Claims

The invention claimed is:

1. A flexible tank for transporting bulk liquids or semi-liquid materials, comprising:

an interior tank made of a flexible water-proof polymeric material, said interior tank being generally rectangular in shape with a width of at least one end of the interior tank being less than the length of the interior tank, the interior tank enclosing within it the bulk liquid or semi-liquid materials being transported;

a first exterior layer made of a flexible polymeric material in a generally rectangular shape, a first end of the first exterior layer having a series of hollow loops and spaces between the hollow loops in a widthwise direction along the first end, the hollow loops and spaces alternating in sequence;

a second exterior layer made of a flexible polymeric material in a shape and size substantially similar to the first exterior layer, a first end of the second exterior layer having a series of hollow loops and spaces between the hollow loops, the hollow loops and spaces alternating in sequence in the widthwise direction of the first exterior layer, the first end of the second exterior layer being matched up with the first end of the first exterior layer such that the hollow loops of the second exterior layer occur at the positions of the spaces of the first exterior layer and the spaces of the second exterior layer occur at the positions of the hollow loops of the first exterior layer; and

a rope, the rope passing through the alternating hollow loops of the first and second exterior layers and connecting the first and second exterior layers to each other, the interior tank being constrained within the first and second exterior layers connected by the rope.

2. The flexible tank of claim 1, wherein said interior tank has multiple layers, at least one of said multiple layers of said interior tank being attached to said first exterior layer or said second exterior layer.

3. The flexible tank of claim 2, wherein said at least one of said multiple layers of said interior tank is attached to said first exterior layer or said second exterior layer by a weld.

4. The flexible tank of claim 3, wherein at least one of said multiple layers of said interior tank has a coupon or seam and said coupon or seam is folded inside of said first and second exterior layers.

~~5. The flexible tank of claim 1, wherein the hollow loops comprise folded over portions of the first and second exterior layers.~~

~~6. The flexible tank of claim 1, wherein the spaces comprise cut-outs from the flexible polymeric material.~~

~~7~~5. The flexible tank of claim 1, wherein the flexible tank is at least 20 feet in length.

~~8~~6. The flexible tank of claim 1, wherein the flexible tank has a capacity of more than 8,000 liters.

~~9~~7. A method of manufacturing a flexible tank for the transport of bulk liquids or semi-liquid materials, comprising:

folding over the ends of rectangular shaped first and second layers of flexible polymeric material to form a continuous loop over the entirety of the width of said ends of said first and second layers;

connecting the longitudinal sides of the first and second layers to form an open ended tube;

attaching a first end of a first end flap to the inside of one of the first and second layers near a first end of the open ended tube and a first end of a second end flap to the inside of one of the first and second layers near a second end of the open ended tube, the length of the first end flap being greater than the distance from its point of attachment to the first end of the open ended tube and the length of the second end flap being greater than the distance from its point of attachment to the second end of the open ended tube;

cutting portions from each one of the continuous loops of said ends of said first and second layers so as to become a sequence of alternating hollow loops and spaces, the hollow loops and spaces of the first layer interlacing with the hollow loops and spaces of the second layer;

inserting an inner liner into the interior space of the open ended tube formed by connecting the longitudinal sides of the first and second layers, the inner liner made of a flexible water-proof polymeric material so as to enclose within it the bulk liquid or semi-liquid materials being transported~~.~~;

moving the respective second ends of the first and second end flaps to cover the ends of the inner liner; and

closing the first and second ends of the flexible tank with the inner liner and end flaps constrained therein by threading a rope between the interlaced hollow loops of the first and second layers.

~~10~~8. A method of manufacturing a flexible tank as set forth in claim ~~9~~7, further comprising the first and second end flaps being attached by a weld to one of the first and second layers.

~~11~~9. A method of manufacturing a flexible tank as set forth in claim ~~10~~8, further comprising the first and second end flaps being attached about 30 to 36 inches from the ends of the open ended tube.

10. The flexible tank of claim 1, wherein the hollow loops comprises folded over portions of the first and second exterior layers.

11. The flexible tank of claim 1, wherein the spaces comprise cut-outs from the flexible polymeric material.

12. The flexible tank of claim 1, wherein the flexible tank further comprises a single valve through which the bulk liquid or semi-liquid materials are transferred into and out of the flexible tank.

13. The flexible tank of claim 12, further comprising a plurality of restricting elements across the width of the flexible tank restricting surges of the bulk liquid or semi-liquid materials within the flexible tank, said plurality of restricting elements forming at least three sections and controlling the liquid dynamics in the flexible tank, during transit.

14. The flexible tank of claim 13, wherein the restricting elements are baffles located external to the flexible tank.

15. The flexible tank of claim 13, wherein said at least three sections are interconnected and can each be loaded and unloaded with the bulk liquid or semi-liquid materials through said single valve.