July 1, 1952 J. F. MORSE 2,601,894

LIQUID LOW-LEVEL WARNING DEVICE

Filed Dec. 17, 1947

FIG. 1

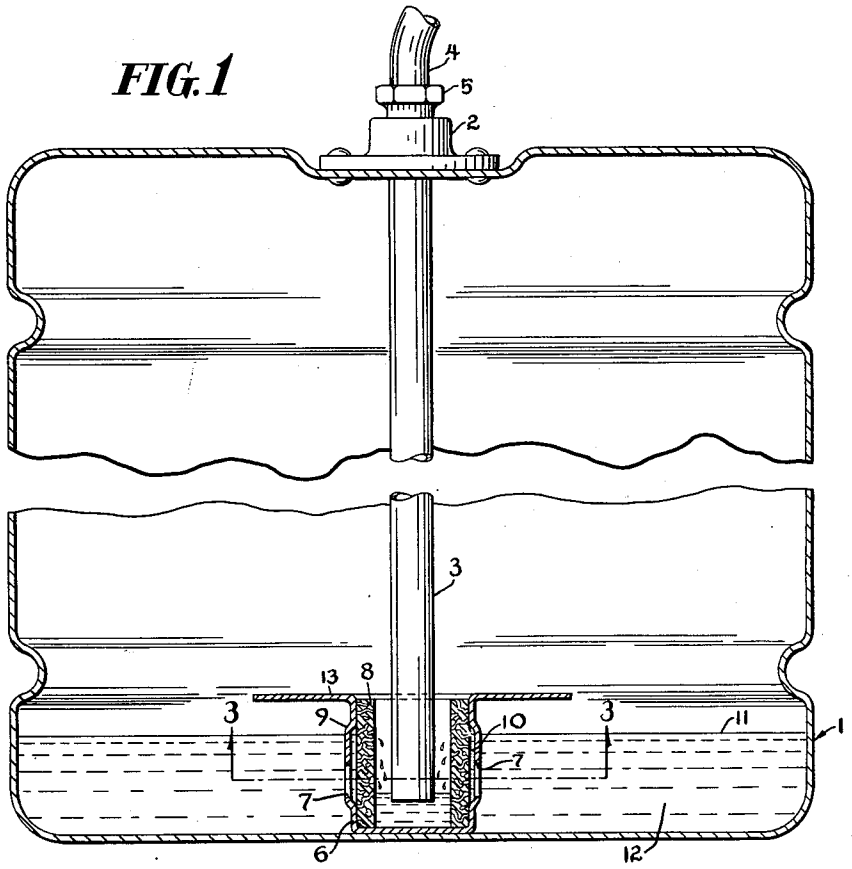


FIG. 2

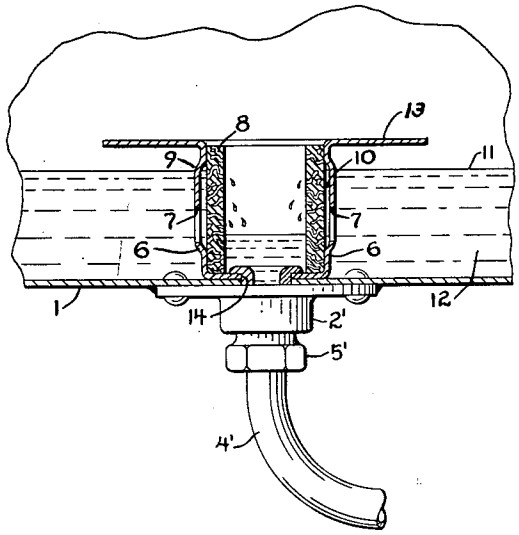
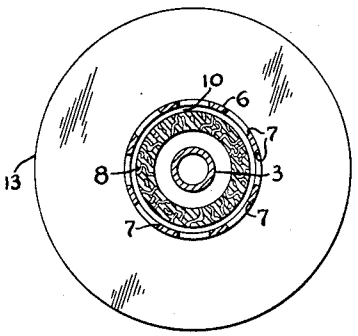


FIG. 3



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LIQUID LOW-LEVEL WARNING DEVICE

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4 Claims. (Cl. 158—46)

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The present invention relates to a device for automatically giving warning of approaching exhaustion of the liquid in a supply reservoir, and comprises, generally, a system whereby a signal is manifest through disturbance of feed flow in a manner to invite attention to the supply situation.

Heretofore, devices have been variously employed to compensate for the human element of neglect but in manners not entirely remedial of the situation. For instance, provision has been made for a reserve supply which can be made available when the main supply has been exhausted. Quite often, in such cases, the exhaustion may be repeated in the reserve supply due to the same human errors. In the present invention, the condition of supply is made manifest and continues so in a manner demanding attention, without, however, completely crippling the consumer end of the supply line.

It is, therefore, an object of the invention to provide a warning device for a liquid supply system which is automatic while being positive and effective, further objects being to provide such a device which is continuing in character and which does not entail complete interruption of supply.

More particularly, it is an object of the invention to provide a liquid supply device in which approaching exhaustion of the supply is manifested by a decreased rate of flow.

The invention is of particular utility in a fuel supply system, such as gasoline tanks for automobiles, trucks and other vehicles, as described in the embodiment chosen for purposes of illustration in the accompanying specification and shown in the drawing, in which:

Fig. 1 is a sectional elevational view of a gasoline tank employing suction withdrawal;

Fig. 2 is a similar view of a tank with gravity feed; and

Fig. 3 is a section taken on the line 3—3 of Fig. 1.

Referring to the drawing, there is shown in Fig. 1 a gasoline tank, such as used in automobiles, indicated generally by the numeral 1. A flange 2 riveted about an opening in the top of the tank body accommodates a withdrawal pipe 3, and the gas line is continued as at 4 through a coupling nipple 5. The pipe 3 extends nearly to the bottom of the tank 1 to utilize the gas content to the fullest.

A cylindrical housing 6 having peripherally spaced openings 7 is fixed, as by spot welding, to the bottom of the tank 1 in surrounding relation to the pipe 3, and the housing 6 is provided with

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a radially extending flange 13 for a purpose which will appear.

Snugly contained within the housing as by a press-fit is a cylindrical member 8 of porous material, such as oilite bronze or any of the types of powdered, pressed and sintered materials, or which may be of any material moderately pervious to the fluid being handled.

In order to increase the capacity of the organization in container 6, the side wall thereof is bent outwardly as at 9 to provide a chamber 10 affording access to a large area of the outside of the porous member 8. When the tank has an adequate supply of gasoline the well formed by the interior of the member 8 is filled from the body of the fluid, but as the fuel approaches the exhaustion point the level of the gasoline will fall below the flange 13.

As shown in Fig. 1 the level 11 of the gasoline 12 is below the top of the housing 6. At this stage of supply, communication of the fuel to the withdrawal pipe 3 can only be had through the openings 7 and thence through the porous member 8. As a result, taking the case of a gas tank in a motor vehicle, for instance, the reduced rate of flow of the fuel into the member 8 and thence to the outlet will become evident in a reduction in speed of the motor below that entailed in the throttle setting or in a series of misfires, or both, or in any of various phases of malfunctioning short of complete stoppage. Thus, the driver can proceed to a refueling point under conditions of modified operation, conditions which constitute a constant reminder of the fuel-supply situation.

The flange 13 is provided to maintain the amount of fluid which is operable during the warning period, the flange functioning as a baffle to minimize overflow into the center of the container 6 on surging of the fuel occasioned by tilting of the vehicle, acceleration and deceleration etc.

In the modification of Fig. 2 which is for a gravity feed tank, all parts are functionally identical with that of Fig. 1, the take-off pipe and appendages bearing primed characters, and a hole 14 being provided in the base of the housing 6 to accommodate the outlet fixtures, and this modification therefore needs no further explanation.

Instead of the surge-preventing flange 13, an alternative device may comprise a member surrounding the porous member 8, extending up into the tank 1 a distance to defeat the highest expected surges and affording communication near its bottom between the fuel supply and the porous member.

It will be understood that the various elements comprising the invention may be varied within wide limits without departing from the scope of the invention as defined in the appended claims. Thus, the exact shape, size and materials of the porous element and its container are susceptible of variation, and the porous member may be composed of any one of several types of material.

What is claimed is:

1. In a fuel tank for vehicles, an outlet pipe, said pipe having its opening located adjacent the bottom of the tank, a tubular member having appreciable wall thickness and composed of porous material, open at its upper end, surrounding the outlet pipe and extending above the bottom of the tank to a distance which determines the level at which the fuel may pass into the member and out of the outlet pipe at a normal rate, said porous member being of a character to allow a reduced flow of fuel from the tank to the outlet when the level of the fuel falls below the top of the member and an outwardly extending flange surrounding the top of the member to prevent fuel from surging over the top of the member.

2. In a fuel tank for vehicles, an outlet pipe, said pipe having a normal, fuel-reciveing opening located adjacent the bottom of the tank, a tubular member having appreciable wall thickness and composed of porous material, said tubular member being open at its upper end and substantially adjacent and surrounding said outlet pipe, and extending upwardly from substantially the bottom of the tank for a distance which determines the lowest level at which the fuel may pass into said tubular member through its open, upper end and thence out through said outlet pipe at a normal rate, said tubular member being of a character to allow a continued but reduced flow of fuel through the pores in its walls from the tank to said opening in said outlet pipe after the level of the fuel falls below the top of said tubular member, and until the level of fuel in the tank reaches the level of said opening in said outlet pipe.

3. In a fuel tank for vehicles, an outlet pipe, said pipe having a normal, fuel-receiving opennig located adjacent the bottom of the tank, a tubular member having appreciable wall thickness and composed of porous material, said tubular member being open at its upper end and substantially adjacent and surrounding said outlet pipe, and extending upwardly from substantially the bottom of the tank for a distance which determines the lowest level at which the fuel may

pass into said tubular member through its open, upper end and thence out through said outlet pipe at a normal rate, said tubular member being of a character to allow a continued but reduced flow of fuel through the pores in its walls from the tank to said opening in said outlet pipe after the level of the fuel falls below the top of said tubular member, and until the level of fuel in the tank reaches the level of said opening in said outlet pipe, a metallic housing surrounding and holding said tubular member, said housing attached to the bottom of said fuel tank and having an annular portion in spaced relation to said member, with openings of appreciable size to permit free access of fuel to the outer surface of said tubular member in said annular portion.

4. In a fuel tank for vehicles, an outlet pipe, said pipe having a normal, fuel-receiving opening located adjacent the bottom of the tank, a tubular member having appreciable wall thickness and composed of porous material, said tubular member being open at its upper end and substantially adjacent and surrounding said outlet pipe, and extending upwardly from substantially the bottom of the tank for a distance which determines the lowest level at which the fuel may pass into said tubular member through its open, upper end and thence out through said outlet pipe at a normal rate, said tubular member being of a character to allow a continued but reduced flow of fuel through the pores in its walls from the tank to said opening in said outlet pipe after the level of the fuel falls below the top of said tubular member, and until the level of fuel in the tank reaches the level of said opening in said outlet pipe, said tubular member comprising pressed, sintered, powdered material.

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