

June 28, 1932.

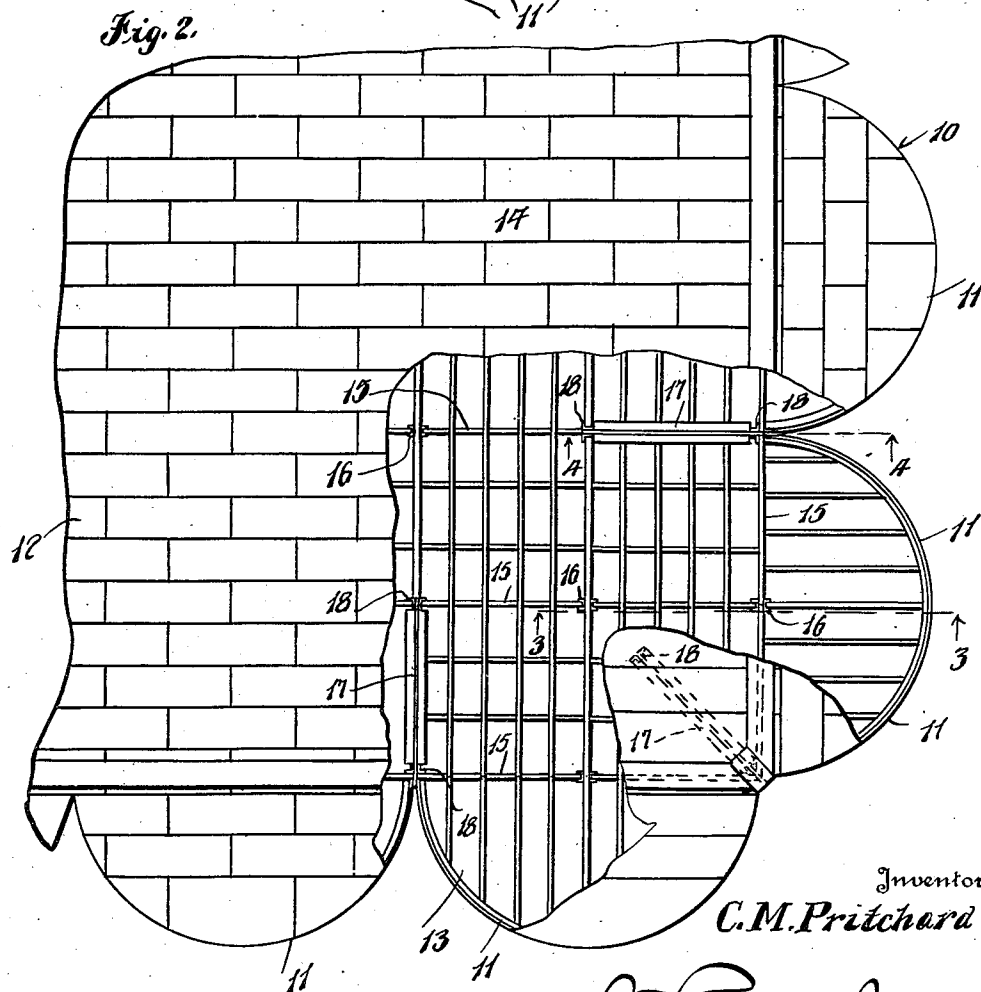
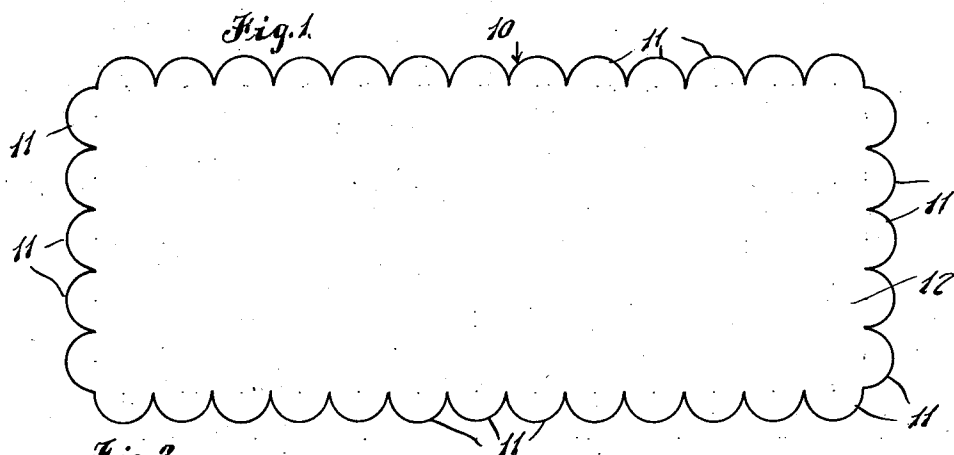
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1,864,759

STORAGE TANK OR CONTAINER

Filed Nov. 14, 1928

4 Sheets-Sheet 1



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Fig. 3

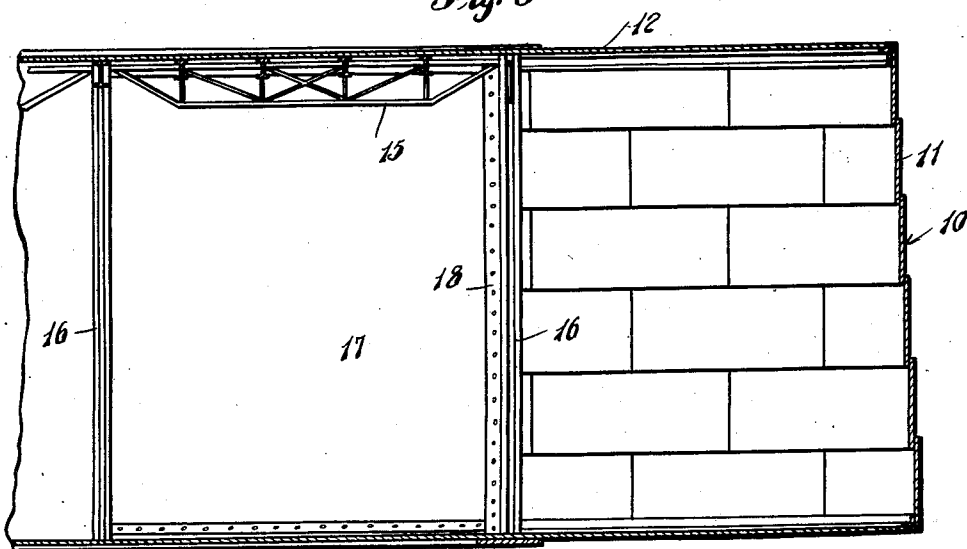


Fig. 6.

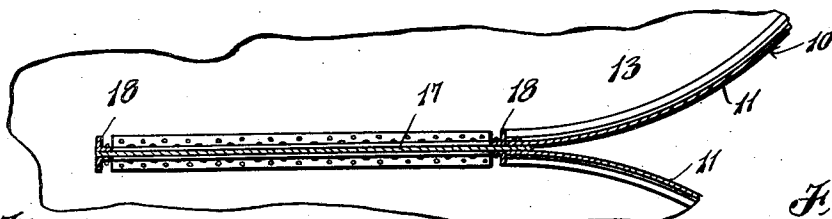


Fig. 4.

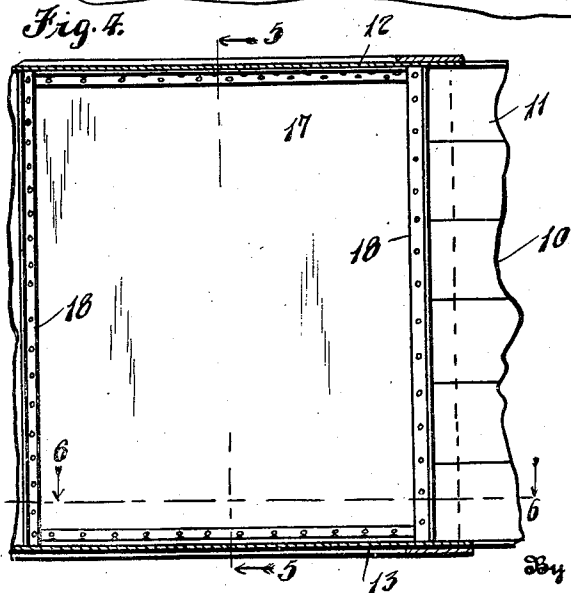
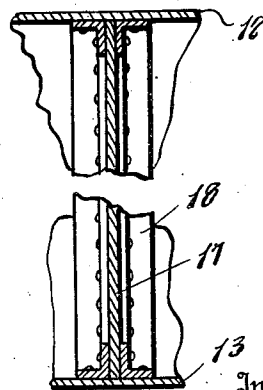


Fig. 5



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Fig. 11.

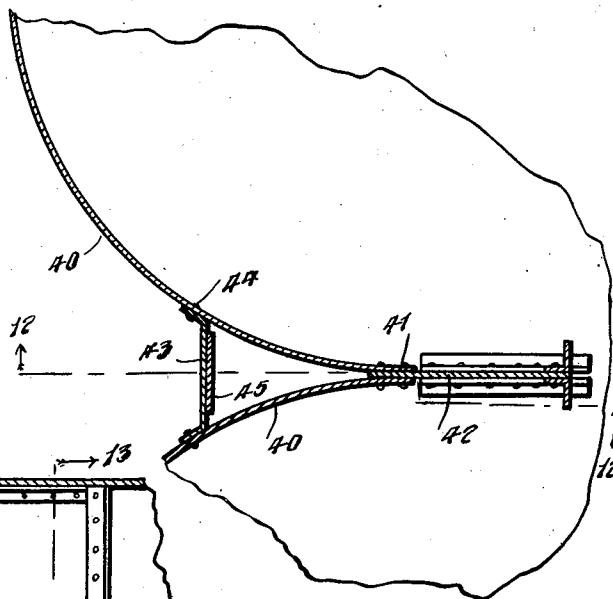


Fig. 12.

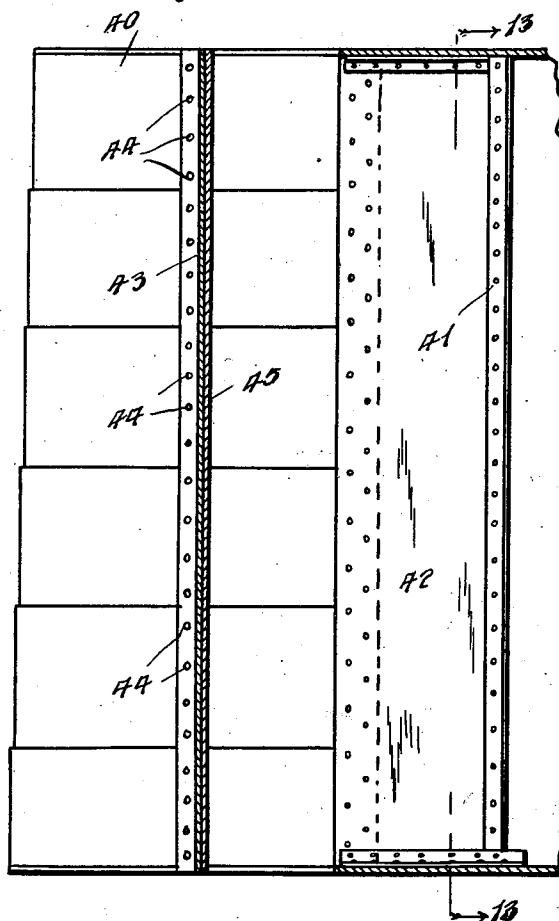
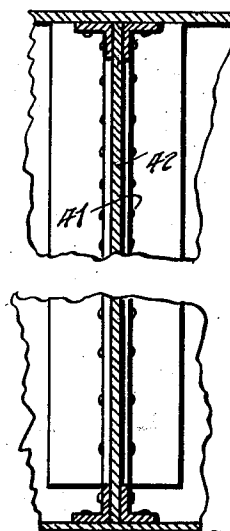


Fig. 13.



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UNITED STATES PATENT OFFICE

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STORAGE TANK OR CONTAINER

Application filed November 14, 1928. Serial No. 319,304.

This invention relates to a storage tank or container for liquids in exceptionally large quantities, and particularly for oil.

At the present time, oil is stored in large quantities in tanks on tank farms, which tanks have a capacity up to approximately eighty thousand barrels. It has been a desideratum to use larger tanks but up to the present time this has not been feasible since there has been no known means whereby such a tank could be made relatively inexpensively and whereby the stresses in the large circular tanks could be taken care of.

The difficulty is solved by the present invention which follows the theory that if a cylindrical or other form of tank is cut into segments along a longitudinal line, and then set any distance apart and so tying the sides together that the roof and bottom plates used will be brought into stress in order to hold such segments against the liquid pressure. A tank of course can follow the practice of the invention utilizing more than two segments and may be arranged so as to generally follow the outline of a large circle, square, rectangle or any other form desired.

It is also an object of the present invention to provide a construction wherein the different essential parts may be constructed as units, to be erected or torn down as desired so that the device may be readily installed and also may be rendered portable.

Additional objects and advantages will become apparent from a consideration of the description following taken in connection with accompanying drawings illustrating an operative embodiment.

In said drawings:—

Figure 1 is a plan view of a tank or container constructed according to the invention,

Figure 2 is an enlarged plan view of a portion of the tank or container of Figure 1, part of the top being broken away to disclose interior details,

Figure 3 is a cross sectional view taken on the line 3—3 of Figure 2,

Figure 4 is a cross sectional view taken on the line 4—4 of Figure 2,

Figure 5 is a cross sectional view taken on the line 5—5 of Figure 4,

Figure 6 is a cross sectional view taken on the plane of line 6—6 of Figure 4,

Figure 7 is a fragmentary plan view of a modified form, partly broken away to disclose interior details,

Figure 8 is a cross sectional view on the line 8—8 of Figure 7,

Figure 9 is a detail section taken on the line 9—9 of Figure 8,

Figure 10 is a detail section taken on the line 10—10 of Figure 8,

Figure 11 is a fragmentary horizontal sectional view taken through a further modified form,

Figure 12 is a vertical sectional view taken on the plane 12—12 of Figure 11, and

Figure 13 is a cross sectional view taken on the line 13—13 of Figure 12.

Referring specifically to the drawings, the tank is generally designated 10 and the various parts thereof are preferably made of structural steel, riveted permanently together or removably bolted together, but so as to be leak proof, as desired and so that in the latter event, the device may be made in units to permit increase in the size of a tank or removal of the tank in sections or units from one position to another.

The tank or container 10 has any suitable number of vertical walls as at 11 which are semi-circular, and arranged so that each two walls 11 in alinement are in effect halves of a circle or cylinder which are spaced apart. Such walls 11 are bolted or riveted to top and bottom walls 12 and 13, each preferably composed of section 14 suitably bolted or riveted together.

Various trusses 15 or other means may be used to strengthen or reenforce the walls 12 and 13. At suitable intervals, vertical trusses or posts 16 are disposed between and fastened to the top and bottom plates 12 and 13.

Of prime importance is the provision of vertical plates or girders 17 which are arranged interiorly of the tank and substantially tangential to the walls 11 and adjoining walls 11 are fastened together and to such plates 17 by bolting or riveting as desired. Such plates or girders 17 are fastened to the top and bottom walls 12 and 13 by bolts or

rivets. In order to strengthen the girders 17 and provide tension and compression and attaching flanges, angles 18 are riveted or bolted thereto as shown, certain of them in turn being riveted or bolted to the top and bottom walls 12 and 13 and others being riveted or bolted, as shown in Figure 6, to the walls 11.

As shown in Figure 2, the trusses 17 at the corners of the tank, are preferably diagonally arranged.

The container or tank 10 may be of any desired shape and as shown in Figure 1, the semi-circular walls 11 follow the general outline of a rectangle. They may obviously also follow the outline of a circle or other preferably symmetrical figure.

As a result of the construction described, the sides of the tank made up of the semi-circular walls 11 are so connected together that the roof and bottom plates, through the medium of the girders 17, are brought into stress and hold such side walls against the liquid pressure, it being understood that the vertical girders 17 are sufficiently strong to carry the outward pull of the semi-circular walls or shells 11, to resultant reactions at the top and bottom of the tank to deliver them to the top and bottom plates. Obviously the amount of material involved in delivering these stresses, size of vertical girders or trusses, and the amount of additional plates in top and bottom of the enlarged tank to distribute such stresses properly, is entirely dependent on the size of the semi-circle as to diameter and height, one would use.

In the form described in Figures 1 to 6, the trusses 17 are located completely within the tank. A modified form is shown in Figures 7 to 10 wherein the principal difference resides in the use of trusses or girders for the same purpose as those at 17, as indicated at 30, such trusses or girders 30 extending partly interiorly and partly exteriorly of the tank and the outer tension angles or flanges 31 thereof preferably, for economy, being inclined upwardly and inwardly as shown in Figure 8. The top and bottom plates 32 and 33 in this form, respectively, have extensions 34 and 35 accommodating the mounting and fastening of the girders or trusses 17. In this form, it will be noted that it is not necessary to diagonally arrange a girder or truss at a corner, as is the case in the first form as suggested in Figure 2.

Still another modified form is suggested in Figures 11 to 13. This form omits the use of posts or trusses such as 18 in the form of Figures 1 to 6, at the junction of the semi-circular plates 11 in that form. In other words, as shown in the modified form of Figures 11 to 13, the semi-circular walls 40, equivalent to those at 11, are riveted or bolted directly as at 41 to a vertical truss or girder 42 like that at 17 in the first form. In addition, and outwardly of the tank, a vertical

brace or girder 43, of channel form, spans the space between adjacent walls 40 and has its edge flanges riveted or bolted thereto as at 44. The girder 43 is preferably reinforced by a strip 45. It will be apparent that this structure utilizes the portions of the walls 40 between the bolts or rivets 41 and 44 as a substantial outer extension of the girder 42, and functioning in the same manner as the outer portions of the girders 30 in Figures 7 and 8.

The forms selected for illustration and detailed description herein have been segments of circular tanks and it is believed that these would be the more economical, but, except where specifically limited thereto in the appended claims, the invention contemplates the use of tanks of other than cylindrical form, that is wall sections of other curved figures such as elliptical and parabolic, and the segments of such tanks, as well as of the cylindrical tanks, may be more or less than a half of the tank form utilized.

Various changes may be resorted to provided they fall within the spirit and scope of the invention.

I claim as my invention:—

A tank for storing liquid having a rectangular shape defined by a plurality of straight side walls connected together by a top and a bottom, each side wall comprising semi-circular sections in longitudinal alignment and bracing panels connecting adjacent ends of the semi-circular sections and projecting into the interior of the tank beyond the abutting ends of the semi-circular sections.

In testimony whereof I affix my signature.

CLIFFORD M. PRITCHARD.