Feb. 18, 1930. J. J. CASEY 1,747,424

FILLING DEVICE FOR TANKS

Filed Oct. 23, 1928

Fig. 1.

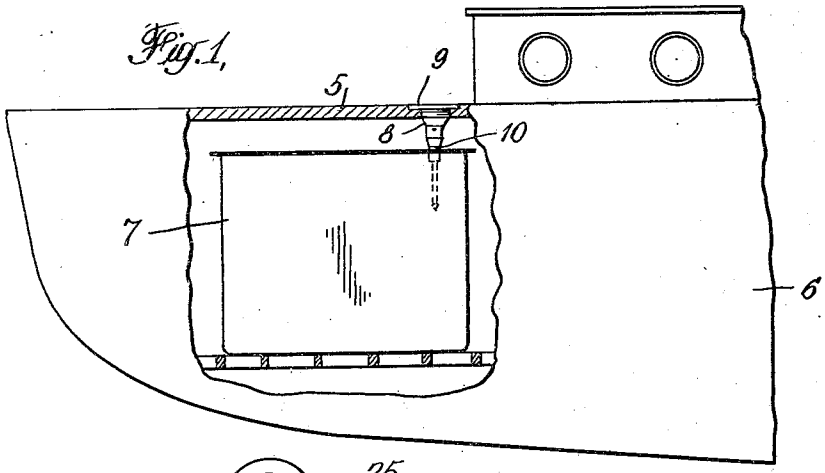


Fig. 2.

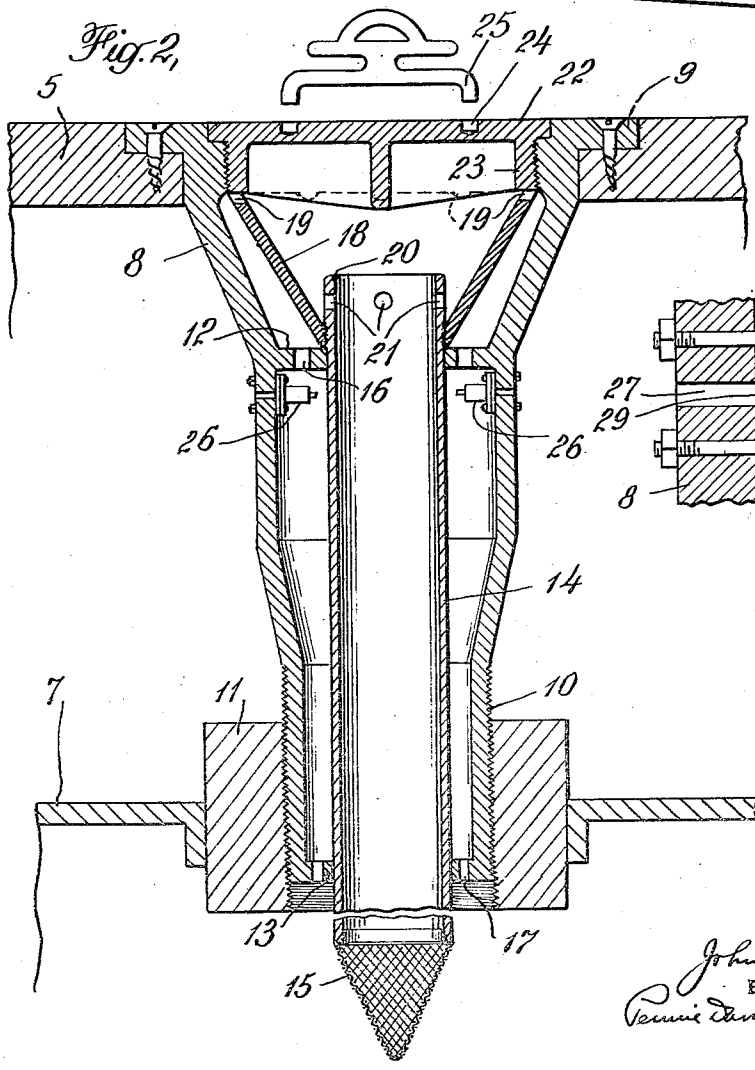
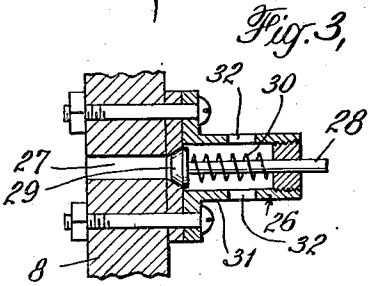


Fig. 3.



INVENTOR
John J. Casey
BY
Dennis Davis Mearn & Edmonds
ATTORNEYS

Patented Feb. 18, 1930 1,747,424

UNITED STATES PATENT OFFICE

JOHN J. CASEY, OF ROCKPORT, MASSACHUSETTS

FILLING DEVICE FOR TANKS

Application filed October 23, 1928. Serial No. 314,395.

This invention relates to filling devices for tanks adapted to contain inflammable liquids such as gasoline and fuel oil, and particularly to a safe and effective arrangement for boats and other marine vessels.

In boats and vessels which are propelled by internal combustion engines, the fuel tank is disposed usually below the deck. The tank is provided with a threaded plug or similar closure, and an opening in the deck with a removable cap affords access to the tank for filling. The top of the tank may be several inches or even several feet below the deck, and a space, normally unventilated, is thus provided in which fumes and inflammable vapors may accumulate. In filling the tank, such vapors are expelled and mixed with the air in this space, thus affording highly explosive mixtures. Moreover, any overflow of the fuel runs over the top of the tank, is sometimes partially vaporized in the space between the tank and the deck, and finds its way into the bilge, where it remains a constant menace to safety. The numerous explosions of motor boats and larger vessels carrying fuel tanks, to which frequent reference is found in the press, are caused by the ignition of the inflammable vapor mixtures and liquid fuel which accumulates in the manner described beneath the deck and in the bilge.

It is the object of the present invention to provide a filling device which prevents the escape of vapors or surplus fuel except to the atmosphere above the deck. The danger heretofore inherent in the structure and arrangement of motor propelled vessels is thus obviated and the safety of the occupants from disastrous explosions is assured.

The device may be embodied in various forms, but consists essentially of a tube extending from the tank to the deck, so that vapors expelled from the tank can be discharged only above the deck. To facilitate the introduction of the fuel, an inner tube is provided which may extend into the tank. The inner tube is of such diameter as to afford a vent space between it and the outer tube, so that the vapors may rise readily and will not interfere with the introduction of the fuel. The inner tube may be provided with a funnel at its upper end to facilitate pouring the fuel, and it may have a screen at its lower end to prevent access of extraneous material to the tank. To avoid the creation of a vacuum in the tank as the fuel is consumed, check valves are provided in the cap which normally closes the opening at the deck or preferably in the wall of the outer tube. The check valves may be controlled resiliently to permit air to enter when the pressure within the tank is reduced. They are normally closed to prevent the escape of vapor to the space above the tank and below the deck.

While the device is designed especially for marine installation, it may be utilized in connection with fuel tanks to avoid the escape of vapor into the space surrounding the tank in any structure where the introduction of such vapor to the space would become a source of danger as in the case of marine vessels. The shape and dimensions of the inner and outer tubes and the general design thereof may vary considerably depending on the particular structure to which the device is applied. The preferred form of the device is illustrated by way of example in the accompanying drawing, in which:

Fig. 1 is a sectional view of a portion of a marine vessel, illustrating the application of the invention;

Fig. 2 is an enlarged sectional view of the device, and

Fig. 3 is an enlarged detail in section of one of the check valves.

Referring to the drawing, 5 indicates the deck of a motor boat 6, having a tank 7 installed in the forward compartment thereof, the tank being rigidly supported in any suitable manner. An opening is provided in the deck 5 to receive the outer tube 8 of the device which is provided with a flange 9 at its upper end, the flange being adapted to be bolted or otherwise fastened to the deck. The outer tube 8 is threaded at its lower end 10 and is adapted to engage a collar 11, suitably secured in the top of the tank 7. The upper end of the tube 8 is preferably somewhat enlarged, as indicated in the drawing, to facilitate the introduction of the fuel.

Flanges 12 and 13 are provided on the inner

wall of the outer tube 8 to afford guides for the inner tube 14, which extends through the outer tube into the tank 7 and is provided at its lower end with a screen 15. The flanges 12 and 13 are provided with slots 16 and 17 to permit the escape of vapor from the tank. The vapor passes upwardly about the inner tube and escapes to the atmosphere through the filling opening. The inner tube may be provided with a funnel 18 threadedly or otherwise secured thereto at its upper end to facilitate the introduction of the fuel. The upper edge of the funnel may be spaced slightly from the wall of the outer tube 8, and is preferably provided with notches 19 to permit the escape of vapor. The diameter of the funnel is such as to permit introduction of the inner tube and funnel through the opening in the deck. Preferably the inner tube 14 extends slightly above the lower edge of the funnel, as indicated at 20, and openings 21 are provided to permit the fuel to drain from the funnel into the tube.

The opening at the upper end of the outer tube 8 is normally closed by a cap 22 having a threaded flange 23 co-operating with similar threads on the outer tube 8. The cap 22 may be provided with holes 24 to receive a spanner 25, so that the cap can be removed readily when the tank is to be filled.

One or more check valves 26 may be provided and are disposed preferably in the wall of the outer tube 8 co-operating with openings 27 in the wall. The check valves comprise plungers 28 with heads 29 to engage the openings 27. The plungers are actuated by springs 30 disposed in housings 31 which are secured by screws or otherwise to the inner face of the outer tube 8. The housing is provided with openings 32. Whenever the pressure within the tank is reduced below atmospheric pressure, the heads 29 of the check valves are moved inwardly against the pressure of the springs 30, thus permitting ingress of air to equalize the pressure. The valves are normally closed and prevent the escape of vapor from the tank to the surrounding space.

The device as described is simple and inexpensive. It can be installed readily and affords complete protection against the escape of vapor and fuel otherwise than to the atmosphere above the filling opening. The vapor escapes readily without interfering with the introduction of the fuel, and any surplus fuel merely overflows on the deck and is washed overboard. Consequently, neither inflammable vapor nor fuel can accumulate in the space surrounding the tank or in the bilge, and danger of explosion from this source is avoided.

Various changes may be made in the details of construction and arrangement of the parts without departing from the invention or sacrificing any of the advantages thereof.

I claim:

A filling device for fuel tanks located below the filling level comprising an outer tube communicating with the tank and with the atmosphere externally of the enclosure and adapted to prevent the escape of vapor and fuel to the space within the enclosure, an inner filling tube disposed below the filling level and within the outer tube and spaced from the wall thereof to provide a vapor passage, a single closure for both tubes, and means below the filling level to permit ingress of air to the tank when the pressure therein is below atmospheric pressure.

In testimony whereof I affix my signature.

JOHN J. CASEY.