REPAIR
MANUAL
FUEL SYSTEMS
1938—1949

Ford Motor Company of Canada
LIMITED

FOREWORD

This manual contains complete information and instruction on the specifications, maintenance, adjustment, repair or overhaul of the fuel systems used on Ford, Monarch, Mercury, Lincoln and Meteor Automobiles and Trucks and Ford Tractors from 1938 to 1949 inclusive.

Included also are specifications and data on the fuel systems used on vehicles of U.S. manufacture which may be of interest.

For the purpose of this Manual the word "repair" is defined as "restore to good working condition" as distinct from "restore to 'like-new' condition" and some of the recommended repair procedures may not be acceptable reconditioning procedure.

FORD MOTOR COMPANY OF CANADA, LIMITED

SERVICE DEPARTMENT

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Part ONE

MAINTENANCE

Chapter

I

DESCRIPTION AND DATA

111. DESCRIPTION

The fuel systems on the various Ford products consist of fuel tank, fuel pump, and 4-, 6-, 8-, and 12-cylinder engine carburetors, and the various connecting lines.

a. 6-, 8-, and 12-Cylinder Engine Carburetors. Dual downdraft-type carburetors are used on Ford V-8, Meteor, Mercury, Monarch and Lincoln engines. While these carburetors resemble each other, there is a difference in jet sizes, nozzle bars, accelerator pump links, etc. Single downdraft-type carburetors are used on 6-cylinder engines.

b. 4-Cylinder Engine Carburetor. The 4-cylinder engine carburetor is used on the tractor and truck 4-cylinder engines, and is of the single updraft plain tube type. A drain opening is provided in the bottom of the main air intake of the carburetor to allow any excessive collection of fuel to escape. This opening is packed to prevent dust from entering the air intake.

c. Fuel Pump. The fuel pump used on the Ford V-8, Meteor, Mercury, Monarch, and Lincoln engines is of the diaphragm type, and is driven by a push rod actuated by an eccentric on the camshaft. The fuel pump on the 6-cylinder engine is actuated by the eccentric on the camshaft operating directly on the fuel pump rocker arm.

d. Fuel and Vacuum Booster Pump. The combination fuel and vacuum booster pump, used on the series "E" engine, is of the diaphragm type, and is driven by a push rod actuated by an eccentric on the camshaft.

112. DATA.

a. Carburetors.

(1) Main Metering Jet Sizes.

CARBURETOR PART NUMBER	JET SIZES STANDARD	5,000 to 10,000 ft. Altitude	10,000 to 15,000 ft. Altitude
91A-9510-A2	0.050	0.048	0.046
922A-9510-A	0.043	0.041	0.039
ONY-9510	Adjustable Jet		
19B-9510-B	0.050	0.048	0.046
1GA-9510-A	0.064	0.062	0.061
5GA-9510-A	0.065	0.063	0.061
21A-9510-A	0.050	0.048	0.046
C59A-9510-A	0.051	0.049	0.047
H-9510-A3	0.052	0.050	0.048
86H-9510-A2	0.054	0.052	0.050
06H-9510	0.054	0.052	0.050
16H-9510-B	0.054	0.052	0.050
26H-9510-C	0.057	0.054	0.050
8EQ-9510	0.054	0.052	0.050
8EL-9510	0.054	0.052	0.050
8CM-9510-A	0.048	0.046	0.044
C8BA-9510	0.051	0.049	0.047
C7RT-9510	0.051	0.049	0.047

(2) Nozzle Bars Used With Various Carburetors.

CARBURETOR PART NUMBER	NOZZLE BAR PART NUMBER
91A-9510-A2	91A-9922-23
922A-9510-A	922A-9922-23
19B-9510-B	91A-9922-23B
1GA-9510-A	1GA-9920
5GA-9510-A	1GA-9920
21A-9510-A	91A-9922-23
C59A-9510-A	91A-9922-23B
H-9510-A3	91A-9922-23
86H-9510-A2	91A-9922-23
06H-9510	06H-9922-23
16H-9510-B	06H-9922-23

26H-9510-C	06H-9922-23
7RA-9510	91A-9922-23
7HA-9510	1GA-9920
C7RT-9510	91A-9922-23

(3) Float Setting Using Float Level Gauge with Fuel Pump at Operating Pressure.

	Inches
6- And 8-cylinder engine carburetors	1.322 to 1.353
12-Cylinder engine carburetors	1.260 to 1.290
4-Cylinder engine carburetors	0.266 to 0.297
8-Cylinder engine dual concentric fuel level	0.500+ or —0.032

(4) Power Valve Identification Mark.

6- And 8-cylinder engine carburetors	None
12-Cylinder engine carburetors	L
8-Cylinder engine dual concentric carburetor (Truck)	52
(Passenger)	35

(5) Idle Tube Identification Number.

CARBURETOR PART NUMBER	IDLE TUBE IDENTIFICATION NUMBER
1GA-9510-A	99
5GA-9510-A	64
H-9510-A3	64
86H-9510-A2	64
06H-9510	64
16H-9510-B	64
26H-9510-C	54
7RA-9510	54
8EL-9510	54
8EQ-9510	54
8CM-9510	54

(6) Pump Discharge Nozzle Identification Number.

CARBURETOR PART NUMBER	PUMP DISCHARGE NOZZLE IDENTIFICATION NUMBER
922A-9510-A	71
19B-9510-B	69
21A-9510-A	69
59A-9510-A	69
H-9510-A3	69

CARBURETOR PART NUMBER	PUMP DISCHARGE NOZZLE IDENTIFICATION NUMBER
86H-9510-A2	69
06H-9510	69
16H-9510-B	69
26H-9510-C	69
7RA-9510	69
8EL-9510	70
8CM-9510	70
C7RT-9510	69
C8BA-9510	69

(7) Accelerating Pump Link Identification Mark.

PUMP LINK PART NUMBER	IDENTIFICATION MARK	FORD CARBURETOR PART NUMBER	LINCOLN CARBURETOR PART NUMBER
*78-9526-A	6	922A-9510-A	
91A-9526	C	922A-9510-A	H-9510-A3
		91A-9510-A	86H-9510-A
		19B-9510-B	06H-9510
		21A-9510-A	
		59A-9510-A	
		7RT-9510	
		C8BA-9510	
1GA-9526	E	1GA-9510-A	
		5GA-9510-A	
16H-9526	D		16H-9510-B
			26-H9510-C
26H-9526	H		16H-9505-A
			16H-9505-C
			26H-9505-D
8CM-9526	164	C8CM-9510	

*Replaced by 91A-9526

(8) Throttle Shaft.

PART NUMBER	MFG. DIAMETER (INCHES)	WEAR LIMIT DIAMETER (INCHES)
18-9581	0.310-0.311	0.306
67-9581	0.247-0.249	0.243
ONY-9581	0.247-0.248	0.243
8EQ-9581	Ball Bearing	—
8EL-9581	0.276-0.277	0.272

(9) Accelerator Pump Return Spring.

PART NUMBER	LENGTH	SIZE OF WIRE (INCHES)	NUMBER OF COILS
40-9636	1.125-1.375	0.035	11
52-9636	1.125-1.375	0.035	11
78-9636	2.810-2.940	0.035	22
922A-9636	2.810-2.940	0.029	22
1GA-9636	2.810-2.940	0.032	22
8EQ-9636	2.810-2.940	0.032	22
8EL-9636	2.810-2.940	0.032	22
8CM-9636	2.810-2.940	0.032	22

(10) Idle Discharge Holes.

	Upper Hole		Lower Hole	
PART NUMBER	DRILL NUMBER	SIZE (INCHES)	DRILL NUMBER	SIZE (INCHES)
922A-9518	68	0.031	66	0.033
26H-9518	60	0.040	60	0.040
78-9518	65	0.035	60	0.040
1GA-9518	53	0.0595		
8EL-9518	59	0.041	56	0.0465
8EQ-9518	59	0.041	56	0.046
8CM-9518	63	0.037	63	0.037
7RA-9518	60	0.040	65	0.035
8BA-9518	60	0.040	65	0.035

b. Fuel Pumps.

Type ..... Diaphragm
Drive (8-cylinder) ..... Push rod from Eccentric on Camshaft
Drive (6-cylinder) ..... Rocker arm from Eccentric on Camshaft
Pressure ..... 1½ to 3½ lbs.
Pressure 8EQ-9350 ..... 3½ to 4½ lbs.
Pressure 7HA-9350 ..... 4 to 5 lbs.
Pressure 8CM-9350 ..... 3½ to 4½ lbs.

(1) Diaphragm Springs.

	Spring Pressure Compressed to 0.625 Inch	
PART NUMBER	MAXIMUM (POUNDS)	MINIMUM (POUNDS)
B-9396	7.4	6.12
40-9396	8.6	7.10
49B-9396-A	18	10

PART NUMBER	MAXIMUM (POUNDS)	MINIMUM (POUNDS)
49B-9396-B	21	18
26H-9396	10.4	10.4
8EL-9396	25 at 0.590	23 at 0.590
8EQ-9396	25 at 0.590	23 at 0.590
8CM-9396	11.5 at 0.590	10.5 at 0.590
7RA-9396A	11 lbs. 6 ozs.	10 lbs. 10 ozs.

(2) Rocker Arm Spring.

Spring Pressure Compressed to 0.81 Inch

PART NUMBER	MAXIMUM (POUNDS)	MINIMUM (POUNDS)
B-9380	7.25	6.75
40-9380	7.25	6.75
49B-9380-A	14	10
49B-9380-B	14	10

(3) Fuel Pump Push Rod.

PART NUMBER	MFG. LENGTH (INCHES)	WEAR LIMIT LENGTH (INCHES)
18-9400-A	6.541	6.535
18-9400-B	8.095	8.089
48-9400-A	8.872	8.866
48-9400-B	7.872	7.866
52-9400-A	5.620	5.614
52-9400-B	5.370	5.364
86H-9400	8.872	8.866
26H-9400	8.872	8.866
8EQ-9400-B	11.700	11.694
8EL-9400-B	11.700	11.694
8BA-9400	10.064	10.058
7RA-9400-B	10.064	10.058

(4) Governor Cut-Off Speed (U.S. Trucks).

MODEL	NO-LOAD CUT-OFF R.P.M.
F8-Truck	3600
F7-Truck	3600

(5) Diaphragm Spring Vacuum Pump.

Spring Compressed Inches

PART NUMBER	MAXIMUM (POUNDS)	MINIMUM (POUNDS)
8CM-17175	28 at 1.720	24 at 1.720
8EL-17175	64 at 1.810	56 at 1.810
8EQ-17175	64 at 1.810	56 at 1.810

Chapter II

MAINTENANCE AND TROUBLE SHOOTING

121. MAINTENANCE AND ADJUSTMENTS.

Periodic use of the performance assurance procedures listed below will generally remove the possibility of trouble with the fuel system. These procedures may be performed at 5000-mile intervals, each Spring and Fall, or during a tune-up.

a. Performance Assurance Procedure.

(1) Tighten the fuel tank hold-down bolts and fuel line connection at the fuel tank.

(2) Drain a quantity of fuel from the tank to remove any accumulation of water or sediment in the tank.

(3) Tighten the intake manifold nuts and cap screws.

(4) Remove the fuel pump cover and clean the sediment chamber. Install the cover, using a new gasket.

(5) Disconnect the fuel pump inlet line, and connect a vacuum gauge to the fuel pump. Start the engine and run it at idle speed. If the vacuum is below 10 inches, repair or replace the pump. Reconnect the fuel line, using a new flexible line if required. Disconnect the fuel pump outlet line and connect a pressure gauge to the fuel pump outlet. Refer to Specifications (Sec. 112) for the correct pressure of the various fuel pumps. Reconnect the fuel line.

(6) Clean the carburetor air cleaner element. If the engine is equipped with an oil bath type cleaner, clean the oil reservoir and fill it to the level mark with the specified oil. Remove the air cleaner and observe if a spray of gasoline comes from the pump discharge nozzle (located inside the carburetor air throat) each time the throttle is opened fully. Repair or replace the carburetor if the accelerator pump is binding or if no spray or a very light spray is observed (carburetor pump mechanism or check valve is faulty).

(7) Adjust carburetor as outlined in par. **b** below.

b. Carburetor Adjustments.

(1) **Idle Speed.** Adjust the carburetor idle speed adjustment so that the idle speed of the engine is approximately 400 revolutions per minute.

(2) **Idle Fuel.** On downdraft carburetors, if required, manipulate the idle fuel adjustment 1/2 to 1 1/4 turns from closed position until the engine idles smoothly.

NOTE: Turning idle needle out makes mixture richer.

The idle fuel adjustment on the 4-cylinder carburetor requires approximately 2 1/2 turns from closed position. The approximate adjustment for the main jet requires 1 1/4 to 1 1/2 turns from closed position.

(3) **Accelerating Pump Stroke.** Check the identification mark on the pump link to make sure the link is the correct one for the particular carburetor. Make sure the pump link is in the proper hole in the throttle lever for the prevailing temperature. The hole farthest from the pivot is for extremely cold temperature, the hole closest to the pivot is for extremely hot temperature, and the centre hole is the average setting.

(4) **Float Level.** Set the float level according to the specifications in section 112.

122. TROUBLE SHOOTING.

What appears to the owner as fuel system or carburetor trouble may actually be ignition or mechanical trouble. Actual fuel system troubles are usually described as: excessive fuel consumption is to be expected at higher elevations. Atmospheric fuel mixture too lean, each of which is covered in this section.

NOTE: The tractor fuel system has neither a fuel pump nor a flexible fuel line. When working on a tractor, disregard the portions of the procedures that refer to either flexible line or fuel pump.

a. Excessive Fuel Consumption. Some variation in fuel consumption is to be expected at higher elevations. Atmospheric conditions are also factors, and the results will be affected by air temperature and pressure.

Consult your local authorized dealer for normal fuel consumption data.

(1) **Preliminary Instructions.** Many conditions not directly connected with the fuel system can result in excessive fuel consumption, as follows:

Make sure the brakes are not dragging and that the tires are inflated to the specified pressure.

Make sure the exhaust tail pipe has not been bent or plugged with mud so as to cause restriction of the exhaust.

Observe the type of wear on the front tires to determine if the toe-in adjustment is incorrect, and adjust the tie rod if required.

Make sure that the spark plugs are spaced correctly.

Make sure the accelerating pump link is in the correct position for the season.

Test spark intensity. Determine if the spark from each spark plug wire will jump a 14 kilovolt gap setting.

(2) **Procedure.** The following tests should be made in the order given, and, by process of elimination will, in nearly every case, determine the cause of the complaint.

(a) **Test Fuel Consumption.** Use a mileage tester having a 1/10-gallon measure, and multiply the speedometer readings by 10 to obtain the miles per gallon. The test must be made on a straight and level road, and must be taken both with and against the wind to arrive at the average miles per gallon. If possible, have the owner along during the test. Make one test while driving the vehicle, and, if the fuel consumption is normal, a second test with the owner driving.

(b) **Observe Owner's Driving Habits.** While the owner is driving, observe his driving habits and tactfully point out to him any practices that may account for the excessive fuel consumption. Let him see how quickly 1/10-gallon of fuel is used up during acceleration in second gear.

(c) **Check Ignition Timing on the Road.** If the fuel consumption is found to be higher than normal, accelerate the engine with the brakes partially applied. If a ping is not heard, it indicates the ignition timing is late. Correct ignition timing. Repeat the test.

NOTE: If the above procedure has not corrected the higher than normal fuel consumption, proceed as follows, omitting those operations that have already been performed.

(d) **Clean Air Cleaner.** Clean the filter element of the air cleaner. Replace the dampening pad in the cover of the filter if it has sagged and is restricting the air flow. If the engine is equipped with an oil bath cleaner, clean it thoroughly and refill it to the specified level with the same grade of oil as used in the engine.

(e) **Check Carburetor on Vehicle.** With the air cleaner removed, make sure that the choke valve opens fully each time the choke button is pushed IN. Make whatever adjustments are required. Run the engine at idle speed (400 R.P.M.), and turn the idle fuel adjusting screws completely closed. If the engine continues to run, if only for a short period, it indicates that there are gum or varnish deposits on the throttle bores close to the throttle plates (subpar. (h)).

(f) **Clean and Space Spark Plugs and Test Engine Compression.** Clean and adjust spark plugs. Sand blast the spark plugs, wipe the porcelain clean, and adjust the spark gap to 0.025 inch for plastic case coils or 0.028 inch for metal can type coils. Replace any plugs that have broken or chipped porcelain, or badly burned electrodes. Test the compression of each cylinder. Make the necessary repairs to the valves, rings, or pistons.

(g) **Test Fuel Pump.** If the pressure is not within specifications, repair or replace the pump.

(h) **Remove and Disassemble Carburetor.** Remove and disassemble the carburetor. Clean all parts (see Part FOUR "Cleaning Zinc Alloy Castings"). Examine the throttle bores where the throttle plates contact the bores when they are in the closed position, and remove any gum or varnish deposits. Examine the float for leakage. Examine the condition of the float valve and seat. Check the size of the main metering jets. Refer to carburetor specifications (sec. 112) for the correct jet sizes for the various carburetors. Make repairs as required and set the float to the correct level (sec. 112 a (3).

(3) **Additional Possible Causes.**

(a) **If the Trouble Is Still Not Corrected.** The above procedure will correct excessive fuel consumption in nearly every case. Several other unlikely conditions are possible, however, and, if the trouble is still not corrected, one of the following may be the cause:

(1) **Brakes Dragging When Hot.** Make sure that the brake pedal has necessary free travel and that the brake master cylinder vent is not obstructed.

(2) **Hand Brake Dragging.** Owner may not have been fully releasing the hand brake.

(3) **Excessive Exhaust Back Pressure.** If it is suspected that there is excessive exhaust back pressure due to clogged muffler,

clogged or bent tail pipe, etc., make the test outlined in subpar. (2) (a) above with the exhaust disconnected (unless prohibited by local laws).

(4) **Camshaft Out of Time.** If either gear has been replaced, major repairs have just been made, or if the main bearings have been replaced, the crankshaft may have been dropped low enough to put the gear out of time. Remove the gear cover to inspect.

(5) **Too Little Valve Clearance.** Too little valve clearance may result in the valves not completely closing when hot (does not apply with hydraulic lifters). Remove the valve chamber cover to inspect.

(6) **Too Much Valve Clearance.** Too much valve clearance may result in the valves opening late and closing early (does not apply with hydraulic lifters). Remove valve chamber cover to inspect.

(7) **Engine Tightness.** Wrong size parts may have been installed. This is particularly true if piston rings have been installed without sufficient gap.

(8) **Valves Sticking.** It is possible for the valve action to be sluggish during operation and not show up as noisy at idle speed.

b. Fuel Not Reaching the Carburetor. If the vehicle is equipped with a fuel shut-off valve, make certain it is open and that there is sufficient supply of fuel in the tank. Make sure that the fuel tank vent is open.

(1) **Procedure.**

(a) **Check Fuel Line.** Remove the flexible tube from the fuel pump, and replace it if it leaks air or if the passage is obstructed. Sometimes the lining of this tube comes loose and obstructs the passage under suction; also some replacement tubes are not reinforced and collapse under suction. Remove the fuel tank filler cap and blow out the fuel line.

(b) **Check For Water in Fuel Tank.** Remove the drain plug, and drain any accumulation of water or sediment from the tank. In freezing weather, water in the fuel tank or fuel line will freeze, and may prevent the fuel from reaching the carburetor. Allow the tank to reach room temperature before draining.

(c) **Check Fuel Pump.** Remove the fuel line between the fuel pump and the carburetor, and blow through the line to make sure it is not clogged. With the ignition switch OFF, crank the

engine with the starter. If a free flow of fuel is not evident, it indicates the fuel pump is faulty and must be repaired or replaced. If the fuel pump and the fuel line are found to be satisfactory, it indicates an obstruction in the carburetor. Remove the carburetor, clean and inspect the carburetor float valve mechanism.

c. Carburetor Floods. In addition to the engine running unevenly, a strong odor of gasoline is usually present when the carburetor is flooding. If the carburetor is flooding due merely to over-choking, open the throttle wide and crank the engine to exhaust the rich gases in order to start the engine.

(1) **Procedure.**

(a) **Check Carburetor Choke Action.** Remove the air cleaner, and operate the choke rod and observe if the carburetor choke plate opens freely. If the choke action is faulty, make necessary corrections.

(b) **Check Fuel Pump Pressure.** Test the fuel pump pressure with the engine running at idle speed. If the pressure is found to be not normal, refer to Specifications (sec. 112) for the correct pressure of the various pumps. Test the push rod stroke and the rocker arm free play, and make the necessary repairs or replacements.

(c) **Remove and Disassemble Carburetor.** Remove and disassemble the carburetor. Clean all parts, examine the float for leaking and the condition of the float needle valve and seat. Make repairs as required and set the float level. Reinstall the carburetor on the engine.

d. Fuel Mixture Too Lean.

(1) **Procedure.**

(a) **Check Fuel Tank Vent and Lines.** Make sure that the fuel pump drain plug and the cover are seated firmly and not leaking, and that the fuel tank vent is open and unrestricted. Remove the flexible line at the intake side of the fuel pump, and replace it if there is any indication of leakage. Remove the fuel tank cap, then blow compressed air back through the fuel line to remove any obstructions.

(b) **Test Fuel Pump.** If the pressure is not within specifications, repair or replace the pump.

(c) **Clean and Adjust Carburetor.** Remove, disassemble, and clean and carburetor, making the necessary repairs. Set the float level. Set the accelerating pump link in the proper hole for the prevailing temperature. Make sure the accelerator linkage permits a full throttle opening.

(d) **Test Engine Vacuum.** Tighten the intake manifold screws or nuts. Connect a vacuum gauge to the windshield wiper connection of the intake manifold, and observe the readings as the engine idles. If the vacuum is lower than normal, it may be due to leakage, incorrect idle adjustment, or bad valves. Points at which the manifold vacuum may leak are: Any vacuum line (distributor, windshield wiper, two-speed axle shift, power brake, etc.), intake manifold gasket, or intake manifold.

Part TWO
CARBURETOR REPAIR
Chapter I
6-, 8-, AND 12-CYLINDER ENGINE CARBURETORS

211. DISASSEMBLY.

This procedure covers the disassembly of both the dual and single downdraft-type carburetors. Refer to Chapter III for procedure covering the 8-cylinder engine dual concentric carburetor.

a. Dual. A dual carburetor is used on both the V-8 and V-12 engines.

(1) **Remove Choke Lever and Throttle Kicker.** Remove the screw and flat washer that secure the choke lever to the air horn, and remove the lever. Lift the choke lever plunger and spring (fig. 1) from the air horn. Remove the screw and flat washer that secure the throttle kicker to the main body. Lift the throttle kicker and spring from the main body. Disconnect the pump link from the pump rod and throttle shaft lever.

(2) **Remove Throttle Body and Air Horn from Main Body.** Remove the three screws that secure the throttle body to the main body. Lift the throttle body and gasket from the main body. Remove the five screws that secure the air horn to the main body. Lift the air horn and gasket from the main body.

(3) **Disassemble Main Body.** Lift the accelerating pump assembly from the main body. Remove the two screws from each nozzle bar clamp (fig. 3), and remove the clamps. Lift the pump discharge nozzle and the two nozzle bars (fig. 3) from the main body. Remove the two drain plugs and gaskets from the main body. Remove the two main jets as shown in fig. 4. Remove the power valve and gasket. Remove the pump check ball retainer from the main body with a piece of wire with a hook on the end

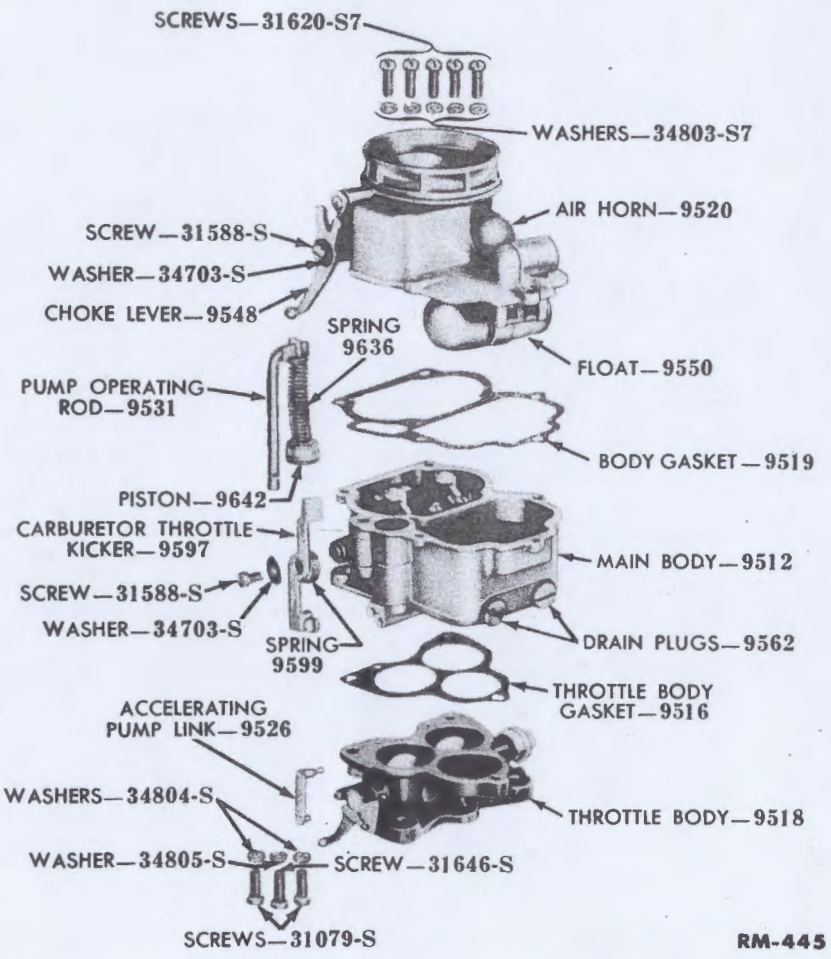

Figure 1—Carburetor, Disassembled (Dual Downdraft)

of the wire. Place a hand over the top of the main body, and turn the main body over to remove the pump check ball and pump discharge needle.

(4) **Disassemble Air Horn.** Remove the float lever shaft, float, and float needle valve from the air horn (fig 5). Remove the float needle valve seat with a jet wrench. Remove the two screws that secure the choke plate to the choke shaft. Remove the choke plate from the shaft, then remove the shaft.

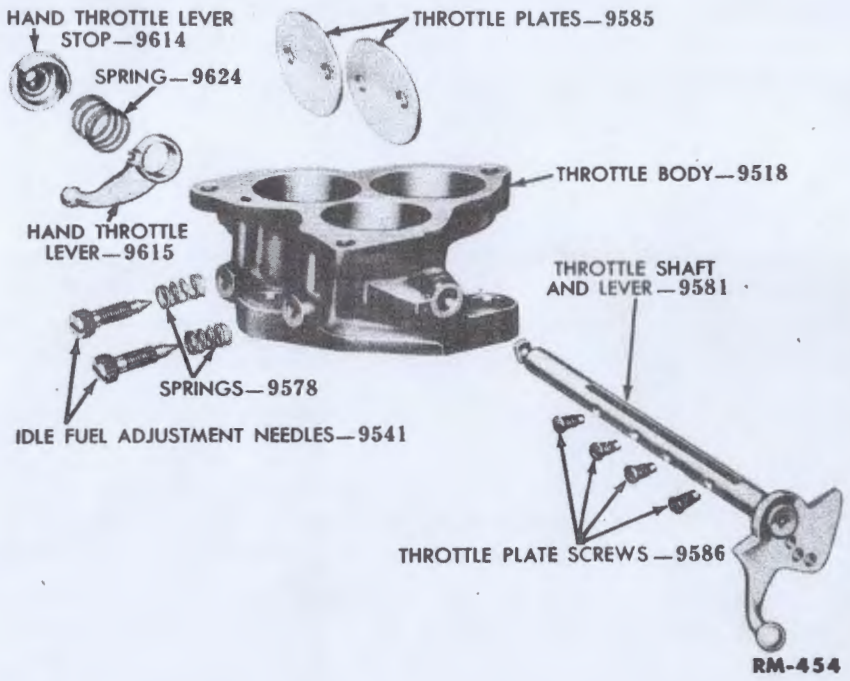

Figure 2—Throttle Body, Disassembled (Dual Downdraft)

b. Single Type. Single type carburetors are used on the 6-cylinder engine.

(1) **Remove Air Horn.** Remove the screw that secures the choke wire bracket to the air horn. Remove the cotter pin from the idler lever shaft, and remove the idler lever from the shaft. Separate the idler lever from the fast idle rod. Turn the fast idle rod (fig. 6) until the spline on the rod is in line with the slot in the choke shaft lever, then remove the rod. Remove the four remaining screws that hold the air horn to the main body, and separate the two assemblies.

(2) **Remove Throttle Body.** Hold the throttle lever in open position, and remove the pump link retainer from the pump link (fig. 6). Remove the pump link. Remove the two screws that hold the throttle body and shaft to the main body. Separate the throttle body from the main body.

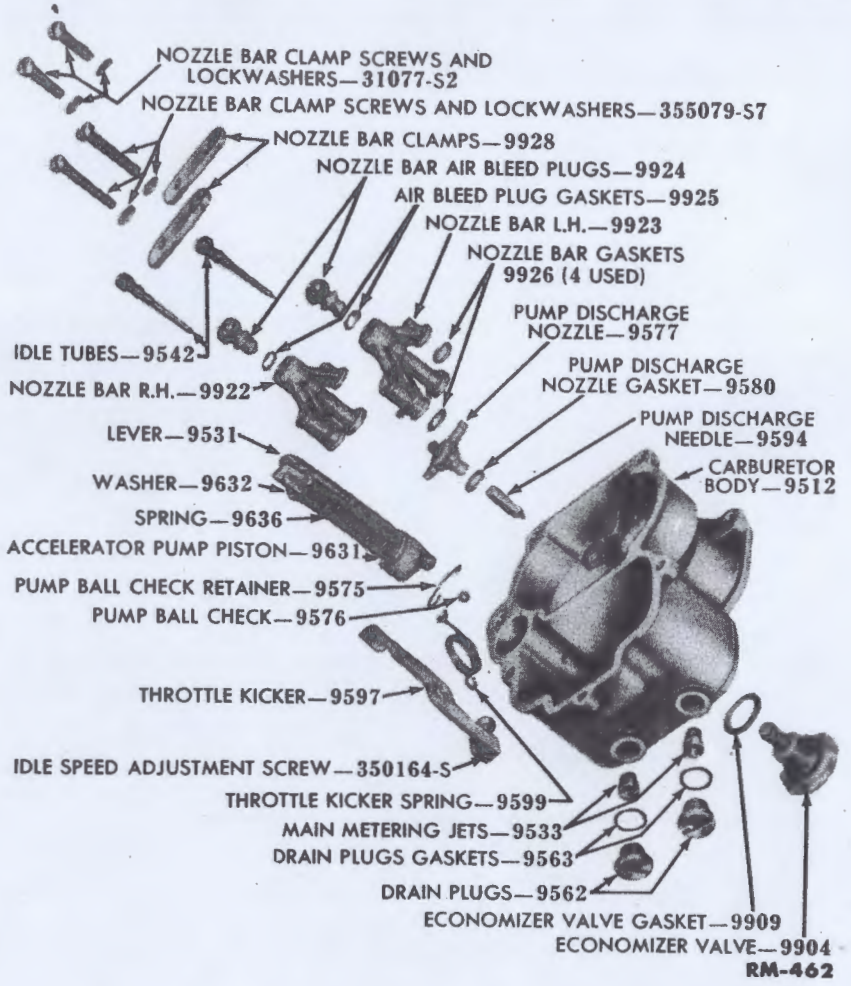

Figure 3—Main Body, Disassembled (Dual Downdraft)

(3) **Disassemble Main Body.** Lift the accelerating pump assembly (fig. 8) from the main body. Remove the two nozzle bar clamps (fig. 9), and lift the nozzle bar from the main body. Remove the power valve (fig. 10) with a jet wrench. Remove the main jet (fig. 10) with a jet wrench. Remove the carburetor pump check ball retainer (fig. 8) with a piece of wire with a hook on the end of the wire. Place a hand over the top of the main body, and turn the body over, being careful not to lose the pump check ball and the pump discharge valve (fig. 10). Remove

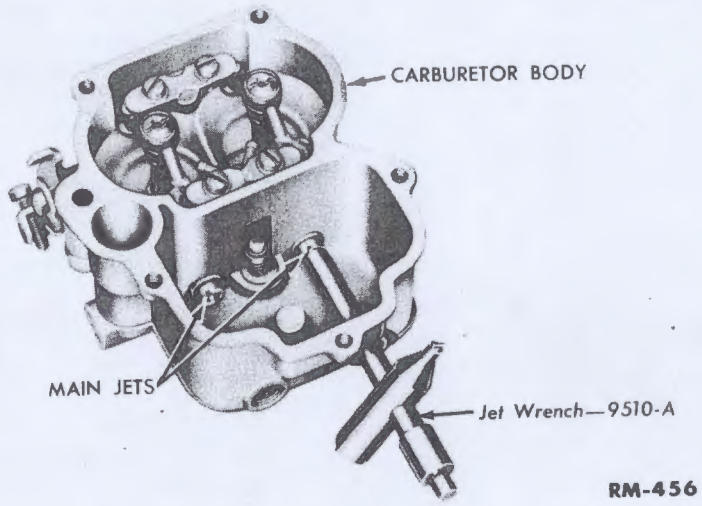

Figure 4—Removing Main Jet

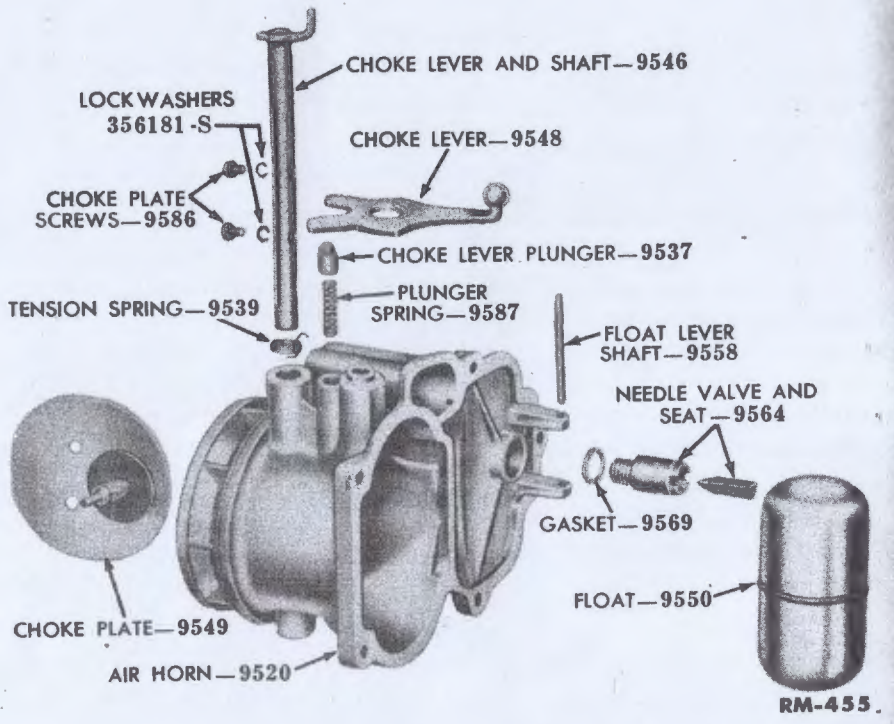

Figure 5—Air Horn, Disassembled (Dual Downdraft)

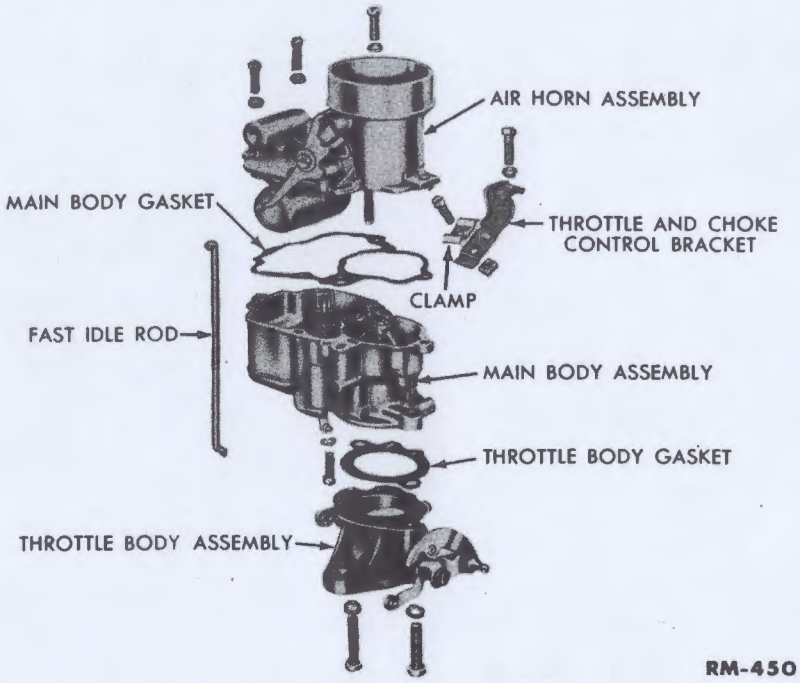

Figure 6—Carburetor, Disassembled (Single Downdraft)

the idle tube and nozzle air bleed plug from the nozzle bar (fig. 9) with a jet wrench.

(4) **Disassemble Air Horn.** Remove the float lever shaft and float from the air horn. Lift the float needle valve from the valve seat. Remove the float needle valve seat from the air horn with a jet wrench. Pull the power valve piston assembly (fig. 11) from the air horn. Remove the screw and washer that secure the choke lever to the air horn. Lift the choke lever from the air horn. Remove the choke lever plunger and spring (fig. 11) from the air horn. Remove the two screws that secure the choke plate in the shaft. Hold the choke lever in the open position, and remove the choke plate. Remove the choke shaft and lever assembly from the air horn.

212. CLEANING, INSPECTION, AND REPAIR.

Most carburetor troubles are the result of deposits of foreign matter in the carburetor, and thorough cleaning usually is the

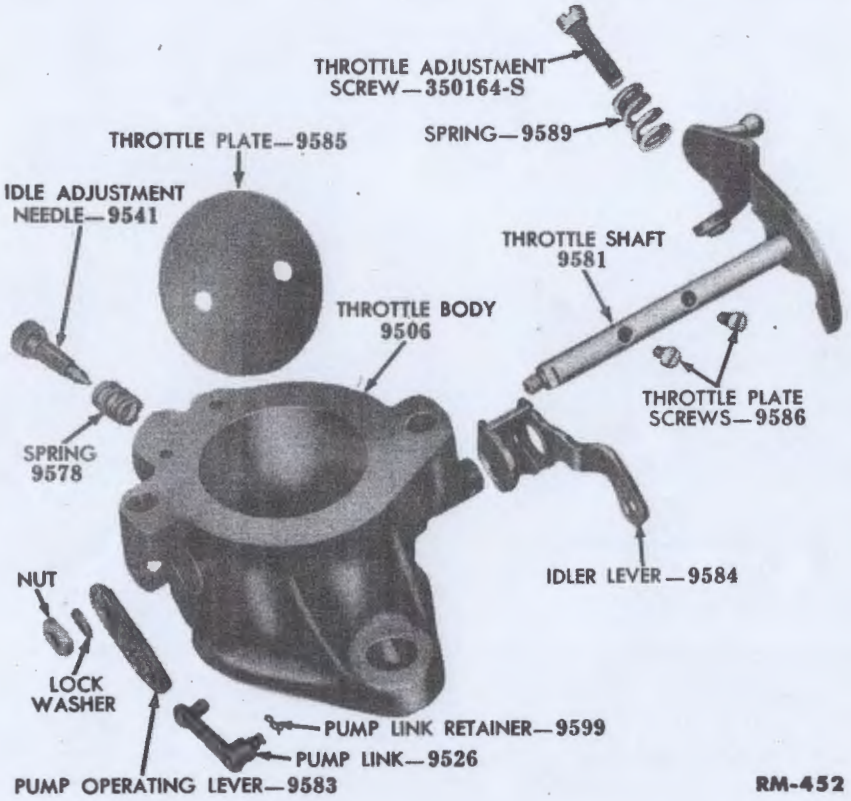

Figure 7—Throttle Body and Shaft, Disassembled (Single Downdraft)

only work required. Several cleaning solutions are available that are made especially for cleaning carburetor parts. In the absence of a special cleaner, alcohol or lacquer thinner may be used, (see Part FOUR, also).

NOTE: Do not use on dual carburetor power valve. The diaphragm may be damaged.

a. Throttle Body. The throttle body of the carburetor controls the mixture at idle speed. Wash the throttle body thoroughly in a cleaning solution. Make certain that any gum or varnish is removed from the throttle bores where the throttle plates contact when they are in the closed position. Clean out the idle feed holes in the throat above the throttle plates with a drill (see Specifications, sec. 112 for correct drill size). Clean the idle adjusting holes. Reface the idle adjusting needle seat (fig. 12). With the

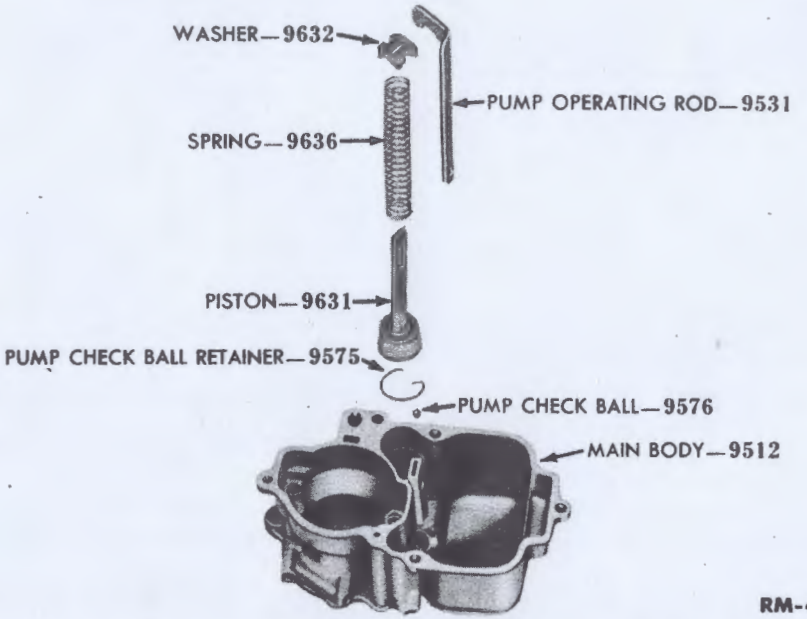

Figure 8—Accelerating Pump Assembly, Disassembled

throttle plates or plate in a closed position, hold the throttle body against a light background. If an excessive amount of light shows between the throttle plates or plate and body, replace the throttle body. Replace the idle adjusting needle if a ridge is visible on the valve surface of the needle.

b. Main Body. Wash all parts thoroughly with a cleaning solution. Blow out all passages with compressed air. Replace the main body (figs. 1 and 6) if it is cracked, has nicks large enough to permit leakage on any gasket surface, or if it has stripped threads.

NOTE: On dual downdraft carburetors, if the main body is provided with a shoulder at the pump rod opening, remove the shoulder (fig. 13).

(1) **Accelerating Pump Assembly.** Replace the pump piston spring if it is broken. Replace the pump piston if the leather cup is worn or damaged, or if the pump piston expander spring is broken.

(2) **Idle Tube.** Replace an idle tube (figs. 3 and 9) that is plugged, bent, damaged, or if the screw driver slot is damaged.

(3) **Main Jets.** Replace a main jet (figs. 3 and 9) if the threads are stripped or if the screw driver slot is damaged.

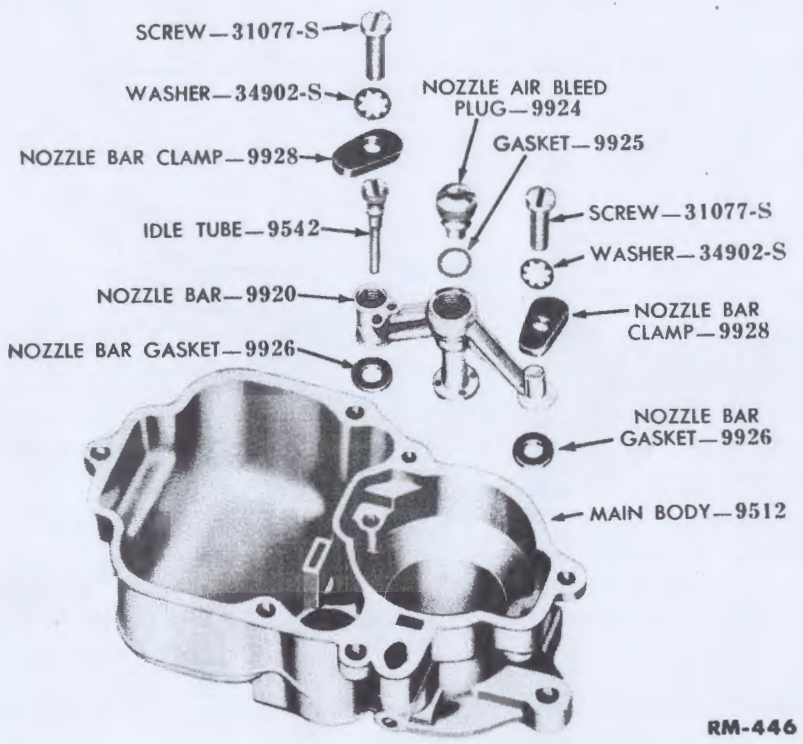

Figure 9—Nozzle Bar, Disassembled (Single Downdraft)

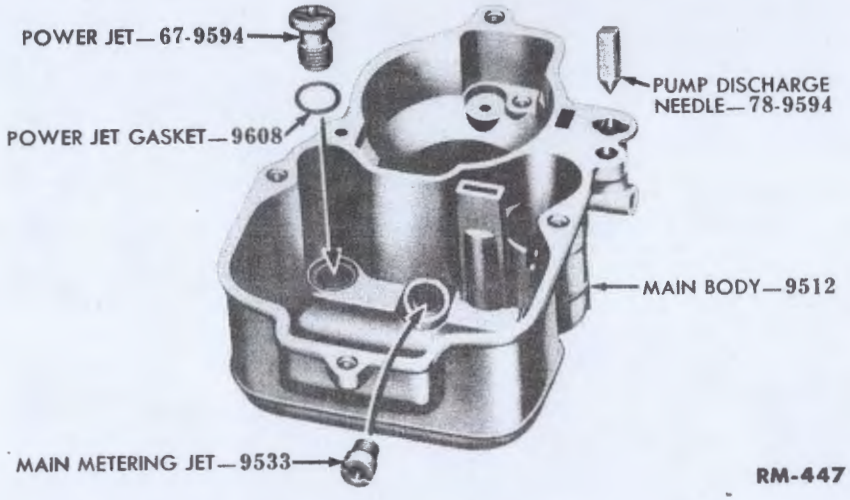

Figure 10—Main Body and Jets, Disassembled

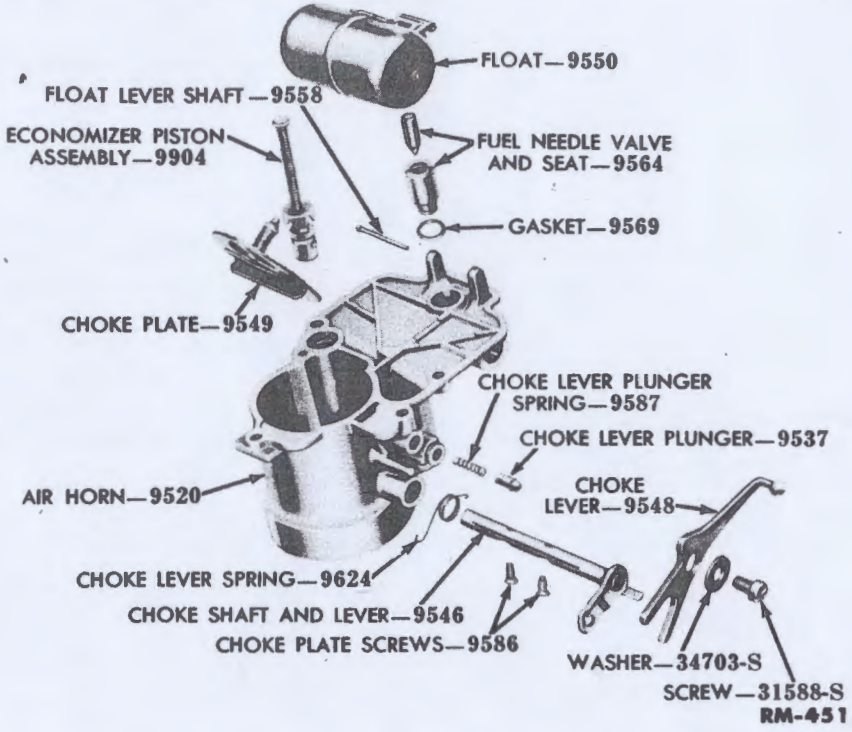

Figure 11—Air Horn, Disassembled (Single Downdraft)

(4) **Pump Discharge Needle.** Replace a pump discharge needle (fig. 10) if it is ridged.

(5) **Nozzle Bar Air Bleed.** Replace a nozzle bar air bleed plug (figs. 3 and 9) that is clogged, if the threads are stripped, or if the screw driver slot is damaged.

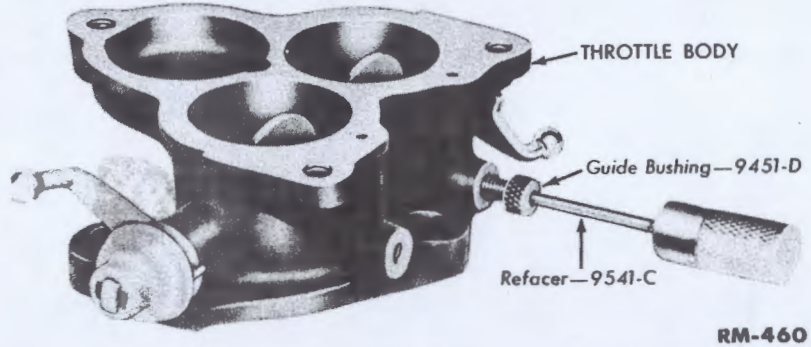

Figure 12—Refacing Idle Adjusting Needle Seat

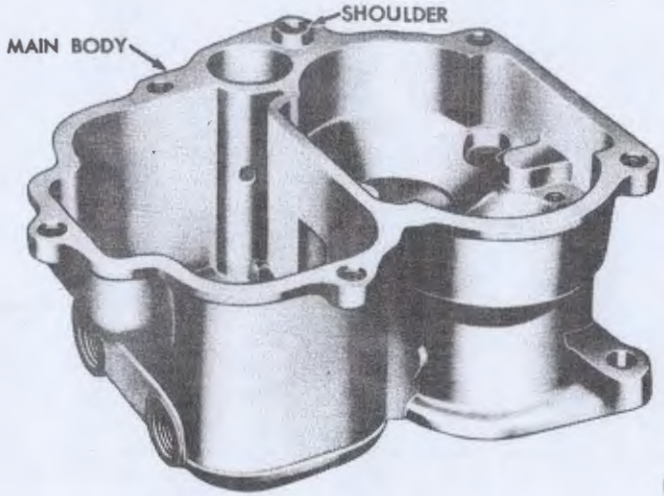

Figure 13—Shoulder Around Hole for Pump Rod (Dual Downdraft)

(6) **Check Valve.** Replace the check ball (figs. 3 and 8) if it is damaged or corroded.

(7) **Nozzle Bar.** Replace a nozzle bar that is damaged in any way.

(8) **Pump Discharge Nozzle (Dual Downdraft Carburetor Only).** Replace a pump discharge nozzle (fig. 3) if it is plugged, broken, or damaged in any way.

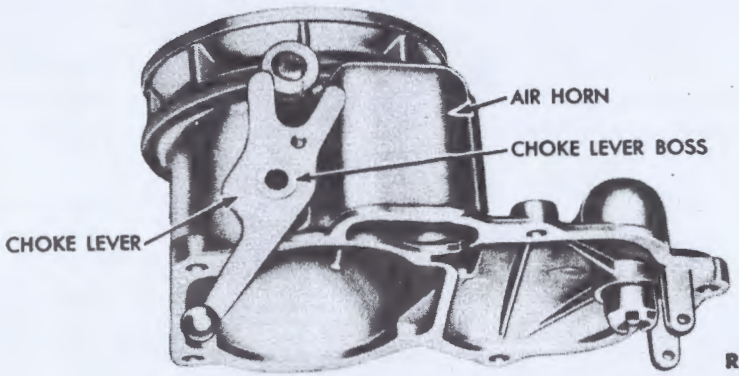

Figure 14—Checking Wear of Choke Lever Boss

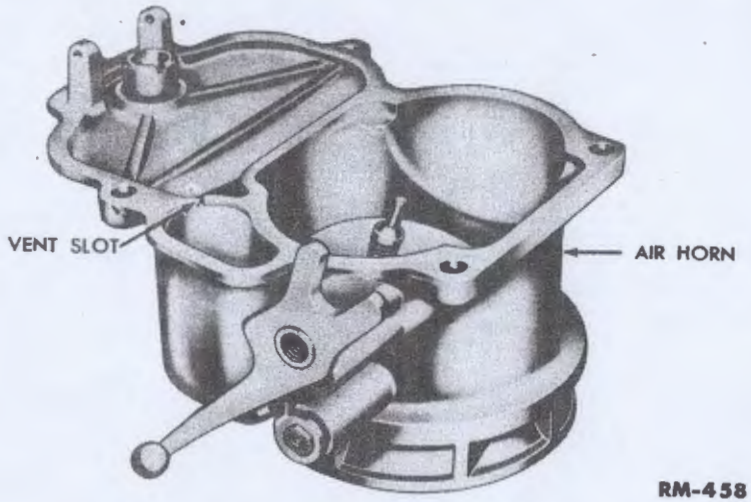

Figure 15—Vent Slot (Dual Downdraft)

(9) **Power Valve.**

NOTE: On single type carburetors, replace the power valve (fig. 10) if it is leaking, if the spring is broken, if the valve will not seat, or if the slot is damaged.

c. **Air Horn.** Clean all parts thoroughly in a cleaning solution, and blow out all passages with compressed air. Replace the air horn if it is cracked or has nicks large enough to permit leakage on any gasket surface. Place a new choke lever on the choke lever boss. (fig. 14). Replace the air horn if the clearance is excessive between the boss and the choke lever.

NOTE: On dual-type carburetors, if there is no vent in the air horn between the float chamber and the accelerating pump rod head clearance chamber (fig. 15), a vent slot must be cut with a small file or hack saw blade.

(1) **Float.** Replace the float if it is leaking or if it is bent or damaged in any way.

(2) **Choke Plate.** Replace the choke plate if the poppet valve spring (figs. 5 and 11) is weak or broken, or if the plate is bent or damaged.

(3) **Choke Shaft and Lever.** Replace the choke shaft (figs. 5 and 11) and lever if the shaft is worn or bent, if the threads are stripped, or if the lever is damaged or loose on the shaft.

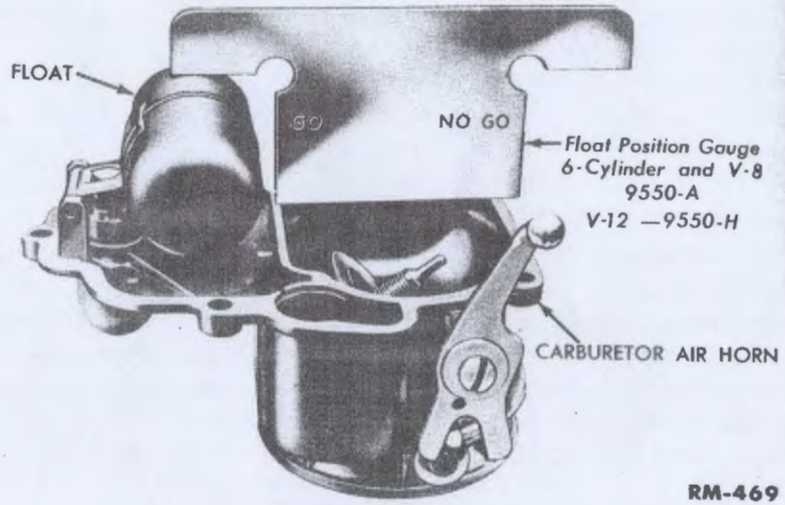

Figure 16—Measuring Float Level (Dual Downdraft)

(4) **Choke Shaft Spring.** Replace the choke shaft spring (figs. 5 and 11) if it is broken.

(5) **Float Needle and Valve Seat.** The float needle and valve seat are matched in sets, therefore, when one is faulty, both must be replaced. Replace both the needle and the seat (figs. 5 and 11) if there is any indication of wear on either part.

(6) **Piston and Stem Power Valve Assembly (Single Downdraft Only).** Replace the piston and stem assembly (fig. 11) if the piston is scored or worn. Replace the piston and stem if the stem is bent or if the spring is broken.

(7) **Choke Lever.** Make a visual inspection of the choke lever for wear on ball end and also for wear in the V opening which operates the lever on the choke plate shaft. Replace the choke lever if the wear is excessive.

213. ASSEMBLY.

This procedure covers both the dual and single type carburetor.

a. Dual Type. This type carburetor is used on the 8- and 12-cylinder engines. Refer to Chapter III for procedure covering the 8-cylinder engine dual concentric carburetor.

(1) **Assemble Air Horn.** Install the float needle valve seat and new gasket with a jet wrench. Install the choke shaft and

choke shaft spring in the air horn. Hook the choke shaft spring in the slot provided in the air horn so the choke plate will remain in the closed position. Place the choke plate in the shaft, and install the two choke plate screws. Stake the screws in place in the shaft. Install the float needle valve and float in the air horn. Measure the float level with a gauge as shown in fig. 16. Set the float to the correct level.

(2) **Assemble Main Body.** Install the two main jets as shown in fig. 4. Install the two drain plugs and new drain gaskets. Install the power valve, using a new gasket. Place the pump discharge needle and pump discharge nozzle and a new gasket in the main body (fig. 3). Place four new nozzle bar gaskets in place in the main body. Place the two nozzle bars in the main body, and secure them to the main body with the two nozzle bar clamps (fig. 3). Install the pump check ball and retainer in the main body. Install the accelerator pump assembly in the main body.

(3) **Install Throttle Body and Air Horn on Main Body.** Place a new throttle body gasket on the main body. Secure the throttle body to the main body with three screws and lock washers. Place a new body gasket on the main body, and secure the air horn to the main body with five screws and lock washers.

(4) **Install Choke Lever and Throttle Kicker.** Secure the throttle kicker and spring to the main body with a screw and flat washer. Install the choke lever plunger spring and plunger in the main body (fig. 1). Position the choke shaft lever in the V of the choke lever, and secure the choke lever to the main body with a screw and flat washer.

b. Single Type Carburetor. Single type carburetors are used on the 6-cylinder engine.

(1) **Assemble Air Horn.** Install the choke shaft and spring in the air horn (fig. 11). Connect the choke lever spring on the peg provided on the side of the air horn. Install the choke plate in the shaft with the flanged side of the choke plate facing upward. Secure the choke plate in the shaft with two screws. Stake the screws in place. Install the choke lever, plunger, and spring on the air horn (fig. 11). Place the choke lever on the boss on the air horn. Making sure the stop on the choke shaft lever is in the V of the choke lever, install the screw and flat washer. Install the piston and stem power valve piston assembly in the air horn (fig. 11). Place a new gasket on the float needle valve seat, and install

it in the air horn with a jet wrench. Install the float needle valve and float in the air horn. Measure the float level with a gauge as shown in fig. 16. Set the float to the correct level (sec.112. a (3)).

(2) **Assemble Main Body.** Place a new gasket on the power valve, and install the valve in the main body with a jet wrench. Install the main jet in the main body with a jet wrench. Drop the check ball in the forward hole in the pump bore. Install the check ball retainer in the pump bore, making sure the bent end of the retainer is over the check ball. Install the idle tube in the nozzle bar with a jet wrench. Place a new gasket on each nozzle seat in the main body. Place the nozzle bar in the main body, and install the two nozzle bar clamps, lock washers, and screws. Install the air bleed plug and new gasket in the nozzle bar with a jet wrench. Install the pump piston assembly in the main body.

(3) **Assemble Throttle Body and Shaft to Main Body.** Place a new throttle body gasket on the main body, and secure the throttle body and shaft to the main body with two screws and lock washers. Insert the grooved pin (long pin) of the pump link (fig. 7) in the pump operating rod and the other pin in the pump operating lever. Install the pump link retainer in the groove of the pin. The hole farthest from the pivot point is for extreme cold temperature. The hole closest to the pivot is for extreme hot temperature. The centre hole is the average setting.

(4) **Assemble Air Horn to Main Body.** Install the pump discharge valve in the main body (fig. 10). Place a new main body gasket and the air horn on the main body. Install the five screws, lock washers, and choke tube bracket (fig. 6). Connect the fast idle rod to the choke shaft lever so the spline on the rod is opposite the slot when the rod is in normal position. Connect the idle lever (fig. 7) to the fast idle rod. Install the idle lever on the throttle body. Install a cotter pin to secure it in place.

Chapter II

4-CYLINDER ENGINE CARBURETOR

221. DISASSEMBLY.

This procedure consists of removing all parts from the carburetor, such as the choke, throttle valve, levers, jets, etc.

a. Remove Throttle Body From Carburetor Body. Remove the main adjustment ratchet screws, and remove the ratchet (fig. 18). Remove the main adjustment needle assembly from the throttle body. Remove the four screws which secure the throttle body to the carburetor body. Separate the two units.

b. Disassemble Throttle Body. Remove the float lever shaft, float, and float needle valve (fig. 18) from the throttle body. Remove the gasket and venturi. Remove the idler jet and economizer jet with a jet wrench or a small screw driver. Remove the idle adjusting needle. Remove the float needle seat (fig. 18) with

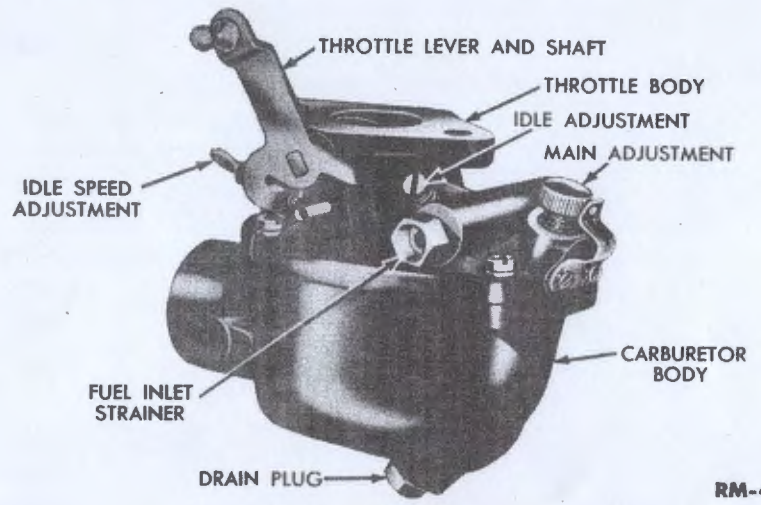

Figure 17—4-Cylinder Engine Carburetor

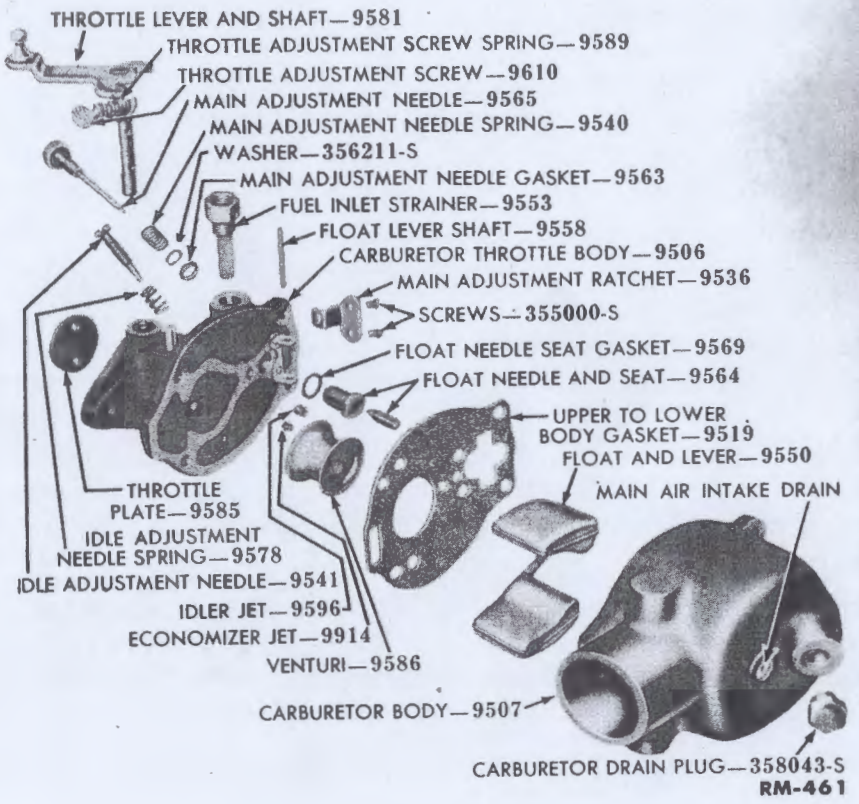

Figure 18—Carburetor, Disassembled

a jet wrench. Remove the two screws which secure the throttle plate to the shaft. Remove the plate and throttle shaft from the throttle body.

c. Disassemble Carburetor Body. Remove the main metering jet (fig. 19) with a screw driver or jet wrench. Remove the two screws and lock washers that secure the choke plate in the choke lever and shaft. Pull the choke plate out of the shaft with a pair of pliers. Remove the choke shaft and lever and choke return spring from the carburetor body.

222. CLEANING, INSPECTION, AND REPAIR.

Clean all parts thoroughly in a cleaning solution. Blow out all jets with compressed air.

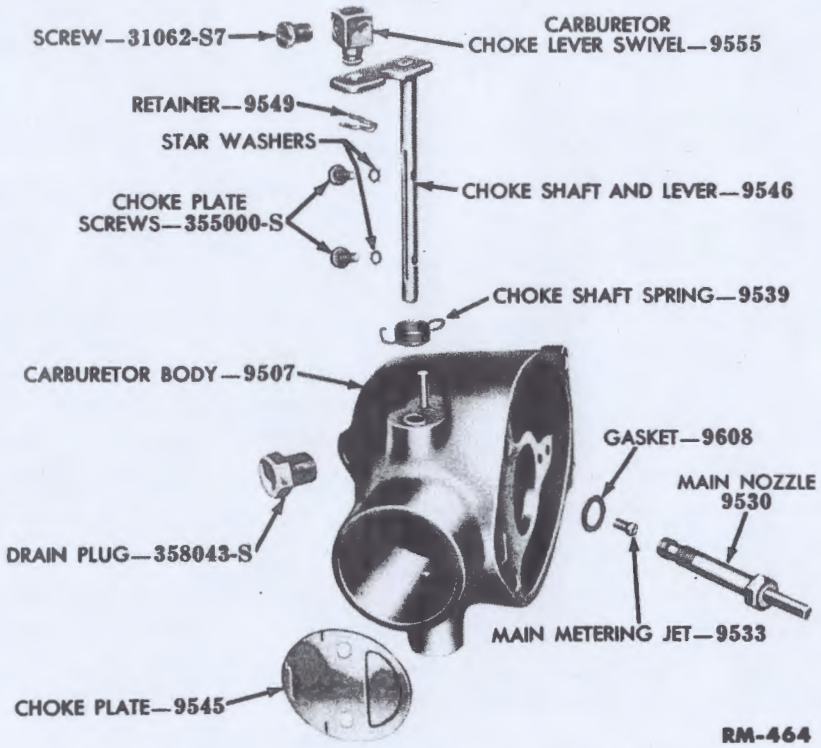

Figure 19—Carburetor Body, Disassembled

a. Carburetor Body. Replace the carburetor body if it is cracked, if the threads are stripped, or if the jets are plugged and cannot be opened without damaging the jets.

b. Carburetor Throttle Body. Replace the carburetor throttle body if it is cracked, if the threads are stripped, or if the throttle or choke shaft holes are worn. Replace the throttle body if the float hanger (fig. 18) is damaged.

c. Throttle Shaft and Lever. Replace the throttle shaft and lever (fig. 18) if the shaft is worn or bent, if the threads are stripped, or if the lever is damaged or loose on the shaft.

d. Choke Shaft and Lever. Replace the choke shaft and lever (fig. 19) if the shaft is worn or bent, if the threads are stripped, or if the lever is damaged or loose on the shaft.

e. Choke Plate. Replace the choke plate (fig. 19) if the poppet valve spring is weak and will not hold the poppet valve closed.

carburetor body. Hook the choke return spring on the peg on the body and on the lever so that the choke shaft lever will rest on the peg. Install the choke plate in the choke shaft. While holding the choke plate in the closed position, install and tighten the two choke plate screws and washers. Install the maximum fuel limiting jet in the carburetor body (fig. 19) with a small screw driver or jet wrench. Install the main nozzle and new gasket.

b. Assemble Carburetor Throttle Body. Install the idler jet and economizer jet (fig. 18) in the throttle body with a small screw driver or jet wrench. Install the float needle and a new gasket with a jet wrench. Install a new felt seal on the lever end of the throttle shaft. Install the throttle shaft and lever in the throttle body. Place the throttle plate on the throttle shaft, and install the two small screws and lock washers. Hold the throttle lever in the closed position, and tighten the two throttle plate screws. Install the idle fuel adjusting screw and spring. Turn the screw in until it seats lightly, then back it out 3/4 of a turn. Place the venturi (fig. 18) in the gasket. Place the gasket on the throttle body so the large end of the venturi seats in the throttle body. Place the float needle valve in the float valve seat. Install the float in the throttle body. Secure the main adjustment ratchet to the throttle body with two screws and washers. Set the float to the correct level (fig. 20).

c. Assemble Carburetor Throttle Body to Carburetor Body. Place the carburetor throttle body on the carburetor body, as shown in fig. 21, being careful not to bend the float. Secure the carburetor throttle body to the carburetor body with four screws and lock washers. Install the main adjustment needle assembly, using a new gasket (fig. 18). Turn the adjustment needle in until it is seated lightly, then turn it out 1 1/4 to 1 1/2 turns.

Chapter III

8-CYLINDER ENGINE DUAL CONCENTRIC 8EQ TRUCK CARBURETOR, U.S. DESIGN

231. DISASSEMBLY.

Disassembly consists of removing the subassemblies and disassembling each subassembly.

a. Remove Subassemblies. Remove the five screws that secure the air horn to the main body. Lift the air horn from the main body. Remove the gasket, float bowl cover plate, and the second gasket from the main body. Remove the cotter pin and the accelerating pump link from the pump operating rod and the throttle lever. Remove the link stud from the operating rod. Remove the two screws that secure the main body to the throttle body. Separate the main body from the throttle body. Remove the retainer ring, felt seal, the seal washer, and the spring from the pump operating rod.

b. Disassemble the Main Body. Lift the accelerating pump rod and piston assembly from the main body. Turn the main body over, and remove the pump discharge needle valve and the two main well tubes. Remove the two idle tube jets. Remove the float shaft, float, and the fuel valve. Remove the fuel valve plug and gasket. Remove the fuel valve seat and gasket. Remove the two main jets. Remove the power valve and gasket. Remove the pump check ball retainer and the check ball. Press the accelerating pump spring and washer down, and remove the piston assembly from the pump rod.

c. Disassemble the Air Horn. Remove the power piston assembly from the air horn. Hold the piston stem with pliers, and tap upward on the pliers to break the staking around the piston retainer. Loosen the screw that secures the choke lever to the choke shaft. Remove the choke lever. Remove the two screws that secure the choke control bracket to the air horn. Remove

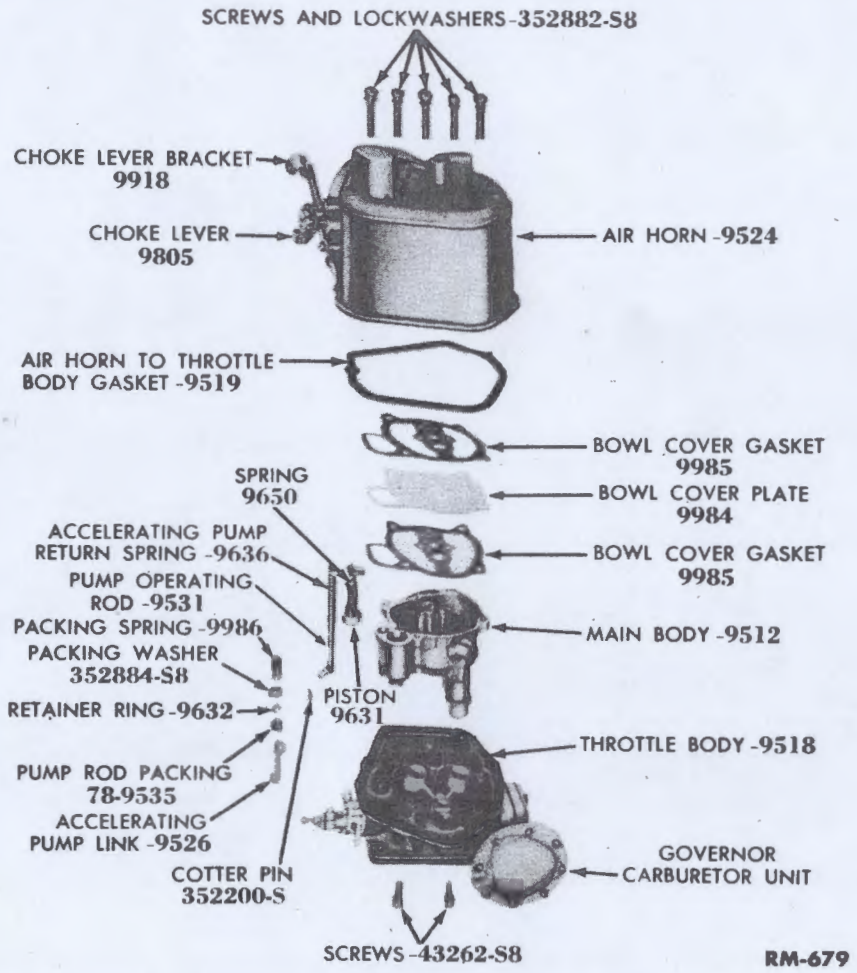

Figure 22—Carburetor, Disassembled

the choke control bracket. Remove the two screws that secure the vent tube to the air horn. Slide the vent tube out of the air horn. Remove the two screws that secure the choke plate to the choke shaft. Remove the choke plate from the shaft. Remove the choke shaft from the air horn.

d. Disassemble Throttle Body. Lift the venturi from the throttle body. Loosen the throttle lever screw, and remove the lever from the throttle shaft. Remove the two screws that secure

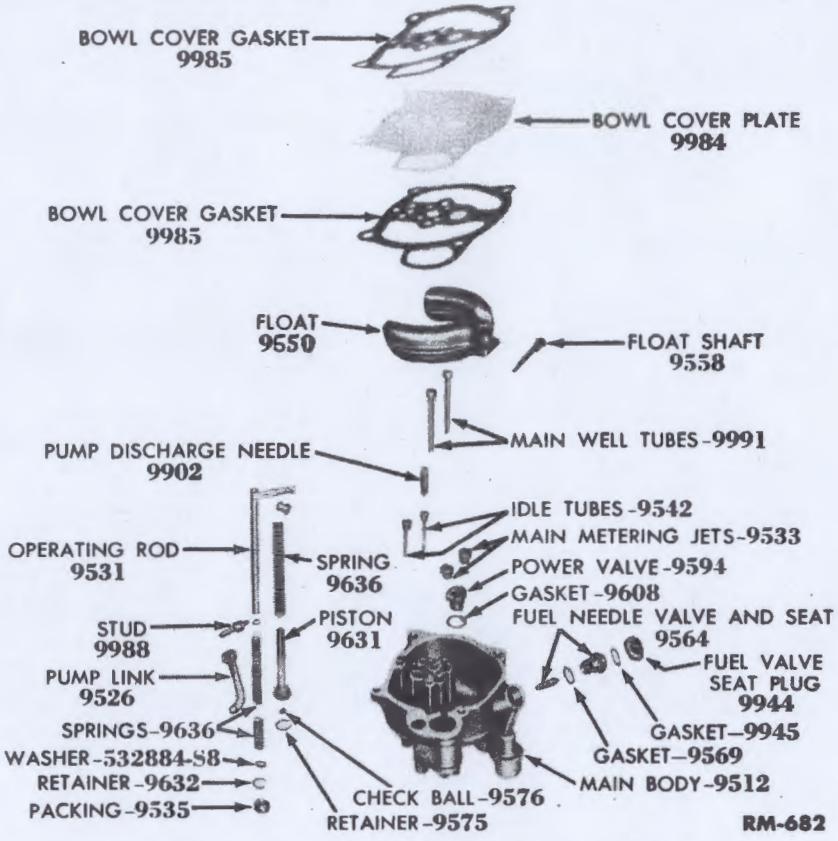

Figure 23—Main Body, Disassembled

the throttle operating housing to the throttle body. Remove the housing and gasket. Remove the throttle lever adjusting screw and spring from the throttle operating housing. Remove the throttle operating shaft assembly from the operating housing. Remove the throttle shaft bearing retainer from the throttle boss. Remove the four screws that secure the throttle plates to the throttle shaft.

NOTE: Mark the plates and their corresponding bores in the throttle body to insure correct assembly.

Remove the throttle plates. Remove the two idle adjusting screws and springs.

e. Disassemble Governor. Remove the seal wire from the

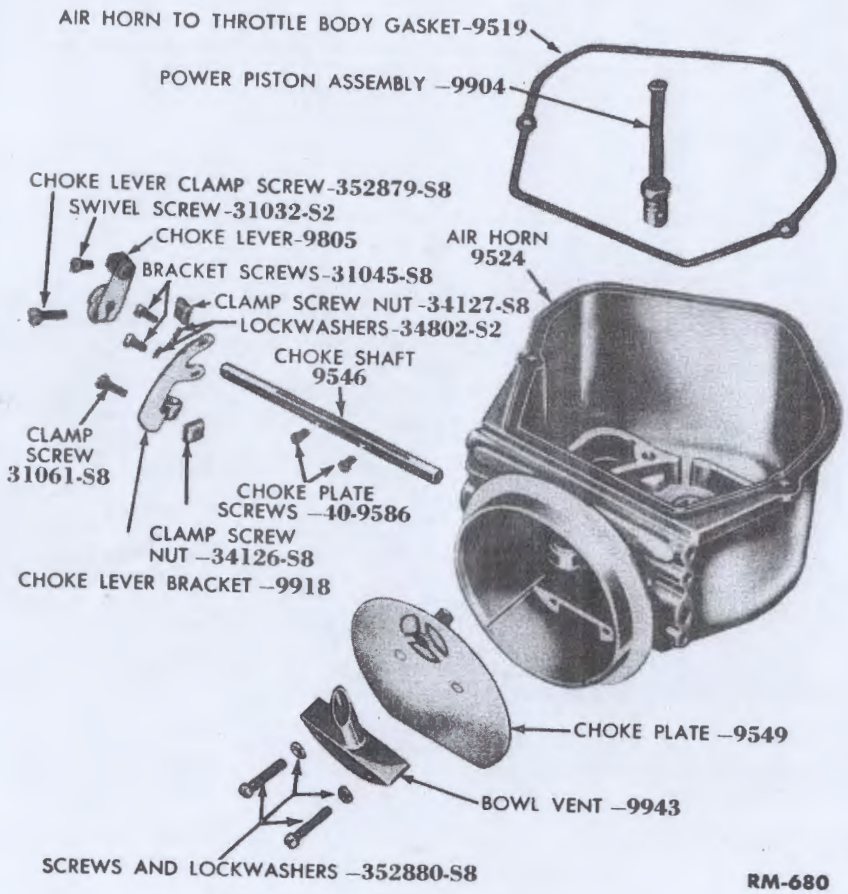

Figure 24—Air Horn, Disassembled

governor throttle body cover screws. Remove the four screws that secure the cover to the throttle body.

Remove the throttle body cover and gasket. Remove the governor lever adjusting screw and spring. Remove the governor spring from the governor lever and the spring pin. Remove the cotter pin from the diaphragm rod. Remove the governor lever retainer nut, and remove the governor lever. Remove the three screws that secure the governor body to the throttle body. Remove the governor body and gasket from the throttle body. Remove the throttle shaft leather seal, washer, and the spring

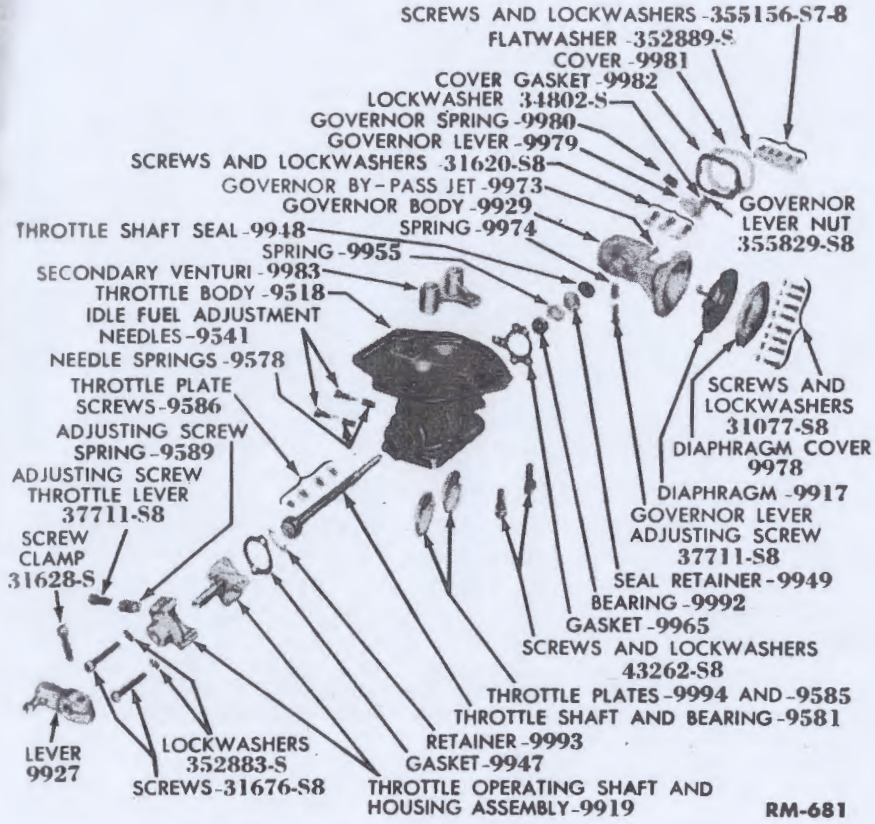

Figure 25—Throttle Body, Disassembled

from the governor body. Press the throttle shaft out of the throttle body. Remove the throttle shaft ball bearing from the body. The opposite ball bearing is staked on the throttle shaft and is not removable. Remove the vacuum restriction screw from the governor body. Remove the seal wire from the screws that secure the diaphragm cover to the governor body. Remove the eight screws and remove the cover. Remove the diaphragm from the governor body. Observe the position of the diaphragm in relation to the governor body. The diaphragm rod end points OUT. Also note the vacuum channels in the governor body and the cover.

CAUTION: Do not remove the governor spring pin from the governor body or change the location of the pin to another of the numbered holes in the body.

232. CLEANING, INSPECTION, AND REPAIRS.

Most carburetor troubles are the result of deposits of foreign matter in the carburetor, and thorough cleaning is usually the only work required. Several cleaning solutions are available that are made especially for cleaning carburetor parts. In the absence of a special cleaner, alcohol or lacquer thinner may be used (see Part FOUR, also).

NOTE: Do not, under any circumstances, blow compressed air through the passages of an assembled carburetor as such action will rupture the governor diaphragm, float setting, or dislodge dirt particles from one passageway and lodge them in another. Do not use cleaners on the diaphragm.

a. Throttle Body. Wash the throttle body thoroughly in a cleaning solution. Make certain that any gum or varnish is removed from the throttle bores where the throttle plates contact when they are in the closed position. Clean out the idle feed holes at the throttle plates with a drill (see Specifications, sec. 112, for correct drill size). Clean the idle adjusting holes.

b. Main Body. Wash all parts thoroughly with a cleaning solution. Blow out all passages with compressed air. Replace the main body if it is cracked, has nicks large enough to permit leakage on any gasket surface, or if it has stripped threads.

(1) **Accelerating Pump Assembly.** Replace the pump spring if it is broken. Replace the piston if the leather cup is worn or damaged.

(2) **Idle Tube Jets.** Replace an idle tube jet if the threads are stripped or if the screw driver slot is damaged.

(3) **Main Jets.** Replace a main jet if the threads are stripped or if the screw driver slot is damaged.

(4) **Main Well Tubes.** Replace a main well tube if it is plugged, bent, or damaged.

(5) **Float Needle Valve and Seat.** The float needle valve and seat are matched in sets, therefore, when one is faulty, both must be replaced. Replace both the needle and the seat if there is any indication of wear on either part.

(6) **Float.** Replace the float if it is bent or damaged in any way.

(7) **Accelerating Pump Discharge Needle Valve.** Replace the discharge needle valve if it is ridged, or if it is corroded.

(8) **Power Valve.** Replace the power valve if it is leaking, if the spring is broken, if the valve will not seat, or if the screw driver slot is damaged.

c. Air Horn. Clean all parts thoroughly in a cleaning solution, and blow out all passages with compressed air. Replace the air horn if it is cracked or has nicks large enough to permit leakage on any gasket surface. Clean the gasket retaining groove on the lower face of the air horn.

(1) **Choke Plate.** Replace the choke plate if the poppet valve spring is weak or broken, or if the plate is bent or damaged.

(2) **Choke Shaft.** Replace the choke shaft if it is worn or bent.

(3) **Power Piston and Stem.** Replace the power piston assembly if the piston is scored or worn, if the piston stem is bent, or if the spring is broken.

233. ASSEMBLY.

The assembly of the subassemblies also includes the assembly of the complete carburetor and governor.

a. Assemble the Air Horn. Install the power piston in the air horn, and securely stake the piston retainer in the air horn body. Install the vent tube in the air horn. Install the choke shaft and the choke plate. Install the choke control bracket. Install the choke lever on the choke shaft.

b. Assemble the Governor and the Throttle Body. Install the throttle shaft and bearing into the throttle body. Install the bearing retainer.

NOTE: The retainer must be installed with the "bowed" side against the bearing flange.

Install the throttle shaft governor end bearing in the bearing boss of the throttle body.

Index locating marks on the plates and their bores in the throttle body made at disassembly. Install the two throttle plates. Hold the throttle body against a light background. If an excessive amount of light shows between the throttle plates and the body, replace the throttle body. Install the two idle adjusting screws and springs. Install the throttle clutch shaft in the throttle

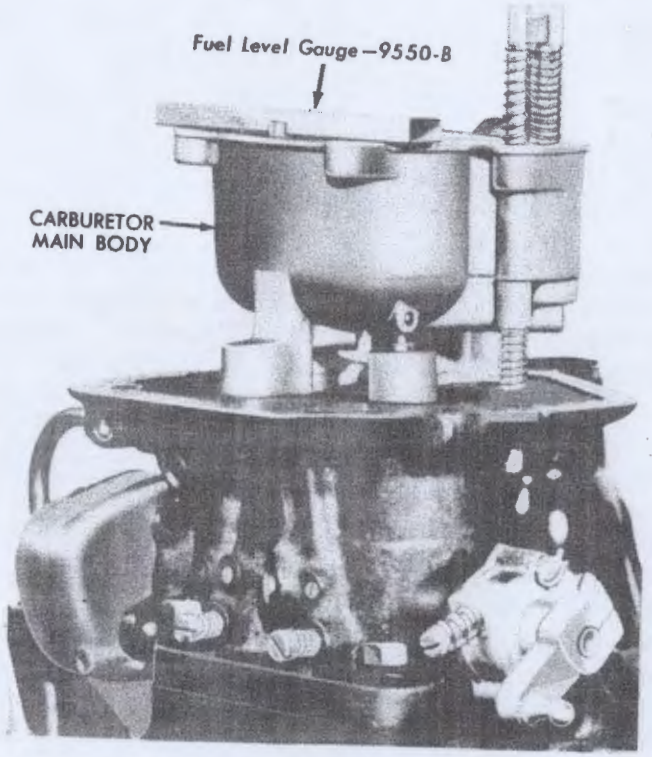

Figure 26—Measuring Fuel Level

operating housing. Install the operating housing and gasket on the throttle body. Install the throttle lever stop screw and spring in the housing. Install the throttle lever.

c. Assemble Governor. Install the diaphragm in the governor body.

NOTE: The bent end of the diaphragm rod must parallel the throttle shaft, and point outward.

Take care to line up the vacuum and screw holes in the diaphragm, governor body, and the body cover. Install the governor body cover. Install the throttle shaft leather seal, seal washer, and the spring in the governor body. Install the seal with the flat side out. Install the governor body and gasket on the throttle body. Install the governor lever, lock washer, and the retainer nut on the throttle shaft. Install the diaphragm rod on the governor lever, and install the cotter pin in the rod. Install the governor spring on the lever and the pin stop. Install the

vacuum restriction in the governor body. Install the governor cover and gasket.

d. Assemble Main Body. Install the accelerating pump check ball and the ball retainer in the main body. Install the power valve and gasket. Install the two main jets. Install the float valve seat and gasket. Install the float valve seat plug and gasket. Install the float valve and the float. Install the two main well tubes. Install the pump discharge needle valve. Install the two idle tube jets. Assemble the accelerating pump piston to the pump operating rod. Install the pump return spring on the pump rod. Install the pump assembly into the main body.

e. Install the Main Body on the Throttle Body. Install the packing spring, the washer, the felt packing, and the retainer ring on the accelerating pump operating rod. Install the secondary venturi on throttle body and main body to throttle body gasket. Install the main body on the throttle body, and secure with the two screws and lock washers. Pull the pump operating rod down and install the pump link stud. Install the pump link and secure it with a cotter pin. The pump link may be installed in three positions. The hole farthest from the pivot is for extreme cold temperature. The hole closest to the pivot is for extremely hot temperature. The centre hole is the average setting.

f. Adjust the Float Level. To adjust the float level, hold the float in the closed position (UP), measure the float level from the face of the float bowl casting to the center sections of the float halves. The correct distance from these two points is 1/4 inch. Check accelerating pump ball check valve for seating.

g. Assemble the Air Horn to the Main and Throttle Bodies. Install a bowl cover plate gasket, the bowl cover plate, and the upper cover plate gasket on the main body. Carefully install an air horn gasket in the groove on the lower face of the air horn. Install the air horn on the main and throttle bodies. Secure with five screws and lock washers.

h. The fuel level may also be checked with the carburetor mounted on the engine.

Remove the air cleaner. Disconnect the choke control. Remove the air horn from the carburetor. Remove the bowl cover gaskets and the bowl cover. Measure the fuel level, using Fuel Level Gauge as shown in fig. 26 opposite. The correct fuel level is 1/2 inch plus or minus 1/32 inch.

Chapter IV

CANADIAN DESIGN "8" CYLINDER DUAL CONCENTRIC MERCURY AND MONARCH CARBURETOR

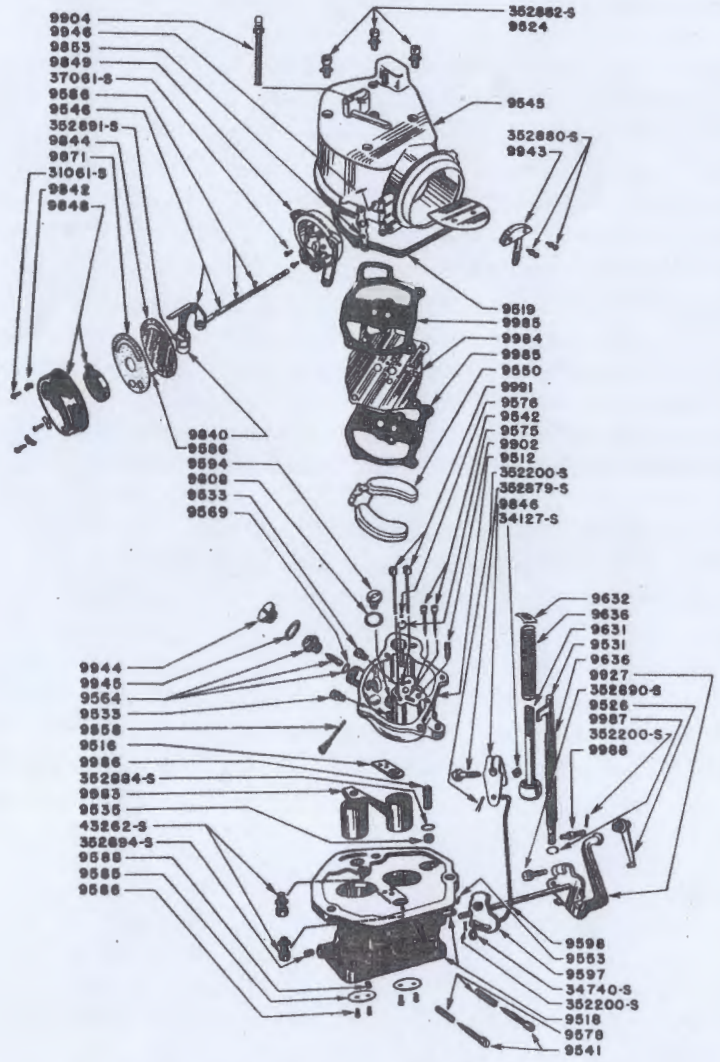

Figure 27—Carburetor Disassembled

241. DISASSEMBLY.

a. Remove Subassemblies. Remove the five screws that secure the air horn to the main body. Loosen choke lever bolt and remove choke lever and fast idle rod. Lift the air horn from the main body. Remove the gasket, float bowl cover plate and the second gasket from the main body. Remove the cotter pin and the accelerating pump link from the pump operating rod and throttle lever. Remove the link stud from the operating rod. Remove the two screws that secure the main body to the throttle body, remove the main body and the main body to throttle body gasket. Remove the felt seal, seal washer, retainer ring and the spring, from the pump operating rod.

b. Disassemble the Main Body. Lift the accelerating pump rod and piston assembly from the main body. Turn the main body over and remove the pump discharge needle valve and the two main well tubes. Remove the two idle jet tubes. Remove the float shaft, float and the fuel valve. Remove the fuel valve plug and gasket. Remove the fuel valve seat and gasket. Remove the two main jets. Remove the power valve and gasket. Remove the pump check ball retainer and the check ball. Press the accelerating pump spring and washer down and remove the piston assembly from the pump rod.

c. Disassemble the Air Horn. Remove the piston assembly from the air horn. Hold the piston stem with pliers, and tap upward on the pliers to break the staking around the piston retainer. Remove the choke thermostat housing screws, housing and spring; choke housing, cover plate and gasket. Remove the two screws that secure the vent tube to the air horn and slide out the vent tube. Remove the two screws that secure the choke plate to the choke shaft and remove the plate. By holding the air horn in a horizontal position, facing the choke housing, rotate the choke shaft clockwise, enough to clear the piston from the cylinder and remove the choke lever shaft and piston. Remove the two choke housing screws and housing from the air horn and remove choke housing to air horn gasket. Remove air horn to throttle body gasket.

d. Disassemble the Throttle Body. Lift the secondary venturi from the throttle body. Remove the four throttle plate retaining screws, throttle plates and remove throttle lever and shaft assembly from throttle body. Remove idle adjusting needles and springs. Remove fast idle cam retaining pin, cam and rod from the throttle body. Remove threaded brass plug which closes lower end of distributor vacuum control passage, so as to facilitate cleaning of vacuum holes.

242. ASSEMBLY.

CAUTION: Use all new gaskets throughout assembly and replace all parts worn beyond limits, damaged, stripped or that may in any way cause poor operation of the carburetor.

a. Assemble the Air Horn. Install the power piston in the air horn and securely stake the power piston retainer in the air horn body and check for free operation. Install the choke housing to air horn gasket, choke housing and screws. Install the choke shaft, lever and piston. Install choke plate and screws making sure that screws are securely staked. Install choke housing cover plate, gasket, thermostat and thermostat housing. Set thermostat cover so that the setting mark on the edge of the thermostat housing coincides with the center position of the choke housing serrations. Install the vent tube. When choke is fully assembled, check visually for undue clearances, between air horn and choke housing and choke housing to thermostat cover, which would cause vacuum leaks. Operate choke plate with finger to insure free operation. Install air horn to throttle body gasket, making sure that gasket retaining groove is clear.

b. Assemble Main Body. Install the accelerating pump check ball and the ball retainer in the main body. Install the power valve and gasket. Install the two main jets. Install the float valve seat and gasket. Install the float valve plug and gasket. Install the float valve and float. Install the two main well tubes. Install the pump discharge needle valve. Install the two idle tube jets. Assemble the accelerating pump piston to the pump operating rod. Install the pump return spring on the pump rod. Install the pump assembly into the main body.

c. Assemble Throttle Body. Replace fast idle cam and rod and retaining pin. Install throttle shaft, plates and screws, being sure to securely stake the throttle plate screws. Replace idle adjusting needles and springs, being careful not to run down idle screws against the seats.

243. ASSEMBLY OF SUBASSEMBLIES.

Install secondary venturi in throttle body and main body to throttle body gasket. Install the packing spring, the washer, the felt packing and the retainer ring on the accelerating pump operating rod. Install the main body on the throttle body and secure with two screws and lock washers. Pull the pump operating rod down and install the pump link stud. Install the pump link and secure it with a cotter pin. The pump link may be installed in three positions. The hole furthest from the pivot is for extreme cold temperature. The hole closest to the pivot is for extremely hot temperature. The center hole is the average setting. Check the float level and accelerating pump ball check valve for seating.

Assemble the Air Horn to the Main and Throttle Bodies. Install the bowl cover plate gasket, bowl cover plate and the upper cover plate gasket on the main body. Carefully install the air horn gasket in the groove in the lower face of the air horn. Install the air horn on the main and throttle bodies and secure with five screws and lock washers. Install the choke lever, screw and nut to the choke rod. The fuel level may also be checked with the carburetor mounted on the engine.

NOTE: The same cleaning, inspection and repair procedure used for the preceding eight cylinder models may be used for above carburetor.

Chapter V
GOVERNOR ROTOR

The second unit of the governor is located in a housing directly below the ignition distributor, and is driven by the governor rotor shaft. The rotor assembly consists of the rotor and the integral shaft, a valve, a spring, and a connector (fig. 28). The governor valve is always balanced between the existing centrifugal force provided by the revolving of the rotor and the tension of the valve spring.

251. DISASSEMBLY.

Remove the ignition distributor and the governor rotor assembly from the engine. Remove the distributor from the rotor

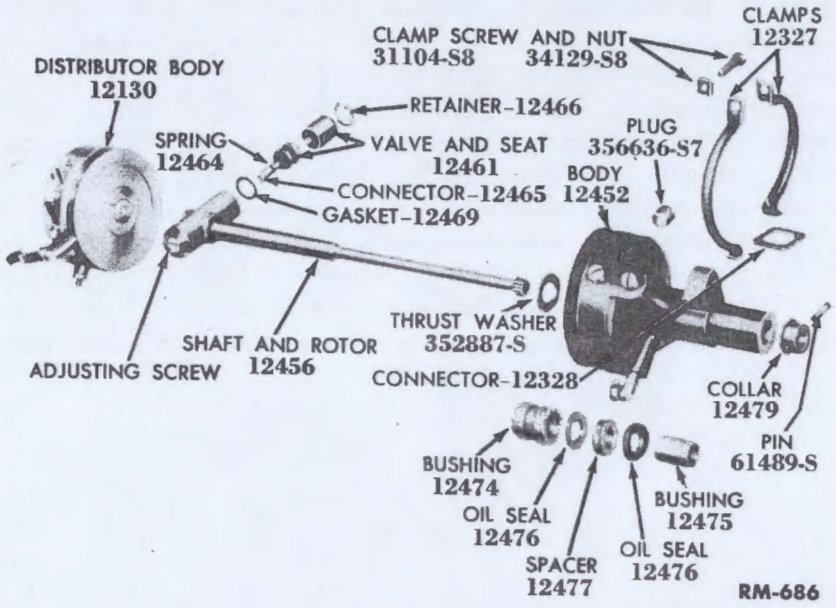

Figure 28—Governor Rotor, Disassembled

housing. Drive the pin out of the rotor shaft collar, and remove the shaft, rotor, and the thrust washer.

Remove the retainer ring and the valve seat sleeve from the rotor. Turn the rotor valve adjusting screw to the left to release the valve assembly from the adjusting screw. Remove the valve assembly. Remove the gasket from the rotor body. The governor valve may be disassembled by driving the spring retainer pins out far enough to release the spring.

NOTE: Do not remove the valve adjusting screw or the short connector locating pin from the rotor.

252. CLEANING, INSPECTION, AND REPAIR

Clean each part thoroughly. Replace the governor valve and the valve seat if they are scored or show signs of leakage.

NOTE: The valve and seat are matched in sets, therefore, when one is faulty, both must be replaced.

Replace the valve spring if it is broken, distorted, or corroded.

253. ASSEMBLY.

Install the gasket in the rotor body. Assemble the valve, spring, and the connector, staking the spring pins to prevent their falling out. Insert the valve assembly in the rotor body, rotating the valve until the slot in the connector indexes with the pin in the rotor body. Press the valve assembly lightly into the rotor body, and turn the adjusting screw to the right two full turns. Releasing the pressure on the valve, turn the rotor over, and if the connector is not properly threaded to the adjusting screw, the valve assembly will fall out of the rotor. If this occurs, repeat the above procedure, using more care in engaging the connector slot with the pin in the rotor body. Install the valve seat sleeve and the retainer ring. A preliminary governor rotor adjustment is made before the rotor is installed into the rotor housing by turning the adjusting screw to the RIGHT until it stops, then turning the screw to the LEFT three full turns. Install the thrust washer on the rotor shaft, and install the rotor and shaft assembly in the rotor housing. Install the rotor shaft collar on the shaft. Install the collar pin, and rivet each end. Install the ignition distributor on the rotor housing.

NOTE: Final adjustment of the governor is made after both units are installed on the engine.

254. ADJUSTMENTS.

Refer to Fuel System Specifications for governor cut-off speed. Install a suitable tachometer on the engine.

To adjust the governor cut-off speed, proceed as follows: Remove the seal wire from the governor adjusting the hole plug in the side of the rotor body (fig. 28). Rotate the engine until the end of the rotor which carries the adjusting screw is in line with the hole in the rotor housing. Turn the adjusting screw to the RIGHT to increase the engine governed speed, or to the LEFT to decrease the speed.

NOTE: Refer to Fuel System Specifications for correct engine governor speeds. Before resealing the governor, make sure the bleed pipe union nuts and the adjusting screw hole plug are tight. Air entering the diaphgram from any source other than the rotor orifice will cause faulty governor control.

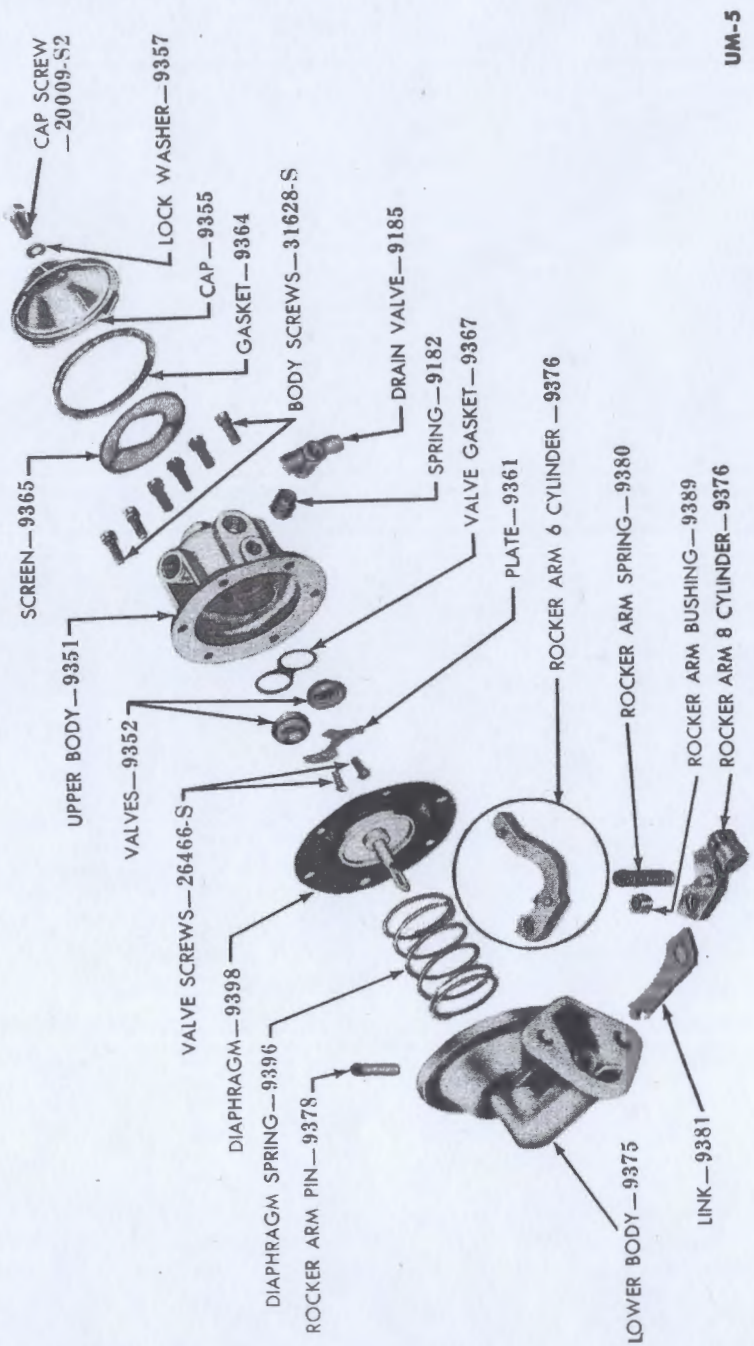

Figure 29—Fuel Pump, Disassembled (6-, 8-, and 12-Cylinder Engines)

Part THREE

FUEL PUMPS

Chapter I

FUEL PUMP REPAIR

The fuel pump repair procedures given below apply to the fuel pumps used on the 6-, 8-, and 12-cylinder engines. A fuel pump repair kit, containing all the parts usually required for replacement, is available at authorized dealers. Refer to Chapter II for procedure covering the combination fuel and vacuum booster pump.

311. DISASSEMBLY.

Remove the cap screw and washer from the top of the pump, and remove the cap, gasket, and screen (fig. 29). On pumps provided with a glass bowl, loosen the bail nut and remove the bowl, gasket, and screen. Remove the six screws which secure the upper body to the lower body and separate them. Remove the diaphragm and spring by holding the rocker arm down while slipping the diaphragm pull rod off the link. Remove the two screws from the valve plate in the upper body, then remove the plate and valves. Remove the rocker arm spring, and drive the rocker arm pin out of the lower body. Remove the link, rocker arm bushing, and rocker arm.

312. CLEANING, INSPECTION, AND REPAIR.

Clean all parts. Make certain that all corrosion is removed from the sediment chamber. Make a visual inspection for signs of rough handling, and discard parts that are damaged or rusty. Generally, it is advisable to install new parts.

313. ASSEMBLY.

NOTE: New gaskets must be used when reassembling the pump.

Place the link, rocker arm bushing, and rocker arm in position in the lower body. Insert the rocker arm pin through the lower body and the link, rocker arm bushing, and rocker arm. Place the diaphragm spring and diaphragm in position on the lower body, and secure them by hooking the diaphragm pull rod on the lower link. Install the rocker arm spring on the rocker arm.

Place the valve, gasket, and plate in the upper body, and install the two screws. Place the upper body on the lower body, and hold the rocker arm in the UP position. Start the six screws which secure the upper body to the lower body, but do not tighten them. Release the rocker arm and tighten the six screws evenly. Install the screen, gasket, and cap on the upper body. Install the washer and cap screw.

314. TEST.

If test equipment is not available, a simple test may be made by holding the thumb over the inlet port of the pump and working the rocker arm up and down until a noticeable vacuum is created. This vacuum should hold the thumb against the inlet port for a few seconds.

Chapter II

FUEL PUMP AND VACUUM BOOSTER REPAIR

NOTE: Do not attempt to install fuel pump and vacuum booster assembly on camshaft marked with letter "U" on forward end of camshaft. A specially hardened camshaft eccentric drive is required when using above assembly.

The fuel pump repair procedures given below apply to the combination fuel pump and vacuum booster. A fuel pump repair kit, containing all the parts usually required for replacement, is available at authorized dealers.

321. DISASSEMBLY.

Loosen the retainer nut on the bail that secures the filter bowl to the pump body. Remove the seat, the glass bowl, and the bowl gasket. Remove the filter from the pump body. Mark the pump and rocker arm body flanges to assure correct assembly (fig. 30).

Remove the ten screws and the lock washers that secure the pump body to the rocker arm body, and separate the bodies. Remove the two screws that secure the valve plate to the pump body. Remove the valve plate, the valves and the valve gasket. Remove the cap screw and the washer that secure the cover to the vacuum pump. Remove the pump cover and the gasket. Remove the retainer and the screen from the pump body. Mark the vacuum pump and rocker arm body flanges to assure correct assembly. Remove the ten screws and the lock washers that secure the pump body to the rocker arm body, and separate the bodies. Remove the diaphragm spring and the spring seat. Remove the screw that secures the valve plate to the pump body. Remove the plate, valves, and gaskets. While pressing inward, rotate the diaphragm to disengage the diaphragm rod from the

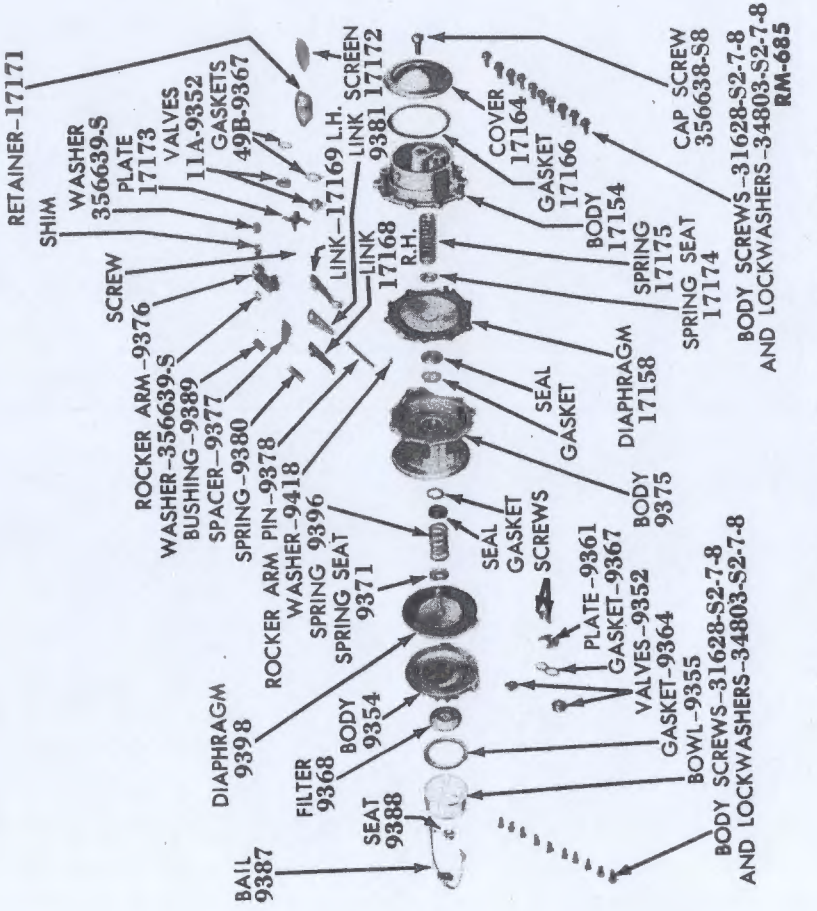

Figure 30—Fuel Pump and Booster, Disassembled

pump links, and remove the diaphragm. Drill out the "peening" in the counterbore of the rocker arm pin bore. Remove the flat washer, and drive the pin out of the rocker arm body. Disengage the fuel pump diaphragm rod from the pump rocker arm link, and remove the diaphragm, the diaphragm spring, and the spring seat. Remove the rocker arm assembly and the rocker arm spring. Remove the spacer washers from the rocker arm bushing, and remove the bushing. Note the position of shims and the links to assure correct assembly. Press the fuel pump diaphragm rod seal out of the rocker arm body, and remove the seal gasket. Press the vacuum pump diaphragm rod seal out of the rocker arm body, and remove the seal gasket.

322. CLEANING, INSPECTION, AND REPAIR

Clean all parts thoroughly. Make certain all corrosion is removed. Make a visual inspection for rough usage, and discard all parts that are damaged or rusty. A porous vacuum pump diaphragm or leaking diaphragm rod seal will cause excessive engine oil consumption. Generally, it is advisable to install new parts as listed in the repair kit.

323. ASSEMBLY.

NOTE: New gaskets must be used when assembling the pump.

Install a new fuel diaphragm pull rod seal and gasket in the rocker arm body, and stake in position. Install a new vacuum diaphragm pull rod seal and gasket in the rocker arm body, and stake in position. Assemble the rocker arm links, spring seat, shims, bushing, and spacer washers. Place the rocker arm assembly in position in the rocker arm body, and insert the small end of the assembly tool through the rocker arm pin hole. Install the rocker arm spring. Place the fuel pump diaphragm spring seat and the spring in position on the diaphragm pull rod, and install the diaphragm in the rocker arm body, hooking the pull rod over the rocker arm link. Install the vacuum pump diaphragm in the rocker arm body, hooking the pull rod over the two rocker arm links. Press the assembly tool through the rocker arm body until the large diameter of the tool is holding the rocker arm in position. Install the rocker arm pin by driving the assembly tool out of the rocker arm body. Install the flat washer on the end of

the rocker arm pin. and peen the end of the pin against the washer. Install the gasket and the inlet and outlet fuel valves in the fuel pump body. Install the valve plate and screws. Place the filter in position on the pump body. Install the cork gasket and the filter bowl. Install the bail on the pump body, place the bowl seat on the bowl, and tighten the retainer nut on the bail. Install the fuel pump body on the rocker arm body, aligning the location marks made at disassembly. Press up on the rocker arm to position the diaphragm at the lowest point, and install the ten screws and lock washers that secure the fuel pump body to the rocker arm body.

NOTE: Tighten the screws alternately and securely.

Install the gaskets and the valves in the vacuum pump body. Install the valve plate and screw. Install the diaphragm spring in the pump body. Install the spring seat on the spring. Install the vacuum pump body on the rocker arm body, aligning the location marks made at disassembly. Install the ten screws and lock washers that secure the pump body to the rocker arm body. Tighten the screws alternately and securely. Place the screen and screen retainer in position in the pump body. Install a new gasket and the cover on the pump body, and secure them with the cap screw and lock washer.

324. TEST.

If test equipment is not available, a simple test may be made by holding the thumb over the inlet ports of the pumps and working the rocker arm up and down until a noticeable vacuum is created. This vacuum should hold the thumb against the inlet ports for a few seconds.

Part FOUR

CLEANING ZINC ALLOY CASTINGS

(Carburetor and Fuel Pump)

Many methods of cleaning carburetor and fuel pumps are available. The type of cleaner used in most instances is determined by the volume of this work being done. The cleaning procedure must not only remove all grease, dirt, and paint, but also all sediment and corrosion which is frequently found in the sediment chamber of fuel pumps and in the float bowl of carburetors. A cleaning procedure that brings back the bright clean appearance that the castings had when new is desirable but not necessary. If a "like new" appearance is desired, the following procedure may be followed.

411. CLEANING PROCEDURE.

a. Place the parts in a suitable cold degreasing solvent. Various makes of degreasing solvents are available on the market. Usually, about 15 minutes of soaking with some agitation of the solution is desired.

b. Rinse the parts in mineral spirits and brush away any loosened dirt or paint.

The mineral spirits used can usually be obtained from most refiners. It is also known as a petroleum substitute for turpentine.

c. Place the parts in a caustic soda solution for not over 15 minutes. This solution should contain 1½ pounds of caustic soda (flake or granular caustic soda) per gallon of water. For the caustic to act on the parts, all oil and grease film must have been removed as outlined in operations **a** and **b** above. This solution removes corrosion from sediment chamber of fuel pump and from float bowl of carburetor. It also brightens the parts.

d. Remove the parts from the caustic solution, and rinse thoroughly in running water. Several minutes of rinsing is usually needed to remove all traces of caustic.

e. Dip the parts for not over 15 seconds in a chromic acid

solution. This solution should contain the following ingredients per gallon of solution.

2 pounds of chromic acid, commercial grade
5 fluid ounces of commercial grade nitric acid
2½ fluid ounces of commercial grade sulphuric acid
Balance, water.

f. After removing the parts from the chromic acid solution, rinse thoroughly in running water. Be sure the running water rinse is free of all traces of caustic before rinsing the parts removed from the chromic acid solution. A final rinse in hot water will make the parts dry faster.

When cleaning very badly corroded parts, a second time through the above complete procedure may be necessary, but for the average run of parts once will give them a new appearance.

Some fuel pump castings are made of an alloy containing a small amount of copper. These castings will not have the same brightness as parts not having copper in the alloy. By matching parts of like brightness at time of assembly, the reconditioned pumps will make the best possible appearance.

When removing the parts from the various solutions, permit them to drain well and turn any parts that have a cupped side up. This will conserve the solutions so they will last for many cleanings before having to be renewed.

This cleaning procedure, while especially developed for carburetors and fuel pumps of alloy castings, is also suitable for brass, iron, and other metals. It can be used for cleaning and brightening aluminum alloy castings such as distributor housings, but when used on such parts, any highly polished surfaces must be protected from the corrosive action of the caustic solution. In the case of the distributor housing, rubber plugs should be placed in the bore for the vacuum brake plunger.

Small parts may be placed in pint size glass jars. Fill the jars with the various solutions in proper sequence. Hold a fine mesh screen over the open end of the jar to allow parts to drain.

412. HANDLING OF CLEANING SOLUTION.

The caustic solution must be kept in an iron container with welded seams. Soldered seams or galvanized metal will be corroded by the caustic.

The chromic acid solution must be kept in crockery as it will corrode any metal, even lead.

The crock for the chromic acid solution must have an inside diameter sufficiently large to accommodate the punched metal or wire brackets containing the parts. Depth need only be 8 to 10 inches.

When using the solutions, acid and oil proof rubber gloves should be worn. Any of the solution coming in contact with the skin should be washed off with water immediately. Goggles should be worn to protect the eyes against splashing.

WARNING: Caustic tank should have a large sign over it marked "DANGER CAUSTIC."

Acid crock should have a large sign over it marked "DANGER ACID."

Boric acid should be available in a one gallon bottle in plain view near these solutions so that it can be quickly poured over anyone who might spill acid on his body. A suitable sign for this would be marked "If caustic soda or acid gets in your eyes or on your skin use boric acid freely."

Employes should wear rubber gloves, rubber acid-proof goggles, and a rubber apron when handling these materials.

Special care must be used when filling containers for use.

When disposing of these solutions after use, they should be heavily diluted with water.

Special care should be taken to see that the public cannot in any way come in contact with this acid cleaning layout. This especially applies to children.

VERY IMPORTANT—When mixing or diluting any of these solutions, add the caustic or acid to the water, adding slowly and stirring constantly. NEVER ADD WATER TO THE ACID OR CAUSTIC.

The most important safety factor is cleanliness.

Keep the floors clean.

Avoid overflowing the containers.

Avoid spilling when transferring from containers.

Guard against any leaks.

Keep warning signs, goggles, and aprons in perfect condition at all times.