

Oct. 1, 1929.

J. S. PATTEN

1,730,237

BREATHER COVER FOR FUEL TANKS

Filed Oct. 3, 1925

Fig. 1.

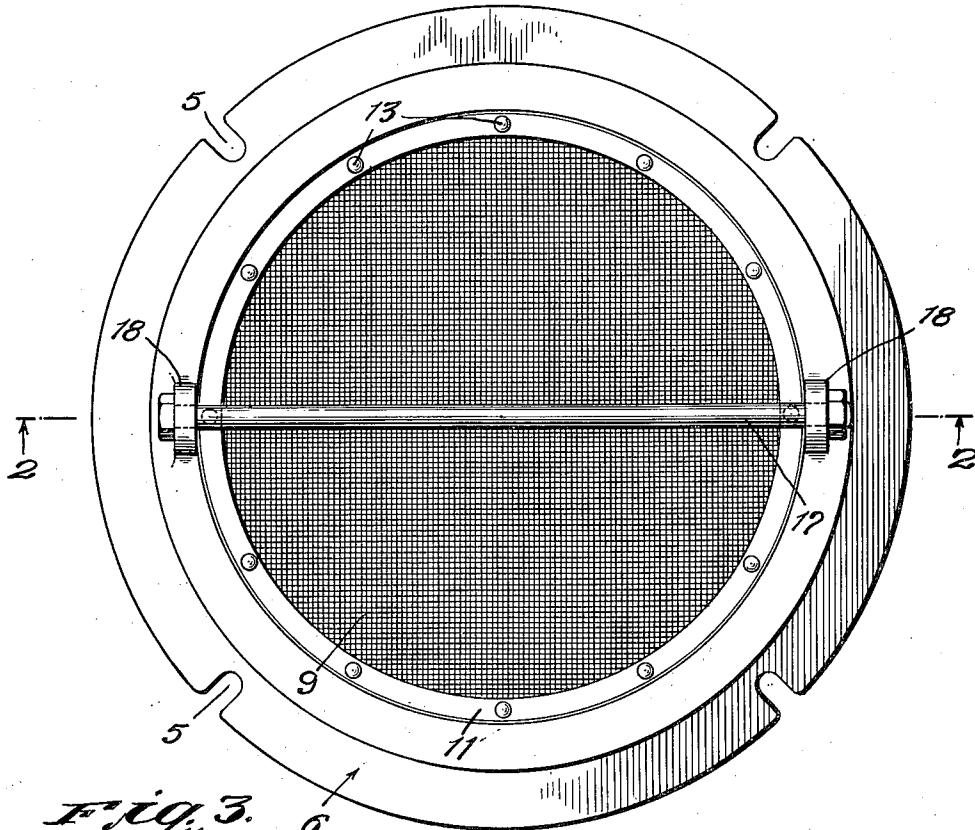


Fig. 3.

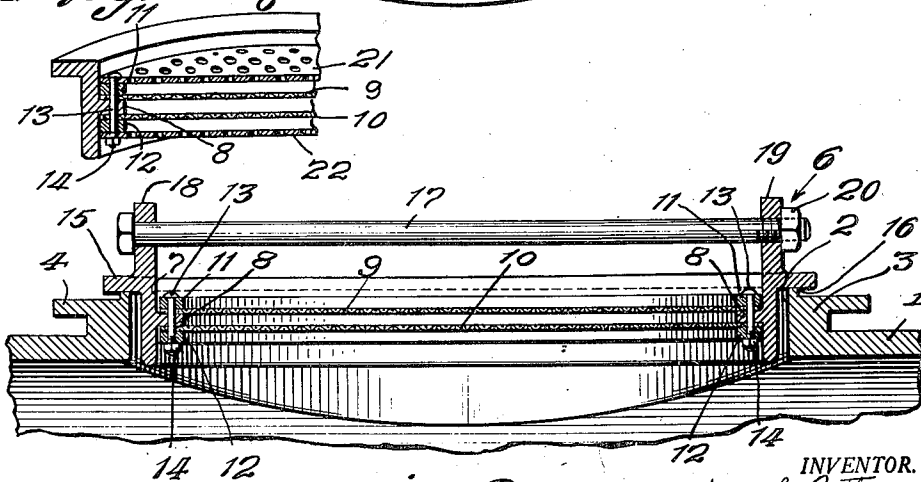


Fig. 2.

INVENTOR.
John S. Patten
BY Clarence M. Crews
ATTORNEY

UNITED STATES PATENT OFFICE

JOHN S. PATTEN, OF MADISON, NEW JERSEY, ASSIGNOR TO JOHN S. PATTEN ENGINEERING COMPANY, INCORPORATED, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK

BREATHING COVER FOR FUEL TANKS

Application filed October 3, 1925. Serial No. 60,148.

This invention relates to fire prevention means for liquid fuel carrying or storage tanks. The invention is disclosed herein as applied to an oil tank of a ship but may also be employed for analogous purposes in other relations.

When oil is being pumped from a ship's tank it is necessary to open the tank to the atmosphere to avoid the creation of a vacuum within the tank which would retard the pumping, impose an unnecessary burden on the pumps and in some cases cause the tank to collapse. At such times it is customary to remove the solid hatch cover from the hatch opening of the tank for the purpose of admitting air. This, however, leaves the contents of the tank exposed to danger of ignition by flying sparks, dropped matches, etc. which may enter the tank directly or may fall near the hatch opening and set the contents of the tank on fire by first igniting combustible gases escaping from the tank through the hatch opening. There is apt to be a combustible, or even an explosive, mixture of gases within the tank due to the air taken in at the hatch opening. Disastrous fires and explosions have been started because of this necessary exposure of the combustible contents of such tanks.

It is an object of the present invention to provide a temporary hatch cover substitutable for the usual solid cover when the latter is removed or swung to open position which will admit air to the tank but will exclude sparks, matches, etc., and which will not permit the propagation of a flame from the outside to the inside of the tank.

Other objects and advantages will hereinafter appear:

In the drawings:

Figure 1 is a plan view of the hatch opening of an oil tank having the cover of the present invention applied thereto;

Figure 2 is a vertical section on the line 2—2 of Figure 1 looking in the direction of the arrows; and

Figure 3 is a fragmentary, perspective section of another embodiment of the invention.

The oil tank 1 has a hatch opening 2 in its top, which is surrounded by an upstanding

neck 3 having an annular flange 4 projecting outwardly from it at a short distance above the main body of the tank. This flange has notches 5 at intervals around its periphery to cooperate with bolts or other suitable securing means for retaining a solid hatch cover (not shown) securely in place over the opening 2 to completely cover and close the same.

A temporary hatch cover 6 is provided to be substituted for the solid cover when the latter is removed either to permit oil to be pumped from the tank or for other purposes. This cover comprises a cylindrical body portion 7 preferably of metal which forms a screen frame. An annular flange 8 of substantial thickness projects inward from the body portion 7 and forms a means of attachment for plies 9 and 10 of fine mesh non-corrodible screen wire such as No. 40 wire which is stretched taut and then secured in place by rings 11 and 12 clamped fast by bolts 13 passed through said rings and through the flange 8 and having nuts 14 threaded upon them.

The flange 8 is of sufficient thickness to space the screen plies 9 and 10 a substantial distance from one another so that a screened chamber of substantial thickness is enclosed by said plies. This chamber has an important function in preventing the transmission of flame through the cover. It is a well known fact that a single ply of wire will retard the passage of a flame downward through it temporarily, but that after a time such wire becomes heated to the kindling temperature of the burning gases and permits the flame to pass through. It has been found that with two or more plies of screen wire spaced to provide a thin, wafer shaped chamber between them the flame cannot spread through from the exterior to the interior of the tank. It is probable that this result is attained because a combustible mixture cannot be maintained in the screen chamber for a sufficient length of time to heat the lower screen ply 10 to the kindling temperature of the gases.

The frame is provided with an external annular supporting flange 15 for engaging the upper rim 16 of the hatch opening, the

lower face of the flange 15 and the upper face of the rim 16 being smooth and flat to co-operate with one another to form a tight joint through which a flame cannot possibly pass. The frame 7 is preferably made of metal heavy enough to hold the cover down fast against disturbance by the wind. The body portion of the frame extends down a sufficient distance below the supporting flange 15 to engage within the hatch opening and guard against dislodgement of the cover by rocking of the vessel upon which the cover is used.

As the usual hatch opening is about ten inches in diameter the cover is quite heavy. Provision is made of a handle 17 in the form of a headed and threaded bar which passes through ears 18 and 19 integral with the frame 7, and is threaded into the latter ear and locked in place by a locking nut 20. This handle may be used for lifting the temporary cover to place it upon the hatch opening or to remove it therefrom.

When a man has removed the cover he is apt to let it fall upon the deck of the vessel. This would very likely damage or destroy the screen wire if the wire were exposed to contact with the deck. It is an important point, however, that provision is made to protect the screen wire against damage in this manner. For this purpose the screen attaching and positioning flange 8 is located substantially midway between the upper and lower edges of the flange 7 so that the frame projects substantially above and below the screen and prevents contact of the screen with the deck, or with bolts or other similar objects which may be lying upon the deck.

In case of damage to the screen wire, however, the wire can be readily renewed by withdrawing the bolts 11, removing the old wire and replacing it with new wire, and reassembling the screen parts.

In Figure 3 another embodiment of the invention is disclosed in which additional provision is made for guarding the screen wire against injury or mutilation. In this form of the invention screen plies 9 and 10 are secured above and below flange 8 of the frame by rings 11 and 12 as in the form of the invention already described. There are also provided for protecting the screen wire perforated metal sheets 21 and 22 secured outside the rings 11 and 12 by the bolts 13 and nuts 14 that secure the wire screen and the rings in place. These protective sheets 21 and 22 prevent breakage of the wire and in addition prevent its being distorted and made slack which would be likely to cause the wire plies to lie in contact with one another and thereby withdraw the protection afforded by the screen chamber. The perforated plates, themselves, being spaced from the screen plies form additional cham-

bers in conjunction therewith which also oppose the propagation of a flame through the cover. The plates 21 and 22 further assist in destroying the velocity of hot gases tending to force their way into the tank as a result of an explosion of escaped gases outside the tank.

Variations may be resorted to within the scope of the invention and parts of the improvements may be used without others.

What I claim is:

1. The combination with a fuel tank having an opening therein of a protective breather cover for said opening adapted to be held in place by gravity, comprising an imperforate, cylindrical body portion insertible in said opening, an external, circumferential supporting flange at the upper end of said body portion, an internal flange intermediate the ends of said body portion, and a plurality of spaced fine mesh screens attached to the internal flange and defining a thin wafer shaped screened chamber across said opening to prevent the spreading of a flame from the exterior to the interior of said tank, the cover being normally sufficiently open to prevent the occurrence in the tank of pressure conditions substantially above or below atmospheric pressure.

2. A temporary cover for openings in fuel tanks arranged to be held down by gravity comprising a frame formed to fit within such openings, an inwardly projecting flange extending completely around said frame between the top and the bottom thereof, screens disposed across said frame above and below said flange, clamping means engaging the margins of said screens for clamping them to the flange, and means passed through the flange and through both of said clamping means for drawing them together, the cover being normally sufficiently open to prevent the occurrence in the tank of pressure conditions substantially above or below atmospheric pressure.

3. A temporary cover for a fuel tank opening comprising an integral metallic frame conforming in contour to said opening, a plurality of plies of screen wire disposed across said frame and defining a wafer shaped screened chamber between them, a peripheral flange projecting outward from the frame to rest upon the rim of the tank opening and form a tight joint therewith, said frame having its body part disposed below the supporting flange to avoid exposing a substantial surface to the wind and to prevent jarring of the cover from the opening, and a handle for lifting the cover, the screen wire being supported within the frame body in a position to be protected by the frame and by said handle when the cover is dropped, the cover being normally sufficiently open to prevent the occurrence in the tank of pressure conditions

substantially above or below atmospheric pressure.

4. In a flame arresting breather cover for fuel tanks, in combination, a frame, a
5 fine mesh screen extending across said frame and secured thereto, and protective perforated plates extending across said frame above and below said screen, and spaced from the screen to form thin wafer shaped chambers at opposite sides of the screen.

10 5. In a flame arresting breather cover for fuel tanks, a frame having an internal flange between the top and the bottom thereof, plies of fine mesh screen wire stretched across the frame above and below said flange, spacer
15 rings positioned upon the margins of the screen plies, perforated plates extending across the frame with their outer margins resting against said rings, and bolts securing
20 the screen wire, the rings, and the perforated plates to the internal flange, at a series of points, whereby a series of wafer-shaped chambers is provided.

In testimony whereof I have affixed my
25 signature to this specification.

JOHN S. PATTEN.

30

35

40

45

50

55

60

65