May 15, 1928. 1,669,877

J. T. MAGUIRE

TANK COVER

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Fig. 1

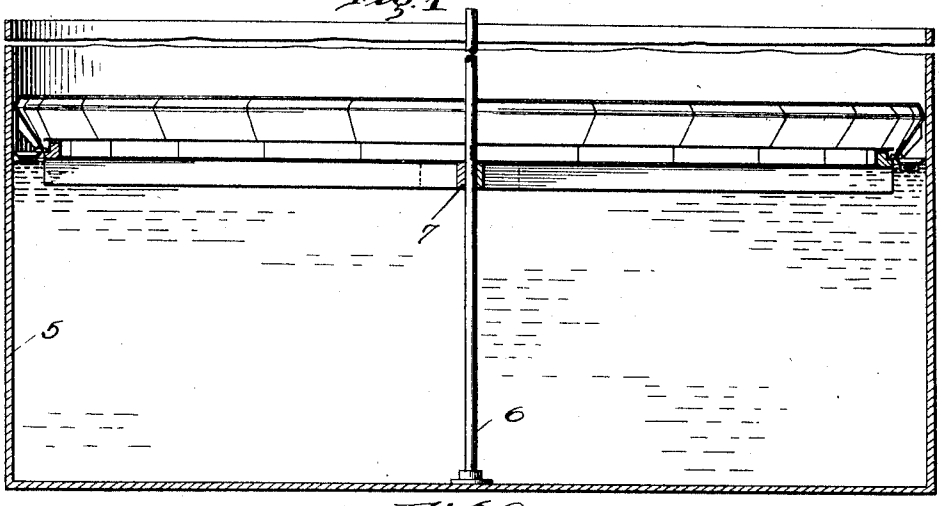
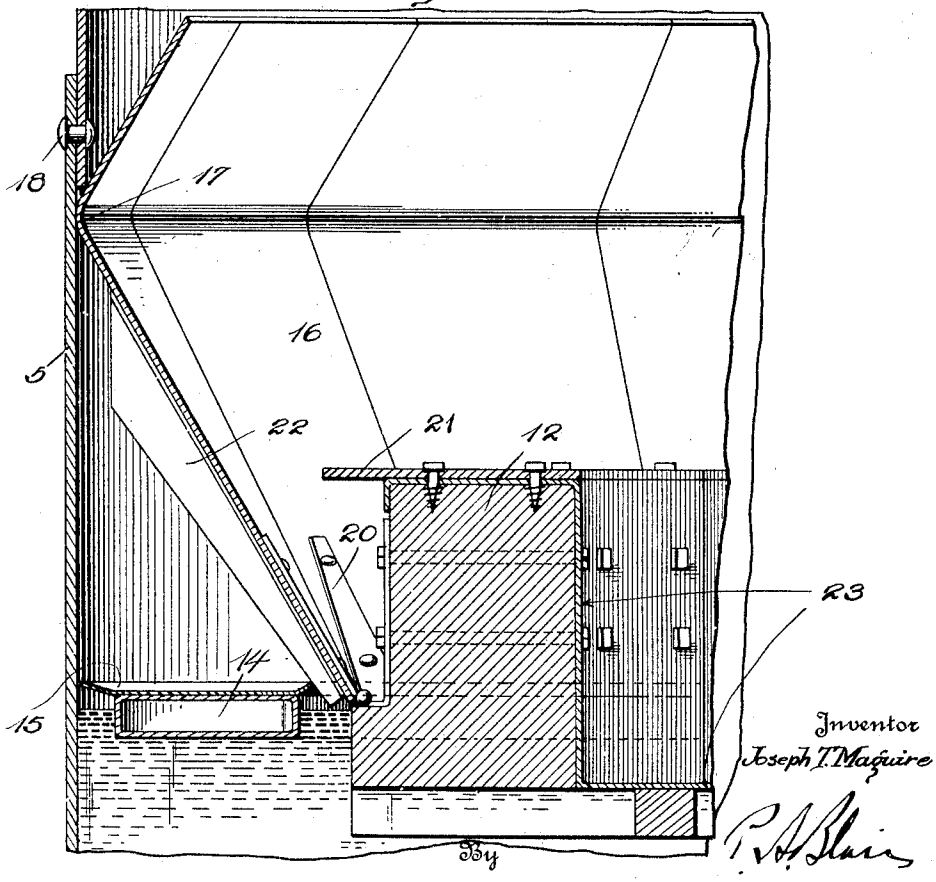


Fig. 2.



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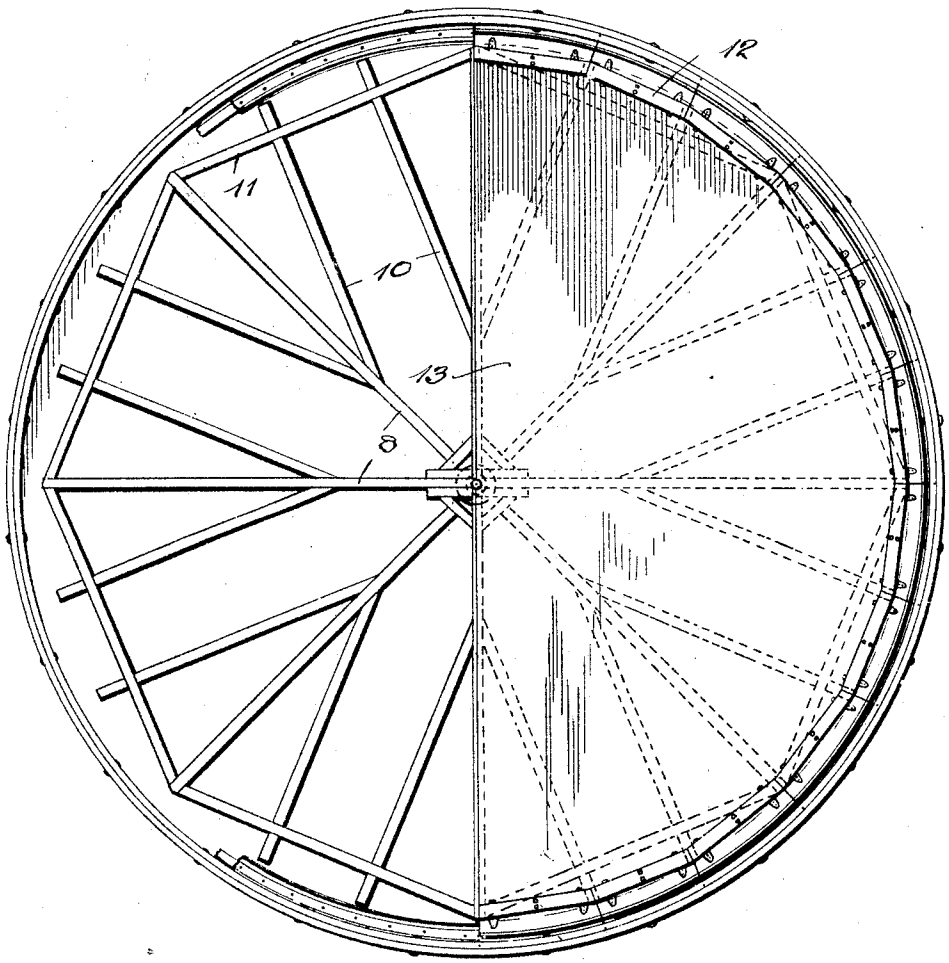
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Fig. 3.



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UNITED STATES PATENT OFFICE.

JOSEPH T. MAGUIRE, OF CHEVY CHASE, MARYLAND.

TANK COVER.

Application filed January 29, 1925. Serial No. 5,652.

This invention relates to improvements in tank construction and more particularly to a leak-proof cover for large oil tanks.

One of the objects of the present invention is to provide a practical floating cover for oil tanks adapted to prevent the escape or leakage of volatile constituents.

A further object is to provide a floating cover of the above character adapted to automatically conform itself to the inner peripheral surface of the tank as distortions or irregularities may occur in the rise and fall of the liquid level therein.

A further object is to provide a reliable and efficient gas seal for oil tanks.

Other objects will be in part obvious and in part hereinafter pointed out in the accompanying drawings wherein is shown one of various possible embodiments of the invention.

Figure 1 is a vertical sectional view showing the tank diagrammatically and the floating cover in place.

Figure 2 is an enlarged detail sectional view of one side of the tank, and,

Figure 3 is a plan view of the tank with certain parts removed or broken away in order to show the details of construction.

Referring now to the drawings in detail and more particularly to Figure 1, 5 indicates an oil tank of usual cylindrical construction provided with a central guide post 6 passing through a boss 7 in the center of a floating cover of general circular shape as shown in Figure 3. This cover is composed of a plurality of radially disposed beams with auxiliary beams 10 and connections 11 at their end as may be necessary. These beams support a floating ring 12 as shown more clearly in Figure 2 and the entire frame work is provided with a sheathing 13 as may be desired. This ring 12 is of slightly less diameter than the internal diameter of the tank and in between the periphery thereof and the walls of the tank is a second floating ring 14 as shown in Figure 2 provided with an annular gasket 15 snugly fitting the interior wall of the tank. This gasket is preferably made of flexible material such, for example, as asbestos composition, whereby it may easily ride over joints in the tank plates or rivet heads as it moves up and down due to the change in liquid level.

About the outer periphery of the ring 12 are hinged a plurality of segmental plates 16 bent at an angle 17 whereby they will swing outwardly against the outer wall of the tank 5 and ride easily over the rivet heads 18 or plate joints as shown at the left of Figure 2. Each plate is provided with one or more hinges 20 as may be necessary. It will be noted that the upper part of the ring 12 is provided with bumpers 21 extending outwardly beyond the pintle line of the hinge thus preventing the plates 16 from swinging inwardly beyond their center of gravity or, in other words, insuring that they always swing outwardly against the wall of the tank 5.

Between each plate is a flexible diaphragm 22 of general V-shaped construction, that is, one edge is secured along one side of one of the plates 16 while the opposite edge is secured to the adjacent side of the adjacent plate 16 thereby to prevent leakage through the cracks between the plates which may be unduly large under certain circumstances, as, for example, when one of these plates 16 happens to rest on a vertical line of rivets.

This construction it will be seen substantially covers the entire liquid surface of the contents of the tank, the major portion being covered by the floating deck bound within the ring 12 while the larger part of the remaining portion is covered by the floating ring 14. Any leakage which may occur between these two rings is further reduced by reason of the close engagement existing between the angle 17 of the plates 16 and the walls of the tank.

It will thus be seen that the present invention provides a highly reliable and efficient floating cover for tanks well adapted to retain the volatile constituents therewithin.

It will be understood that the present disclosure is largely diagrammatic and limited primarily to the joint construction at the top of the floating cover and no provision is made so far as this disclosure is concerned in providing for the inlet and outlet of oil to the tank or the main cover to the tank in order to protect the contents thereof from rain or snow, these parts all being of well-known construction and forming no part of the present invention. It may also be noted that it is customary to provide suitable telescopic supports on the under side of the floating cover to suspend the same at a fixed distance above the bottom of the tank as may be necessary to enable cleaners to enter the tank for removing sediment, etc.

It will thus be seen that the present invention is well adapted to accomplish, among others, all of the objects and advantages herein set forth.

What I claim is:—

1. A floating cover for tanks, comprising a central annular member covering the major portion of the liquid and adapted to float freely up and down as the liquid level changes, and a flexible metal seal connected to the central member and extending from the central annular member outwardly to the interior of the wall of the tank, the flexible seal being held in place against the wall of the tank solely by its own weight, and being of such shape as to have the tank wall practically tangent to it at point of contact, and a second independently floating annular member covering the minor portion of the liquid surface between the periphery of the central member and the wall of the tank.

2. A floating cover for tanks, comprising a central annular member covering the major portion of the liquid and adapted to float freely up and down as the liquid level changes, and a flexible metal seal connected to the central member and extending from the central annular member outwardly to the interior of the wall of the tank, the flexible seal being held in place against the wall of the tank solely by its own weight, and being of such shape as to have the tank wall practically tangent to it at point of contact, the flexible seal consisting of a plurality of hinged plates, and a second independently floating annular member covering the minor portion of the liquid surface between the periphery of the central member and the wall of the tank.

3. A floating cover for oil tanks and the like, comprising a central annular member, a guide upon which said annular member may rise and fall, a second annular member interposed between the periphery of said first member and the interior walls of the tank, said second annular member having a flexible diaphragm extending substantially between the outer periphery of said first ring and the outer walls of the tank, and a plurality of annularly disposed plates flexibly connected to said inner annular member and covering the space between the periphery thereof and the inner walls of the tank.

4. A floating cover for oil tanks and the like, comprising a central annular member, a guide upon which said annular member may rise and fall, a second annular member interposed between the periphery of said first member and the interior walls of the tank, said second annular member having a flexible diaphragm extending substantially between the outer periphery of said first ring and the outer walls of the tank, a plurality of annularly disposed plates flexibly connected to said inner annular member and covering the space between the periphery thereof and the inner walls of the tank and flexible members covering the joints between said plates.

5. A floating cover for oil tanks and the like, comprising a central annular member, a guide upon which said annular member may rise and fall, a second annular member interposed between the periphery of said first member and the interior walls of the tank, a plurality of annularly disposed plates flexibly connected to said inner annular member and covering the space between the periphery thereof and the inner walls of the tank, flexible members covering the joints between said plates and means for preventing said plates swinging inwardly beyond a predetermined distance.

6. A floating cover for tanks, comprising a central annular member covering the major portion of the liquid surface, a second and surrounding annular member covering the minor portion thereof, this second annular member having a flexible diaphragm extending substantially between the outer periphery of said first ring and the outer walls of the tank, and a flexible seal extending from the inner annular member outwardly to the interior walls of the tank, said flexible seal comprising a plurality of hinged plates, which retain their position against the interior walls of the tank by their own weight.

7. A floating cover for oil tanks and the like, comprising a central annular member, a second annular member interposed between the periphery of said first member and the interior of the wall of the tank, said second annnlar member having a flexible diaphragm extending substantially between the outer periphery of said first member and the wall of the tank, and said first member having a plurality of annularly disposed hinged plates which retain their position against the interior wall of the tank by their own weight.

8. A cover for oil tanks and the like adapted to float freely up and down as the liquid level changes, comprising a central annular member, a plurality of annularly disposed plates hinged to said inner annular member and covering the space between the periphery thereof and inner walls of the tank, and held in place by their own weight, said plates being bent to such shape that the wall of the tank will be tangent to the hinged plates when in their outward position so as to ride freely over the joints and rivet heads, flexible members covering the joints between said hinged plates, and means for preventing said plates swinging inwardly beyond a predetermined distance.

9. A floating cover for oil tanks and the like, comprising a central annular member, a second annular member interposed between the periphery of said first member and interior of the wall of the tank, said

second annular member having a flexible diaphragm extending substantially between the outer periphery of the first annular member and the wall of the tank, and said first member having a plurality of annularly disposed hinged plates flexibly connected together and to the first annular member and adapted to retain their position against the interior of the wall of the tank by their own weight and means for preventing the plates swinging inwardly beyond a predetermined distance.

10. A protective means for tanks comprising a floating central member covering the major portion of the upper surface of the material in the tank and adapted to float freely up and down as the liquid level changes, a flexible seal extending from the central member to the wall of the tank, and an independently floating member covering the minor portion of the contents of the tank.

Signed at Washington, District of Columbia, this 31st day of December, 1924.

JOSEPH T. MAGUIRE.