FUEL SYSTEM

GROUP 10

PART 10-1 GENERAL FUEL SYSTEM SERVICE

This part covers general fuel system diagnosis, tests, adjustment and repair procedures. In addition, the cleaning and inspection procedures are covered.

For fuel system component removal, disassembly, assembly, installation, major repair procedures and specifications, refer to the pertinent part of this group.

The carburetor identification tag is attached to the carburetor. The basic part number for all carburetors is 9510. To procure replacement parts, it is necessary to know the part No. prefix and suffix and, in some cases, the design change code (Fig. 1).

Always refer to the Master Parts Catalog for parts usage and interchangeability before replacing a carburetor or a component part for a carburetor.

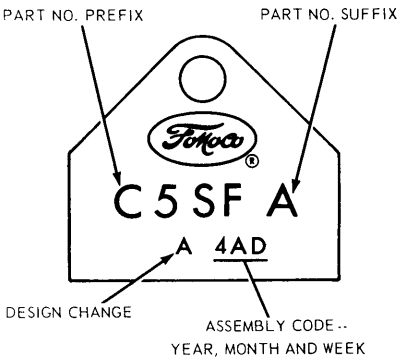

FIG. 1—Carburetor Identification Tag

1 DIAGNOSIS AND TESTING

FUEL TANK, LINES AND FILTER

Water and dirt that accumulate in the fuel tank can cause a restricted fuel line or filter and malfunction of the fuel pump, or carburetor. Condensation, which is the greatest source of water entering the fuel tank, is formed by moisture in the air when it strikes the cold interior walls of the fuel tank.

If the accumulation of sediment in the filter is excessive, the fuel tank should be removed and flushed, and the line from the fuel pump to the tank should be blown out.

Leakage in the fuel inlet line can cause low vacuum, pressure and volume conditions, and loss of fuel.

A restricted fuel tank vent can cause low fuel pump pressure and volume, and may, in some instances, result in collapsed inlet line hoses or a collapsed fuel tank.

FUEL PUMP

Incorrect fuel pump pressure and low volume (flow rate) are the two most likely fuel pump troubles that will affect engine performance. Low pressure will cause a lean mixture and fuel starvation at high speeds and excessive pressure will cause high fuel consumption and carburetor flooding. Low volume will cause fuel starvation at high speeds.

Tests for fuel pump static pressure and fuel volume are necessary to determine that the fuel pump is in satisfactory condition.

If both the fuel pump volume and

pressure are within specifications (Part 10-6) and the pump and lines are in satisfactory condition, a vacuum test is not required.

If the pump volume is low, but the pressure is within specifications, a fuel pump capacity test must be made with the filter removed. If the pump volume meets specifications with the filter removed, replace the filter. If the pump volume is still below specifications, repeat the capacity test, using an auxiliary fuel supply. If the pump volume still does not meet specifications, replace the pump. If the pump does meet specifications, there is a restriction in the fuel supply from the tank or the tank is not venting properly.

The tests are performed with the fuel pump installed on the engine and engine temperature stabilized. **Make certain the replaceable fuel filter element has been changed within the recommended maintenance mileage interval.** When in doubt, install a new filter prior to performing the tests. A clogged or restricted filter is often the cause of fuel system malfunction.

PRESSURE TEST

1. Remove the air cleaner assembly. Disconnect the fuel inlet line at the carburetor. **Use care to prevent combustion due to fuel spillage.**
2. Connect a pressure gauge, petcock and flexible hose (Fig. 2) between the carburetor inlet connector and the fuel inlet line connector.
3. Position the flexible hose in the petcock so that the fuel can be expelled into a suitable container (Fig. 2) for the capacity (volume) test.
4. Operate the engine. Vent the system into the container by opening the hose restrictor momentarily before taking a pressure reading.
5. Operate the engine at 500 rpm. After the pressure has stabilized, it should be to specification (Part 10-6).

CAPACITY (VOLUME) TEST

Perform this test only when the fuel pump pressure is within specifications (Part 10-6).

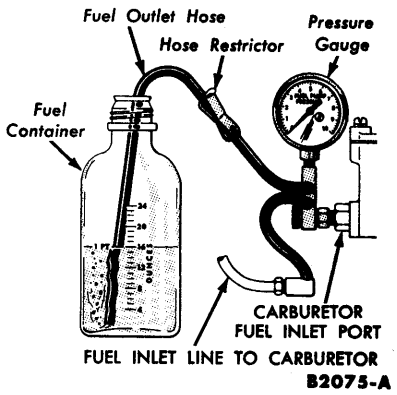

FIG. 2—Fuel Pump Pressure and Capacity Tests

1. Operate the engine at 500 rpm.
2. Open the hose restrictor and expel the fuel into the container (Fig. 2) while observing the time required to expel one pint; then, close the petcock. At least one pint of fuel should be expelled within the specified time limit.
3. Remove the test equipment, and connect the fuel inlet line to the carburetor.

FUEL PUMP, TANK AND LINES TROUBLE DIAGNOSIS GUIDE

LOW FUEL PUMP PRESSURE OR VOLUME	Diaphragm stretched or leaking. Fuel pump diaphragm spring is weak. Rocker arm or eccentric worn or undersize. Excessive clearance between rocker arm and fuel pump link. Fittings loose or cracked.	Fuel line cracked or broken. Fuel pump valves improperly seating. Dirt in fuel tank and/or lines. Fuel tank vent restricted. Diaphragm ruptured. Main body retaining screws loose. Fuel filter clogged (low volume).
HIGH FUEL PUMP PRESSURE OR VOLUME	Diaphragm spring too strong or improper spring. Diaphragm surface too tight (over-tensioned).	Pump link has no free play (frozen). Pump diaphragm vent hole plugged or omitted.
LOW FUEL PUMP VOLUME WITH NORMAL PRESSURE	Fuel filter clogged. Fuel pump to carburetor inlet line obstructed, crimped or leaks.	Restriction in fuel supply line to fuel pump.
FUEL PUMP LEAKS FUEL	Diaphragm defective. Fittings loose.	Threads on fittings stripped. Body cracked.
FUEL PUMP LEAKS OIL	Fuel pump retaining bolts loose. Mounting gasket defective.	Pump diaphragm pull rod oil seal defective.
FUEL PUMP NOISE	Rocker arm or eccentric worn. Mounting bolts loose. Rocker arm spring is weak or broken.	Diaphragm pull rod bumper pad defective.
FUEL TANK AND/OR INLET LINE HOSES COLLAPSED	Fuel tank vent restricted.	

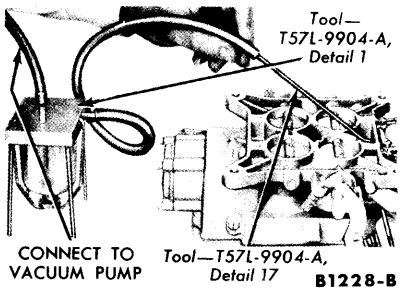

FIG. 3—Power Valve Test

CARBURETOR

Dirt in the fuel and air passages, improper idle adjustments, and improper fuel level are the major sources of carburetor troubles.

TESTS

Accelerating Pump Discharge.

1. Remove the air cleaner.

2. Open the primary throttle plates and observe the fuel flow from the accelerating pump discharge nozzles. If the system is operating correctly, a quick, steady stream of fuel will flow from the discharge nozzles.

Power Valve. A power valve must not be replaced unless it is leaking sufficiently to cause an unadjustable rough engine idle condition. Fuel accumulation in the power valve cover does not necessarily indicate a defective power valve. Fuel vapors will be drawn into the vacuum side of the power valve and condense during periods of deceleration. Leakage in the power valve area can be caused by an improperly tightened cover or defective gaskets. Any gasket sealing defect must be corrected before the power valve is replaced.

Power valve leakage that causes an unadjustable rough engine idle condition can be diagnosed, in most instances, by the fact that the idle mixture needles must be nearly, or completely, seated in order to obtain a relatively smooth engine idle condition. If power valve leakage is suspected, the following test procedure must be performed:

1. Remove the carburetor from the intake manifold and invert it.

2. Remove the glass bowl from the fixture (Fig. 3). Fill the bowl half-full of water. Install the bowl on the fixture.

3. Connect a line from the vacuum pump to the fitting on top of the fixture. Insert the large OD end of the wand into the tube and attach the other end of the tube to the fitting on the side of the fixture. Slip the rubber gasket (furnished with the tool) over the small OD end of the wand. Hold this end against the power valve vacuum pick-up port.

4. Look for bubble formations in the water in the bowl. A continuous stream of bubbles indicates leakage through the power valve diaphragm or gasket, or the cover or gasket.

If leakage is encountered, the power valve, power valve gasket, cover, and cover gasket should be replaced one at a time with a new part and the test repeated until the source of leakage has been found. If the leakage can not be found, the gasket seats are damaged and the defective parts should be replaced.

A few bubbles may be noticed immediately upon attaching the vacuum line. The bubbling should stop within approximately 15 seconds or after the air has been removed from the system. If no bubbles are seen, the power valve, gaskets, and cover are sealing properly.

Secondary Vacuum System. Vacuum is transmitted from the secondary throttle control vacuum tube through passages in the air horn, air horn mounting gasket, and main body area behind the secondary operating diaphragm. The diaphragm spring, ball check and a vacuum bleed in the ball check seat (located in the vacuum passage in the diaphragm housing) controls the rate at which the secondary throttle plates are allowed to open (high vacuum) or close (low vacuum).

With the engine operating temperature stabilized and the air cleaner removed, check the secondary system:

1. Position the transmission selector lever in neutral. Start the engine. Open the throttle gradually from the fully-closed to the fully-open position. Hold the throttle fully open for 5 seconds before allowing the throttle to close, and observe the operation of the secondary throttle lever. **To prevent injury due to combustion back-lash thru the carburetor air horn, do not position any part of the body (head, hands, etc.) near the top of the carburetor air horn when checking the secondary system.**

2. If the secondary throttle lever doesn't open fully as the throttle reaches the maximum open position, air leakage at the diaphragm or the air horn mounting gasket may be causing the malfunction. Tighten the air horn and secondary diaphragm retaining screws. Check the secondary throttle plate operating rod for binds. Check the secondary vacuum tube to make certain it is properly positioned.

3. Gradually open and close the throttle and observe the action of the secondary throttle lever. If the secondary throttle lever doesn't fully open and close, the trouble may be caused by an air leak where the secondary vacuum tube fits into the air horn, air leakage between the secondary diaphragm housing cover and the housing, air leakage between the air horn and main body, the secondary diaphragm return spring is too stiff, a restricted vacuum pick-up tube, secondary throttle plates wedged in the barrels or a bent secondary throttle shaft.

CARBURETOR DIAGNOSIS GUIDE

FLOODING OR LEAKING CARBURETOR	Cracked carburetor body. Defective main body gasket. High fuel level or float setting. Fuel inlet needle not seating properly or worn needle and/or seat. Ruptured accelerating pump diaphragm. Excessive fuel pump pressure.

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CARBURETOR DIAGNOSIS GUIDE (Continued)

HARD STARTING	Improper starting procedure causing a flooded engine. Improper carburetor fuel level. Improper idle adjustments. Sticking or incorrectly seating fuel inlet needle. Incorrect fuel pump pressure.	Improper carburetor gasket and spacer combination. Incorrect setting of choke thermostatic spring housing. Choke linkage or plate binding. Restrictions or air leaks in the choke vacuum or hot air passages.
STALLING	**ENGINE HOT OR COLD** Incorrect idle fuel mixture. Engine idle speed too slow (fast or cold idle adjustments). Dirt, water or ice in fuel filter. Positive crankcase ventilation system malfunctioning, or restricted. Fuel lines restricted or leaking air. Fuel tank vent restricted. Leaking intake manifold or carburetor gaskets. Carburetor icing (cold, wet or humid weather).	Incorrect throttle linkage adjustment to carburetor. Clogged air bleeds or idle passages. Defective fuel pump. **ENGINE HOT ONLY** Improperly adjusted or defective carburetor dashpot. Idle compensator malfunctioning. Coolant control thermostat defective. Excessive looseness of throttle shaft in bores of throttle body.
ROUGH IDLE	Positive crankcase ventilation system malfunctioning, or restricted. Incorrect idle mixture adjustment. Idle compensator, malfunction. Idle adjusting needles grooved, worn, or otherwise damaged. Idle air bleeds restricted. Idle air or fuel passages restricted. Idle discharge holes restricted. Idle discharge holes not in proper relation to throttle plates. Excessive dirt in air cleaner. High or low fuel level or float setting.	Fuel inlet needle not seating properly, or worn needle or seat. Power valve leaking. Restricted air bleeds. Worn or damaged main metering jet. Accelerating pump discharge ball check and/or weight not seating properly. Fuel pump pressure too low, or excessive. Fuel siphoning from secondary main fuel system. Restriction in main fuel passage.
POOR ACCELERATION	Poor acceleration complaints fall under one of three headings: the engine is sluggish on acceleration, the engine stalls when accelerated, or the engine hesitates or develops a flat spot when accelerated. Poor acceleration is caused by either an excessively lean or rich mixture on acceleration, and defects or improper adjustments in the ignition system. **A LEAN MIXTURE ON ACCELERATION CAN BE CAUSED BY:** Low fuel pump pressure. Sticking fuel inlet needle. Low fuel level or float setting. Restriction in main fuel passage. Air leak between the carburetor	and the manifold caused by loose mounting bolts or defective gasket. Air leak at the throttle shaft caused by a worn throttle shaft. Accelerating pump diaphragm defective. Incorrect accelerating pump stroke adjustment. Accelerating pump elastomer valve not seating on acceleration. Restriction in the accelerating pump discharge passage. Accelerating pump discharge ball check or weight not coming fully off its seat, or failing to seat properly on the reverse stroke of the pump diaphragm. Air leak at the accelerating pump cover caused by a defective gasket or warped pump cover.

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CARBURETOR DIAGNOSIS GUIDE (Continued)

POOR ACCELERATION (Continued)	Defective secondary diaphragm or air horn mounting gasket (leakage). Air leak where secondary vacuum pick-up tube fits into air horn, between air horn and main body, or between the secondary diaphragm housing cover and housing. Secondary throttle plates wedged in barrels. Bent secondary throttle shaft. Secondary throttle plate operating rod binding, or disconnected from secondary diaphragm or secondary throttle lever. Secondary vacuum probe restricted or not properly positioned. Defective power valve.	**A RICH MIXTURE ON ACCELERATION CAN BE CAUSED BY:** Excessive fuel pump pressure. High fuel level or float setting. Fuel inlet needle not seating properly or worn needle and/or seat. Malfunctioning automatic choke. Excessively dirty air cleaner. Incorrect accelerating pump stroke adjustment. Power valve leakage. Restricted air bleeds. Worn or damaged main metering jet. Accelerating pump ball check and/or weight not seating properly.
INCONSISTENT ENGINE IDLE SPEED	Fast idle screw contacting low step of cam at curb idle. Incorrect throttle linkage adjustment to carburetor. Binding or sticking throttle linkage or accelerator pedal. Sticking carburetor throttle shaft. Excessive looseness of throttle	shaft in bores of throttle body. Improperly adjusted or defective carburetor dashpot. Incorrectly installed throttle plates. Idle compensator malfunctioning. Positive crankcase ventilation system malfunctioning. Sticking fuel inlet needle.
AUTOMATIC CHOKE SLOW WARM-UP, ON TOO OFTEN	Thermostatic choke setting too rich. Choke linkage sticking or binding. Incorrect choke linkage adjustment. Choke plate misaligned or binding in air horn. Defective coolant thermostat. Restricted coolant line at carburetor. Choke heat inlet tube restricted.	
SEVERE TRANSMISSION ENGAGEMENT AFTER COLD ENGINE START	Carburetor fast idle speed setting too high. Throttle operating on starting step	(highest step) of fast idle cam. Binding or sticking throttle linkage or accelerator pedal.
SURGING (CRUISING SPEEDS TO TOP SPEEDS)	Clogged main jets. Improper size main jets. Low fuel level or float setting. Low fuel pump pressure or volume. Clogged filter screen. Distributor vacuum passage clogged. Power valve not opening.	
REDUCED TOP SPEED	Float setting too high or too low. Fuel pump pressure or volume too high or too low. Improper size or obstructed main jets. Faulty choke operation. Air leak where secondary vacuum pick-up tube fits into air horn and main body; or air leakage between the secondary diaphragm housing cover and housing or the air horn mounting gasket. Secondary diaphragm return spring too stiff. Secondary throttle plates wedged	in barrels. Bent secondary throttle shaft. Secondary throttle plate operating rod binding. Secondary vacuum passage ball check sticking on its seat. Secondary vacuum pick-up tube restricted or not properly positioned. Power valve spring weak, or power valve restricted. Restricted air bleeds. Restriction in main fuel passages. Excessive dirt in air cleaner. Throttle plates not fully open.

2 COMMON ADJUSTMENTS AND REPAIRS

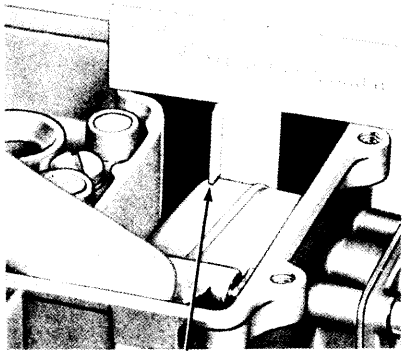

FIG. 4—Fuel Level Float Adjustment (Dry)

CARBURETOR

The fuel level float adjustment (dry) and the secondary throttle plate adjustments are performed only as bench adjustments.

The automatic choke plate clearance (pull-down) and fast idle cam linkage adjustment, automatic choke thermostatic spring housing adjustment and the accelerating pump stroke adjustment can be performed with the carburetor on the bench or in the car.

The fuel level float adjustment (wet), idle fuel mixture and idle speed adjustments, and the anti-stall dashpot adjustment are performed only with the carburetor installed in the car.

FLOAT ADJUSTMENT (DRY)

The dry float fuel level adjustment is a preliminary adjustment only. The final float adjustment must be made after the carburetor is mounted on the engine.

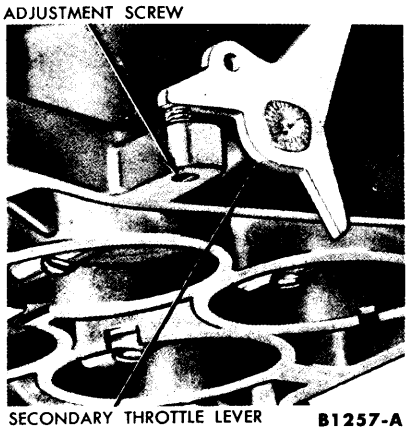

FIG. 5—Secondary Throttle Plate Adjustment

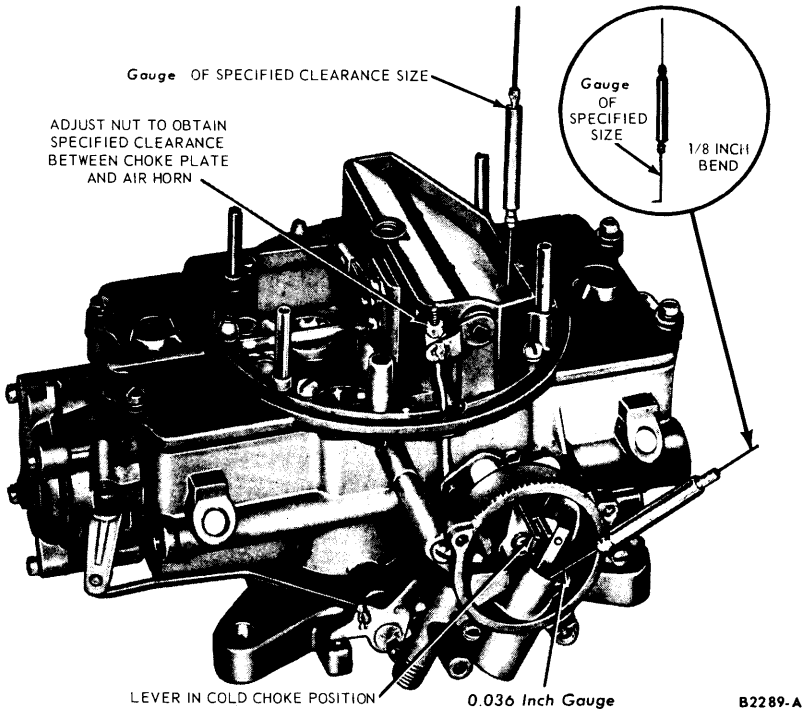

FIG. 6—Choke Plate Clearance (Pull-Down) Adjustment

1. Remove the air horn.
2. With the float raised and the fuel inlet needle seated, check the distance between the top surface of the main body and the top surface of the float for conformance to specifications. Take the measurement at a point ⅛ inch from the free end of the float and $^{3}/_{16}$ inch in from the side of the float adjacent to the inside wall of the fuel bowl. **If the cardboard gauge is used, place the float gauge in the corner of the enlarged end section of the fuel bowl (Fig. 4). The gauge should touch the float near the end, but not on the end radius.** Depress the float tab to seat the fuel inlet needle. The float height is measured from the gasket surface of the main body with the gasket removed. If necessary, bend the tab on the float to bring the setting within the specified limits. This should provide the proper fuel level.

SECONDARY THROTTLE PLATE ADJUSTMENT

1. Hold the secondary throttle plates closed.
2. Turn the secondary throttle shaft lever adjusting screw out (counterclockwise) (Fig. 5) until the secondary throttle plates stick in the throttle bores.
3. Turn the screw in (clockwise) until the screw just contacts the secondary lever:
4. Turn the screw in (clockwise) the specified distance (Part 10-6).

AUTOMATIC CHOKE PLATE CLEARANCE (PULL-DOWN) AND FAST IDLE CAM LINKAGE ADJUSTMENT

1. If the air cleaner, heater hose and mounting bracket have not been removed previously, remove them from the carburetor.
2. Bend a specified size (Part 10-6) wire gauge (tool) at a 90° angle, approximately ⅛ inch from its end (Fig. 6).
3. Remove the choke thermostatic spring housing if it has not been removed. Block the throttle about half-open so that the fast idle cam does not contact the fast idle adjustment screw.
4. Insert the bent end of the

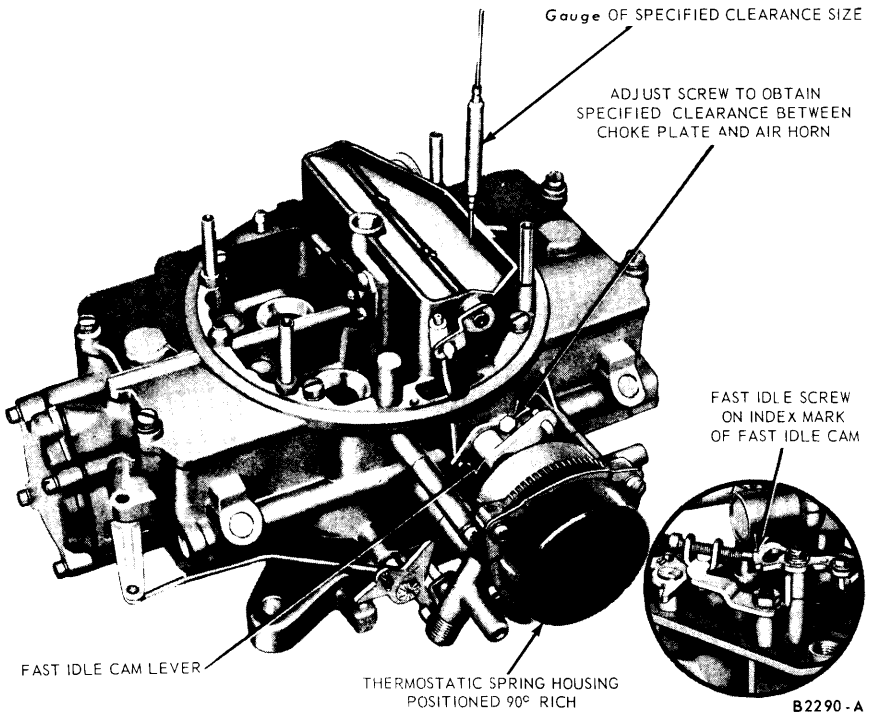

FIG. 7—Fast Idle Cam Linkage Adjustment

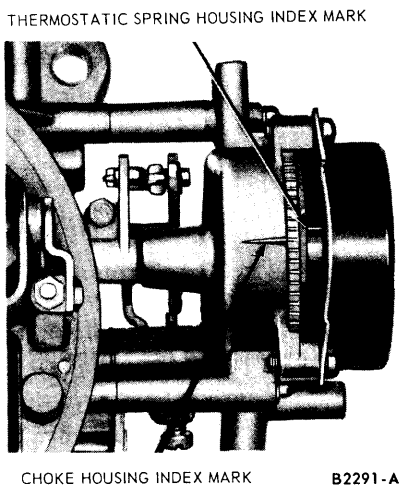

FIG. 8—Automatic Choke Thermostatic Spring Housing Adjustment

gauge between the lower edge of the piston slot and the upper edge of the right hand slot in the choke housing (Fig. 6), and pull the choke countershaft lever counterclockwise until the gauge is snug in the piston slot. Hold the wire gauge in place by exerting light pressure on the countershaft lever, and adjust the choke plate clevis (pull-down) adjusting nut to obtain the specified clearance (Part 10-6) between the front of the choke plate and the air horn (Fig. 6).

5. Install the choke thermostatic spring housing and gasket. Install the housing retainer and the retaining screws.

6. Position the fast idle (rpm) adjustment screw on the index mark of the fast idle cam (Fig. 7).

7. Turn the choke thermostatic cover 90° rich (counterclockwise) and check the clearance between the front of the choke plate and the air horn (Fig. 7). Adjust the clearance to specification (Part 10-6), if required. **Turn the fast idle cam lever adjusting screw clockwise (inward) to increase the clearance and counterclockwise (outward) to decrease the clearance. Make certain the fast idle screw remains on the index mark (kickdown step) of the fast idle cam during the adjustment procedure.**

8. Set the choke thermostatic housing to the specified index mark. Tighten the housing clamp retaining screws. Install the heater hose and mounting bracket on the carburetor. Adjust the engine idle speed and idle fuel mixture, and the dashpot.

AUTOMATIC CHOKE THERMOSTATIC SPRING HOUSING ADJUSTMENT

1. If the heater hose and mounting bracket, and the carburetor air cleaner assembly have not been previously removed, remove them from the carburetor.

2. Loosen the thermostatic spring housing clamp retaining screws. Set the spring housing to the specified (Part 10-6) index mark (Fig. 8) and tighten the clamp retaining screws.

3. Install the heater hose and bracket on the carburetor and tighten the bracket retaining screws. If other carburetor adjustments are not required, install the carburetor air cleaner assembly.

FUEL LEVEL FLOAT ADJUSTMENT (WET)

The dry (bench) float fuel level settings are preliminary adjustments performed during carburetor overhaul procedures on the bench. These settings are used as a guide only; therefore, a final check and adjustment of the wet fuel level should be made as follows:

1. Operate the engine for 30 minutes at 1200 rpm to normalize engine temperatures, and place the car on a flat surface as near level as possible. Stop the engine.

2. Remove the carburetor air cleaner assembly and anchor screw (if they have not been previously removed), the carburetor air horn assembly and gasket.

3. Temporarily place the air horn gasket in position on the carburetor main body and start the engine. Let the engine idle for several minutes, then remove the air horn gasket.

4. While the engine is idling, use a standard depth scale to measure the vertical distance from the top machined surface of the carburetor main body to the level of the fuel in the fuel bowl (Fig. 9). The measurement must be made at least ¼ inch away from any vertical surface to assure an accurate reading, because the surface of the fuel is concave (higher at the edges than in the center). Care must be exercised to measure the fuel level at the point of contact with the fuel. Refer to the specifications (Part 10-6) for the correct fuel level (wet) setting.

5. **If any adjustment is required, stop the engine to minimize the hazard of fire due to fuel spray when the float setting is disturbed.** To adjust the fuel level, bend the

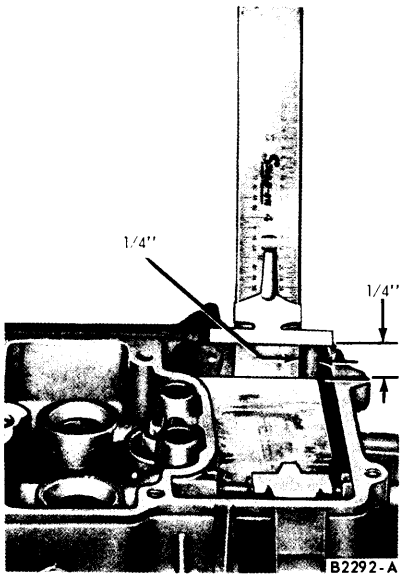

FIG. 9—Fuel Level Float Adjustment (Wet)

float tab (contacting the fuel inlet valve) upward in relation to the original position to raise the fuel level, and downward to lower it. Each time an adjustment is made to the float tab to alter the fuel level, the engine must be started and permitted to idle for at least three minutes to stabilize the fuel level. Check the fuel level after each adjustment until the specified level is achieved.

6. Install the new air horn gasket and the carburetor air horn assembly.

7. Check the idle fuel mixture and the idle speed adjustment, and the carburetor dashpot. Adjust the carburetor as required.

8. Install the anchor screw and the air cleaner assembly.

IDLE FUEL MIXTURE AND IDLE SPEED ADJUSTMENTS

The engine idle speed is adjusted to settings for a hot engine, and a cold engine (fast idle speed) during choke operation. With the air cleaner removed make the idle adjustments in the following sequence:

INITIAL IDLE MIXTURE SETTING

Initially set the idle mixture by turning the idle mixture screws (needles) inward (clockwise) until lightly seated; then, turn the screws outward (counterclockwise) the specified turns (Part 10-6) (Fig. 10). **Do not turn the needles tightly against their seats as this may groove the ends. If the needle is damaged, it must be replaced before a satisfactory fuel mixture can be obtained.**

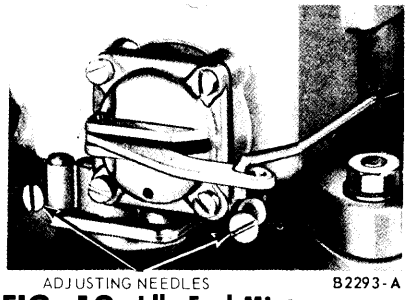

FIG. 10—Idle Fuel Mixture Adjustment

ENGINE IDLE SPEED AND MIXTURE (HOT)

1. Operate the engine for 30 minutes at approximately 1200 rpm to stabilize engine temperatures. **On a car with an air conditioner, operate the air conditioner for 20 minutes before setting the engine idle speed. The engine idle speed is adjusted with the air conditioner operating.**

2. Allow the throttle to drop back to the normal idle speed position. Attach a tachometer to the engine. Remove the vacuum line from the vacuum power unit of the automatic vacuum release parking brake assembly, and plug the vacuum line. Set the parking brake. **It is necessary to inactivate the vacuum power unit to keep the parking brake engaged when the engine is running during the adjustment procedures.**

3. Turn on the headlamps. **It is necessary to place the alternator under a load condition in this manner in order to obtain the specified engine idle speed during the adjustment procedure.** Place the transmission selector lever in drive range. Check the engine idle speed. **Be sure the dashpot is not interfering with the throttle lever or the fast idle screw is not contacting the fast idle cam. Also, be sure the hot idle compensator is seated to allow for proper adjustment.**

4. Adjust the engine idle speed to specifications (Part 10-6) by turning the engine idle speed screw inward to increase the speed or outward to decrease the speed (Fig. 11).

5. Turn each idle mixture needle inward until engine rpm begins to drop, due to the lean mixture (Fig. 11); then turn each needle outward until the rpm increases and then begins to drop, due to the rich mixture, then turn the needles inward for maximum engine rpm and smoothness. **The needles should be turned approximately the same amount. The final setting may vary about ½ turn difference between needles.**

6. After the correct engine idle

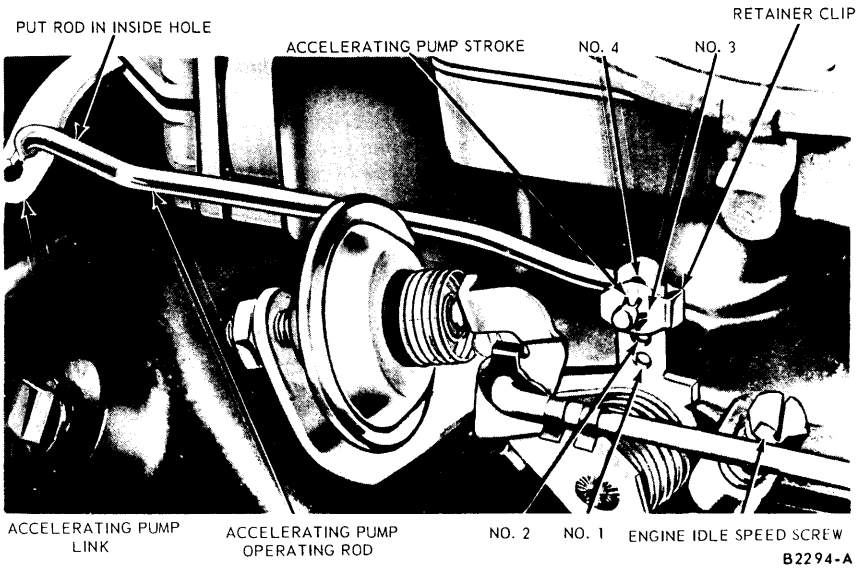

FIG. 11—Accelerating Pump Stroke and Engine Idle Speed Adjustment Points

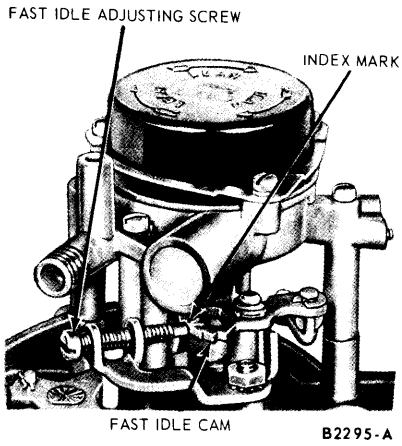

FIG. 12–Engine Fast (Cold Engine) Idle Speed Adjustment

mixture has been obtained, check the idle speed by placing **the transmission selector lever in neutral and manually opening and closing the throttle.** Position the selector lever in drive range, then check and adjust the idle speed to specification (Part 10-6), if necessary. Shut off the engine.

The final engine idle speed may be varied to suit the conditions under which the car is to be operated.

ENGINE FAST (COLD ENGINE) IDLE SPEED

The adjusting screw on the right side of the carburetor (Fig. 12) contacts one edge of the fast idle cam. The cam permits a faster engine idle speed for smoother running when the engine is cold during choke operation. As the choke plate is moved through its range of travel from the closed to the open position, the fast idle cam pick-up lever rotates the fast idle cam. Each position on the fast idle cam permits a slower idle rpm as engine temperature rises and choking is reduced.

1. Manually rotate the fast idle cam (Fig. 12) until the fast idle adjusting screw rests adjacent to the shoulder of the highest stop (screw aligned with arrow mark) on the cam.
2. Start the engine, and turn the fast idle adjusting screw inward or outward as required to obtain the specified fast idle rpm (Part 10-6).
3. Remove the tachometer if the idle fuel mixture does not require adjustment. If the idle fuel mixture requires adjustment, leave the tachometer installed so that the idle speed can be checked after the idle fuel mixture has been adjusted.

ACCELERATING PUMP STROKE

The primary throttle shaft lever (overtravel lever) has 4 holes and the accelerating pump link has 2 holes (Fig. 11) to control the accelerating pump stroke for various ambient temperatures and operating conditions of the engine.

The accelerating pump stroke adjustment is made with the carburetor air cleaner assembly removed from the carburetor.

The accelerating pump operating rod should be in the specified (Part 10-6) hole in the overtravel lever and the inboard hole (hole closest to the pump plunger) in the accelerating pump link (Fig. 11). To release the rod from the retainer clip, press the tab end of the clip toward the rod; then, at the same time, press the rod away from the clip until it is disengaged.

ANTI-STALL DASHPOT

1. The anti-stall dashpot adjustment is made with the carburetor air cleaner assembly removed from the carburetor. With the engine idle speed and idle mixture properly adjusted, and the engine at normal operating temperature, loosen the anti-stall dashpot lock nut (Fig. 13).
2. Hold the throttle in the closed position and depress the plunger with a screwdriver blade. Check the clearance between the throttle lever and the plunger tip with a feeler gauge of the specified clearance (Part 10-6) dimension. Turn the anti-stall dashpot, in its bracket, in a direction to provide the specified clearance between the tip of the plunger and the throttle lever. Tighten the lock nut to secure the adjustment.
3. Place the transmission in neutral, and turn off the engine. Connect the vacuum line to the vacuum power unit of the automatic vacuum release parking brake assembly.

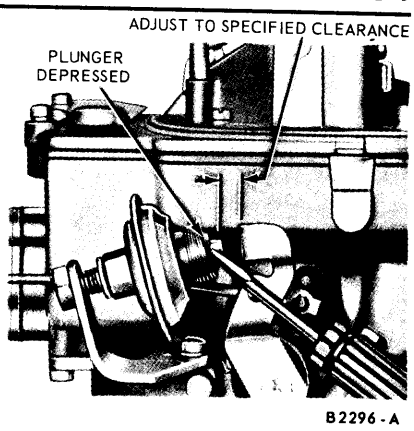

FIG. 13–Anti-Stall Dashpot Adjustment

THROTTLE LINKAGE ADJUSTMENTS

The throttle linkage adjustments are covered in Group 7.

3 CLEANING AND INSPECTION

CARBURETOR

The cleaning and inspection procedures in this section are for a complete carburetor overhaul; therefore, for partial carburetor overhaul or parts replacement, follow the pertinent cleaning or inspection procedure.

Dirt, gum, water or carbon contamination in the carburetor or the exterior moving parts of the carburetor are often responsible for unsatisfactory performance. For this reason, efficient carburetion depends upon careful cleaning and inspection.

The cleaning and inspection of only those parts not included in the carburetor overhaul repair kit are covered here. All gaskets and parts included in the repair kit should be installed when the carburetor is assembled and the old gaskets and parts should be discarded.

Wash all the carburetor parts (except the accelerating pump diaphragm, the power valve, the secondary operating diaphragm, and the anti-stall dashpot assembly) in clean commercial carburetor cleaning solvent. If a commercial solvent is not available, lacquer thinner or denatured alcohol may be used.

Rinse the parts in kerosene to remove all traces of the cleaning solvent, then dry them with compressed air. Wipe all parts that can not be immersed in solvent with a clean, soft, dry cloth. Be sure all dirt, gum, carbon, and other foreign matter are removed from all parts.

Force compressed air through all passages of the carburetor. **Do not use a wire brush to clean any parts, or a drill or wire to clean out any openings or passages in the carburetor.** A drill or wire may enlarge the hole or passage, changing the calibration of the carburetor.

Check the choke shaft for grooves, wear and excessive looseness or binding. Inspect the choke plate for nicked edges and for ease of operation and free it if necessary.

Check the throttle shafts in their bores for excessive looseness or binding and check the throttle plates for burrs which prevent proper closure.

Inspect the main body, air horn, nozzle bars and booster venturi assemblies, choke housing and thermostatic spring housing, power valve cover, accelerating pump cover, and the secondary operating diaphragm cover for cracks.

Check the floats for leaks by holding them under water that has been heated to just below the boiling point. Bubbles will appear if there is a leak. If a float leaks, replace it. Replace the float if the arm needle contact surface is grooved. If the floats are serviceable, polish the needle contact surface of the arm with crocus cloth or steel wool. Replace the float shafts if they are worn.

Replace all screws and nuts that have stripped threads. Replace all distorted or broken springs.

Inspect all gasket mating surfaces for nicks and burrs. Repair or replace any parts that have a damaged gasket surface.

Inspect the idle tubes in each nozzle bar assembly. If they are plugged, bent, or broken, replace the booster venturi and nozzle bar assembly.

Inspect the rubber boot of the anti-stall dashpot for proper installation in the groove of the stem bushing. Check the stem movement for smooth operation. Do not lubricate the stem. Replace the assembly if it is defective.

FUEL PUMP

MAINTENANCE

Refer to Group 19 for the recommended maintenance mileage interval.

Clean the fuel pump body with a cloth. Clean the filter housing in solvent. Inspect the fuel pump for cracks or damage. Inspect the mounting flange for distortion. Lap the distorted flange, if necessary. Inspect the rocker arm spring, pin, and the rocker arm for wear, cracks or damage. **The rocker arm spring, pin and the rocker arm are the only fuel pump components that are replaceable. If any other fuel pump components are damaged beyond repair, replace the fuel pump.**

AIR CLEANER

MAINTENANCE

Refer to Group 19 for the recommended air cleaner assembly maintenance mileage interval.

REMOVAL AND INSTALLATION

Refer to Part 10-3, Section 2 for the air cleaner assembly removal and installation procedures.

FILTER ELEMENT

The filter element must never be cleaned with a solvent or cleaning solution. Also, oil must not be added to the surfaces of the filter element or air cleaner body.

There are two procedures that can be used to clean the air filter element. One method is performed with the use of compressed air. The other is performed by tapping the element on a smooth, horizontal surface.

Compressed Air Method. Direct a stream of compressed air through the element in the direction opposite that of the intake air flow, that is from the inside outward. **Extreme care must be exercised to prevent rupture of the element material.**

Tapping Method. Hold the element in a vertical position and tap it lightly against a smooth, horizontal surface to shake the dust and dirt out. **Do not deform the element or damage the gasket surfaces by tapping too hard.** Rotate the filter after each tap until the entire outer surface has been cleaned.

Inspection. Hold the filter in front of a back-up light and carefully inspect it for any splits or cracks. If the filter is split or cracked, replace it.

BODY AND COVER

Clean the air cleaner body and the cover with a solvent or compressed air. **Probe the air cleaner body at the positive crankcase ventilation system inlet connection to assure removal of deposits.** Wipe the air cleaner dry if a solvent is used. Inspect the air cleaner body and cover for distortion or damage at the gasket mating surfaces. Replace the cover or body if they are damaged beyond repair.

PART 10-2 FORD 4-V CARBURETOR

1 DESCRIPTION AND OPERATION

DESCRIPTION

The Ford 4-V carburetor (Figs. 1, 2, and 3) has two main assemblies; the air horn, and the main body.

The air horn assembly, which serves as the main body cover, contains the choke plate, the hot idle compensator, the vents for the fuel bowls, the secondary throttle control vacuum tube, and the automatic choke clean air pick-up tube. A rubber hose and steel tube connects the clean air pick-up tube to the automatic choke heat chamber in the right exhaust manifold.

The primary and secondary throttle plates, the accelerating pump assembly, the power valve assembly, the secondary operating diaphragm assembly, and the fuel bowls are in the main body. The automatic choke housing is attached to the main body.

The two primary (front) barrels each contain a main and booster venturi, main fuel discharge, accelerating pump discharge, idle fuel discharge, and a primary throttle plate.

The two secondary (rear) barrels each have a main fuel discharge, and a vacuum operated throttle plate.

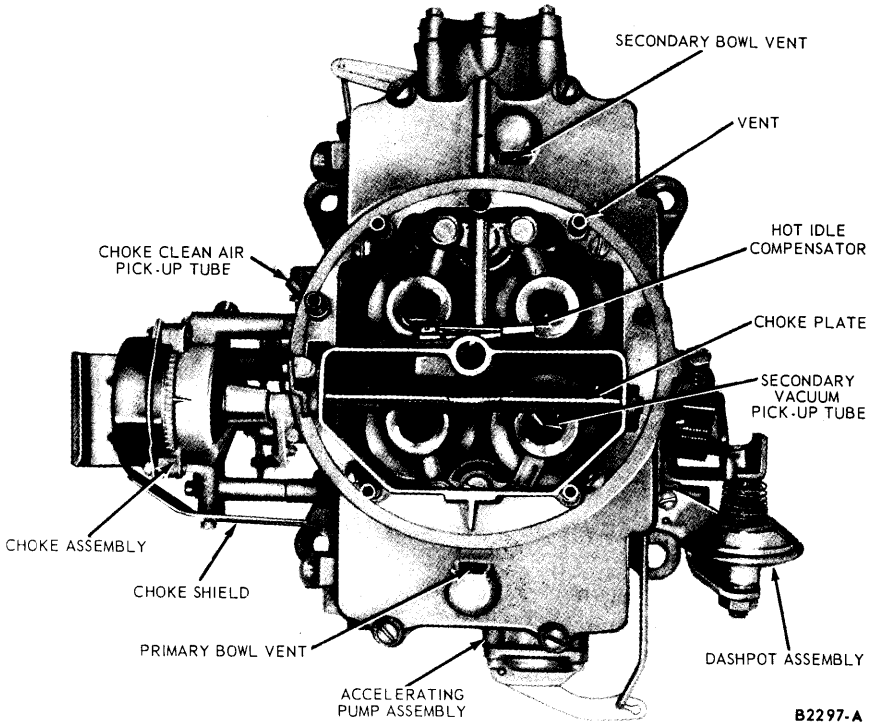

FIG. 1—Top View—Air Horn Installed

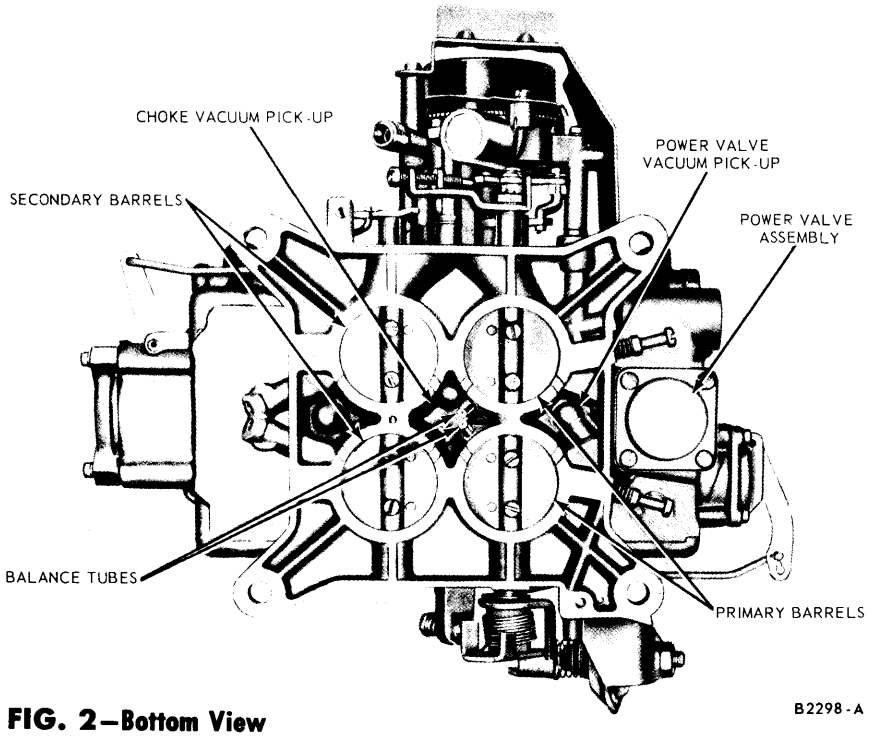

FIG. 2—Bottom View

OPERATION

FUEL INLET SYSTEM

A separate fuel bowl is provided for the primary and secondary stages (Fig. 4). The fuel first enters the primary fuel bowl through the fuel inlet. A drilled passage through the right side of the main body connects the fuel bowls. The pressure in the two fuel bowls is balanced by means of a pressure equalizing chamber built into the left side of the main body. Two baffles in the internal fuel equalizer passage between the primary and secondary fuel bowls permit proper control and balance of the metering forces within each fuel bowl.

The amount of fuel entering a fuel bowl is regulated by the distance the fuel inlet needle is raised off its

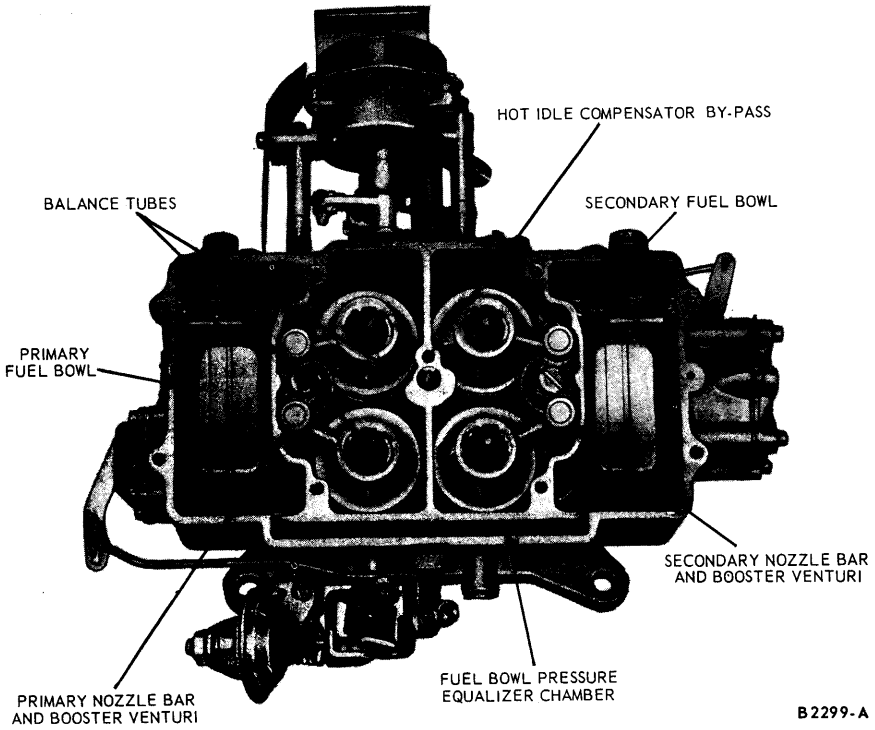

FIG. 3—Top View—Air Horn Removed

seat and by fuel pump pressure. Movement of the fuel inlet needle in relation to the seat is controlled by the float and lever assembly which rises and falls with the fuel level. When the fuel in the fuel bowl reaches a pre-set level, the float lowers the fuel inlet needle to a position where it restricts the flow of fuel, admitting only enough fuel thru the filter screen to replace that being used.

A retracting clip is attached to the fuel inlet needle and hooks over the tab of the float assembly. This clip assures reaction of the fuel inlet needle to any movement of the float.

A wire-type retainer prevents movement of the float shaft within the guides on each side of the fuel bowl. The retainer fits into a groove on the inlet needle seat. The ends of the retainer are hooked over grooves on opposite ends of the float shaft.

A torsion (damper) spring is located on the float shaft, between the inboard end of the float retainer and the float shaft guide in the fuel bowl. The short end of the spring rests under the float lever, and the long end of the spring rests against the inner face of the fuel bowl.

The torsion spring tension resists and absorbs fuel pump pressure pulsations and movement of the fuel in the bowl due to driving conditions. This assures proper regulation of the fuel inlet needle which rises and falls with the fuel level in the bowl.

The fuel filter screen, located below the inlet needle seat, prevents the entrance of foreign matter.

The primary and secondary fuel bowls are vented externally at all times. In addition, both the primary and secondary fuel bowls are internally vented into the air cleaner. The standpipe pitot tubes in the primary and secondary internal vent tube openings raise the level of the internal vent openings above the external vent openings. This provides the necessary pressure differential for proper evacuation of the gaseous vapors through the external vent during a hot soak period.

An integral anti-splash washer is located on top of each fuel inlet needle.

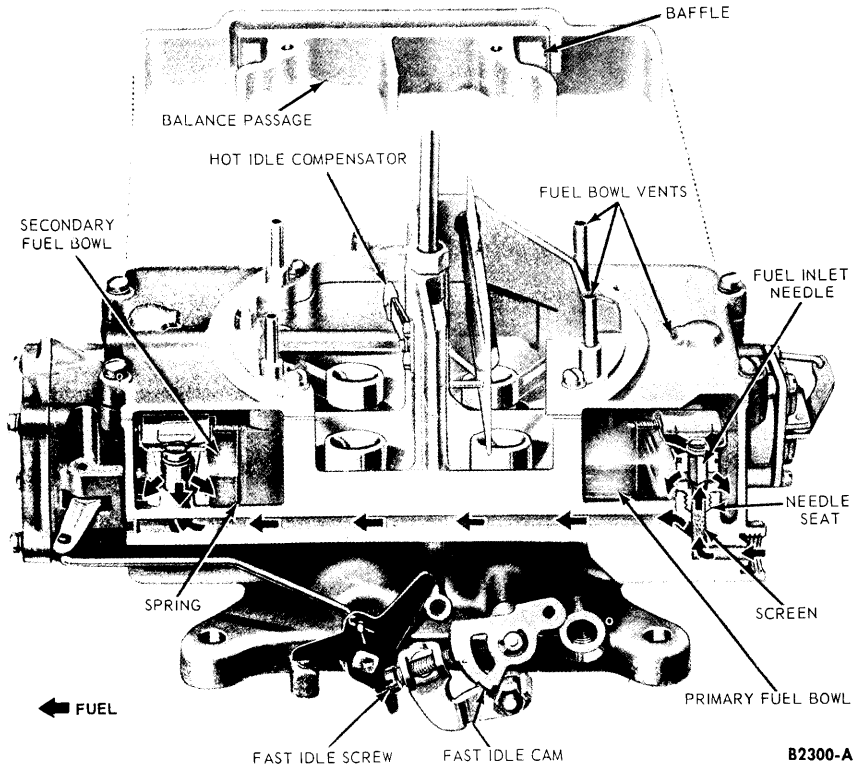

FIG. 4—Fuel Inlet System

AUTOMATIC CHOKE SYSTEM

The choke plate, located in the air horn above the primary barrels, when closed, provides a high vacuum above as well as below the throttle plates. With a vacuum above the throttle plates, fuel will flow from the main fuel system as well as from the idle fuel system. This provides the extremely rich fuel mixture necessary for cold engine operation.

The carburetor choke shaft is

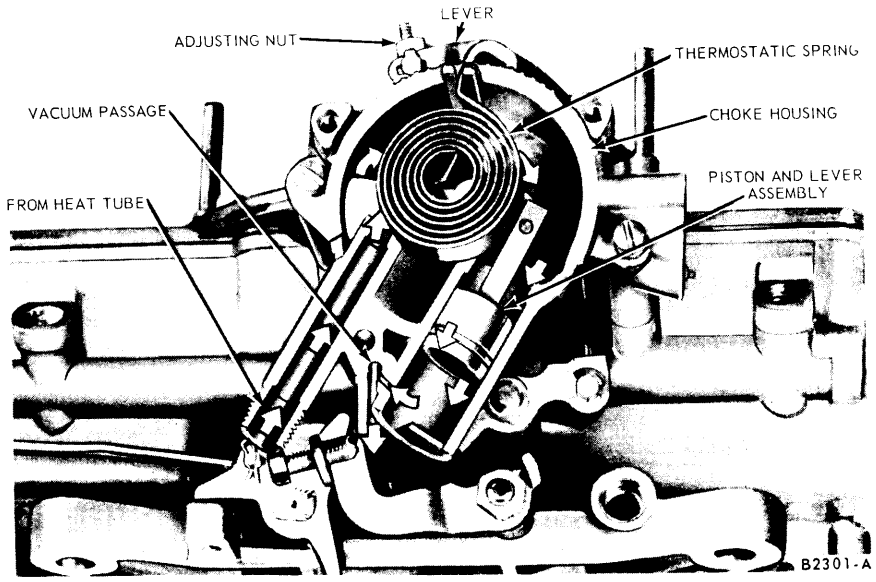

FIG. 5–Automatic Choke System

linked to a thermostatic choke control mechanism mounted on the main body (Fig. 5).

The linkage between the choke lever and the throttle shaft is designed so that the choke plate will partially open when the accelerator is fully depressed. This permits unloading of a flooded engine.

The automatic choke is equipped with a bi-metal thermostatic spring and a vacuum piston (Fig. 5). The bi-metal thermostatic spring mechanism winds up when cold and unwinds when warm. When the engine is cold, the thermostatic spring, through attaching linkage, holds the choke piston upward and the choke plate in a closed position prior to engine start. Manifold vacuum channeled through a passage in the choke control housing, draws the choke vacuum piston downward, exerting an opening force on the choke plate.

When the engine is started, manifold vacuum, acting directly on the piston located in the choke housing, immediately moves the plate against the tension of the thermostatic spring to a partially open position to prevent stalling.

As the engine continues to operate, manifold vacuum draws heated air from the exhaust manifold heat chamber. The amount of air entering the choke housing is controlled by restrictions in the air passages in the carburetor.

The warmed air enters the choke housing and heats the thermostatic spring, causing it to unwind. The tension of the thermostatic spring gradually decreases as the temperature of the air from the heat chamber rises, allowing the choke plate to open. The air is exhausted into the intake manifold.

When the engine reaches its normal operating temperature, the thermostatic spring exerts tension on the choke plate forcing it to the full open position. In this position, the choke piston it at its lowest point in the cylinder. Slots in the piston chamber wall allow sufficient air to bleed past the piston and into the intake manifold, causing a continual flow of warm air to pass through the thermostatic spring housing. The spring thus remains heated and the choke plate remains fully open until the engine is stopped and allowed to cool.

The choke rod actuates the fast idle cam during choking. Steps on the edge of the fast idle cam contact the fast idle adjusting screw which permits a faster engine idle speed for smoother running when the engine is cold. As the choke plate is moved through its range of travel from the closed to the open position, the choke rod rotates the fast idle cam. Each step on the fast idle cam permits a slower idle rpm as engine temperature rises and choking is reduced.

During the warm-up period, if the engine should reach the stall point due to a lean mixture, manifold vacuum will drop considerably. The tension of the thermostatic spring then overcomes the lowered vacuum acting on the choke piston, and the choke plate will be moved toward the closed position, providing a richer mixture to help prevent stalling.

The linkage between the choke lever and the throttle shaft is designed so that the choke plate will partially open when the accelerator pedal is fully depressed. This permits unloading of a flooded engine.

IDLE FUEL SYSTEM

The difference in pressure between the fuel bowls and the idle discharge ports forces fuel through the primary and secondary stage idle fuel systems.

Primary Stage. Fuel flows from the primary stage fuel bowl through the main jet and into the bottom of the main well (Fig. 6).

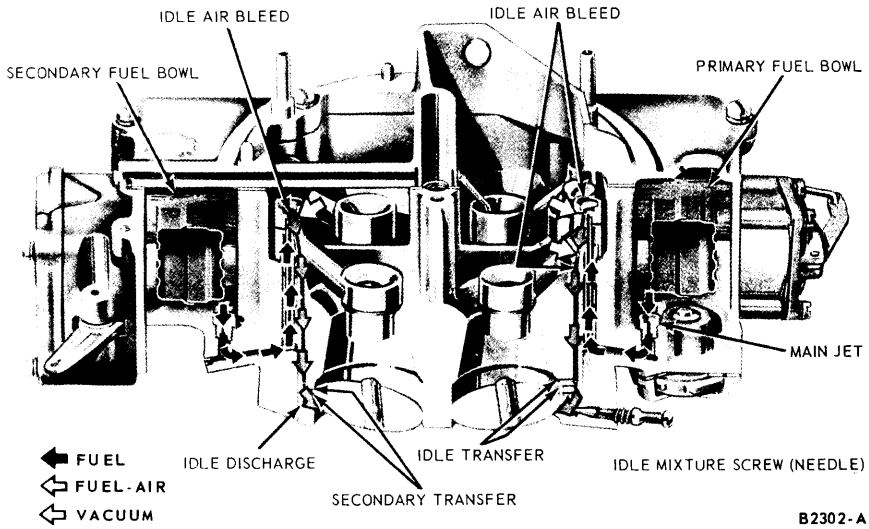

FIG. 6–Idle Fuel System

From the main well, the fuel flows up through the idle tube and through a short diagonal passage in the booster venturi assembly into the idle passage in the main body. A calibrated restriction, at the upper tip of the idle tube, meters the flow of fuel.

Air enters the idle system from the air bleed which is located directly above the idle tube. The air bleed also acts as a vent to prevent siphoning at off-idle or high speeds and when the engine is stopped. The fuel and air pass down a diagonal passage in the booster venturi and through a calibrated restrictor. Additional air is bled into the system through an air bleed located at the bottom of the diagonal passage where the fuel enters the idle passage in the main body.

Fuel flows down the idle passage in the main body past two idle transfer holes. The idle transfer holes act as additional air bleeds at curb idle. The fuel then flows past the pointed tip of the adjusting needle which controls the idle fuel discharge in the primary stage. From the adjusting needle chamber, the fuel flows through a short horizontal passage and is discharged below the primary throttle plates.

During off-idle when the primary throttle plate is moved slightly past the idle transfer holes, each hole begins discharging fuel as it is exposed to manifold vacuum. As the primary throttle plate is opened still wider and engine speed increases, the air flow through the carburetor is also increased. This creates a vacuum in the booster venturi strong enough to bring the primary stage main fuel system into operation. Fuel flow from the primary idle fuel system begins tapering off as the main fuel system begins discharging fuel.

Hot Idle Compensator System. A thermostatically controlled hot idle compensator is located on the air horn above the secondary booster venturis (Fig. 7). At carburetor high inlet air temperatures, the hot idle compensator will open and allow air to bypass the throttle plates through a passage in the air horn and main body and enter the intake manifold. This improves idle stability and minimizes the effect of fuel vaporization which results in excessively rich idle mixtures.

Secondary Stage. Fuel flows from the secondary stage fuel bowl through the main jet and into the bottom of the main well (Fig. 6).

From the main well, the fuel flows up through the idle tube and through a short diagonal passage in the booster venturi assembly and then into the idle passage in the main body. A calibrated restriction, at the upper tip of the tube, meters the flow of fuel.

Fuel flows down the idle passage in the main body, past two transfer holes above the closed throttle plate, and flows through a metered restriction into a short horizontal passage where it is discharged into the secondary barrel below the closed throttle plate. The transfer holes act as air bleeds at idle. The secondary idle fuel system continues discharging fuel until the secondary main fuel system comes into operation.

Air is introduced into the secondary stage idle fuel system from the idle air bleed, located directly above the idle tube. The air bleed also acts as a vent to prevent siphoning in the idle fuel system at high speeds and when the engine is stopped.

ACCELERATING SYSTEM

Upon accelerating, the air flow through the carburetor responds almost immediately to the increased throttle opening. There is, however, a brief interval before the fuel, which is heavier than air, can gain speed and maintain the desired balance of fuel and air. During this interval, the accelerating system (Fig. 8) supplies fuel until the other systems can once again provide the proper mixture.

When the throttle is closed, the diaphragm return spring forces the diaphragm toward the cover, drawing fuel into the chamber through the inlet. The inlet has an Elastomer valve which uncovers the inlet hole to admit fuel from the fuel bowl and covers the inlet hole when the accelerating pump is operated to prevent the fuel from returning to the bowl. A discharge weight and ball check prevents air from entering from the discharge nozzle when fuel is drawn into the diaphragm chamber.

When the throttle is opened, the diaphragm rod is forced inward, forcing fuel from the chamber into the discharge passage. Fuel under pressure forces the pump discharge weight and ball off their seat and fuel passes through the accelerating pump discharge screw and is sprayed into each main venturi through discharge ports.

An air bleed in the wall of the accelerating pump fuel chamber pre-

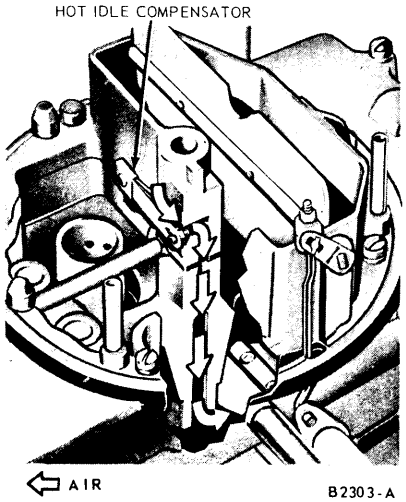

FIG. 7—Hot Idle Compensator System

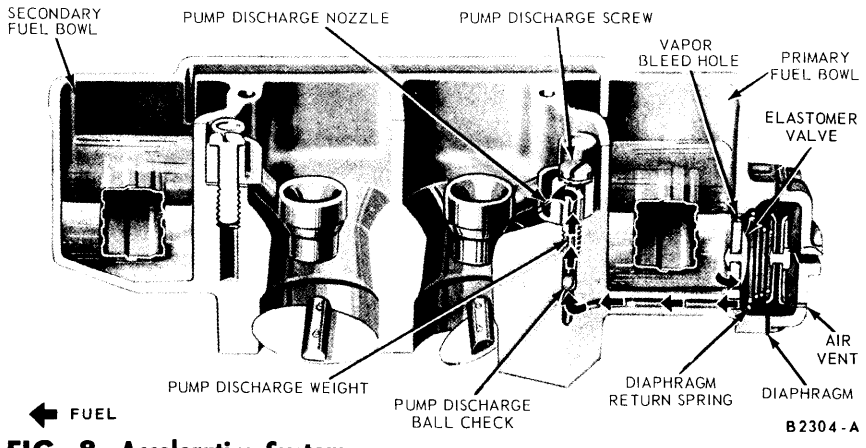

FIG. 8—Accelerating System

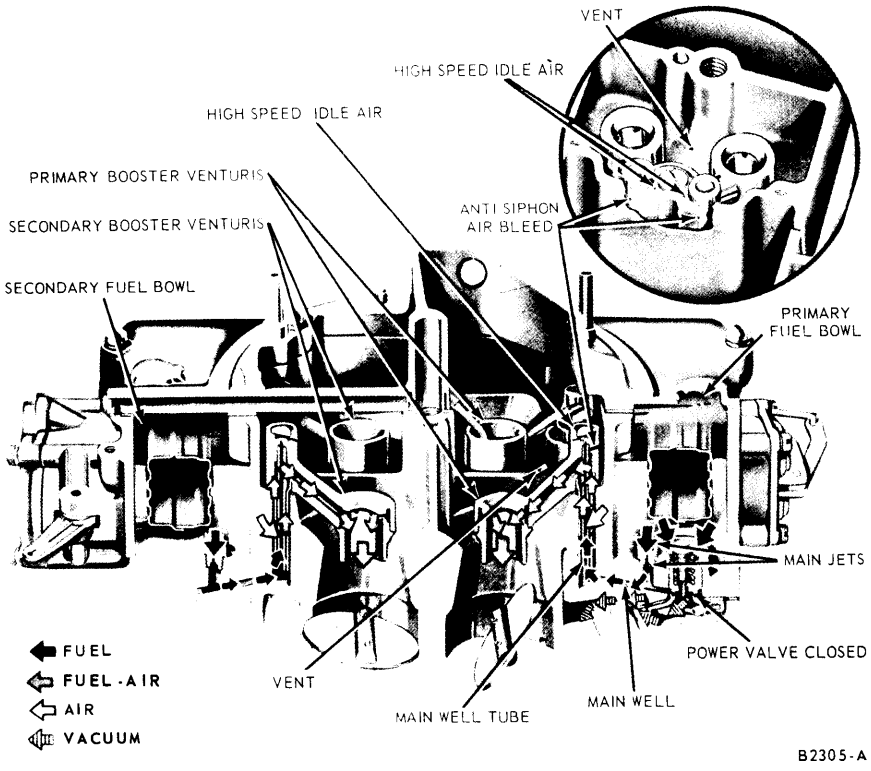

FIG. 9–Primary Stage Main Fuel System

vents vapor entrapment and pressure build-up in the diaphragm chamber.

PRIMARY STAGE MAIN FUEL SYSTEM

As engine speed increases, the air passing through the booster venturi creates a vacuum. The amount of vacuum is determined by the air flow through the venturi, which in turn is regulated by the speed of the engine. The difference in pressure between the main discharge port and the fuel bowl causes fuel to flow through the main fuel system (Fig. 9).

At a predetermined venturi vacuum, fuel flows from the primary fuel bowl, through the main jets, and into the bottom of the main well. The fuel moves up the main well tube past air bleed holes. Filtered air from the high speed air bleed enters the fuel flow in the main well tube through holes in the side of the tube. The high speed air bleed meters an increasing amount of air to the fuel as venturi vacuum increases, maintaining the required fuel-air ratio. The mixture of fuel and air is lighter than raw fuel and responds faster to changes in venturi vacuum. It also atomizes more readily than raw fuel. The fuel and air continue up the main well tube past another air bleed which also acts as a vent to prevent siphoning when the engine is shut down. The fuel is discharged into the booster venturi where it is atomized and mixed with the air flowing through the carburetor.

The throttle plate controls the amount of the fuel-air mixture admitted to the intake manifold, regulating the speed and power output of the engine.

A balance tube is located in each primary barrel directly below the booster venturi. When decelerating, the balance tube siphons off any excess fuel droplets remaining around the edge of the booster venturi and discharges the droplets into the equalizing slots in the base of the carburetor where they are mixed with the idle fuel. The balance tube also acts as an additional air bleed during the idle fuel system operation.

POWER FUEL SYSTEM

During periods of increased road loads or high speed operation, the fuel-air ratio must be increased for added power. The added fuel required during this period is supplied by the power fuel system (Fig. 10).

The power fuel system is controlled by manifold vacuum.

Manifold vacuum is transmitted from an opening in the base of the main body, through a passage in the main body and power valve chamber to the power valve diaphragm. The manifold vacuum, acting on the power valve at idle speed or normal road load conditions, is great enough to hold the power valve diaphragm down, overcoming the tension of the spring on the valve stem and holding the valve closed. When high power operation places a greater load on the engine and manifold vacuum drops below a predetermined value, the spring opens the power valve. Fuel from the primary fuel bowl flows through the power valve and into passages leading to both primary stage main fuel wells. Here the fuel is added to the fuel from the primary stage main fuel system, enriching the mixture.

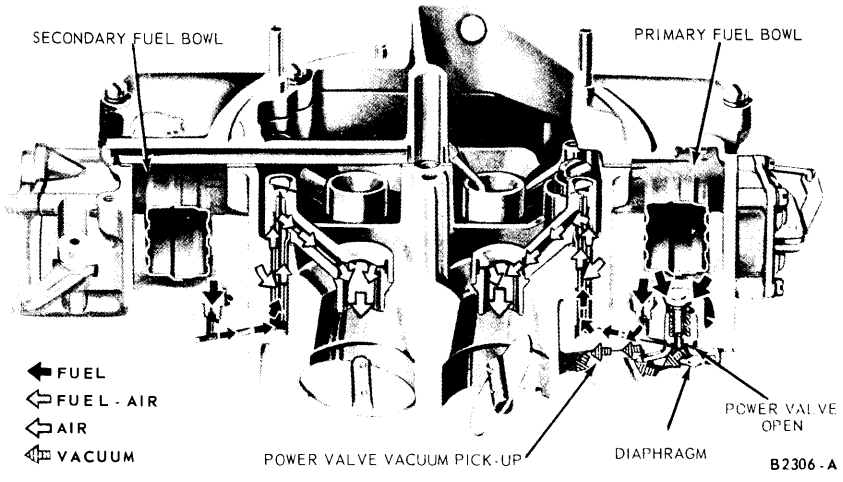

FIG. 10–Power Fuel System

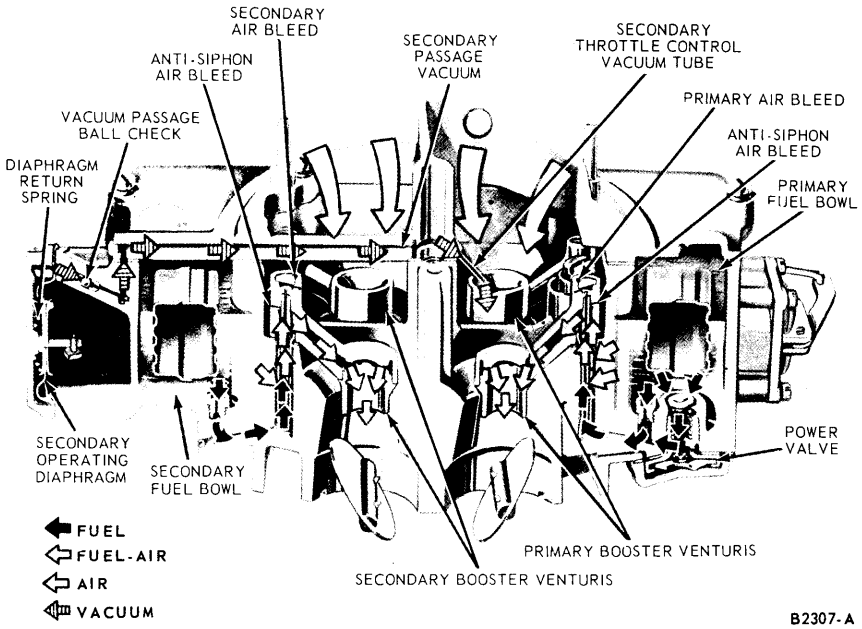

FIG. 11—Secondary Stage Main Fuel System

As engine power demands are reduced, manifold vacuum increases. The increased vacuum overcomes the tension of the valve stem spring and closes the power valve.

SECONDARY THROTTLE OPERATION AND MAIN FUEL SYSTEM

To provide sufficient fuel-air mixture to operate the engine at maximum power, the mixture supplied by the primary stage is supplemented by an additional quantity of fuel-air mixture from the secondary stage (Fig. 11).

This additional supply of fuel-air mixture is delivered through the two secondary (rear) barrels of the carburetor. The secondary stage throttle plates are operated by a spring-loaded vacuum diaphragm assembly attached to the main body and linked to the secondary throttle shaft.

Opening of the secondary throttle plates is controlled by vacuum from the left primary booster venturi. The vacuum is transmitted from the secondary throttle control vacuum tube through passages in the air horn, main body, and behind the secondary operating diaphragm.

As the primary throttle plates are opened, primary venturi vacuum increases. When the vacuum reaches a predetermined amount, it starts to act on the secondary stage operating diaphragm, which in turn starts to open the secondary throttle plates.

A ball check, located in the vacuum passage in the diaphragm housing, controls the rate at which the secondary throttle plates are allowed to open. Any rapid increase in vacuum which would tend to open the secondary throttle plates too suddenly holds the ball check against its seat. The opening of the secondary throttle plates is slowed to a rate governed by the amount of vacuum passing through a bleed in the ball seat.

As the secondary throttle plates begin to open, fuel flows from the secondary fuel bowl through the secondary main jets into the bottom of the main well and up the main well tube past air bleed holes. Air is introduced through an air bleed at the top of the tube. When the secondary throttle plates are moved slightly past the secondary transfer holes, each hole begins discharging fuel as it is exposed to manifold vacuum. As secondary venturi vacuum is increased, the fuel is discharged into the secondary booster venturi. Fuel from the transfer holes tapers off and the holes act as additional air bleeds.

When decelerating, vacuum in the primary venturi decreases, and the secondary throttle plates begin to close. The ball check in the diaphragm housing passage will unseat when the throttle is closed quickly, allowing the low pressure on the vacuum side of the diaphragm to rapidly return to atmospheric pressure. As the vacuum acting on the diaphragm is lessened, the load on the diaphragm spring will start closing the secondary plates.

2 IN-CAR ADJUSTMENT AND REPAIR

CARBURETOR ADJUSTMENTS

All carburetor adjustments are covered in Part 10-1, Section 2, "Common Adjustments and Repairs."

The fuel level float adjustment (dry) and the secondary throttle plate adjustment are performed only as bench adjustments.

The choke plate clearance (pull-down) and fast idle cam linkage adjustment, the automatic choke thermostatic spring housing adjustment, the accelerating pump stroke adjustment, and the initial idle mixture setting can be performed with the carburetor on the bench or installed in the car.

The fuel level float adjustment (wet), the idle fuel mixture and idle speed adjustments, and the anti-stall dashpot adjustment are performed only with the carburetor installed in the car.

THROTTLE LINKAGE ADJUSTMENTS

The throttle linkage adjustments are covered in Group 7.

REPAIRS

AIR HORN TO MAIN BODY GASKET REPLACEMENT

1. Remove the air cleaner assembly (Part 10-3, Section 2). Remove the air cleaner anchor screw.
2. Disconnect the automatic choke clean air tube at the carburetor.
3. Remove the automatic choke plate operating rod to choke lever retainer.
4. Remove the air horn retaining screws and lockwashers, and the carburetor identification tag. Remove

the air horn and air horn gasket.

5. Install a new air horn to main body gasket. **Make sure all holes in the new gasket have been properly punched and that no foreign material has adhered to the gasket.**

6. Position the air horn on the main body and gasket so that the choke plate operating rod fits into the opening in the choke housing lever. Install the choke plate rod retainer. **Use care to prevent damage to the secondary throttle control vacuum tube during the air horn installation.**

7. Install the air horn retaining screws and lockwashers and the identification tag. Install the air cleaner anchor screw.

8. Connect the automatic choke clean air tube to the carburetor.

9. Adjust the idle fuel mixture and idle speed and the dashpot (Part 10-1, Section 2).

10. Install the carburetor air cleaner assembly (Part 10-3, Section 2).

FLOAT, NEEDLE VALVE AND SEAT, OR INLET SCREEN REMOVAL OR REPLACEMENT

1. Remove the carburetor air horn to main body gasket by following steps 1 thru 4 under "Air Horn to Main Body Gasket Replacement" in this section.

2. Remove the carburetor float(s) and the fuel inlet needle assembly(ies) by following step 1 under "Main Body Disassembly" (Part 10-2, Section 4).

3. If required, remove the fuel inlet needle seat(s), gasket(s) and filter screen(s) by following step 2 under "Main Body Disassembly" (Part 10-2, Section 4).

4. Install the fuel inlet filter(s), needle valve seat(s) and gasket(s) by following step 13 under "Main Body Assembly" (Part 10-2, Section 4).

5. Install the carburetor float(s) and fuel inlet needle(s) by following steps 14 thru 16 under "Main Body Assembly" (Part 10-2, Section 4).

6. Install the carburetor air horn and gasket by following steps 5 thru 7 under "Air Horn to Main Body Gasket Replacement" in this section.

7. Perform a fuel level float adjustment (wet) by following steps 1 thru 8 under "Fuel Level Float Adjustment–Wet" (Part 10-1, Section 2).

MAIN JET REPLACEMENT

1. Remove the carburetor float(s), needle valve(s), seat(s) and inlet screen(s) by following steps 1 thru 3 of "Float, Needle Valve and Seat, or Inlet Screen Removal or Replacement" in this section.

2. Remove the carburetor main jet(s) with a jet wrench.

3. Install the carburetor main jet(s) with a jet wrench.

4. Install the carburetor inlet screen(s), needle valve(s), and seat(s), and the carburetor floats by following steps 4 thru 7 under "Float Needle Valve and Seat, or Inlet Screen Removal or Replacement" in this section.

ACCELERATOR PUMP DIAPHRAGM AND ELASTOMER VALVE REPLACEMENT

1. Remove the carburetor air horn to main body gasket by following steps 1 thru 4 under "Air Horn to Main Body Gasket Replacement" in this section.

2. Remove the accelerating pump diaphragm and the Elastomer valve by following step 6 under "Main Body Disassembly" (Part 10-2, Section 4).

3. Install the Elastomer valve and the diaphragm by following steps 5 thru 7 under "Main Body Assembly" (Part 10-2, Section 4).

4. Install the carburetor air horn and gasket by following steps 5 thru 7 under "Air Horn to Main Body Gasket Replacement" in this section.

SECONDARY DIAPHRAGM REPLACEMENT

1. Remove the carburetor air horn to main body gasket by following steps 1 thru 4 under "Air Horn to Main Body Gasket Replacement" in this section.

2. Remove the secondary diaphragm assembly, except the ball check, by following step 7 under "Main Body Disassembly" (Part 10-2, Section 4).

3. Install the secondary diaphragm assembly by following step 11 under "Main Body Assembly" (Part 10-2, Section 4).

4. Install the carburetor air horn and gasket by following steps 5 thru 7 under "Air Horn to Main Body Gasket Replacement" in this section.

POWER VALVE OR GASKETS REPLACEMENT

1. Remove the carburetor from the engine; refer to steps 1 and 2 under "Removal" (Part 10-2, Section 3).

2. Test the power valve; refer to steps 1 thru 4 under "Power Valve" (Part 10-1, Section 1).

3. Remove the power valve and/or gaskets by following step 8 under "Main Body Disassembly" (Part 10-2, Section 4).

4. Replace the power valve and/or gaskets by following step 6 and 7 under "Main Body Assembly" (Part 10-2, Section 4).

5. Install the carburetor assembly; refer to steps 1 and 2 under "Installation" (Part 10-2, Section 3).

ANTI-STALL DASHPOT REPLACEMENT

1. Remove the air cleaner (Part 10-3, Section 2).

2. Remove the retaining nut and the dashpot from the mounting bracket.

3. Install the dashpot and retaining nut on the mounting bracket.

4. Adjust the anti-stall dashpot; refer to "Anti-Stall Dashpot" (Part 10-1, Section 2).

5. Install the air cleaner (Part 10-3, Section 2).

THERMOSTATIC CHOKE SPRING HOUSING AND GASKET REPLACEMENT

1. Remove the carburetor air cleaner assembly (Part 10-3, Section 2).

2. Remove the heater hose and mounting bracket from the carburetor.

3. Remove the thermostatic spring housing clamp retaining screws and remove the spring housing and gasket.

4. Replace the gasket and/or spring housing. Position the thermostatic choke spring housing gasket on the choke housing.

5. Install the spring housing on the choke housing, with the slot in the arm of the thermostatic spring lever inserted into the loop of the thermostatic spring. Position the retainer over the thermostatic spring housing and loosely install the retaining screws.

6. Set the thermostatic spring housing to the specified index mark (Part 10-6) and tighten the retaining screws.

7. Install the heater hose mounting bracket, heater hose, and the air cleaner assembly (Part 10-3, Section 2) on the carburetor.

THERMOSTATIC CHOKE REMOVAL AND INSTALLATION —CLEAN OR OVERHAUL

1. Remove the carburetor air cleaner assembly (Part 10-3, Section 2).

2. Remove the heater hose and mounting bracket from the carburetor. Disconnect the choke heat tube from the choke housing.

3. Remove and disassemble the thermostatic choke assembly by following steps 1 thru 4 under "Vacuum Piston Choke Disassembly" (Part 10-2, Section 4).

4. Assemble and install the thermostatic choke assembly by following steps 1 thru 4 under "Vacuum Piston Choke Assembly" (Part 10-2, Section 4). Connect the choke heat tube to the choke housing.

5. Perform an "Automatic Choke Plate Clearance (Pull-Down) and Fast Idle Cam Linkage Adjustment" (Part 10-1, Section 2).

ACCELERATOR PEDAL

1. Remove the retaining screws securing the accelerator pedal to the floor panel. Remove the accelerator pedal.

2. Position the accelerator pedal on the accelerator pedal shaft. Align the pedal to floor pan mounting holes and install the retaining screws.

SPACER AND GASKETS REPLACEMENT

Perform the carburetor "Removal and Installation" procedure steps (Part 10-2, Section 3) to replace the carburetor spacer and/or gaskets.

3 REMOVAL AND INSTALLATION

REMOVAL

Flooding, stumble on acceleration, and other performance complaints are, in many instances, caused by the presence of dirt, water, or other foreign matter in the carburetor. To aid in diagnosing the cause of a complaint, the carburetor should be carefully removed from the engine without removing the fuel from the bowls. The contents of the bowls may then be examined for contamination as the carburetor is disassembled.

1. Partially drain the cooling system coolant into a clean container. Remove the air cleaner (Part 10-3, Section 2). Remove the bracket that secures the heater hose to the automatic choke. Remove the throttle rod from the throttle lever. Disconnect the distributor vacuum line, the fuel inlet line, the choke clean air tube, and the choke heat tube at the carburetor.

2. Remove the carburetor retaining nuts and lock washers; then remove the carburetor. Remove the spacer gasket from the spacer and discard the gasket. **Whenever the carburetor is removed from the engine, care must be exercised to prevent damage to the throttle plates. The lower edges of the throttle plates project below the carburetor body whenever they are open.**

3. Disconnect the coolant inlet and outlet hoses, and the crankcase ventilation system hose from the carburetor spacer. Remove the spacer and gaskets. Discard the gaskets.

INSTALLATION

1. Clean the gasket surface of the intake manifold, spacer and carburetor. Place a new gasket above and below the spacer and install the spacer. Connect the coolant hoses, and the crankcase ventilation system hose to the spacer. Position the carburetor on the spacer. To prevent leakage, distortion or damage to the carburetor body flange, snug the nuts; then, alternately tighten each nut in a criss-cross pattern to the specified torque.

2. Connect the throttle rod, the choke heat tube, the fuel inlet line, the choke clean air tube, and the distributor vacuum line. Fill the radiator to the required level with the previously removed coolant. Refer to "Common Adjustments and Repairs" (Part 10-1, Section 2) and adjust the accelerating pump stroke (if necessary), the idle fuel mixture and idle speed, and the anti-stall dashpot. Install the air cleaner (Part 10-3, Section 2).

4 MAJOR REPAIR OPERATIONS

DISASSEMBLY

To facilitate working on the carburetor and to prevent damage to the throttle plates, install carburetor legs on the base. If legs are unavailable, install 4 bolts (about 2¼ inches long of the correct diameter) and 8 nuts on the carburetor base.

Use a separate container for the component parts of the various assemblies to facilitate cleaning, inspection and assembly.

For a complete carburetor overhaul, follow all the steps. To partially overhaul the carburetor or to install a new gasket kit, follow only the applicable steps.

Refer to Fig. 25 for parts identification.

AIR HORN

1. Remove the air cleaner anchor screw.

2. Remove the automatic choke plate operating rod to choke lever retainer (Fig. 12).

3. Remove the air horn retaining screws and lock washers and the identification tag. Remove the air horn and air horn gasket.

4. If it is necessary to remove the choke plate rod, seal and washers, remove the choke plate rod by loosening and turning the choke shaft lever clevis nut counterclockwise. Remove the rod from the air horn. Slide the felt seal and two washers out of the choke rod seal retainer.

5. If it is necessary to remove the choke plate or choke shaft, remove the staking marks on the choke plate retaining screws and remove the screws. **If the tips of the screws are flared excessively, file off the flared portion to prevent damage to the**

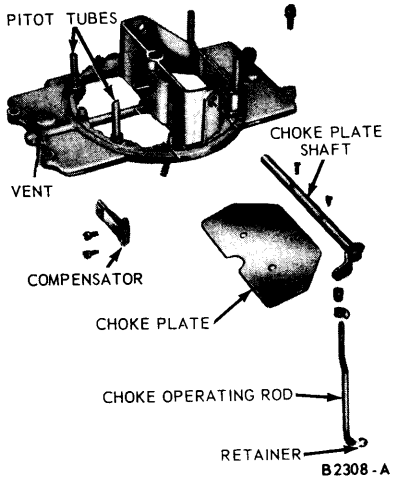

FIG. 12–Air Horn Assembly

threads of the shaft. Remove the choke plate by sliding it out of the shaft, from the top of the air horn. Slide the choke shaft out of the air horn.

6. If it is necessary to remove the secondary throttle control vacuum tube, pry it out with needle nose pliers. Discard the tube after removal.

7. If it is necessary to replace the hot idle compensator, remove the staking marks on the retaining screws and remove the hot idle compensator.

VACUUM PISTON CHOKE

1. Remove the fast idle cam retainer (Fig. 13).

2. Remove the thermostatic choke spring housing retaining screws, and remove the clamp, housing and gasket (Fig. 13).

3. Remove the choke housing assembly retaining screws. If the air horn was not previously removed, remove the choke control rod retainer. Remove the choke housing assembly, gasket and the fast idle cam. Remove the fast idle cam and rod from the fast idle cam lever.

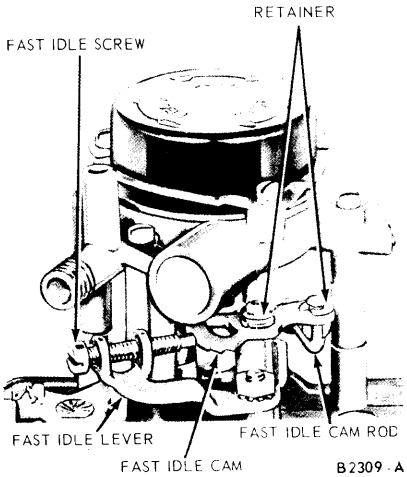

FIG. 13–Fast Idle Cam and Fast Idle Lever

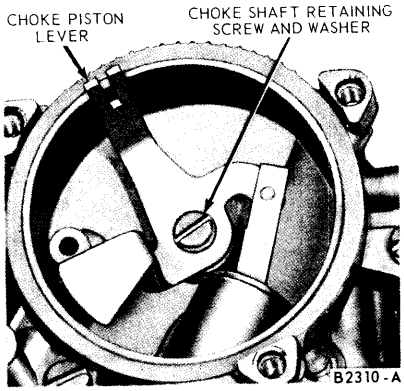

FIG. 14–Choke Shaft and Piston Lever

4. Remove the automatic choke shaft retaining screw and washer (Fig. 14). Remove the choke thermostat lever, link and piston from the housing. If necessary, remove the pin securing the choke piston to the choke thermostat lever link. Remove the choke shaft and lever assembly and the fast idle cam lever from the choke housing.

MAIN BODY

1. Using a hook, disconnect the float shaft retainer from each float (Figs. 15 and 16). Remove the float and shaft and the fuel inlet needle assembly from each fuel bowl. Remove the torsion (damper) spring from the shafts.

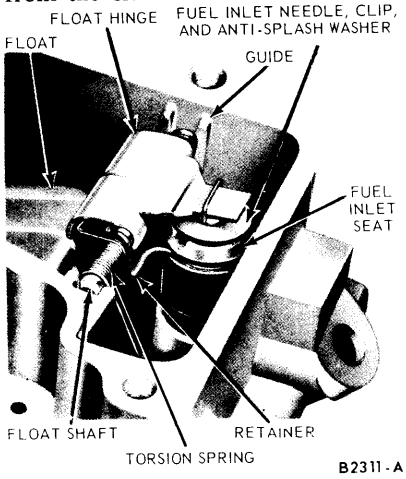

FIG. 15–Float Assembly

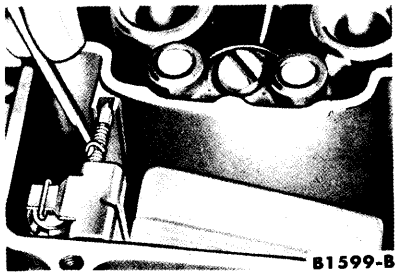

FIG. 16–Float Shaft Retainer Removal or Installation

2. Using a jet wrench, remove the fuel inlet needle seat, gasket and filter screen from each fuel bowl (Fig. 17).

3. Remove the primary stage and secondary stage main jets (Fig. 18).

4. Remove the primary stage booster venturi assembly and gasket (Fig. 19). Invert the main body and let the accelerating pump discharge weight and the ball fall into the hand.

5. Remove the secondary stage booster venturi assembly and gasket.

6. Remove the accelerating pump operating rod retainer. To release the rod from the retainer clip, press the tab ends of the clip together; then, at the same time, press the rod away from the clip until it is disengaged. Remove the rod. Remove the accelerating pump cover, diaphragm assembly and spring (Fig. 20).

If it is necessary to remove the Elastomer valve, grasp it firmly and pull it out. If the Elastomer valve tip broke off during removal, be sure to remove the tip from the fuel bowl. **An Elastomer valve must be replaced whenever it is removed from the main body.**

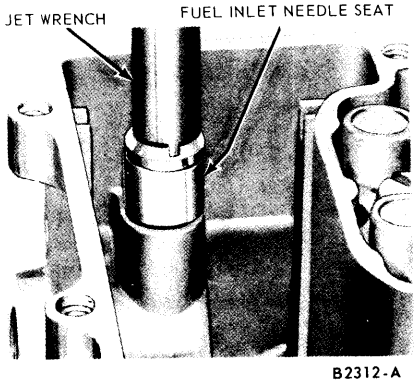

FIG. 17–Fuel Inlet Needle Seat Removal or Installation

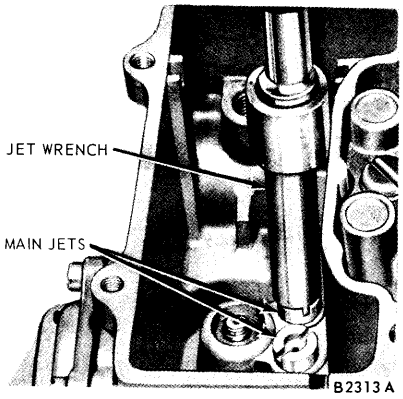

FIG. 18—Main Jet Removal or Installation

7. Remove the secondary diaphragm operating rod retainer and remove the rod. Remove the diaphragm cover, return spring, and diaphragm (Fig. 21). Invert the main body and let the secondary ball check fall into the hand.

8. Invert the main body and remove the power valve cover and gasket. Using a box wrench, remove the power valve and gasket (Fig. 22).

9. Remove the idle fuel mixture adjusting screws (needles) and springs.

10. Remove the anti-stall dashpot.

11. If necessary, remove the idle (hot engine) adjusting screw and spring, and the nut and washer securing the fast idle cam adjusting lever assembly to the primary throttle shaft (Fig. 13). Remove the lever assembly.

12. If it is necessary to remove the throttle plates, lightly scribe the primary and secondary throttle plates along the throttle shafts, and mark each plate and its corresponding bore with a number or letter for proper installation (Fig. 23).

Remove the staking marks on the throttle plate retaining screws and remove the screws. **If the tips of the screws are flared excessively, file off the flared portion to prevent damage to the threads of the shaft(s). Do not scratch the edge of the plates or walls of the barrels.** Remove the screws and the throttle plates.

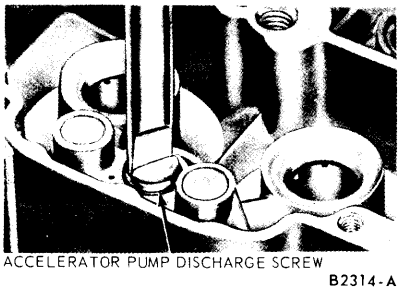

FIG. 19—Booster Venturi Removal or Installation

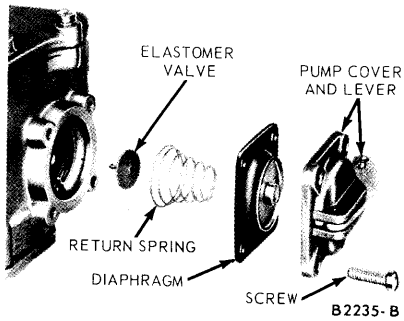

FIG. 20—Accelerating Pump Assembly

Slide the primary and secondary throttle shafts out of the main body.

Remove the accelerating pump over-travel lever retainer (Fig. 24) and slide the anti-friction bearing, spring and lever off the primary throttle shaft.

PARTS REPAIR OR REPLACEMENT

Clean and inspect the carburetor component parts. Refer to "Cleaning and Inspection" (Part 10-1) for the proper procedure. Replace all worn or damaged parts.

ASSEMBLY

Make sure all holes in the new gaskets have been properly punched and that no foreign material has adhered to the gaskets. Make sure the accelerating pump diaphragm and secondary operating diaphragm are not torn or cut. The carburetor assembly is shown in Fig. 25.

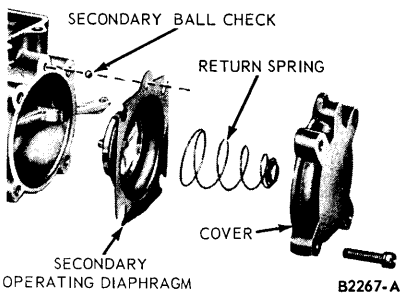

FIG. 21—Secondary Diaphragm Assembly

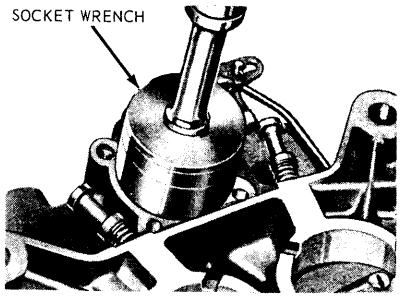

FIG. 22—Power Valve Removal or Installation

MAIN BODY

1. If the throttle plates were removed, install the accelerator over-travel spring anti-friction bearing on the accelerator over-travel lever boss. Place the accelerator over-travel spring, with the shortest tang end first, over the bearing on the over-travel lever (Figs. 24 and 26). Place the short tang of the spring under the lug on the over-travel lever. Slide the over-travel lever spring and bearing assembly on the primary throttle shaft. Hook the longest tang

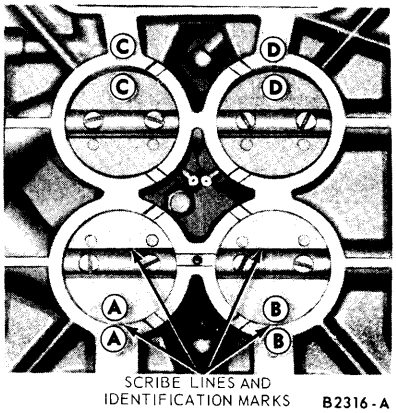

FIG. 23—Throttle Plate Removal

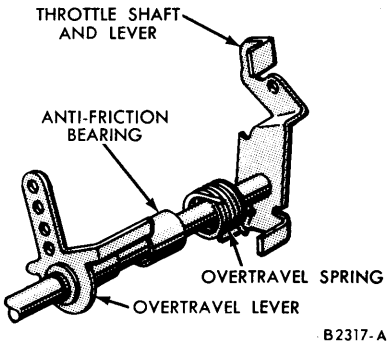

FIG. 24—Throttle Shaft Assembly

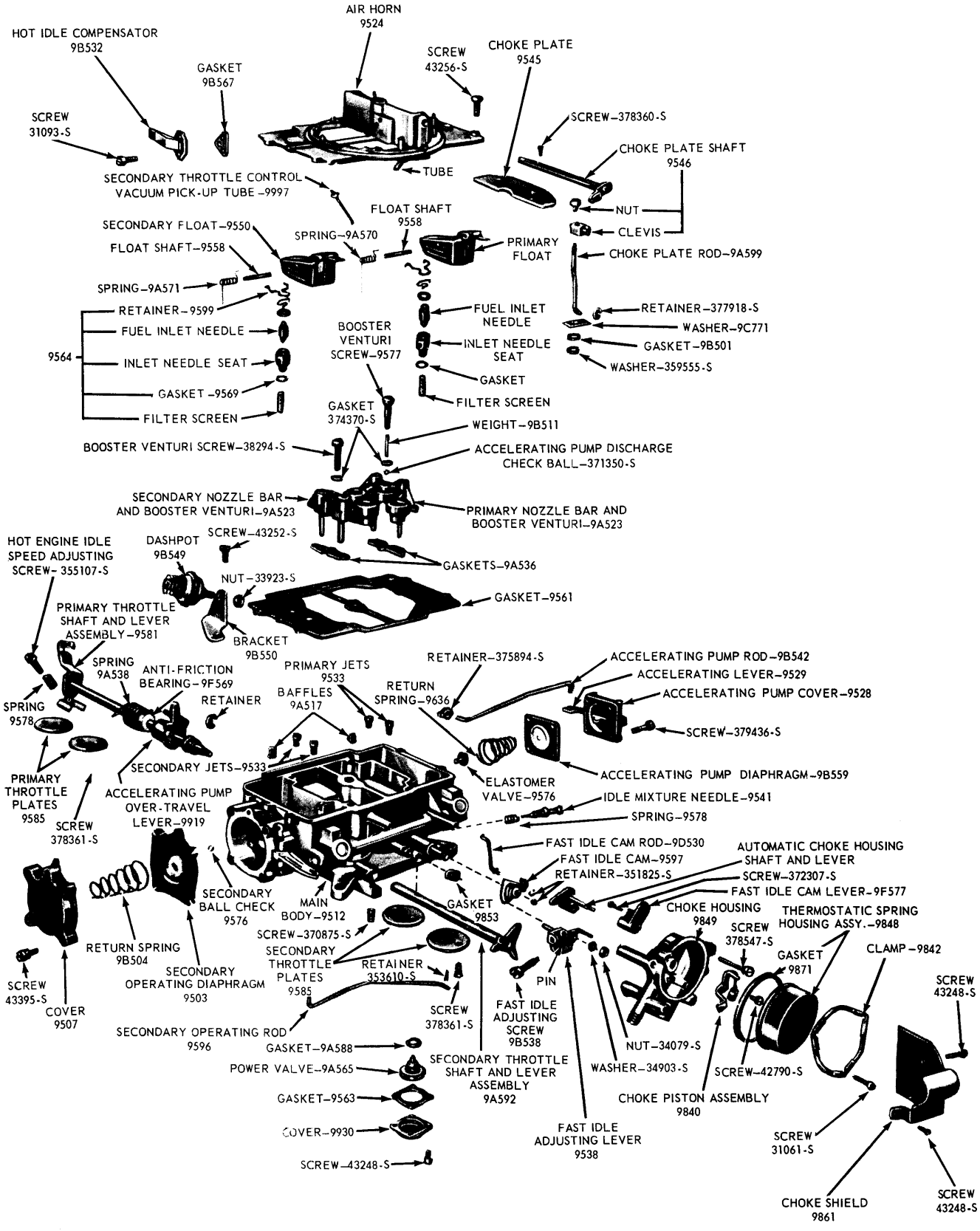

FIG. 25–Carburetor Assembly

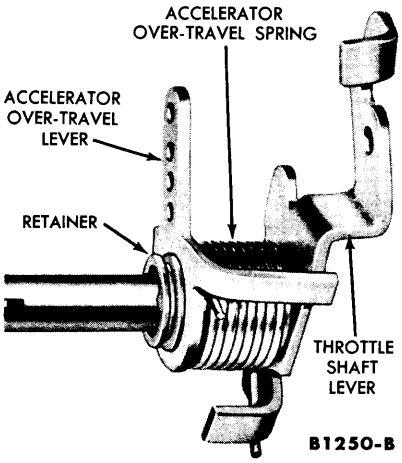

FIG. 26—Accelerator Over-Travel Spring and Lever Installation

of the spring under the closed throttle lug of the throttle lever. Install the over-travel lever retainer. Slide the primary throttle shaft assembly into the main body.

Refer to the lines and identification marks scribed on the throttle plates (Fig. 23), and install the primary throttle plates in their proper location with the screws snug, but not tight. Invert the main body and hold it up to the light. Little or no light should show between the throttle plates and the throttle bores. Tap the plates lightly with a screwdriver handle to seat them. Tighten and stake the screws.

Slide the secondary throttle shaft into the main body. Refer to the lines scribed on the secondary throttle plates and install the throttle plates in their proper location. To install the plates, follow the procedure given for the primary throttle plates.

Adjust the secondary throttle plates. Refer to Part 10-1, Section 2 for the proper procedure.

2. Install the idle (hot engine) adjusting screw and spring.

3. If the fast idle lever was removed, place the fast idle lever assembly on the primary throttle shaft, and install the retaining washer and nut (Fig. 13). Do not install the fast idle cam or retainer at this time.

4. Install the anti-stall dashpot.

5. If the Elastomer valve was removed, lubricate the tip of a new Elastomer valve and insert the tip into the accelerator pump cavity center hole (Fig. 20). Using a pair of needle nosed pliers, reach into the fuel bowl and grasp the valve tip. Pull the valve in until it seats and cut off the tip at the retaining shoulder. Position the diaphragm return spring on the boss in the chamber.

6. Position the accelerator pump diaphragm assembly to the cover and place the cover and diaphragm assembly in position on the return spring and main body. Install the cover screws finger tight. Push the accelerating pump plunger the full distance of its travel and tighten the cover screws.

7. Install the accelerating pump operating rod. Refer to Part 10-1, Section 2 and adjust the accelerating pump stroke.

8. Invert the main body. Using a socket wrench, install the power valve and gasket (Fig. 22). **Tighten the power valve securely.** Install the cover and gasket.

9. Install the idle adjusting needles and springs. Turn the needles in gently with the fingers until they just touch the seat; then back them off the specified number of turns (Part 10-6) for a preliminary idle adjustment.

10. Drop the secondary discharge ball check into the passage in the main body (Fig. 21).

11. Install the secondary operating diaphragm on the secondary operating lever. Install the diaphragm return spring on the cover. Install the cover with the screws finger tight. With the diaphragm in the extended position, tighten the cover screws. Install the secondary operating rod in the operating lever, and secure the rod to the secondary throttle shaft with the retaining clip.

Check the operation and seal of the secondary vacuum system by opening the primary and secondary throttle plates. Hold the secondary throttle plates open. Place a finger over the secondary vacuum inlet hole in the main body and release the secondary throttle plates. This is a check for vacuum leakage at the diaphragm. The throttle plates should not close fully. They will move slightly when released, but they must stop and should not move toward the closed position after the initial movement. Replace the diaphragm or tighten the cover screws as necessary to correct the vacuum leakage.

12. Using a jet wrench, install the primary and secondary main jets (Fig. 18). **Be sure the correct jets are installed for the primary and secondary systems (Part 10-6).**

13. Install the primary and secondary fuel inlet filters, below the fuel inlet valve seats. Install the valve seats and gaskets (Fig. 17).

14. Position the primary float shaft retainer in the groove on the fuel inlet needle seat (Figs. 15 and 16). Install the fuel needle assembly in the fuel inlet seat. Slide the float shaft into the float lever hinge. Install the damper spring on the float shaft and insert the short end of the spring under the flange of the float lever.

Insert the float assembly into the fuel bowl and hook the float tab under the clip on the fuel inlet needle assembly. Insert the float shaft into its guides at the sides of the fuel bowl. Allow the long end of the damper spring to rest against the wall of the fuel bowl. Using a hook (Fig. 16) position the shaft retainer in the grooves on the shaft.

15. Repeat step 14 on the secondary stage fuel bowl.

16. Refer to Part 10-1, Section 2, "Float Adjustment (Dry)" and perform a dry float fuel level adjustment on the primary and secondary floats.

17. Drop the accelerating pump discharge ball into its passage in the primary side of the main body. Seat the ball with a brass drift and a light hammer. **Make sure the ball is free.** Drop the accelerating pump discharge weight on top of the ball. Position the primary booster venturi assembly and gasket in the main body. Install the retaining screw securely (Fig. 19). **The primary booster screw is hollow.**

18. Position the secondary booster venturi assembly and gasket in the main body, and install the gasket and retaining screw.

VACUUM PISTON CHOKE

1. If the choke piston and link was disassembled, install the choke piston on the choke thermostatic spring lever link and install the retaining pin (Fig. 27).

2. Position the fast idle cam lever on the thermostatic choke shaft and lever assembly (Figs. 27 and 28). **The bottom of the fast idle lever adjusting screw must rest against the tang on the choke shaft lever.** Insert the choke shaft assembly into the rear of the choke housing. Position the choke shaft lever so that the hole in the lever is to the left side of the choke housing (Fig. 28).

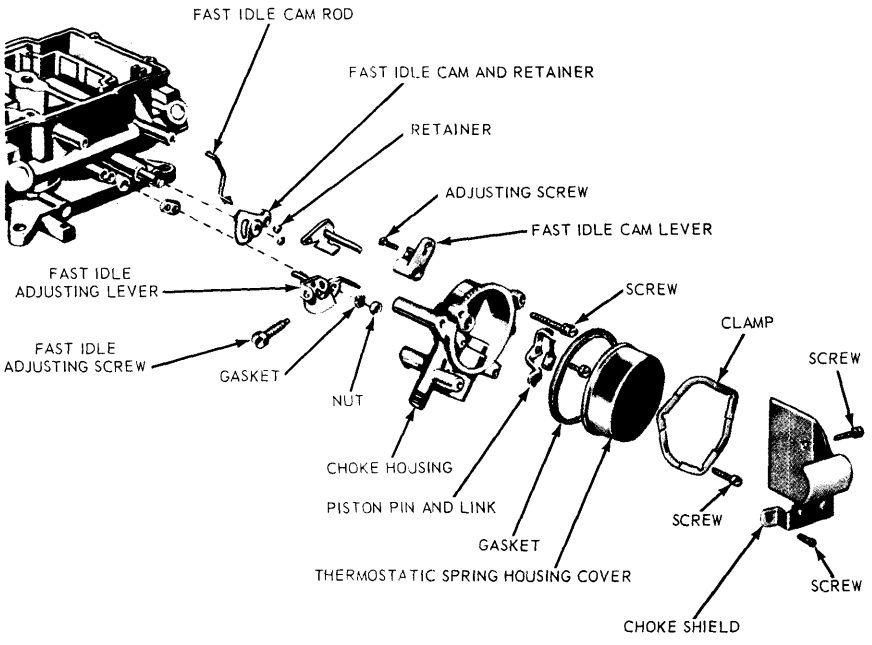

FIG. 27–Choke Housing Assembly

3. Insert the choke piston into the choke housing. Position the choke thermostatic spring lever on the flange of the choke shaft, and install the retaining screw and washer (Fig. 14).

4. Install the fast idle cam rod on the fast idle cam lever (Fig. 28). Place the fast idle cam on the fast idle cam rod and install the retainer. Place the choke housing vacuum pick-up port to main body gasket on the choke housing flange. Position the choke housing on the main body, and at the same time, install the fast idle cam on the hub of the main body. Position the gasket and install the choke housing retaining screws. Install the fast idle cam retainer. **The thermostatic spring housing is installed after the choke plate clearance (pull-down) has been adjusted to specification.**

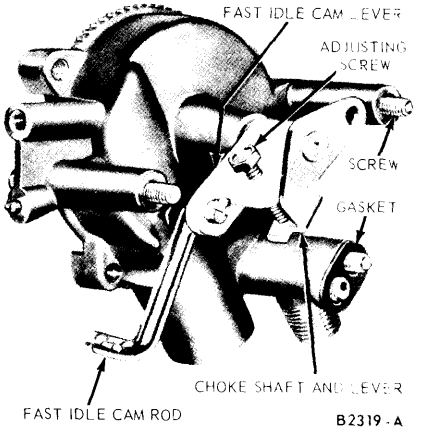

FIG. 28–Choke Linkage Installation

AIR HORN

Refer to Fig. 12 for the correct location of the parts.

1. If the choke plate shaft was removed, position the choke plate shaft in the air horn. Insert the plastic choke pulldown adjusting nut and swivel into the keyed hole in the choke shaft lever. Position the felt washer between the two brass washers and slide them into place on the choke control rod seal retainer.

Insert the choke control rod through the control rod seal and the air horn. Insert the choke control rod into the choke shaft lever clevis nut, and turn the nut clockwise to thread the rod onto the nut.

2. If the choke plate was removed, insert the choke plate into the choke plate shaft. Install the choke plate screws snug, but not tight. Check for proper plate fit, binding in the air horn, and free rotation of the shaft by moving the plate from the closed position to the open position. If necessary, remove the choke plate and grind or file the plate edge where it is binding or scraping on the air horn wall. If the choke plate and shaft moves freely, tighten the choke plate screws while holding the choke in the fully closed position. Stake the screws. **When staking the screws, support the shaft and plate on a block of wood or a metal bar to prevent bending of the shaft.**

3. If necessary, start a new secondary throttle control vacuum tube into the air horn. **Make certain the tube is installed in a manner that will insure that the pick-up end will face downward toward the primary booster venturi when the air horn is installed.** Drive the tube into the air horn by grasping it lightly below the shoulder with pliers and striking the pliers with a hammer. Drive the tube in until it stops against its shoulder. **Do not crush or bend the tube.**

4. If the hot idle compensator was removed, install a new compensator and gasket. Stake the retaining screws.

5. Position the main body gasket on the main body (Fig. 29). Position the air horn on the main body and gasket so that the choke plate rod fits into the opening in the choke housing lever. Install the choke plate rod retainer. **Use care to prevent damage to the secondary throttle control vacuum tube during the air horn installation.** Install the air horn retaining screws, lock washers and the carburetor identification tag.

6. Refer to Part 10-1, Section 2, "Common Adjustments and Repairs" and perform the automatic choke plate clearance (pull-down) and fast idle cam linkage adjustment.

7. Position the thermostatic choke

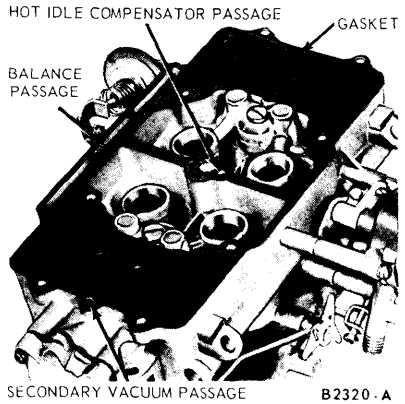

FIG. 29–Main Body Gasket Installation

spring housing gasket on the choke housing. Install the spring housing on the choke housing and gasket, with the slot in the arm of the thermostatic spring lever inserted into the loop of the thermostatic spring. Position the spring housing retainer (clamp) over the spring housing and loosely install the retaining screws.

8. Refer to Part 10-1, Section 2, "Common Adjustments and Repairs" and perform the automatic choke spring housing adjustment.

BENCH ADJUSTMENTS

The fuel level float adjustment (dry) and the secondary throttle plate adjustment are performed only as bench adjustments. Refer to Part 10-1, Section 2 for the procedures.

The automatic choke plate clearance (pull-down) and fast idle cam linkage adjustment, automatic choke housing cover adjustment, and the accelerating pump stroke adjustment can be performed with the carburetor on the bench or in the car. Refer to Part 10-1, Section 2, for the procedures.

PART 10-3 AIR CLEANER

1 DESCRIPTION AND OPERATION

DESCRIPTION

The engine is equipped with a dry-type air cleaner that has a replaceable cellulose fiber filtering element (Fig. 1).

The air cleaner body is mounted on a sealing gasket located on the carburetor air horn. The air cleaner assembly is retained on the engine by a stud in the carburetor body and a wing nut above the filter cover. The replaceable filter element assembly is equipped with integral plastic gaskets, located on the top and bottom of the element. The gaskets prevent entry of dirt and unfiltered air into the engine.

An integral positive crankcase ventilation system tube is located on the lower surface of the air cleaner body. The crankcase ventilation system inlet hose is attached to the air cleaner tube with a clamp.

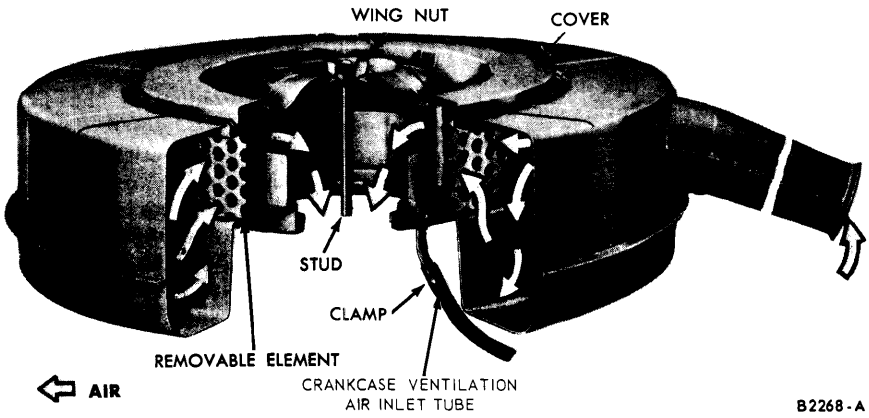

FIG. 1—Air Cleaner Assembly Sectional View

OPERATION

The air from the engine compartment enters the air cleaner assembly through the opening (horn) on the side of the body, passing into a silencing chamber and through the filter element (Fig. 1). Dust particles are trapped in the filter element as the air rushes through it into the positive crankcase ventilation system, carburetor and the automatic choke clean air tube in the carburetor air horn.

The filtered air flows through the choke clean air tube in the carburetor, passing into a connecting hose and tube to the heat chamber in the exhaust manifold. Filtered air also flows through the integral positive crankcase ventilation system tube on the bottom of the air cleaner body, passing into a connecting hose and tube to the intake manifold.

2 REMOVAL AND INSTALLATION

FILTER MAINTENANCE

Refer to Group 19 for the recommended maintenance mileage interval.

REMOVAL

1. Loosen the retaining clamp and disconnect the positive crankcase ventilation inlet hose at the air cleaner.

2. Remove the wing nut retaining the air cleaner on the carburetor; then, lift the air cleaner off the carburetor. **To prevent dirt from entering the carburetor, the filter element must never be removed when the air cleaner body is mounted on the carburetor.**

3. Remove the cover and filter element. Discard the air cleaner mounting gasket on the carburetor if it is excessively worn or damaged.

CLEANING AND INSPECTION

Refer to Group 10-1, Section 3 for the recommended cleaning and inspection procedure.

INSTALLATION

1. Install the air cleaner mounting gasket on the carburetor. Install the air cleaner body on the carburetor so that the word "FRONT" faces the front of the car.

2. Place the element in the air cleaner body. Make sure the element gasket is properly seated. Install the cover and tighten the retaining wing nut.

3. Connect the crankcase ventilation inlet hose to the air cleaner body and tighten the retaining clamp.

PART 10-4 FUEL PUMP

1 DESCRIPTION AND OPERATION

DESCRIPTION

The single-action fuel pump (Fig. 1) is mounted on the left side of the cylinder front cover. The disposable-type fuel filter is integral with the fuel pump.

OPERATION

The fuel pump is mechanically actuated by the fuel pump rocker arm and an eccentric mounted on the front of the camshaft. The fuel pump diaphragm is operated by a combination of rocker arm action and calibrated spring pressure.

On the fuel intake stroke, the camshaft eccentric causes the rocker arm to pull the fuel pump diaphragm against the diaphragm spring pressure. This action draws fuel through the inlet valve into the pump chamber and closes the outlet valve. At the same time, fuel is drawn from the fuel tank through the fuel inlet line to replace the fuel drawn into the chamber.

As the camshaft eccentric continues to rotate, the rocker arm relieves the pressure on the diaphragm spring and allows the spring to move the diaphragm toward the inlet and outlet valves, exerting pressure on the fuel in the fuel inlet chamber. This pressure causes the pump inlet valve to close and the ensuing pressure buildup opens the outlet valve. The fuel is then forced through the valve housing cover outlet to the filter element, where the fuel is cleansed before entering the outlet line leading to the carburetor. **Fuel is delivered to the carburetor only when the fuel inlet valve in the carburetor is open. The fuel inlet valve is closed by fuel pressure on the float when the specified fuel level in the carburetor float chamber is reached.**

When there is no demand for fuel from the carburetor, the diaphragm spring tension is not strong enough to force the diaphragm downward against the fuel pressure built up in the inlet chamber of the pump. Thus, the up and down rocker arm action continues, but the diaphragm remains stationary until pressure against the carburetor float is relieved by a demand for fuel at the carburetor.

Pressure relief orifices are incorporated in the inlet and outlet valve cages to prevent excessive pressure build-up in the line betwen the carburetor during hot soak periods.

An air vent is located in the fuel pump body to relieve air pressure build-up on the spring side of the diaphragm.

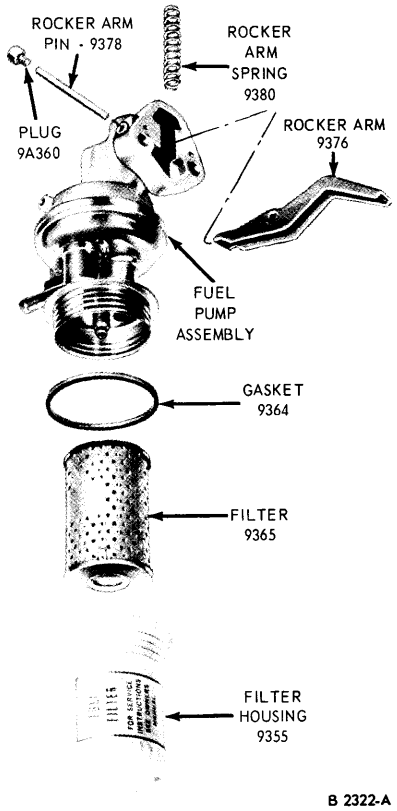

FIG. 1—Fuel Pump and Fuel Filter Assembly

2 IN-CAR ADJUSTMENTS AND REPAIRS

FUEL FILTER REPLACEMENT

The fuel filter is integral with the fuel pump (Fig. 1). The filter housing contains a long-life replaceable element. Replace the element if it becomes clogged, and also at the maintenance mileage interval recommended in Group 19.

1. Unscrew the filter housing from the fuel pump, and remove the filter element and gasket. Discard the element and gasket. Clean the filter housing in cleaning solvent.

2. Place a new filter element over the spout in the fuel pump valve housing cover (Fig. 1). Coat a new gasket with light engine oil and position the gasket on the filter housing. Screw the filter housing on the pump. Hand-tighten the filter housing until the gasket contacts the pump, then advance it ⅛ turn.

3. Start the engine and check for leaks.

3 REMOVAL AND INSTALLATION

TESTS

Fuel pump tests are covered in Part 10-1, Section 1.

REMOVAL

1. Disconnect the fuel lines at the pump.

2. Remove the pump retaining bolts, then remove the pump and gasket. Discard the gasket.

CLEANING AND INSPECTION

Clean and inspect the fuel pump. Refer to "Cleaning and Inspection" in Part 10-1 for the proper procedure.

INSTALLATION

1. Remove all the gasket material from the pump mounting pad and pump flange. Apply sealer to both sides of a new gasket.

2. Position the gasket on the pump flange, and hold the pump in position against the mounting pad. Make sure the rocker arm is riding on the camshaft eccentric.

3. Press the pump tight against the pad. Install the retaining screws, and alternately torque them to specifications. Connect the fuel lines.

4. Operate the engine and check for leaks.

4 MAJOR REPAIR OPERATIONS

DISASSEMBLY

The fuel pump assembly is shown in Fig. 1.

1. Remove the filter housing, gasket and filter element. Discard the filter element and gasket.

2. Scrape away the staking mark and remove the rocker arm pin seal plug as shown in Fig. 2.

3. Release the tension on the rocker arm by pressing the arm downward against the diaphragm and rocker arm spring pressure and allow the rocker arm pin to fall out. If the pin does not come out freely, tap the fuel pump assembly lightly on the bench until the pin sticks out of the bore; then, remove the pin with pliers.

CLEANING AND INSPECTION

Clean and inspect the fuel pump component parts. Refer to "Cleaning and Inspection" (Part 10-1, Section 3) for the proper procedure. Replace all worn or damaged parts.

ASSEMBLY

The fuel pump assembly is shown in Fig. 1.

1. Invert the fuel pump so that the filter housing cover faces upward. Insert the rocker arm spring into the spring guide bore in the dome of the fuel pump rocker arm cavity.

2. Insert the rocker arm into the cavity and hook it onto the diaphragm rod, directly below the rod flange. Position the rocker arm spring over the spring locater on the rocker arm. Align the rocker arm pin holes and install the rocker arm pin. **Make certain the rocker arm spring is properly positioned on the spring locater on the rocker arm.**

3. Install a new rocker arm pin plug. Stake the plug into position.

4. Place a new filter element over the spout in the fuel pump. Coat the filter housing gasket with oil. Position the gasket on the filter housing, and screw the housing on the pump. Hand tighten the filter housing until the gasket contacts the pump; then, advance it ⅛ turn.

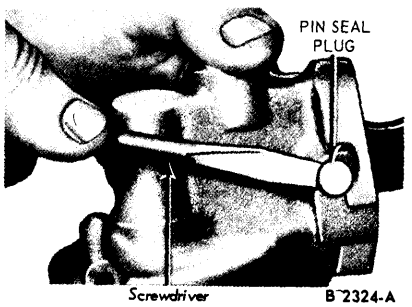

FIG. 2–Rocker Arm Pin Seal Plug Removal

PART 10-5 FUEL TANK AND LINES

1 DESCRIPTION AND OPERATION

The fuel tank (Fig. 1) is held in a vertical position by two steel straps. An insulating pad is positioned between the top of the tank and the underside of the luggage compartment floor pan, and also between the rear vertical wall of the tank and the front wall of the spare tire well.

The fuel gauge sender unit is located on the front side of the tank and is accessible from underneath the car.

The fuel outlet line is fastened to a connecting hose that is attached to the fuel tank sender gauge unit assembly. A filter is located in the tank on the fuel line pick-up tube. **This filter does not require servicing.**

The fuel tank filler pipe opening is located behind a door in the left rear quarter panel, just above and rearward of the wheel house opening. The tank is vented through a vent tube, located on the top of the fuel tank. The filler pipe is attached to the filler pipe housing of the quarter panel. A gasket is positioned between the filler pipe housing and the door housing. The filler pipe is sealed at the tank with an O-ring.

The fuel line is routed from the fuel tank, passing beneath the left side of the underbody; then, under the left fender and through the forward part of the fender apron. The complete fuel line is replaceable as a unit. However, only the damaged segments are usually replaced.

2 REMOVAL AND INSTALLATION

FILLER PIPE

REMOVAL

In some instances, removal of the fuel filler pipe may prove difficult. A fuel tank filler pipe removal tool can be fabricated locally from standard steel shapes that are readily available. Fig. 2 outlines instructions for fabricating the tool.

1. Refer to Fig. 1. Partially drain the fuel tank with a siphon to a level below the filler pipe connection in the tank.
2. Remove the retaining screws securing the filler pipe to the filler pipe housing. Insert the filler pipe removal tool in the filler pipe opening. Rotate the filler pipe with the removal tool and pull it outward to remove it from the fuel tank and housing.
3. Remove and discard the O-ring seal located in the filler pipe opening of the fuel tank.

INSTALLATION

1. Refer to Fig. 1. Install a new O-ring seal in the fuel tank.
2. Position the filler pipe and rotate the pipe into the fuel tank. **Index the filler pipe properly. The word "TOP", inscribed on the filler pipe flange, must face upward. Make certain the O-ring seal is properly seated.** Install and tighten the filler pipe retaining screws.
3. Fill the fuel tank and install the filler cap. Check for fuel leaks.

FUEL TANK

REMOVAL

1. Refer to Fig. 1. Remove the fuel tank filler cap. Drain the fuel from the tank into a suitable container, with the use of a siphon.
2. Disconnect the rear shock absorber upper mounting brackets from the underbody crossmember, from within the luggage compartment.
3. Raise the front of the car and keep the rear wheels lowered. Disconnect the fuel tank gauge sender unit wire, the sender unit ground wire and the fuel line from the sender unit. Also, remove the low fuel level warning device wire, if so equipped.
4. Remove the filler pipe to filler pipe housing retaining screws. Rotate the filler pipe and pull it outward to remove it from the fuel tank and housing.
5. Loosen the nuts and release the tank retaining strap bolts (hooks) from the slotted underbody member of the fuel tank.
6. Remove the tank and discard the filler pipe opening O-ring seal.
7. If the fuel tank is to be replaced, remove the fuel gauge sending unit and discard the gasket. **Note the position of the insulating pad.** Remove the retaining tape and clamps securing the vent tube and hose to the fuel tank. **If the vent tube is damaged beyond repair or leaking fuel at the soldered connection on the fuel tank, the tube must be soldered or replaced. To prevent combustion during soldering operations, completely drain the fuel from the tank; then steam clean the tank and dry it with compressed air.**

INSTALLATION

1. Refer to Fig. 1. If the retaining strap(s) require replacement, install the flanged end(s) of the new strap(s) in the slot(s) of the underbody member. If necessary, properly position the tank insulating pad.
2. If the fuel tank vent pipe was removed from the fuel tank for replacement purposes, solder the new pipe into position. Check the connection for leaks; then, dry the tank. Secure the vent pipe into position on

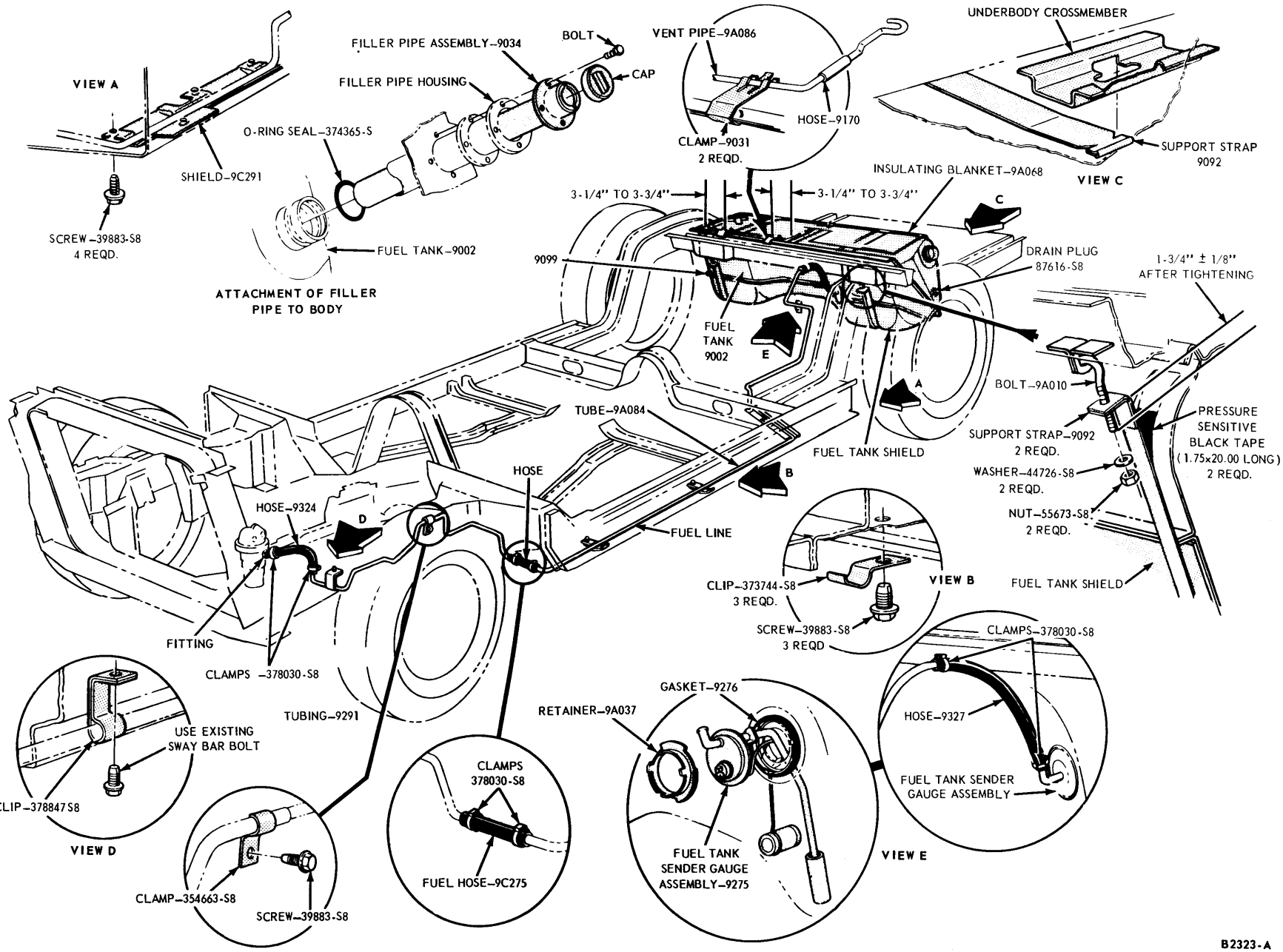

FIG. 1–Fuel System Installation

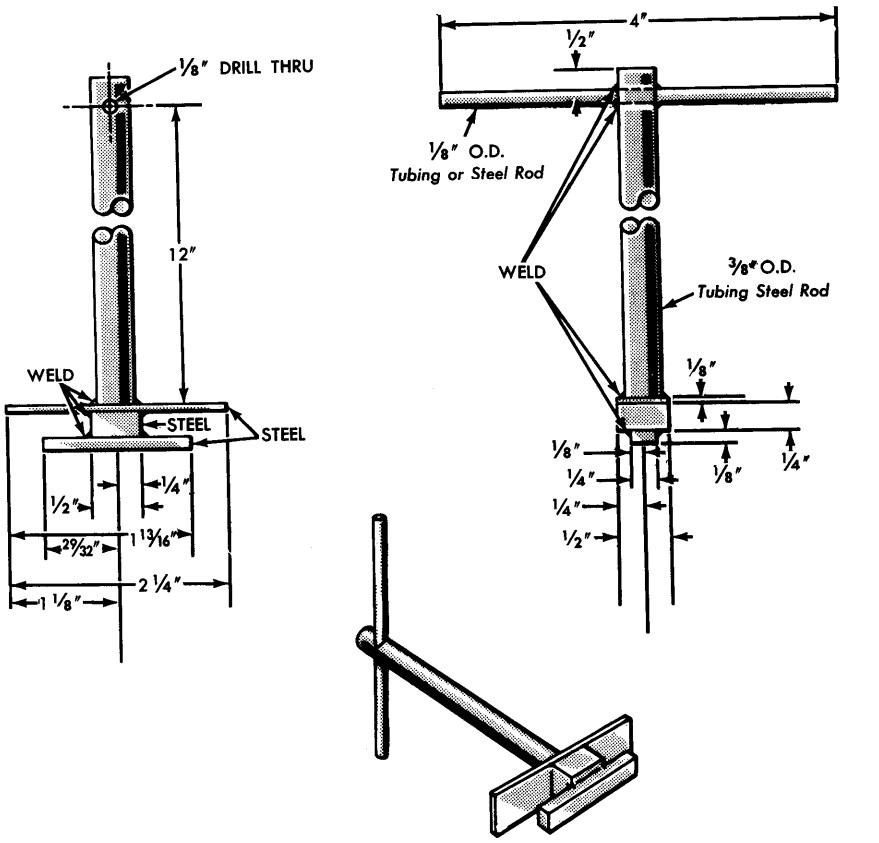

FIG. 2—Fuel Tank Filler Pipe Removal Tool—Fabricated

the tank with new tape and the retaining clamps.

3. If a new tank is to be installed, put new insulating pressure-sensitive black tape on the sides of the fuel tank.

4. Install the fuel gauge sending unit and a new gasket on the tank. Install a new O-ring in the filler pipe opening of the tank. Insert the filler pipe in the filler pipe housing. Carefully position the tank assembly on the retaining straps, and hook the strap bolts in the slots of the underbody member flange. Align the filler pipe opening and the filler pipe, and tighten the tank strap bolt retaining nuts.

5. Position the filler pipe and rotate it into the tank. **Index the filler pipe properly. The word "TOP" inscribed on the filler pipe flange, must face upward. Make certain the O-ring is properly seated in the fuel tank opening.** Install and tighten the filler pipe retaining screws.

6. Connect the sender unit wire, ground wire, and fuel line to the sender unit. Connect the fuel level warning device wire, if so equipped. Install the shock absorbers and torque the retaining nuts to specification.

7. Lower the car. Fill the fuel tank and install the filler cap. Check for fuel leaks.

FUEL LINES

The various fuel lines are not serviced as assemblies. They must be cut, squared and formed out of rolls of fuel system service tubing and hose material of the specified size (Fig. 1), available at dealerships.

A damaged section of **tubing** longer than 12 inches can be cut out of the existing line and replaced by a comparable service **tubing section,** spliced into the line by means of connecting hoses and retaining clamps.

A damaged section of tubing shorter than 12 inches can be cut

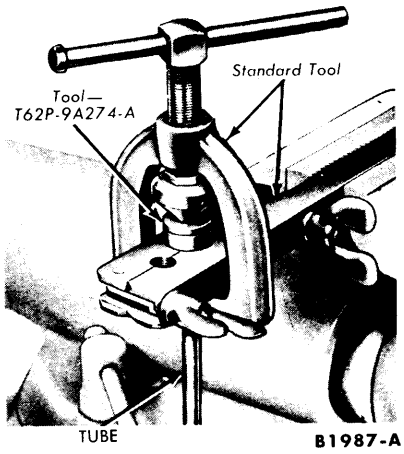

FIG. 3—Fuel Line Tube Die

out of the line and replaced by a length of **service hose** and two retaining clamps. **All replacement hoses must be cut to a length that will insure proper clamp retention beyond the flared ends of the connecting tubing.**

REMOVAL

1. Drain the fuel from the tank.
2. Disconnect the line at the fuel gauge sender unit and the fuel pump. Remove the lines from the holding clips along the underbody. Remove all damaged hose sections and tube sections.

INSTALLATION

1. Cut a new section of tubing to approximately the same length as the section to be replaced. **Allow extra length for flaring the ends of the tubing.** Square the ends of the cut tubing with a file.
2. Ream the inside edges of the cut tubing with the reamer blade on the tube cutter. **Be sure metal chips are removed from inside the tube(s).** Flare the ends of the cut tubing, as required, with a standard tube flaring kit and tool (Fig. 3).
3. Bend the tube section to conform to the contour of the original tube. Cut an ample length of hose to form a coupling between the flared ends of the fuel lines. Connect the hose couplings to the tubing and install the retaining clamps.
4. Position the lines in the underbody clips and tighten the clips. Connect the line to the fuel gauge sender unit and the fuel pump. Fill the tank and check for leaks.

PART 10-6 FUEL SYSTEM SPECIFICATIONS

FUEL PUMP

FUEL PUMP STATIC PRESSURE—Psi @ 500 Engine rpm	
390 (EES)	4.0-6.0
MINIMUM FUEL PUMP VOLUME—Flow @ 500 Engine rpm	
390 (EES)	1 pint in 20 seconds
ECCENTRIC TOTAL LIFT	
390 (EES)	0.690-0.710

FORD 4-BARREL CARBURETOR

The basic part number of the carburetor is 9510. The part number prefix and suffix appears on the identification tag mounted on the air horn.

CARBURETOR PART NO. C5SF-9510-A	
Engine	390 (EES)
Transmission	Automatic
Car Model	All
THROTTLE BORE DIAMETER—Inches	
Primary	1 9/16
Secondary	1 9/16
VENTURI DIAMETER—Inches	
Primary	1 1/8
Secondary	1 3/16
BOOSTER VENTURI CODE LETTER	
Primary	KD
Secondary	BA
MAIN METERING JET IDENTIFICATION NO.	
Primary	
0-5,000 Feet	49F
5,000-10,000 Feet	47F
Secondary	
0-5,000 Feet	60F
5,000-10,000 Feet	58F
POWER VALVE IDENTIFICATION NO. OR COLOR	
0-5,000 Feet	Plain (#85)
5,000-10,000 Feet	Green (#75)
POWER VALVE TIMING—Opens @ Inches of Mercury	7.5-9.5
CHOKE THERMOSTATIC SPRING IDENTIFICATION	TT
CHOKE PLATE PULL-DOWN CLEARANCE—Inches	3/16
CHOKE THERMOSTATIC SPRING HOUSING INITIAL SETTING	
Set at index	

FORD 4-BARREL CARBURETOR (Cont'd)

ACCELERATOR PUMP SETTING
Insert the link in the inboard hole (hole closest to plunger) of the pump lever and the No. 3 hole (third from bottom) in the over-travel lever.

INITIAL FLOAT SETTING—Dry
15/32 ± 1/64 inch from machined surface of main body to top of free end of float—with float in uppermost position.

FUEL LEVEL SETTING—Wet (Inches)*
Primary and Secondary ..... 7/8 ± 1/32
*Distance below the top machined surface of main body.

ANTI-STALL DASHPOT CLEARANCE—Inches 1/16-3/32

DECHOKE CLEARANCE
1/16 inch minimum between choke plate and air horn with primary throttle plates in the wide open position.

FAST IDLE CAM SETTING
1/8 inch clearance between choke plate and air horn with the fast idle screw on the kickdown step (index mark) of the fast idle cam.

INITIAL IDLE MIXTURE ADJUSTMENT—Turns Open* 1½
*Turns back from bottomed needle.

FAST (COLD ENGINE) IDLE ADJUSTMENT* ..... 1500 rpm
*With fast idle screw on the kickdown step (index mark) of the fast idle cam (hot engine).

CURB (HOT ENGINE) IDLE ADJUSTMENT* ..... 475-500 rpm
*Fast idle screw not contacting fast idle cam and the idle compensator seated, with transmission in "Drive" range.

CARBURETOR AIR CLEANER

TYPE	Dry

FUEL TANK CAPACITY

U. S. MEASURE	22 gallons
IMPERIAL MEASURE	18½ gallons

SPECIAL TOOLS

TOOL	TOOL NO.
FLOAT GAUGE	9550-MFB
POWER VALVE TEST FIXTURE	T57L-9904-A
WIRE GAUGES	
0.010 and 0.012	9545-A
0.065 and 0.080	9545-B
0.076 and 0.085	9581-A
0.015	9597
0.020 and 0.030	9597-B