March 2, 1926.

1,575,033

J. BOWN

STORAGE TANK

Filed Dec. 11, 1923

2 Sheets-Sheet 1

Fig. 1

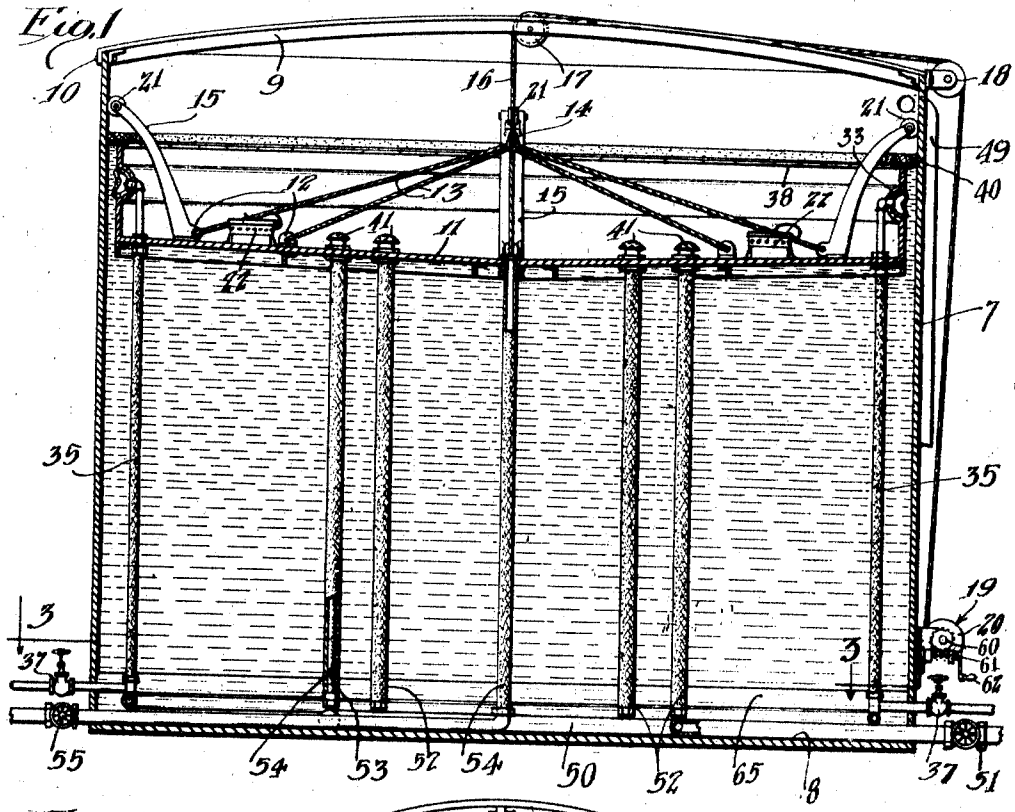
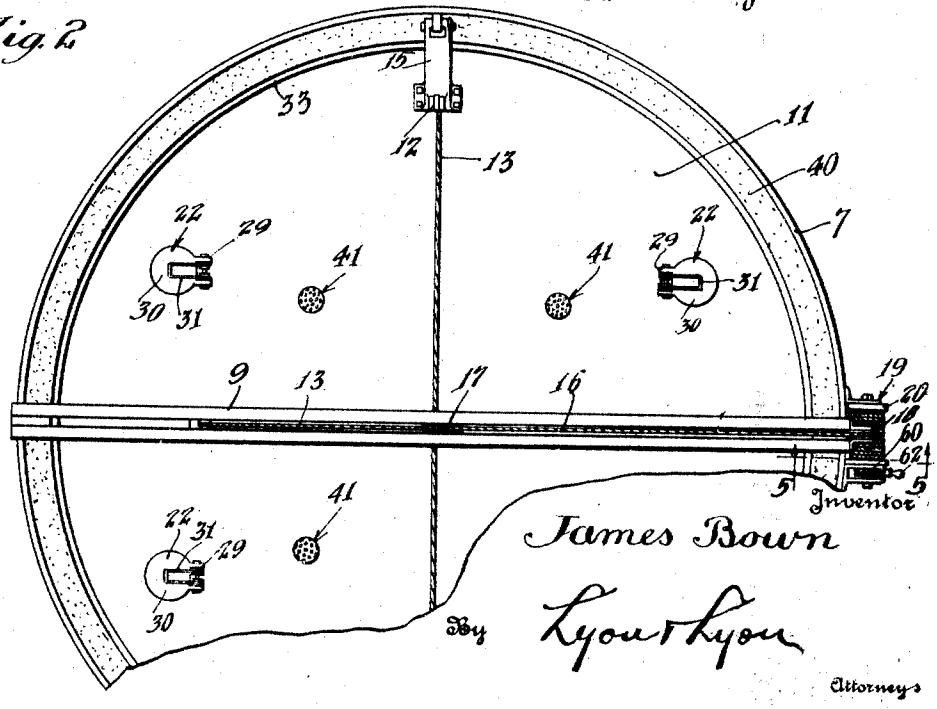


Fig. 2



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Fig. 3

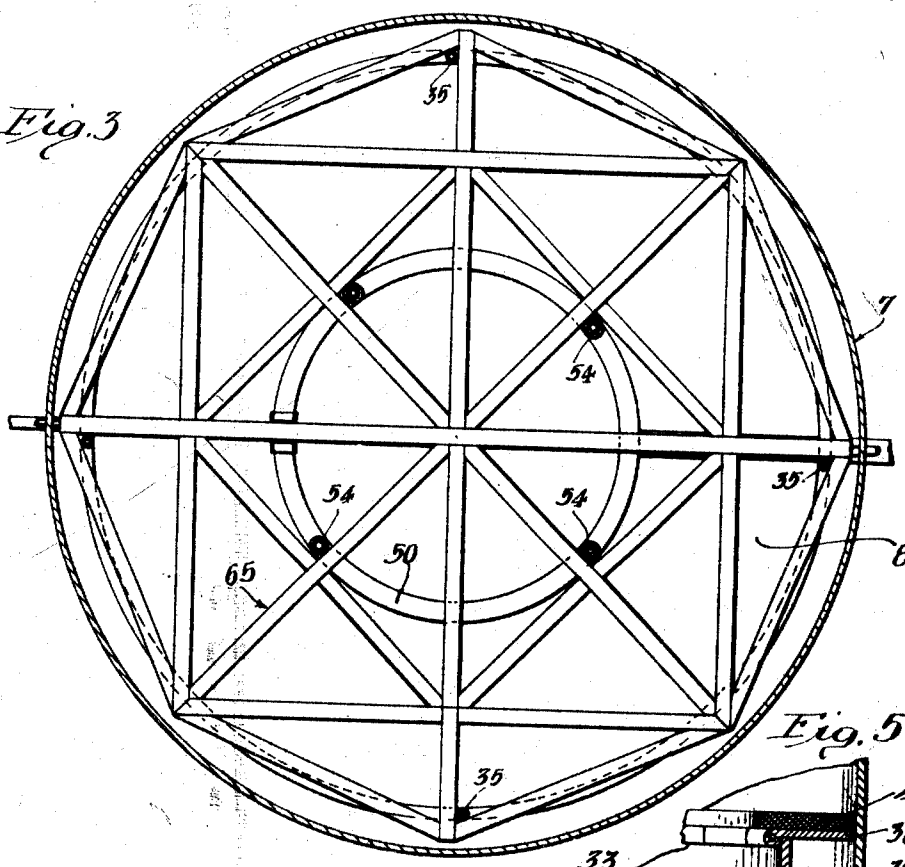


Fig. 5

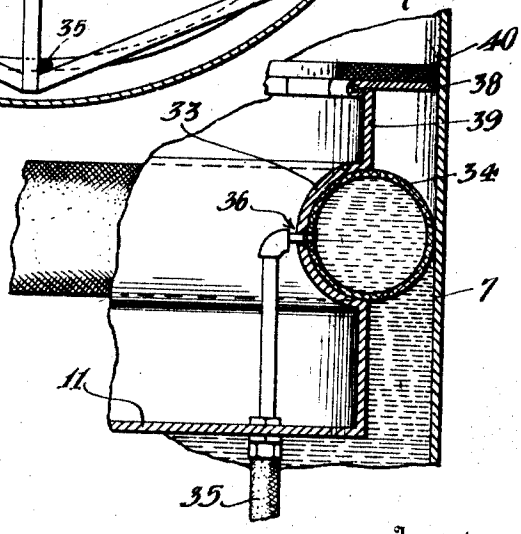


Fig. 4

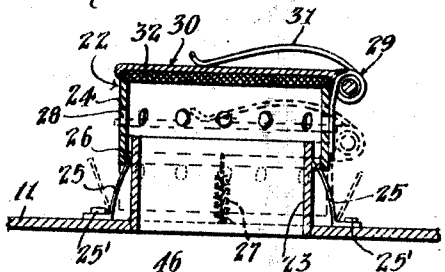
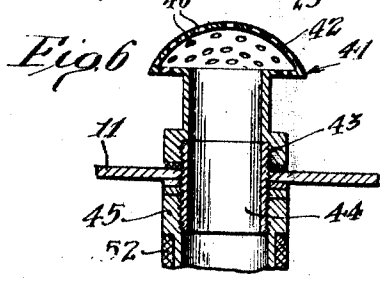


Fig 6



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Patented Mar. 2, 1926. 1,575,033

UNITED STATES PATENT OFFICE.

JAMES BOWN, OF DEATH VALLEY, CALIFORNIA.

STORAGE TANK.

Application filed December 11, 1923. Serial No. 679,953.

To all whom it may concern:

Be it known that I, JAMES BOWN, a subject of the King of Great Britain, residing at Death Valley, in the county of Inyo and State of California, have invented a new and useful Storage Tank, of which the following is a specification.

This invention relates to oil containers and more particularly to a device for preventing and extinguishing fire in large oil storage tanks.

Oil fires are very common in storage tank fields and a high percentage of the oil recovered from the earth never comes to commercial use because of the loss due to fires. It is therefore the primary object of this invention to reduce the fire hazard in storage fields and wherever oil is stored.

An object of this invention is to provide an oil storage tank wherein the friction is reduced to a minimum.

An object of this invention is to provide an oil storage tank wherein an oil fire can be readily extinguished by suffocation of the fire.

An object of this invention is to provide an easily controlled device for use in oil storage tanks whereby the oil fire is easily extinguished without loss of the oil therein contained.

An object of this invention is to provide a structure to carry out the above objects that is of economical construction and whereby the customary "dome" of the tank is eliminated.

Further objects and advantages will appear in the following detailed description of the accompanying drawings, although it is to be understood that I do not wish to limit myself to the particular construction shown in these drawings of the preferred embodiment of this invention.

In the drawings:

Fig. 1 is a section of an oil storage tank illustrating this invention, the frame structure of which tank is not in place.

Fig. 2 is a plan view thereof partly broken away.

Fig. 3 is a plan view of the bottom of the storage tank taken substantially on the line 3—3 of Figure 1 illustrating a frame structure on the bottom of the tank.

Fig. 4 is a side elevation of the exhaust valves used in connection with this invention.

Fig. 5 is a section taken substantially on the lines 5—5 of Figure 2 showing the tire inflated.

Fig. 6 is a sectional side elevation of a water nozzle.

In the drawings 7 indicates the cylindrical wall of the storage tank, which is riveted to the bottom 8 forming the body of the tank. The curved beam 9 is securely riveted to the wall 8 as shown at 10.

The plate 11 is adapted to ride on the oil surface and is of concave structure as shown in Figure 1. In order to hold to plate 11 on the surface of the oil, I provide the following construction.

Riveted at regular intervals on the plate 11 are the eyes 12 to which cables or wires 13 are adapted to be secured, said cables 13 being united on a central ring 14. The cables or wires 13 are also secured within eyes cast integral with brackets 15, which brackets 15 are riveted to the plate 11. Secured to the ring 14 is the operating cable 16 which passes over the guide wheel 17, said guide wheel being secured to the beam 9, at a point near the center. The cable 17 is also guided by the wheel 18 to the worm control mechanism 19 which consists of a cable drum 20, a worm gear wheel 60 and a worm screw 61, to the end of which screw the control crank 62 is fixed. By this construction, the plate 11 is easily elevated or lowered to the surface of the oil and held in the desired position.

The brackets 15 are secured at regular intervals to the plate 11 and are adapted to hold the plate guide wheels 21. Said wheels are positioned to space the plate from the wall, and allow the plate to be easily positioned on the surface of the oil.

Safety valves 22 are positioned on the plate 11 to allow the escape of the gases resulting from a fire or an explosion in the tank and are of the following construction and mode of operation:

In Figure 4, the inner wall of the valve is indicated at 23 and is shown as vertical extension of the plate 11. The cap 24 of the valve is adapted to fit closely the inner wall and is held in the position indicated by the full line in Figure 4 by the springs 25 which are adapted to be held normally at the under edge of the cap in a slot 26. The spring members 25 are riveted to the plate 11 as shown at 25' and are adapted to hold the cap 24 elevated against the normal tendency of the helical spring 27, which

spring is secured to the cap 24 and the plate 11, as shown.

In the upper portion of the cap 24 are the perforations 28 to allow the escape of the vapors of the oil to comply with the law as regulating the storage of oil in closed receptacles.

Hinged at 29 is the cover 30 of the exhaust valve 22 which is held in a closed position by the extended coil spring 31. The cover 30 is held by the spring 31 on an asbestos washer or gasket 32 which construction provides an air-tight juncture of the cover on the cap 24.

To illustrate the operation of this valve, suppose a fire or an explosion to occur in the tank, the cover 30 is forced open against the pressure of the spring 31, which likewise results in the cap 24 being raised and disengaging the spring 25 from the groove 26. The cap is then pulled downward by the extended spring 27 from the position shown in full lines to that shown in the dotted lines in Figure 4, bringing the perforated portion 28 of the cap 22 over the inner wall and substantially closing the perforations. The gases caused by the explosion are dispersed through the open cover into the air, after which the cover 30 is closed by the spring 31, making an air-tight closure which suffocates the fire due to the lack of oxygen, and the presence of the inert burned gases.

In order to make the closure of the plates on the surface of the oil completely air-tight, I provide the following construction.

Mounted in a rim 33 which is pressed in a vertical extension of plate 11 is a tire 34, which is of fire proof material, (such as reinforced asbestos). The tire 34 is normally collapsed as shown in Figure 1. Flexible water hose 35 are connected to the tire 34 as shown at 36. When a fire occurs and it is desired to suffocate the flames, the water is turned on at the valves 37 and the tire inflated which then forms an air-tight juncture with the wall 7 as clearly shown in Figure 5.

A sectional hinged ring 38 is provided on the top end of the vertical extension 39 of plate 11 so as to allow any gases formed by the oil, which may be burning above the tire 34, to escape. An asbestos ring 40 is positioned on the sectional hinged ring 38 to normally close this aperture to rain and the heat of the sun.

When an explosion occurs within the storage tank and the valves 22 have thereby been blow open, oil which is burning will be blown with the gases through the valve opening onto plate 11; in order to stop the burning of this oil, I provide the following construction:

Spaced at intervals on the plate 11 are water sprays 41 having spray caps 42 which are adapted to throw the water onto the plate 11 as clearly shown in Figure 6. The caps 42 are internally threaded as at 43 and are adapted to be screwed into the nipples 44, secured to the bottom of the plate 11. The caps 42 are provided with perforations 46 for spraying the water onto the plate 11. By this construction, I provide means whereby the plate 11 may be quickly flooded with water. The oil will then rise to the top of the water and will then be carried out of the overflow pipe 49 into a suitable storage tank (not shown).

The water is supplied to the spray nozzles 41 from the water main 50 located in the bottom of the storage tank. The valve 51 controls the supply of water. The spray nozzles 41 are connected by means of coupling 45 threaded to the nipples 44 to the flexible hose members 52 which are preferably constructed as follows:

The inner wall 53 of the hose is of rubber, with an outer wall 54 of asbestos. The outer wall is for the purpose of assuring that the hose is not burned in case of fire in the tank which would result in breaking the water connection to the plate. The hose 52 is made flexible so that the plate 11 may be lowered or raised to the surface of the oil in the storage tank.

The plate 11 is of concave structure to allow rain to collect in the center where it may be drained through the flexible hose 54, when the valve 55 is opened.

When it is desired to drain the oil from the tank, it is preferable to provide a seat on the bottom of the tank for the float plate so that it will not be necessary to hold the same suspended on the cable; for this I provide a net work of supporting beams 65 located in the bottom of the storage tank upon which the plate may be positioned, it being obviously unsatisfactory in view of the many hose connections and the weight of the float plate to allow the said plate to rest on the bottom of the tank.

Although, I have herein described one complete embodiment of my invention, it will be understood that various modifications may be made therein, without departing from the spirit of my invention as the same is indicated above and in the following claims.

I claim:

1. In combination with an oil storage tank, an oil surface plate, means to position the plate from the sides of said tank, means for holding the surface plates spaced from the side walls of the tank, and means controllable in case of fire to close the gap between said plate and said walls.

2. In combination with an oil storage tank, an oil surface plate, means to position said plate from the walls of said tank, means controllable in case of fire to close the gap between said plate and said walls to make an

air-tight connection, said latter means comprising a tire.

3. In combination with an oil storage tank, an oil surface plate, means to make an air-tight connection between said plate and the walls of the tank comprising a tire, means to inflate the tire with a fluid.

4. In combination with an oil storage tank, an oil surface plate, safety valves positioned on said plate, said safety valves comprising a cap member, having a hinged closure and a perforated portion, means to hold said cap in elevated position, an inner portion, means to force said cap over said inner portion.

5. In combination with an oil storage tank, an oil surface plate, safety valves positioned on said plate, said safety valves comprising a cap member having a hinged closure and a perforated portion, means to hold the said cap in an elevated position to allow the gases formed within the tank to be vented through the perforations, and means for forcing said cap over the perforations in case of fire within the tank.

6. In combination with an oil storage tank, an oil surface plate, means for flooding the oil surface plate with a fire extinguishing fluid, safety valves positioned on said plate, such safety member having a hinged closure and a perforated portion, means for holding said cap in elevated position to allow a vent of the gas formed within the tank, and means for closing the perforations in case of fire within the tank.

7. In combination with an oil storage tank, an oil surface plate, means to position the plate from the side of the tank, means controllable in case of fire to close the space between the plate and the said side walls, a plurality of spaced vents positioned on said plate, and means automatically operable in case of fire to close said vents.

8. The combination of an oil storage tank, an oil surface plate, means to position the plate on the sides of said tank, means controllable in case of fire to close the space between the plate and the side walls, and means for flooding the upper surface of the surface plate with a non-inflammable fluid.

9. In combination with an oil storage tank, an oil surface plate, means to position the plate from the sides of said tank, means controllable in case of fire to close the space between the plate and the side walls, a plurality of safety vents positioned in said plate, means automatically operable in case of fire to close said vents, and means for flooding the upper surface of the surface plate with a non-inflammable fluid.

Signed at Death Valley, Cal., this 3rd day of December 1923.

JAMES BOWN.