Pump System (Fig. 10)

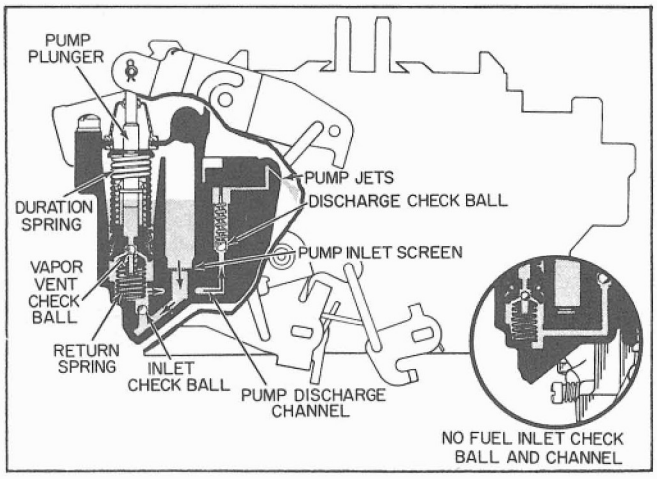

FIGURE 10

When the throttle is opened rapidly the air flow increases almost instantaneously, while the heavier fuel tends to lag behind, causing a momentary leanness. The accelerator pump provides the fuel necessary for smooth operation during acceleration. It will be noted that since the throttle valves on the secondary side of the carburetor remain fully closed throughout part throttle operation, it is only necessary to have one accelerator pump which is located on the primary side of the carburetor.

A double spring pump plunger is used. The rates of compression of the top spring and the bottom spring are calibrated to insure a smooth sustained charge of fuel for acceleration. The accelerator pump is connected through the pump shaft and lever assembly, and the pump rod to the throttle lever. On the pump intake or up stroke of the plunger, fuel from the float bowl passes through the pump filter screen. It unseats an aluminum inlet check ball and fills the pump well. Upon acceleration or down stroke of the pump plunger, the force of fuel in the pump well seats the inlet ball. The fuel is then forced through the discharge channel, to unseat the pump discharge ball, and then discharges through the pump jets into the air stream. At the end of the discharge, the discharge ball is returned to its seat by a calibrated spring, which prevents air being drawn back into the fuel channel during the intake stroke.

The pump plunger head is vented to minimize the effect of fuel percolation in the pump well. This has been accomplished by the design of a check ball and seat in the plunger head. In this manner, any fuel vapors in the pump well will rise and by-pass the ball, venting themselves into the float bowl. There is always a charge of solid fuel beneath the plunger head for rapid acceleration. Without this feature, any vapor pressure build up would evacuate the charge of fuel in the pump system, causing poor initial acceleration as well as difficult hot starting.

(See Inset)

Some models do not have inlet check balls. On these applications, the fuel enters through a slot in the side of the pump well. On the up stroke of the plunger, fuel will pass through the vapor vent ball passage and between the plunger and pump well wall. This will fill the pump well below the plunger with fresh fuel.

The carburetor also makes use of a pump plunger boot which serves the dual purpose of preventing dirt and foreign material from entering the fuel bowl through the shaft opening on top of the air horn and also provides the proper seal necessary to maintain the correct air pressure within the fuel bowl.

Choke System

The 4GC models use an automatic choke while the 4G models use a manual choke.

There are three designs of automatic choke systems used on the 4GC models. We will refer to them as the *conventional system*, the *split linkage system* and the *hot water system*.

Conventional System (Fig. 11)

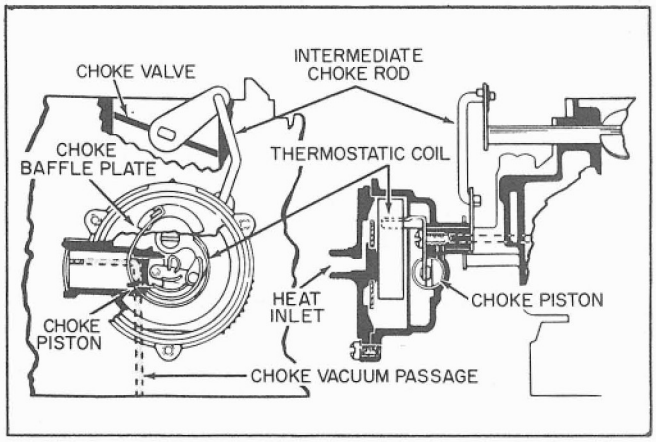

FIGURE 11

The conventional choke system may have the choke housing assembly mounted on the air horn, float bowl, or throttle body. On units with the housing on the bowl or throttle body, an intermediate choke rod adjustment is necessary. The principles of operation are the same on all units.

Choking of the carburetor is necessary only on the primary side as the secondary throttle valves are locked in the closed position whenever the choke valve is partially closed. This is accomplished by a secondary throttle shaft lock out lever and a slot in the fast idle cam. Whenever the choke valve is closed, the lock out lever prevents opening of the secondary throttle valves. When the choke valve is wide open, the fast idle cam drops down so that the lock out lever clears the cam, permitting the secondary throttle valves to open.

The choke system consists of a thermostatic coil assembly, choke piston, off set choke valve and fast idle cam and linkage. Its operation is controlled by a combination of intake manifold vacuum, the off set choke valve and temperature.

When the engine is cold, the thermostatic coil is

Delco Rochester

Choke System — *(Cont.)*

calibrated to hold the choke valve closed. As the engine is started, air velocity against the off set choke valve causes it to open slightly against the torque of the thermostatic coil. In addition, intake manifold is applied to the choke piston through a vacuum passage which also tends to open the choke valve. The choke valve assumes a position where the torque of the thermostatic coil is balanced against vacuum pull on the choke piston and air velocity against the off set choke valve. This results in a regulated air flow into the carburetor which provides a richer mixture during the warm-up period.

During the warm-up period the vacuum piston serves to modify the choke action to compensate for varying engine loads or acceleration. Any acceleration or increased load decreases the vacuum pull on the choke piston. This allows the thermostatic coil to momentarily increase choke valve closure to provide the engine with a richer mixture for acceleration.

As the engine warms up, hot air from a tube heated by exhaust gas is drawn into the thermostatic coil housing. The hot air causes the coil to slowly relax its tension. Thus the choke valve is allowed to move gradually to the full open position.

To prevent stalling during the warm-up period, it is necessary to run the engine at a slightly higher idle speed than for a warm engine. This is accomplished by the fast idle screw which rests on the steps of the fast idle cam. The fast idle cam is linked to the choke valve shaft by the choke rod, choke trip lever and choke lever and collar assembly. This holds the throttle valves open sufficiently during the warm up period to increase the idle RPM until the choke valve moves to the full open position.

When the automatic choke is in operation the driver may wish to advance the throttle to the full wide open position. Since this would decrease the pull upon the choke piston thereby closing the choke valve, it is necessary to provide increased carburetor air flow by opening the choke valve mechanically. To accomplish this, a tang on the fast idle cam is made to contact the throttle lever at wide open throttle position to sufficiently open the choke valve. This is called a choke unloader and also serves to de-choke a flooded engine during starting, whenever the engine is started with the accelerator held fully depressed.

Split Linkage Choke (Fig. 12)

The split linkage choke is designed to let the choke valve and fast idle cam work independently. The operation of the coil and piston is the same as the conventional system. The split linkage operates in the following manner.

The intermediate choke rod is attached to a hole in the end of the intermediate choke lever, while the choke rod is attached to a hole half-way out on the lever. The hole for the intermediate choke rod is at a greater distance from the pivot point than the choke rod. The result is, that as the thermostatic coil warms up and allows the weight of the intermediate choke lever to rotate the lever clockwise,

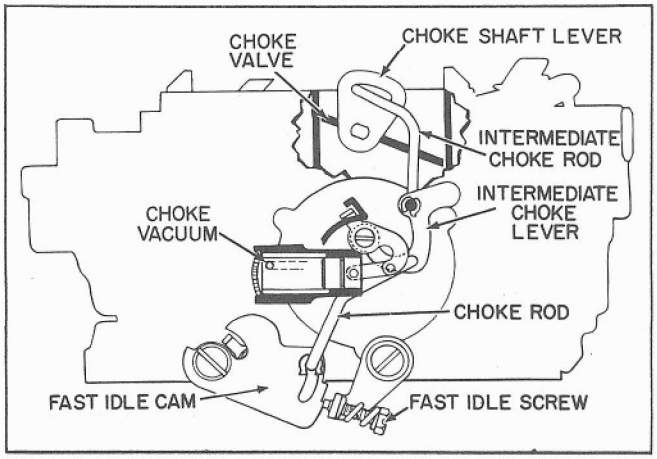

FIGURE 12

the intermediate choke rod will drop faster than the choke rod and allow the choke valve to open while still maintaining a fast idle. With this design, it provides a relatively short choking period with adequate fast idle for a cold engine.

Hot Water System (Fig. 13)

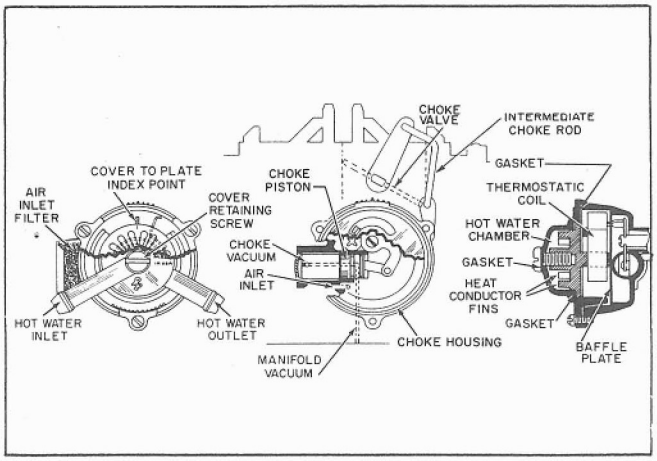

FIGURE 13

Instead of using hot air from the exhaust manifold to heat the thermostatic coil, heat from the engine hot water is used. The engine water is circulated directly from the engine to a chamber in the choke cover. The hot water choke has an inner and outer cover. The inner cover retains the choke coil and the outer cover provides the chamber through which the hot water is circulated. Pick up fingers on the aluminum inner cover extend into the outer cover hot water chamber and pick up heat from the water. The heat is then transmitted through the inner aluminum cover and around the thermostatic coil. The choke housing inside baffle plate is made of an insulating material to hold the heat around the stat coil, which will gradually relax the tension on the coil and allow the choke valve to open. A conventional choke piston is used to control the vacuum break and to assist in opening the choke valve as the coil releases its ten-