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EMERGENCY FUEL SUPPLY SYSTEM

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Fig. 1.

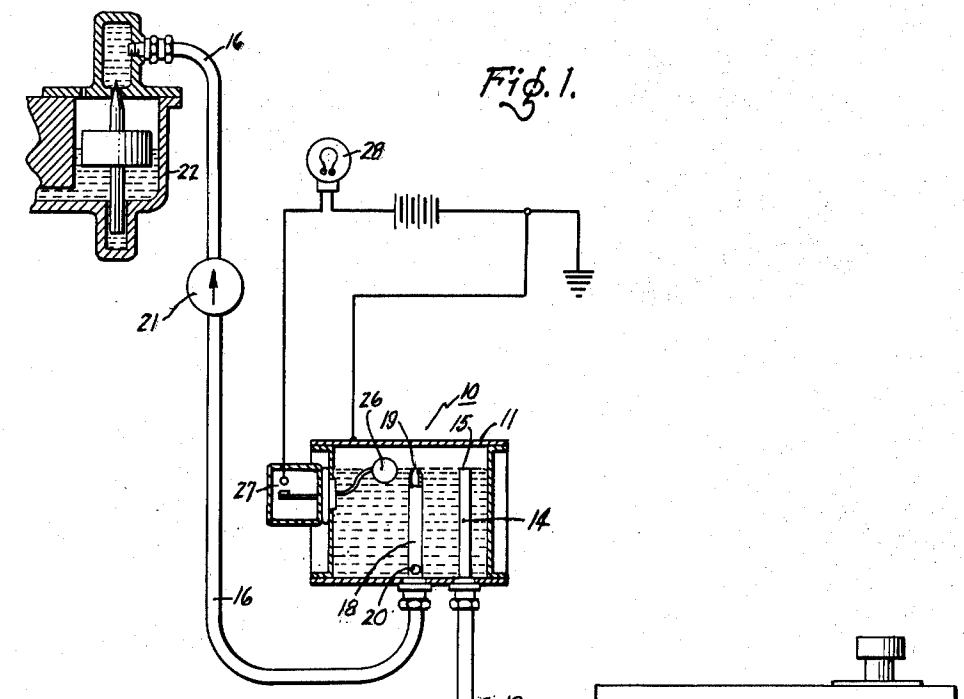
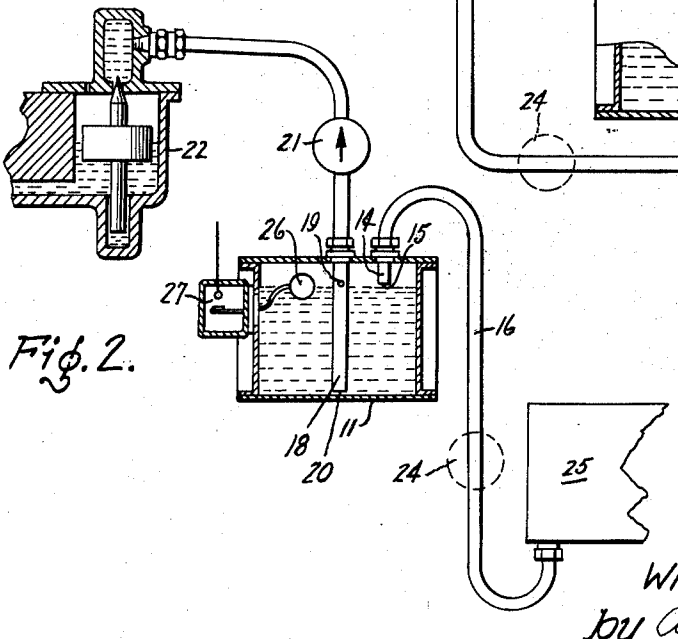


Fig. 2.



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EMERGENCY FUEL SUPPLY SYSTEM

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The present invention relates to liquid supply devices and more particularly, to emergency fuel supply devices for use in motor vehicles.

In the use of devices, such as motor vehicles, it is very common to experience unexpectantly the depletion of the fuel supply due to inadvertence. This occurs despite the provision of fuel gages on vehicles. In order to avoid the inconvenience of such an occurrence, some vehicles are supplied with emergency fuel sources which may be manually connected at the time the main fuel source is exhausted. The present invention envisions the provision of means for automatically continuing the supply of fuel from an emergency source while simultaneously alerting the vehicle operator of the depletion of the main fuel source.

The chief object of the invention is to provide an improved liquid supply system.

Another object of the invention is to provide an improved emergency fuel supply device.

A further object is to provide an improved automatically actuated emergency fuel supply device.

A still further object is to provide an improved automatically actuated emergency fuel supply device including indicating means for signalling the use of fuel from this source.

These and other objects of my invention may be more readily perceived from the following description.

Briefly stated, the present invention relates to an emergency fuel supplying device including a tank into which fuel may be supplied adjacent the upper portion thereof. Fuel may be discharged from the lower portion of the tank through a conduit which may also be in communication with the upper portion of the tank for the purpose of maintaining a predetermined level of fuel in the tank.

The attached drawing illustrates preferred embodiments of my invention, in which—

FIGURE 1 is a diagrammatic view, partially in section, of an apparatus for practicing my invention; and

FIGURE 2 is a diagrammatic view, partially in section, of another embodiment of the invention.

In FIGURE 1 there is shown an emergency fuel supply device indicated generally as **10**. This device may include an enclosed tank **11** having means for supplying fuel adjacent the upper portion of tank **11** from a main tank **25**. Such means for supplying fuel into tank **11** may take the form of a supply conduit **12** extending from tank **25** to the bottom wall of tank **11**, continuing as pipe **14** upwardly into the tank and terminating in opening **15** adjacent the upper portion of tank **11**..

A discharge pipe **18** may also extend through the bottom wall of tank **11** and terminate at opening **19** which is shown at the same level as opening **15**. Preferably, opening **19** is restricted for a purpose more fully described hereinafter. Discharge pipe **16** may have a second opening **20** located adjacent the bottom of tank **11**. During operation of the present device, fuel may be passed from tank **11** through both openings **19** and **20** in pipe **18**. Pipe **18** may be connected to discharge conduit **16** which passes fuel from tank **11** to the float chamber of carburetor **22** associated with a suitable engine. This fuel may be passed through conduits **12** and **16** by a suitable vacuum pump **21** located in a conventional manner in conduit **16**. If desired, a pressure fuel pump may be utilized in conduit **12** as shown by dotted line **24**.

In the preferred embodiment of the invention, main

fuel tank **25** may be located at a lower level than tank **11** and carburetor **22** may be mounted at a level above tank **11**. It will be appreciated that other component orientations are possible while practicing the present invention.

Suitable remote indicating means may be associated with tanks **11** and **25** to show that the emergency fuel supply in tank **11** is being utilized. Such means may include, in combination, a sender comprising a float **26** connected to switch **27** through a hermetic seal, float **26** being associated with tank **11** to sense and indicate the fuel level therein. Switch **27** may be connected in a transmission, which in this example is a circuit including an electrical energy source. At the other end of the transmission is connected a receiving indicating device **28** which may take the form of a light, buzzer, or the like.

In FIGURE 2 similar reference numerals have again been used to designate similar structure as shown in FIGURE 1. In this embodiment, tank **25** and carburetor **22** are similarly disposed as in FIGURE 1. However, tank **11** is supplied with fuel through conduit **12** which extends through the upper wall of tank **11**, pipe **14** passing downward therefrom and terminating at opening **15** adjacent the upper portion of the tank. Discharge conduit **16** may also pass through the upper wall of tank **11** and terminate in pipe **18** having openings **19** and **20** which constitute passage means for placing the conduit in communication with the upper and lower portions of tank **11**. In this embodiment, however, opening **19** should be extremely small for a purpose to be more fully described hereinafter.

In operation of the embodiment in FIGURE 1, assuming that both tanks **11** and **25** are empty, fuel is first added to tank **25**. When the engine is started, it operates vacuum fuel pump **21** and a vacuum may be formed in tank **11** causing fuel to flow from tank **25** through conduit **12** to ultimately be discharged adjacent the upper portion of tank **11**. The fuel first covers opening **20** of discharge pipe **18** and the level in tank **11** rises above opening **19** because of this vacuum condition. In this embodiment, fuel flows initially into opening **20** and the flow may be later supplemented through opening **19**. The fuel flows through conduit **16** and is supplied to carburetor **22**.

As the engine continues to operate, fuel from tank **11** is drawn through conduit **16** and the level in tank **11** is maintained by the vacuum condition therein continuing the flow of fuel from tank **25**.

If a pressure pump **24** is utilized rather than a vacuum pump, the pressure in tank **11** will be above atmospheric pressure causing fuel flow through tank **11** and conduit **16** to carburetor **22**.

In the event the fuel supply in tank **25** is exhausted, fuel flow continues from tank **11** through opening **20** to discharge conduit **16**. In this embodiment, opening **19** is a restricted opening in pipe **18** so that upon depletion of the main fuel supply, this opening limits the passage of air into pipe **18** so that mostly fuel flows through opening **20** and through discharge conduit **16**. This fuel is drawn by the vacuum pump **21** or if pump **24** is utilized by the elevated air pressure in tank **11**. The decrease in fuel level in tank **11** is immediately sensed by float **26** and the attendant indicator circuit, thereby giving notice to the operator of his remaining fuel supply.

In the operation of the embodiment in FIGURE 2, the device functions substantially similarly as previously described. However, when the main tank fuel supply is exhausted, since the fuel is being drawn by the vacuum pump up the discharge pipe **18** to discharge conduit **16**, the venting effects of opening **19** must be minimized. It will be appreciated that when tank **25** is empty, the upper portion of tank **11** is vented to the atmosphere.

Vacuum pump will draw fuel up pipe **18** because opening **20** is submerged in fuel and opening **19** is so small that it will not sufficiently vent the sub-atmospheric pressure conditions in pipe **18**.

In the event the pressure pump **24** is utilized in the embodiment in FIGURE 2, when the fuel in tank **25** is exhausted, the air pressure maintained by pump **24** in tank **11** propells the fuel to the carburetor and the small size of opening **19** assures the continued flow of fuel from tank **11** despite the fact that opening **19** is not covered with fuel. In actual practice, a motor which uses this opening has been found to work well with orifices in the region of 0.014–0.016 inch in diameter.

Fuel pumps produce a pressure of about 4 pounds. As most fuel gages are very inaccurate and have no definite calibration, and as the fuel is spread out over the bottom of a large conventional flat tank to a depth of one inch when the tank is level, this would amount to a considerable quantity of fuel; but when the car tips at a slight angle on a crowned road, or otherwise, the bottom of the tank may be dry at the point where the supply to the carburetor is located. By means of the present invention, this situation will no longer obtain, because the emergency fuel tank is small and the operator, as soon as the indicator informs him that this tank has become his sole source of supply, knows almost exactly how much fuel he has left.

The present invention has been described with particular reference to use in motor vehicles. It will be appreciated that the invention may also be employed with stationary engines and in other liquid supply systems.

While I have described preferred embodiments of my invention, it will be appreciated that the invention may be otherwise embodied within the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. An emergency fuel supply system comprising an emergency tank, means for supplying fuel into said emergency tank, adjacent the upper portion thereof, from a main supply tank, a discharge conduit extending from the lower portion of said emergency tank, a sender responsive to the level of fuel in said emergency tank, an indicating receiver adapted to be located at a position remote from said emergency tank, and a transmission connecting said sender and receiver.

2. The emergency fuel supply system of claim 1 wherein the sender, transmission, and receiver are of the electric type.

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