Sept. 9, 1958 A. J. PALFEY 2,851,075

COLLAPSIBLE TANK

Filed April 2, 1956 2 Sheets-Sheet 1

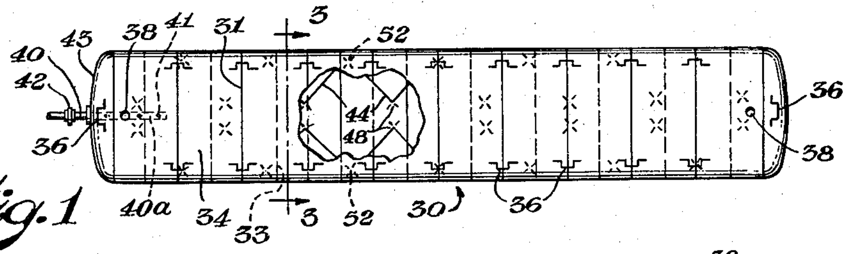

Fig. 1

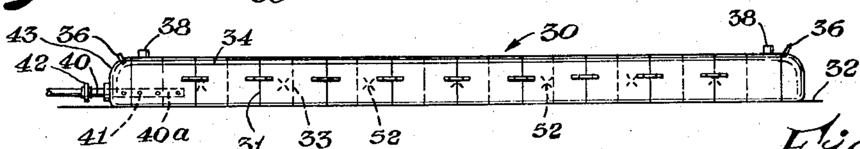

Fig. 2

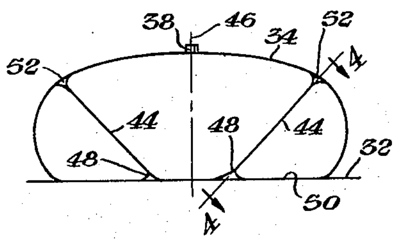

Fig. 3

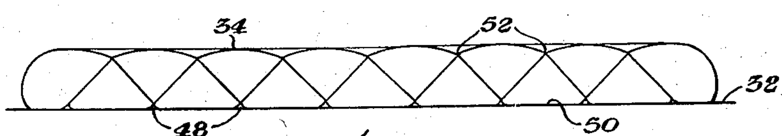

Fig. 4

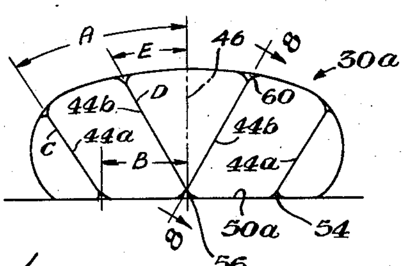

Fig. 5

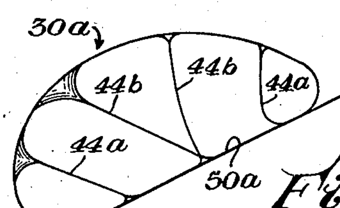

Fig. 6

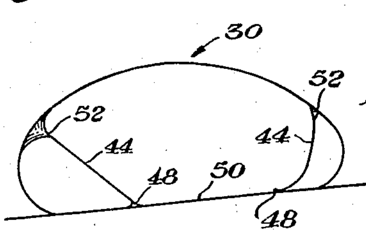

Fig. 7

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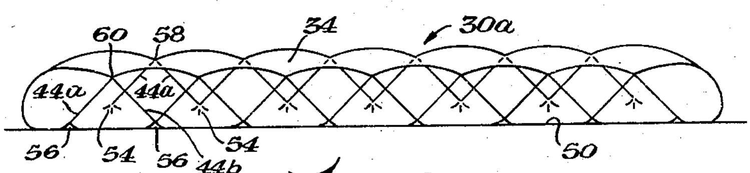

Fig. 8

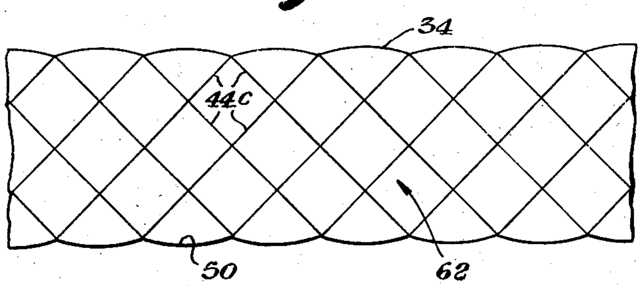

Fig. 9

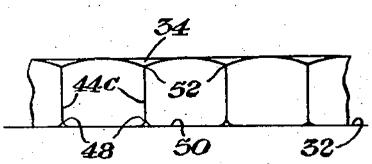

Fig. 12

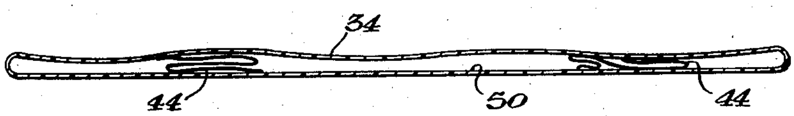

Fig. 10

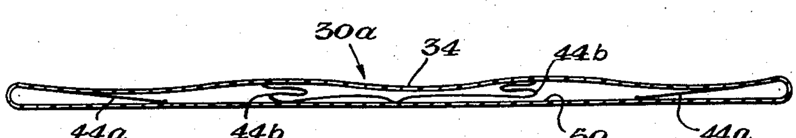

Fig. 11

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COLLAPSIBLE TANK

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Application April 2, 1956, Serial No. 575,474

15 Claims. (Cl. 150—0.5)

This invention relates to collapsible tanks and particularly to collapsible tanks which are adapted for use on sloping terrain.

Flexible, collapsible fabric vessels or tanks for the storage of fluids range in size from those having a capacity of a few hundred gallons to those having a capacity of many thousands of gallons. The use of such tanks is becoming more common because of their light weight, small storage space requirements when not in use, ease of transportation of the tanks to locations where needed, and ease of handling of the tanks. Flexible tanks are well adapted to use in oil and water well treatments, for example, in which large volumes of fluids are used and provision for at least temporary storage at the well site must be provided. Other uses, such as for, temporary fuel storage for either military or civilian purposes, have been suggested.

In the treatment of oil and water wells, the treating equipment is moved from job to job as much as 6 or 8 times a day. Hence, the time and special equipment needed to prepare leveled sites for collapsible tanks usually proves too costly. Because of the tendency of collapsible tanks to roll when disposed on sloping surfaces, it has heretofore usually been necessary to hold the tanks in position with guy ropes or by blocking or bracing the tank. Such expedients are time consuming and sometimes impossible to use.

While it is true that collapsible tanks can be constructed which are stable even when filled on sloping terrain, the shape of such tanks is such that a large wall surface area is required in relation to the fluid capacity of the tank and consequently the tank in its empty condition is bulky and difficult to load and unload from the vehicle in which it is transported from location to location.

Thus, in order that the bulk of the tank be small in relation to its capacity, a generally cylindrically shaped tank (with hemispherical end sections) is highly desirable despite the rolling tendencies of tanks of that shape. Also, sausage shaped tanks, when collapsed, may easily be folded or rolled into a compact bundle.

Accordingly, a principal object of this invention is to provide an improved, compact collapsible tank which is stable when the tank is disposed on a slope.

Another object of this invention is to provide an improved, more compact collapsible liquid storage tank which does not require external holding means to prevent excessive rolling of the tank on sloping terrain.

In accordance with this invention there is provided a collapsible tank having a generally cylindrical transverse central section (but elliptically shaped in transverse cross sectional configuration when the tank is filled and lying on level terrain) and having generally hemispherically shaped end sections. The tank has a plurality of flexible straps disposed symmetrically with respect to a vertical central plane extending from end to end through the tank. The straps or stabilizer elements may be arranged in either one or two rows on each side of the central vertical plane, depending on the degree of stability required and the shape of the tank when filled. The length of the straps and their points of attachment to the tank must be within suitable positioning limitations to achieve effective stabilizing action against rolling.

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The invention, as well as additional objects and advantages thereof, will best be understood when the following detailed description is read in connection with the accompanying drawing, in which:

Fig. 1 is a top view, partly broken away to show internal constructional features, of a filled collapsible tank in accordance with this invention;

Fig. 2 is a side elevational view of the tank shown in Fig. 1;

Fig. 3 is a transverse enlarged sectional view, taken along the line 3—3 of Fig. 1;

Fig. 4 is a sectional view taken along the line 4—4 of Fig. 3;

Fig. 5 is a transverse section through a tank similar to that of Fig. 1 and having two sets of internal stabilizers, two of the stabilizers being anchored to the bottom of the tank along the vertical center line of the tank;

Fig. 6 is a similar section to Fig. 11, but with the tank shown disposed on a sloping surface;

Fig. 7 is similar to Fig. 6, but shows a tank containing only a single set of stabilizer elements;

Fig. 8 is a sectional view taken along the line 8—8 of Fig. 5;

Fig. 9 is a fragmentary sectional view, similar to Fig. 4, but showing an alternative stabilizer arrangement comprising a network of rope-like elements;

Fig. 10 is a transverse sectional view of a collapsed tank having one set of stabilizers;

Fig. 11 is a transverse sectional view of a collapsed tank having two sets of stabilizers, and

Fig. 12 is a fragmentary sectional view, similar to Fig. 4, but showing the tie points for the stabilizers aligned with respect to one another whereby the stabilizers are disposed perpendicularly with respect to the longitudinal exis of the tank.

Referring to the drawings and particularly to Figs. 1–4 inclusive, there is shown a collapsible tank, indicated generally by the numeral **30**, shown inflated and disposed on a level surface **32**. The tank **30** is elongated, of roughly elliptical transverse cross sectional configuration and has dished shaped or somewhat hemispherically shaped end sections.

The tank **30** is, as illustrated, a two ply multiple section construction, the seams **31**, **33** between sections of each ply being staggered.

The wall **34** of the tank **30** is composed of fluid-tight sheet material, for example rubberized fabric. The tank has a plurality of hand hold and handling straps **36** affixed thereto along the sides of the tank **30** and at the ends.

Vents **38** are provided at or near to the top of the tank **30**. The vents **38** may be shut off if, for example, it is desired to preclude entrance of air.

A tube **40** which serves as a fluid inlet and outlet extends through one end of the tank **42**. The part **40***a* of the tube **40** which lies within the tank **30** has a plurality of apertures **41** to facilitate the discharge of fluid from the tank **30**. The tube **40** is fed through the tank end **43** in any desired fluid-tight manner. The end of the tube **40** which lies outside of the tank **30** conveniently terminates in a quick detachable type coupling unit **42**. The inlet-outlet tube **40** is illustrated as entering at the center of the end **42** of the tank **30**. However the tube **40** may be at one side of the tank **30** or otherwise disposed to project along the bottom inside the tank.

Referring particularly to Figs. 3 and 4, it may be seen that the tank **30** contains internal bracing or stabilizing tie members, for example, straps indicated generally by the numeral 44, which are symmetrically disposed on each side of the vertical longitudinal plane **46** of the longitudinal axis of the tank **30**. As shown in Fig. 4, the internal tension members or stabilizer elements braces **44**, in the form of flexible cables or straps, are generally equally spaced one from another at their points of attachment along the length of the tank. A spacing between the points of attachment of the stabilizer elements **44** to the tank **30** of about ⅙ the girth dimension of tank **30** has proven to be a good spacing, although other spacings may be used.

Except at the ends of the tank, the stabilizer elements **44** are preferably attached in twos at each of the tie points **48** and **52**. The upper tie points **52** are in transverse vertical planes which are longitudinally offset from those of the lower tie points **48**. Thus, the stabilizer elements **44** do not extend directly outward from their points of attachment **48** to the points of attachment **52** on the sides of the tank **30**, but approach the tie points **52** obliquely as shown more particularly in Fig. 1. This arrangement of the stabilizer elements **44** results in a tank **30** which is stable in all directions against rolling when filled and on a sloping surface or support. Therefore the tank does not have to be as carefully oriented on the sloping location where it is to be filled as would be necessary if the stabilizer elements **44** were disposed in vertical transverse planes perpendicular to the vertical plane **46**.

Fig. 7 shows the cross-sectional appearance of a tank of the type shown in Fig. 1 when disposed on sloping terrain. Although the tank tends to roll counterclockwise, the left hand stabilizer elements **44** restrict the rolling movement of the tank to the distance required to tighten the stabilizer elements on the down hill side of the tank.

Although a tank **30** having left hand and right hand stabilizer elements is illustrated, both left hand and right hand stabilizers are not used at the same time to achieve stabilization. Thus, a tank having stabilizer elements on one side only would be practical provided the tank is oriented so that the stabilizer containing side is always the "down hill" side.

Fig. 10 shows a transverse sectional view of a collapsed tank **30** containing a single set of stabilizer elements **44**. The stabilizer elements **44** fold readily leaving a flat pack which may be easily folded for storage and shipment when the tank **30** is not in use.

Figs. 5 and 6 are transverse cross sections of a tank **30***a* having two sets of internal stabilizers or braces **44***a*, **44***b* respectively, with the tank shown disposed in a level position in Fig. 5 and tilted in Fig. 6. A "set" of stabilizer elements or "braces," as the term is used herein, means stabilizers or braces **44** in corresponding positions on each side of the vertical central plane **46** passing longitudinally through the tank **30** when the tank is disposed on a level surface. Under such conditions the braces **44***a* constitute one "set" and the braces **44***b* constitute another "set." The lower ends of the braces **44***a* are attached to the bottom **50***a* of the tank **30***a* at the position where the bottom **50***a* of the tank is intersected by the vertical central plane **46**. The braces **44***a* correspond roughly to the single set of braces shown in Fig. 4. The disposition in the tank **30***a* of each set of braces or stabilizers **44***a* and **44***b* will be explained in detail later.

Referring to Fig. 8, as well as to Figs. 5 and 6, the manner of disposing the braces or stabilizer elements **44***a*, **44***b* may be clearly seen. The tie points or points of attachment **54** and **56** on the bottom **50** of the tank **30***a* are staggered with respect to the corresponding side wall tie points **58** and **60**. The tie points **54**, **58** are joined together by stabilizer elements **44***a* and the tie points **56**, **60** are joined together by the stabilizer elements **44***b*.

Fig. 11, similar to Fig. 10, shows a collapsed (un-filled) tank **30***a* having two sets of stabilizer elements **44***a*, **44***b*.

Fig. 9 is a fragmentary sectional view of the general type shown in Fig. 4, but with the stabilizer elements being the individual strands **44***c* of a net-like structure, indicated generally by the numeral **62**. The net-like structure **62** extends between the bottom **50** and side wall **34** to replace the individual stabilizer elements **44** shown in Fig. 3, for example.

Although two of the stabilizer elements **44**, **44***a*, or **44***b* have been illustrated in the various figures of the drawings as being connected to each of the tie points (except for the end tie point or points, that is), such an arrangement is not essential to achieve stability of the tank **30** or **30***a*. However, when the points of attachment of the stabilizer elements are staggered with respect to one another, attaching each end of each stabilizer element to a separate tie point would not only add considerably to the cost of fabrication of the tank **30** or **30***a*, but would result in considerable additional strain being placed on the tank wall between two adjacent tie points.

The length of the stabilizer elements **44**, for example, and the positioning of their points of attachment with respect to a vertical central axis **46** determines the degree of stability of a tank **30** containing stabilizer elements.

The weight of the tank fabric with respect to the weight of the liquid load the tank can hold must be considered in determining the point of attachment of the stabilizer elements. For example, in a tank **30** containing a single set of stabilizer elements **44** (as in Fig. 3), and having a fabric to load weight ratio of 1:80 with the tank filled with a liquid having a specific gravity of about 1.0, the array stabilizer elements **44** should be attached to the bottom **50** of the tank **30** at a distance equal to about .114 of the girth dimension of the tank from the vertical center line **46**. Similarly, the upper point of attachment or tie point **52** should be about .23 of the girth dimension of the tank from the vertical center line **46**. The girth dimension, as used here, is intended as the girth of the tank as measured around the tank at the point of attachment. It should be emphasized that while the dimensional data as to length of stabilizers **44** and the positioning of the points of attachment **48**, **52** are such that good tank stability is achieved, points of attachment within the scope of the invention will provide varying degrees of stability. For example, the points of attachment of each array need not necessarily be in a straight line along the tank, but may vary slightly without seriously affecting the stability of the tank thus constructed.

The length of each stabilizer element **44** used in tanks having the above mentioned fabric weight to load weight ratio should be about .115 of the girth dimension divided by the cosine of the angle the attached stabilizer element makes (when the tank is inflated by its load on level terrain) with the vertical plane perpendicular to the plane **46** and passing through the point of attachment **48** on the bottom of the tank **30**.

To show the effect of a change in fabric weight to load weight ratio on the placement and length of the stabilizer elements, a tank **30** having a fabric weight to load weight ratio of 1:50 should have the upper or side wall tie point located about .22 of the girth dimension from the intersection of the vertical central or axial plane **46** with the top of the tank **30**. The bottom tie points **48** should be about .075 of the distance from the intersection of the central plane **46** with the bottom **50** of the tank. The length of each stabilizer element should be about .145 of the girth dimension divided by the cosine of the angle the stabilizer makes (under the conditions described above) with the vertical plane which passes through the point of attachment **48** and is perpendicular to the plane **46**.

It may be noted that a fabric weight to load weight ratio becomes smaller, the bottom point goes further from the central vertical plane **46**.

Tanks of the type shown in Figs. 1–3 and made in accordance with the above dimensional data have proven to be stable when filled and emptied on a 20 percent grade. It is also obvious that not all the stabilizers need be attached at tie points **48** or **52** which are the same distance from the intersection of the plane **46** with the top or bottom of the tank. The data given for the length and points of attachment of the stabilizers is by way of example of generally good design and not intended to completely define the scope of the invention. Further although tanks having fabric weight to load weight ratios greater than 1 to 50 or 1 to 80 may occur, the range between the two specifically given ratios are to be preferred generally.

The dimensional data for tanks **30***a* having two sets or arrays of stabilizer elements **44***a*, **44***b*, as in Fig. 5, are given with respect to the distances A, B, C, D, and E indicated in Fig. 5.

The dimension "E" should be equal to .095 of the girth dimension (as previously defined). The dimension "B" should be between .05 and .12 of the girth dimension, as defined above, the longer lengths (towards .12) being from tanks **30** having fabric weight to load weight ratios smaller than 1:50 (as 1:80, for example). In tanks in which the stabilizer elements lie in a vertical plane perpendicular plane **46**, the combined dimensions B plus C times the cosine of the angle the stabilizer element C makes with the vertical plane passing through the bottom point of attachment of the stabilizer and perpendicular to the plane **46** should not exceed .25 of the girth of the tank **30***a* and should be equal to or slightly less than dimension A. Thus, dimension A should not exceed .25 of the girth dimension of the tank. The dimensions C or D should be between .9 and 1.0 times the linear distance between the proposed points of attachment.

The above data is given for stabilizing a tank for use on a 20 percent grade. As stated in connection with tanks **30** having but a single set of stabilizers **44**, alternative stabilizer dimensional and placement arrangements may provide suitable stabilization of the tank for other tank usage requirements.

In operation, whether one or two sets or arrays of stabilizers are used in the tank, the bottom of the tank is held down by the weight of fluid in the tank and thus serves as an anchor for the stabilizers. But the fabric weight also contributes to the effectiveness of the bottom of the tank as an anchor for the stabilizers as previously mentioned.

Reference is now made to the operation of collapsible tanks. On a sloping supporting surface, that is, sloping terrain a flexible fabric vessel containing a liquid will roll and coast down hill due to the resultant horizontal component of the vertical fluid pressure tank.

Since the unbalanced forces phenomenon discussed above presents stationary and moving sections, advantage is taken of this fact to hold the tank stationary by joining together the bottom or normally stationary sections with those sections which potentially tend to move, or the top and side sections, with arrays of stabilizers or braces **44**, **44***a*, or **44***b* of negligible stretch.

The length of the various stabilizer elements has been described in terms of the cosine of the included angle made between a stabilizer element and a vertical plane perpendicular to the central or axial vertical plane **46** of the tank. In most tanks the said included angle will not exceed 45° and may even be 0 degrees in which case the cosine of the angle is of course **1**. Tanks having stabilizer elements whose above defined included angle is 0 degrees are disclosed and claimed in applicant's copending application Serial No. 556,573, filed December 30, 1955, entitled "Collapsible Tank," now abandoned.

Fig. 12, similar to Fig. 4, illustrates a tank in which top and bottom points of attachment (**48**, **52**, for example) of the stabilizer elements lie in the same vertical plane which is perpendicular to the vertical axial plane **46**. Thus, as mentioned above, the "included angle" is zero and the cosine of zero degrees is 1, as described above.

It is assumed in the above discussion that the longitudinal axis of the tank is preferably arranged horizontally when the tank is used on a slope.

It is realized that for other uses, such as military use, for example, tanks which are stable on steeper slopes than 20 percent slopes may be desired. Such tanks may be constructed in accordance with this invention by providing a suitable B dimension as described for the fluid weight to fabric weight ratio involved.

In the discussion of stabilized tanks made in accordance with this invention, no mention has been made of the coefficient of friction between the tank and its support (earth, platform, etc.) and its effect on the stability of the tank **30**. It is assumed that the support will be earth which is not unduly pebbly in nature and that the support is not ice covered. Under conditions where the tank is disposed on pebbly or icy terrain, the degree of stability of the tank will necessarily be reduced to the extent that the horizontal component of the frictional force between the surface of the bottom of the tank and its supporting surface is decreased.

This application is a continuation-in-part of my copending application Serial No. 556,573, filed December 30, 1955, entitled "Collapsible Tank," now abandoned.

I claim:

1. In a flexible fabric walled elongated tank adapted to hold a liquid, said tank being generally symmetrical about the vertical plane of the longitudinal axis when resting on a level surface, at least one array of flexible stabilizer members inside the tank, each of said members having one end held to the upper side of the tank at a point remote from the vertical plane of the longitudinal axis of the tank and the other end held to the bottom side of the tank nearer to the said vertical plane than the end held to the upper side and having a length less than the shortest peripheral distance measured along the inside surface of the tank between the said holding points, each said member when taut sloping from the upper to the lower end toward the said vertical plane.

2. In a collapsible flexible fabric walled elongated tank wherein an array of flexible stabilizing tension members are disposed on each side of the vertical plane of the longitudinal axis of the tank.

3. A collapsible tank in accordance with claim 2, adapted to hold a liquid, said tank being generally symmetrical about the vertical plane of the longitudinal axis when resting on a level surface, an array of flexible stabilizing tension members inside the tank disposed on at least one side of the vertical plane of the longitudinal axis of the tank, each member having one end held to the upper side of the tank and the other to the bottom side, the lower end of each tension member being nearer to the said vertical plane than the other end and having a length less than the shortest peripheral distance measured along the inside surface of the tank between the said holding points of the tension members.

4. A collapsible tank in accordance with claim 2, wherein said tank has a plurality of arrays of said flexible stabilizing members disposed on each side of the vertical plane of the longitudinal axis of the tank.

5. In a collapsible, flexible fabric walled, generally symmetrical elongated tank adapted to hold a liquid and having its top, bottom, and sides symmetrically disposed on each side of the vertical plane of the longitudinal axis of the tank when the tank bottom is disposed on a level supporting surface, the vertical plane passing through the top at a top intersection line and through the bottom at a bottom intersection line, a plurality of flexible stabilizer elements secured to and within the tank wall between top and bottom points of attachment thereto, said top points of attachment of each stabilizer element being

disposed at a distance from the said top intersection line of between .09 and 0.25 of the girth dimension of the tank as measured through said bottom point of attachment of each stabilizer, said bottom points of attachment of each stabilizer element being disposed on the same side of said vertical plane of the longitudinal axis as is its top point of attachment and at a distance from the said bottom intersection line of not greater than 0.125 of said girth dimension as measured above, the length of each stabilizer element being between .9 and 1.0 times the linear distance between its points of attachment as measured before said stabilizer element is attached thereto.

6. In a collapsible, flexible fabric walled, generally symmetrical elongated tank adapted to hold a liquid and having its top, bottom, and sides symmetrically disposed on each side of the vertical plane of the longitudinal axis of the tank when the tank bottom is disposed on a level supporting surface, the vertical plane passing through the top at a top intersection line and through the bottom at a bottom intersection line, a plurality of flexible stabilizer elements secured to and within the tank wall between top and bottom points of attachment thereto, said top points of attachment being disposed on the top and bottom point of attachment for each of the individual stabilizer elements being on the same side of the plane of the longitudinal axis of the tank, on opposite sides of and at a distance from the said top intersection line of between .2 and 0.25 of the girth dimension of the tank as measured through the individual bottom points of attachment, said bottom points of attachment being disposed on opposite sides of and at a distance from the said bottom intersection line of not greater than 0.125 of said girth dimension, the length of each stabilizer element being not greater than

$$\frac{A}{\text{Cos } B}$$

where A is .9 times the distance between the top point of attachment and the top intersection line minus the distance between the bottom point of attachment and said bottom intersection line, and B is the included angle at which each stabilizer element meets the vertical plane passing through the bottom point of attachment of each stabilizer element and perpendicular to the vertical plane of the longitudinal axis.

7. In a collapsible, flexible fabric walled, generally symmetrical elongated tank adapted to hold a liquid and having its top, bottom, and sides symmetrically disposed on each side of the vertical plane of the longitudinal axis of the tank when the tank bottom is disposed on a level supporting surface, the vertical plane passing through the top at a top intersection line and through the bottom at a bottom intersection line, a plurality of flexible stabilizer elements secured to and within the tank wall between top and bottom points of attachment thereto, said top points of attachment being disposed, on opposite sides of and at a distance from the said top intersection line of 0.23 of the girth dimension of the tank as measured through the bottom point of attachment of each stabilizer element, said bottom points of attachment being disposed on opposite sides of and at a distance from the said bottom intersection line of 0.125 of said girth dimension, the length of each stabilizer element being not greater than

$$\frac{A}{\text{Cos } B}$$

where A is between .9 and 1.0 times the distance between the top point of attachment and the top intersection line minus the distance between the bottom point of attachment and said bottom intersection line, and B is the included angle at which each stabilizer element meets the vertical plane passing through the bottom point of attachment of each stabilizer element and perpendicular to the vertical plane of the longitudinal axis.

8. A collapsible, tank in accordance with claim 4, wherein said stabilizer elements on each side of said vertical plane are axially aligned with each other.

9. In a collapsible, flexible fabric walled, generally symmetrical elongated tank adapted to hold a liquid and having its top, bottom, and sides symmetrically disposed on each side of the vertical plane of the longitudinal axis of the tank when the tank bottom is disposed on a level supporting surface, the vertical plane passing through the top at a top intersection line and through the bottom at a bottom intersection line, an inner array and an outer array of flexible stabilizer elements secured to and within the tank wall between top and bottom points of attachment thereto, said top points of attachment said outer array being disposed on opposite sides of and at a distance from the said top intersection line of between .2 and 0.25 of the girth dimension of the tank as measured through said top point of attachment, said bottom points of attachment of said outer array being disposed on opposite sides of and at a distance from the said bottom intersection line of not greater than 0.125 of said girth dimensions as measured above, the length of each stabilizer element being between .9 and 1.0 times linear distance between the top point of attachment and the bottom point of attachment as measured before said stabilizer element is connected thereto, said bottom point of attachment of said inner array being generally along said bottom intersection line, the top point of attachment being between said top point of attachment of said outer array and said top intersection line, the length of each stabilizer element of said inner array being between .9 and 1.0 times the linear distance between said points of attachment of said inner array before as measured before said stabilizer elements are connected thereto.

10. A collapsible tank in accordance with claim 9 wherein said top point of attachment of said inner array is disposed about .095 of the girth dimension from the top intersection line.

11. A tank in accordance with claim 9, wherein stabilizer elements of said inner and outer arrays are symmetrically disposed on both sides of said vertical plane.

12. A tank in accordance with claim 9, wherein the corresponding stabilizer elements of each array are in axial alignment with one another and the elements of the inner array are interposed with the elements of the outer array.

13. A tank in accordance with claim 5, wherein said stabilizer elements comprise the strands of a net.

14. A collapsible tank in accordance with claim 5, wherein at least one of said stabilizer elements is disposed at an angle with respect to a vertical plane passing through the bottom point of attachment of said stabilizer element and perpendicular to said vertical plane of the longitudinal axis.

15. A collapsible tank in accordance with claim 5, wherein said angle does not exceed forty-five degrees.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 2,851,075 September 9, 1958

Albert J. Palfey

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 6, line 44, beginning with "2. In a collapsible flexible fabric" strike out all to and including "tension members." in line 60, and insert instead the following as claims 2 and 3:

2. In a collapsible flexible fabric walled elongated tank adapted to hold a liquid, said tank being generally symmetrical about the vertical plane of the longitudinal axis when resting on a level surface, an array of flexible stabilizing tension members inside the tank disposed on at least one side of the vertical plane of the longitudinal axis of the tank, each member having one end held to the upper side of the tank and the other to the bottom side, the lower end of each tension member being nearer to the said vertical plane than the other end and having a length less than the shortest peripheral distance measured along the inside surface of the tank between the said holding points of the tension members.

3. A collapsible tank in accordance with Claim 2, wherein an array of flexible stabilizing tension members are disposed on each side of the vertical plane of the longitudinal axis of the tank.

Signed and sealed this 24th day of February 1959.

(SEAL)
Attest:

KARL H. AXLINE

Attesting Officer

ROBERT C. WATSON
Commissioner of Patents