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GASOLINE TRAP

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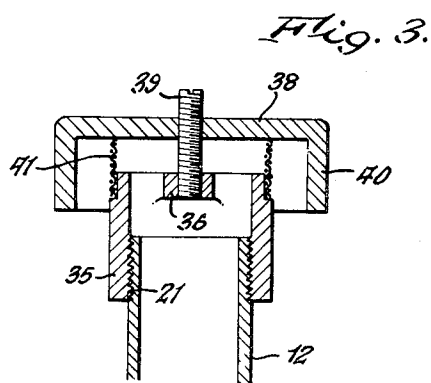
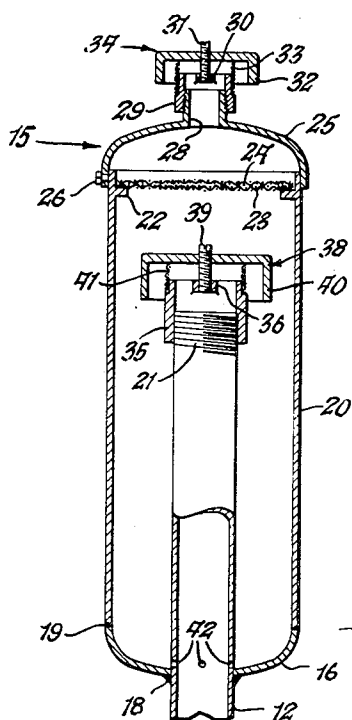
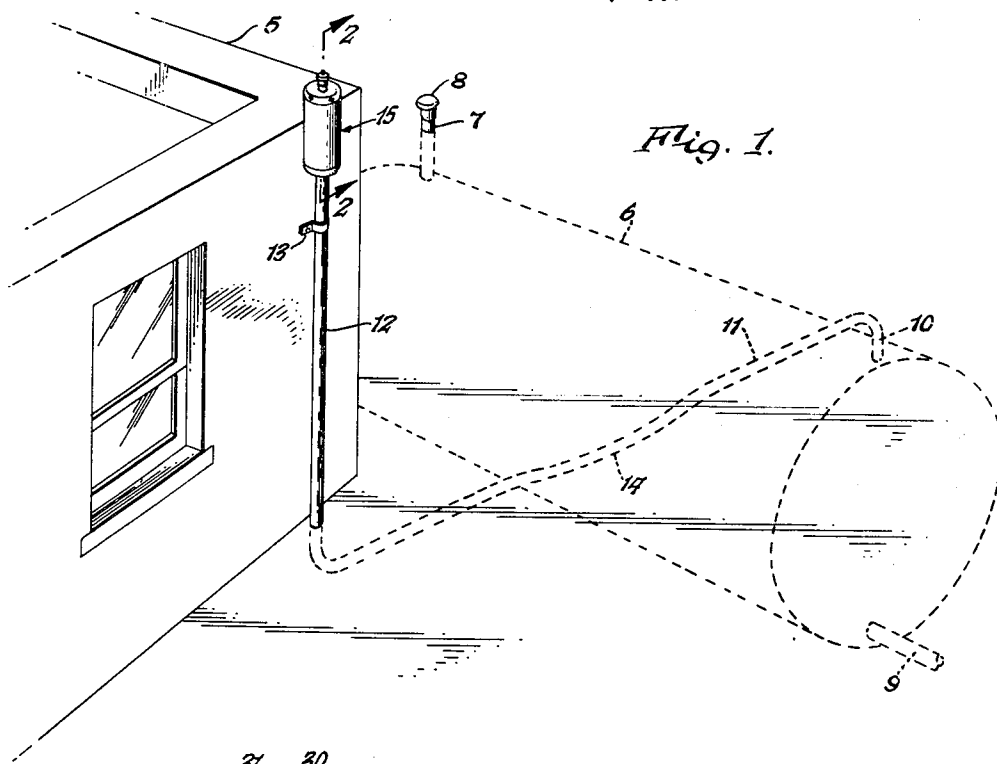


Fig. 2.

Fig. 3.

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GASOLINE TRAP

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5 Claims. (Cl. 220—18)

This invention relates to a gasoline trap and more particularly to such a trap arranged in the vent line from an underground gasoline storage tank to prevent the discharge of any liquid gasoline from the vent pipe and hence to avoid the resulting fire hazard.

At gasoline filling stations, the gasoline is stored in large underground tanks. These storage tanks are provided with filling pipes through which the tanks are usually positively filled by providing a pipe fitting and forcing the gasoline under pressure through the filling pipe into the tank. These tanks are also provided with vent lines which terminate in vertical pipes usually attached to the sidewall of the station house and terminating at a considerable elevation above the ground. Usually each vent pipe includes a horizontal run which may be of considerable length and which also is liable to develop a sag somewhere along its length. If the tank is completely filled, especially if both it and the filling line are filled to ground level, gasoline will, of course, enter the horizontal run of the vent pipe buried in the ground. Under such circumstances a body of gasoline will become trapped in the sag in the horizontal run of the vent line since it cannot return to the gasoline tank. The next time the tank is filled under pressure this trapped gasoline will be driven as a body of liquid gasoline up the vertical part of the vent pipe since the gasoline is being introduced into the underground tank under pressure and the vapor displaced from the tank can only escape through the vent line. As a consequence, this body of liquid gasoline will be discharged into the atmosphere from the upper end of the vent pipe. This, of course, creates a fire hazard since any nearby flame can start a fire which will rapidly spread to all parts sprayed by the discharge of the liquid gasoline.

It is the principal object of the present invention to provide a simple, low cost trap for such body of gasoline driven up the vent pipe of an underground gasoline storage tank and which will return this charge of gasoline to the vent pipe following the filling of the tank.

Another object of the invention is to minimize the development of fumes from such trapping and return of the liquid gasoline, thereby to further minimize the fire hazard at the vent of an underground storage tank for gasoline.

Other objects and advantages of the invention will be apparent from the following description and drawings in which:

Fig. 1 is a perspective view of a corner of the building of a gasoline station having an underground gasoline storage tank and also having the gasoline trap embodying the present invention connected to the vent line of this underground storage tank.

Fig. 2 is a fragmentary enlarged vertical section taken generally on line 2—2, Fig. 1.

Fig. 3 is an enlarged vertical section through one of the two vent caps used in conjunction with the trap.

In the sale of gasoline to motorists the gasoline station

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usually has a station house or a building, indicated at 5, and the gasoline is stored in large underground storage tanks indicated generally at 6. Each of these underground storage tanks is provided with a filling line 7 extending upwardly from the top of the tank to above ground level and having a cap 8. In filling the tank, this cap 8 is removed and the gasoline is usually introduced under pressure by providing a tight fitting (not shown) which is attached to the upper end of the filling pipe 7 and through which the gasoline is forced under positive pressure into the tank 6. The object of so positively charging the tank 6 is, of course, to reduce the time necessary to fill the tank.

The gasoline is removed from the tank 6 through one or more lines 9 near the bottom thereof and leading to the usual pumps (not shown). It is also essential that the tank 6 have a vent line. Such a vent line leads, of course, from the upper part of the tank 6 through a suitable fitting 10 and then has a horizontal run 11 which extends to the wall of the station house 5. The vent line then has a vertical part 12 which is usually attached to the wall of the station house 15, as by the fasteners 13, and usually terminates near the roof of the station house.

While usually, of course, the horizontal stretch 11 of the vent line is given a pitch to drain back into the gasoline tank 6, there is necessarily some settling of the ground following the installation of the underground tank 6 and the underground horizontal run of the vent pipe. Usually, also, the horizontal stretch 11 of the vent pipe passes under the driveway used by automobiles and trucks both in filling the gasoline tank and also in obtaining gasoline from the gasoline pumps. As a result of the settling of the ground, particularly as concentrated under a particular area subjected to particularly heavy traffic, it not infrequently happens that a sag 14 develops in the horizontal run of the vent line.

With the rapid filling of underground gasoline tanks under pressure, it not infrequently happens that the tank 6 is completely filled and that also the vent line 7 is filled up to ground level. When this occurs, of course, the horizontal run 11 of the vent line is also filled its entire length including the sag 14. While the greater part of the gasoline so introduced into the horizontal line 11 of the vent line will, of course, run back into the tank 6, that small body caught in the sag 14 will stay in the sag because it dips below the portion of the horizontal run of the vent line between it and the tank 6.

With such a body of gasoline caught in the sag 14, the next time gasoline is introduced under positive pressure through the filling line 7 this body is driven along the horizontal run of the vent line 11 and up the vertical part 12 thereof and is discharged into the atmosphere as a liquid body. This not only sprays against the adjacent part of the gasoline station house 5 but also other objects which may be near and obviously creates a fire hazard since if there is any flame in the vicinity the extremely volatile gasoline will be ignited.

To avoid such a fire hazard and also to avoid the loss of the body of gasoline by tripping it and returning it to the horizontal run 11 of the vent line, applicant has provided a trap embodying the present invention. This trap, indicated generally at 15, is preferably attached to the upper end of the vertical part 12 of the vent line and for this purpose is shown as having a lower dished end head 16 through which the vertical part 12 of the vent line extends and is welded as indicated at 18, Fig. 2. To the rim of the dished end head 16 is secured, as by welding, indicated at 19, a tubular or cylindrical metal shell 20 which extends vertically to a point above the upper end of the vent pipe 12 which is shown as threaded, as indicated at 21. Near its upper end the

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vertical shell 20 is shown as having an inwardly extending internal annular flange 22 which supports a coarse circular disk 23 of woven wire, this in turn supporting a finer mesh disk 24 of woven wire. The shell 20 is provided with an upwardly dished removable upper end head 25 the rim of which fits around the periphery of the tubular or cylindrical shell 20 and can be secured thereto by set screws 26 or in any other suitable manner.

The upper end head 25 is shown as provided with a central upwardly extending tubular vent 28 which is externally threaded. On this externally threaded vent 28 is shown as screwed a sleeve 29 having a diametral cross bar 30. A cap 34 is shown as secured to this diametral cross bar 30 by means of a screw 31, this cap having a downwardly extending flange or skirt 32 which extends below the level of the sleeve 28 and is spaced a substantial distance therefrom. One or more cylinders 33 of woven wire fabric are shown as fitted around the upper part of the sleeve 29 and as extending up to the underside of the cap 34 particularly to insure against the entrance of foreign matter, bugs etc. into the trap.

As previously indicated the vertical part 12 of the vent pipe extends a substantial distance up into the tubular shell 20 and to its upper threaded end is screwed a sleeve 35 having a diametral cross part or bar 36. A cap 38 is secured to this cross bar 36 by means of a screw 39 and this cap has a downwardly extending flange or skirt 40 which extends below the level of the sleeve 35 and is also spaced outwardly therefrom. In order to break up the liquid gasoline discharged from the upper end of the vertical part 12 of the vent pipe, a cylinder 41 of woven wire surrounds the upper part of the sleeve 35 and extends up to the underside of the cap 38.

An important feature of the invention resides in the provision of drain holes 42 in the vertical part 12 of the vent pipe immediately above the lower end head 16 for the trap so that any gasoline trapped within the cylindrical shell 20 and lower end head 16 will drain back into the vent pipe 12 and hence to the horizontal stretch 11 thereof.

In operation it will be assumed that a charge or body of gasoline is contained in the sag 14 of the horizontal run 11 of the vent pipe due to a previous filling of the tank 6 under pressure and which filling introduced gasoline into the horizontal run 11 of the vent pipe.

Upon the next filling of the tank 6, the cap 8 of its filling line 7 is removed and the discharge nozzle (not shown) of the truck bringing the gasoline to the station is attached to the upper end of the charging or filling pipe 7. The gasoline is then pumped under pressure into the filling pipe 7, this pressurized gasoline entering the tank 6 and displacing the body of vapor therein. This vapor must escape through the vent line 11, 12 and since a body of gasoline is contained in the sag 14 in this horizontal run 11 in the vent line, this body of gasoline is driven under pressure up the vertical part 12 of the vent line. This body of gasoline strikes the underside of the cap 38 and is driven laterally through the cylindrical screen or woven mesh 41 and is deflected downwardly by the skirt or flange 40 of the cap 38 to the bottom of the shell 20.

Accordingly this solid body of gasoline is not discharged into the atmosphere so as to create a fire hazard. Instead this body of gasoline is caught in the shell 20 where it drains back through the drain holes 42 into the vent pipe. After the tank has been filled, this drain back of gasoline reenters the sag 14 and displaces any gasoline therein back into the tank 6. The only loss of gasoline from the tank can be through evaporation, and there is no danger at any time of the body of gasoline being discharged in liquid form to the atmosphere.

While the gasoline tank 6 is so being filled and also as a normal part of the venting thereof, the vapors escape through the two layers of screen 23, 24 and thence escape

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through the cylindrical screen 33 under the cap 32 at the extreme upper end of the trap.

From the foregoing it will be seen that the present invention provides a very simple and effective trap for gasoline which positively prevents a body of liquid gasoline being discharged from the vent pipe of an underground tank and which insures the return of such liquid gasoline to its source. It will therefore be seen that the present invention avoids a distinct fire hazard heretofore existent with underground storage tanks having horizontal runs in their vent lines.

I claim:

1. In an underground storage tank for gasoline or the like having a vent pipe open to the atmosphere including a subsurface horizontal run buried at such shallow depth as to be susceptible to having a dip formed therein by vehicles travelling on the ground thereover and also having an upright end part projecting above ground and open at its upper end, the combination therewith of means for trapping any liquid gasoline discharged from said open end of said vent pipe, comprising a lower end head secured to said upper end of said vent pipe and through which said upper end of said vent pipe extends, a tubular shell secured to and rising from the rim of said lower end head, means within said tubular shell and arranged over the open upper end of said vent pipe and deflecting laterally any liquid discharged therefrom, said vent pipe being provided above said lower end head with a drain hole for returning such discharged liquid into said vent pipe, said tubular shell being provided with a removable upper end head forming a cap above and enclosing the space above said deflecting means and means venting the chamber formed by said tubular shell and its end heads.

2. Apparatus as set forth in claim 1 wherein a generally horizontal screen extends across the interior of said shell above said upper end of said vent pipe.

3. In an underground storage tank for gasoline or the like having a vent pipe open to the atmosphere including a subsurface horizontal run buried at such shallow depth as to be susceptible to having a dip formed therein by vehicles travelling on the ground thereover and also having an upright end part projecting above ground and open at its upper end, the combination therewith of means for trapping any liquid gasoline discharged from said open end of said vent pipe, comprising a lower end head secured to said upper end of said vent pipe and through which said upper end of said vent pipe extends, a tubular shell secured to and rising from the rim of said lower end head, means within said tubular shell and arranged over the open upper end of said vent pipe and deflecting laterally any liquid discharged therefrom, said vent pipe being provided above said lower end head with a drain hole for returning such discharged liquid into said vent pipe, said tubular shell being provided with a removable upper end head and said upper end head being provided at its center with an upright vent pipe and a cap arranged above said vent pipe in spaced relation thereto, said vent pipe venting the chamber formed by said tubular shell and its end heads.

4. In an underground storage tank for gasoline or the like having a vent pipe open to the atmosphere including a subsurface horizontal run buried at such shallow depth as to be susceptible to having a dip formed therein by vehicles travelling on the ground thereover and also having an upright end part projecting above ground and open at its upper end, the combination therewith of means for trapping any liquid gasoline discharged from said open end of said vent pipe, comprising a lower end head secured to said upper end of said vent pipe and through which said upper end of said vent pipe extends, a tubular shell secured to and rising from the rim of said lower end head, and means within said tubular shell and arranged over the open upper end of said vent pipe and

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deflecting laterally any liquid discharged therefrom, said vent pipe being provided above said lower end head with a drain hole for returning such discharged liquid into said vent pipe, said deflecting means comprising a cap mounted over said open upper end of said vent pipe and having a marginal skirt to deflect any liquid so discharged downwardly as well as laterally.

5. Apparatus as set forth in claim 4 wherein a tubular screen is operatively interposed between said upper end of said vent pipe and said cap.

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205,716
223,403
995,314
1,306,421
1,545,352
1,966,998
2,458,909
2,893,423

6

References Cited in the file of this patent

UNITED STATES PATENTS

Allonas	July 9, 1878
Stewart	Jan. 6, 1880
Abs	June 13, 1911
Feltz	June 10, 1919
Rodriguez	July 7, 1925
Steele	July 17, 1934
John	Jan. 11, 1949
Seney	July 7, 1959