the valve opens and closes in response to the particular vacuum pressure created within the tank **10**. The valves **112** and **114** are designed to admit just enough air to the tank **10** from the apertures **100** at engine idle to prevent the engine from stalling.

Referring now to FIGS. **6** through **8**, the vapor equalizer chamber **16** of the present invention is seen to include front and rear walls **152** and **154**, respectively, a top wall **156**, a side wall **158**, and another side wall **160**. The vapor equalizer chamber **16** is secured to the manifold **18** as by a plurality of bolts **162** under which may be positioned a conventional gasket **164**.

In the top wall **156** of the vapor equalizer **16** is formed an opening **166** for communicating the outlet end of vapor conduit **14** with a mixing and equalizing chamber **168**. Adjacent the mixing and equalizing chamber **168** in wall **154** is formed another opening **170** which communicates with ambient air via opening **178** formed in the upper portion of housing **176**. The amount of air admitted through openings **178** and **170** is controlled by a conventional butterfly valve **172**. Butterfly valve **172** is rotated by a control rod **180** that, in turn, is coupled to a control arm **182**. Cable **26** is connected to the distal end of control arm **182** and acts against the return bias of spring **184**, the latter of which is journaled to side plate **152** of vapor equalizer **16** via an upstanding flange **188**. Reference numeral **186** indicates generally a butterfly valve operating linkage, as illustrated more clearly in FIG. **8**, and which is conventional as may be appreciated by a person of ordinary skill in the art.

Positioned below mixing and equalizing chamber **168** is a filter unit which is indicated generally by reference numeral **188**. The filter unit **188**, which is illustrated in an exploded view in FIG. **11**, comprises a top plastic fluted cover **190** and a bottom plastic fluted cover **192**. Positioned adjacent the top and bottom covers **190** and **192** are a pair of screen mesh elements **194** and **196**, respectively. Positioned between the screen mesh elements **194** and **196** is a support member **198** which is preferably formed of a sponge-like filter material, such as, for example, neoprene. The support member **199** has formed on the top and bottom surfaces thereof a pair of receptacles **200** and **202**, respectively, whose diameters are sized similarly to the opening **166** in top plate **156** and the openings formed in the intake manifold **18** which are respectively indicated by reference numerals **210** and **212** in FIG. **6**.

Positioned in receptacles **200** and **202** are carbon particles **204** and **206**, respectively, for vapor retardation and control purposes.

Referring now to FIG. **9**, the filter unit **38** mounted in vapor conduit **14** is illustrated in a longitudinal sectional view and is seen to comprise an outer flexible cylindrical hose **214** which is adapted to connect with hose **14** at both ends by a pair of adapter elements **216** and **218**. Contained within the outer flexible hose **214** is a cylindrical container **220**, preferably of plastic, that houses in the central portion thereof a mixture of carbon and neoprene filter fibers **222**. At both ends of the mixture **222** are deposited carbon particles **224** and **226**, while the entire filtering unit is held within the container **220** by end screens **228** and **230** which permit passage of vapors therethrough while holding the carbon particles **224** and **226** in place.

FIG. **10** illustrates one form of the thrust adjustment valve **40** which is placed within line **14**. The valve simply controls the amount of fluid passable through the conduit **14** via a rotating valve member **41**.

In operation, the thrust adjustment valve **40** is initially adjusted to achieve as smooth an idle as possible for the particular motor vehicle in which the system is installed. The emergency shut-off valve **42**, which is closed when the engine is off, generally traps enough vapor between it and the vapor equalizer **16** to start the engine **20**. Initially, the rear intake valves **12** on the tank **10** are fully closed, while the air intake valves **22** on the equalizer **16** are open to admit a charge of air to the vapor equalizer prior to the vapor from the tank, thus forcing the pre-existing vapor in the vapor equalizer into the manifold. The small apertures **100** formed in base plate **96** on tank **10** admit just enough air to actuate the reed valves to permit sufficient vapor and air to be drawn through vapor conduit **14** and equalizer **16** to the engine **20** to provide smooth idling. The front air valves **22** are always set ahead of the rear air valves **12** and the linkages **24** and **26** are coupled to throttle pedal **28** such that the degree of opening of front valves **22** always exceeds the degree of opening of the rear valves **12**.

Upon initial starting of the engine **20**, due to the closed condition of rear valves **12**, a high vacuum pressure is created within tank **10** which causes the filter assembly **134** positioned in tank **10** to rise to its operative position indicated by solid outline in FIG. **2**. In this manner, a relatively small amount of vapor will be drawn directly from filter **134** through vapor conduit **14** to the engine to permit the latter to run on an extremely lean mixture.

Upon initial acceleration, the front air intake valve **22** will open further, while the rear butterfly assembly **12** will begin to open. The latter action will reduce the vacuum pressure within tank **10** whereby the filter assembly **134** will be lowered to its alternate operating position illustrated in dotted outline in FIG. **2**. In this position, the lower end of the filter assembly **134** may actually rest in the liquid gasoline contained within the tank **10**. Accordingly, upon acceleration, the filter assembly **134** is moved out of direct fluid communication with the opening **82** such that the vapor conduit **14** then draws fuel vapor and air from the entire tank **10** to provide a richer combustion mixture to the engine, which is necessary during acceleration.

When the motor vehicle attains a steady speed, and the operator eases off the accelerator pedal **28**, the rear butterfly valve assembly **12** closes, but the front air intake **22** remains open to a certain degree. The closing of the rear air intake **12** increases the vacuum pressure within tank **10** to the point where the filter assembly **134** is drawn up to its initial operating position. As illustrated, in this position, the opening **82** is in substantial alignment with the aperture **151** of hose **150** to place the filter unit **134** in direct fluid communication with the vapor conduit **14**, thereby lessening the amount of vapor and air mixture fed to the engine. Any vapor fed through conduit **14** while the filter **134** is at this position is believed to be drawn directly off the filter unit itself.

I have been able to obtain extremely high gas mileages with the system of the present invention installed on a V-8 engine of a conventional 1971 American made automobile. In fact, mileage rates in excess of one hundred miles per gallon have been achieved with the present invention. The present invention eliminates the need for conventional fuel pumps, carburetors, and gas tanks, thereby more than offsetting whatever the components of the present invention might otherwise add to the cost of a car. The system may be constructed with readily