

Nov. 7, 1950

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SAFETY TANK CLOSURE
Filed July 31, 1948

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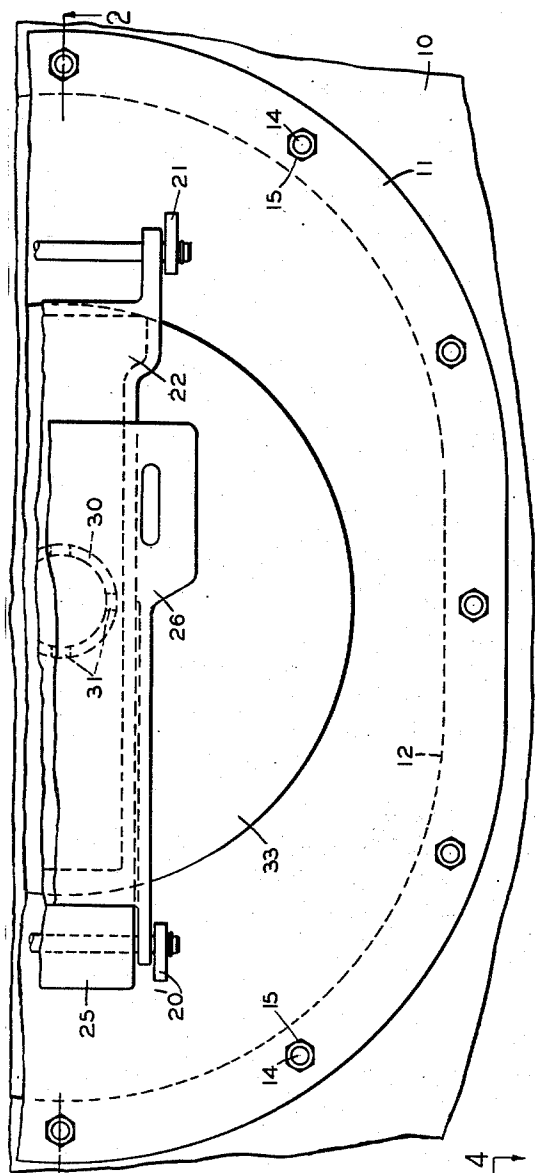


FIG-1

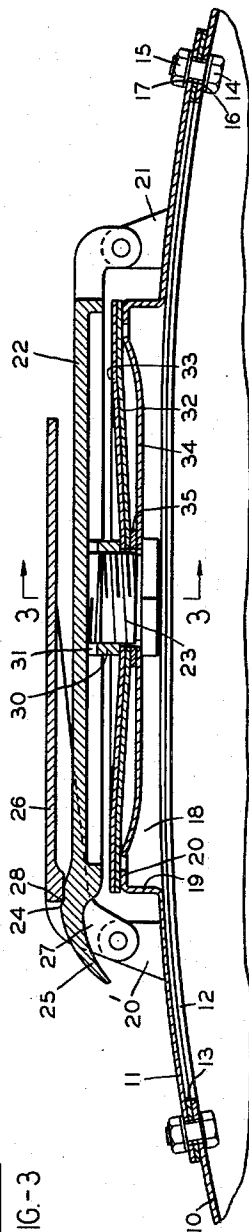


FIG-2

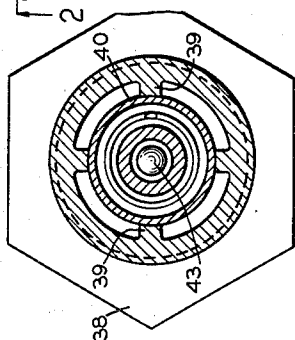


FIG-3

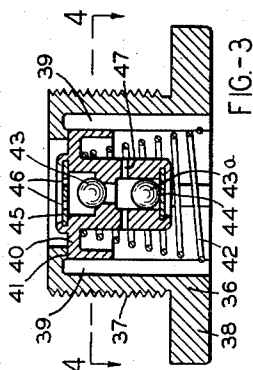


FIG-4

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2,529,329

SAFETY TANK CLOSURE

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Application July 31, 1948, Serial No. 41,790

3 Claims. (Cl. 220-44)

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This invention relates to safety tank closures, and more particularly to a combined vent valve, fill, and manhole cover for mobile gasoline tanks, such as are used upon delivery trucks.

One object of the invention is to provide a combined closure of the character described, in which all parts are carried by a plate or disc attachable directly to the metal shell of the tank itself, without the interposition of a sleeve or ring between the two, enabling all necessary securing parts, such as the nuts or attaching bolts, to be mounted exteriorly of the gasoline-containing chamber, thereby avoiding any possibility of accident as the result of tool manipulation within the tank chamber at a time when explosive gases might be contained therein.

A further object of the invention is to provide a combined closure of the character described, including all necessary vent or relief means for the flow of air or gas either inwardly or outwardly through the closure, and at both low and high pressures, so as to take care of eventualities resulting from variations in pressure either internally or externally of the tank, as well as danger arising when the tank tips over, or from similar causes.

Another object of the invention is to provide a combined closure of the character described, including a small vent valve unit, capable of convenient replacement and repair, attached to a filling opening closure, the latter of which provides for maximum emergency vent relief in cases where the pressure within the tank suddenly rises to an abnormal degree as in case of fire.

Finally, another object of the invention is to provide a combined closure of the character described, which is simple, effective and durable in operation, which can be made and applied at low cost, which is capable of manipulation without special tools or appliances, and which safeguards the tank and its contents from most of the usual hazards encountered in vehicles of this kind.

Further objects of the invention in part are obvious and in part will appear more in detail hereinafter.

In the drawings, which represent one suitable embodiment of the invention,

Fig. 1 is a plan view, illustrating one-half of the cover, of which the omitted half is a duplicate;

Fig. 2 is a sectional elevation on the line 2-2, Fig. 1, the vent valve being shown in elevation;

Fig. 3 is a detailed section, on a larger scale, on the line 3-3, Fig. 2; and

Fig. 4 is a detailed sectional plan view on the line 4-4, Fig. 3.

The tank to which the closure forming the subject matter of the present invention is applied, indicated at 10, may be of any suitable form or description and is usually made of heavy sheet metal, of the order of one-eighth

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of an inch in thickness, the tank as a whole being elongated and of circular or oval cross-section.

The closure of the present invention includes a base disc or plate 11, of circular or oval form, a little larger than an opening 12 in the tank wall which it covers. Thus, the peripheral portion of the plate 11 overlaps the edge of the opening 12, the overlapping portions of the cover and tank being sealed by a ring-form cork or other suitable gasket 13. Base plate 11 is secured to the tank wall by a series of bolts 14, spaced peripherally around the opening and supplied with adjustable clamping nuts 15 and sealing gasket 16, preferably copper covered asbestos gaskets, and with lock washers 17. Thus, at each bolt the cover and body are firmly and tightly clamped and sealed together, preventing any possible leakage.

At any time, by taking off the nuts 15, the plate 11 and all parts supported by it may be taken off from the tank, the large opening 12 serving as a manhole for access to its interior. By opening the filling opening later described, access may be had to the heads of bolts 14 to prevent them from falling into the tank cavity, but removal of the closure involves no tool manipulation within the tank chamber, such as might cause a spark and ignite inflammable gases and cause an explosion.

The central portion of base plate 11 is provided with a large filling and vent opening 18, around which the plate is turned up to form a generally cylindrical short neck or wall 19 flanged inwardly at 20. Flange 20 is formed in a uniform flat plane even though the plate 11 must be curved to correspond to the contour of the wall 10 of the tank itself.

Adjacent to and outside of the wall 19, the cover plate is provided with two pairs of upstanding ears, 20' at the left in Fig. 2 and 21 at the right. Ears 21 pivotally support a cross bar member 22, to the undersurface of which is secured a vent valve unit, marked generally 23 and later described in detail. The far end of bar member 22 is provided with a shoulder 24 and beyond it with a curved tongue or extension 25.

Cooperating with bar 22 is a locking or latch lever 26 pivotally connected to the ears 20' and having a recess or opening 27 through which the tongue 25 of bar 22 extends, when the parts are in closed position, and also having a transversely extending shoulder or abutment 28, adapted, in closed position of the parts, to engage the shoulder 24 and thus releasably lock or latch the bar 22 in cover-closed position.

The undersurface of bar 22 is provided with a hollow central boss 30 having several lateral openings 31. This boss is internally threaded to receive the threaded portion of the vent valve unit 23. The head of the vent valve unit clamps in place a disc valve or gasket member 32 backed by a steel disc diaphragm 33, below which is lo-

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cated a gasket retaining disc 34, spaced from gasket 32 by a spacing washer 35.

The vent valve unit is shown in detail in Figs. 3 and 4. It comprises a body portion 36 threaded at 37 for securement to the boss 30 and provided with a noncircular or hex head 38. Body 36 is hollow and is provided internally with several, four being shown, of internal longitudinal ribs 39 which form guides along which slides a poppet valve member 40 biased upwardly in Fig. 3, against an annular seat 41 by a light compression spring 42.

The central portion of the poppet valve is of tubular form, the chamber therein being provided with an upper ball valve member 43 seating downwardly, and with a lower ball valve member 43a normally inactive and supported by an imperforate closure disc 44. The upper end of the chamber is provided with a disc 45 provided through ports or openings 46. 47 indicates a series of several small lateral relief ports or openings in the lower portion of the central body of the poppet valve member.

Figs. 2 and 3, together, illustrate the normal positions of all parts when the cover is fully closed, such as when the vehicle is traveling along the road. Movement of latch lever 26 to the latching position shown has depressed the bar 22 so as to apply the sealing disc from gasket 32 to the flange 20 with yielding pressure, although the bar 22 has not been depressed sufficiently to contact with the backing plate or disc 33. Spring 42 holds the poppet valve elevated and in closed position. Ball valve 43 is at rest closing the channel beneath it, while ball valve 43a is also at rest upon imperforate disc 44.

Should the pressure within the tank rise a small amount, say one pound or so, for any reason, relief of the pressure to atmosphere is afforded by way of the vent valve, through ports 47, and then upwardly around ball 43, which it unseats, thence through ports 46 and 31 and out to atmosphere around the bar 26. However, should the pressure within the tank rise abnormally, say about six, seven or more pounds, then the backing disc 33 yields and allows gasket 32 to rise away from the flange 20 and open a wide vent around the disc-like gasket directly to atmosphere.

Should the pressure within the tank fail, spring 42 yields and permits the poppet valve as a whole to move downwardly in Fig. 3, air then flowing inwardly through ports 31 and downwardly around the outside of the poppet valve in the spaces between the ribs 39 and thence to the interior chamber.

Should the truck turn over, so that the vent valve is upside down, or partially so, so that ball 43 is below ball 43a, then ball 43a moves to a seat at the opposite end of its chamber, closing off the ports 47 and preventing loss of liquid through the vent valve. However, if with the parts in this position venting inwardly is necessary, the valve spring 42 again yields, permitting the poppet valve to move inwardly and open a passage as before. Likewise, if the pressure in the overturned tank rises abnormally, such as because of fire, the large disc 33 yields and opens the larger vent to the outside, as before.

The construction described not only provides for all necessary safeguarding vents, both inwardly and outwardly, but also provides a tank closure that requires no attachment of a ring or flange to the tank itself, and entirely dispenses with tool work on the inside of the tank when re-

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moving or re-applying the closure thereto, thus avoiding accident.

Other advantages of the invention will be apparent to those skilled in the art.

What I claim is:

1. A combined vent valve and filling and man-hole cover for mobile gasoline tanks, comprising a sheet metal base adapted for attachment of its peripheral portion to the metal around an opening in the tank wall, said plate being provided with an opening of relatively large diameter, an arm pivoted on said plate at one side of the opening therein and extending across said opening and provided at the center thereof with a recessed internally threaded boss, a cover for the tank wall opening seated upon said boss, and a generally cylindrical externally threaded vent valve unit extending through a central opening in said cover and threaded into the recess of said boss and having a shouldered head which secures the cover to the boss.

2. A combined vent valve and filling and man-hole cover for mobile gasoline tanks, comprising a sheet metal base adapted for attachment of its peripheral portion to the metal around an opening in the tank wall, said plate being provided with an opening of relatively large diameter, an arm pivoted on said plate at one side of the opening therein and extending across said opening and provided at the center thereof with a recessed internally threaded boss, a cover for the tank wall opening seated upon said boss, a generally cylindrical externally threaded vent valve unit extending through a central opening in said cover and threaded into the recess of said boss and having a shouldered head which secures the cover to the boss, said vent valve unit including a tubular body portion, and a yielding valve member seating outwardly and mounted within the bore thereof.

3. A combined vent valve and filling and man-hole cover for mobile gasoline tanks, comprising a sheet metal base adapted for attachment of its peripheral portion to the metal around an opening in the tank wall, said plate being provided with an opening of relatively large diameter, an arm pivoted on said plate at one side of the opening therein and extending across said opening and provided at the center thereof with a recessed internally threaded boss, a cover for the tank wall opening seated upon said boss, a generally cylindrical externally threaded vent valve unit extending through a central opening in said cover and threaded into the recess of said boss and having a shouldered head which secures the cover to the boss, said vent valve unit including a tubular body portion, a yielding valve member seating outwardly and mounted within the bore thereof, and having a through passage, and two yieldable check valves, one seating outwardly and the other inwardly, carried by said valve member and mounted in the through channel thereof.

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