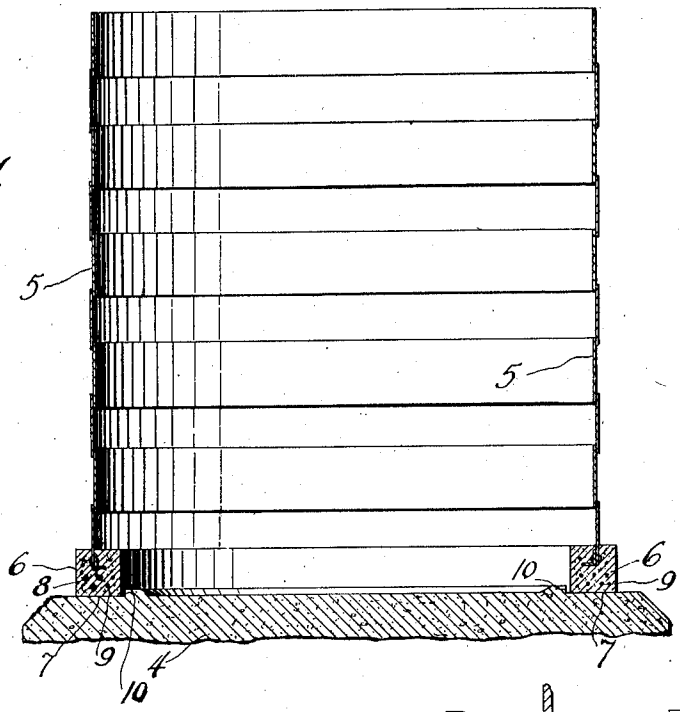
R. D. JOHNSON.

TANK AND METHOD OF FORMING THE SAME.

APPLICATION FILED APR. 23, 1919.

1,339,062. **Patented May 4, 1920.**

Fig. 1.



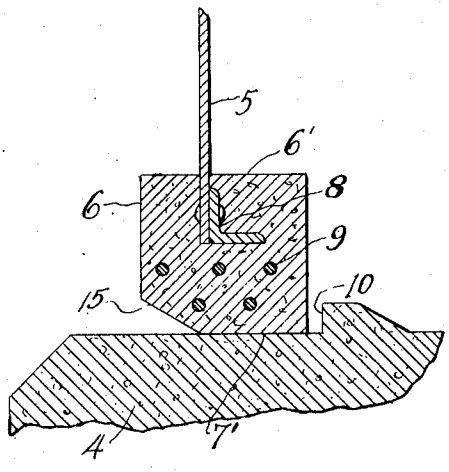


Fig. 2.

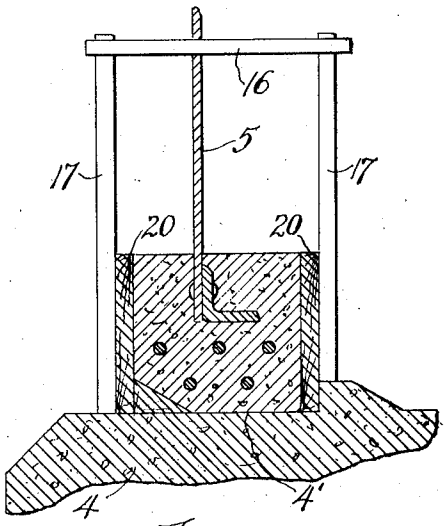


Fig. 3.

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By his Attorneys

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UNITED STATES PATENT OFFICE.

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TANK AND METHOD OF FORMING THE SAME.

1,339,062. Specification of Letters Patent. Patented May 4, 1920.

Application filed April 23, 1919. Serial No. 292,141.

To all whom it may concern:

Be it known that I, RAYMOND D. JOHNSON, a citizen of the United States, residing at Sea Gate, Coney Island, in the county of Kings and State of New York, have invented certain new and useful Improvements in Tanks and Methods of Forming the Same, of which the following is a specification.

This invention relates to the construction of fluid reservoirs and particularly to the formation of large metal tanks or containers in such manner as to allow for relative distortion between the sides and bottom.

Such a tank when filled with fluid expands or stretches in diameter to a greater degree than it is possible for the bottom to stretch, and in fact if the bottom is made of concrete it does not stretch at all. The greater stretching of the sides relative to the bottom sets up stresses at the point of connection between the sides and the bottom which cause a leakage often difficult or impossible to overcome.

By the structure of this invention and the method of its formation an intermediate member is provided between the elastic metal sides and the rigid bottom partaking of the movement of the former and maintaining a tight fit with the latter by utilizing the fact that smooth, accurately fitting surfaces under sufficient pressure may be relatively shiftable without permitting leakage of the fluid between them. In this way the stresses between the parts are made negligible and a durable, fluid-tight tank is provided.

In the accompanying drawings,

Figure 1 is a vertical section of a tank constructed in accordance with this invention,

Fig. 2 is a view on enlarged scale of a portion of Fig. 1, showing a modification and

Fig. 3 is a vertical section illustrating the method of formation of the tank shown in Figs. 1 and 2.

In the embodiment of the invention shown in the drawings 4 is a foundation bottom preferably of concrete and 5 is a metal cylinder forming the top of the reservoir. Fluid in the reservoir will tend to expand or stretch the metal cylinder sides 5 particularly at the bottom where the pressure is greatest and just where the sides of the reservoir meet the rigid unstretchable bottom 4, so that the stresses encountered here in practice have necessitated troublesome and expensive construction to avoid rupture and leakage.

By the structure of this invention an intermediate wall or ring 6 is provided between the metal cylinder 5 and the foundation 4 reinforcing the cylinder and moving with it and having a fluid-tight sliding fit at 7 with the bottom. The ring 6 is preferably of cement, concrete or similar material and embeds the lower end of the cylinder and the attached angle iron 8 and is provided with reinforcing rods 9, the whole forming a strong compact but yielding structure.

At the same time the wall 6 has its lower surface smoothed and slidingly mounted on a corresponding smooth surface of the foundation 4 the parts being retained in place by the central annular shoulder 10 so that the tank sides are free to expand and contract without undue stresses and without danger of causing leakage by rupture at the joint.

The smooth surface contact 7 is kept under sufficient pressure to form a leak-proof joint and the unit pressure here is preferably greater than the unit pressure of the reservoir water at the same point, so that any water finding its way between the surfaces will not be able to raise the ring. If necessary to secure this preponderance of unit pressure the outer corner of the ring may be cut away as shown at 15 in Fig. 2, thus concentrating on the reduced surface 7′ the weight of the cylinder and ring and of the column of water above the surface 6′ of the ring. At all levels of the fluid in the reservoir the pressure between the surfaces at 7′ will necessarily exceed the fluid pressure at that point assuming that the material of the tank and ring exceeds the fluid in specific gravity.

The structure of this invention avoids the failure of the tank at the juncture of the sides and bottom and maintains a permanent fluid-tight joint. It is also simple and readily constructed and may be built up at the tank site. As illustrated in Fig. 3 after the foundation 4 has been finished and the tank shell 5 or the lower part of it completed the shell is suspended in spaced relation to the foundation by three or more horizontal bars 16 on supporting legs or posts 17; between these posts the forms 20 shape a

curved trough into which the concrete for the ring 6 is poured embedding reinforcing rods and the lower end of the cylinder shell, the smooth surface 4′ of the foundation having been previously troweled hard, coated, or otherwise protected from adhesion to the concrete of the ring 6. When the ring 6 has hardened, the forms and supports are removed and the reservoir upon completion of the shell is ready for use. It is obvious that other material may be used for the ring and foundation instead of concrete or cement which however, is particularly advantageous in that it may be cast in place between the tank and its foundation.

I claim:—

1. In a tank or reservoir the combination with a metal cylinder for containing a liquid, of a bottom therefor comprising a horizontal base from which said cylinder is spaced, said base having a smooth annular surface, and a relatively low annular ring of concrete fitted between said cylinder and said base to slide on said base surface and embedding the lower edge of said metal tank and adapted to stretch therewith under pressure of the liquid in said tank.

2. A fluid tank or reservoir comprising a top cylinder of metal, a foundation having a smooth circular surface, a relatively low intermediate annular wall of concrete embedding the end of said cylinder and having a smooth under surface of an area such that its unit pressure will exceed the unit pressure of the column of water above it when the tank is full, said annular wall being fitted accurately to the surface of said foundation to permit relative movement between the parts while retaining fluid in said tank.

3. The method of forming a tank or reservoir comprising forming a cylindrical metal ring and a bottom foundation, sustaining the ring in spaced relation to said foundation, and forming a concrete wall embedding the end of said ring and separated from said foundation by a thin space permitting relative motion without leakage.

4. The method of forming a tank or reservoir comprising forming a cylindrical metal ring and a bottom foundation, sustaining the ring in spaced relation to said foundation, forming a concrete wall embedding the end of said ring and separated from said foundation by a thin space permitting relative motion without leakage, and adding an upper portion to said ring to complete said tank.

RAYMOND D. JOHNSON.