GENERAL MOTORS EVAPORATIVE CONTROL SYSTEM

DESCRIPTION

An evaporative control system (E.C.S.) is used on all General Motors vehicles to reduce gasoline vapor emissions. Vapors are stored in a canister for burning during combustion rather than being vented to the atmosphere.

The fuel tank and usually the carburetor fuel bowl are vented through a hose into a canister containing activated charcoal. The canister absorbs these vapors when the vehicle is parked, and retains them until purged by air drawn through a filter at the bottom of the canister. Purging of the charcoal takes place when the engine is running.

OPERATION

SINGLE STAGE CANISTER

The single stage canister has inlet tubes to permit vapors from carburetor float bowl and from fuel tank to enter. A third tube is connected to engine vacuum and draws vapors out of the charcoal canister when the engine is running.

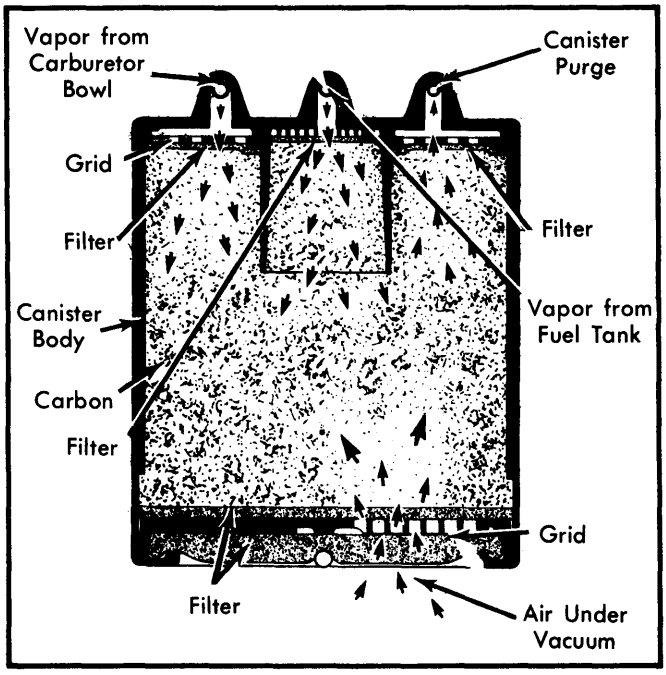

Fig. 1 Cutaway View of Single Stage Carbon Canister

CANISTER WITH PURGE VALVE

This vapor storage canister is used to absorb and store fuel vapors from the fuel tank and carburetor. Vapors enter the canister when the engine is not running and are absorbed by the bed of activated charcoal.

The canister has an integral purge valve which operates as follows: At idle, only a small amount of air can be drawn through the canister for purging. A spring holds the purge valve closed and a small bleed valve permits air flow. As engine speed is increased, a vacuum signal opens the purge valve, allowing much greater air flow. Both purge channels operate to remove fuel vapors from the charcoal, venting them into a common tube (marked "PCV") that is connected to the positive crankcase ventilation hose.

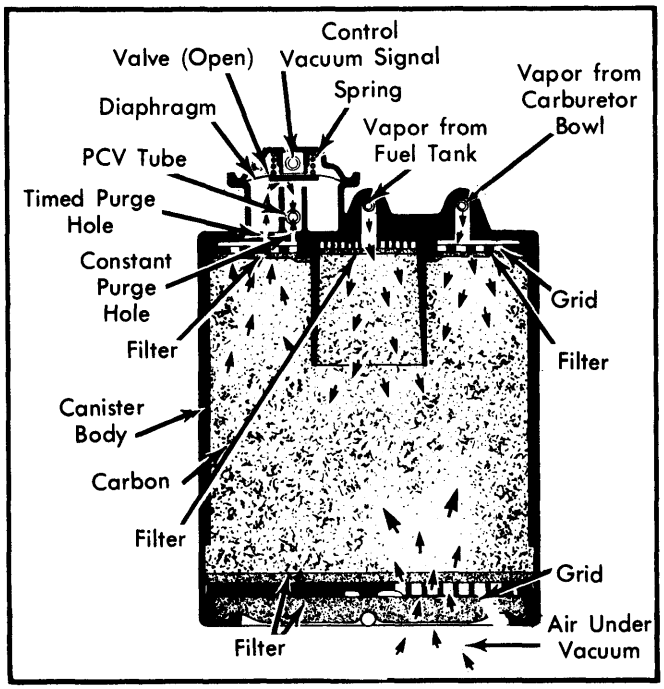

Fig. 2 Cutaway View of Carbon Canister with Purge Valve

CANISTER WITH VAPOR VENT VALVE

This vapor storage canister is designed to absorb and store fuel vapors from the fuel tank and carburetor float bowl. It also contains a valve that opens or closes the float bowl vent on the carburetor.

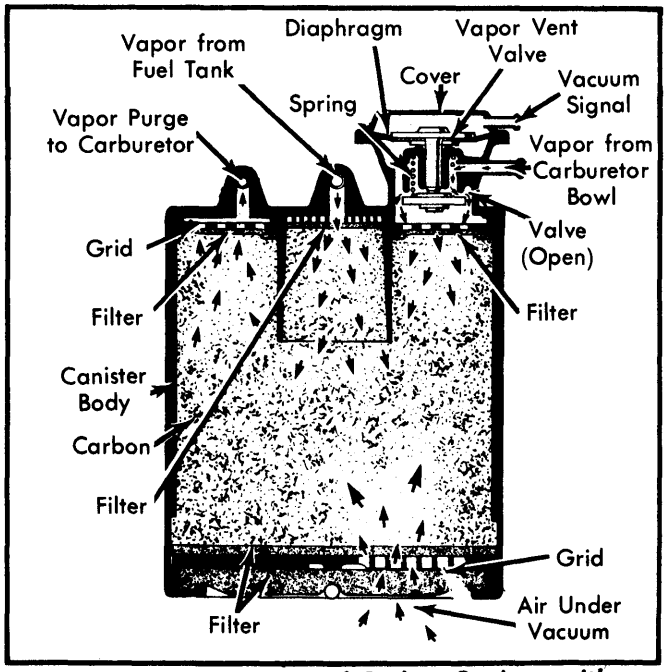

Fig. 3 Cutaway View of Carbon Canister with Vapor Vent Valve

GENERAL MOTORS EVAPORATIVE CONTROL SYSTEM (Cont.)

When the engine is off, the spring force opens the valve and fuel vapors from the carburetor float bowl can flow into the charcoal canister. When the engine is running, manifold vacuum closes the vent valve and seals the passage of fuel vapors, allowing the float bowl to be vented directly to the intake air stream. When the engine is turned off, the valve opens and again vents vapors to the canister.

CANISTER WITH PURGE VALVE & VAPOR VENT VALVE

This canister design combines a float bowl vent valve with a vacuum controlled purge valve. Float bowl vapors are collected when the engine is off, along with fuel tank vapors. These emissions are stored in the charcoal bed until the engine is started.

A thermal vacuum switch (TVS) delays canister purging until a specified engine temperature is reached. At idle or with the engine cold, only a small amount of air is allowed through the bleed valve. As engine speed is increased and coolant temperature reaches normal, a vacuum signal opens the purge valve, allowing much greater air flow to purge the canister vapors.

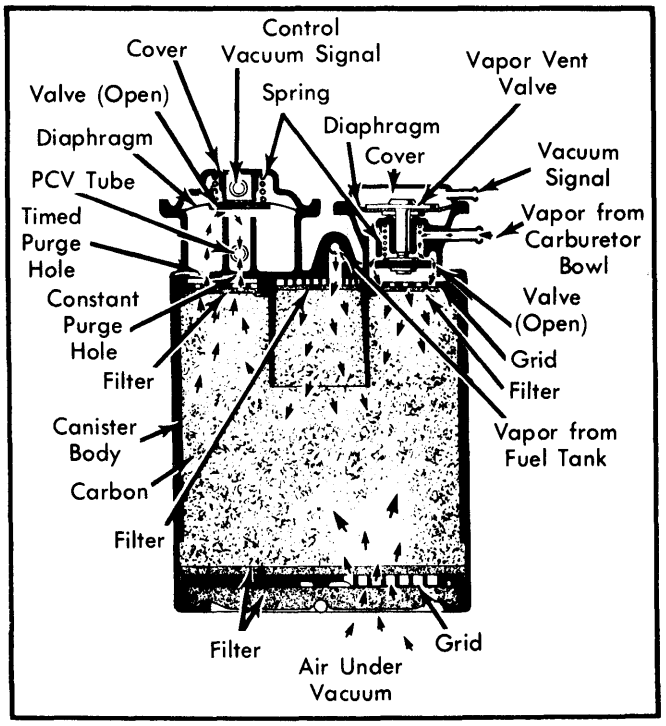

Fig. 4 Cutaway View of Carbon Canister with Purge Control Valve & Vapor Vent Valve

MAINTENANCE

Check all fuel and vapor lines and hose for proper connections and correct routing as well as condition. Remove canister and check for cracks or damage. Replace damaged or deteriorated parts as necessary. Replace filter in bottom of canister every 30,000 miles or 24 months (whichever occurs first).

NOTE – *Canister filter should be changed more frequently if vehicle is operated in extremely dusty conditions.*

CHECKING CANISTER PURGE VALVE

1) Remove purge valve control vacuum line. Check for a vacuum signal with engine operating above idle (1500 RPM). If no vacuum signal, perform EGR System Function Check. See *General Motor EGR System article in Exhaust Emission Systems section.*

2) Apply an external vacuum source to the purge valve control diaphragm. A good valve will hold vacuum. If valve will not hold vacuum, replace canister.

3) If valve holds vacuum, remove purge line and check for vacuum. If no vacuum, check PCV hoses and system. Repair or replace as necessary.

CHECKING CANISTER VAPOR VENT VALVE

1) Remove bowl vent vapor hose from carburetor. Check the open condition of the valve by connecting to a manual vacuum pump. It should not be possible to obtain .5 inch Hg if valve is open.

2) If a high resistance or plugged system is found, check for a plugged or restricted hose. Hose may be cleared with compressed air. If the hose is clear, remove canister filter. If the restriction persists, replace the canister.

3) The valve closed condition can be checked using the same procedure, but with engine operating at normal temperature. Manifold vacuum will be applied to valve through the control line. The bowl vent line should exhibit a plugged condition.

4) If the valve is not closed, remove control vacuum line and check for vacuum. If no vacuum is present, check hose for restriction or vacuum leak. Repair or replace as required. If vacuum is present, replace canister.