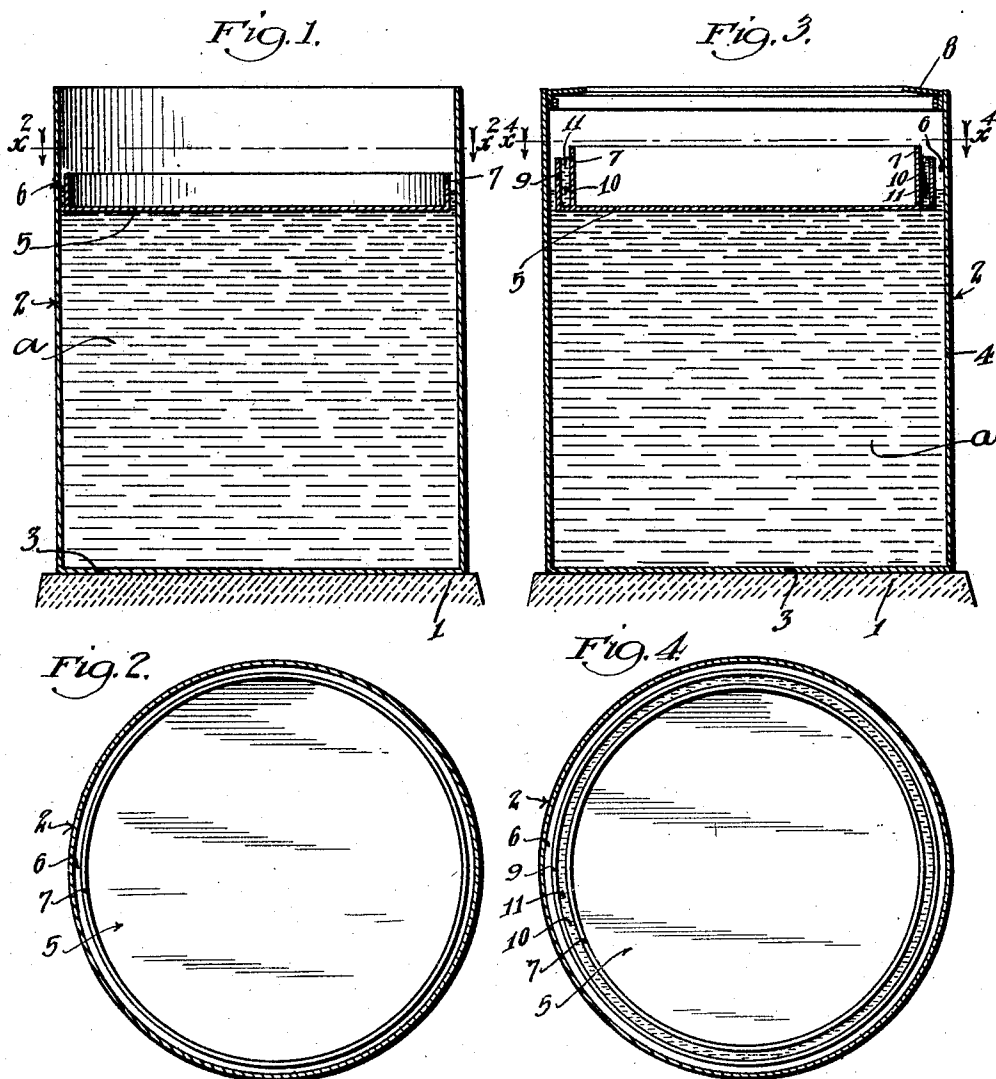


R. E. BOLE.
 APPARATUS FOR FIGHTING FIRE IN LIQUID RECEPTACLES.
 APPLICATION FILED AUG. 4, 1919.

1,386,232.

Patented Aug. 2, 1921.



WITNESSES
John D. Allen,
Sully J. Russo.

INVENTOR
Robert E. Bole,
 BY *Fredrick B. Ryan,*
 ATTORNEY

UNITED STATES PATENT OFFICE.

ROBERT E. BOLE, OF LOS ANGELES, CALIFORNIA.

APPARATUS FOR FIGHTING FIRE IN LIQUID RECEPTACLES.

1,386,232.

Specification of Letters Patent.

Patented Aug. 2, 1921.

Application filed August 4, 1919. Serial No. 315,041.

To all whom it may concern:

Be it known that I, ROBERT E. BOLE, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Apparatus for Fighting Fire in Liquid Receptacles, of which the following is a specification.

My invention relates to apparatus to be utilized for the prevention and fighting of fire in liquid receptacles and particularly storage tanks containing petroleum oils.

Notwithstanding many attempts which have heretofore been made to prevent fire in liquid receptacles particularly petroleum storage tanks, and many devices and methods which have been produced for fighting fire once started in said class of receptacles, a vast loss is now incurred annually by reason of destructive fires in this class of inflammable liquid containers. Experience has shown that where a fire has once gotten well under way in a tank containing many thousands of gallons of petroleum oil, none of the methods heretofore employed in the art have been effective to check or stop the conflagration, and ordinarily the fire continues until the entire tank and its contents have been destroyed, or at least the inflammable liquid has been burned away.

If a storage tank for petroleum oil is only partially filled there will form immediately above the surface of the liquid an extremely combustible mixture of petroleum vapor and oxygen derived from the atmosphere. Where the tank is covered this vapor is trapped. It is this combustible mixture which so readily ignites.

If the said combustible mixture be once ignited the roof of the receptacle must either be quickly removed or the same will be blown off by the expansion of the combustible gases. In any case the entire top surface of the liquid contained within the tank will be brought in contact with the atmosphere and the burning surface will become equal in area with the cross section of the tank.

As is common knowledge in the art the flame from the burning tank will extend high into the air and no methods heretofore suggested will suffice to extinguish the flame once it has gotten under way.

My invention consists primarily in reducing the area of the surface of combustible liquids exposed to contact with the oxygen

from the atmosphere and to thus restrict the area of a possible burning surface. It is my object to restrict this area so that the burning portion will never be of such consequence that the flame thereof cannot be readily extinguished.

Further my invention contemplates the elimination of the formation above the surface of the liquid within the receptacle of a combustible mixture of inflammable vapor and oxygen derived from the air.

A further object of my invention is to accomplish the restriction of the possible burning area of the liquid and the elimination of the formation of combustible oxygen mixture within the receptacle, without endangering an explosion of the same.

Other objects and advantages will appear from the subjoined detailed description.

In the drawings:

Figure 1 is a vertical section of a petroleum storage tank containing one form of my invention.

Fig. 2 is a top plan view of the tank and apparatus illustrated in Fig. 1.

Fig. 3 is a vertical sectional view of a petroleum storage tank containing another form of my invention.

Fig. 4 is a top plan view of the top and apparatus illustrated in Fig. 3.

Referring to the drawings, 1 indicates a foundation upon which is mounted a petroleum storage tank 2 of usual construction comprising a bottom 3 and an annular vertical wall 4. The tank 2 is partially filled with petroleum *a*.

A blanket 5 is adapted to contact with the surface of the petroleum *a*. The blanket 5 is circular and of a slightly less diameter than the tank 2.

When positioned in contact with the surface of the petroleum *a* the blanket 5 will extend over all of the petroleum except a margin 6 between the edges of the blanket 5 and the wall 4.

In practice I prefer that the blanket 5 be allowed to float upon the surface of the petroleum *a*, but it is possible within the scope of my invention to suspend the blanket by any desired mechanical method.

I preferably provide the blanket 5 with a vertical flange 7 so that the blanket 5 may be constructed of thin material and petroleum prevented from overflowing the upper surface of the blanket by means of the flange 7. However the blanket 5 may be con-

structed of a sufficient thickness so that the buoyancy of the same will maintain the upper surface of the blanket above the surface of the petroleum.

5 The blanket 5 being in contact with the surface of the petroleum excludes the oxygen from access to that portion of the surface of the petroleum beneath the blanket. It will, therefore, be impossible for the
10 blanketed surface of the petroleum to become ignited and the blanket 5 thus constitutes means to limit the possible burning area within the tank 2 and the possible burning area therein is limited to the margin 6.
15 The provision of the margin 6 eliminates any danger of explosion within the tank 2. As the margin 6 is the only portion of the surface of the petroleum which is in contact with the atmosphere all combustion within
20 the tank must be limited to such margin. There will be no combustion beneath the blanket 5 as there is no possibility of a combustible mixture forming thereunder. The relative area of the blanket 5 and the margin
25 6 will vary according to the size and nature of the tank and kind of inflammable liquid stored therein.

My invention contemplates and is concerned with only such ratio between the
30 area of the blanket 5 and the area of the margin 6 that there will be no danger of explosion within the tank.

If the petroleum within the margin 6 becomes ignited it will be a relatively easy matter to extinguish the flame. This can be accomplished by the use of steam or other smothering device or preparations now common in the art. In no case will the combustion within the tank 2 reach the uncontrollable
40 magnitude now common in the art where the entire upper surface of the petroleum in the tank constitutes an effective burning area and there is formed above this entire area a combustible mixture of petroleum
45 vapors and oxygen derived from the air.

In Figs. 3 and 4 I have illustrated a modified form of my invention. In the said form the receptacle may be preferably provided with a roof ledge 8, which ledge extends
50 inwardly around the top of the vertical tank wall 4. In practice the roof ledge 8 serves to prevent rain from falling upon the upper surface of the inflammable liquid at the marginal area 6. Also in practice the roof
55 ledge 8 may provide a footway or support for those who are engaged in extinguishing a fire within the receptacle. From the ledge 8 steam or other smothering material may be readily directed within the marginal
60 area 6 to extinguish the flame.

In the modified form illustrated in Fig. 3 the blanket 5 is formed with an auxiliary vertical flange 9 surrounding the flange 7. Between the flange 9 and the flange 7 there is thus provided an annular basin 10. This
65 basin 10 may be filled with a flame smothering material 11, for example soap. Upon the marginal area 6 becoming ignited the flame within the same will heat the smothering material within the basin 10 and the
70 same will overflow upon the marginal area 6 and extinguish the flame arising therefrom. In this connection it is to be noted that the vertical flange 9 is of a slightly less height
75 than the flange 7. Further it is to be noted that the flange 9 should be of a sufficient height to keep a portion of the smothering material 11 above the surface of the liquid α within the receptacle. This is necessary
80 so that the flame rising from the marginal area 6 may heat the smothering material 11 and cause the same to overflow as above set forth.

I claim:

1. The combination of a receptacle for an
85 inflammable liquid, a floating blanket member limiting the exposed surface of said liquid, the blanket member having a vertical peripheral wall and an inner wall extended
90 therefrom to form an intermediate channel, and a flame smothering material in the channel.

2. The combination of a receptacle for an
95 inflammable liquid, a floating blanket member limiting the exposed surface of said liquid, said member having relatively spaced peripheral walls forming an intermediate channel with the outer wall extended vertically
100 above the liquid surface and the inner wall extended vertically above the outer wall, and a flame smothering material within the channel.

3. The combination of a receptacle for an
105 inflammable liquid, a floating blanket member limiting the exposed surface of said liquid and having a peripheral channel, and a flame smothering material in the channel, the channel extending above the liquid
110 and so that the heat of the flaming liquid will expand the flame smothering material in the channel causing it to overflow upon the liquid surface to extinguish the flame.

Signed at Los Angeles, California, this
29th day of July, 1919.

ROBERT E. BOLE.

Witnesses:

LEONARD S. LYON,
L. BELLE WEAVER.