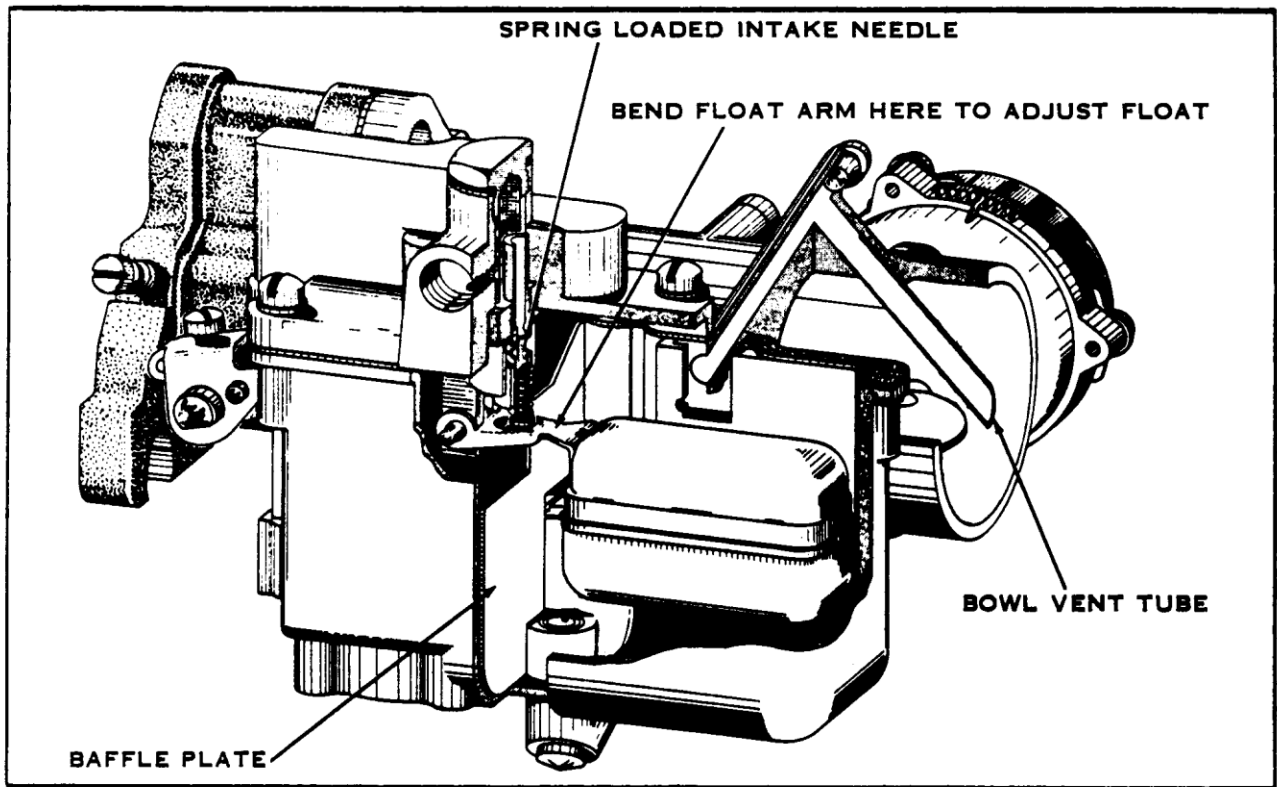


AN EXPLANATION OF CIRCUITS CARTER YH HORIZONTAL CLIMATIC CONTROL CARBURETER

The Carter Model YH carbureter may be compared with a Carter YF downdraft carbureter with the circuits rearranged to operate in a horizontal or sidedraft position. It has five (5) conventional circuits, as have been used in previous carbureters. They are:

- Float Circuit
- Low-Speed Circuit
- High-Speed Circuit
- Pump Circuit
- Climatic Control (Choke) Circuit



FLOAT CIRCUIT

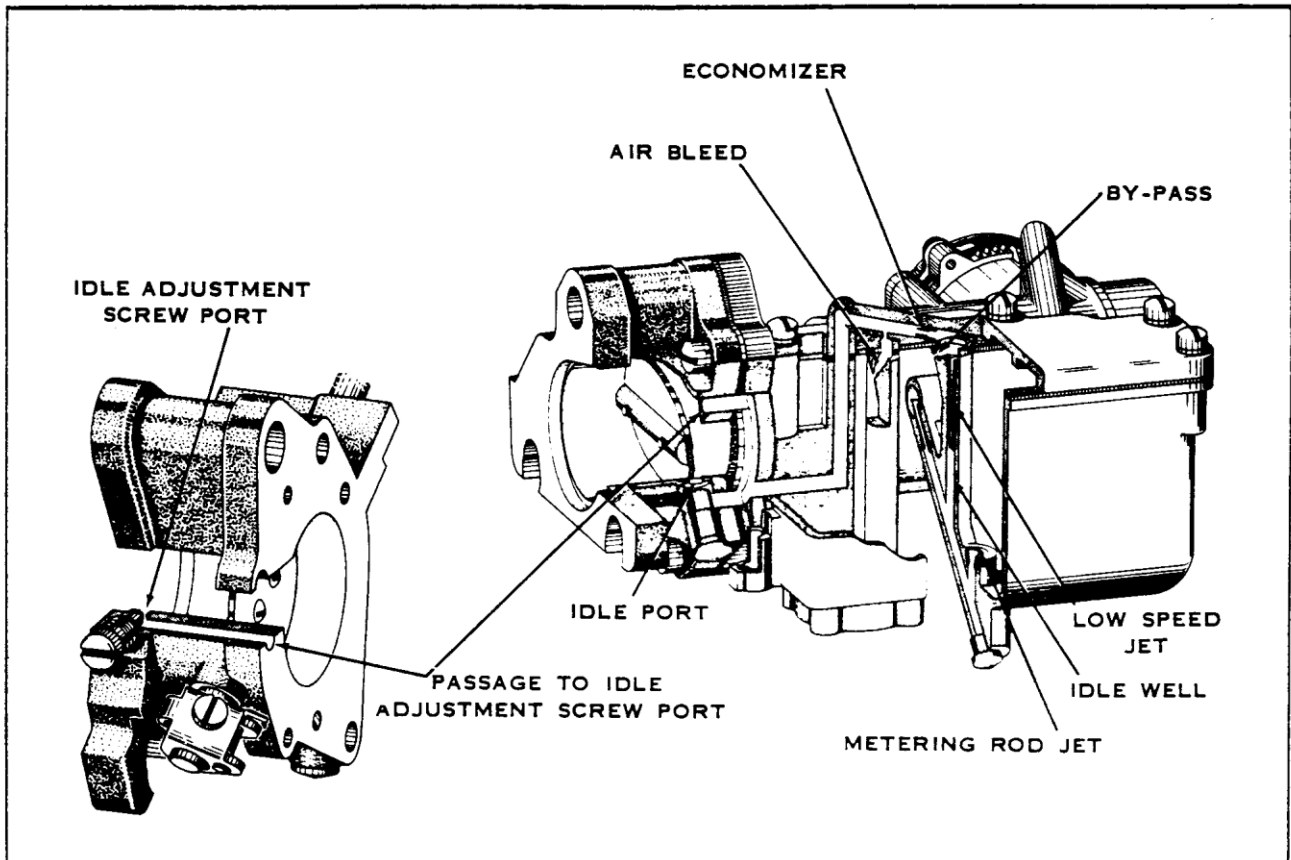
The purpose of the float circuit is to maintain an adequate supply of fuel at the proper level in the bowl for use by the low-speed, high-speed, pump and choke circuits. The spring loaded intake needle and the fuel baffle plate are designed to provide a stable fuel supply under all operating conditions.

Setting the float to specifications assures an adequate supply of fuel in the bowl for all operating conditions. Float adjustment must be made with the bowl cover gasket removed and the bowl cover held inverted and level at eye height with the true weight of the float resting on the pin in the intake needle. An incorrect float setting will result if the bowl

cover is not held level, or the float is depressed when gauging the float setting. Adjust the float by bending the float arm. To avoid placing unnecessary strain on the float, do not grasp the float shell when bending the float arm.

Inspect the intake needle and seat, and float assembly for wear. The carburetor bowl and the intake strainer screen should be clean and free of dirt, gum, or other foreign matter.

The bowl is vented to the inside of the air horn. The bowl vent is calibrated to provide proper air pressure above the fuel at all times. To assure a positive seal, always use a new bowl cover gasket when reassembling. An air leak at this point can result in a mileage complaint.



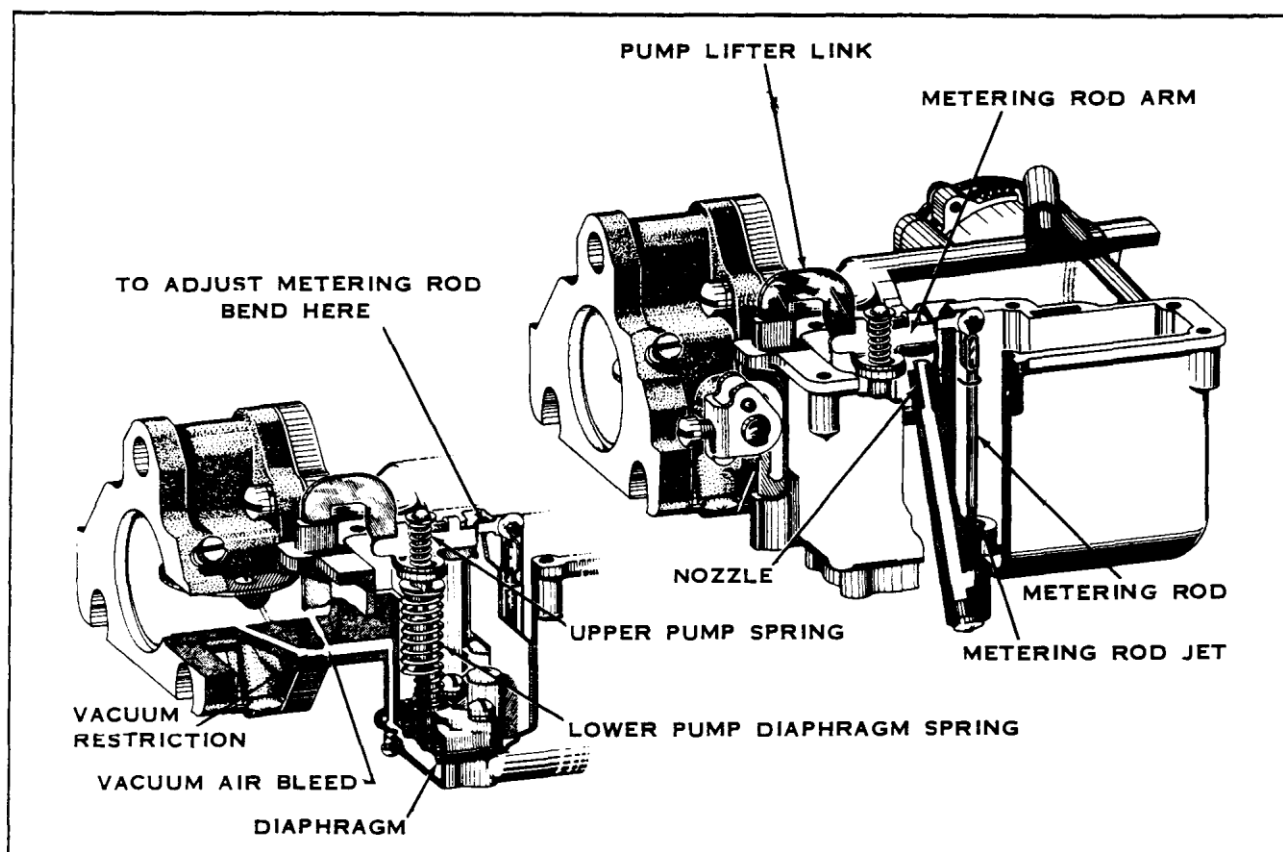
LOW SPEED CIRCUIT

Fuel for idle and early part throttle operation is metered through the low-speed circuit.

Gasoline enters the idle well through the metering rod jet. The low-speed jet measures the amount of fuel for idle and early part throttle operation. The air by-pass, economizer, and idle air bleed are carefully calibrated and serve to break up the liquid fuel and mix it with air as it moves through the passage to the idle port and idle adjustment screw port. Turning the idle adjustment screw toward its seat reduces the quantity of fuel mixture supplied by the idle circuit.

The idle port is slot shaped. As the throttle valve is opened more of the idle port is uncovered allowing a greater quantity of gasoline and air mixture to enter the carbureter bore.

The by-pass, economizer, idle port, idle adjustment screw port, as well as the bore of the carbureter flange must be clean and free of carbon. Obstructions will cause poor low-speed engine operation. Worn or damaged idle adjustment screws or low-speed jets should be replaced.



HIGH-SPEED CIRCUIT

Fuel for part throttle and full throttle operation is supplied through the high-speed circuit.

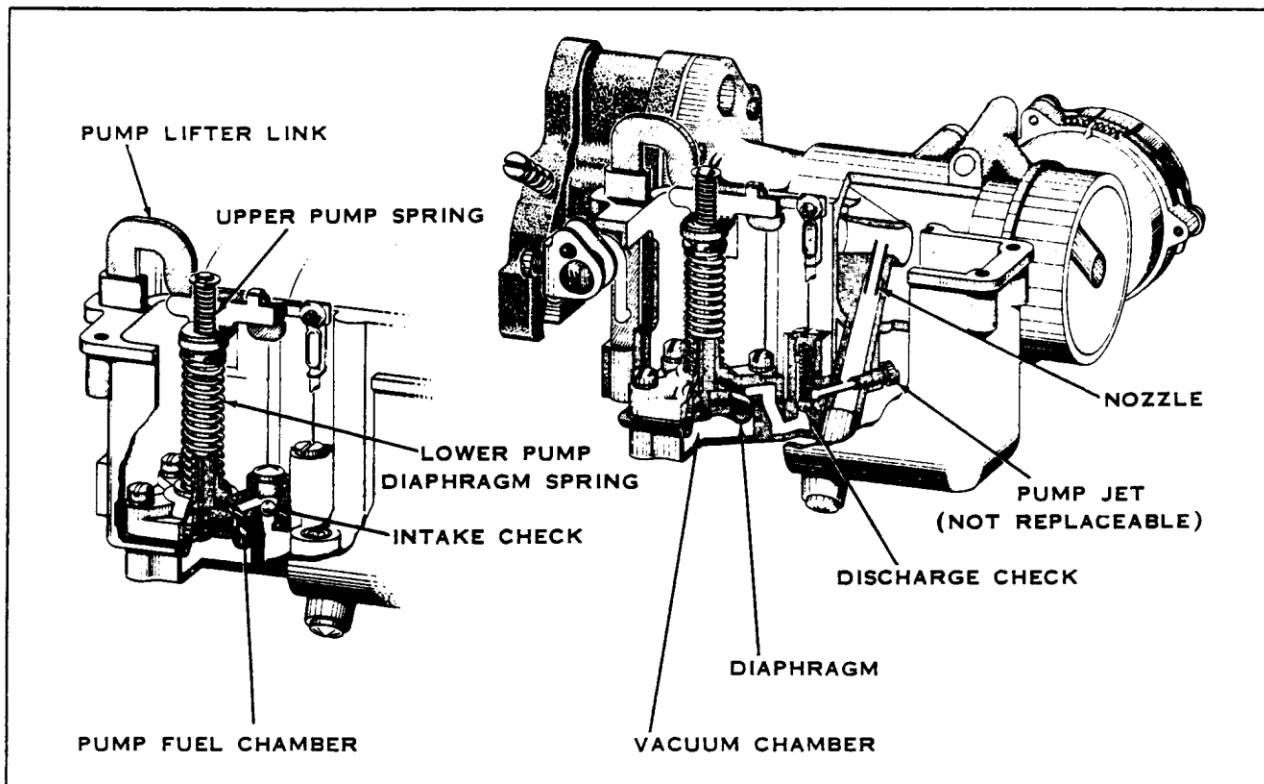
The position of the metering rod in the metering rod jet controls the amount of fuel admitted to the high speed nozzle. The position of the metering rod is dual controlled, mechanically, by movement of the throttle and by manifold vacuum applied to the diaphragm. During part throttle operation manifold vacuum pulls the diaphragm assembly down holding the metering rod arm against the pump lifter link. Movement of the metering rod will then be controlled by the pump lifter link, which is connected to the throttle shaft. This is true at all times that the vacuum under the diaphragm is

strong enough to overcome the tension of the lower pump diaphragm spring. The upper pump spring serves as a bumper upon deceleration and a delayed action spring on acceleration.

Under any operating condition, when the tension of the lower pump diaphragm spring overcomes the pull of vacuum under the diaphragm, the metering rod will move toward the wide open throttle or power position.

The restriction and air bleed in the vacuum passage provide a lower and more uniform vacuum condition in the chamber below the diaphragm.

The main nozzle is permanently installed and must not be removed in service.



PUMP CIRCUIT

The accelerating pump circuit provides a measured amount of fuel, which is necessary to insure smooth engine operation for acceleration at speeds below approximately 30 MPH.

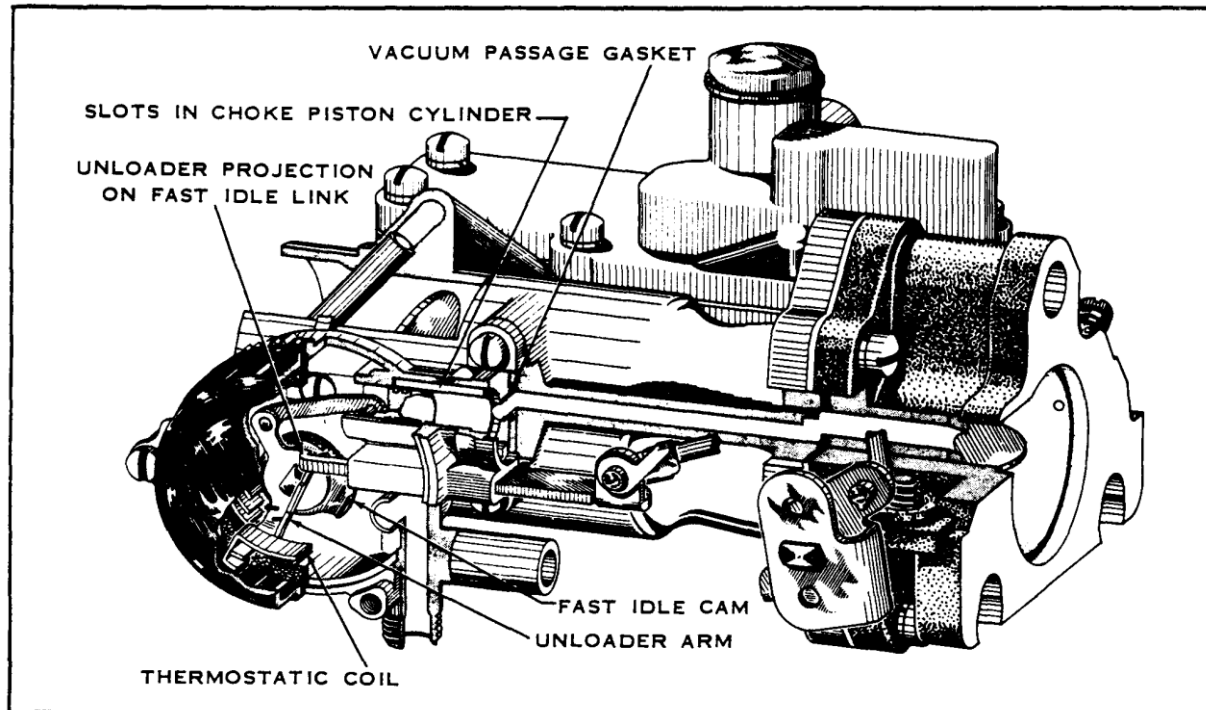
Accelerating pump action is controlled both mechanically and by manifold vacuum in the same manner as the metering rod. When the throttle is closed, the diaphragm moves downward and fuel is drawn into the pump fuel chamber through the intake check. The discharge check is seated at this time to prevent fuel from the nozzle passage being drawn into the pump chamber. When the throttle is opened, the diaphragm moves upward forcing fuel out through the discharge passage, past the discharge check, and out of the pump jet, which directs the fuel up the nozzle passage and out the end of the nozzle. When the

diaphragm moves upward, the intake check is closed preventing fuel from being forced back into the bowl.

If the throttle is opened suddenly, the upper pump spring will be compressed resulting in a smoother pump discharge of longer duration.

Manifold vacuum is applied to the underside of the diaphragm at all times the engine is in operation. When manifold vacuum decreases to the point where the lower pump diaphragm spring overcomes the pull of vacuum, the diaphragm moves upward and a pump discharge results.

The pump jet is pressed into the casting during manufacture, and must not be removed in service. Be sure the diaphragm is in good condition and the intake and discharge checks are free of lint or other foreign matter.



CLIMATIC CONTROL CHOKE CIRCUIT

The climatic control circuit provides a correct mixture necessary for quick cold engine starting and warm up.

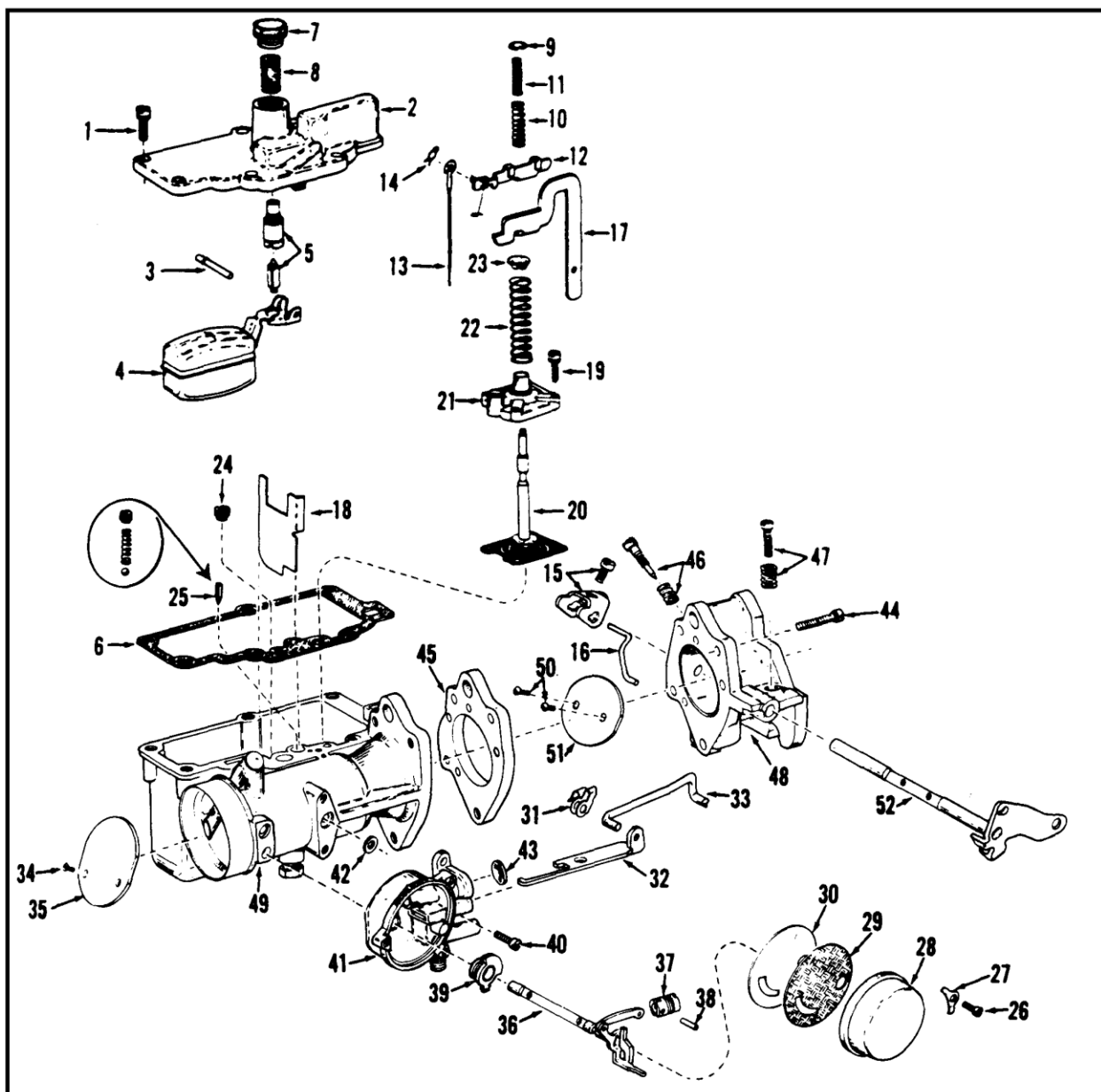
When the engine is cold, tension of the thermostatic coil spring holds the choke valve closed. When the engine is started, air velocity against the offset choke valve causes the valve to open slightly against the thermostatic spring tension. Intake manifold vacuum applied to the choke piston also tends to pull the choke valve open. The choke valve assumes a position where tension of the thermostatic spring is balanced by the pull of vacuum on the piston and force of air velocity on the offset valve.

When the engine starts, slots located in the sides of the choke piston cylinder are uncovered allowing intake manifold vacuum to draw warm air heated by the exhaust manifold, through the climatic control housing. The flow of warm air in turn heats the thermostatic spring and causes it to lose some of its tension. The thermostatic spring loses its tension gradually until the choke valve reaches full-open position.

If the engine is accelerated during the warm-up period, the corresponding drop in manifold vacuum allows the thermostatic spring to momentarily close the choke, providing a richer mixture.

During the warm-up period it is necessary to provide a fast idle speed to prevent engine stalling. This is accomplished by a fast idle cam connected to the choke shaft. The fast idle link attached to the throttle lever contacts the fast idle cam and prevents the throttle valve from returning to a normal warm engine idle position while the climatic control is in operation.

If during the starting period the engine becomes flooded, the choke valve may be opened manually to clean out any excessive fuel in the intake manifold. This may be accomplished by depressing the accelerator pedal to the floor mat and engaging the starter. The unloader projection on the fast idle link will contact the unloader arm on the choke shaft and in turn partially open the choke valve.



NOMENCLATURE

- | | | |
|--|--|---|
| 1. Bowl cover attaching screw and washer (6) | 19. Diaphragm housing attaching screw and washer (4) | 37. Choke piston |
| 2. Bowl cover and strainer assembly | 20. Pump diaphragm assembly | 38. Choke piston pin |
| 3. Float lever pin | 21. Pump diaphragm housing assembly | 39. Fast idle cam and spring assembly |
| 4. Float and lever assembly | 22. Pump diaphragm spring | 40. Piston housing attaching screw (3) |
| 5. Needle and seat assembly | 23. Pump diaphragm spring retainer | 41. Piston housing and plug assembly |
| 6. Bowl cover gasket | 24. Metering jet | 42. Piston housing gasket |
| 7. Strainer nut assembly | 25. Pump check needle | 43. Welsh plug |
| 8. Bowl strainer | 26. Coil housing attaching screw (3) | 44. Body flange attaching screw and washer |
| 9. Upper pump spring retainer | 27. Coil housing retainer (3) | 45. Body flange gasket |
| 10. Upper pump spring (outer) | 28. Thermostatic coil housing | 46. Idle adjustment screw and spring |
| 11. Upper pump spring (inner) | 29. Thermostatic coil housing gasket | 47. Throttle lever adjusting screw and spring |
| 12. Metering rod arm assembly | 30. Baffle plate | 48. Body flange |
| 13. Metering rod | 31. Choke connector rod retainer | 49. Main casting |
| 14. Pin spring | 32. Fast idle link | 50. Throttle valve attaching screw (2) |
| 15. Throttle shaft arm assembly | 33. Choke connector rod | 51. Throttle valve |
| 16. Throttle shaft arm connector link | 34. Choke valve attaching screw (2) | 52. Throttle shaft and lever assembly |
| 17. Pump lifter link | 35. Choke valve | |
| 18. Fuel bowl baffle plate | 36. Choke piston lever, link and shaft assembly | |

YH CARBURETOR OPERATION

"YH" CARBURETOR CIRCUITS

The various circuits of the Carter "YH" carburetor used on turbocharged engines may be traced as follows:

Float Circuit

The purpose of the float circuit is to maintain an adequate supply of fuel at the proffer level in the bowl for use by the idle system, main metering system, accelerator pump circuit and choke circuit. Fuel is supplied from the fuel pump through the special in-line fuel filter to the wire mesh screen and the float needle and seat in the carburetor bowl cover. The position of the float controls the needle to seat opening and fuel supply to the carburetor bowl. The fuel bowl is vented to the inside of the air horn. This vent is calibrated to provide proper air pressure above the fuel in the bowl at all times. This passage may be traced in the following manner. A 1/4" outside diameter tube is pressed into the inside of the air horn at the air cleaner attachment area. The tube indexes with a 1/4" inside diameter passage cross drilled at an angle on top of the air horn. This passage indexes with a vertical cast slotted-type passage in the bowl wall adjacent to the air horn. The vertical slot is open on top to a space on the under side of the bowl cover, thus admitting atmospheric pressure to the top of the fuel in the bowl. An additional smaller hole is drilled from the bottom of the vertical slot on an angle downward into the bowl proper,

Idle system

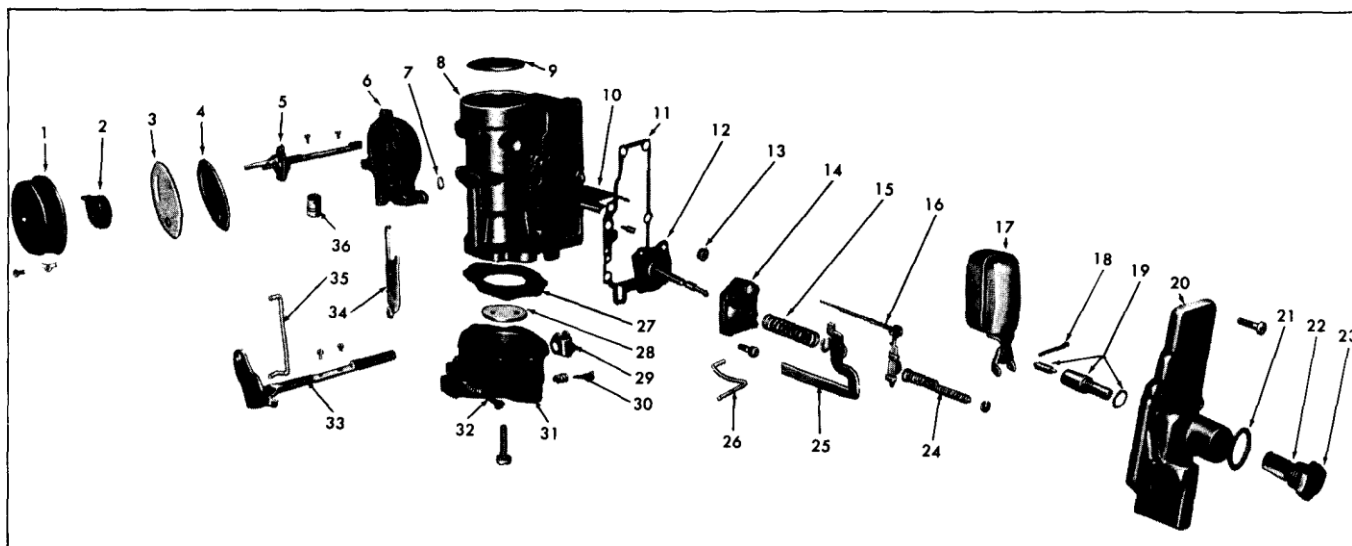
Fuel for idle and early part throttle operation is metered through the low speed circuit or idle system. This system may be traced through the components of the carburetor in the following manner. Fuel enters the main well from the bowl, past the metering rod and through the metering rod jet. Due to the position of the throttle valve, the low pressure area is on the turbocharger inlet side of the throttle valve rather than at the venturi. For this reason, fuel must travel up the vertical idle passage, which is a small tube pressed into the carburetor body from the bowl cover side downward on an angle to index with the main well. This tube is known as the idle jet. Adjacent to the upper end of this tube is a small idle air bleed tube pressed into the bore of the carburetor. Fuel leaving this area now becomes a fuel-air mixture. This fuel-air mixture then travels through the bowl cover gasket and into a drilled passage in the bowl cover. From here the mixture travels upward through an angular passage to another vertical passage. In this vertical passage is a restricted orifice. This orifice is called an economizer. After passing through the economizer, the mixture travels down the vertical passage indexes with one end of a horizontal passage in the carburetor body. The opposite end of this horizontal passage index with a

vertical curved slot in the throttle body flange area of the carburetor body. The fuel mixture flows to the extremities of the slot to index with two holes in the throttle body gasket. The upper hole in this gasket indexes with a horizontal passage in the throttle body. This passage leads to the idle adjusting needle which is on the turbocharger inlet side of the throttle valve. The lower hole in this gasket indexes with a short passage in the throttle body leading to the slot shaped idle port. As the throttle is opened, more of the idle port is uncovered allowing a greater quantity of the fuel air mixture to enter the carburetor bore. Turning the idle adjustment screw towards its seat reduces the quantity of fuel mixture supplied by the idle circuit. This idle system is the only supply of the fuel-air mixture to the turbocharger under closed or light throttle opening.

Main Metering System

As the throttle is opened wider, the fuel-air mixture to the engine gradually transfers from the idle system previously described to the main metering system or high-speed circuit. Fuel for this circuit is supplied from the bowl past the metering rod and through the metering rod jet to the main well as previously described in the idle system. Due to the larger throttle opening, the low pressure area now transfers from the turbocharger inlet side of the throttle valve to the venturi area of the carburetor bore. Because of this, the fuel will no longer be supplied by the idle system and will be forced to travel through the relatively short high-speed circuit. This circuit may be traced in the following manner. The main well is immediately below the metering jet. From this point, the fuel travels upward through an angular passage to the high-speed nozzle at the upper end of the passage. This nozzle outlet is located in the center of the venturi. Thorough mixing of the fuel and air takes place at this point. The fuel-air mixture then travels past the open throttle valve to the turbocharger. There is a second vertical passage in the main well for fuel storage and supply. This passage is located in the wall of the carburetor body between the bowl and the carburetor throat. The upper end of this passage indexes with a hole in the carburetor bowl cover gasket and a small dead end passage in the bowl cover. There is a small tube pressed into the carburetor body from this passage to index with the nozzle passage at the venturi area of the carburetor. The opposite end of this tube may be located in the vertical main well slightly below the bowl cover gasket area. This tube is a vapor vent for the main well and its purpose is to introduce into the venturi area any fuel vapors that may accumulate on top of the fuel in the main well.

The position of the metering rod in the metering-rod jet controls the amount of fuel admitted to the high-speed nozzle. The position of the metering rod is controlled in a dual manner.



- | | | | |
|---------------------------------|-----------------------------------|------------------------------|------------------------------|
| 1. Choke Coil Housing | 10. Bowl Splash Baffle | 19. Needle and Seat Assembly | 28. Throttle Plate |
| 2. Choke Coil | 11. Bowl Cover Gasket | 20. Bowl Cover | 29. Throttle Lever Pump Arm |
| 3. Gasket | 12. Diaphragm Pump Assembly | 21. Gasket | 30. Idle Mixture Screw |
| 4. Baffle Plate | 13. Main Jet | 22. Inlet Screen | 31. Throttle Body |
| 5. Choke Shaft | 14. Pump Housing | 23. Screen Nut | 32. Idle Speed (Air) Screw |
| 6. Choke Housing | 15. Pump Lower Spring | 24. Upper Pump Spring | 33. Throttle Shaft |
| 7. Vacuum Passage "O" Ring Seal | 16. Metering Rod and Arm Assembly | 25. Pump Actuating Link | 34. Fast Idle Link |
| 8. Carburetor Body | 17. Float | 26. Connector Link | 35. Fast Idle Connector Link |
| 9. Choke Plate | 18. Hinge Pin | 27. Gasket | 36. Choke Piston |

Fig. 3-10—Turbo Charger Carb. Exploded

Mechanical control is by movement of the throttle valve with the accelerator pedal and accelerator linkage. Wider throttle opening lifts the metering rod to allow more fuel to pass from the bowl to the main well. The second means of control is by vacuum applied to the underside of the pump diaphragm. This vacuum passage may be traced in the following manner. There is an angularly drilled passage in the throttle body. Vacuum for this passage is supplied from the turbocharger side of the throttle valve to the throttle-body-to-carburetor gasket area of the throttle body. This passage is approximately 3/32" in diameter. The choke vacuum passage in the throttle body is approximately 3/16" in diameter. This passage will be discussed later in the choke circuit description. The vacuum passage for the pump diaphragm passes from the throttle body through a hole in the throttle-body-to-carburetor gasket to index with a horizontal passage in the carburetor body. This passage may be identified by a small brass restriction tube located at the throttle body flange area of the carburetor body. This horizontal passage in the carburetor body is approximately 1" long. An airbleed from the bore of the carburetor body indexes with this passage. The end of this horizontal passage indexes with a vertical passage in the carburetor body. This vertical passage runs downward in

the carburetor body to index with a second horizontal passage which is cross-drilled into the bowl area of the carburetor body to apply vacuum to the underside of the pump diaphragm. The restriction and air-bleed provide a more uniform vacuum in the chamber below the diaphragm.

During part throttle operation, vacuum pulls the diaphragm assembly down holding the metering-rod arm against the controlled by the pump-lifter link which is connected to the throttle shaft. The vacuum under the diaphragm is opposed by the tension of the lower pump spring. The upper pump springs serve as a bumper upon deceleration and as a delay action on acceleration. Under any operating condition, when the tension of the lower pump spring overcomes the pull of vacuum under the diaphragm, the metering rod will move toward wide throttle or power position.

Accelerator Pump Circuit - The accelerating pump circuit provides a measured amount of fuel, which is necessary to insure smooth engine operation for acceleration at speeds below approximately 30 miles per hour. Accelerating pump action is controlled both mechanically and by vacuum in the same manner as the metering rod. When the throttle is closed, the diaphragm moves downward and fuel is drawn into the pump fuel

chamber. This chamber is contained within the underside of the pump housing and the upper side of the pump diaphragm. Fuel to this chamber passes from the fuel in the bowl, up past the inlet ball check in the pump housing, and then downward on an angle through a short passage drilled in the pump housing. The brass discharge check needle is seated at this time. When the throttle is opened, the diaphragm moves upward forcing fuel out through the discharge passage, past the discharge needle and out of the pump jet. The intake check ball is closed at this time to prevent fuel from being forced back into the bowl. Fuel from the fuel chamber passes through a short 90° passage in the pump housing, through a hole in the pump diaphragm and downward through a short vertical passage in the carburetor body. This passage indexes with another short passage which is cross-drilled in the carburetor body to index with a long vertical passage in the wall of the carburetor body between the bowl and the carburetor throat. The brass discharge needle is in the lower part of this vertical passage. The bowl-cover gasket seals the upper end of this passage, thus fuel is forced out of the accelerating jet which is pressed into the bore of the carburetor at the upper end of this long vertical passage. Fuel leaving this jet is sprayed into the carburetor bore striking the outer wall of the venturi cluster. When the throttle is opened suddenly, the upper pump springs are compressed resulting in a smoother pump discharge of longer duration.

Choke Circuit

The choke circuit provides a correct mixture necessary for quick cold-engine starting and warm up.

When the engine is cold, tension of the thermostat coil spring holds the choke valve closed. When the engine is started, air velocity against the offset-choke valve causes the valve to open slightly against the tension of the thermostatic spring. Vacuum applied to the choke piston also tends to pull the choke valve open. This vacuum passage may be traced in the following manner. From the turbocharger inlet side of the throttle valve vacuum is applied through the 3/16" drilled passage in the throttle body to the throttle body-to-carburetor flange gasket. This vacuum is then applied through a hole in the gasket to a horizontal hole drilled in the body of the carburetor. The opposite end of this passage indexes with

a short horizontal passage in the carburetor body. This short passage indexes with another very short passage in the choke housing to apply vacuum to the choke piston. There is a rubber "O" ring seal to seal this vacuum passage between the carburetor body and the choke housing. The choke valve assumes a position where tension on the thermostatic spring is balanced by the pull of vacuum on the piston and the force of air velocity on the choke valve.

When the engine starts, slots in the top and bottom of the choke piston cylinder are uncovered allowing vacuum to draw clean, warm air heated in the choke-heat passage of the turbocharger exhaust flange. The air is pulled from the air cleaner through a hose and metal tube to the choke-heat passage in the turbocharger exhaust flange and from this choke heat passage through a second metal tube to the choke housing. The flow of warm air in turn heats the thermostatic spring causing it to lose some of its tension. This loss of tension takes place gradually until the choke valve reaches the full-open position.

If the engine is accelerated during the warm-up period, the corresponding drop in vacuum allows the thermostatic spring to momentarily close the choke, providing a richer mixture.

During the warm-up period, it is necessary to provide a fast idle speed to prevent engine stalling. This is accomplished by a fast idle cam connected to the choke shaft.

The fast idle link attached to the throttle lever contacts the fast idle cam and prevents the throttle valve from returning to a normal warm engine idle position while the choke control is in operation.

If during the starting period the engine becomes flooded, the choke valve may be opened manually to clear the engine of any excessive fuel in the intake manifold. This may be accomplished by depressing the accelerator pedal to the floor mat and engaging the starter. The unloader projection on the fast idle link will contact the unloader arm on the choke shaft and in turn partially open the choke valve.