GROUP 3
ENGINE FUEL AND EXHAUST SYSTEMS

SECTIONS IN GROUP 3

SECTION 3-A
SPECIFICATIONS, DESCRIPTION, SERVICE RECOMMENDATIONS

CONTENTS OF SECTION 3-A

SERVICE BULLETIN REFERENCE

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3-1 SPECIFICATIONS

a. Tightening Specifications

Use a reliable torque wrench to tighten the parts listed to insure proper tightness without straining or distorting parts. These specifications are for *clean and lightly lubricated threads only;* dry or dirty threads produce increased friction which prevents accurate measurement of tightness.

Part	Name	Thread Size	Torque-Ft. Lbs.
Nut	Manifold	3/8-24	25-30
Nut	Exhaust Pipe Flange to Valve Body Bolt	3/8-24	18-20
Nut	Exhaust Pipe Clamp Bolt	5/16-18	7-10
Nut	Muffler Support Clamp Bolt	5/16-18	7-10
Nut	Muffler Support to Frame Bolt	5/16-18	7-10
Nut	Tail Pipe Hanger Clamp Bolt	5/16-18	7-10
Bolt	Tail Pipe Front Hanger to Frame	5/16-18	7-10
Screw	Tail Pipe Rear Hanger to Frame	5/16-18	15-18

b. General Specifications

Items	Series 40-50	Series 70
Gasoline Tank Capacity (gal.)	19	19
Gasoline Gauge—Make and Type	←AC, Electric→	
Fuel Pump—Make and Type	←AC, Type AJ, Comb. ←Fuel and Vacuum→	
Fuel Pump Drive	Direct from Camshaft	
Fuel Pump Location	←Right Side Front→	
Fuel Pump Pressure, Pounds:		
At Pump Outlet Port	←4½ to 5½→	
At Carburetor	←4 to 5→	
Fuel Filter—Make and Type	←Carter, Ceramic or AC Paper-Edge Type→	
Fuel Filter Location	←At Carburetor Inlet→	
Carburetor Make	←Stromberg or Carter→	
Carburetor Type	←Downdraft—Dual→	
Air Cleaner—Make and Type	←AC Heavy Duty Oil Bath→	
Air Cleaner Sump Capacity and Grade of Oil Used	←1 pt. S.A.E. 50→	
Intake Manifold Heated by	←Exhaust Gas→	
Manifold Heat Control	Valve and Thermostat	
Wind up of Valve Thermostat at 70° F., with Valve Closed	←¼ Turn→	
Exhaust Pipes, O. D.	2"	2¼"
Tail Pipe, O. D.	2"	2"

Muffler, Type	←Straight Thru Resonance→
Muffler, 1948, Diam. x Length	←5 9/16" x 37 3/8"→
Muffler, 1949, Diam. x Length	←5" x 43 7/8"→

c. Carter Carburetor and Choke Calibrations

IMPORTANT: *Calibrations are identified by the CODE NUMBER and not by model number. Carburetors of same model number but different code numbers are not interchangeable.*

Model	WCD	WCD
Code Number	663S	664S
Size	1"	1 1/4"
Large Venturi Diameter	1 1/16"	1 3/16"
Float Bowl Fuel Level	←At bottom of sight hole→	
Float Setting	←5/32", Cover to Float→	
Metering Rod Jet	.082"	.082"
Metering Rod, (see note below)		
Production	75-614	75-615
High Altitude	75-634	75-636
Low Speed Jet	#65	#65
By-pass	.049"	.051"
Economizer	#65	#60
Idle Bleed	.049"	.051"
Idle Discharge Port	.030"x.100"	.030"x.125"
Idle Adjustment Screw Port	.0655"	.0655"
Float Needle Seat	#42	#38
Pump Jet	#71	#72
Pump Strokes	21/64"	21/64"
Pump Spring	#61-171	#61-171
Pump Plunger Spring	#61-328	#61-328
Vacuum Spark Control Port	.040"	.040"
Choke Thermostat Setting	Index	Index
Choke Suction Hole	#45	#36
Fast Idle Setting, Throttle Valve to Barrel, Wall	.015"	.018"
Choke Unloader Setting, Edge of Valve to Air Horn	3/16"	3/16"

NOTE: *Use production metering rods for altitudes up to 3500 feet. Use high altitude metering rods for altitudes above 3500 feet.*

d. Stromberg Carburetor Calibrations

IMPORTANT: *Calibrations are identified by the CODE NUMBER and not by model number. Carburetors of same model number but different code numbers are not interchangeable.*

Model	AAV-167	AAV-267
Code Number	7-69	7-70
Size	1"	1 1/4"
Throttle Diameter	1 3/16"	1 7/16"
Primary Venturi Diameter	1 1/32"	1 1/8"
Float Bowl Fuel Level	←At bottom of sight hole→	
Main Discharge Jet	#32-28	#32-28
Main Metering Jet (see note below)		
Production	.045"	.051"
High Altitude	.042"	.048"
Power By-pass Jet	#60	#54
High Speed Bleeder	#70	#70
Float Needle Seat	.101"	.101"
Idle Air Bleeder		
Main Body	#70	#70
Throttle Valve Body	#42	#42
Idle Tube Feed Hole	#70	#70
Idle Discharge Holes		
Upper	#60	#60
Lower	#54	#54
Pump Discharge Nozzle Holes	#68	#68
Pump Blow-off Hole	#60	#56
Holes in Throttle Valve	2—#56	2—#60
Pump Bottoming	1/32"	1/8"
Vacuum Spark Control Port	#58	#58
Choke Thermostat Setting	1 Notch Lean	Index
Drill Size for Checking Fast Idle Cam Setting	#26	#26
Drill Size for Checking Start Air Lock and Loose Levers	#53	#53
Drill Size for Checking Choke Unloader Setting	←#17 or 11/64"→	

NOTE: *Use production main metering jet for altitudes up to 3500 feet. Use high altitude jet for 3500 to 9000 feet. Above 9000 feet use jet .002" smaller than specified for high altitude.*

3-2 DESCRIPTION OF FUEL SYSTEM

a. Gasoline Tank and Feed Pipes

The gasoline tank is made of two halves ribbon-welded together at the central flanges. Two internal braces spot-welded to the upper half on the centerline of tank at the support seats act as struts to maintain the shape of tank and prevent its flexing from the weight of gasoline and pull of supporting straps.

The filler is securely soldered into an opening in upper half of tank and is supported by an upper and a lower brace soldered to filler and tank. An external vent pipe soldered into the highest point of tank and into the upper end of the filler, and a groove formed in the upper end of filler where the filler cap seats, provide a protected air vent for the tank.

The gasoline tank is attached by two strap type supports to the body under the trunk compartment, where it is seated against strips of anti-squeak material. The rear feed pipe, which is connected to the gasoline gauge tank unit is supported by clips on the body. The rear feed pipe and the front feed pipe, which is connected to the fuel pump, are joined by a rubber hose which provides the flexibility required by movement of the engine on its rubber mountings. Flared type fittings are used at all other feed pipe connections.

b. Fuel Pump and Gasoline Filter

The combination fuel and vacuum pump is mounted in the right side of crankcase at the front end and is driven directly from the engine camshaft. The construction and operation of the pump assembly is described in Section 3-D (par. 3-16).

A gasoline filter is located at the gasoline inlet of the carburetor for the purpose of removing any dirt and water which may pass the filter built into the fuel pump. The filter may be a Carter ceramic type or an AC Paper-edge type. Either type consists of a glass sediment bowl and a strainer which may be removed for periodic cleaning. See figures 3-11 and 3-12. The incoming gasoline flows into the sediment bowl and then flows upward through the strainer and into the carburetor.

c. Carburetor and Automatic Choke Assembly

Engines on all series are equipped in production with either Stromberg or Carter carburetors of the dual-barrel down draft type. *Either make of carburetor is considered "standard" and it is not intended that these units be interchanged to provide "optional" equipment.*

The carburetor assembly incorporates an automatic choke and an accelerator vacuum switch. The construction and operation of the Carter carburetor and choke assembly is described in Section 3-E (par. 3-21 and 3-22) and the Stromberg assembly is described in Section 3-F (par. 3-28 and 3-29). The accelerator vacuum switches on both carburetors are described in Section 10-E (par. 10-32 and 10-33).

A thick fibre gasket is used between the carburetor and the intake manifold to insulate the carburetor from the heat of the manifold.

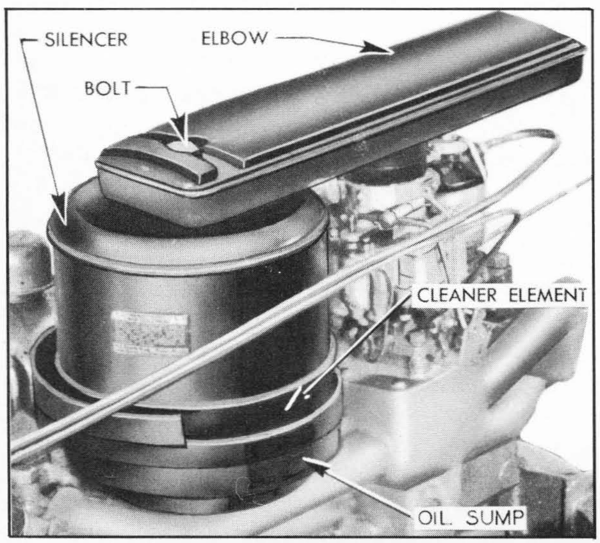

Figure 3-1—Air Cleaner and Intake Silencer—Series 40-50

d. Air Cleaner and Intake Silencer

All series engines are equipped with heavy duty oil bath air cleaners combined with intake silencers. The air cleaner removes abrasive dust and dirt from the air before it enters the engine through the carburetor. The intake silencer reduces to a very low level the roaring noise made by the air as it is drawn through the intake system. The cleaner and silencer also functions as a flame arrester in event of "backfire" through the intake system.

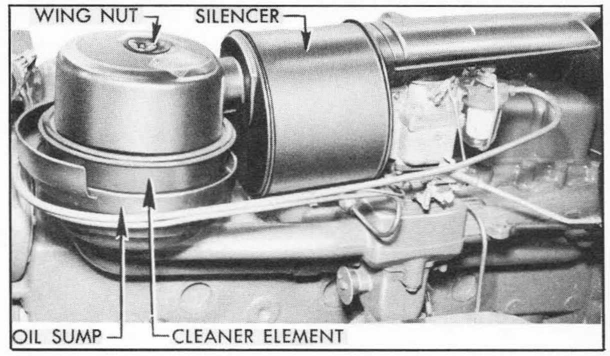

Figure 3-2—Air Cleaner and Silencer—Series 70

The air cleaner consists of a sump containing oil and a cleaner element containing a filtering mesh which nests down in the sump. *On Series 40-50 engines,* the silencer rests on top of the cleaner element and is connected to the carburetor by a sheet metal elbow. See figure 3-1. *On Series 70 engines,* the silencer is incorporated in the elbow which connects the cleaner to the carburetor. See figure 3-2. A bolt and wing nut holds the cleaner and silencer or elbow together.

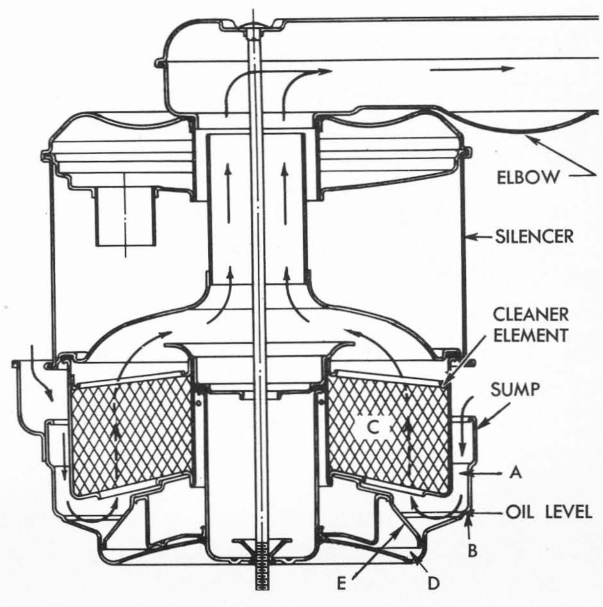

Figure 3-3—Air Cleaner Action—Series 40-50

The sump ot air cleaner must be filled to oil level line with one pint of S.A.E. 50 engine oil. Incoming air passes downward through the annular passage "A" between the oil sump and cleaner element until it strikes the shelf on oil sump at "B", where it is suddenly reversed and directed upward into and through the cleaner element filtering mesh "C". The perforated baffle "E" on bottom of cleaner element extends down into the oil and prevents oil in the sump from pulling over into the air stream. See figure 3-3.

The sudden change in direction of air at "B" causes the heavier dust particles in the air to be thrown into the oil in sump. Oil mist is carried upward by the air stream into the cleaner element in a predetermined amount which automatically oils and washes the filtering mesh. The lighter dust particles which were not thrown into the oil sump at "B" adhere to the oily surfaces of the oil-wetted filtering mesh and are washed back into the oil sump as the oil drains back from the cleaner element. All dirt particles settle to the bottom of the oil sump at "D" (fig. 3-3).

Cleaned air leaving the cleaner element passes through the silencer which muffles the noise.

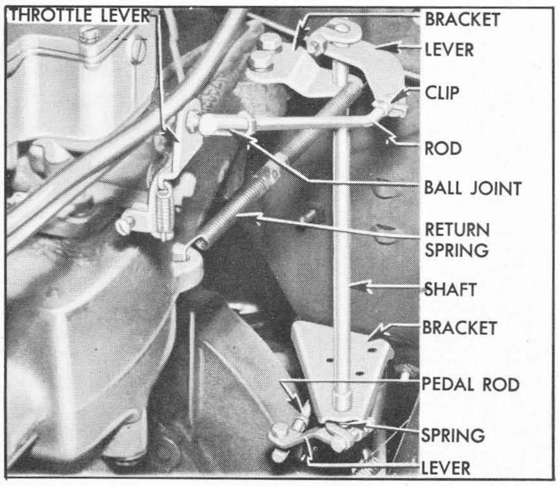

Figure 3-4—Carburetor Throttle Control Linkage

e. Carburetor Throttle Control Linkage

The carburetor throttle control linkage is designed to provide positive control of the throttle valves through their entire range without being affected by movement of the engine in its rubber mountings. The linkage also serves to operate the accelerator vacuum switch when cranking the engine.

The accelerator pedal is connected by a rod and ball joint to an accelerator lever on the lower end of a vertically mounted equalizer shaft. The equalizer shaft is supported at the lower end by a bracket attached to the dash and supported at upper end by a bracket attached to the intake manifold. A throttle operating lever on upper end of equalizer shaft is connected by a rod and ball joint to the throttle shaft lever on carburetor. The throttle return spring is connected to the throttle operating lever on equalizer shaft and to a boss on intake manifold. See figure 3-4.

On cars equipped with Dynaflow Drive, a dash pot is included in the throttle control linkage to prevent engine stalling when the accelerator pedal is suddenly released while driving. The dash pot cushions the closing of the throttle to prevent sudden shut off. The dash pot operating lever and adjusting screw are mounted on the lower end of accelerator equalizer shaft so that the adjusting screw contacts the plunger of dash pot, which is mounted on the equalizer shaft lower bracket. A pipe connects the dash pot to the intake manifold. The dash pot action is controlled by a spring and vacuum operated diaphragm, ball check valve, and a calibrated bypass bleed.

3-3 DESCRIPTION OF INTAKE AND EXHAUST SYSTEM

a. Intake and Exhaust Manifolds

The intake and exhaust manifolds are separate units joined together by a valve body through which hot exhaust gasses may be directed into a heat jacket cast on the intake manifold to heat the area below the carburetor.

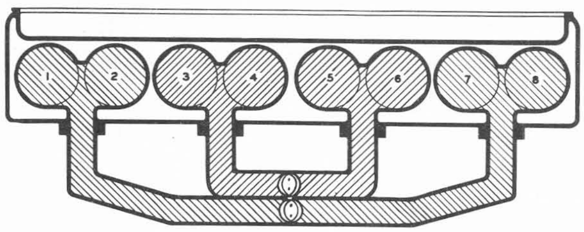

Figure 3-5—Fuel Distribution Through Intake Manifold

The intake manifold is of dual type with the carburetor mounted at the middle. The outside barrel of the carburetor feeds into the outside branch of the manifold to supply fuel to Nos. 1, 2, 7, and 8 cylinders while the inside barrel feeds into the inside branch to supply fuel to Nos. 3, 4, 5, and 6 cylinders. See figure 3-5.

b. Intake Manifold Heat Control

The amount of heat supplied to the intake manifold below the carburetor is regulated in accordance with operating requirements by means of the exhaust manifold valve. The valve is controlled by a bi-metal thermostat wound around the valve shaft so as to act as a spring to close the valve when engine is cold. The inner end of the thermostat engages a slot in valve shaft and the hooked outer end engages an anchor stud on the valve body:

When the engine is cold, the valve is held in closed position by the thermostat. Hot exhaust gasses strike the valve and are deflected upward into the heat jacket on intake manifold, where they pass around the intake passages and then pass downward to the exhaust pipe. See figure 3-6.

counterweight on the shaft. An anti-rattle spring is provided to prevent the valve from fluttering and rattling against the valve body in the open and closed position.

c. Exhaust Pipes, Muffler, and Tail Pipe

The muffler is connected to the exhaust manifold by a front and a rear exhaust pipe which

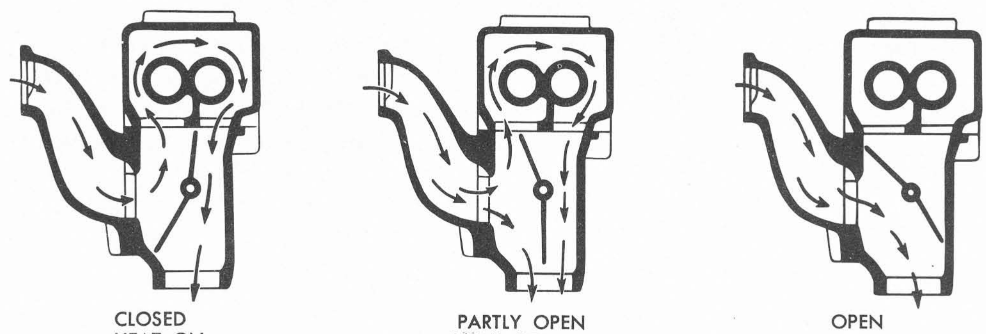

Figure 3-6—Exhaust Manifold Valve Operation—Sectional View

As the engine warms up, heat conducted to the thermostat through the valve shaft as well as by the increasing air temperature under the hood causes the thermostat to lose spring tension and allow the valve to move toward the open position, thereby reducing the amount of exhaust gas deflected into the heat jacket and consequently reducing the amount of heat to the intake manifold. See figure 3-6.

are joined together by a split clamp. The front exhaust pipe is connected to the manifold by a bolted flange and a gasket. The rear exhaust pipe is joined to the muffler by the muffler front support. The tail pipe is connected to the muffler by the muffler rear support. See figure 3-7.

The muffler and tail pipe are flexibly mounted in the frame to allow for engine movement and

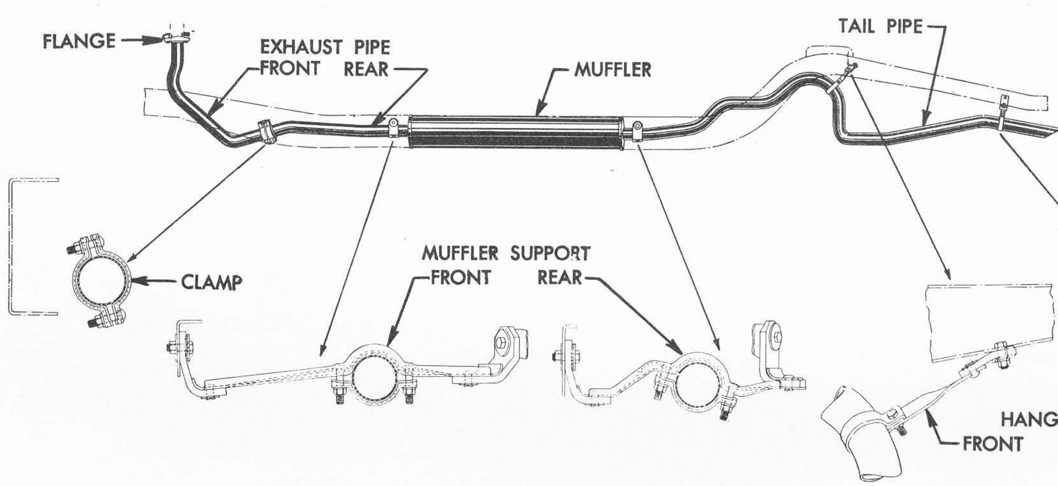

Figure 3-7—Exhaust System and Mountings—All Series

The exhaust manifold valve is offset or longer on the lower side of the shaft. This allows exhaust gas pressure to force the valve open when the engine is accelerated or operated with wide open throttle, thus reducing the heat to the intake manifold.

The valve is prevented from fluttering by a

for expansion and contraction due to temperature changes. The muffler supports and the tail pipe hangers are attached to the frame by fabric straps which provide the required flexibility and also serve to insulate exhaust system vibration from the chassis.

The muffler is a "straight through" type with resonance chambers which absorb and dampen out the exhaust sound waves. A slip joint at one end allows for expansion and contraction due to temperature changes. See figure 3-8.

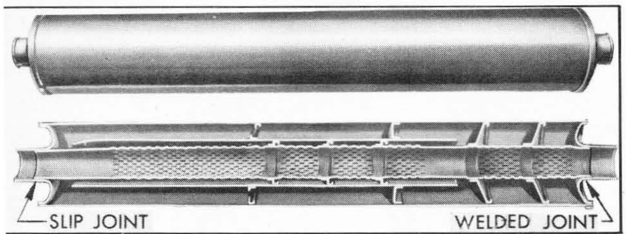

Figure 3-8—Muffler—Sectional View

The word "Front" is stamped on one end of the outer shell of muffler to indicate the end to place toward front of car during installation. The drain hole in outer shell should always be located at the bottom.

There should be a minimum clearance of 1" between the tail pipe and the rear seat pan at the closest point.

3-4 SERVICE RECOMMENDATIONS

a. Use of Accelerator Pedal for Starting Engine

To avoid complaints of hard starting, owners should be advised on the proper use of the accelerator pedal for starting the engine.

When the engine is cold, depress the accelerator pedal just far enough to cause cranking motor to engage and crank the engine. Do not pump the pedal as this will cause the accelerating pump to flood the manifold.

When the engine is partially warm, hot, or flooded, depress accelerator pedal to the floor and hold it until engine fires regularly. This procedure actuates the choke unloader on the carburetor to prevent or to clear up a flooded condition.

b. Fuel Selection

The compression ratio of the Series 40 engine is such that a grade of fuel having an octane rating of 72 to 74 can be used satisfactorily. Under certain conditions such as high temperature and carbon accumulations, higher octane number fuel will result in less detonation or spark rap. Fuel having an octane rating of 78 to 80 is required in Series 50-70 engines because of higher compression ratios.

c. Fuel Additives

Gasoline extenders, carbon removers, valve and ring freeing additives to the fuel may seriously affect lubrication or may cause corrosion of the engine parts and generally do more harm than good. The addition of any compound to the fuel for break-in or otherwise is unnecessary and should not be used unless the supplier can furnish satisfactory proof that the compound does not contain harmful ingredients.

d. Cars in Storage

When car is stored for any length of time, fuel should be drained from the tank, feed pipes, fuel pump, and carburetor in order to avoid gum formation.

e. Changing Carburetor Calibrations

Under no circumstances should the jet sizes, metering rods and other calibrations of a carburetor be changed from factory specifications. The calibrations given in paragraph 3-1 must be adhered to unless these are later changed by a bulletin issued from the Buick Factory Service Department.

Carburetor calibrations have been determined after exhaustive tests with laboratory equipment and instruments which accurately measure overall performance and economy. Since equipment and instruments of identical accuracy are not available for field use, it is not possible to properly measure the effect of a change in calibrations by any means available in service stations.

SECTION 3-B
FUEL SYSTEM TROUBLE DIAGNOSIS

CONTENTS OF SECTION 3-B

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3-5 HARD STARTING

a. Improper Use of Accelerator Pedal

If the engine has been operating satisfactorily and developing full power when hot, hard starting may be due to improper use of the accelerator pedal when cranking the engine. See paragraph 3-4.

b. Improper Ignition

Before attempting any correction in fuel system make certain that the battery and ignition system are in proper condition. See paragraph 10-44.

c. Improper Vacuum Switch Timing

Hard starting may be caused by incorrect timing of the accelerator vacuum switch. If the switch is timed too early, the engine will be cranked with insufficient throttle opening and failure to start, or stalling after starting, will result. Extremely late timing may bring the choke unloader into operation and cause hard starting with a cold engine. See paragraph 10-32 (Carter) or 10-33 (Stromberg).

d. Improper Adjustment of Fast Idle Cam or Choke Unloader

An incorrectly adjusted fast idle cam may provide insufficient throttle opening and stalling will result as soon as accelerator pedal is released.

If the choke unloader goes into action too soon it may cause hard starting when engine is cold. If choke unloader goes into action too late or not at all, it may cause hard starting when engine is partially warm, hot, or flooded. See paragraph 3-23 (Carter) or 3-30 (Stromberg).

e. No Fuel at Carburetor

No fuel may be delivered to carburetor due to empty gasoline tank or stoppages in filters, strainers or feed pipes, or inoperative fuel pump. Test fuel supply as described in paragraph 3-17.

f. Improper Carburetor Adjustment

Improper setting of carburetor idle needle valves may cause stalling after starting. A high fuel level in float bowl will cause flooding and consequent hard starting. Check fuel level and adjust carburetor (par. 3-12).

g. Low Grade Gasoline

Low grade gasoline is usually insufficiently volatile to provide easy starting in cold weather even though it may perform reasonably well after the engine is started and warmed up. A change to higher grade gasoline is the only remedy.

h. Volatile Gasoline

In some parts of the country, gasolines are marketed which are very volatile and generally advertised as "easy starting gasolines." Some of these fuels are so volatile they boil (commonly referred to as "percolation") in a carburetor bowl which is only normally warm, especially when the engine is shut off following a run. This overloads the manifold, resulting in an over rich mixture which may cause "delayed" starting.

Such gasolines are not necessary in a Buick since the automatic choke has been designed and calibrated to provide easy and positive starting with fuels of ordinary volatility, but if the owner wishes to use volatile gasolines the automatic choke thermostat should be adjusted for a "lean" setting (par. 3-13).

3-6 IMPROPER ENGINE PERFORMANCE

a. Engine Idles Too Fast

A cold engine should operate on fast idle for two to five minutes depending on air temperature. At 32° F. the fast idle cam should move to slow idle position in approximately ½ to ¾ mile of driving. At higher temperatures it should move to slow idle position in a correspondingly shorter distance.

If the engine operates too long on the fast idle cam, check the choke thermostat setting (par. 3-13) and the fast idle adjustment (par. 3-23, Carter, or par. 3-30, Stromberg).

If engine idles faster than 8 MPH on a level road in third speed when off the fast idle cam, check throttle linkage for binding or weak return spring and adjust throttle stop screw (par. 3-12).

b. Improper Idle and Low Speed Performance

Rough idling and tendency to stall may be caused by idling speed set below 8 MPH or improper needle valve adjustment (par. 3-12).

High fuel pump pressure will cause rough idling and poor low speed performance (par. 3-17).

An intake manifold air leak will cause rough idling and poor low speed performance. A manifold air leak produces a low, erratic reading on a vacuum gauge connected to the intake manifold. Look for leaks at windshield wiper and all pipe connections and check manifold joints with gasoline.

Rough idling, poor performance, and back firing at low speeds frequently originates in improper ignition. Check ignition system (par. 10-44).

When rough idling and poor low speed performance cannot be corrected by checks of carburetion and ignition mentioned above, check valve adjustment and check cylinder compression.

c. Improper High Speed Operation

Roughness or poor performance above 22 MPH indicates faulty ignition (par. 10-44) or improper settings in the high speed circuit of carburetor.

With Carter carburetors, a surging or loss of power at 55 to 65 MPH constant speed indicates that the metering rod adjustment is too lean. This may occur even though top speed performance is satisfactory.

With Stromberg carburetors, surging at 75 to 80 MPH constant speed indicates that the power jet is stopped up or the vacuum piston is sticking.

If there is lack of power at top speed, check throttle linkage to insure full throttle valve opening (par. 3-10).

3-7 EXCESSIVE FUEL CONSUMPTION

Complaints of excessive fuel consumption require a careful investigation of owner driving habits and operating conditions as well as the mechanical conditions of the engine and fuel system; otherwise, much useless work may be done in an attempt to increase fuel economy.

Driving habits which seriously affect fuel economy are: high speed driving, frequent and rapid acceleration, driving too long in first or second speed when getting under way, excessive idling while standing.

Operating conditions which adversely affect fuel economy are: frequent starts and stops, congested traffic, poor roads, hills and mountains, high winds, low tire pressures.

High speed is the greatest contributor to low gas mileage. Air resistance increases as the square of the speed. For instance, a car going sixty miles an hour must overcome air resistance four times as great as when going thirty miles an hour. At eighty miles an hour the resistance is over seven times as great as when going thirty miles an hour. Over seventy-five per cent of the power required to drive a car eighty miles an hour is used in overcoming air resistance, while at thirty miles an hour only thirty per cent of the power required is used to overcome air resistance.

Gas mileage records made by car owners never give a true picture of the efficiency of the engine fuel system since they include the effects of driving habits and operating conditions. Because of the wide variation in these conditions it is impossible to give average mileage figures for cars in general use; therefore, any investigation of a mileage complaint must be based on an accurate measurement of gasoline consumption per mile under proper test conditions.

A gas mileage test should be made with a 1/10th gallon gauge on a reasonably level road, at fixed speeds, without accelerating or decelerating. Test runs should be made in both directions over the same stretch of road to average the effect of grades and wind resistance. Test runs made at 30, 50, and 70 m.p.h. will indicate the approximate efficiency of the low speed, high speed, and power systems of the carburetor and show whether fuel consumption is actually abnormal. Under the conditions given the fuel consumption should be approximately as follows:

Series	*30 MPH*	*50 MPH*	*70 MPH*
40-50	19.0	16.5	13.0
70	17.5	15.0	12.0

If a mileage test indicates that the fuel consumption is above normal, check the following items.

1. Fuel Leaks. Check all gasoline pipe connections, fuel pump bowl gasket, gasoline filter gasket, and carburetor bowl gasket.

2. Tires. Check for low tire pressures (par. 6-8).

3. Brakes. Check for dragging brakes (par. 8-12).

4. Ignition Timing—Spark Plugs. Late ignition timing causes loss of power and increases fuel consumption, (par. 10-47). Dirty or worn out spark plugs are wasteful of fuel (par. 10-48).

5. Low Grade Gasoline. Use of gasoline of such low grade that ignition timing must be retarded to avoid excessive detonation will give very poor fuel economy.

6. Exhaust Manifold Heater Valve. Check for sticking valve or improper setting of thermostat (par. 3-11).

7. Air Cleaner. Check for dirty or clogged cleaner element and excessive oil in sump (par. 3-8).

8. Automatic Choke. Check for sticking choke valve and improper setting of thermostat (par. 3-13).

9. Valves. Check for tight valve lash or sticking valve (par. 2-14).

10. Fuel Pump. Check for excessive fuel pump pressure (par. 3-17).

11. Carburetor Adjustment. Check float bowl fuel level and idle adjustment (par. 3-12). On Carter carburetor, the metering rod setting may be checked without removing carburetor. For all other corrections to high speed and power systems of Carter or Stromberg carburetors, the carburetors must be removed and disassembled (par. 3-25, Carter, or 3-32, Stromberg).

SECTION 3-C
ADJUSTMENTS AND REPLACEMENTS—EXCEPT IN PUMP AND CARBURETOR ASSEMBLIES

CONTENTS OF SECTION 3-C

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3-8 CLEANING AND FILLING AIR CLEANER

An air cleaner with a dirty element, or with oil that is dirty, too heavy, or too high in the sump, will restrict the air flow to the carburetor and cause a rich mixture at all speeds. The device will not properly remove dirt from the air and the dirt entering the engine will cause abnormal formation of carbon, sticking valves, and wear of piston rings and cylinder bores.

Regular cleaning of the element and sump and filling sump with clean oil at 5000-mile intervals, or more frequently in dusty territory, is necessary to prevent excessive engine wear and abnormal fuel consumption.

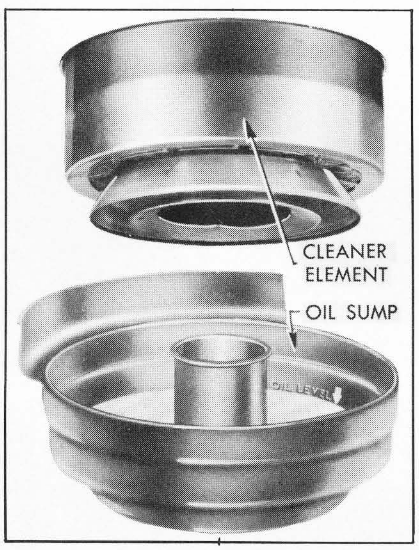


Figure 3-9—Air Cleaner Element and Sump, Showing Oil Level

1. Remove wing nut, loosen clamp screw at carburetor air horn and remove air cleaner, intake silencer and elbow from engine, being careful not to spill the oil. Separate the cleaner and silencer parts.

2. Dip the cleaner element in a non-inflammable solvent and agitate until thoroughly clean. Do not use kerosene. Shake out cleaning fluid and allow element to drain until dry. CAUTION: *Do not dry the element with a hard blast of air; this will permanently injure and distort the filtering mesh.*

3. Drain and thoroughly wash the oil sump and wipe it dry with a clean cloth. Wipe out interior of the air intake silencer.

4. Fill sump to oil level line with one pint of S.A.E. 50 engine oil. See figure 3-9. *Do not oil the cleaner element because this oil will drain back into the sump and cause sump to be overfull.*

5. Assemble and install cleaner, silencer, and elbow on engine. The baffle on oil sump must be placed toward front of engine. CAUTION: *Excessive tightening of clamp screw at carburetor air horn may distort this part and cause binding of choke valve.* Wipe all oil from outer surface of cleaner.

3-9 CLEANING GASOLINE FILTERS AND STRAINERS

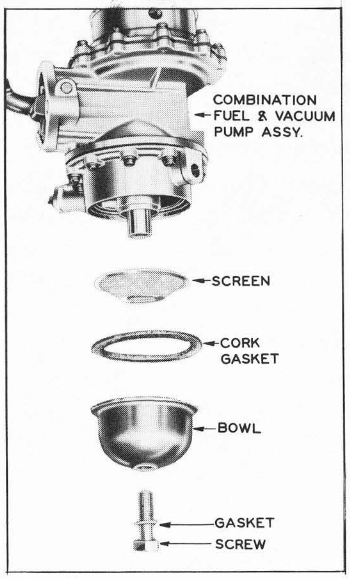


Figure 3-10—Fuel Pump Gasoline Filter—Disassembled

The bowl and strainer on the lower end of fuel pump and the gasoline filter located at carburetor inlet collect dirt and water which should be cleaned out periodically, at least twice a year. The fine mesh cylindrical strainer located in the carburetor inlet should be cleaned if fuel supply to carburetor appears to be restricted.

a. Cleaning Fuel Pump Gasoline Filter

1. Use Z-shaped Wrench KMO 655 to remove screw and gasket then remove bowl, gasket, and strainer from lower end of fuel pump. See figure 3-11.

2. Wash strainer and sediment bowl in Bendix Carburetor Cleaning Solvent, or its equivalent, to remove all traces of dirt and gum, then rinse in kerosene, distillate, or white gasoline. Gently blow through strainer with air hose.

3. Use new bowl and screw gaskets when reinstalling strainer and bowl, to insure against gasoline leakage. Tighten bowl screw securely.

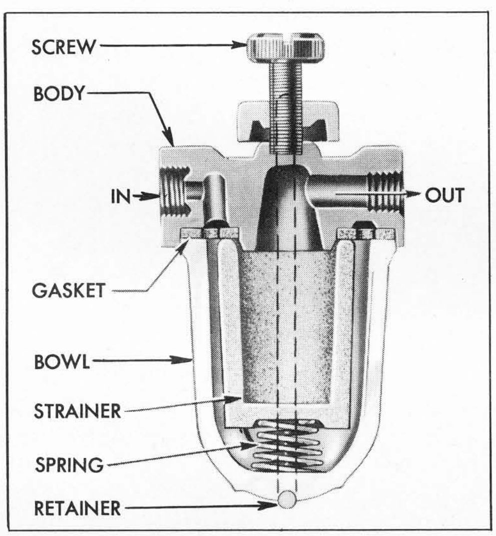


Figure 3-11—Carter Ceramic Type Gasoline Filter—Sectional View

b. Cleaning Carter Ceramic Type Gasoline Filter

1. Loosen bowl retainer screw, swing bowl retainer to one side and remove bowl, ceramic strainer, and spring. See figure 3-11.

2. Wash strainer and bowl in Bendix Carburetor Cleaning Solvent, or its equivalent, and rinse in kerosene, distillate, or white gasoline. Direct air stream against *inside* surface of strainer to force dirt from outside surface.

3. Install strainer, spring, and bowl, using a new bowl gasket.

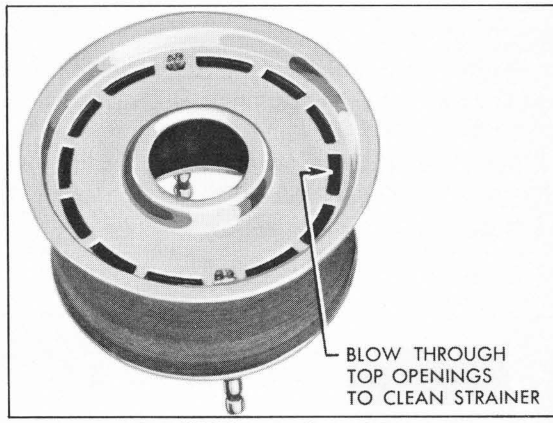


Figure 3-12—AC Paper-Edge Gasoline Filter Strainer

c. Cleaning AC Paper-Edge Type Gasoline Filter

1. Remove bowl and strainer and clean these parts in gasoline. Agitate the strainer in gasoline to loosen dirt.

2. *Gently* blow through openings in top of strainer to force dirt out from between paper laminations. See figure 3-12. Do not blow against outside of strainer.

3. Install strainer and bowl.

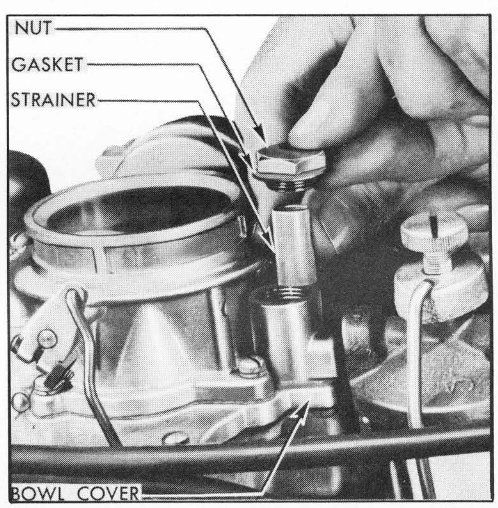


Figure 3-13—Removal of Strainer—Carter Carburetor

d. Cleaning Carburetor Inlet Strainer

1. On *Carter* carburetor remove brass strainer nut and gasket from carburetor bowl cover and lift strainer out of well in bowl cover. See figure 3-13.

On *Stromberg* carburetor, disconnect fuel pipe from gasoline filter then remove filter with carburetor inlet fitting. Remove strainer from carburetor air horn. See figure 3-14.

2. Clean strainer in Bendix Carburetor Cleaning Solvent, or its equivalent, to remove all traces of dirt and gum, then rinse in kerosene, distillate, or white gasoline. *Gently* blow through strainer with air hose.

3. When reinstalling *Carter* strainer make sure that strainer nut gasket is in good condition and nut is tightened securely.

When reinstalling *Stromberg* strainer coat threads of inlet fitting with joint compound and tighten fitting securely.

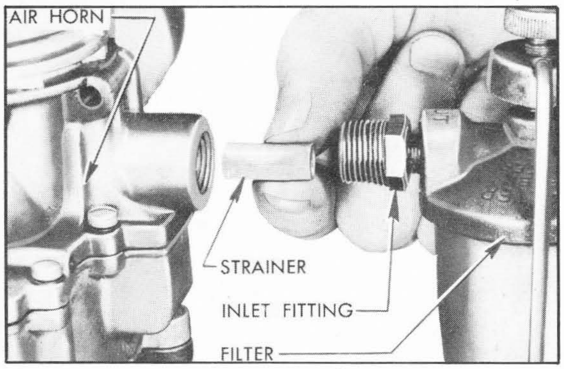


Figure 3-14—Removal of Strainer—Stromberg Carburetor

3-10 THROTTLE LINKAGE ADJUSTMENT

The throttle linkage must work freely and be adjusted so that the accelerator pedal can move the throttle valve smoothly from fully closed to wide open positions, and operate the choke unloader in the wide open position.

Make sure that accelerator pedal is securely fastened to floor pan and Rod does not bind in hole through floor mat. Throttle return spring must be strong enough to pull throttle to closed position against throttle stop screw.

When accelerator pedal is released, the throttle must close against the throttle stop screw. When pedal is pressed all the way down, the throttle must fully open to the throttle stop on carburetor.

a. Throttle Linkage Adjustment—Syncro-Mesh Transmission Cars

1. Disconnect the throttle operating rod ball joint from the throttle lever and open the throttle valve to wide open position against its stop.

2. While a second man presses accelerator pedal firmly against the floor mat, which must be in place, adjust the ball joint on throttle operating rod so that the screw will just enter the *upper* hole in throttle lever.

3. Turn ball joint 1 or 2 turns clockwise on rod and connect ball joint to throttle lever. The desired adjustment is to obtain full opening of throttle valve when accelerator pedal strikes floor mat rather than having the stop on throttle lever strike the boss on throttle body.

4. Hold choke valve closed and check for proper operation of choke unloader when accelerator is pressed to floor mat. If choke unloader does not operate properly, adjust as described in paragraph 3-23 (Carter) or 3-30 (Stromberg).

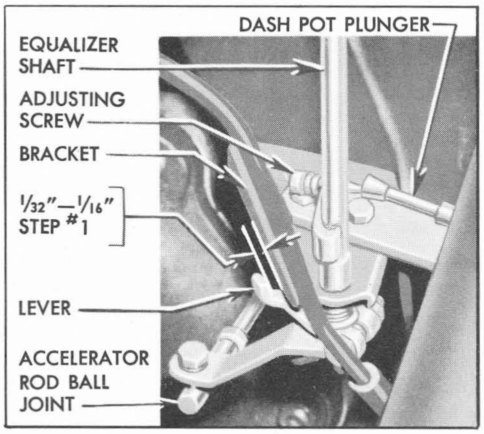


Figure 3-15—Throttle Dash Pot Adjustment—Dynaflow Drive Cars

b. Throttle Linkage and Dash Pot Adjustment—Dynaflow Drive Cars

1. With engine idling at 450 RPM, check clearance between the stop on lever at lower end of equalizer shaft and the shaft lower bracket. See figure 3-15. If clearance is not 1/32" to 1/16", adjust throttle operating rod at ball joint to obtain 1/32" to 1/16" clearance.

2. With engine shut off, check for full opening of throttle valve when accelerator pedal hits the floor mat, which must be in place. Full opening should be obtained when pedal strikes floor mat, rather than having the stop on throttle lever strike the boss on throttle body. Adjust accelerator pedal rod at ball joint, if necessary, to obtain full opening of throttle valve.

3. Hold choke valve closed and check for proper operation of choke unloader when accelerator pedal is pressed to floor mat. If choke

unloader does not operate properly, adjust as described in paragraph 3-23 (Carter) or 3-30 (Stromberg).

4. Hold choke valve closed and check clearance beween the fast idle cam and the adjustment or stop screw. Clearance should be 1/64" to 1/32", and may be obtained by adjusting the screw on the dash pot operating lever at lower end of equalizer shaft. See figure 3-15.

3-11 EXHAUST MANIFOLD VALVE SERVICE

a. Freeing Up Sticking Valve

Carbon or lead salt deposits around the valve shaft may cause the valve to stick or become sluggish in operation. A valve sticking in the open position will cause slow engine warm up, excessive spitting and sluggish engine operation when cold. A valve sticking in the closed position will cause overheating, loss of power, and hard starting when the engine is hot, and may also cause warped or cracked manifolds. Sticking in either position will adversely affect fuel economy.

If the valve shaft is sticking or frozen in the valve body, free it up by tapping on the ends with a light hammer, and by rotating the counterweight. Penetrating oil or kerosene may be used to aid in freeing the shaft.

When the valve shaft is free, apply a mixture of kerosene and powdered graphite liberally to the shaft bearing; the mixture to be composed of 2½ ounces of powdered graphite to 1 pint of kerosene. Lubrication of shaft every 1,000 miles is specified in Lubricare Instructions (par. 1-1).

b. Checking Manifold Valve Thermostat Setting

The setting of the exhaust manifold valve thermostat may be checked when the engine is at room temperature of approximately 70° F. Unhook the outer end of thermostat from anchor stud on the valve body and hold the valve in the closed (heat on) position. To bring the end of thermostat to the anchor stud will then require approximately ¼ turn wind-up of the thermostat.

The thermostat is not adjustable and should never be distorted or altered in any way as this will affect its calibration. If the thermostat does not have the proper setting, or is damaged, it should be replaced.

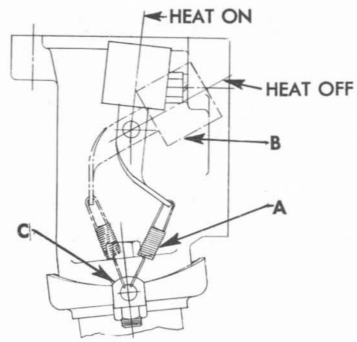


Figure 3-16—Valve Anti-Rattle Spring Adjustment

c. Adjusting Valve Anti-Rattle Spring

The anti-rattle spring shown at "A" in figure 3-16 must be adjusted so that the valve cannot flutter and chatter against the inside of valve body in either the closed (heat on) or open (heat off) positions. These positions can be felt by moving the counterweight by hand, and adjustment can be made with engine hot or cold.

Bend clip "C" as required so that spring "A" will prevent the valve from contacting the valve body in either closed or open positions. Adjustment so that valve has sufficient clearance to prevent rattle in the closed position will usually be correct for the open position also. Clearance equal to 1/16" to 1/8" movement at the extreme end of counterweight is correct.

3-12 CARBURETOR ADJUSTMENT

Do not attempt to adjust the carburetor idle needle valves until it is known that the ignition system is in proper operating condition (par. 10-44), that compression is satisfactory and valves are properly adjusted. It should also be known that the exhaust manifold valve is operating properly (par. 3-11) and that intake manifold has no air leaks, that gasoline filters and strainers are clean (par. 3-9), that fuel pump is supplying carburetor with ample fuel at specified pressure (par. 3-17), that the air supply is not restricted by the air cleaner (par. 3-8) or choke (par. 3-13) and that throttle control linkage is correctly adjusted (par. 3-10).

Any attempt to adjust or alter the carburetor to compensate for faulty conditions elsewhere in items affecting engine performance will result in reduced fuel economy and overall performance.

a. Checking Float Bowl Fuel Level

Any deviation from the specified fuel level in the float bowl will seriously affect carburetion; therefore, the level should be checked before adjusting the carburetor.

1. Remove the fuel level sight plug from carburetor float bowl.

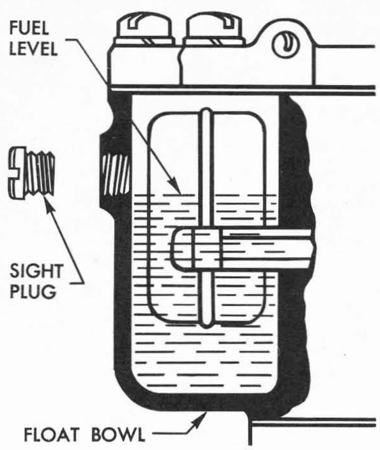


Figure 3-17—Float Bowl Fuel Level

2. With engine idling at normal operating temperature, the fuel in the bowl must be just high enough to wet the threads at the lower side of the sight hole. See figure 3-17.

3. If the fuel level is not correct, it must be adjusted to correct height to insure proper carburetor operation. If the level is too high it is advisable to check fuel pump pressure (par. 3-17) before making an adjustment of carburetor float.

b. Making Initial Setting of Throttle Stop Screw

The initial setting of the throttle stop screw will provide an engine idling speed of approximately 450 RPM (8 MPH on level road in third speed) to prevent stalling during starting and warm up of engine.

1. Back off throttle stop screw until throttle valves are fully closed.

2. With choke wide open, turn throttle stop screw "IN" (clockwise) until it just contacts the low step of fast idle cam of Stromberg carburetor or boss on throttle body of Carter carburetor.

3. Turn throttle stop screw "IN" one complete turn, which will give engine idling speed of approximately 450 r.p.m.

NOTE: *If the engine operates on fast idle too long after starting or else moves to slow idle too soon, or the choke unloader does not operate properly, check fast idle cam and choke unloader adjustments as described in paragraph 3-23 (Carter) or paragraph 3-30 (Stromberg).*

c. Making Initial Setting of Idle Needle Valves

An initial setting of the idle needle valves is necessary to make certain that both valves are opened an equal amount.

1. With engine stopped, turn both idle needle valves "IN" (clockwise) until they seat lightly. CAUTION: *Do not force valves against seats as this will damage valves and seats.*

2. On Stromberg carburetor, turn each valve "OUT" (counter clockwise) 1¾ turns. On Carter carburetor, turn each valve "OUT" 1 turn. *Be careful to turn both valves exactly the same amount. See figure 3-18.*

d. Making Final Adjustment of Idle Needle Valves

The two idle needle valves and the throttle stop screw are the only external means provided for adjusting the carburetor. Turning the idle needle valves "IN" (clockwise) makes the mixture "LEAN."

The idle needle valves control the idle or low speed system of the carburetor; all adjustments affecting the main metering or high speed system are made during assembly of the carburetor.

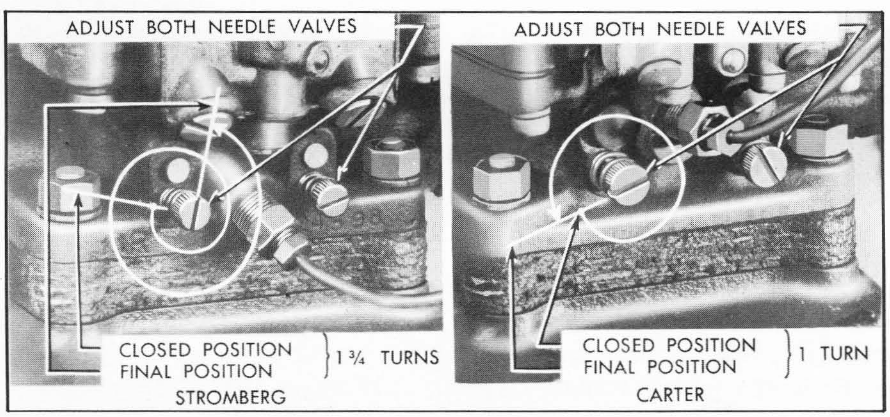


Figure 3-18—Initial Setting of Idle Needle Valves

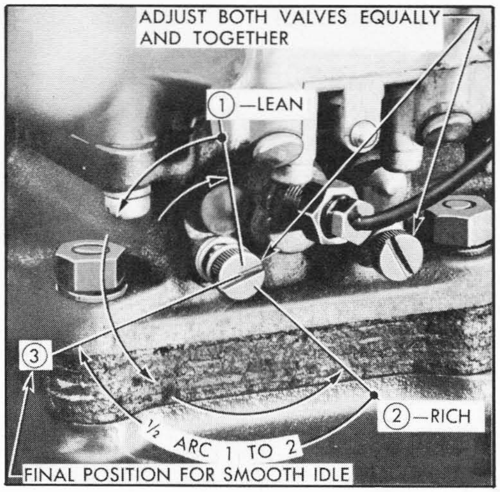


Figure 3-19—Adjustment for Smooth Idle

1. With throttle stop screw and idle needle valves at the initial settings as described above, start the engine and run it until it is at normal operating temperature.

2. Carefully turn both idle needle valves "IN" (clockwise) exactly the same amount until engine begins to roll or run unevenly.

3 Carefully turn both needle valves "OUT" (counterclockwise) exactly the same amount until engine again starts to roll or run unevenly.

4. Turn both needle valves "IN" one-half the distance between the first and second positions, being careful to turn both valves an equal amount. See figures 3-19. This should give the smoothest idling point. NOTE: *As the needle valves are changed, the throttle stop screw also must be changed to maintain engine idling speed at 450 RPM (8 MPH on level road in third speed).*

5. If outside temperature is much colder than shop where adjustment is made, turn both needle valves "OUT" a slight amount to compensate for difference in temperature.

Final adjustment of the carburetor idle needle valves also may be made with the aid of a combustion tester, tachometer, or vacuum gauge. When such instruments are used, be sure they are in good condition and are used in accordance with the instructions of the manufacturer.

Regardless of the methods or instruments used for making adjustments in the shop, the correctness of adjustment should be finally checked by a road test for smoothness at idling speed, power on acceleration, and freedom from sluggishness or flat spots throughout entire speed range.

3-13 CHOKE THERMOSTAT ADJUSTMENT

It is desirable to have the choke thermostat set as lean as operating conditions will permit in order to avoid an over rich mixture during engine warm-up. The correctness of the thermostat setting can be tested only when the engine and choke thermostatic coil are cold. The carburetor must be properly adjusted (par. 3-12) and the manifold heat control valve must be operating properly (par. 3-11). The cold engine should start readily, idle without loading or rolling, and should accelerate smoothly during the warm-up period while the choke is normally in operation.

The thermostat is calibrated to give satisfactory performance with regular blends of gasoline when it is placed at the "Normal" factory setting. A "Lean" setting should be used only when the car is habitually operated on highly volatile fuel. The need for this setting will be indicated by excessive loading or rolling of the engine on warm up, with the choke at the "Normal" setting and the carburetor properly adjusted. A "Rich" setting should be used only when excessive spitting occurs on engine warm up, with the choke at the "Normal" setting, the carburetor properly adjusted, and the manifold heat control valve operating properly.

The "Normal" settings for Carter and Stromberg choke thermostats are given below. When making either a "Lean" or a "Rich" setting, *make no adjustment except when engine and thermostatic coil are cold.* Turn thermostat housing one mark at a time in required direction and test the results, until the desired performance is obtained.

a. Setting of Carter Climatic Control Thermostat

The plastic thermostatic coil housing has an

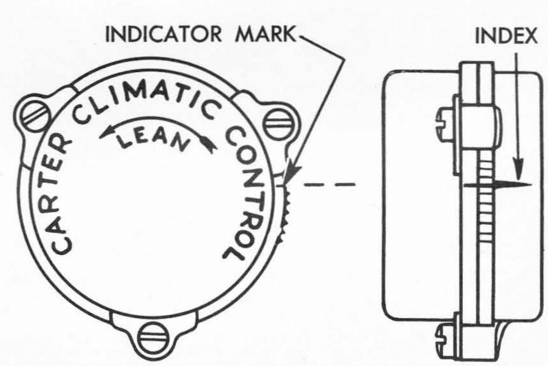


Figure 3-20—Carter Climatic Control Thermostat at Normal Setting

indicator mark cut in the flanged edge and an arrow pointing in the direction of rotation for a "Lean" setting. Small graduation ribs are cast in the flange of the choke piston housing which is integral with the air horn. A larger rib extending out on this housing serves as an index point. See figure 3-20.

The thermostatic coil housing is clamped in position by three retainers and screws which must be loosened to turn the housing. The hooked end of thermostatic coil must be in position to contact the choker shaft lever and close the choker valve when coil is cold.

The "Normal" or standard setting of thermostat exists when the indicator mark on coil housing is in line with the index rib on air horn. A "Lean" setting is obtained by turning the coil housing counterclockwise, in the direction of arrow. A "Rich" setting is obtained by turning coil housing in the opposite direction.

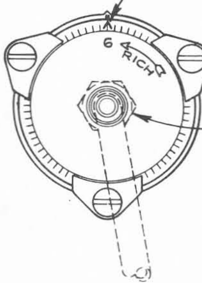


Figure 3-21—Stromberg Choke Thermostat at Normal Setting —Series 70

b. Setting of Stromberg Choke Thermostat

An indicator rib is cast on the top surface of the thermostat housing attached to carburetor air horn. Small graduation ribs are cast on the edge of the thermostat cover, and a "V" mark is punched on edge of cover to serve as an index. An arrow cast on thermostat cover points in the direction of rotation for a "Rich" setting. See figure 3-21.

The thermostat cover is clamped in position by three lug-washers and screws, which must be loosened to turn the cover. It is also necessary to loosen the heat pipe connection to turn cover. The hooked end of thermostat coil must be in position to contact the pin on the vacuum piston lever and close the choke valve when coil is cold.

On *Series 70,* the "Normal" or standard setting exists when the "V" index mark on cover aligns with the indicator rib on housing (fig. 3-21). On *Series 40-50,* the "Normal" setting exists when the "V" mark is one notch "Lean" or clockwise from indicator rib.

A "Rich" setting is obtained by turning thermostat cover counterclockwise, in direction of arrow on cover. A "Lean" setting is obtained by turning housing in the opposite direction. *When tightening heat pipe connection do not use excessive pressure, which may change position of thermostat cover.*

3-14 REPLACEMENT OF INTAKE AND EXHAUST MANIFOLDS

Exhaust manifolds should never be removed while the engine is hot because warpage is liable to occur.

When manifolds are assembled and installed, care must be exercised to avoid strain which will result in leaking joints or cracked manifolds. Assembly and installation should be done in the following manner:

1. Install the valve body on the exhaust manifold with a new ring gasket in pilot ring recess in body and a new gasket between body and manifold; make sure that pilot ring is in place. See figure 3-22. Leave attaching stud nuts snug but not tight.

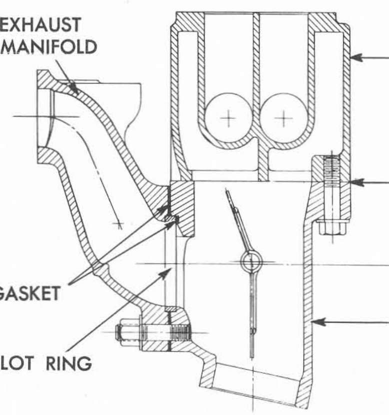


Figure 3-22—Sectional View of Joints Between Valve Body and Manifolds

2. Coat joint surfaces with graphite lubricant, then install intake manifold on exhaust manifold valve body leaving attaching bolts snug but not tight.

3. Install intake and exhaust manifold assembly on engine with new intake manifold gaskets. The individual intake manifold gaskets are centered and the branches of the intake manifold are aligned with the intake ports in cylinder head by pilot rings installed at each joint.

4. Exhaust manifold gaskets are not used.

In production, a special compound is used at joints between manifold and cylinder head, and original manifold may be reinstalled without using additional compound. When a new manifold is installed, however, coat the joint surfaces with a thin fluid mixture of graphite and oil.

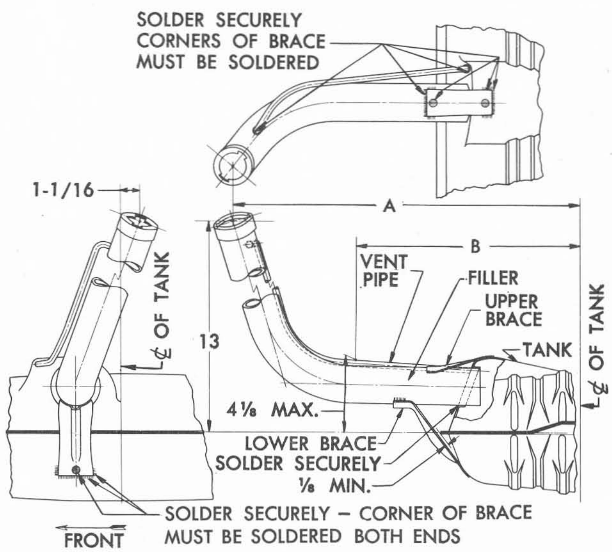
5. Uniformly tighten all stud nuts which attach manifolds to cylinder head, then tighten stud nuts which attach valve body to exhaust manifold and finally, tighten bolts which attach intake manifold to valve body.

3-15 REPLACEMENT OF GASOLINE TANK OR FILLER

When removing gasoline tank, disconnect gasoline feed pipe from gasoline gauge pipe, support the tank while disconnecting support straps at rear ends, then lower tank far enough to disconnect the wire from gasoline gauge.

When installing gasoline tank by reversing procedure for removal, make sure that all road dirt is cleaned from gasoline gauge and wire terminal; also make sure that wire is securely attached to gauge and that insulation is folded over the terminal and snapped over the wire. An accumulation of road dirt around the gauge terminal may permit an electrical leak that will affect the accuracy of the gauge. Insulating strips must be located between the tank and the upper supports on body.

The gasoline tank filler and the vent pipe are furnished separately so that they may be replaced if damaged. After unsoldering the old parts, the new filler and vent pipe should be installed in gasoline tank in accordance with the dimensions given in figure 3-23 for 1948 models or figure 3-24 for 1949 models. Joints must be thoroughly soldered and should be tested for leaks with gasoline before installing gasoline tank.



A	B	MODELS
26 11/16	20 1/4	ALL EXCEPT ESTATE WAGONS
28 5/8	22 3/16	ESTATE WAGONS

Figure 3-23—Location Dimensions for Gasoline Tank Filler—All 1948 Models

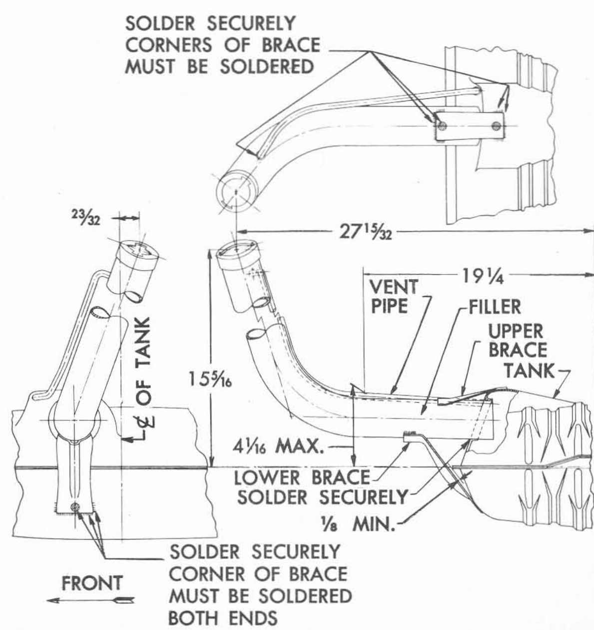


Figure 3-24—Location Dimensions for Gasoline Tank Filler—1949 Series 50-70

SECTION 3-D
FUEL AND VACUUM PUMP

CONTENTS OF SECTION 3-D

SERVICE BULLETIN REFERENCE

Bulletin No.	Page No.	SUBJECT

3-16 DESCRIPTION AND OPERATION OF FUEL AND VACUUM PUMP

a. Description of Pump

The AC type AJ combination fuel and vacuum pump is used on all series engines. The pump assembly for Series 70 differs from the pump for Series 40-50 only in the shape of rocker arm and in the use of an air dome on the fuel outlet of the Series 70 pump.

The pump assembly, which is mounted on right side of engine crankcase at the front, is operated by an eccentric on the engine camshaft which actuates the pump rocker arm. The single rocker arm actuates both the fuel and the vacuum sections of the pump through separate links which permit each section to function independently of the other section. See figure 3-25.

The fuel and vacuum sections form two separate, independently operating diaphragm type pumps. They are combined in one assembly for compactness and to permit operation from one eccentric on the engine camshaft.

A fuel filter, consisting of a metal bowl and a fine mesh screen, is incorporated in the fuel

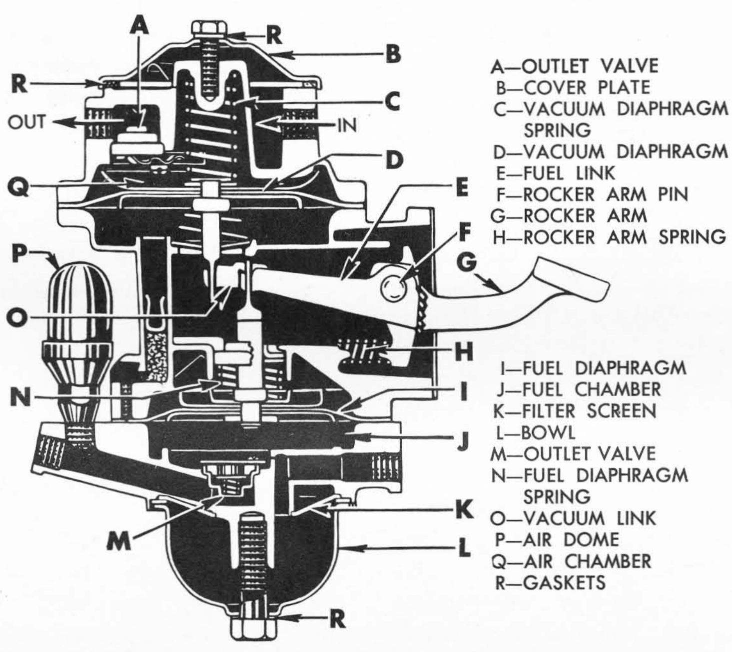


Figure 3-25—Combination Fuel and Vacuum Pump—Sectional View

section of the pump. See figure 3-10. Fuel from the gasoline tank first enters the bowl then flows upward through the screen into the fuel pump. The bowl provides a settling chamber for water and the dirt which cannot pass the screen. The bowl and screen should be cleaned periodically (par. 3-9).

b. Operation of Fuel Section of Pump

The function of the fuel section of the pump is to draw gasoline from the tank and supply it to the carburetor in sufficient quantity to meet engine requirements at all speeds and loads.

The pump rocker arm (G) is actuated by an eccentric on engine camshaft. The arm is held in contact with the eccentric by the rocker arm spring (H). Movement of rocker arm is transmitted to the fuel link (E) which pulls the fuel diaphragm (I) upward from the fuel chamber (J) against pressure of the diaphragm spring (N). See figure 3-25.

Vacuum created in the fuel chamber by upward movement of diaphragm holds the outlet valve (M) closed and causes fuel to flow from the gasoline tank, through the inlet valve (not shown), into the fuel chamber.

The return stroke (low point of cam) releases the compressed diaphragm spring which then exerts pressure on the diaphragm and the fuel in the chamber. This pressure closes the inlet valve and forces fuel out through the outlet valve to the carburetor in an amount governed by the pressure in the pump-to-carburetor line.

The fuel link is hinged to the rocker arm so that the link and the connected fuel diaphragm can be moved up, but not down, by the rocker arm. The link and the diaphragm are moved downward only by the diaphragm spring. The pump, therefore, delivers fuel to the carburetor only when the fuel pressure in the outlet line is less than the pressure maintained by the diaphragm spring. This condition arises when the carburetor float needle valve is not seated and the fuel passage from the pump into the carburetor float chamber is open. When the needle valve is closed and held in place by the pressure of the fuel on the float, the pump builds up pressure in fuel chamber until it overcomes the pressure of the diaphragm spring. This pressure results in almost complete stoppage of diaphragm movement until more fuel is needed. Normal diaphragm stroke is aproximately $\frac{1}{64}$″.

The air dome used on Series 70 pumps provides a pocket in which fuel under pressure can compress a certain volume of air. When the pressure is relieved (pump on suction stroke) the pocket of compressed air pushes the fuel on to its destination. The air dome minimizes flow variations experienced with a two-cycle pump stroke and increases the pump output.

c. Operation of Vacuum Section of Pump

The function of the vacuum section of the pump is to act as a booster to the intake manifold vacuum, thereby providing uniform operation of the windshield wiper at all engine speeds and loads.

The pump rocker arm (G) is actuated by an eccentric on engine camshaft. The arm is held in contact with the eccentric by the rocker arm spring (H). Movement of rocker arm is transmitted to the vacuum link (O) which pushes vacuum diaphragm (D) upward into air chamber (Q) against pressure of the diaphragm spring (C). See figure 3-25.

Pressure created in the air chamber by upward movement of diaphragm holds the inlet valve (not shown) closed and expels air through the outlet valve (A) into the engine manifold.

The return stroke (low point of cam) releases the compressed diaphragm spring which then pushes the diaphragm down, creating a vacuum in air chamber. This vacuum closes the outlet valve and draws air through the inlet valve from the windshield wiper.

The diaphragm operates only when engine vacuum is insufficient for windshield wiper action. When manifold vacuum is greater than that created by the pump, the stronger manifold vacuum pulls the diaphragm into the air the vacuum link out of engagement with the rocker arm. The windshield wiper then operates on manifold vacuum without assistance from the pump. When intake manifold vacuum is low, as on acceleration or at high speed, the vacuum created by the pump will assure adequate operation of the wiper.

3-17 FUEL PUMP INSPECTION AND TEST

If the fuel pump is suspected of delivering an improper amount of fuel to the carburetor, it should be inspected and tested on the engine, as follows:

1. Make certain that there is gasoline in the tank.

2. With engine running, inspect for leaks at all gasoline feed pipe connections at gasoline tank, fuel pump, gasoline filter, and carburetor. Tighten any loose connections. Inspect the flexible connection in feed line and all pipes for dents or kinks which would restrict the flow of fuel. *Air leaks or restrictions on suction side of fuel pump will seriously affect pump output.*

3. Inspect for leaks at fuel pump diaphragm flange. Tighten the cover screws alternately and securely. Do not use shellac or any other adhesive on diaphragm.

4. Clean the filter in fuel pump and gasoline filter at carburetor (par. 3-9) and make sure that filter bowl gaskets are sealing securely.

5. Disconnect pump-to-carburetor pipe. Ground primary terminal of distributor with jumper wire so that engine can be cranked without firing. Place suitable container at end of pipe and crank engine a few revolutions. If no gasoline, or only a little, flows from pipe the feed pipes are clogged or fuel pump is inoperative. Before condemning the fuel pump, disconnect feed pipes at pump and blow through them with air hose to make sure that pipes are clear.

6. If gasoline flows in good volume from pipe at carburetor it may be assumed that the fuel pump and feed pipes are okay; however, it is advisable to make the following "static pressure" test to make certain that fuel pump is operating within specified pressure limits.

7. Attach a suitable pressure gauge to the disconnected end of gasoline pipe at carburetor. Run engine at 450 and 1000 rpm on gasoline in carburetor bowl and note reading on pressure gauge.

8. If fuel pump is operating properly the pressure will be 4 to 5 pounds and will remain constant at speeds between 450 and 1000 rpm. If pressure is too low or too high, or varies materially at different speeds, the pump should be removed for repairs (par. 3-19). NOTE: *If pressure gauge is connected at pump outlet instead of at end of feed pipe the pressure should be 4½ to 5½ pounds.*

3-18 VACUUM PUMP INSPECTION AND TEST

To test the vacuum section of pump, fully open the windshield wiper valve and observe the wiper blade while alternately idling and accelerating the engine. Operation of the windshield wiper should continue at nearly constant speed regardless of the engine speed or throttle opening. NOTE: *A dry windshield has the effect of slowing wiper blades in comparison with operation over a wet windshield. Consider this when testing, or wet the windshield by spraying with water.* If windshield wiper does not operate properly make the following inspection and test.

1. Check windshield wiper transmission cables to make sure they are correctly attached to wiper motor, are properly located in pulleys on wiper transmissions and cable tensioners, and are not rubbing against anything under the cowl. Make certain that wiper control is connected so that it can fully open the motor valve.

2. Check tightness of vacuum pump cover plate screw and check all pipe and hose connections between pump and windshield wiper motor. Tighten loose connections and replace any cracked or deteriorated hose.

3. If windshield wiper does not operate properly after all points of leakage have been corrected, detach both pipes at vacuum pump and join them with a piece of rubber hose. *Slowly* operate engine from idle to about 25 MPH speed; the wiper should run at full speed operating on engine vacuum only. If it does not, it can be assumed that the wiper motor, or tubing is defective. The pump vacuum section is inoperative if the windshield wiper operates properly on engine vacuum but not on pump vacuum.

4. A further test of vacuum pump may be made by attaching a vacuum gauge to the inlet port (port connected to wiper motor), with outlet pipe disconnected. CAUTION: *Always make this test of vacuum pump with the outlet open. The downward or exhaust stroke of pump is positive and the mechanism may be damaged if the outlet is closed or restricted.*

5. With engine operating at equivalent of 20 MPH road speed, the gauge should show 7 to 12 inches of vacuum. Less than 7 inches of vaccum indicates an inoperative vacuum pump.

6. Before removing the fuel and vacuum pump assembly for repairs to vacuum section, it is advisable to remove the cover plate and check condition of cover plate and screw gaskets, and condition of the screen under the cover plate. Leaking gaskets or a plugged screen would affect vacuum pump operation.

3-19 FUEL AND VACUUM PUMP REPAIRS

If only the vacuum section of the pump requires replacement of the diaphragm or valves, the procedures given in subparagraphs *a, c,* and *e,* should be followed. If the fuel section of pump requires replacement of the diaphragm, however, the complete procedure given in subparagraphs *a* through *e* must be followed.

The fuel diaphragm is sealed around the pull rod with a tight fitting oil seal which is staked into the pump body. Tilting of the diaphragm to unhook pull rod from the fuel link will damage this oil seal. The safest method to follow is to first remove the rocker arm and link so that diaphragm pull rod can be pulled straight out without damage to the seal.

The vacuum diaphragm should be removed before the fuel diaphragm andd installed after the fuel diaphragm because the fuel diaphragm and link cannot be correctly assembled with the vacuum diaphragm connected to the vaccum links.

a. Removal of Vacuum Diaphragm and Valves

1. Plug all openings and thoroughly wash outside of the unit with cleaning solvent and blow off with air hose to remove all dirt and grease.

2. Mark edges of vacuum cover and pump body with edge of a file, so that cover may be reinstalled in its original position on body.

3. Remove only two cover screws from opposite sides of the cover, and substitute for them two No. 10-32 x 1½" fillister head screws. Turn the two long screws all the way down, and then remove the balance of the short screws. Alternately back off the two long screws, a few turns at a time, until the force of the heavy vacuum diaphragm spring is no longer effective. If cover and body stick together, rap cover with screwdriver handle after backing off long screws a few turns; do not pry between the flanges. Remove long screws, vacuum cover assembly, diaphragm spring and spring retainer. See figure 3-25.

4. Remove cover plate and gasket, retainer and screen, valve retainer and valves from vacuum cover.

5. Hold pump with vacuum diaphragm down while pushing upward on diaphragm to unhook diaphragm pull rod from the vacuum links.

6. Remove oil seal retainers, seal, and spring from diaphragm pull rod. See figure 3-26.

7. If fuel section of pump is to be repaired also, proceed with subparagraph *b;* otherwise, inspect parts removed (subpar. *c)* and reassemble vacuum section with necessary new parts (subpar. *e).*

b. Removal of Fuel Diaphragm and Valves

1. Mark edges of fuel cover and pump body with edge of a file, so that cover may be reinstalled in its original position on body.

2. Remove fuel cover screws and separate the cover from pump body by rapping with screwdriver handle; do not pry between flanges.

3. Remove bowl and gasket, screen, valve retainer and valves from fuel cover. See figure 3-26.

4. File riveted end of rocker arm pin flush with steel washer, or cut off end with ⅜" drill, then drive out rocker arm pin with a drift punch. Wiggle rocker arm until link unhooks from fuel diaphragm, then remove rocker arm and link assembly, and rocker arm spring.

5. Remove fuel diaphragm from body by pulling straight out. CAUTION: *Do not tilt excessively or staked-in oil seal in pump body will be damaged.* Remove diaphragm spring and spring retainer.

6. Remove bushing from rocker arm to disassemble rocker arm, two vacuum links, one fuel link, link spacer, and link washers (there may be one or two link washers). See figure 3-26.

c. Cleaning and Inspection of Pump Parts

Replacement parts are available in three different kits, as follows:

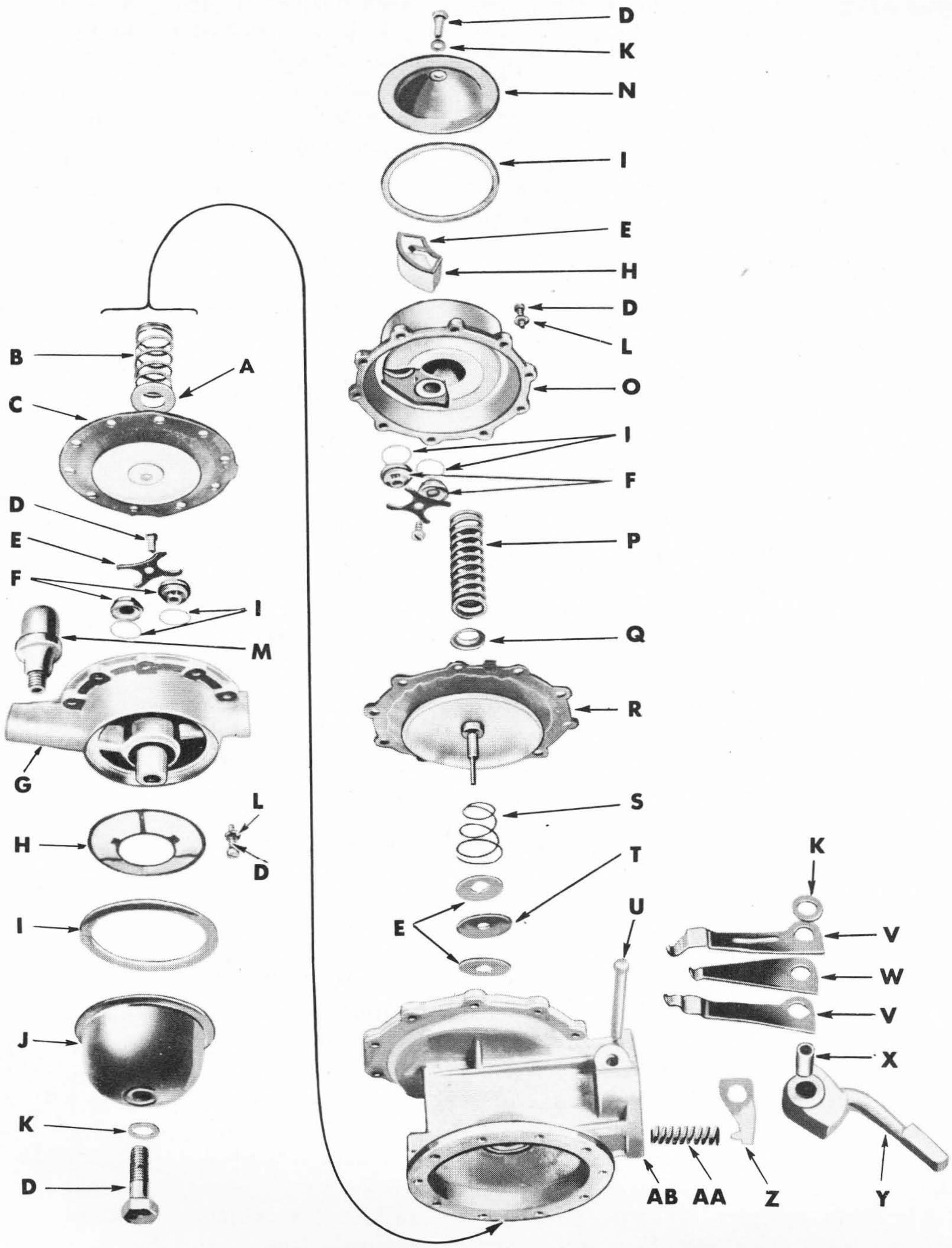
Vacuum Pump Diaphragm Kit
Fuel Pump Diaphragm Kit
Overhaul Kit

Each diaphragm kit contain the proper diaphragm, valves, springs, and gaskets to service the indicated section of the pump. A separate rocker arm pin is required with the fuel pump diaphragm kit. The overhaul kit contains all parts in both diaphragm kits plus links and other parts subject to wear or deterioration.

The kit to use will be determined by the corrections required, or by inspection of disassembled parts as follows:

1. Clean and rinse all metal parts in solvent. Blow out all passages with air hose.

2. Inspect pump body, fuel, and vacuum covers for cracks, breakage, and distorted



A—RETAINER
B—FUEL DIAPHRAGM SPRING
C—FUEL DIAPHRAGM
D—SCREW
E—RETAINER
F—VALVE AND CAGE
G—FUEL COVER
H—SCREEN
I—GASKET
J—BOWL
K—WASHER
L—LOCKWASHER
M—AIR DOME
N—PLATE
O—VACUUM COVER
P—VACUUM DIAPHRAGM SPRING
Q—SPRING RETAINER
R—VACUUM DIAPHRAGM
S—OIL SEAL SPRING
T—OIL SEAL
U—PIN
V—VACUUM LINK
W—FUEL LINK
X—BUSHING
Y—ROCKER ARM
Z—LINK SPACER
AA—SPRING
AB—BODY

3-26—Combination Fuel and Vacuum Pump Disassembled flanges. Examine all screw holes for stripped or crossed threads. Replacement of the pump assembly is advisable if one of the three main castings is not serviceable.

3. Inspect rocker arm for wear or scores at camshaft pad, at point of contact with links, and at pivot hole.

4. Inspect screws and replace if damaged or obstructed. Screws must fit snugly into recesses around all edges.

5. Replace links if pump has been in service for high mileage. Amount of wear cannot be determined visually.

6. Replace diaphragm in faulty section of pump, or both diaphragms if service mileage is high.

7. Replace valve and cage assemblies as these parts cannot be visually checked for wear.

8. Replace rocker arm and diaphragm springs, as removed, because old springs may be distorted or corroded.

9. Replace rocker arm pin and washer if removed, as these cannot be used again.

10. Always replace all gaskets removed, to insure tight seals.

d. Installation of Fuel Diaphragm and Valves

Always install the fuel diaphragm before the vacuum diaphragm.

1. Soak new fuel diaphragm in clean kerosene while performing the following steps. Fuel oil or gasoline may be used.

2. Insert drilled end of fuel link (short) into link spacer. Place one vacuum link (long) on each side of spacer so that the hooked ends of long links come together. The hooked ends of all links and the projection on link spacer must point as shown in figure 3-27.

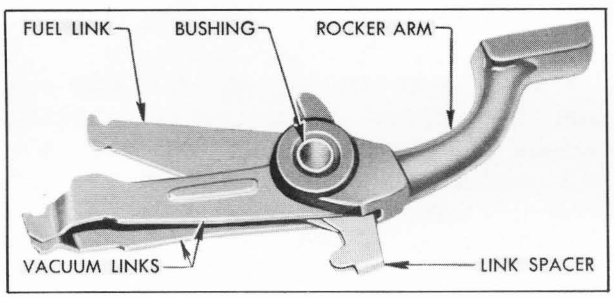


Figure 3-27—Links, Spacer, Rocker Arm, and Bushing Assembled

3. Line up holes in links and spacer, slide parts between the jaws of rocker arm with flat surface of rocker arm pad facing in same direction as link hooks, then install the pin bushing. See figure 3-27.

4. Check clearance of links and spacer in rocker arm. If required, place spacer washer between rocker arm and one or both vacuum links to take up clearance while allowing free movements of links in rocker arm.

5. Stand the pump body on the bench, fuel flange down. Set rocker arm spring in body with one end over cone cast into body. Slide rocker arm and link assembly into body, with open end of all link hooks pointing up toward vacuum flange, and engage rocker arm spring with projection on link spacer. Hold parts in body with the *small end* of Rocker Arm Dummy Pin KMO-707 (or a piece of 5/32" drill rod). See figure 3-28.

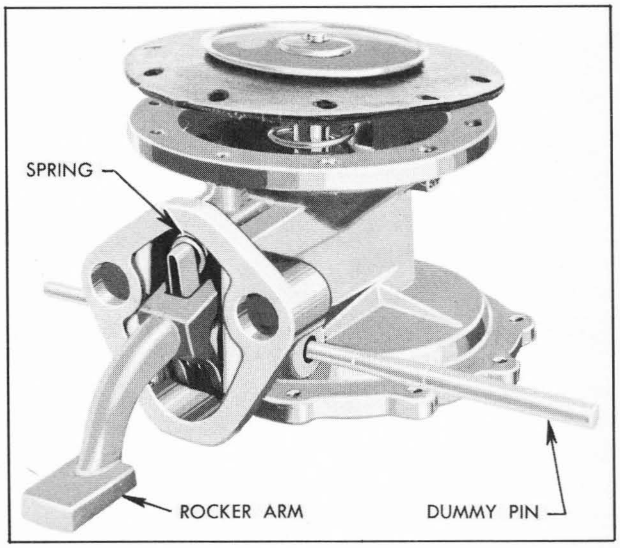


Figure 3-28—Rocker Arm and Links Held in Body by Dummy Pin

6. Turn the pump body over so the fuel diaphragm flange is up. Set the diaphragm spring on the staked-in oil seal, and the retainer on top of the spring. Push diaphragm pull rod through retainer, spring and oil seal. Flat of pull rod must be at right angles to link. Hook diaphragm pull rod to the short center fuel link. CAUTION: *Do not tilt diaphragm pull rod excessively as this may damage the oil seal.*

7. Push Dummy Pin through body so that large diameter aligns the holes in all parts, then drive the pin out with the new permanent rocker arm pin.

8. Support head of rocker arm pin on a suitable steel block, place washer over small end of pin so it lies flat against body, then spread or "mushroom" end of pin with a ball peen hammer.

9. Place one gasket in each valve seat in fuel cover. Place one valve in seat nearest the outlet port with the three legged spider down. Place

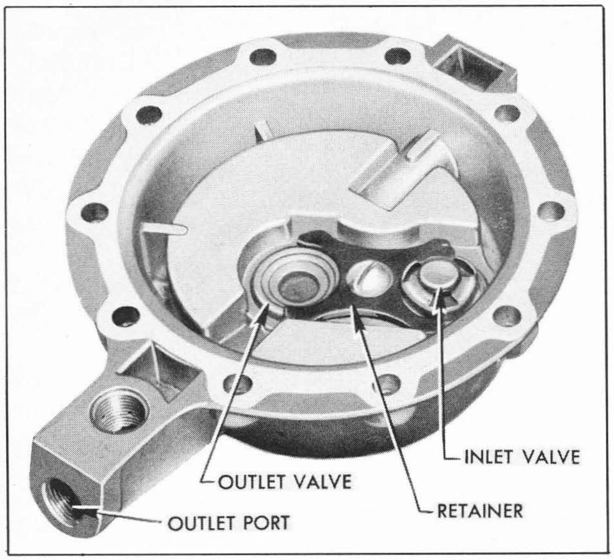


Figure 3-29—Valves and Retainer Installed in Fuel Cover

another valve in other seat with spider facing up. Place retainer over valves with humped side up and install retainer screw. See figure 3-29.

10. Install gasoline screen, bowl gasket and bowl in the order named, then install bowl screw and gasket and tighten screw securely.

11. A diaphragm gasket (not used in factory assembly) is included in each repair parts kit. Its purpose is to compensate for slight warpage of the fuel cover flange that may occur in service. Place this gasket on the fuel diaphragm and align all screw holes in gasket, diaphragm, and pump body.

NOTE: *Holes may be kept in alignment and possible distortion of diaphragm may be avoided by making two guide pins with short 10-32 threads and temporarily installing these in opposite screw holes in body flange.*

12. Place fuel cover in position so that file marks on cover and pump body are in line, maintain pressure on rocker arm so that diaphragm is flat across body flange, then install all cover screws and lockwashers until screws just engage lockwashers. *Be sure that screws pass through holes in fabric of diaphragm without chewing.*

13. Pump rocker arm two or three full strokes to make sure that diaphragm is not stretched too tight, then hold arm to fully compress the diaphragm spring while tightening cover screws. Tighten screws alternately on diametrically opposite sides until all are tight before releasing the rocker arm.

CAUTION: *Diaphragm must be held in flexed position until all screws are tightened, otherwise diaphragm may be stretched too tight and cause pump to deliver excessive pressure.*

e. Installation of Vacuum Diaphragm and Valves

1. Soak new vacuum diaphragm in clean kerosene while performing the following steps. Fuel oil or gasoline may be used.

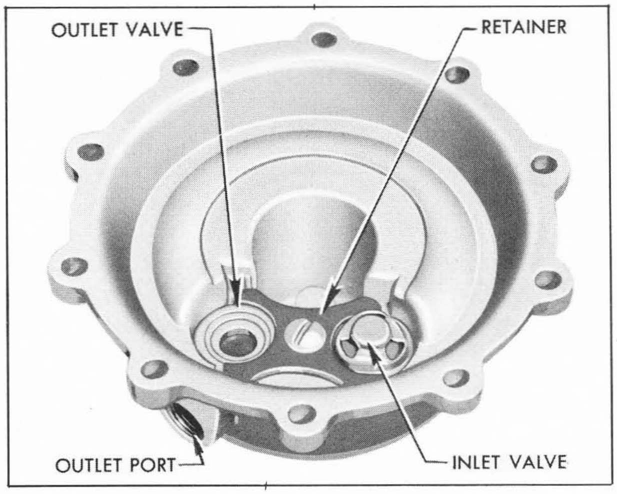


Figure 3-30—Valves and Retainer Installed in Vacuum Cover

2. Place one gasket in each valve seat in vacuum cover. Place one valve in seat adjacent to outlet port with the three legged spider down. Place another valve in other seat with spider facing up. Place retainer over valves with humped side up and install retainer screw. See figure 3-30.

3. Turn cover over, and set screen in recess over valve hole. Set screen retainer on screen. Place cover plate gasket, cover plate, screw gasket, and cover plate screw in position in the order named. Tighten cover screw.

4. Install oil seal parts on vacuum diaphragm pull rod in the following order: spring, retainer, oil seal, and retainer. Turn outer retainer to lock parts on pull rod.

5. Hold pump with fuel side up so that vacuum links will drop into position for attaching vacuum diaphragm pull rod. Insert diaphragm pull rod through opening in pump body and hook it to the *two long* vacuum links.

6. Hold vacuum diaphragm in place while clamping pump body mounting flange in a vise, with diaphragm up.

7. Depress rocker arm and insert hooked end of Diaphragm Flexing Tool KMO-613 between rocker arm and the stop cast in pump body, then release rocker arm. The vacuum diaphragm will be held in a flat or level position. See figure 3-31.

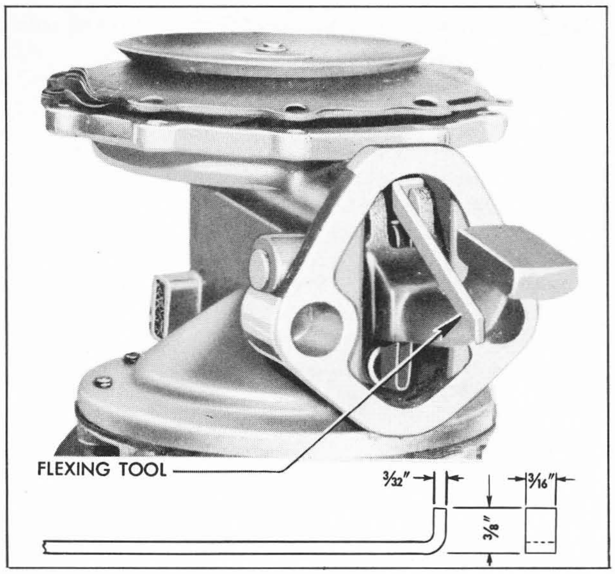


Figure 3-31—Vacuum Diaphragm Flexing Tool in Place

8. Place spring retainer over the riveted end of diaphragm pull rod, place diaphragm spring on the retainer, then place vacuum cover over the spring. Make sure that retainer stays down in place against the diaphragm protector.

9. Line up the file marks on vacuum cover and pump body, then install two long screws (10-32 x 1½") in opposite holes. Alternately turn screws down until the regular cover screws and lockwashers can be installed, but do not tighten these screws. Remove long screws and install short ones. *Be sure that screws pass through holes in fabric of diaphragm without chewing.*

10. Remove the flexing tool. The pressure of the vacuum spring will then flex the diaphragm the correct amount.

11. Tighten all cover screws alternately on diametrically opposite sides, turning each several turns at a time, until all are securely tightened.

f. Testing Repaired Fuel and Vacuum Pump

Bench tests of the fuel and vacuum sections of the pump require equipment which is not available in service stations; therefore, tests must be made after installation of pump assembly on an engine. Test fuel section of pump as described in paragraph 3-17. Test vacuum section of pump as described in paragraph 3-18.

SECTION 3-E
CARTER CARBURETOR AND CLIMATIC CONTROL

CONTENTS OF SECTION 3-E

SERVICE BULLETIN REFERENCE

Bulletin No.	Page No.	SUBJECT

3-20 CARTER CARBURETOR IDENTIFICATION NUMBERS

Carter Carburetors used on 1948 and 1949 engines have the following model and code numbers:

Series	*Model*	*Code No.*
40-50	WCD	663 S
70	WCD	664 S

The model designation, which is cast on the main body below the gasoline inlet, indicates the basic design of the unit. The code number, which is stamped on a metal tag attached by one bowl cover screw, furnishes the key to the size, calibrations, and other alterations required for the particular year and series engine for which the unit is specified.

Carburetors having different code numbers are not interchangeable even though the model designations are identical. The variations between carburetors of different code numbers may not be apparent on inspection, but they have a very important bearing on the performance of the engine.

When ordering or using replacement parts for a Carter carburetor always make certain that they are as specified for the carburetor model and code number, as well as for the car model and series.

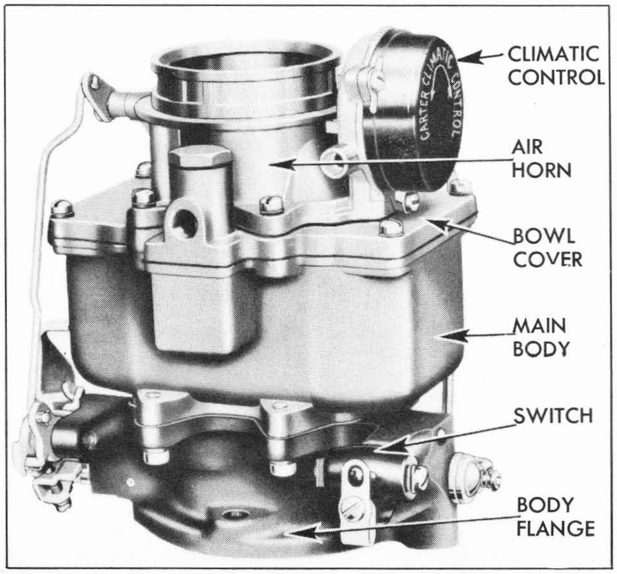


Fig. 3-32—Carter Carburetor Assembly

3-21 DESCRIPTION AND OPERATION OF CARTER CARBURETOR

a. General Description

The WCD Carter carburetor is a dual-barrel down draft type. See figure 3-32. It contains a float system, low speed (idle) system, high speed system, power system, accelerating system, and climatic control (automatic choke). An accelerator vacuum switch, which is part of the cranking motor control circuit, is incorporated in the throttle body flange of carburetor.

Air enters both barrels of carburetor through the air horn which has one inlet and contains the choker valve. Fuel is supplied to both barrels from one float chamber. The float chamber encircles both barrels and contains a dual type float and lever assembly which operates one float needle or valve. The accelerating pump jet in each barrel is supplied with fuel from one pump located in the float chamber. The power systems of both barrels are controlled by one vacuum piston and link.

Except as noted above, each barrel forms a complete carburetor system. Each barrel contains a low speed system with an adjustment screw, a high speed system with a metering rod, accelerating pump discharge jet, a triple venturi system, and a throttle valve. The throttle valves of both barrels are mounted in line on one shaft. The dual construction combines the advantages of two carburetors in one compact unit. The dual carburetor and dual intake manifold provide more uniform distribution of fuel to all cylinders than would be possible with one single barrel carburetor.

Operation of each system of the WCD Carter carburetor is described in the following subparagraphs. The climatic control is described in paragraph 3-22, which follows. The accelerator vacuum switch is described in paragraph 10-32.

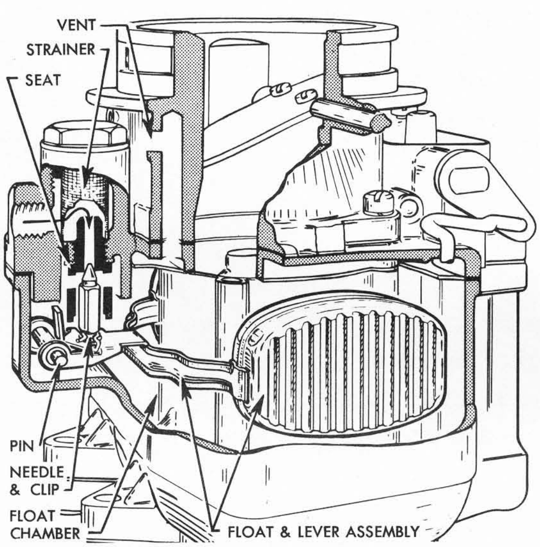


Fig. 3-33—Float System—Carter Carburetor

b. Operation of Carter Float System

Fuel enters the carburetor at the gasoline connection and flows through the strainer and needle seat into the float chamber. When the fuel reaches the prescribed level in float chamber, the dual float presses the needle against its seat to shut off the flow of fuel. Thereafter, the fuel is maintained at the prescribed level by opening and closing of needle as required. The float lever is hinged on a pin and connected to the float needle by a clip. The float chamber is vented externally through a port in air horn to allow fuel to be smoothly withdrawn through the various systems. See figure 3-33.

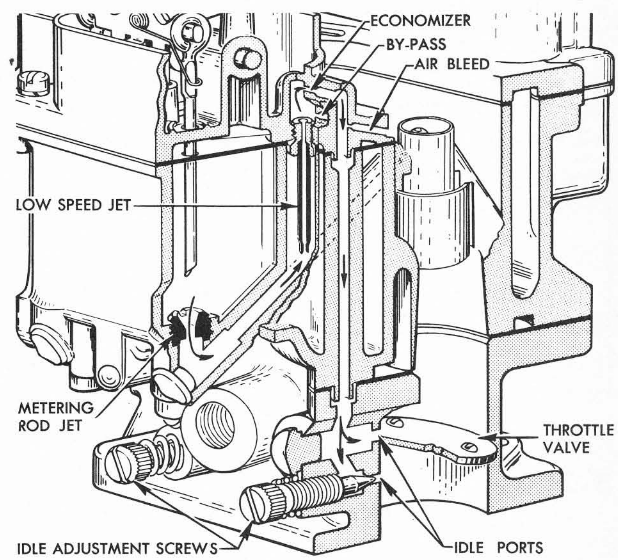


Fig. 3-34—Low Speed System—Carter Carburetor

c. Operation of Carter Low Speed or Idle System

Fuel is delivered to the egine through the low speed system at closed throttle and light load speeds up to approximately 20 MPH. The low speed system also partially controls fuel supply for light load speeds up to approximately 30 MPH.

The operation of the low speed system in each barrel of the carburetor is identical. Fuel flows from the float chamber through the metering rod jet into a passage which supplies both the low speed jet and the main nozzle. It then flows upward through the low speed jet which meters the fuel used by the low speed system. At the upper end of the low speed jet the fuel is combined with a stream of air coming in from the carburetor throat through a by-pass. The combining of the air stream with the fuel tends to atomize or break up the gasoline into a vapor. See figure 3-34.

The fuel-air mixture passes through a small drilled passage called the economizer and is combined with an additional air stream coming through the air bleed from the throat of the carburetor. This additional air tends to break the fuel particles into a still finer vapor.

The fuel-air mixture that flows downward through the idle mixture passage and out through the two idle ports is still richer than an idle mixture needs to be, but when it mixes with the air coming in past the throttle valve, it forms a combustible mixture of the right proportions for idle speed. The idle adjustment screw permits regulation of the quality of the low speed mixture.

The upper idle port is slotted vertically. As the throttle valve is opened it not only allows more air to come in past it but also uncovers more of the idle port, thereby allowing a greater quantity of the fuel-air mixture to enter the carburetor throat from the idle mixture passage.

The closed position of the throttle valve is such that at idle speed of 8 to 10 MPH, it leaves enough of the slotted idle port in reserve to cover the range in speed between idle and the point where the high speed system begins to operate.

As the speed increases from approximately 20 MPH, the low speed system starts cutting out as the high speed system cuts in until the high speed system is carrying the entire load and the low speed system is doing nothing.

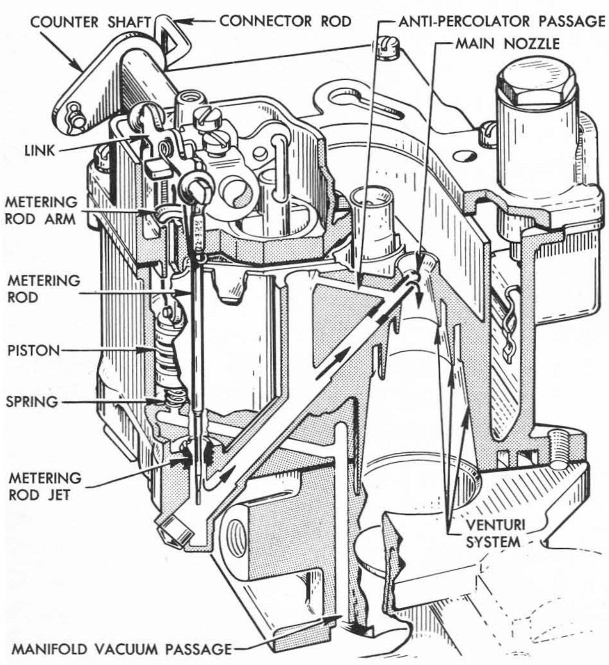


Fig. 3-35—High Speed and Power Systems—Carter Carburetor

d. Operation of Carter High Speed System

The high speed system controls the flow of fuel during the intermediate or part throttle operation, starting at approximately 20 MPH and continuing up to approximately 75 MPH.

The operation of the high speed system in each barrel of the carburetor is identical. Air entering the barrel through the air horn passes through the triple venturi system which increases the velocity of the air and creates a suction on the main nozzle. This causes fuel to flow from the float chamber through the metering rod jet into the main nozzle from which it is discharged into the air stream passing through the small venturi. The triple venturi system tends to atomize or break up the fuel into a vapor and mix it with the air stream. See figure 3-35.

If any vapor bubbles are formed in the hot gasoline in the main nozzle passage, they rise in the low speed jet well and the vapor exhausts through the anti-percolator passage into the main nozzle. This avoids percolating difficulties which might occur if the vapor bubbles rose directly into the main nozzle.

The amount of fuel entering the high speed system is metered or controlled by the area of the opening between the metering rod jet and the end of the metering rod which extends into the jet. The lower end of the metering rod has steps of three different diameters to provide three different metering areas, depending upon the position of the metering rod in the jet. The metering rod is connected by a link, countershaft and connector rod to the throttle shaft so that it is raised when the throttle valve is opened and lowered when the throttle valve is closed.

At approximately 20 MPH the largest or economy step of metering rod extends into the jet, thereby giving the smallest possible metering area. As the throttle valve is opened for higher speed or greater power, the metering rod is raised so that the middle step and later the smallest or power step provides increased metering area between rod and jet. At top speed, the smallest or power step is in the jet.

Engines operated at part throttle on level road use a mixture of maximum leanness. The mixture for greatest power and acceleration is somewhat richer, and is furnished by the power and accelerating systems described below.

e. Operation of Carter Power System

For maximum power or high speed operation above approximately 75 MPH, a richer mixture is required than that necessary for normal throttle opening. The richer mixture is supplied through the high speed systems of both barrels of carburetor by means of the power system.

The power system consists of a vacuum piston located in a cylinder connected to manifold vacuum, a spring which tends to push the piston upward against manifold vacuum, and a vacumeter piston link attached to the piston and supporting the two metering rods. See figure 3-35.

Under part throttle operation, manifold vacuum is sufficient to hold the piston and link down against the tension of the spring, so that the link is held against the tongue of the metering rod arm. The metering rods are then raised and lowered mechanically as the throttle valve is opened and closed. When the throttle valve is opened to a point where additional fuel is required for satisfactory operation, manifold vacuum decreases sufficiently so that the piston spring moves the piston, link and metering rods upward to the proper metering rod step position to give the required richer mixture, independently of throttle opening. As soon as the demand is passed, manifold vacuum moves the piston link down against the metering rod arm so that the metering rods are controlled mechanically again.

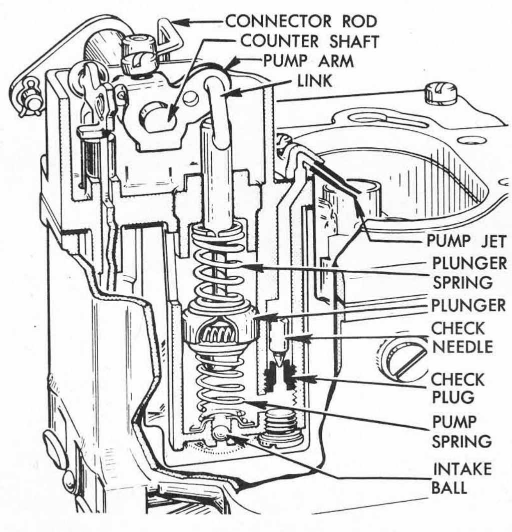


Fig. 3-36—Accelerating System—664S Carter Carburetor (Series 70)

f. Operation of Carter Accelerating System

The accelerating system supplies the extra quantity of fuel which is needed momentarily for smooth and rapid acceleration when the throttle valve is suddenly opened.

A pump plunger, located in a cylinder extending into the float chamber, is mechanically operated from the throttle valve shaft by means of the throttle shaft arm, throttle connector rod, pump operating arm and countershaft assembly, pump arm and pump arm link. The pump cylinder contains intake and discharge check valves and a discharge passage leading to a pump jet in each barrel of carburetor. See figure 3-36.

When the throttle is closed, the pump plunger moves up and draws a supply of fuel from the float chamber past the intake ball into the pump cylinder. When the throttle is opened, the pump plunger on its downward stroke exerts pressure on the fuel which presses the intake ball against its seat, raises the check needle off the discharge check plug, and discharges a metered quantity of fuel through the pump jets into each barrel of carburetor. This occurs only momentarily during the accelerating period. The pump plunger spring provides a follow-up action so that the fuel discharge carries out over a brief period of time. See figure 3-36. In the 664 S (Series 70) carburetor only, a relief valve in the pump discharge passage plug prevents excessive build-up of pressure in the accelerating system when the throttle is suddenly snapped open.

When the desired speed is reached and the throttle is held in fixed position, the pressure on the fuel in pump cylinder decreases sufficiently so that fuel ceases to discharge from the pump jets. With the throttle held in a fixed position the fuel flows only through the low speed or high speed systems as previously described.

3-22 DESCRIPTION AND OPERATION OF CARTER CLIMATIC CONTROL (AUTOMATIC CHOKE)

a. General Description

The climatic control consists of a choker valve mounted on a shaft in the carburetor air horn, a bi-metal thermostatic coil and housing attached to a housing cast on air horn, a vacuum actuated choke piston located in a cylinder in the housing on air horn, and a fast idle connector rod which connects a lever on the choke shaft to a fast idle cam mounted on carburetor body flange. An upper heat pipe connects the choke housing to a lower heat pipe in the exhaust manifold.

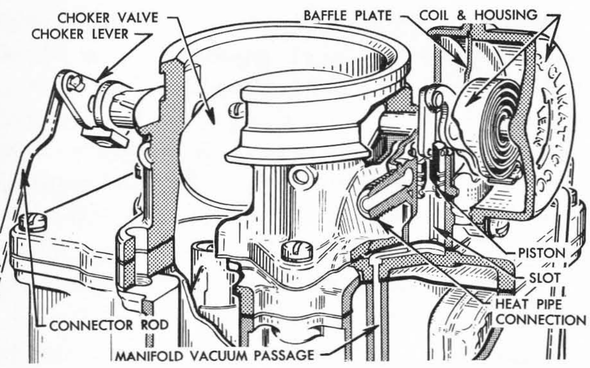


Fig. 3-37—Carter Climatic Control

The choker valve is mounted off-center on the choke shaft so that the force of air stream passing through the air horn tends to move the valve to the open position. A short lever riveted to choke shaft is engaged by the free outer end of the thermostatic coil which, when cold, tends to close the choker valve. The choke piston, which is actuated by intake manifold vacuum, is connected by a link to the short lever on choke shaft and tends to open the choker valve when the engine is running. See figure 3-37.

The lower heat pipe in the exhaust manifold heats the air which is drawn through it and the upper heat pipe into the thermostatic coil housing. Two slots in the choke piston cylinder permit manifold vacuum to draw this heated air through the thermostatic coil housing and down into the manifold. A baffle plate separates the thermostatic housing from the housing on air horn to insure circulation of heated air around the thermostatic coil.

The fast idle cam trip lever is connected by a rod to a choker lever on the outer end of choke shaft so that the fast idle cam is rotated as the choker valve moves. In closed throttle position when choker valve is not wide open, a fast idle adjustment screw on throttle shaft lever bears against the edge of the fast idle cam to give a greater throttle opening than that provided by the throttle lever adjustment screw. The edge of the cam is graduated in height from center to give increased throttle opening as choker valve moves toward closed position. When choker valve is in wide open position, the fast idle adjustment screw is opposite an opening in edge of cam so that throttle may close against the throttle lever adjustment screw.

b. Choke Operation—Cold Engine

When the engine becomes cold the thermostatic coil also becomes cold and increases its spring tension sufficiently to close the choker valve. It is prevented from closing the valve, however, because the fast idle adjustment screw holds the fast idle cam in the slow idle position; consequently, the choker valve is held partially open.

When the accelerator pedal is depressed to start the engine, the fast idle adjustment screw is lifted clear of the fast idle cam and the thermostatic coil then closes the choker valve. After the engine starts running, intake manifold vacuum causes the piston to partially open the choker valve against the spring tension of thermostatic coil, thereby admitting sufficient air to give a satisfactory running mixture.

When accelerator pedal is released after starting the engine, the fast idle adjustment screw comes to rest against a high point of fast idle cam which was rotated to the fast idle position by the closing of choker valve. This provides proper throttle opening to prevent stalling of the cold engine.

If the throttle is partially opened while the running engine is cold, the vacuum piston and the increased force of air flow against the offset choker valve will open the valve against the spring tension of the thermostatic coil. These opposing forces balance the choker valve at a position which provides the required choke action without causing loading or an excessively rich mixture. At wide open throttle the vacuum piston does not help to open the choker valve.

c. Choke Operation—Warm-Up Period

As the engine and exhaust manifold warm up, warm air is drawn through the heat pipes into the thermostat housing by manifold vacuum operating through the slots in choke piston cylinder. This warms the thermostatic coil, causing it to reduce its spring tension on choker valve in proportion to the increase in temperature. The choke piston moves the choker valve to a more open position within the range permitted by the fast idle cam trip lever, which can move independently of the fast idle cam which is held stationary at closed throttle by the fast idle adjustment screw.

When the throttle is opened and fast idle adjustment screw is lifted from the fast idle cam, the cam then rotates to bring a lower point into position for the fast idle adjustment screw. The engine will then run at a slower speed at closed throttle.

d. Choke Operation—Hot Engine

When the engine reaches normal operating temperature, the thermostatic coil is heated to the point where it no longer exerts any spring tension on the choker valve. The choker valve is in the wide open position and the fast idle cam is in the slow idle position so that the fast idle adjustment screw no longer contacts it at closed throttle. The throttle lever adjustment screw then governs throttle valve opening at closed throttle.

e. Choke Unloader Operation

If the engine becomes flooded for any reason, the choker valve can be partially opened by depressing accelerator pedal to the full extent of its travel. This causes a tongue or arm on the throttle lever to contact and rotate the fast idle cam, which forces the choker valve open. See figure 3-39.

3-23 ADJUSTMENT OF FAST IDLE CAM, CHOKE UNLOADER, AND FAST IDLE ADJUSTMENT SCREW

If the engine operates on fast idle too long after starting or else moves to slow idle too soon, or the choke unloader does not operate properly, adjust fast idle cam, choke unloader, and fast idle adjustment screw.

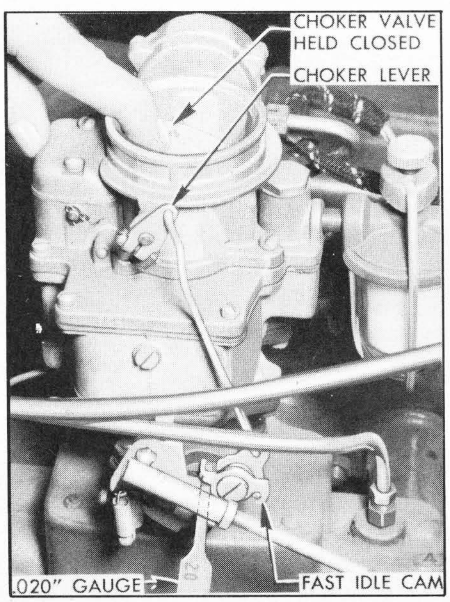


Fig. 3-38—Clearance Between Fast Idle Cam and Boss

1. Remove air cleaner and silencer.
2. Hold choker valve in closed position and see that the cam trip lever is in contact with the fast idle cam, then check the clearance between the arm of fast idle cam and the boss on throttle body, using feeler gauge .020" thick and not over 3/16" wide. See figure 3-38.
3. If clearance is not .020", slightly loosen choker lever lock screw, hold choker valve closed and rotate choker lever on shaft until specified clearance is obtained. Tighten lock screw securely and recheck the clearance.

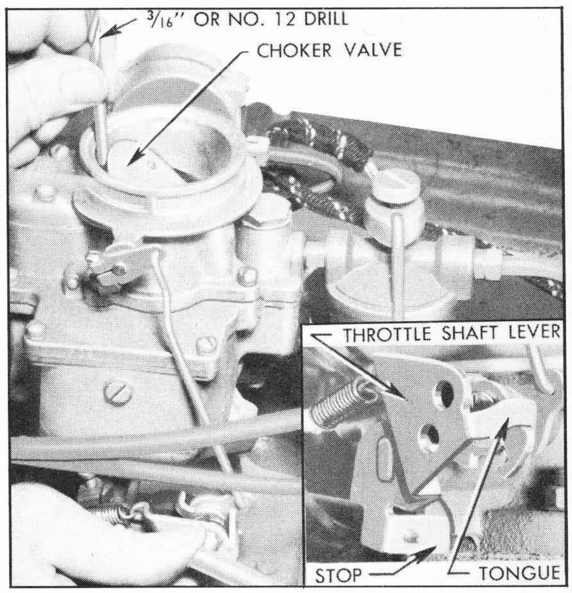


Fig. 3-39—Choke Unloader Adjustment—Carter

4. Open throttle until the stop on throttle shaft lever strikes the stop on throttle body, hold choker valve closed as far as possible, then check the clearance between the wall of air horn and the center of upper edge of choker valve using a 3/16" or No. 12 drill as a gauge (.187" to .189"). See figure 3-39.
5. If clearance is not correct, bend the tongue on throttle shaft lever as required to provide a close fit of drill gauge.
6. Start engine and warm it up to normal operating temperature. Connect a tachometer to register engine speed.
7. Remove pin spring and disconnect the fast idle connector rod from the cam trip lever.
8. While holding the arm of fast idle cam in contact with boss on throttle body so that the fast idle adjustment screw bears against the highest section of cam, turn adjustment screw to obtain engine speed of 1200 RPM. See figure 3-40.

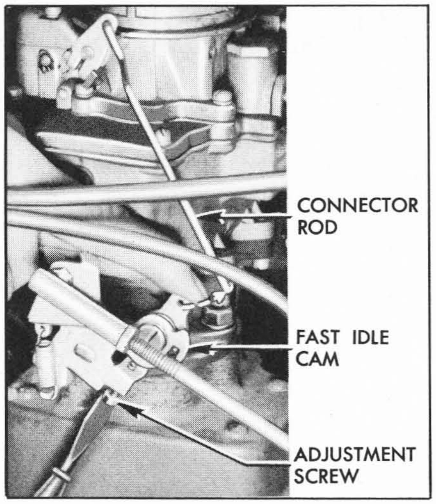


Fig. 3-40—Setting Fast Idle—Carter

NOTE: *If tachometer is not available, approximately the same setting may be made with car on level road in high gear, engine at normal operating temperature and fast idle connector rod disconnected. Set car speed at 20 miles per hour with fast idle adjustment screw against highest point on fast idle cam. With rod connected to cam, cold idle speed will be lower than 20 miles per hour, depending on temperature.*

9. Connect fast idle connector rod to cam trip lever and install pin spring.

10. Install air cleaner and silencer.

3-24 DISASSEMBLY, CLEANING, ASSEMBLY OF CARTER CLIMATIC CONTROL

It is not necessary to remove the carburetor assembly from the engine in order to overhaul the climatic control.

a. Removal and Disassembly

1. Remove air cleaner and silencer. Disconnect choke upper heat pipe.

2. Disconnect fast idle connector rod from fast idle cam trip lever, then remove air horn and climatic control assembly from carburetor.

3. Disconnect fast idle connector rod from choker lever and remove lever from choker shaft.

4. Remove thermostatic coil and housing assembly, gasket, and baffle plate. See figu~e 3-42.

5. Remove choker valve, then remove choker shaft and lever assembly with piston attached. See figure 3-47. Remove piston pin and piston from link.

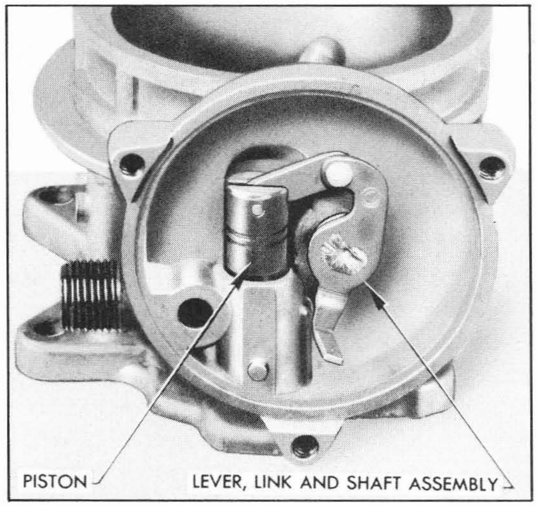


Figure 3-41—Removing Shaft and Piston

b. Cleaning and Inspection

Soak all parts, *except thermostatic coil and housing assembly,* in Bendix Carburetor Cleaning Solvent or its equivalent, then thoroughly rinse in kerosene, distillate, or white gasoline to remove all gummy deposits that have been softened by the solvent. Wipe parts dry with clean cloth.

It is particularly necessary for the piston and its cylinder in air horn to be thoroughly clean and free of burrs or scores. Do not use any abrasive material for cleaning piston and cylinder. If piston or cylinder is scored replace the affected part.

Check choker shaft for free action in air horn. If shaft is worn so that excessive play in bearings exists, replace the shaft assembly. If chocker valve is bent or otherwise damaged it should be replaced.

Inspect thermostatic coil housing for cracks and thermostatic coil for distortion or other damage. If damaged, replace the coil and housing assembly.

Raise the air horn gasket and check the choke suction hole in bowl cover, which may be partially clogged with carbon. Check and clean out suction hole with drill of proper size as specified under Carter Carburetor and Choke Calibrations (par. 3-1).

c. Assembly and Installation

1. Connect choke piston to shaft link with piston pin, install shaft in air horn, and guide piston into cylinder. See figure 3-41.

2. Install choker valve on shaft with small "c" in circle on valve upward; *use new screws.*

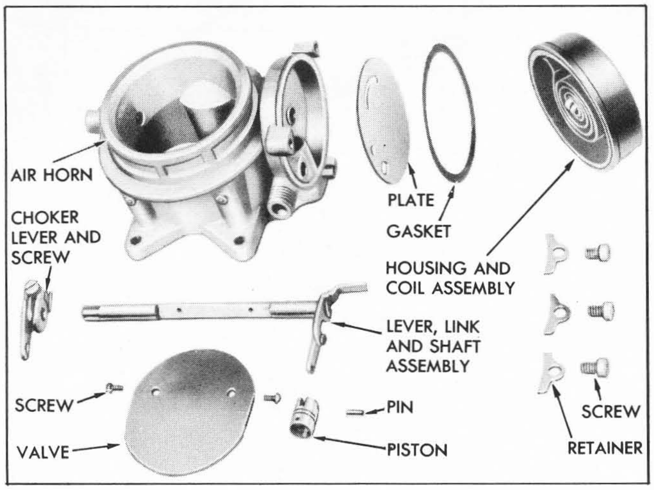


Figure 3-42—Air Horn and Climatic Control—Disassembled

Close valve and check for uniform clearance between edges of valve and wall of air horn. If clearance is not uniform, or valve sticks in air horn at any point, loosen screws and shift valve to obtain uniform clearance and freedom from sticking. It is important to have the choker valve fit properly otherwise hard starting may result.

3. Install coil housing baffle plate and a new coil housing gasket. Place housing on air horn with indicator mark at bottom and install retainers, leaving screws loose. Revolve housing clockwise (opposite to arrow) until indicator mark is at large index rib on air horn, then tighten retainer screws.

4. Install choker lever and screw assembly on choker shaft and attach fast idle connector rod to lever.

5. Install air horn and climatic control assembly on carburetor. Connect fast idle connector rod to fast idle cam trip lever with a spring pin. Connect choke upper heat pipe to choke housing.

6. Adjust fast idle cam, choke unloader, and fast idle adjustment screw as described in paragraph 3-23.

7. Install air cleaner and silencer.

3-25 DISASSEMBLY, CLEANING, INSPECTION OF CARTER CARBURETOR

a. Removal and Disassembly

1. Remove air cleaner and silencer. Disconnect throttle rod, accelerator vacuum switch wires, choke upper heat pipe, vacuum spark control pipe, and gasoline pipe.

2. Remove gasoline filter assembly, then remove carburetor from engine.

3. Remove air horn and climatic control assembly from carburetor and disassemble it, following procedure given in paragraph 3-24.

4. Remove strainer nut and gasket, and bowl strainer.

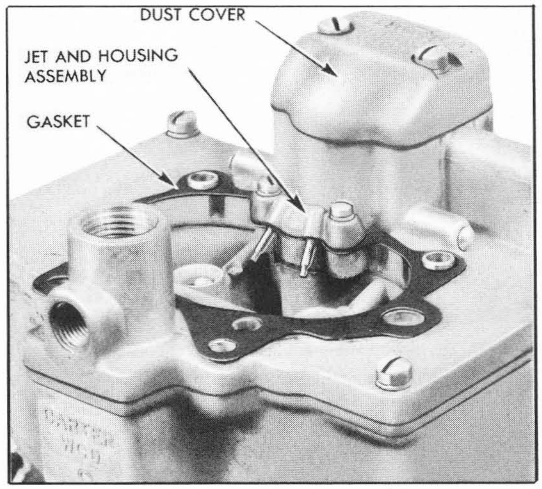


Figure 3-43—Pump Jet and Housing Assembly

5. Remove pump jet and housing assembly and lift off air horn gasket. Remove dust cover. See figure 3-43.

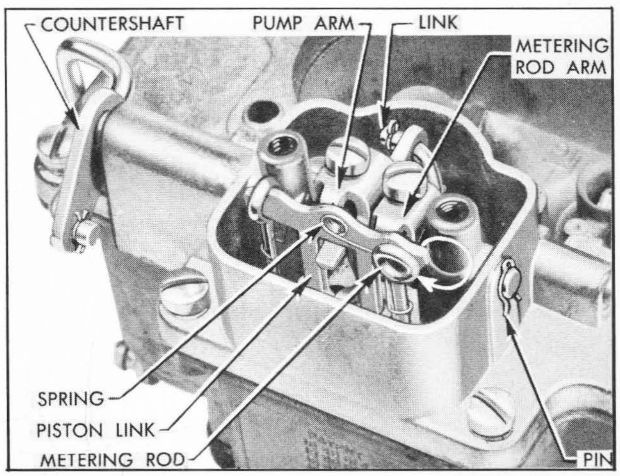


Figure 3-44—Removal of Metering Rod and Operating Parts

6. Rotate eyes of metering rods off pins on vacumeter piston link and lift rods out, using care to avoid bending them. Remove metering rod spring from link to avoid damaging it in later operations. See figure 3-44.

7. Remove throttle connector rod and pump arm link. Loosen screws in metering rod and pump arms, remove spring pin from end of countershaft, and remove shaft. Lift out metering rod and pump arms. See figure 3-44.

8. Hold finger on pump plunger guide while removing guide retainer screw, then remove

pump plunger and guide and lift pump spring from pump cylinder.

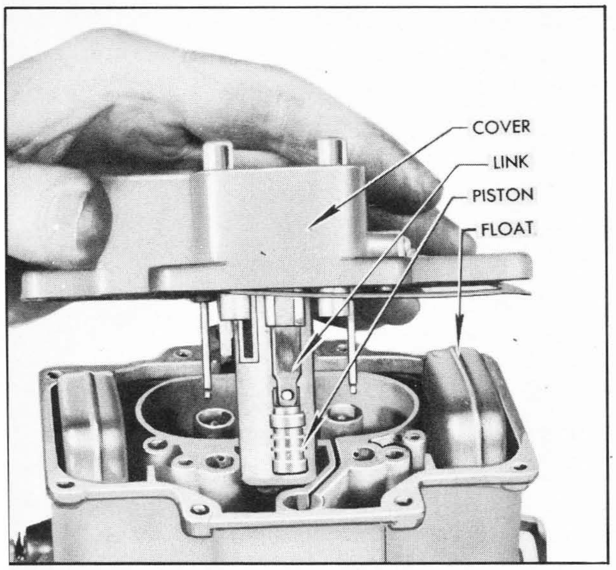


Figure 3-45—Removing Bowl Cover

9. Note the location of code tag and wire clips so that these can be reinstalled in their original positions, then remove bowl cover, using care to avoid damaging the float. See figure 3-45.

10. Swing vacumeter piston one-quarter turn and remove it from piston link, then remove link. Remove piston spring from cylinder in main body.

11. Remove float lever pin and lift off float and lever assembly. Remove needle from float lever. Shake float to see whether it is "loaded" with gasoline due to a leak.

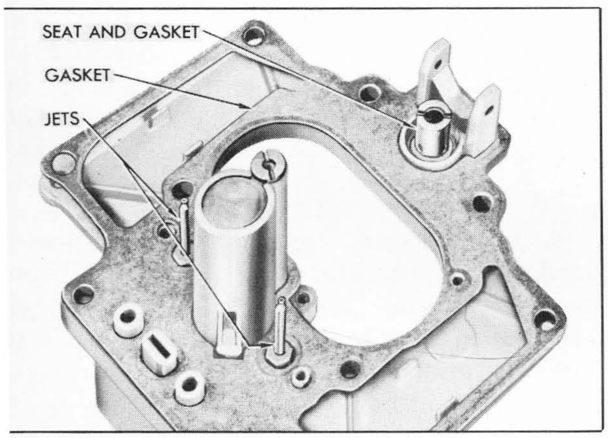


Figure 3-46—Needle Seat, Gasket, and Low Speed Jets

12. Remove float needle seat and gasket, using large screwdriver. Remove both low speed jets, and cover gasket from bowl cover. See figure 3-46.

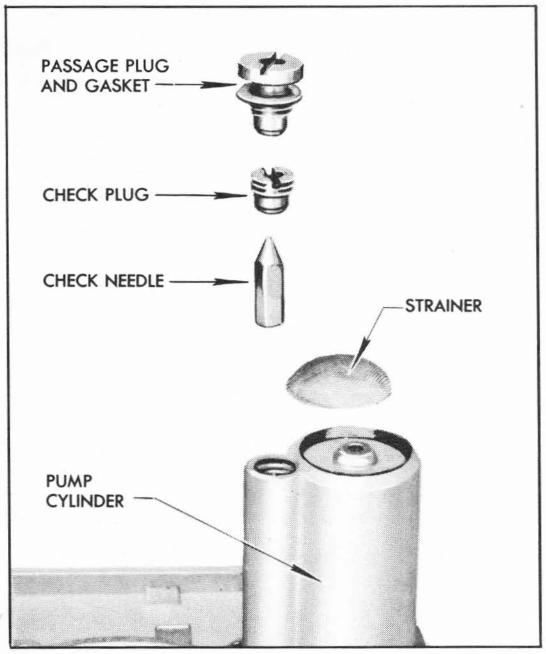


Figure 3-47—Pump Discharge Check Parts

13. Remove pump discharge passage plug, discharge check plug, and pump check needle from lower end of pump cylinder. Remove pump strainer from lower end of pump cylinder. See figure 3-47.

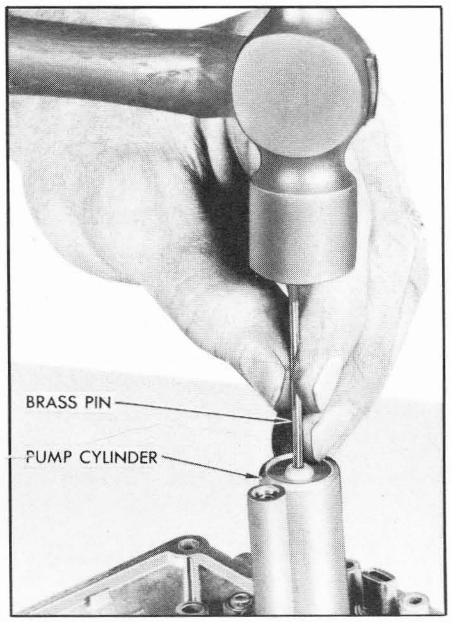


Figure 3-48—Removing Pump Intake Ball and Retainer

14. Insert soft brass pin through hole in bottom of pump cylinder and tap out the pump intake ball and retainer. See figure 3-48.

15. Remove two idle channel rivet plugs from bowl cover, using Rivet Extractor T109-43. See

figure 3-49.

16. Remove metering rod jets from interior of main body. *Do not, under any circumstances, attempt to remove nozzles from main body.*

17. Remove body flange and vacuum switch assembly from main body. Remove body flange gasket.

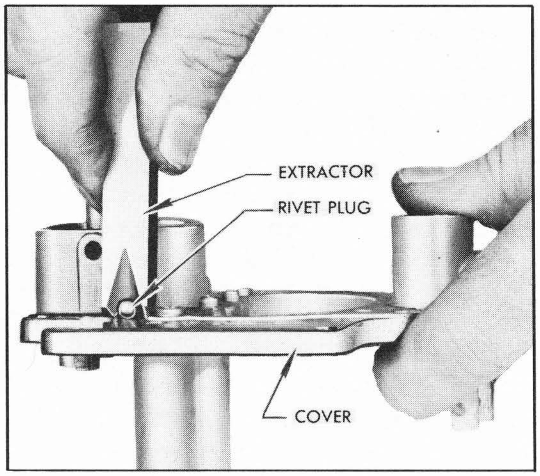


Figure 3-49—Removing Rivet Plug

18. Remove the two nozzle passage rivet plugs from main body, using Rivet Extractor T109-42. See figure 3-50.

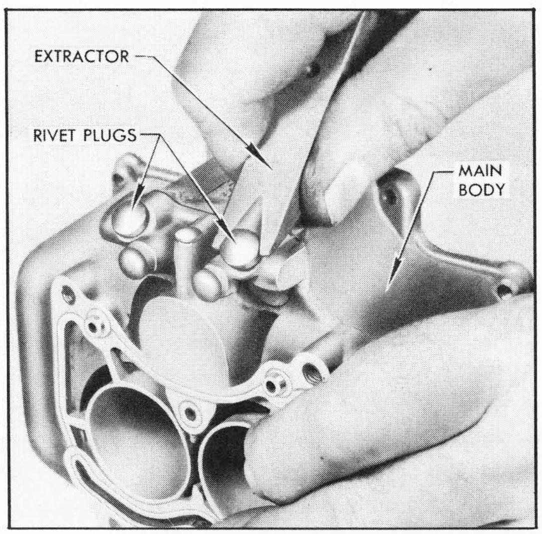


Figure 3-50—Removing Rivet Plug

19. Hold down on vacuum switch terminal cap while removing hold-down clip. Remove terminal cap and switch return spring, then lift out switch guide block with contact spring and shims. Do not lose timing shims and the spring washer on contact spring. Turn body flange over to allow plunger and ball to drop into hand. See figure 3-51.

20. Using a sharp scriber, lightly scratch one

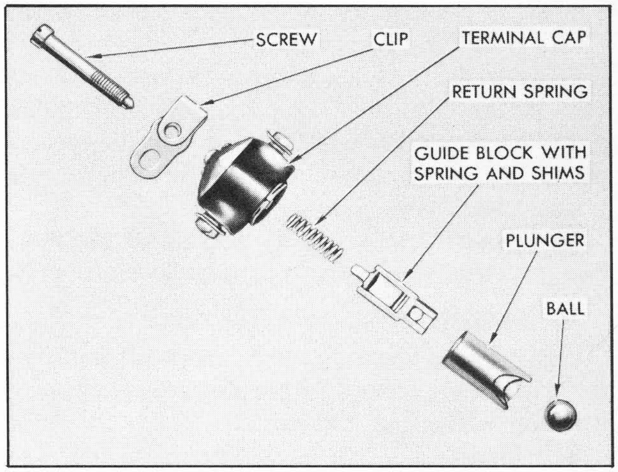


Figure 3-51—Vacuum Switch Parts

line on one throttle valve and its barrel and two lines on the other valve and barrel; also scribe lines on valves along the near edge of throttle shaft. These marks will assist in installing valves in their original positions on throttle shaft. After marking valves, remove valves from shaft.

21. Remove screw, washer, and arm from end of throttle shaft. Using rawhide mallet or equivalent, tap end of shaft through the shaft retaining ring then remove throttle shaft and lever assembly from body flange.

22. Remove fast idle cam and cam trip lever from body flange. See figure 3-52.

23. Remove idle adjustment screws and springs from body flange. It is not necessary to remove the idle port rivet plugs unless they are leaking.

b. Cleaning Carburetor Parts

Regardless of the number of new parts that are used in rebuilding a carburetor, the job in the end will not be satisfactory unless all metal parts are thoroughly cleaned. Because of the nature of carburetor parts, with numerous small passages subject to fouling with tenacious carbon and gum deposits, ordinary cleaning processes are entirely inadequate. The correct procedure is to use a cleaning bath in which metal parts can be immersed and "soaked" for sufficient time after disassembly to thoroughly clean all surfaces and passages.

Bendix Carburetor Cleaning Solvent has been developed especially for cleaning carburetors, and is recommended for this purpose. Regardless of the cleaning material used, however, be sure to thoroughly rinse the parts in kerosene, distillate, or white gasoline to remove all gummy deposits that have been softened by the cleaner.

Do not soak cork, plastic, or leather parts such as the vacuum switch terminal cap, switch guide block, choke thermostat and housing, and pump plunger in the cleaner. Wipe such parts with a clean cloth.

Remove all carbon from barrels of the body flange so that throttle valves may close properly.

c. Inspection of Carburetor Parts

After being thoroughly cleaned, all parts of the carburetor should be carefully inspected for wear or damage as follows:

1. *Climatic Control.* Inspect control parts as described in paragraph 3-24.

2. *Bowl Cover.* Check for warped surfaces with a straight edge. Make sure that idle and pump channels are clean and clear. Inspect pump cylinder for scoring or roughness. Inspect bearings of pump operating countershaft for wear or scoring. If bowl strainer is damaged or clogged so that it cannot be cleaned, it should be replaced.

3. *Float Needle and Seat.* Because of the wear that normally occurs in these parts and the necessity of having a tight seating needle, it is advisable to replace these parts if the carburetor has been used for considerable mileage.

4. *Accelerating Pump Parts.* Inspect countershaft assembly for wear of shaft and make sure that lever is tight on countershaft.

Inspect throttle connector rod and holes in throttle shaft arm and pump operating lever for excessive wear.

Inspect pump plunger leather washer for cracks, creases, turned edges, or other damage. Check holes in plunger shaft and pump arm, also pump arm link, for excessive wear.

Inspect pump check needle for groove on tapered end and inspect needle seat in discharge check plug. If pump discharge passage plug contains a relief valve, test seating of valve by sucking on threaded end of plug. Inspect pump intake ball for corrosion and the retainer for distortion.

Blow through each pump jet to make sure it is clear.

5. *Low Speed Jets.* Test jets by blowing or sucking to make sure that metering holes are clear. Inspect small ends for damage which might deform the metering holes.

6. *Metering Rods, Jets, and Spring.* Metering rods and jets are subject to wear in normal use. As the parts wear, the metering orifice becomes larger and a richer mixture results. If carburetor has been used for considerable mileage, it is advisable to replace these parts since wear cannot readily be detected by inspection. If metering rod spring is distorted or damaged it should be replaced since it performs an important function in keeping wear of metering rods and jets at a minimum.

7. *Vacumeter Piston.* Inspect vacumeter piston and the cylinder in main body for scoring or roughness. Piston and cylinder must be clean and smooth. If piston spring is distorted it should be replaced.

8. *Body Flange Parts.* Be sure that the idle discharge ports are clean of all carbon deposits and that the seats for idle adjustment screws are not damaged. If ends of adjustment screws are grooved or bent they should be replaced.

Check wear of throttle shaft bearing and throttle shaft. There should not be more than about .005″ play between shaft and bearings, otherwise air leaks will interfere with performance.

Make sure that throttle valves are not bent and do not have burrs or sharp edges.

9. *Accelerator Vacuum Switch.* Inspect ball, plunger, and cylinder in body flange to make sure all are clean and smooth. Check terminal cap for cracks. Switch contact surfaces must be smooth and free of corrosion. If strainer is damaged or is clogged so that it cannot be cleaned it should be removed.

3-26 ASSEMBLY AND ADJUSTMENT OF CARTER CARBURETOR

a. Assembly of Carburetor

In the assembly of carburetor, use all new gaskets and any additional new parts found to be necessary during inspection. *The following new gaskets must be soaked in 90 proof denatured alcohol for 15 minutes, installed on part, and let dry before installing the parts:*

Needle seat gasket
Pump discharge passage plug gasket
Bowl strainer nut gasket

1. Install new idle port rivet plugs if old plugs were removed from body flange. Install springs and idle adjustment screws in body flange. Seat screws lightly with fingers, then turn each screw out exactly one full turn off seat. Do not force a screw against its seat; this will score the point of screw and ruin it for service.

2. Place fast idle cam and cam trip lever

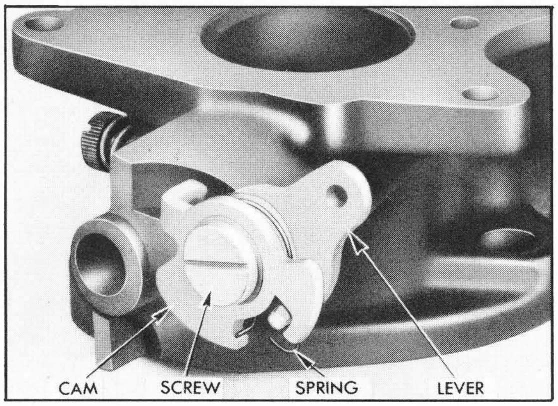


Figure 3-52—Fast Idle Cam, Spring and Trip Lever

over attaching screw so that tongue on trip lever is located in notch in cam under hooked end of cam spring, then install parts on body flange. See figure 3-52.

3. Place throttle shaft dog and screw assembly on throttle shaft and hook throttle flex spring to dog and throttle lever. Slide throttle shaft into body flange, move to closed throttle position, and push retaining ring *with prongs outward* over end of shaft far enough to obtain snug fit with no end play in shaft.

4. Install throttle arm with side having small "c" in circle outward, then install washer and screw on end of throttle shaft.

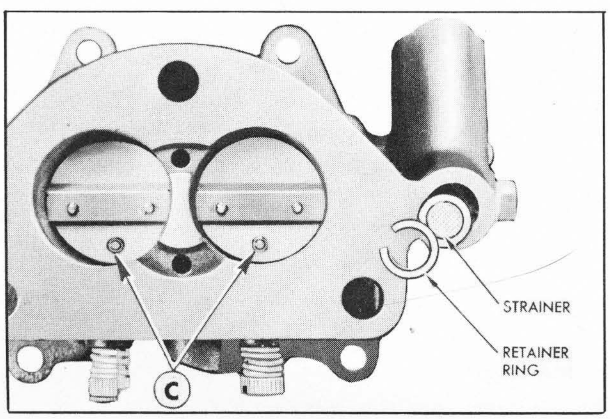


Figure 3-53—Vacuum Switch Strainer and Throttle Valves

5. Install throttle valves on shaft in accordance with scribe marks made at removal, *using new screws.* The small "c" in circle on valves must be toward idle ports when viewing body flange from manifold side. See figure 3-53. Back off throttle lever adjustment screw and close valves. Center valves in barrels of body flange and hold firmly with fingers while tightening screws.

6. If vacuum switch strainer was removed during inspection, install new strainer and the retainer ring using sleeve of Inserter T109-122 U to install ring. See figure 3-59.

7. Make sure that vacuum switch contact spring is assembled in guide block with the original number of timing shims and that return spring washer is on contact spring. See figure 3-51.

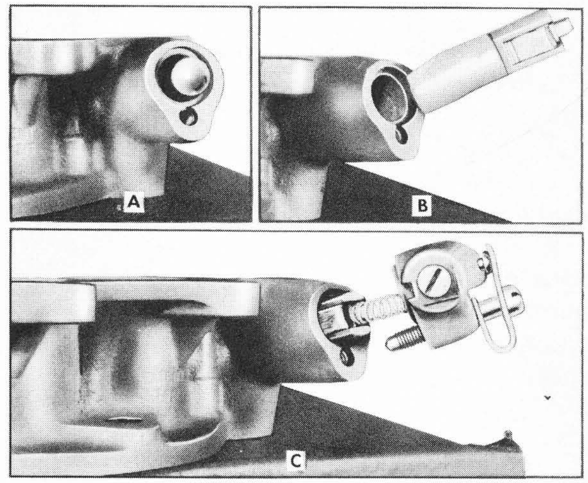


Figure 3-54—Installation of Switch Parts

Place switch ball in body flange. Place guide block in switch plunger and install in body flange with *grooved side of plunger upward* toward main body flange. Install switch return spring and terminal cap, holding cap down while installing hold-down clip and screw. See figure 3-54.

8. Drive new nozzle passage rivet plugs securely into main body, using the depression in Extractor T109-42, then install body flange on main body, using a new gasket.

9. Install metering rod jets. See figure 6-55. Jets must be tightened firmly but not so tightly as to cause distortion.

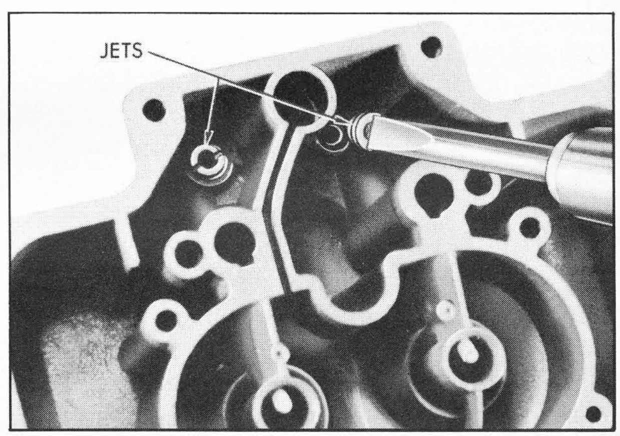


Figure 3-55—Installation of Metering Rod Jets

10. Drive new idle channel rivet plugs securely into bowl cover using the depression in Extractor T109-43.

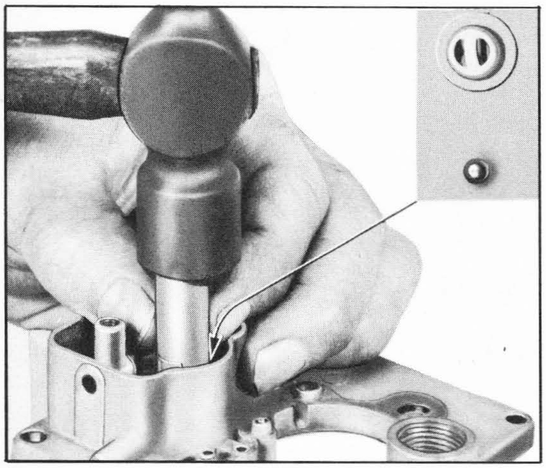


Figure 3-56—Installation of Intake Ball and Retainer

11. Install intake ball in pump cylinder, then install ball check retainer. See figure 6-56. Use rod of Ring Inserter T109-122U to put retainer in place and then use sleeve of tool to tap retainer firmly into recess at bottom of pump cylinder.

12. Install pump strainer, using care to avoid distorting it or leaving openings around the edge. Install pump check needle, blunt end first. Install discharge check plug, then discharge passage plug with new gasket. See figure 3-53.

13. Install both low speed jets; no gaskets are used. Install float needle seat with new gasket, using large screw driver. Tighten seat firmly but not so tightly as to cause distortion. See figure 3-52.

14. Attach float needle to float lever by means of clip, then install float with lever pin.

15. *Adjust Float for Proper Fuel Level.* To obtain the most efficient operation of the carburetor, the fuel level must be maintained at the bottom of the threads of sight hole in the side of float chamber with engine idling. See figure 3-17. This level will be produced in practically all cases by carefully setting the floats with Float Gauge T109-196.

(a) With bowl cover inverted (gasket off), place the float gauge under the middle of the floats as shown in figure 3-57.

(b) Adjust floats as required so that the outer sides just touch the upright guides of gauge, without clearance and without excessive drag on gauge. Adjust the height of both floats so that the seams *just clear* the horizontal section of gauge. Make both adjustments by bending float lever with pliers applied at points "X". (fig. 3-57) ; *do not use pressure on floats.*

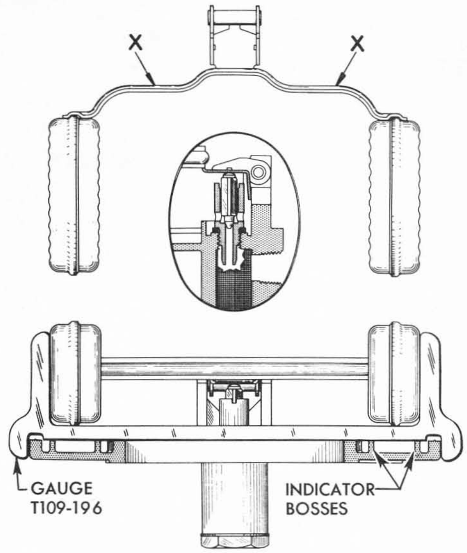


Figure 3-57—Checking Float with Gauge

NOTE: *If the Float Gauge T109-196 is not available, sight down the sides of floats and align the sides with the small indicator bosses cast in bowl cover (fig. 3-57), then adjust the height with a suitable gauge 5/32" in width or diameter.*

(c) When floats are properly set, turn bowl cover over and measure the downward travel of floats from the closed position of needle valve. Float travel must be 1/2", measured at outer end of float, and can be adjusted by bending the short tongue of float lever which contacts the float needle seat.

(d) After all adjustments are completed,

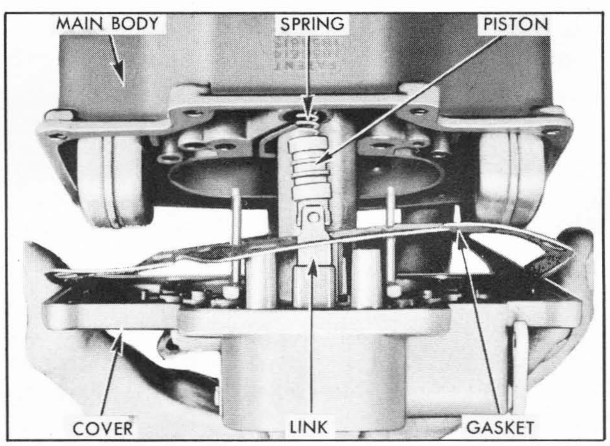


Figure 3-58—Assembling Main Body and Bowl Cover

carefully remove float, install a new bowl gasket, and reinstall float.

16. Install vacumeter piston link in bowl cover with lug at center opening toward outer side of cover, then install piston on lower end of link. Invert cover and place piston spring in piston, then place main body over bowl cover while guiding spring and piston into cylinder. See figure 3-58. Use care to avoid damaging float or changing adjustment during this operation.

When installing bowl cover screws and lock washers attach the code tap and wire clips in their original locations.

17. Place pump spring in cylinder, place guide on plunger shaft and install in cylinder, using care to avoid creasing or curling edges of plunger leather washer. Hold guide down with finger while installing retainer screw.

18. Start pump operating countershaft into its bearing in bowl cover. Hold pump arm so it is centered over pump plunger shaft and push countershaft through arm. While holding metering rod arm so that it engages opening in vacumeter piston link, push countershaft through the arm and bearing in bowl cover. Install spring pin on end of countershaft.

19. Tighten pump arm screw. Install pump arm link in *outer hole* of pump arm and hole in pump plunger shaft, then install spring pin on link.

20. Install throttle connector rod, with spring pin on upper end and flat washer, spring, and spring retainer on lower end.

21. *Adjust Accelerating Pump Plunger Travel.* Since the pump plunger travel controls the amount of fuel discharged through the pump jets, correct plunger travel is very important and should be checked and adjusted each time the carburetor is assembled.

Pump plunger travel should be measured by using Pump Stroke Gauge T109-117S shown in figure 3-59. If this gauge is not available, pump plunger travel may be measured with a machinists depth gauge having a scale reading in 64ths of an inch, using it in the same manner as described for the pump stroke gauge.

(a) Back out throttle lever stop screw and fully close throttle valves.

(b) Place Pump Stroke Gauge T109-117S on edge of dust cover boss of bowl cover and turn knurled nut until gauge finger "C" just touches upper end of pump plunger shaft as shown in figure 3-59.

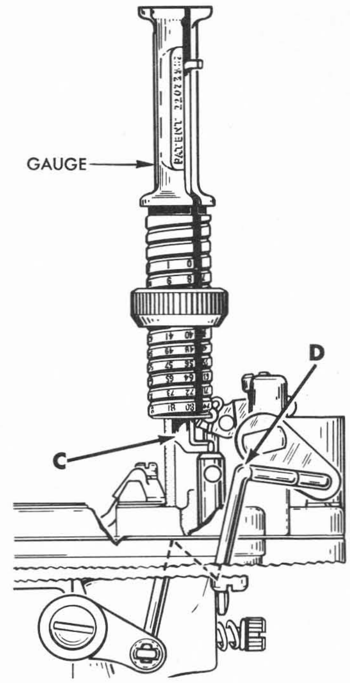


Figure 3-59—Use of Pump Stroke Gauge T109-117S

(c) Read figure on gauge at notch in knurled nut, then open throttle slowly until plunger just bottoms (at approximately half throttle). This will be indicated by the additional force required to move throttle lever. Hold throttle lever at this point and take a second reading on gauge.

(d) The difference between the first and second reading on gauge should be 21. When using a machinists depth gauge the difference should be $21/64$".

(e) If pump plunger travel is not $21/64$", adjust as required by bending the throttle connector rod at the upper angle indicated by "D" in figure 3-59.

22. Install metering rod spring through hole in piston link. Insert end of each metering rod in hooked end of spring, push metering rod down and rotate eye of rod over pins on link, using care to avoid bending metering rod. See figure 3-44.

23. *Adjust Metering Rods.* Proper setting of the metering rods is of vital importance to engine performance and fuel economy; therefore the following adjustment must be carefully made after adjusting the pump plunger travel.

(a) Back out throttle lever stop screw to allow throttle valves to seat in bores of carburetor and loosen metering rod arm clamp screw.

(b) Press down on vacumeter link until metering rods bottom in carburetor body casting.

(c) While holding rods down and throttle valves closed, revolve metering rod arm until finger on arm contacts lip of vacumeter link, then carefully tighten metering rod arm clamp screw. See figure 3-60.

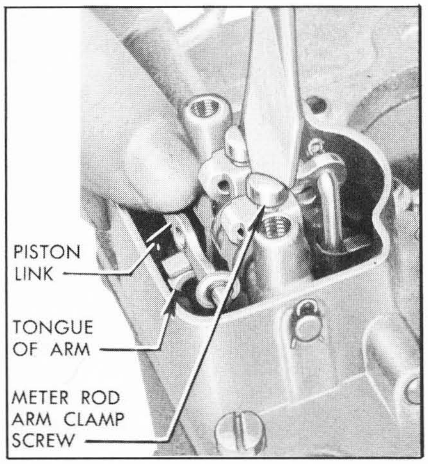


Figure 3-60—Adjusting Metering Rods

24. Pack dust cover screw holes in bowl cover with a light graphite grease and install dust cover. Install new air horn gasket and the pump jet and housing assembly. See figure 3-43.

25. *Adjust Accelerating Pump Jets.* Good acceleration performance at low speeds depends primarily on the gasoline discharged from the pump jets. Each of the two jet streams must be directed to its proper section of the venturi system, and in order to obtain maximum efficiency each stream must strike a target point marked on the primary venturi.

(a) Fill float bowl with gasoline through float bowl inlet.

(b) Operate accelerating pump with a short, quick movement of throttle shaft lever and note whether the stream from each jet strikes its specified target point. See figure 3-61.

(c) Carefully bend jets, if necessary, to properly aim the streams. *Only a slight bend should be necessary; use care to avoid distorting the jets.*

26. Install bowl strainer and strainer nut with a new gasket.

27. Assemble and install air horn and climactic control assembly, following procedure given in paragraph 3-24. Adjust fast idle cam and choke unloader as described in paragraph 3-23, but use the following bench method for setting fast idle adjustment screw.

(a) With adjustment screw in contact with highest section of fast idle cam, adjust screw until a wire gauge just can be inserted between edge of throttle valve and the throttle body diametrically opposite the idle ports.

(b) Use a wire gauge .015" in diameter for the 663 S (series 40-50) carburetor, and .018" in diameter for the 664 S (series 70) carburetor.

28. Check the timing of the accelerator vacuum switch as described in paragraph 10-32. Use Carter Indicator Gauge T109-155 S if available; otherwise use a 6-volt battery and test light.

b. Installation of Carburetor

1. Make sure that carburetor gasket is in good condition, then install carburetor on intake manifold.

2. Clean the gasoline filter (par. 3-9), install filter on carburetor and connect the gasoline pipe. Connect the vacuum spark control pipe and choke upper heat pipe.

3. Adjust and connect throttle linkage as described in paragraph 3-10.

4. Connect the accelerator vacuum switch wires. If timing of switch was not checked on the bench, it may be checked after installation of carburetor, as described in paragraph 10-32.

5. Install air cleaner and silencer.

6. Check float bowl fuel level and adjust carburetor as described in paragraph 3-12.

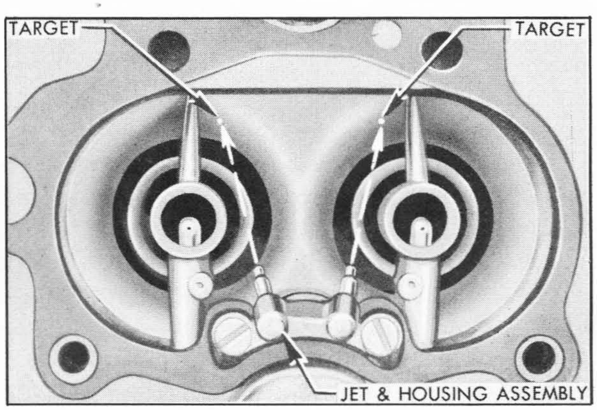


Figure 3-61—Pump Jet Targets

SECTION 3-F
STROMBERG CARBURETOR AND AUTOMATIC CHOKE

CONTENTS OF SECTION 3-F

SERVICE BULLETIN REFERENCE

Bulletin No.	Page No.	SUBJECT

3-27 STROMBERG CARBURETOR IDENTIFICATION NUMBERS

Stromberg carburetors used on 1948 and 1949 engines have the following model and code numbers:

Series	*Model No.*	*Code No.*
40-50	AAV-167	7-69
70	AAV-267	7-70

The model designation indicates the basic design of the unit. The code number which is stamped on the float bowl cover (air horn) directly above the fuel level sight plug, furnished the key to the size, calibrations, and other alterations required for the particular year and series engine for which the unit is specified.

Carburetors having different code numbers are not interchangeable even though the model designations are identical. The variations between carburetors having different code numbers may not be apparent on inspection, but they have a very important bearing on the performance of an engine.

When ordering or using replacement parts for a Stromberg carburetor always make certain that they are specified for the carburetor model and code number, as well as for the car model and series.

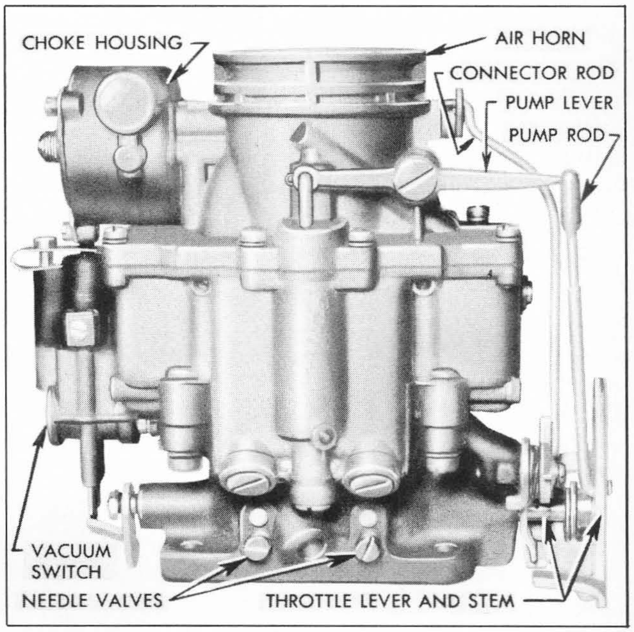


Figure 3-62—Stromberg Carburetor Assembly

3-28 DESCRIPTION AND OPERATION OF STROMBERG CARBURETOR

a. General Description

The AAV Stromberg carburetor is a dual-barrel down draft type. See figure 3-62. It contains a float system, idle (low speed) system, main metering (high speed) system, power system, accelerating system, and automatic choke. An accelerator vacuum switch, which is part of the cranking motor control circuit, is incorporated in the carburetor assembly.

Air is supplied to both barrels of carburetor through the air horn which has one inlet and contains the choke valve. Fuel is supplied to both barrels from one float chamber. The float chamber encircles both barrels and contains a dual type float and lever assembly which actuates one float needle valve. The accelerating pump discharge nozzle in each barrel is supplied with fuel from one pump located in the float chamber. The power system for both barrels is controlled by one vacuum power piston.

Except as noted above, each barrel forms a complete carburetor system. Each barrel contains an idle system with adjustable needle valve, a main metering system, accelerating pump discharge nozzle, primary and auxiliary venturi tubes, and a throttle valve. The throttle valves of both barrels are mounted in line on one stem. The dual construction provides the advantages of two carburetors in one compact unit. The dual carburetor and dual intake manifold provides more uniform distribution of fuel to all cylinders than would be possible with one single barrel carburetor.

Operation of each system of the AAV Stromberg carburetor is described in the following subparagraphs. The automatic choke is described in paragraph 3-29, which follows. The accelerator vacuum switch is described in paragraph 10-33.

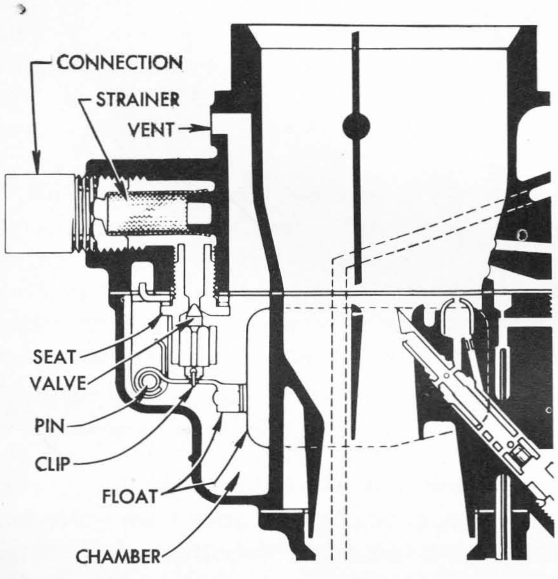


Figure 3-63—Float System—Stromberg Carburetor

b. Operation of Stromberg Float System

Fuel enters the carburetor at the gasoline connection and flows through the strainer and needle valve seat into the float chamber. When the fuel reaches the prescribed level in float chamber, the dual float presses the needle valve against its seat to shut off the flow of fuel. Thereafter, the fuel is maintained at the prescribed level by opening and closing of the needle valve as required. The float lever is hinged on a fulcrum pin and connected to the needle valve by a clip. See figure 3-63.

The float chamber is vented externally through a port in air horn to allow fuel to be smoothly withdrawn through the various systems.

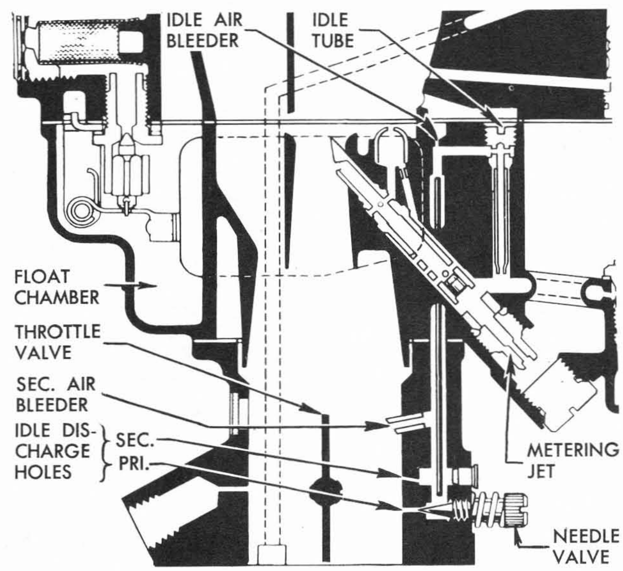


Figure 3-64—Idle System—Stromberg Carburetor

c. Operation of Stromberg Idle (Low Speed) System

Fuel is delivered to the engine through the idle system at closed throttle and light load speeds up to approximately 20 MPH. The idle system also partially controls fuel supply for light load speeds up to approximately 30 MPH.

The operation of the idle system in each barrel of the carburetor is identical. Fuel flows from the float chamber through main metering jet and upward through the idle tube which meters the fuel. From the idle tube it flows through a connecting channel where air from the idle air bleeder is mixed with it so that a mixture of air and fuel passes down the idle channel to the idle discharge holes. Additional air is drawn into the fuel air mixture in the idle channel through the secondary air bleeder. See figure 3-64.

On idle or closed throttle operation, the fuel-air mixture is drawn only from the lower or primary idle discharge hole due to high suction at this point. As throttle valve is opened, suction is also placed on the upper or secondary idle discharge hole to feed additional fuel. Fuel supplied through the idle discharge holes begins to diminish when the throttle valve is opened to the point where the main metering system begins to supply fuel, as described below, until a throttle position is reached where the idle system ceases to function.

The idle needle valve controls the quantity of fuel that is supplied through the primary idle discharge hole, thereby affecting the final fuel-air ratio supplied to the engine while the idle system is in operation.

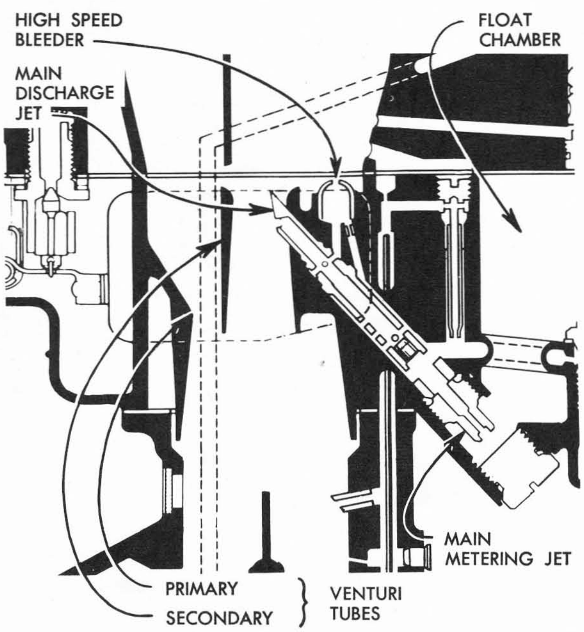


Figure 3-65—Main Metering System—Stromberg Carburetor

d. Operation of Stromberg Main Metering System

The main metering system controls the flow of fuel during the intermediate or part-throttle operation, starting at approximately 20 MPH and continuing up to approximately 75 MPH.

The operation of the main metering system in each barrel of the carburetor is identical. Air entering the barrel through the air horn passes through the primary and auxiliary venturi tubes which increase the velocity of the air and create a suction on the main discharge jet. This causes fuel to flow from the float chamber through the main metering jet into the main discharge jet. Air is drawn in through the high speed bleeder so that a mixture of fuel and air is discharged from the main discharge jet into the air stream passing through the auxiliary venturi in the barrel of the carburetor. See figure 3-65.

The main discharge jet is designed so that if any vapor bubbles are formed in the hot gasoline, the vapors will follow the outside channel around the main discharge jet instead of passing through the jet tube. These vapor bubbles escape through the dome-shaped high speed bleeder and thereby reduce percolating troubles.

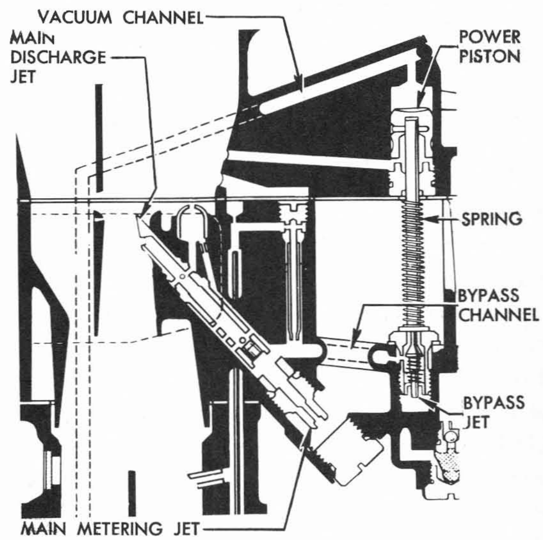


Figure 3-66—Power System—Stromberg Carburetor

e. Operation of Stromberg Power System

For maximum power or high speed operation above approximately 75 MPH a richer mixture is required than that necessary for normal throttle opening. The richer mixture is supplied through the main metering systems of both barrels of carburetor by means of the power system.

The power piston cylinder is connected by a channel to the intake manifold. At part throttle position the manifold vacuum is sufficient to hold the power piston in its "up" position against the tension of the piston spring. When the throttle valve is opened to a point where additional fuel is required for satisfactory operation, the manifold vacuum decreases sufficiently so that the piston spring moves the power piston down to open the power by-pass jet. Opening of the by-pass jet allows additional fuel to enter the main discharge jets through a by-pass channel without passing through the restricted main metering jet. See figure 3-66.

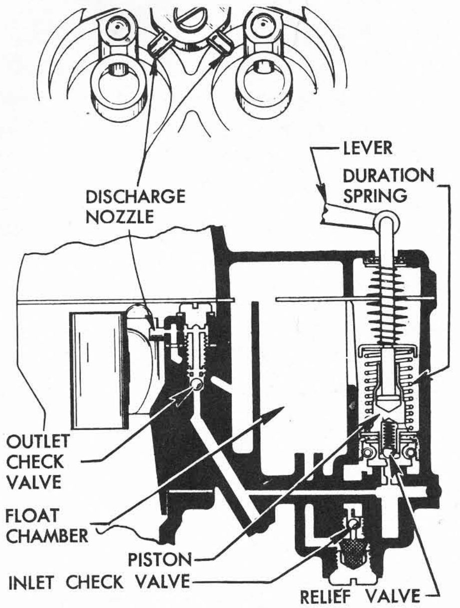


Figure 3-67—Accelerating System—Stromberg Carburetor

f. Operation of Stromberg Accelerating System

For smooth and rapid acceleration it is necessary to supply an extra quantity of fuel momentarily when the throttle is suddenly opened. This accomplished by operation of the accelerating pump piston which is directly connected to the throttle valve lever by means of a rod and fulcrum lever. See figure 3-67.

When the throttle is closed, the pump piston moves up and draws a supply of fuel from the float chamber through the inlet check valve into the pump cylinder. When the throttle valve is opened, the piston on its downward stroke exerts pressure on the fuel which closes the inlet check valve, opens the outlet check valve, and discharges a metered quantity of fuel through the pump discharge nozzles in each barrel of carburetor. This occurs only momentarily during the accelerating period. The pump duration spring provides a follow-up action so that the fuel discharge carries out over a brief period of time. The relief valve in the pump piston prevents excessive build-up of pressure in the accelerating systems when the throttle is suddenly snapped open.

When the desired speed is reached and the throttle is held in fixed position, the pressure on the fuel in the pump cylinder decreases sufficiently so that the outlet check valve closes and fuel ceases to discharge from the pump nozzles. With the throttle held in a fixed position the fuel flows only through the idle or main metering systems as previously described.

3-29 DESCRIPTION AND OPERATION OF STROMBERG AUTOMATIC CHOKE

a. General Description

The Stromberg automatic choke consists of a choke valve mounted on a stem or shaft in the carburetor air horn, a bi-metal thermostat and cover, a vacuum actuated piston located in a choke housing attached to the air horn, a fast idle rod connecting the choke valve to a fast idle cam mounted on carburetor throttle body. An upper heat pipe connects the choke housing to a lower heat pipe in the exhaust manifold.

The choke valve is mounted off-center in the choke stem so that the force of air stream passing through the air horn tends to move valve to the open position. A short lever mounted on the choke stem in choke housing is engaged by the free outer end of the thermostat which, when cold, tends to close the choke valve. The piston, which is actuated by intake manifold vacuum, is connected by a link to the short lever on choke stem and tends to open the choke valve when the engine is running.

The lower heat pipe in the exhaust manifold heats the air which is drawn through it and the upper heat pipe into the choke housing. A small slot in the vacuum piston and a small hole in choke housing permit manifold vacuum to draw the air into the choke housing to heat the thermostat.

The fast idle cam is connected by the fast idle rod to a lever on the outer end of the choke stem so that it is rotated as the choke valve moves. In closed throttle position, the throttle stop screw bears against one edge of the fast idle cam which has a number of steps of different heights to give different amounts of throttle opening, depending on positions of the cam and choke valve.

b. Choke Operation—Cold Engine

When the engine becomes cold the choke thermostat also becomes cold and increases its spring tension sufficiently to close the choke valve. It is prevented from closing the valve, however, because the throttle stop screw holds the fast idle cam in the slow idle position; consequently, the choke valve is held partially open.

When the accelerator pedal is depressed to start the engine, the throttle stop screw is lifted clear of the fast idle cam and the thermostat then closes the choke valve. See figure 3-78.

After the engine starts running, intake manifold vacuum causes the piston to partially open the choke valve against the spring tension of thermostat, thereby admitting sufficient air to give a satisfactory running mixture.

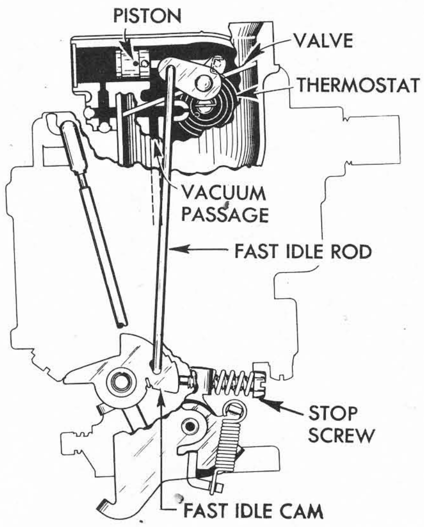


Figure 3-68—Stromberg Choke in Cold Starting Position

When accelerator pedal is released after starting the engine, the throttle stop screw comes to rest against a step of fast idle cam which was rotated to the fast idle position by the closing of choke. This provides proper throttle opening to prevent stalling of the cold engine. See figure 3-68.

If the throttle is partially opened while the running engine is cold, the vacuum piston and the increased force of air flow against the off-set choke valve will open the valve against the spring tension of the thermostat. These opposing forces balance the choke valve at a position which provides the required choke action without causing loading or an excessively rich mixture. At wide open throttle the vacuum piston does not help to open the choke valve.

c. Choke Operation—Warm-up Period.

As the engine and exhaust manifold warm up, warm air is drawn through the heat pipes into the choke housing by manifold vacuum operating through the small slot in vacuum piston and hole in choke housing. This warms the thermostat, causing it to reduce its spring tension on choke valve in proportion to the increase in temperature.

When the throttle is opened and throttle stop screw is lifted from the fast idle cam, the choke valve then moves to a more open position and the fast idle cam is rotated to bring a lower

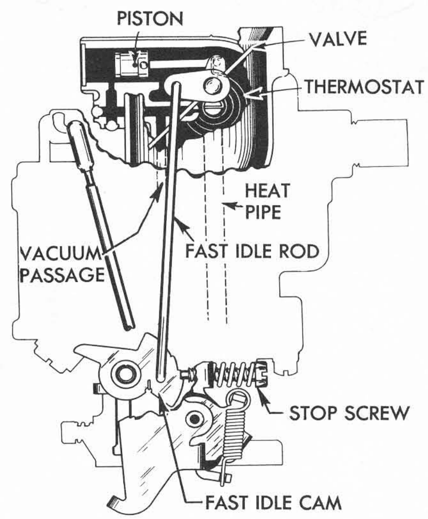


Figure 3-69—Stromberg Choke During Warm-up

step into position for the throttle stop screw. The engine will then run at a lower speed at closed throttle. See figure 3-69.

d. Choke Operation—Hot Engine

When the engine reached normal operating temperature, the choke thermostat is heated to the point where it no longer exerts any spring tension on the choke valve. The choke valve is in the wide open position and the fast idle cam is in the slow idle position so that the throttle stop screw bears against the lowest step of fast idle cam at closed throttle. See figure 3-70.

e. Choke Unloader Operation

If the engine becomes flooded for any reason, the choke valve can be partially opened by de-

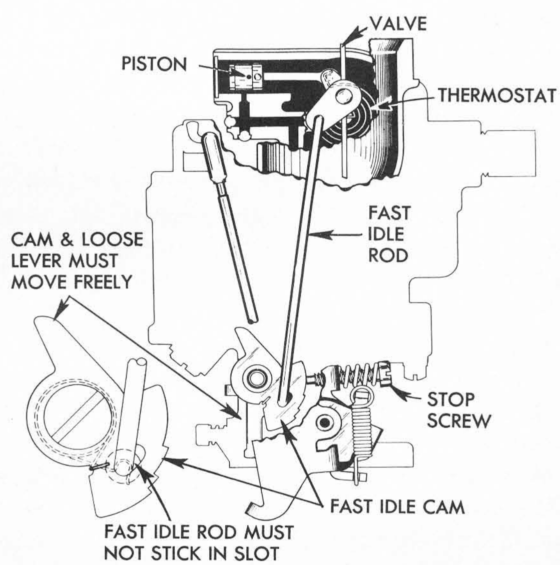


Figure 3-70—Stromberg Choke in Hot Position

pressing accelerator pedal to the full extent of its travel. This causes a tongue or arm on the throttle lever to contact and rotate the fast idle cam, which forces the choke valve open. See figure 3-73.

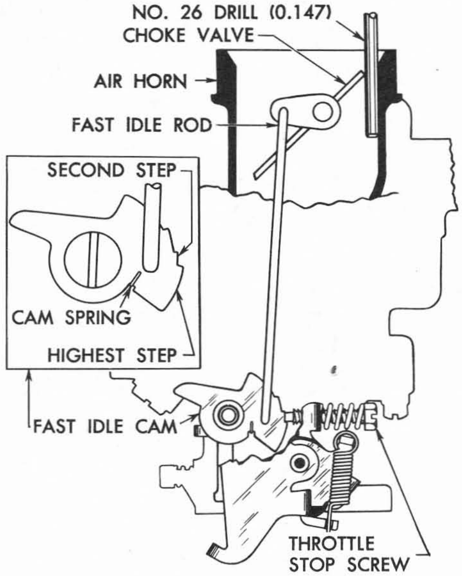


Figure 3-71—Stromberg Fast Idle Cam Adjustment

3-30 ADJUSTMENT OF FAST IDLE CAM AND CHOKE UNLOADER

If the engine operates on fast idle too long after starting or else moves to slow idle too soon, or the choke unloader does not operate properly, adjust fast idle cam and choke unloader as follows:

1. Remove air cleaner and silencer.
2. Place a No. 26 drill (0.147″) between wall of air horn and the center of upper edge of choke valve, and hold valve firmly closed against the drill. See figure 3-71.
3. Check fast idle cam spring to make sure it holds the cam upward against the end of fast idle rod.
4. Close the throttle until stop screw contacts the fast idle cam. The screw should just clear the edge of the highest step of cam and bear against the second step, as shown in figure 3-71.
5. If stop screw does not contact fast idle cam as specified, bend fast idle rod at the large curve as required to obtain specified contact.
6. Remove the No. 26 drill and place a No. 53 drill (0.595″) at the same point, then hold choke valve firmly closed against the drill. See figure 3-72.
7. Slowly open and close throttle valve several times and check clearance between the lock

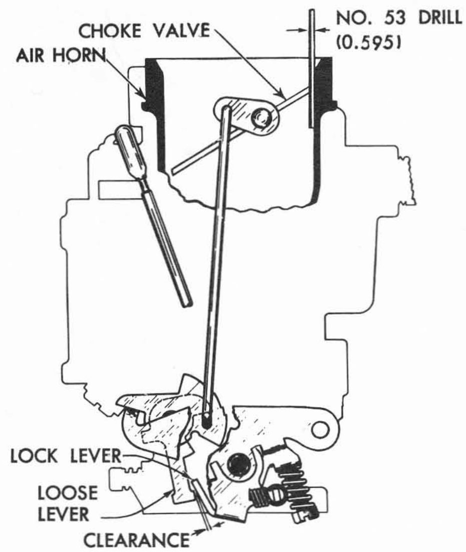


Figure 3-72—Stromberg Lock Lever Adjustment

lever on throttle stem and the loose lever behind the fast idle cam, as indicated in figure 3-72.

8. Clearance should be just enough to allow the lock lever to pass the loose lever. Bend end of lock lever up or down as required to secure proper clearance.

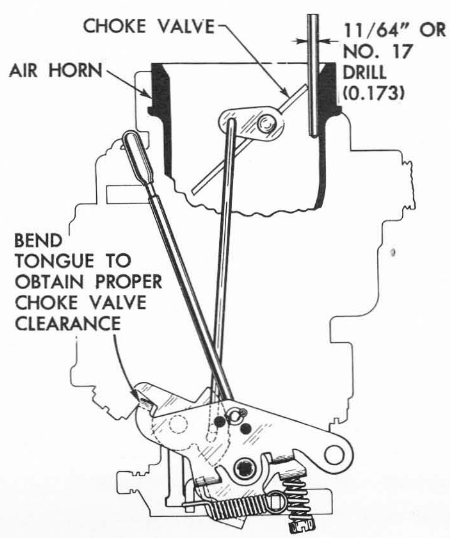


Figure 3-73—Stromberg Choke Unloader Adjustment

9. Open throttle valve to full wide open position, making sure that stop on throttle lever is against boss on throttle body.
10. Check the clearance between wall of air horn and the center of upper edge of choke valve. The clearance should be 0.173″, and may be measured with a No. 17 or 11/64″ drill. See figure 3-73.
11. Bend the tongue on throttle lever as re-

quired to obtain specified clearance.

12. Install air cleaner and silencer.

3-31 DISASSEMBLY, CLEANING, ASSEMBLY OF STROMBERG AUTOMATIC CHOKE

a. Removal and Disassembly

1. Remove carburetor assembly from engine.

2. Remove three screws and lug-washers; then remove thermostat cover with thermostat. See figure 3-74.

3. Remove lock nut from choke stem, using Wrench T-25047; then remove lock washer and serrated washer.

4. Remove choke housing screws and while removing housing slide the vacuum piston lever off choke stem. Remove piston from housing.

5. Disconnect fast idle rod from choke stem lever. Remove choke valve and the choke stem and lever assembly.

6. Remove lead ball plugs from choke housing, using Plug Remover T-25052, shown in figure 3-85. Be careful not to damage plug seats in housing.

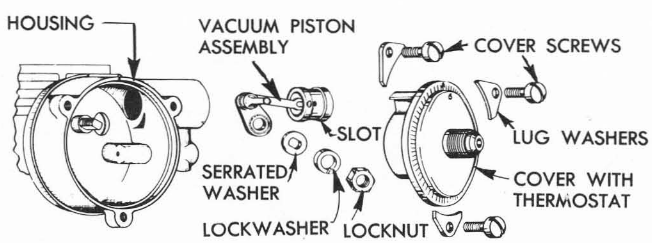


Figure 3-74—Stromberg Choke—Disassembled

b. Cleaning and Inspection

1. Allow all parts to soak in suitable cleaner bath to remove all foreign material. Bendix Carburetor Cleaning Solvent is recommended for this purpose. Regardless of cleaning material used, however, be sure to thoroughly rinse the parts in kerosene, distillate, or white gasoline to remove all gummy deposits that have been softened by the cleaner.

2. It is particularly necessary for the piston and the cylinder in housing to be thoroughly clean and free of burrs or scores. Do not use any abrasive material for cleaning piston and cylinder. If piston or cylinder is scored, replace the affected part.

3. If thermostat is distorted or damaged it must be replaced with a new thermostat cover with thermostat assembly. The thermostat is not furnished separately because the "V" index mark is stamped on cover after installation of thermostat, to insure proper calibration.

4. Remove gum or other foreign material from the choke stem bearings in air horn, using cleaning fluid; do not scrape bearings with a cutting tool. Check choke stem for free action in air horn. If stem is worn so that excessive play in bearings exists, replace the stem and lever assembly. If choke valve is bent or otherwise damaged it should be replaced.

c. Assembly and Installation

1. Install lead ball plugs in choke housing, using Plug Set T-25053 (tool in figure 3-88).

2. Install choke stem and valve in air horn. Close valve and check for uniform clearance between edges of valve and wall of air horn. If clearance is not uniform, or valve sticks in air horn at any point, loosen screws and shift valve to obtain uniform clearance and freedom from sticking. It is important to have the choke valve fit properly, otherwise hard starting may result.

3. Place vacuum piston in cylinder with *slot on piston down; this is very important. Do not use lubricant of any kind on piston or in cylinder.*

4. With the housing gasket in place, install choke housing on the air horn; at the same time place piston lever on choke stem. Install housing screws, making certain choke stem does not bind.

5. Install serrated washer with the serrations matching those on the lever. Install lock washer and lock nut; at this time turn the nut only finger-tight.

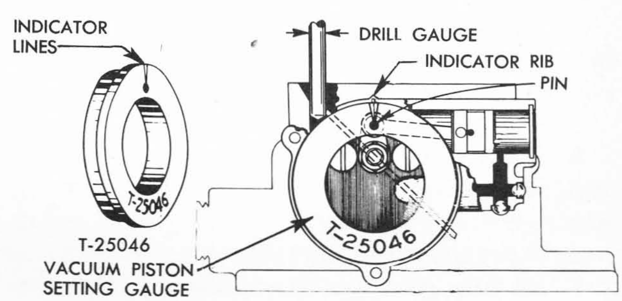


Figure 3-75—Setting Vacuum Piston with Gauge T-25046

6. Place piston setting Gauge T-25046 on choke housing with a small hole fitting over the pin of the choke lever. There are two indicator lines on the face of the gauge. The gauge should be positioned so that the indicator rib on top of the choke housing is centered between the indicator lines. See figure 3-75.

7. Place drill, of size specified below, between choke valve and wall of air horn and hold choke

valve tight against drill while tightening lock nut lightly with Wrench T-25047.

Car Series	*Carburetor Code No.*	*Drill Size*
40-50	7-69	15/64″
70	7-70	No. 3

8. Remove drill and Setting Gauge T-25046. Hold choke valve closed and tighten lock nut securely, using Wrench T-25047. Recheck choke valve opening to be certain the setting has not been changed. Do not try to change the position of the piston lever without first loosening the lock nut and serrated washer.

9. Make certain the choke stem operates freely and that the choke valve will drop freely of its own weight, then attach fast idle rod to choke stem lever with a cotter pin.

10. Place thermostat cover on housing with thermostat hook in "down" position. Rotate cover in direction of arrow until "V" punch mark is located in line with indicator rib on top of housing for Series 70 (code No. 7-70), or is one notch "lean" (clockwise) for Series 40-50 (code No. 7-69). Install lug-washers and tighten screws securely.

11. Check adjustment of fast idle cam and choke unloader (par. 3-30).

12. Install carburetor assembly on engine. When attaching choke upper heat pipe to thermostat cover avoid excessive tightening which may change the position of cover and affect the thermostat setting.

3-32 DISASSEMBLY, CLEANING, INSPECTION OF STROMBERG CARBURETOR

a. Removal and Disassembly

1. Remove air cleaner and silencer. Disconnect throttle rod, accelerator vacuum switch wires, choke upper heat pipe, vacuum spark control pipe, and gasoline pipe.

2. Remove gasoline filter assembly, then remove carburetor from engine.

3. Remove automatic choke parts from air horn as described in paragraph 3-31. Disconnect fast idle rod from fast idle cam by unhooking the cam spring from rod.

4. Disconnect pump rod from pump lever by pushing upward on spring housing on rod and pulling outward. Remove pump lever fulcrum screw *(left hand thread)* and spring washer; then disconnect pump lever from stem of accelerating pump piston.

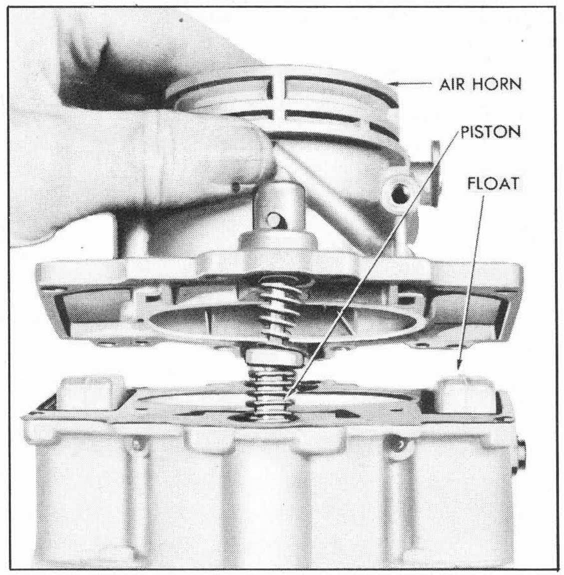


Figure 3-76—Removing Air Horn

5. Remove screws and lift off air horn assembly with float attached. See figure 3-76.

6. Remove pump piston assembly from air horn. Remove felt washer, splash washer, and retainer spring from piston link.

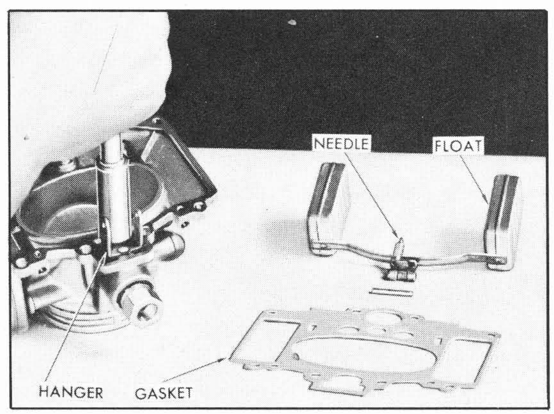


Figure 3-77—Removing Needle Valve Seat and Float Hanger

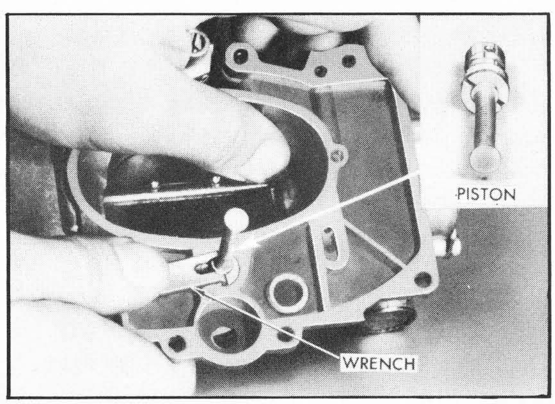


Figure 3-78—Removing Power Piston

7. Tap end of float fulcrum pin which is not serrated to remove the pin, then remove float and needle valve. Shake float to see whether it is "loaded" with gasoline due to a leak. Remove needle valve seat and float hanger using Wrench T-20140. See figure 3-77.

8. Remove vacuum power piston from air horn, using Wrench T-29733. See figure 3-78. Remove gasoline connection and screen.

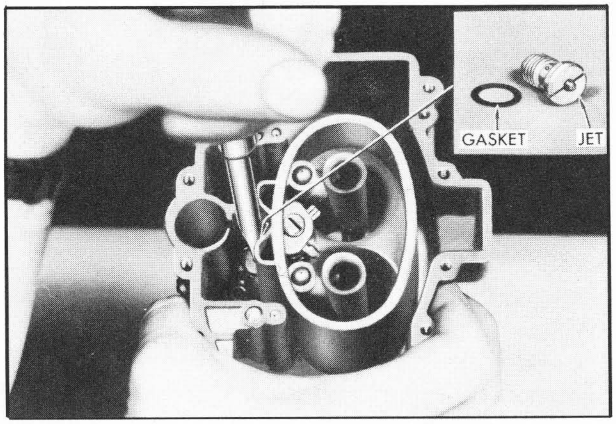


Figure 3-79—Removing By-Pass Jet

9. Remove accelerator vacuum switch, which is attached to throttle body by two screws.

10. Remove power by-pass jet and gasket from main body, using a large screw driver. See figure 3-79.

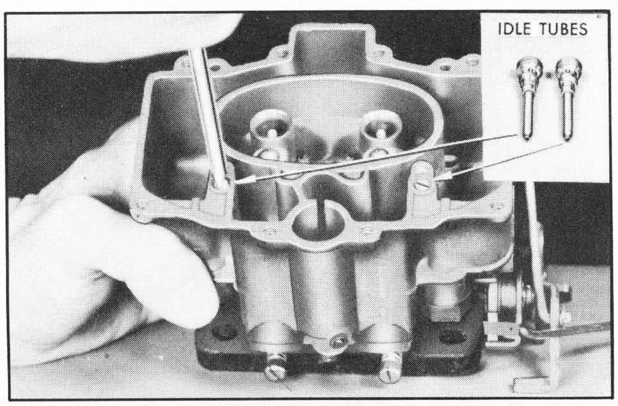


Figure 3-80—Removing Idle Tubes

11. Remove both idle tubes from main body. See figure 3-80. Handle each tube carefully to avoid damaging the small end which contains the metering orifice.

12. Remove pump discharge nozzle screw, nozzle and gaskets. See figure 3-81. Place hand on top of main body and invert body to catch the check valve ball.

13. Remove main discharge jet plugs and gaskets, then remove main metering jets. See figure 3-82.

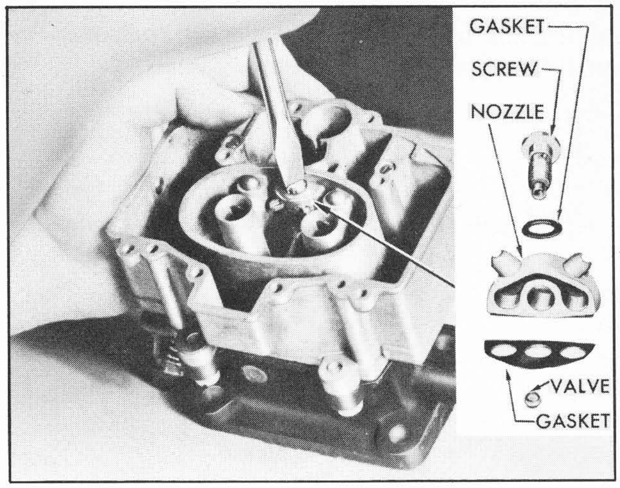


Figure 3-81—Removing Pump Discharge Nozzle

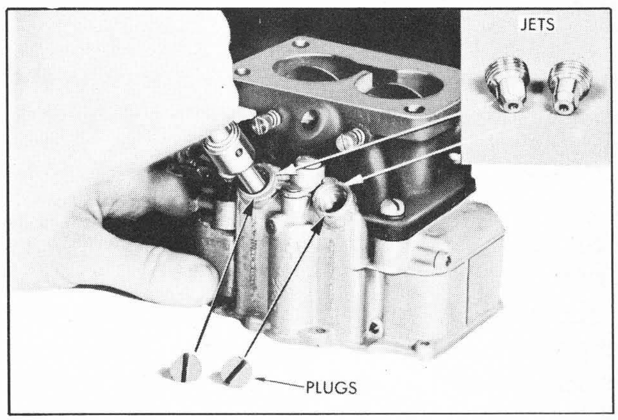


Figure 3-82—Removing Main Metering Jets

14. Remove main discharge jets by screwing Jet Remover T-24967 (R.H. thread) into base of jet, then pulling jets from main body. See figure 3-83. The threads formed in the main discharge jet by the tool will not affect the metering characteristics of the jet. NOTE: *Make sure that main discharge jet lead gaskets are removed from main body.*

15. Remove screws and separate the main

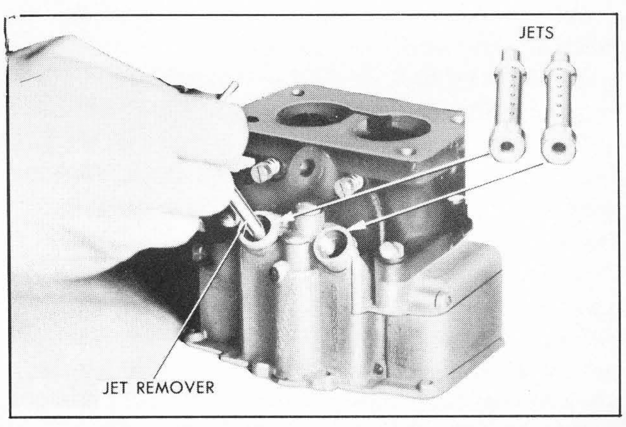


Figure 3-83—Removing Main Discharge Jets

body from the throttle valve body, then remove the idle channel reducer wires.

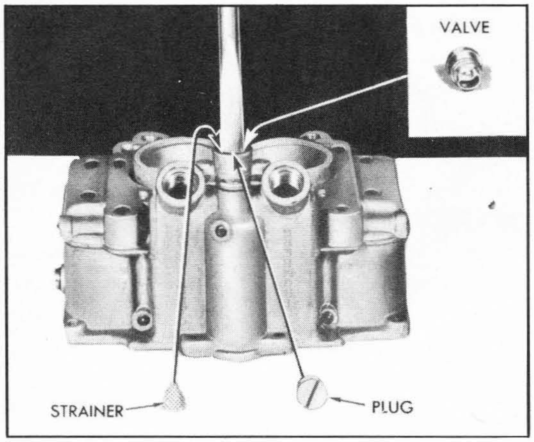


Figure 3-84—Removing Inlet Check Valve

16. Remove pump inlet check valve plug and gasket. Remove strainer and inlet check valve. See figure 3-84.

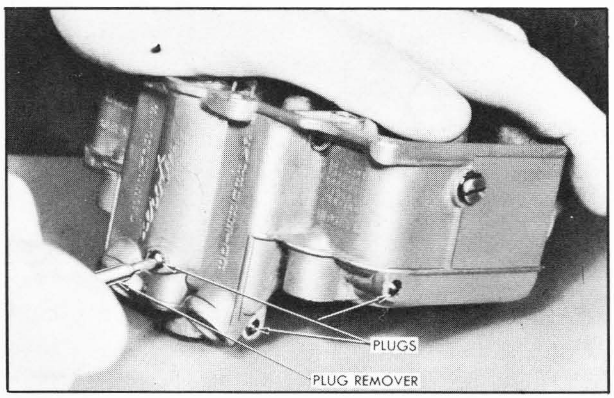


Figure 3-85—Removing Lead Ball Plug

17. Remove all lead ball plugs from main body, using Plug Remover T-25052. See figure 3-85. Be careful not to damage the plug seats in body.

18. Remove both idle needle valves and springs. If carburetor is exceptionally dirty it may be advisable to remove the adjacent taper drive plugs from throttle body; otherwise these plugs should be left in place.

19. Before throttle valves are removed, they should be marked so that each valve may be reinstalled in the barrel from which it was removed and may be accurately positioned in the barrel of throttle body. Using a sharp scriber, lightly scratch one line on one valve and its barrel and two lines on the other valve and barrel; also scribe lines on each valve along both edges of the valve stem. See figure 3-86. After marking the parts, remove the valves and the throttle lever and stem assembly.

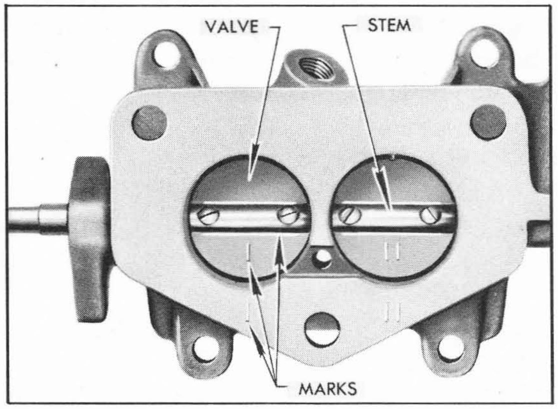


Figure 3-86—Marks on Throttle Valves

b. Cleaning Carburetor Parts

Regardless of the number of new parts that are used in rebuilding a carburetor, the job in the end will not be satisfactory unless all metal parts are thoroughly cleaned. Because of the nature of carburetor parts, with numerous small passages subject to fouling with tenacious carbon and gum deposits, ordinary cleaning processes are entirely inadequate. The correct procedure is to use a cleaning bath in which metal parts can be immersed and "soaked" for sufficient time after disassembly to thoroughly clean all surfaces and channels.

Bendix Carburetor Cleaning Solvent has been developed especially for cleaning carburetors, and is recommended for this purpose. Regardless of the cleaning material used, however, be sure to thoroughly rinse the parts in kerosene, distillate, or white gasoline to remove all gummy deposits that have been softened by the cleaner.

Before immersing in the cleaning bath, all lead ball plugs and taper drive plugs should be removed so that the cleaner can penetrate and wash through the channels, thus removing all foreign material. Removal of all carbon from the inside of the throttle barrel is particularly important.

c. Inspection of Carburetor Parts

All metal parts should be thoroughly cleaned and each part should be carefully inspected for wear or damage as follows:

1. *Automatic Choke.* Inspect choke parts as described in paragraph 3-31.

2. *Air Horn.* Make certain that the vacuum cylinder is thoroughly clean. Check wear of

choke stem bearings.

3. Float Needle Valve and Seat. Because of the wear that normally occurs in these parts and the necessity of having a tight seating valve, it is advisable to replace these parts if the carburetor has been used for considerable mileage.

4. Vacuum Power Piston and By-Pass Jet. Make certain that the surface of the piston is thoroughly clean. Do not use any abrasive material for polishing the piston surface. Inspect for wear or damage. Replace if necessary. Test by-pass jet for tight seating by sucking on the upper end. Replace jet if doubtful.

5. Main Body. Make certain the main body is thoroughly clean and that all passages are free of foreign material. Check high speed and idle air bleeders for correct sizes, using a drill shank as a gauge. For drill sizes see Stromberg Carburetor Calibrations, paragraph 3-1.

6. Main Discharge Jets and Idle Tubes. Inspect tips of main discharge jets to make certain that they are not damaged, and that walls are not distorted so as to deform the holes. Test idle tubes by blowing or sucking to make sure that metering holes are clear. Inspect small ends to make sure that they are not damaged so as to deform the metering holes.

Replace any parts whose condition appears doubtful.

7. Pump Piston, Check Valves, Strainer, Discharge Nozzle. Inspect pump piston leather washer for cracks, creases, turned edges, or other damage. Test relief valve in piston for tight seating by blowing on lower end of piston; if valve is seating tightly it will not be possible to blow through it.

Test inlet check valve for tight seating by sucking on lower end. Inspect outlet check valve ball for rough surfaces.

Inspect inlet strainer for holes or other damage.

Test discharge nozzle by sucking or blowing to make sure that all holes are clear.

Replace any part whose condition appears doubtful.

8. Throttle Valve Body and Idle Needle Valves. Be sure that the idle discharge holes, the air bleeders, and the barrels of the throttle valve body are clean of all carbon deposits. A comparatively small amount of carbon in the barrel may have the effect of decreasing the bore sufficiently to prevent the throttle valves resting at the correct angle when closed. This can have serious effects on performance because the distance from the throttle valve, when closed, to the edge of the idle discharge hole must be kept within close limits to the established dimension.

Check the size of the upper idle discharge hole by inserting the shank of the correct size drill. This has the further advantage of removing any foreign matter that may be obstructing the hole. The lower discharge hole for the idle needle valve should be checked in the same manner. For drill sizes see Stromberg Carburetor Calibrations (par. 3-1).

Inspect seats for idle needle valves for scoring or other damage. If ends of idle needle valves are grooved or bent, replace the valves.

Check wear of throttle stem bearing. There should not be more than about .006″ play, otherwise air leaks will interfere with performance.

9. Throttle Valves, Throttle Lever and Stem Assembly. See that throttle valves are not bent and do not have burrs or sharp edges. Replace if damaged.

Inspect throttle lever and stem assembly for wear on bearing surfaces. Check pump rod holes for wear and also see that lever is not loose on stem. Replace if necessary.

3-33 ASSEMBLY AND ADJUSTMENT OF STROMBERG CARBURETOR

a. Assembly of Carburetor

In the assembly of the carburetor, use all new gaskets and any additional new parts found to be necessary during inspection.

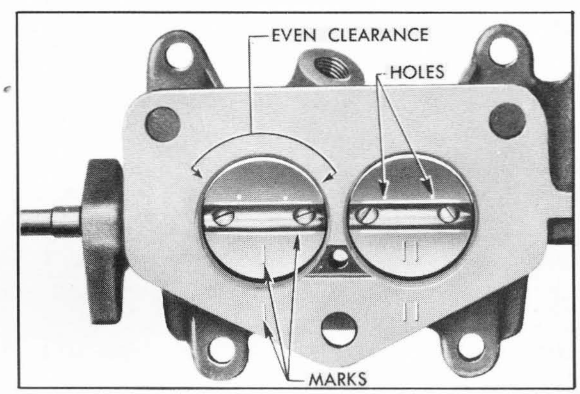


Figure 3-87—Correct Position of Throttle Valves

1. Install throttle lever and stem assembly in throttle body. Insert each valve through the stem in the same barrel from which it was removed as indicated by the marks previously made, placing the two small holes in valve toward the idle discharge holes in throttle body.

Loosely install valve screws and align the valves carefully with the scribe marks previously made along edges of valve stem.

With valves held in closed position, hold throttle body to the light and check for even clearance between each valve and the barrel. See figure 3-87. If clearance is excessive at any point, shift valve in stem until it fits the barrel with the least amount of light showing around the edge, then tighten screws firmly.

2. Install new taper drive plugs in throttle body at upper idle discharge holes, if old plugs were removed. Install spring and idle needle valves. Seat needle valves lightly with fingers, then turn each valve out exactly 1¾ turns off seat. Do not use a screwdriver or otherwise force a needle valve against its seat; this will score the valve and ruin it for service.

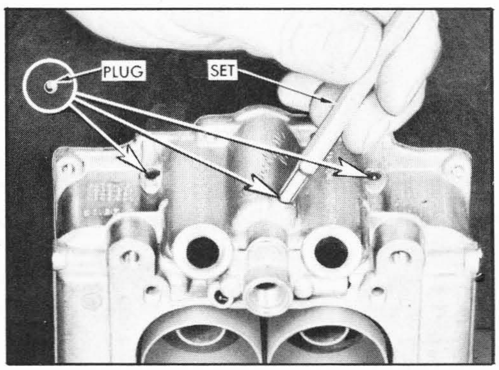


Figure 3-88—Installing Lead Ball Plugs

3. Install lead ball plugs in main body, using Plug Set T-25053. See figure 3-97.

4. Install pump inlet check valve. See figure 3-84.

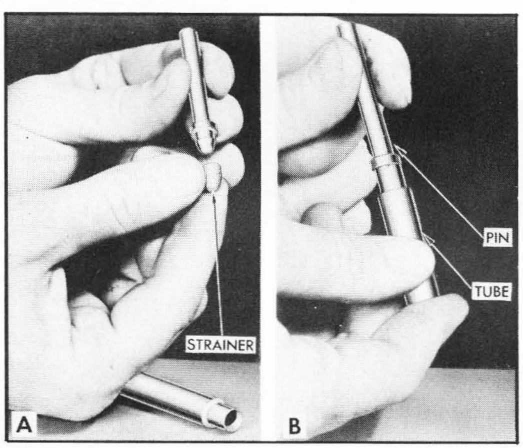


Figure 3-89—Assembling Screen in Installer T-25097

5. Using Screen Installer T-25097, install pump inlet strainer as follows:

(a) Place inlet strainer over the rounded end of pin in Installer T-25097. See figure 3-89, view A.

(b) Insert the strainer into tube of Installer T-25097. See figure 3-89, view B.

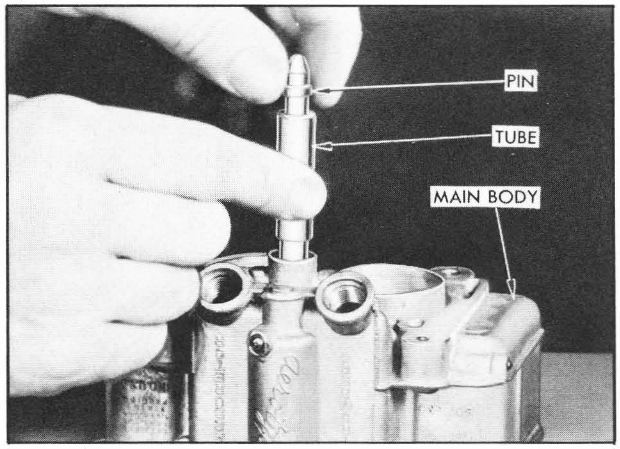


Figure 3-90—Installing Strainer in Main Body

(c) Remove the pin and place tube in the main body, then use reverse end of the pin to slide strainer into place in body. See figure 3-90.

(d) Install check valve plug. Use a new copper gasket if available; otherwise, make sure that plug and seat are clean to insure tight joint.

6. Place new gasket on main body. Insert *long* ends of reducer wires in idle channels in throttle body, and guide *short* ends of wires into idle channels in main body as bodies are assembled together. Install screws with lock washers.

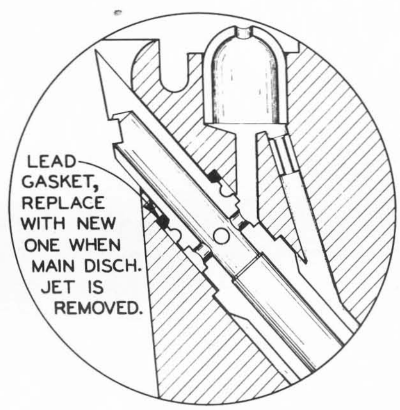


Figure 3-91—Location of Main Discharge Jet Gasket

7. Place new lead gaskets over beveled ends of main discharge jets. Use tool T-24967 to install jets in main body, being careful to position jets so that flat surface is parallel with the di-

rection of air flow. See figures 3-91 and 3-83.

8. Install main metering jets, using Wrench T-24924. See figure 3-82. Install main discharge jet plugs, using new copper plug gaskets if available; otherwise make sure that plugs and seats are clean to insure tight joint.

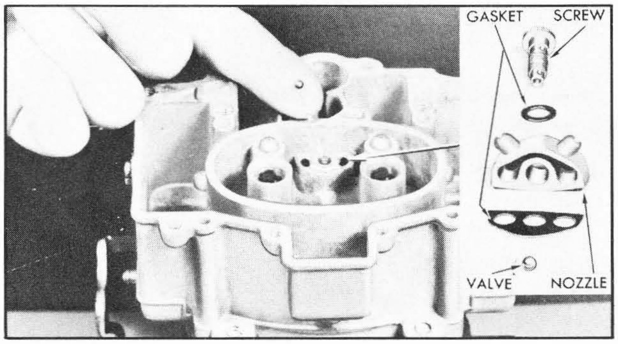


Figure 3-92—Installing Check Valve Ball and Pump Discharge Nozzle

9. Install the pump outlet check valve ball, new nozzle gasket, the discharge nozzle, the nozzle attaching screw and a new gasket. See figure 3-92.

10. Install idle tubes in main body. See figure 3-80.

11. Install power by-pass jet and a new gasket in main body, using a large screwdriver. See figure 3-79.

12. Attach accelerator vacuum switch to throttle body with two screws, using a new gasket between switch and body. Check switch timing as described in paragraph 10-33.

13. Install the vacuum power piston in air horn, using Wrench T-24733. Hold the tool flat against the gasket surface to avoid damage to the piston or to the tool. See figure 3-78. No lubricant of any type should be used on the piston or in the cylinder in the air horn. Piston must operate freely without any lubrication.

14. Install float hanger with a new gasket on each side and install new float needle valve seat, using Wrench T-20140. See figure 3-77. Place strainer over boss in inlet opening of air horn and install gasoline connection.

15. Place new gasket on air horn. Attach float needle valve to clip on float lever and attach float assembly to float hanger with fulcrum pin which should be tapped lightly so that serrated end "bites" into hanger leg. Make certain float lever does not bind in float hanger due to distortion of the legs. NOTE: *All 1948 and 1949 carburetors use floats designed for 5 pound fuel pump pressure. These floats are identified by a small numeral 5 stamped on float lever. No other float should be used. Float may be either brass or steel.*

16. *Adjust Float for Proper Fuel Level.* To obtain the most efficient operation of the carburetor, the fuel level must be maintained in the bottom of the threads of the sight hole in the side of float chamber, with engine idling. See figure 3-17. This level will be produced in practically all cases by carefully setting the floats with Float Gauge T-24971.

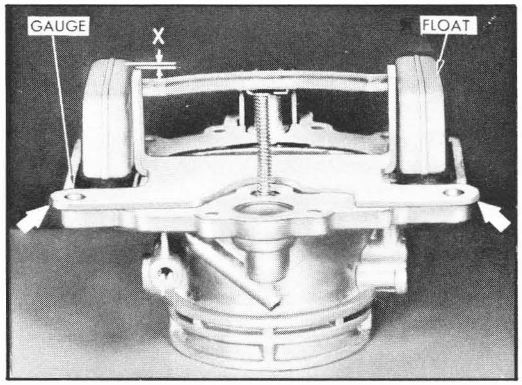


Figure 3-93—Checking Float Height

(a) With air horn inverted, place the float gauge on top of gasket so that the locating buttons on gauge fit in holes in air horn. Gauge must rest flat and solid on the gasket. See figure 3-93.

(b) Adjust each float so that the inner side just touches the upright guide of the gauge; this must be a light fit, without clearance and without excessive drag on the gauge upright guide.

(c) Both floats must be the same height with reference to the ends of upright guides on gauge. Brass floats must be $\frac{3}{64}$" *above* ends of gauge guides. *Steel* floats must be $\frac{1}{32}$" *below* ends of gauge guides. The distance is measured between the top inside edge of float *(not the seam)* and top end of gauge guide as shown at "X" in figure 3-93. If any change in height is required it can be made by bending the float lever with pliers at point shown in figure 3-94. *Do not use pressure on floats.*

(d) The float needle valve must have $\frac{1}{16}$" of travel from closed position. Check travel and adjust, if necessary, by bending the float lever stop to give specified travel.

17. Install retainer spring, splash washer, and felt washer on stem of pump piston assembly, then install piston assembly in air horn.

18. Install air horn assembly on main body,

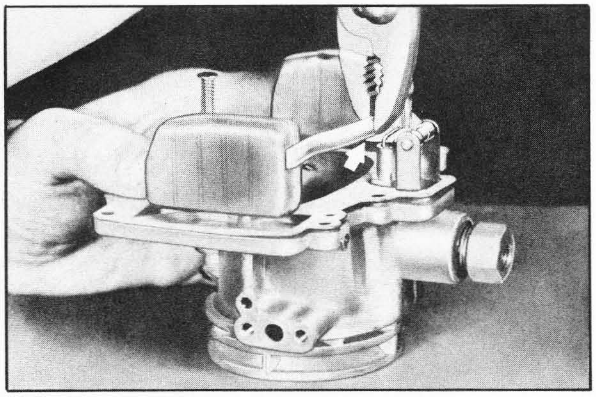


Figure 3-94—Adjusting Float Height

using care to avoid distortion of float assembly and making certain that pump piston leather washer does not have any creases or curled edges when it is inserted into the cylinder in main body. See figure 3-76. Install cover screws and lock washers, with accelerator vacuum switch wire clip attached by the corner screw located to rear of choke.

19. Attach pump lever to pump piston stem and install cotter pin. Attach lever to air horn with lever fulcrum screw *(left hand thread)*, with spring washer placed between lever and screw head. Push upward on spring housing of pump rod while connecting rod to ball end of pump lever. *The rod must be connected to the middle hole in the throttle lever.*

20. Connect fast idle rod to fast idle cam by placing washer over end of rod and an engaging hooked end of cam spring in groove in rod. Install automatic choke parts on air horn as described in paragraph 3-31.

b. Installation of Carburetor

1. Make sure that carburetor gasket is in good condition; then install carburetor on intake manifold.
2. Clean the gasoline filter (par. 3-9), install it in carburetor, and connect the gasoline pipe. Connect the vacuum spark control pipe.
3. Connect the choke upper heat pipe to check thermostat cover, avoiding excessive tightening which may change the position of cover and affect the thermostat setting.
4. Adjust and connect throttle linkage as described in paragraph 3-10.
5. Connect the accelerator vacuum switch wires and check switch timing as described in paragraph 10-33.
6. Install air cleaner and silencer.
7. Check float bowl fuel level and adjust carburetor as described in paragraph 3-12.