main control diaphragms. The purpose of the regulator unit is to regulate the fuel pressure to the inlet side of the metering jets in the fuel control unit. This pressure is automatically regulated according to the mass airflow to the engine.

The carburetor fuel strainer, located in the inlet to chamber E, is a fine mesh screen through which all the fuel must pass as it enters chamber D. The strainer must be removed and cleaned at scheduled intervals.

Referring to *Figure 2-24*, assume that for a given airflow in lb/hr through the throttle body and venturi, a negative pressure of ¼ psi is established in chamber B. This tends to move the diaphragm assembly and the poppet valve in a direction to open the poppet valve permitting more fuel to enter chamber D. The pressure in chamber C is held constant at 5 psi (10 psi on some installations) by the discharge nozzle or impeller fuel feed valve. Therefore, the diaphragm assembly and poppet valve moves in the open direction until the pressure in chamber D is 5¼ psi. Under these pressures, there is a balanced condition of the diaphragm assembly with a pressure drop of ¼ psi across the jets in the fuel control unit (auto-rich or auto-lean).

If nozzle pressure (chamber C pressure) rises to 5½ psi, the diaphragm assembly balance is upset, and the diaphragm assembly moves to open the poppet valve to establish the necessary 5¾ psi pressure in chamber D. Thus, the ¼ psi differential between chamber C and chamber D is re-established, and the pressure drop across the metering jets remains the same.

If the fuel inlet pressure is increased or decreased, the fuel flow into chamber D tends to increase or decrease with the pressure change causing the chamber D pressure to do likewise. This upsets the balanced condition previously established, and the poppet valve and diaphragm assembly respond by moving to increase or decrease the flow to re-establish the pressure at the ¼ psi differential.

The fuel flow changes when the mixture control plates are moved from auto-lean to auto-rich, thereby selecting a different set of jets or cutting one or two in or out of the system. When the mixture position is altered, the diaphragm and poppet valve assembly repositions to maintain the established pressure differential of ¼ psi between chambers C and D, maintaining the established differential across the jets. Under low power settings (low airflows), the difference in pressure created by the boost venturi is not sufficient to accomplish consistent regulation of the fuel. Therefore, an idle spring, shown in *Figure 2-24*, is incorporated in the regulator. As the poppet valve moves toward the closed position, it contacts the idle spring. The spring holds the poppet valve off its seat far enough to provide more fuel than is needed for idling. This potentially overrich mixture is regulated by the idle valve. At idling speed, the idle valve restricts the fuel flow to the proper amount. At higher speeds, it is withdrawn from the fuel passage and has no metering effect.

Vapor vent systems are provided in these carburetors to eliminate fuel vapor created by the fuel pump, heat in the engine compartment, and the pressure drop across the poppet valve. The vapor vent is located in the fuel inlet (chamber E) or, on some models of carburetors, in both chambers D and E.

The vapor vent system operates in the following way. When air enters the chamber in which the vapor vent is installed, the air rises to the top of the chamber, displacing the fuel and lowering its level. When the fuel level has reached a predetermined position, the float (which floats in the fuel) pulls the vapor vent valve off its seat, permitting the vapor in the chamber to escape through the vapor vent seat, its connecting line, and back to the fuel tank.

If the vapor vent valve sticks in a closed position or the vent line from the vapor vent to the fuel tank becomes clogged, the vapor-eliminating action is stopped. This causes the vapor to build up within the carburetor to the extent that vapor passes through the metering jets with the fuel. With a given size carburetor metering jet, the metering of vapor reduces the quantity of fuel metered. This causes the fuel/air mixture to lean out, usually intermittently.

If the vapor vent valve sticks open or the vapor vent float becomes filled with fuel and sinks, a continuous flow of fuel and vapor occurs through the vent line. It is important to detect this condition, as the fuel flow from the carburetor to the fuel supply tank may cause an overflowing tank with resultant increased fuel consumption.

To check the vent system, disconnect the vapor vent line where it attaches to the carburetor, and turn the fuel booster pump on while observing the vapor vent connection at the carburetor. Move the carburetor mixture control to auto-rich; then return it to idle cutoff. When the fuel booster pump is turned on, there should be an initial ejection of fuel and air followed by a cutoff with not more than a steady drip from the vent connection. Installations with a fixed bleed from the D chamber connected to the vapor vent in the fuel inlet by a short external line should show an initial ejection of fuel and air followed by a continuing small stream of fuel. If there is no flow, the valve is sticking closed; if there is a steady flow, it is sticking open.