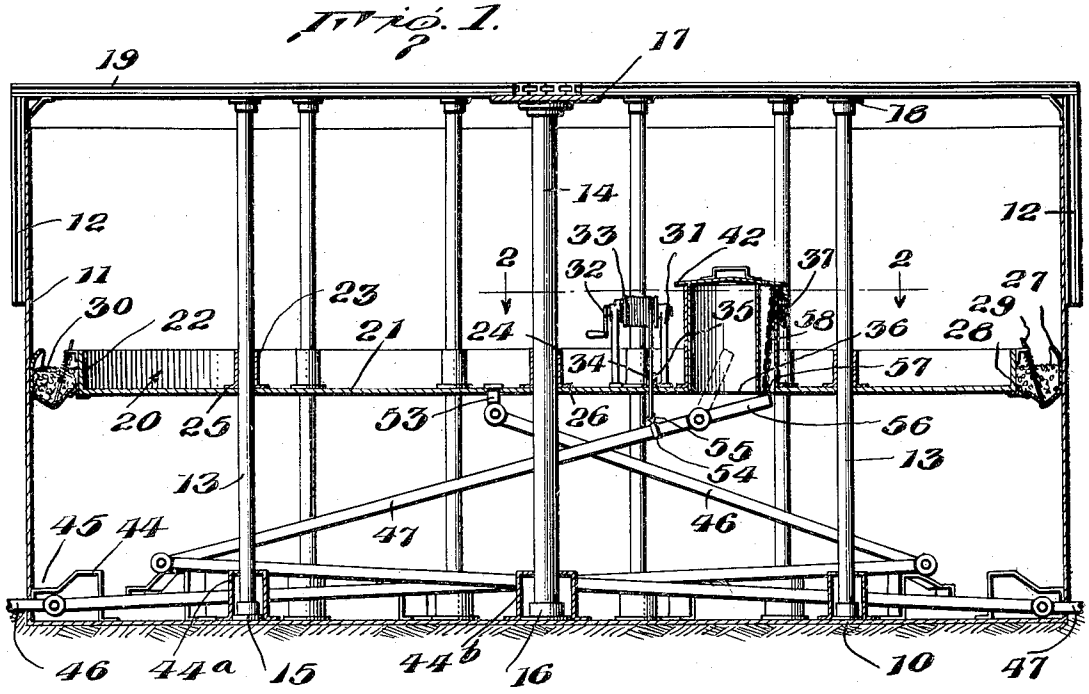
Feb. 13, 1923. 1,445,091

F. W. KUEFFER

OIL TANK

Filed Apr. 23, 1921

Fig. 1.



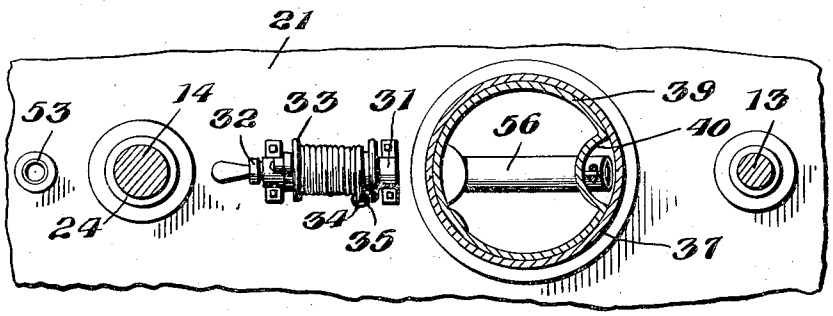




Fig. 2.

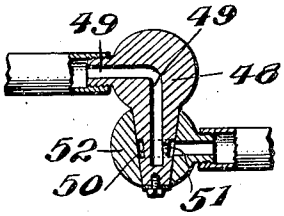



Fig. 4.

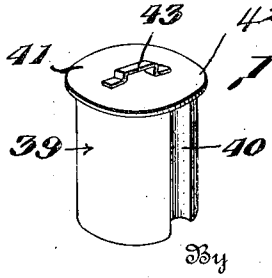



Fig. 3.

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Patented Feb. 13, 1923. 1,445,091

# UNITED STATES PATENT OFFICE.

FREDERICH W. KUEFFER, OF TULSA, OKLAHOMA, ASSIGNOR TO GEORGE F. EASTIN, E. A. LEWIS, F. W. KUEFFER, AND JACOB COLE, TRUSTEES OF THE SAFETY OIL TANK COMPANY, OF TULSA, OKLAHOMA.

## OIL TANK.

Application filed April 23, 1921. Serial No. 464,020.

*To all whom it may concern:*

Be it known that I, FREDERICH W. KUEFFER, a citizen of the United States, residing at Tulsa, in the county of Tulsa and State of Oklahoma, have invented new and useful Improvements in Oil Tanks, of which the following is a specification.

This invention relates to oil tanks and particularly to such tanks having floating roofs and means for draining and filling the tank and draining the roof.

My invention provides a plurality of pipe lines having hinged joints, one of these pipe lines including a pivoted end section which may be raised or lowered at will. Means are also provided for raising and lowering this pipe line. In this way the pivoted terminal section of the pipe line may be normally kept submerged in the oil so that no mist or spray or agitation is caused when the tank is being filled, such as ordinarily takes place when the oil must fall from a considerable height before reaching the surface of the oil in the tank. This latter condition results in mixing the oil with impurities which have settled at the bottom of the tank, and the mist and spray promote evaporation which results in considerable economic loss. However, in case it is desired to inspect the oil being supplied to the tank, the pivoted end may be raised, whereupon the outlet of the oil will be lifted above the level of the oil in the tank and may be readily inspected. In case it is desired to lower the oil level a certain amount, the oil drain pipe may be lowered to this desired level with the assurance that when this level is reached the end of the pipe will not become exposed above the level of the oil thus resulting in the suction of air or gas by the pumps instead of liquid. The other pipe located within the tank has one of its ends attached to the float and passes to the exterior of the tank, whereby water such as rain water or the water from melted ice and snow may be readily drained from the surface of the floating roof and conducted away from the tank.

Having thus described the general nature and objects of my invention I will now proceed with the description of the same in connection with the accompanying drawings which illustrate the preferred form. It will be understood, however, that variations and changes may be made in the illustrated embodiment of the invention without departing from the spirit and scope of the invention as expressed in the appended claims.

In the drawings:—

Fig. 1 is a vertical section through the tank and its supporting framework.

Fig. 2 is a partial horizontal section on the line 2—2 of Fig. 1 looking in the direction of the arrows.

Fig. 3 is a detail perspective view of a cover for sealing an opening in the float.

Fig. 4 is a detail sectional view of one of the pipe joints.

Referring to Fig. 1, the numeral 10 designates the base of the tank and numeral 11 the vertical shell thereof which may be constructed in the usual manner. To the upper portion of the shell are secured a plurality of columns 12 which may be of channel or I-section, and on the base 10 of the tank rest a plurality of posts or casings 13 and a central post or casing 14. These posts are provided with suitable flanged bases 15, 16 respectively which are secured to the base 10 in any suitable manner. A plate 17 is secured to the top of the central post 14 and suitable flanges or plates 18 are provided on the top of the posts 13, the upper limit of these plates being in horizontal alignment with the tops of the posts 12, and eye-beams or other structural members 19 are secured to the plates 17 and extend over and are secured to the plates 18 and the posts 12, in any suitable manner. It will be understood that as constructed this tank is not provided with a stationary closed roof but has only the open framework formed by the beams 19 at the top.

For the purpose of sealing the tank against evaporation, a floating roof 20 is provided, preferably similar in construction to the floating roof described and claimed in my copending application Serial No. 448,823, filed March 1, 1921. This floating roof has a base 21, preferably made of structural plates riveted together, to which is secured, an upstanding annular flange or side member 22. The base 21 is provided with suitable openings through which the

posts 13 and 14 are adapted to pass and these openings are sealed by means of sleeves 23, 24 having bottom flanges 25 and 26 which are secured to the base plates of the float about said openings by fluid tight connections. These sleeves are greater in internal diameter than the exterior dimension of the posts and thereby provide spaces therebetween in which the oil may rise to the same level as in the tank, whereby danger of leakage and overflow into the float is eliminated.

The main body of the float 20 is smaller in diameter than the interior diameter of the shell 11 and a suitable receptacle 27 is pivoted at 28 to the float and is supported thereon by means of a spring pressed rod 29. This receptacle is adapted to contain gravel 30 or the like, the weight of which is so disposed as to normally hold the side plates of the receptacle 27 firmly against the side wall of the shell 11 but owing to the pivotal mounting of the plates comprising the receptacle and the yielding of the gravel, the plates are adapted to yield inwardly in order to clear obstructions such as rivet heads in the shell of the tank.

To the base plates of the float are also secured standards 31, 32 in which is journaled the drum 33 of a windlass, the cable of which is adapted to extend through an opening 34 in the float for a purpose which will hereinafter appear. The opening 34 is surrounded by a sleeve 35 secured to the float which permits the oil to rise in the sleeve to the same height as the oil level in the tank. A larger opening 36 is also formed in the base plates of the float and this opening is surrounded by an annular flange or sleeve 37 which is suitably secured to the base plates of the float. The upper end of this sleeve 37 is adapted to be closed by a cover 39 having a depending sleeve adapted to fit within the sleeve 37, and provided with a vertical recess 40. This cover is also provided with a cap 41 having a flange 42 which rests upon the top of the sleeve 37 and projects beyond the same for the purpose of terminating said recess and closing said opening. This cap is provided with a handle 43 whereby the same may be readily removed or replaced.

On the base 10 of the tank are placed at suitable points preferably at points corresponding in location to the post 10, suitable rests 44 which may be made of structural elements properly secured to the base 10 and shell 11, or formed of concrete or other similar material. These rests are adapted to engage and support the main body of the float 20 when the oil level in the tank is sufficiently lowered or the tank is drained, and the rests are provided with suitable depressions 45 adapted to receive the pivoted receptacle 27. Rests $44^a$ and $44^b$ composed of structural elements having flat top plates are also mounted on the bottom of the tank at the base of the posts 13 and 14 respectively for supporting the central and intermediate portions of the floating roof.

Two pipe lines lead into the tank, preferably at opposite sides of the latter, these pipes being designated respectively 46 and 47. The sections of these pipes are joined together by pivoted joints such as that illustrated in Figure 4 and consisting of the plug 48 having the longitudinal passage 49 therein which communicates with the pipe line through the annular passage 50 and a transverse passage 51, this plug being pivotally mounted in a head 52 properly secured to one of the rigid sections of the pipe line. No novelty is claimed for this particular construction of an extensible pipe line as any of the commercial forms may be utilized. The pipe 46 is herein termed the water drain pipe and has one end thereof pivotally secured to a suitable connection 53 which is passed through an opening in the base of the float and serves as a drain connection through which water or other liquid accumulating in the float may be drained. It will be noted that the pipe 46, because of its pivotal joints will rise and fall with the movements of the float and therefore the float will always be provided with an open drain adapted to conduct the water therefrom to a suitable point outside of the tank.

The other pipe 47 is the oil drain and filling pipe and the sections thereof are pivotally connected together in like manner as above described. A collar 54 is secured near the upper end of the pipe line 47 and this collar is provided with an eye 55 to which is secured one end of the cable 34 of the windlass. The cable passes through the sleeve 35 as above described. A short section of pipe, herein called the terminal section 56, is pivotally secured to the upper end of the pipe line 47 and the free end of this terminal section is provided with an eye 57 to which is attached the end link of a chain 58. The chain 58 passes upwardly through the recess 40 in the cover 39 and is held in place by the flange 42 of the cap which engages the chain as it passes over the top of the sleeve 37.

By means of the windlass 36 it is evident that the pipe line 47 may be lowered or raised to any position consistent with the position of the floating roof and at the same time the chain 58 is correspondingly adjusted. The roof floats on the surface of the oil in such position that the oil rises to about one-third the depth of the float so that in the normal position of the terminal section 56, the outlet end thereof is disposed below the oil level of the tank. Therefore oil supplied to the tank will emerge below the surface of the oil and thus will not produce any

spray vapor or agitation of the mass of oil as would be produced by the incoming oil falling from above the level of the oil into the same. Furthermore, if it is desired to inspect the character of the oil being supplied to the tank it is only necessary to remove the cover 39 and pull on the flexible connection 58 until the upper end of the section 56 is raised above the surface of the oil whereupon samples of the oil may be readily obtained or the incoming oil merely given a visual inspection. If it is desired to lower the oil level of the tank one-third, the pipe line 47 is lowered the desired amount and the pumping is continued until the float reaches the lower level. This result can be accomplished without any danger of the terminal section 56 being placed above the level of the oil in the tank.

In case it is desired to drain the tank for the purpose of cleaning or repairing the same the float 20 will be deposited upon the rests 44, $44^a$ and $44^b$ where it may remain until the tank is again filled to a level sufficient to support the floating roof by the buoyant effect of the oil.

Having described my invention what I claim as new and desire to secure by Letters Patent is:—

1. In an oil tank, the combination of a floating roof, means pivotally attached to said roof and interposed between the roof and the side wall of the tank for sealing the tank against evaporation, spring devices for supporting said means from said floating roof, and rests mounted on the base of the tank for supporting the roof when the oil level is lowered sufficiently, said rests having depressions formed therein for receiving said means.

2. In an oil tank, the combination of a floating roof, means mounted on the roof and interposed between the roof and the side wall of the tank for sealing the tank against evaporation, said means normally projecting slightly below the base of the floating roof, and rests in the tank for supporting the roof when the oil level is lowered sufficiently, said rests having depressions formed therein for receiving said means.

3. In an oil tank, the combination with a shell, of a floating roof, a plurality of pipe lines leading into the tank, said pipe lines consisting of a plurality of sections pivotally joined together, means for attaching the end of one pipe line to the base of the floating roof in a drain opening formed therein, and means of adjustably supporting another of said pipe lines from said floating roof.

4. In an oil tank, the combination with a shell, of a floating roof, an extensible oil feed and drain pipe line located within said shell, said pipe line, including a terminal section pivotally secured thereto, means for adjustably suspending said pipe line from the floating roof, and means accessible from the float for varying the position of said terminal section relatively to the oil level in the tank.

5. In an oil tank, the combination with the shell of the tank, of a floating roof having an inspection opening formed therein, an extensible oil feed and drain pipe line located within said shell, said pipe line including a terminal section pivotally secured thereto, means for adjustably suspending said pipe line from the floating roof to varying depths within the oil, and means for raising said terminal section so as to expose the open end thereof to inspection through said opening.

6. In an oil tank, the combination with a shell normally open at the top, of a floating roof for closing said opening, an extensible oil feed and drain pipe line located within said shell, said pipe line including a pivoted terminal section, means for adjustably suspending said pipe line from the floating roof, said roof having an opening therein adapted to be closed by a detachable cover having a depending sleeve formed with a recess, and means secured to said terminal section adapted to be located in said recess whereby the angular position of said section may be adjusted at will.

7. In an oil tank, the combination with a shell, of a floating roof, an extensible oil feed and drain pipe line located within said shell, said pipe line including a terminal section pivotally secured thereto, means for adjustably suspending said pipe line from the floating roof including a windlass mounted on said roof having the cable thereof secured to said pipe line, and means accessible from the float for varying the angular position of said terminal section.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

FREDERICH W. KUEFFER.

Witnesses:
E. W. SHACKELFORD,
C. H. MCCRACKEN.