W. A. BOYCE & S. FISHER.

CEMENT RESERVOIR.

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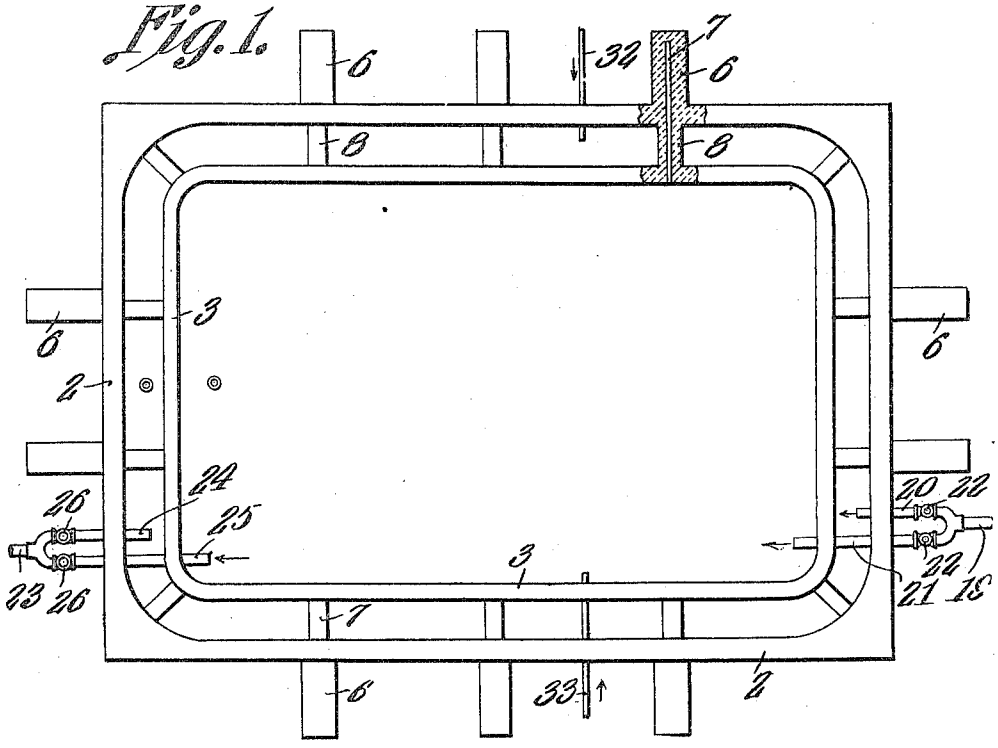
1,039,091. Patented Sept. 24, 1912.

Fig. 1.



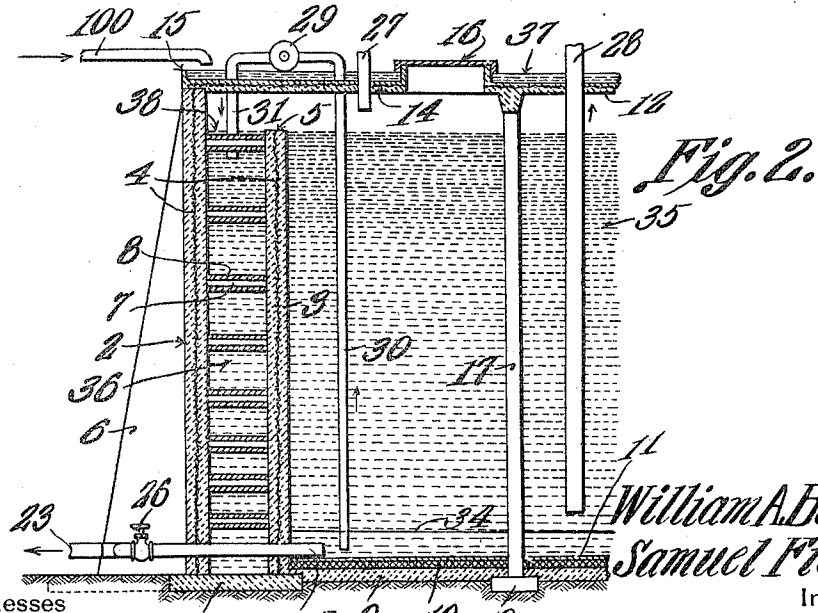


Fig. 2.

Witnesses

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CEMENT RESERVOIR.

1,039,091. Specification of Letters Patent. Patented Sept. 24, 1912.

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To all whom it may concern:

Be it known that we, WILLIAM A. BOYCE and SAMUEL FISHER, citizens of the United States, residing at Gas City, in the county of Grant, State of Indiana, have invented a new and useful Cement Reservoir, of which the following is a specification.

It is the object of the present invention to provide a storage tank or reservoir for oil, so constructed that seepage of the oil through the walls of the reservoir, will be prevented.

A further object of the invention is to provide an oil reservoir, the oil in which will be entirely surrounded by bodies of water, thereby preventing the evaporation of the oil.

A further object of the invention is to provide novel means for supplying water to the tank or reservoir, and to provide means for maintaining a circulation of the water.

A further object of the invention is to provide an oil reservoir or tank of unusual strength.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of invention herein disclosed can be made within the scope of what is claimed without departing from the spirit of the invention.

In the accompanying drawings,—Figure 1 shows the invention in top plan, the roof of the reservoir being removed; and Fig. 2 is a fragmental vertical transverse section of the reservoir.

The reservoir may be fashioned in a variety of ways. If desired, a foundation 1, preferably of concrete, may be fashioned, and upon the foundation 1 may be superposed an outer wall 2 and an inner wall 3, these walls 2 and 3 being likewise fashioned from concrete, and being suitably reinforced by metallic mesh work, or the like, as shown at 4. The specific material from which the walls and the foundations are made, will vary, but they are preferably monolithic structures. For a purpose to be set forth hereinafter, the upper edge of the inner wall 3 is spaced, as shown at 5, below the upper edge of the outer wall 2. The outer wall 2 is reinforced by buttresses 6, placed as closely together as may be desired. The walls 2 and 3 are connected by transverse stay rods 7, terminally extended into the buttresses 6, as clearly shown in Fig. 1. The stay rods 7, between the walls 2 and 3, are surrounded by concrete or the like, as shown at 8.

The bottom of the reservoir may be constructed variously. In the present instance, the bottom consists of a layer of concrete 9, upon which is superposed a layer of asbestos 10, covered by a layer of grout 11; although these structural details, obviously, may be departed from. The layer of asbestos 10 serves to prevent sudden changes in the temperature of the contents of the reservoir, due to terrestrial temperature changes.

The roof of the reservoir is supported upon the outer walls 2, the roof being constructed as the exigencies of the case may demand. In the present instance, the roof consists of a layer of concrete, denoted by the numeral 12, and reinforced, as shown at 14, the roof being provided with an upstanding peripheral lip 15, having a function which will be set forth hereinafter. Access is had to the interior of the reservoir, for the purpose of ascertaining the ullage, through a scuttle, of any desired form, and denoted by the numeral 16. Of these scuttles 16, there may be any number. The roof is supported by struts, one of which appears in Fig. 2, and is there denoted by the numeral 17, the strut 17 being supported upon a suitable foundation 18.

The bottom of the reservoir is normally covered by a layer of water, and the space between the walls 2 and 3 is likewise filled with water. To provide for the introduction of the water into the places specified, any desired number of water supply pipes may be provided, one of which, denoted by the numeral 19, appears in Fig. 1. The water supply pipe 19 is equipped with a branch 20 which discharges between the walls 2 and 3, another branch 21 of the pipe 19, discharging within the inner wall 3. Through the medium of the branch 20, the space between the walls 2 and 3 may be filled with water, as shown at 36; and through the medium of the branch 21, a layer of water 34 may be deposited upon the bottom of the reservoir. The branches 20 and 21 are equipped with cut-off valves 22.

The water may be drained from between the walls 2 and 3, and from the bottom of the reservoir, through a drain pipe 23, having a branch 24 opening between the walls 2 and 3, another branch 25 opening within the inner wall 3. In the branches 24 and 25, there are cut-off valves 26. The reservoir may be equipped with any number of drain or discharge pipes, and it may be stated that the specific means shown for supplying water to the structure, and for removing the water therefrom, may be taken as typical of any means for securing the desired results.

A layer of oil, shown at 35, is deposited upon the layer of water 34, through the medium of a series of oil inlet pipes 27, positioned as may be desired. In the present instance one of the pipes 27 is shown in Fig. 2, as entering the top of the reservoir. The oil 35 may be removed from the reservoir, through a series of pipes, one of which is shown at 28 in Fig. 2.

Located at any desired point with respect to the reservoir, is a pump 29. From one side of the pump 29 a branch pipe 30 extends downwardly into the reservoir, below the oil 35, and into the water 34 which is upon the bottom of the tank. From the other side of the pump 29 a branch 31 discharges between the walls 2 and 3.

The water 34 upon the bottom of the tank, and the water 36 between the walls 2 and 3 may be heated by any suitable means. In the present instance, noting Fig. 1, a steam supply pipe 32 is shown as entering the space between the walls 2 and 3, for the purpose above specified; another steam supply pipe 33 passing through the walls 2 and 3, adjacent the bottom of the tank.

In fashioning the walls 2 and 3, and in fashioning the bottom of the reservoir, care will be exercised to render the reservoir oil tight. It is found, however, that this result is difficult to attain, oil readily passing through a wall which water will not permeate. Since the bottom of the reservoir is covered by the layer 34 of water, the oil 35 in the reservoir cannot seep away downwardly. Moreover, since the inner wall 3 is surrounded by the wall of water 36, the oil 35 cannot seep away laterally. It may be stated at this point that, when a device constructed as hereinbefore set forth, was tested, there was no seepage of oil through the walls 2 and 3; whereas, after the water 36 was drawn away, the oil appeared upon the outer surface of the wall 3 after the space of a few hours. The invention makes it possible to construct the walls of the reservoir relatively thin, the water jacket about the walls serving to prevent seepage of oil therethrough, in spite of the thinness of the walls.

In order to prevent an evaporation of the oil 35, the roof of the reservoir is flooded with water as shown at 37, the water 37 being retained by the lip 15; and, if desired, means 100 may be provided for maintaining the water 37 constantly moving, so that the water will overflow the lip 15, and run down the outside of the outer wall 2. Thus, the entire reservoir will be adequately cooled, and evaporation may be prevented.

Should oil seep through the wall 3, the oil which finds its way between the walls 2 and 3 will rise to the top of the mass of water 36 between the walls, the oil accumulating at the top of the water 36, as shown at 38. If the pump 29 be put into operation, the water 34 will be drawn from the bottom of the reservoir, through the branch 30, and discharged through the branch 31, into the space between the walls 2 and 3, below the layer of oil 38, which has accumulated upon top of the water 36. The layer of oil 38 will thus be displaced, and pass over the upper edge 5 of the inner wall 3, the water passing over the edge 5, along with the oil, sinking to the bottom of the reservoir. It may be stated that when the wall 3 is water-jacketed, as hereinbefore described, the seepage of oil through the wall 3 will be very slight. In an oil tank having an extent of several acres, it may be desirable, however, to return accumulated oil shown at 38, to the interior of the reservoir; and to effect this result, the pump 29 may be operated; it being recalled that the pump 29 is typical of any suitable means for displacing the water 36 which stands between the walls 2 and 3.

Having thus described the invention what is claimed is:

1. A concrete oil reservoir comprising spaced inner and outer walls, the inner wall being of less height than the outer wall; buttresses reinforcing the outer wall; reinforcing elements uniting the walls transversely, and terminally embedded in the buttresses; the bottom consisting of a layer of concrete, having a layer of heat-insulating material embedded therein; means for supplying water to the bottom of the reservoir; and means for introducing water between the walls.

2. A concrete oil reservoir comprising spaced inner and outer walls, the inner wall being of less height than the outer wall; buttresses reinforcing the outer wall; reinforcing elements uniting the walls transversely, and terminally embedded in the buttresses; a bottom for the reservoir, consisting of a layer of concrete, having a layer of heat-insulating material embedded therein; a roof supported by the outer wall, and provided with an upstanding lip; means for supplying water to the bottom of the reservoir; means for introducing water between the walls; and means for applying water

to the roof, within the contour of the lip; and means for effecting an interchange of water between the walls and the bottom.

3. A concrete oil reservoir comprising spaced inner and outer walls, and a roof supported by the outer wall, the upper edge of the inner wall being spaced from the roof, an oil inlet pipe entering the roof within the contour of the inner wall; an oil outlet pipe entering the roof within the contour of the inner wall; a U-pipe passing through the roof and having its branches disposed respectively between the walls and within the contour of the inner wall; a pump interposed in the last mentioned pipe, upon the outside of the reservoir; drain pipes opening respectively between the walls and within the contour of the inner wall; water supply pipes opening respectively between the walls and within the contour of the inner wall; steam pipes opening respectively between the walls and within the contour of the inner wall; and a water supply pipe discharging upon the roof.

In testimony that we claim the foregoing as our own, we have hereto affixed our signatures in the presence of two witnesses.

WILLIAM A. BOYCE.
SAMUEL FISHER.

Witnesses:
L. H. CONLEY,
WILL C. JAY.