United States Patent

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[45] **Aug. 15, 1972**

[54] **FUEL RESERVOIR WITH FILLING SIGNAL**

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[21] Appl. No.: **109,761**

[52] **U.S. Cl.** .....**220/86 R**, 116/118 R, 141/95

[51] **Int. Cl.** **B65b 3/00**

[58] **Field of Search** .....220/86 R, 86 NR; 116/118; 141/95, 297, 300

[56] **References Cited**

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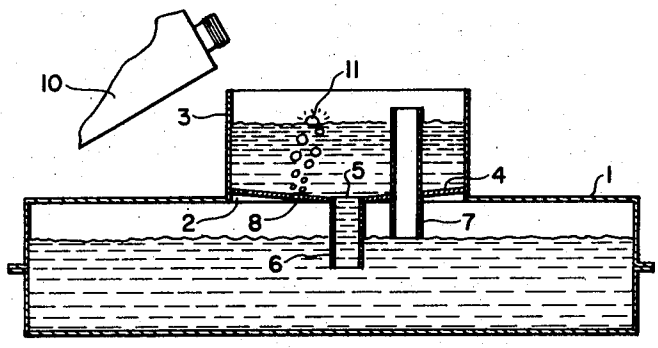
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Assistant Examiner—James R. Garrett
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[57] **ABSTRACT**

A fuel tank has a pouring bowl on top of it for receiving a liquid being discharged from a supply container. The bottom of the bowl has an outlet that opens into the tank, with a spout extending from the outlet down into the tank. A vent tube extends from inside the tank upwardly above it, and the bowl has a signal opening in its bottom communicating with the inside of the tank above the lower end of the tube, which is higher in the tank than the lower end of the spout. When the liquid level in the tank rises around the spout high enough during filling to close the lower end of the vent tube, air in the tank will start to escape through the signal opening and produce a string of bubbles in the liquid remaining in the bowl to signal that no more liquid should be poured into the bowl.

9 Claims, 9 Drawing Figures



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SHEET 1 OF 2

Fig. 1

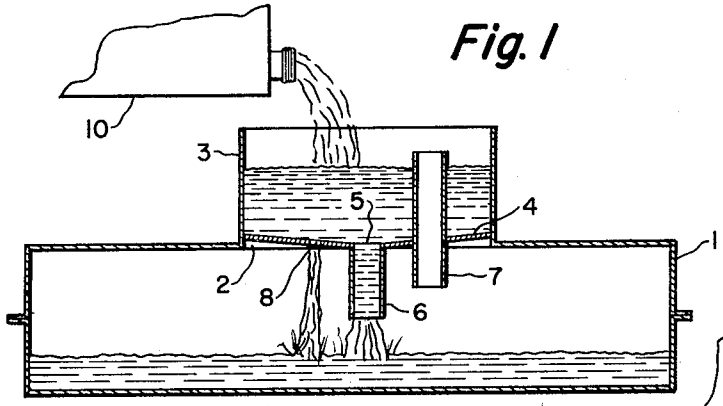


Fig. 2

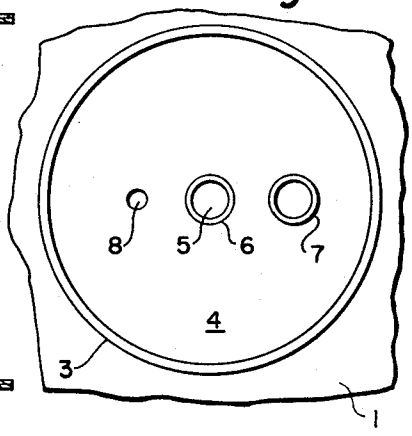


Fig. 3

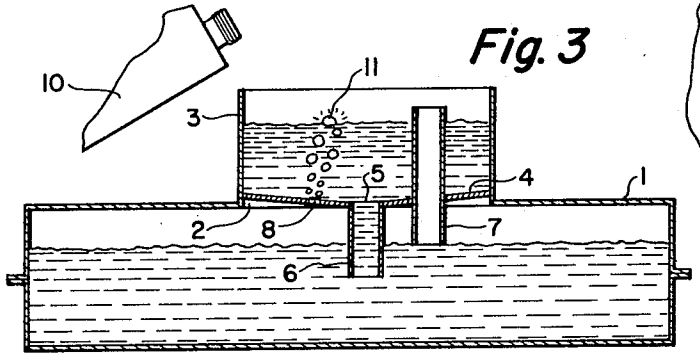


Fig. 4

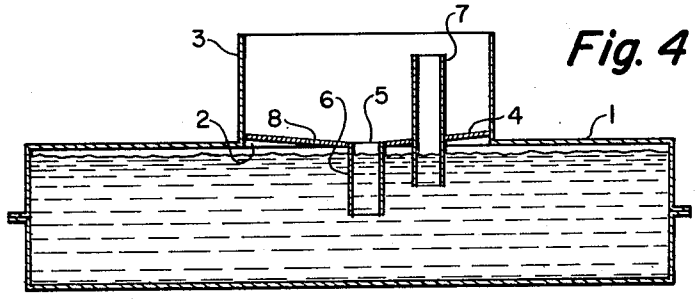


Fig. 5

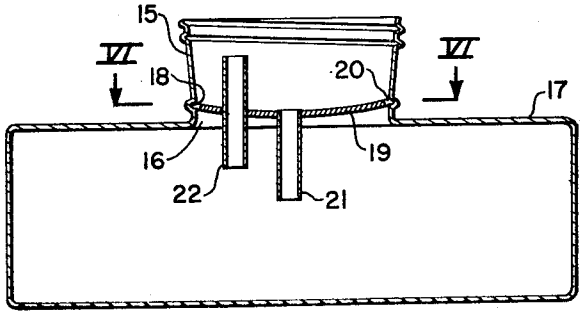
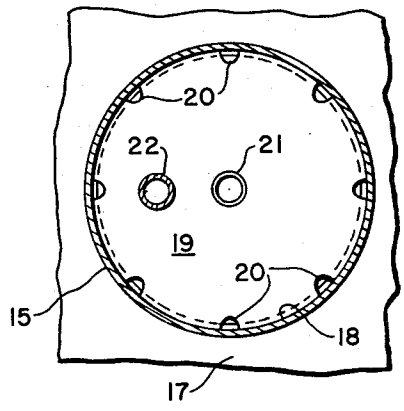


Fig. 6



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Fig. 8

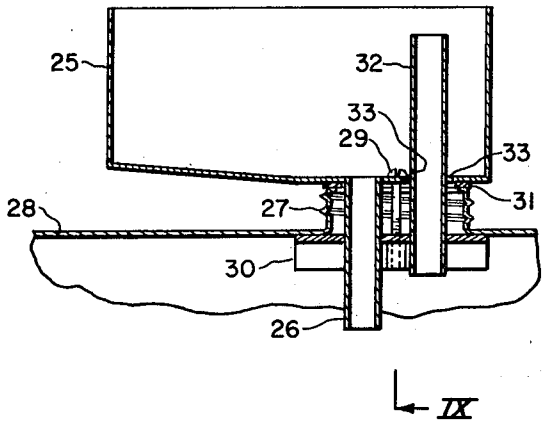


Fig. 9

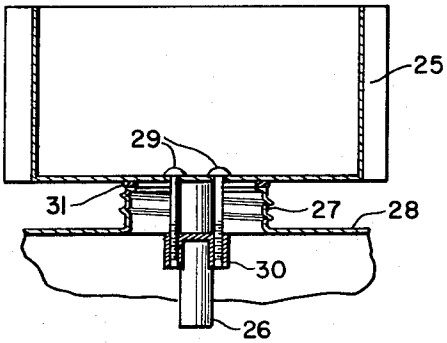
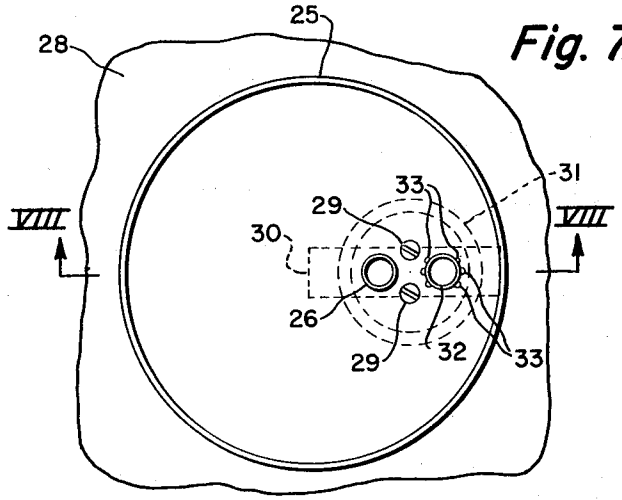


Fig. 7



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FUEL RESERVOIR WITH FILLING SIGNAL

Gasoline powered lawn mowers, garden tractors, domestic snow blowers and the like are provided with fuel tanks that have to be refilled with liquid fuel periodically. These tanks are provided with small filling openings, through which the fuel is poured. It often is difficult to tell when the pouring should be stopped, so the fuel frequently overflows such tanks.

It is among the objects of this invention to provide a fuel reservoir which is easy to fill and which signals when a person should stop pouring fuel into it so that it will not overflow.

The invention is illustrated in the accompanying drawings, in which

FIG. 1 is a vertical section of my fuel reservoir showing fuel pouring into it;

FIG. 2 is a fragmentary plan view;

FIG. 3 is a view similar to FIG. 1, but showing signal bubbles starting to rise;

FIG. 4 is a longitudinal section of the filled tank;

FIG. 5 is a longitudinal section of a modification;

FIG. 6 is a horizontal section taken on the line VI—VI of FIG. 5;

FIG. 7 is a fragmentary plan view of a further embodiment of the invention;

FIG. 8 is a fragmentary vertical section taken on the line VIII—VIII of FIG. 7; and

FIG. 9 is a fragmentary vertical section taken on the line IX—IX of FIG. 8.

Referring to FIGS. 1 to 4 of the drawings, a fuel tank 1 of any desired shape is provided in its top with a relatively large opening 2. This opening is encircled by an upwardly extending side wall 3 that forms the side of a pouring bowl. The bowl has a bottom wall 4, preferably concave, at the center of which there is an outlet opening 5 that empties into the tank. A spout 6 extends downwardly from this opening. Beside the spout there is a vent tube 7 that extends up through the bottom of the bowl to a point near the top of the bowl. The tube is rigidly secured in the bottom of the bowl. The lower end of the tube is above the level of the lower end of the spout. The bottom of the pouring bowl also is provided with a small opening 8 or openings at one side of the spout. This opening is called a signal opening herein.

To fill the tank with fuel, such as gasoline or a mixture of oil and gasoline, the fuel is poured from a can 10 or the like into the bowl. Due to the relatively large diameter of the bowl, this is an easy operation. The liquid in the bowl flows out of it through spout 6 and into the tank. It also flows down through the small signal opening 8 as shown in FIG. 1. The liquid level in the bowl should be kept below the upper end of the vent tube, but if the pouring from the can is too fast the tube will act as a second spout that will tend to prevent overflowing of the bowl. When the level of the liquid rising in the tank reaches the lower end of the vent tube 7 as shown in FIG. 3, it shuts off further escape of air through that tube. This traps the air in the upper part of the tank until the pressure increases to the point where it is great enough to stop flow of fuel from the signal opening 8 and to force air up through that opening and into the liquid in the bowl. This produces a distinct and very visible string 11 of air bubbles rising through the bowl liquid. This string of small bubbles will not cause the liquid in the bowl to surge and splash.

As soon as the operator sees this string of bubbles, he knows that he must stop pouring fuel into the bowl. This is because the reservoir is constructed in such a manner that the fuel remaining in the bowl and nearly filling it is sufficient in itself to nearly fill the tank without any further fuel from the can. Thus, the capacity of the bowl is designed to be slightly less than the volume of the space in the tank above the level of the lower end of the vent tube. Another way of expressing it is that the lower end of the vent tube is located at a level in the tank that will leave the capacity of the tank above that level slightly greater than the capacity of the bowl. Consequently, when the lower end of the vent tube is closed by the rising liquid level in the tank, so that a string of bubbles starts to rise in the bowl and pouring into it is stopped, the liquid filling the bowl will drain into the tank through the spout and substantially complete the filling of the tank without overflowing it, as shown in FIG. 4. After the tank has been filled, the bowl can be closed by a suitable cap.

If desired, the vent tube can be mounted in the top wall of the tank outside of the bowl, in which case the upper end of the tube should be provided with its own removable cap.

Another way of carrying out this invention, illustrated in FIGS. 5 and 6, is to provide the lower end of the neck 15, extending upwardly around the filling opening 16 of a tank 17, with an internal circular groove 18. A disc 19 is mounted in this groove to form the bottom of a bowl that has the neck as its side wall. The periphery of such a disc is provided with a plurality of circumferentially spaced notches 20 that permit the marginal areas between them to be sprung upwardly sufficiently to allow the disc to be pushed down into the neck until those marginal areas can snap out into the groove to support the disc. This disc is provided with a central opening, from which a spout 21 extends downwardly into the tank. The disc also has a vent tube 22 extending through it. The notches in the edge of the disc serve as signal openings for air trapped in the tank after the level of the liquid rising therein during filling closes the lower end of the vent tube. The fine streams of air bubbling up from these notches signals the operator to stop pouring fuel into the bowl or tank neck.

The filling opening neck is quite small and therefore may be inconvenient to use. A large bowl can be attached to the relatively small neck of a conventional tank by providing a separate bowl 25 of the desired diameter as shown in FIGS. 7 to 9. The bottom of this bowl is provided in a suitable location, such as at one side of center, with a spout 26 extending downwardly through the neck 27 around the filling opening of a fuel tank 28. The bowl is removably mounted on the neck by a pair of screws 29 that extend down through the neck and are screwed into the central portion of a cross bar 30 that extends across the bottom of the neck and engages the inner surface of the top of the tank. By tightening these screws, the bowl is clamped down against the top of the neck, on which there should be a gasket 31.

Rigidly mounted in the cross bar is the lower end of a vent tube 32 that extends up into the bowl. Preferably, the bar is an inverted channel. The tube is slidably disposed in the bottom of the bowl. The bowl bottom is

provided with one or more signal openings above the tank neck. These can conveniently be formed by notches **33** in the wall of the bowl opening containing the vent tube.

In order to assemble the bowl and its associated parts with the fuel tank, the cross bar **30** is pulled off the spout, which simultaneously pulls the vent tube out of the bowl. The tube and cross bar then are tilted so that the spout-receiving end of the bar can be inserted in the neck and moved downwardly until the entire bar is inside the tank. The vent tube then is swung up to upright position and the bowl is lowered over it as the spout is inserted in the cross bar. By grasping the upper end of the vent tube inside the bowl, the bowl can be moved down until it seats on the tank neck. Then the two screws are screwed down into the bar to clamp the neck between it and the bowl. This procedure is just reversed if it is desired to remove the bowl from the tank.

One advantage of this form of the invention is that the bowl can easily be applied to existing fuel tanks.

With this invention the spilling of fuel, such as gasoline, can be avoided. Spilled gasoline will evaporate and pollute the atmosphere. Also, there is the danger of spilled fuel being ignited, such as by coming in contact with the hot exhaust duct of the motor, and burning the motor.

According to the provisions of the patent statutes, I have explained the principle of my invention and have illustrated and described what I now consider to represent its best embodiment. However, I desire to have it understood that, within the scope of the appended claims, the invention may be practiced otherwise than as specifically illustrated and described.

I claim:

1. A fuel reservoir comprising a tank, a pouring bowl on top of the tank for receiving a liquid, the bottom of the bowl having an outlet therein opening into the tank, a spout extending from said outlet down into the tank, and a vent tube extending from inside the tank upward above it, the lower end of the tube being higher in the tank than the lower end of said spout, the bowl having a signal opening in its bottom communicating with the inside of the tank above the lower end of said tube, whereby when the liquid level in the tank rises up around the spout high enough to close the lower end of the vent tube during filling of the tank, air in the tank will start to escape through said signal opening and produce a string of signal bubbles in the liquid remaining in said bowl.

2. A fuel reservoir according to claim **1**, in which said vent tube extends through the bottom of said bowl.

3. A fuel reservoir according to claim **1**, in which the capacity of said bowl is less than the volume of the space in the tank above the level of the lower end of the vent tube, whereby the tank can accommodate the liquid remaining in the bowl after air bubbles start to rise in the bowl.

4. A fuel reservoir according to claim **1**, in which the side wall of said bowl is formed by an upstanding neck around a filling opening in the top of the tank, the bottom of the bowl is formed by a disc mounted in the lower end of said neck, and said vent tube extends through said disc.

5. A fuel reservoir according to claim **4**, in which the edge of said disc is provided with a plurality of circumferentially spaced notches and engages the encircling neck for support, said notches serving as signal openings.

6. A fuel reservoir according to claim **5**, in which said neck is provided inside with an annular groove, and the edge of said disc fits in said groove.

7. A fuel reservoir according to claim **1**, in which the top of the tank is provided with a filling opening encircled by an upstanding neck that encircles said spout and vent tube, and the vent tube is slidably mounted in the bottom of the bowl, said reservoir including a cross bar inside the tank secured to the lower end of the vent tube and engaging the inner surface of the tank at opposite sides of said filling opening, and a screw extending down through the bottom of the bowl and screwed into the cross bar to clamp said neck between the bar and bowl.

8. A fuel reservoir according to claim **7**, in which said spout is slidably mounted in said cross bar, whereby the bowl and spout can be separated from the vent tube and cross bar when said screw is removed.

9. A fuel reservoir according to claim **7**, in which said spout is slidably mounted in said cross bar, whereby the bowl and spout can be separated from the vent tube and cross bar when said screw is removed, and said cross bar is short enough to be removed from the tank by first moving the bar lengthwise to free one end of it from the tank and then tilting the vent tube to swing said free end of the bar up into said filling opening to permit the bar to be withdrawn through said neck.

9. A fuel reservoir according to claim **7**, in which said spout is slidably mounted in said cross bar, whereby the bowl and spout can be separated from the vent tube and cross bar when said screw is removed, and said cross bar is short enough to be removed from the tank by first moving the bar lengthwise to free one end of it from the tank and then tilting the vent tube to swing said free end of the bar up into said filling opening to permit the bar to be withdrawn through said neck.

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