Oct. 1, 1946. C. W. BRANDON ET AL 2,408,505

RECEPTACLE FOR FLUIDS

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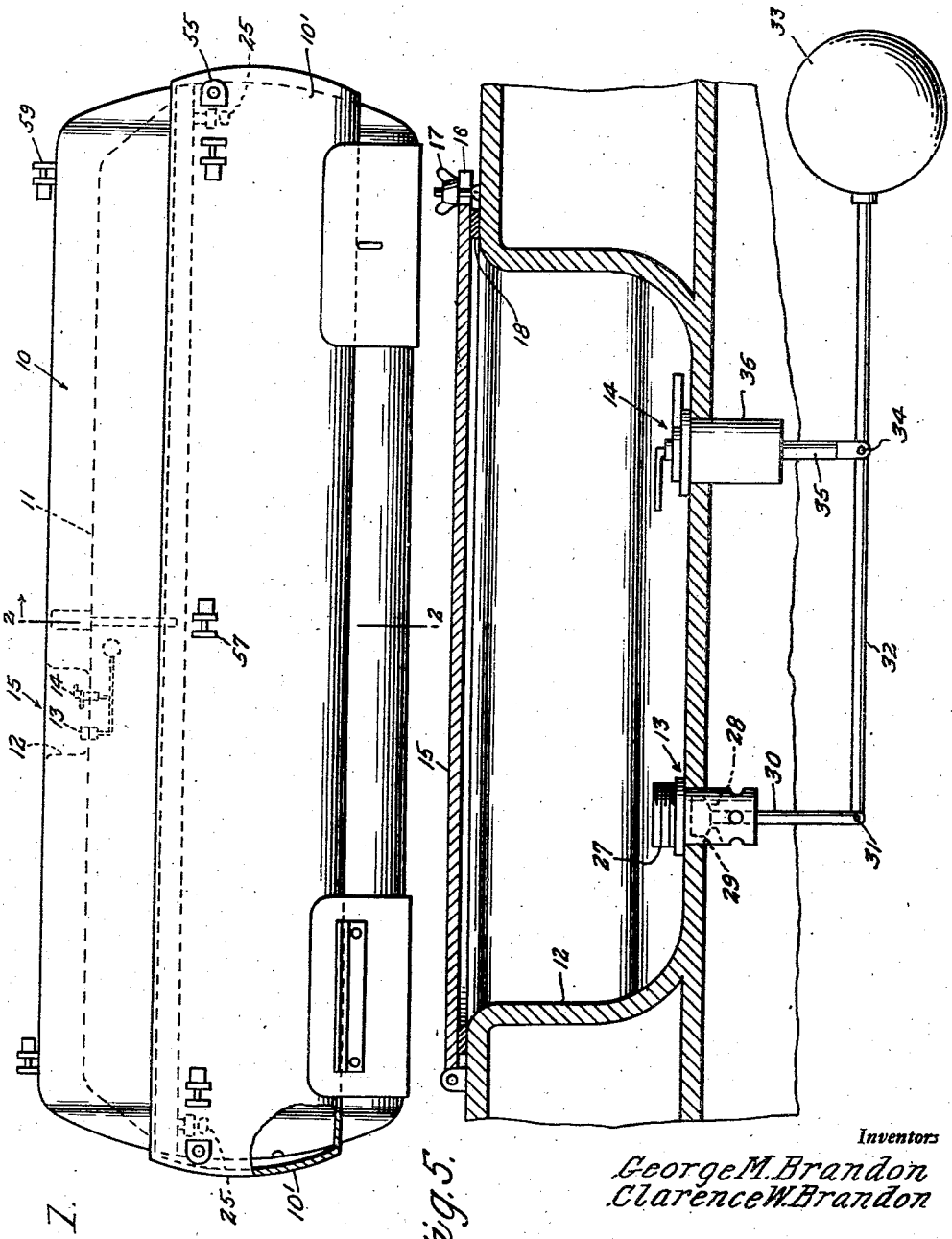


Fig. 1.

Fig. 5.

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Fig. 6.

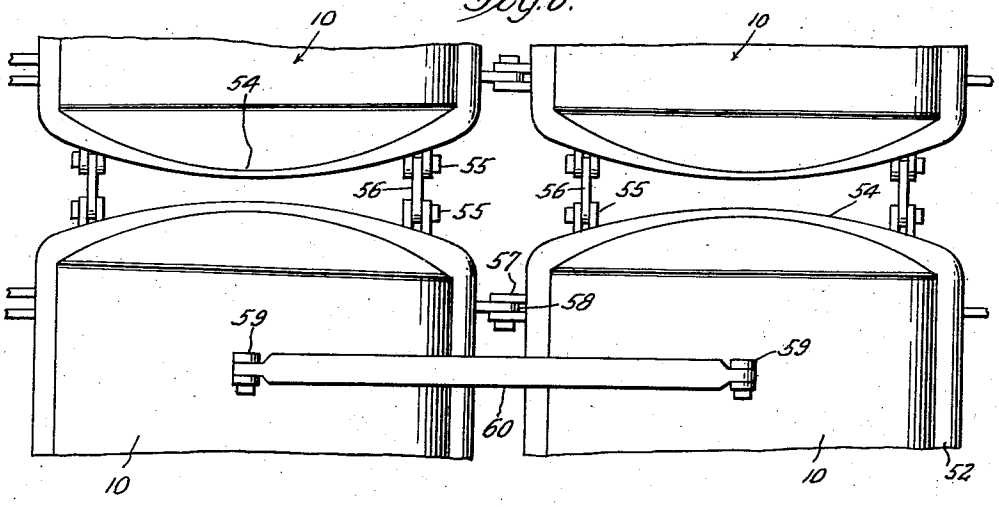
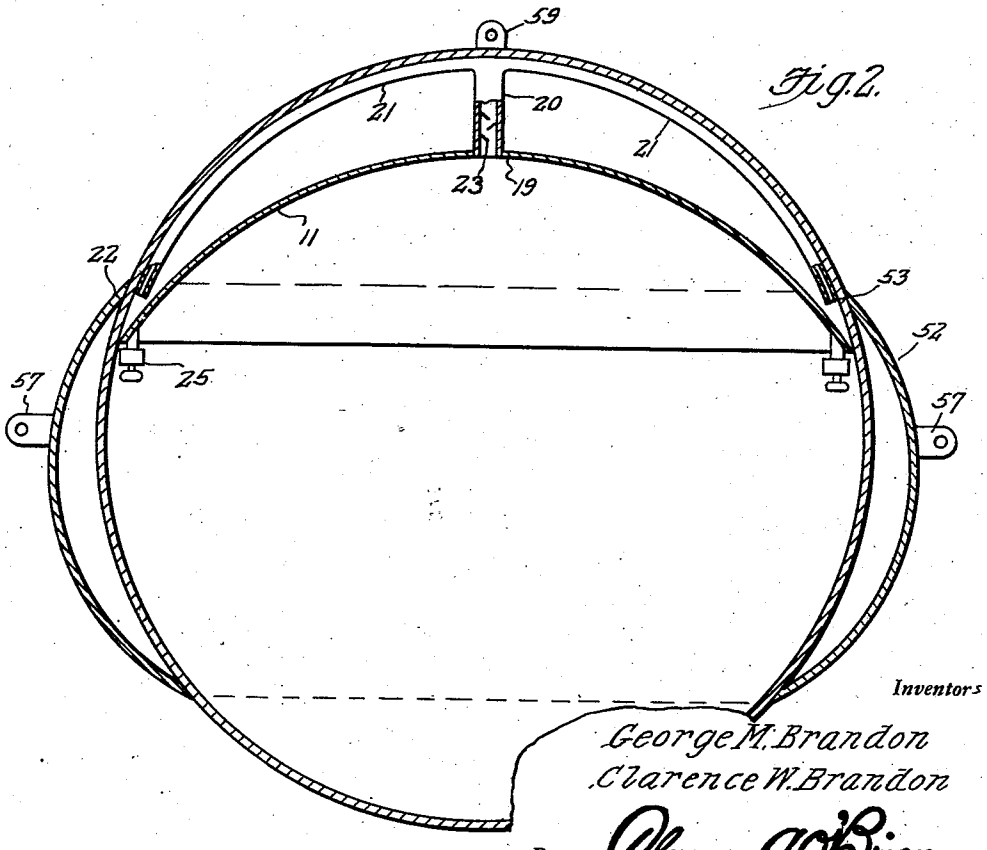


Fig. 2.



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Fig. 3.

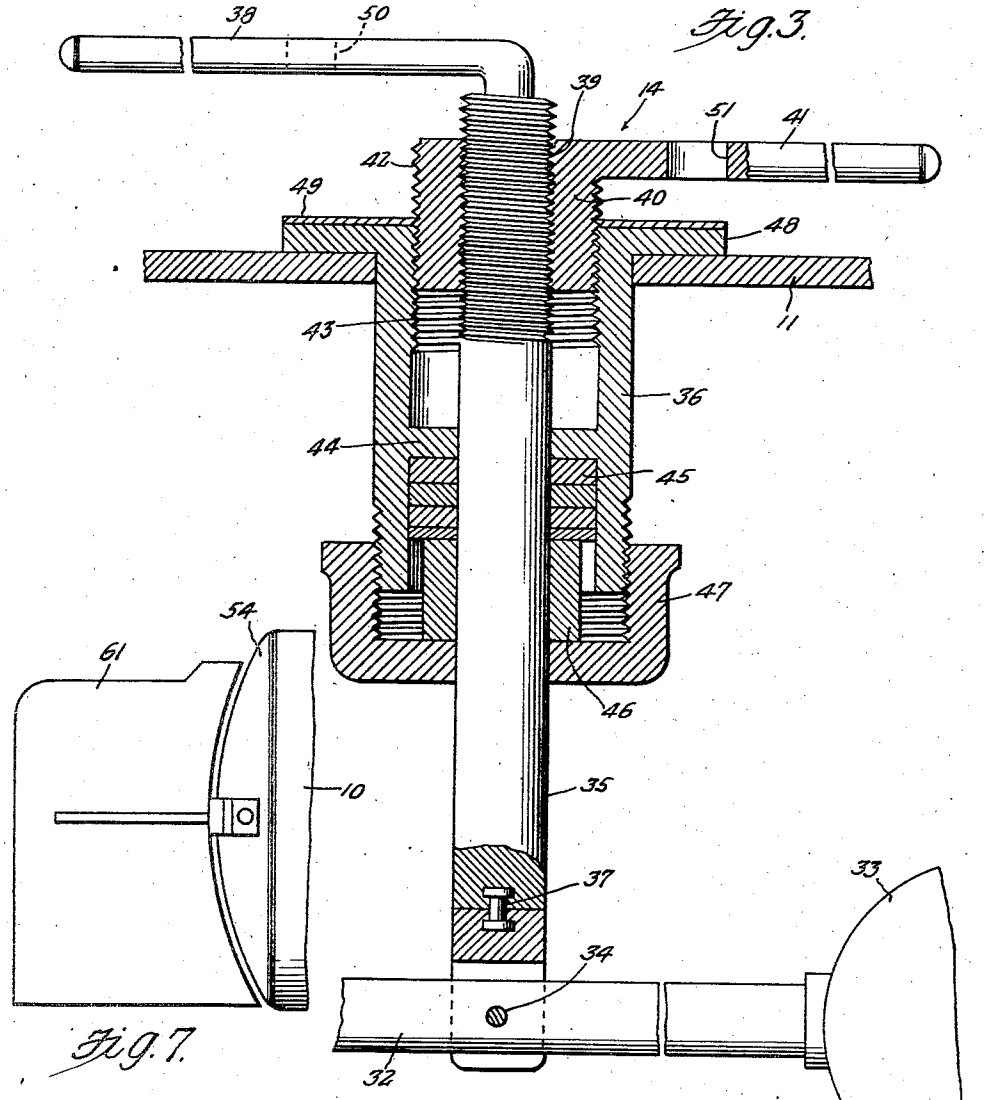


Fig. 7.

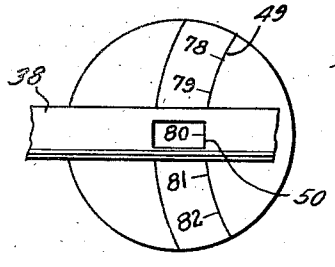


Fig. 4.

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UNITED STATES PATENT OFFICE

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RECEPTACLE FOR FLUIDS

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16 Claims. (Cl. 114—74)

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This invention relates to a receptacle for fluids and more particularly to such a receptacle adapted to contain fluids, such as petroleum products during transportation thereof.

A primary object of this invention is the provision of an improved fluid containing receptacle provided with means whereby the same may be readily floated in a body of water, and towed as by a boat to a desired destination, and so arranged and constructed that the same receptacle may be readily removed from the water and transported overland on a truck, a railway car, or the like.

A further important object of this invention is the provision of an improved tank characterized by a baffle or shell of arcuate configuration closing off a portion thereof, whereby the tank will float in an upright position, with a marked increase in stability.

An additional and important object of this invention is the provision of an improved tank provided with a protecting shield, whereby the tank may be let into the direct rays of the sun or the like, and the shield or dead air space will serve effectively to prevent too great a heat striking directly the contents of the tank.

A still further object is the provision of such a tank characterized by internal construction in such manner that the tank will float upright and level, and not as is customary in plain cylindrical tanks with one end or the other downwardly.

A still further specific object is the provision of a tank, of the character described, which when on land will right itself automatically when loaded.

A still further object is the provision of a tank characterized by the provision of buoyancy, insulating, and collision safe guard compartments on the ends and sides thereof, such compartments also providing additional dead air space.

Still another object is the provision of an improved cylindrical tank, provided with means whereby the interior braces or supports hitherto necessary to maintain such a tank in proper structural relation may be substantially eliminated.

A further object of the invention is the provision of a cylindrical tank, so arranged and constructed that the main body thereof may be maintained substantially full regardless of the temperature or other conditions affecting the volume of the liquid contained therein.

A still further object of the invention is the provision of such a tank provided with a recess or space into which the vapors or fumes of

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volatile fluids may escape, when the temperature of the liquid increases, and provided with means whereby the condensate of these vapors may be returned to the tank as the temperature, and the corresponding volume of the fluid in the tank decreases.

A further and more specific object of the invention is the provision of means in association with such a tank whereby the quantity of fluid introduced into the same may be governed in accordance with the specific gravity of the liquid involved.

A further specific object is the provision of means in association with such a tank whereby the amount of liquid placed therein may be varied in accordance with the temperature of the liquid, and consequently its volume, in order to retain the tank substantially full at all times.

An additional specific object is the provision of such a tank provided with an improved means permitting fluid to overflow into the vapor compartment on increase in temperature, and return to the tank on decrease in temperature.

Still another object of the invention is the provision of such a tank provided with means whereby a plurality of tanks may be secured together in related assembly to provide a tank train, which may be towed through a body of water.

Another and more specific object is the provision of means whereby such a tank may be readily secured to a land vehicle for transportation thereon.

Still other objects reside in such a tank which will be sturdy and durable in construction, reliable, buoyant, stable, and efficient in operation, and relatively simple and inexpensive to manufacture and assemble.

Other objects reside in the combinations of elements, arrangements of parts, and features of construction, all as will be more fully pointed out hereinafter and disclosed in the accompanying drawings wherein there is shown a preferred embodiment of this inventive concept.

In the drawings:

Figure 1 is a side elevational view of one form of tank embodying this inventive concept, certain concealed parts thereof being indicated by dotted lines.

Figure 2 is an enlarged sectional view taken substantially along the line 2—2 of Figure 1 as viewed in the direction as indicated by the arrows.

Figure 3 is an enlarged vertical sectional view taken substantially along the center line of the device for governing a float valve controlling the

admission of fluid into the tank in accordance with the temperature and specific gravity of the fluid.

Figure 4 is a fragmentary, top plan view of a constructional detail of the device shown in Figure 3.

Figure 5 is an enlarged sectional view taken substantially along the center line of the tank, and showing the compartment in which the control means and inlet valve are contained.

Figure 6 is a fragmentary detailed view showing one method of assembling a plurality of tanks into a tank train, and

Figure 7 is a fragmentary elevational view disclosing an additional constructional detail adapted to be utilized in conjunction with the tank, when the same forms the rearmost tank of a tank train.

Similar reference characters refer to similar parts throughout the several views of the drawings.

Having reference now to the drawings, there is generally indicated at **10** a cylindrical tank, closed at its ends as by externally convex pressure head **10'**. Positioned within the tank **10**, and secured thereto in fluid tight relationship, as by welding or the like, is an arcuate shield or shell **11**, having a greater radius of curvature than the arc of a tank, and providing above the fluid containing base of the tank a vapor escape compartment of generally crescent shaped cross-sectional configuration.

A recessed compartment **12** in the top wall of the tank **10** extends to the top of the shell **11** and is provided with a pair of spaced apertures, through which extend a valve fitting **13** and a control member generally indicated as **14**, both to be more fully described hereinafter.

The recess **12** is provided with a hinged cover **15** adapted to be held in place as by a locking means **16** including a bolt and wing nut **17**, a suitable sealing gasket **18** being provided to retain the compartment **12** watertight when the tank is floated.

As best shown in Figure 2, the shell **11** is provided with a centrally disposed aperture **19**, from which a pipe **20** extends upwardly to the outer periphery of the tank **10**, and thence curves in two divergent branches **21** to openings **22** positioned adjacent the juncture of the shell **11** with the side wall of the tank **10** but spaced slightly therefrom, the arcuate member **21** closely conforming to the configuration of the top of the tank **10**. Fluid diffusing baffles **23** are positioned interiorly of the pipe **19**.

Float valves **25** of conventional construction adapted to remain in closed position so long as the float thereof is immersed in fluid are positioned at the opposite extremities of the juncture of the shield **11** with the tank **10**.

From the foregoing it will now be seen that when the tank **10** is filled completely in a manner to be more fully described hereinafter in such manner that the fluid obstructs the under surface of shield **11**, expansion of the fluid, as might be occasioned by an increase in temperature causes a certain quantity thereof to pass through the pipe **20** into the pipe **21** and thus into the vapor expansion chamber between the shield **11** and the upper surface of the tank **10**. As the temperature is reduced, a syphoning effect may be produced by the tube **21** to withdraw the fluid into the body of the tank. The valves **25** are provided in order that when the tank is emptied, the lowering of the level of the fluid in the tank will occasion the opening of the valve, whereupon any fluid retained in the vapor chamber upon the shield **11** will flow into the tank, and be withdrawn with the balance of the contents thereof.

Referring back to the valve **13**, as best shown in Figure 5, it will be seen that the same comprises a fitting **27** to which may be secured a flexible tube or the like for filling the receptacle, within which is positioned a valve seat member **28** adapted to be closed at its upper extremity by a valve **29**, secured to a valve stem **30**. The valve stem **30** is secured as by a pivot **31** to a rod **32**, at the opposite extremity of which is positioned a float **33**. The rod or lever **32** is fulcrumed at **34** to a rod **35** extending downwardly from the bottom of a casing **36** comprising a portion of the control member **14**.

As best shown in Figure 3, the rod **35** is provided with a conventional swivel **37** of any desired type whereby the upper portion of the same may be rotated with respect to the lever **32**, and extends upwardly through the casing **13** to the exterior of the shield **11**, and terminates in an operating handle **38**. The upper portion of the rod **35** is threaded as at **39** and engages corresponding interior threads on a sleeve **40** provided with an operating handle **41**. The exterior of the sleeve **40** is also threaded as at **42** and is adapted to engage interior threads **43** positioned interiorly of the housing **36**.

A partition **44** extends interiorly within the housing **36**, in close juxtaposition with the rod **35**, beneath which are positioned packing glands or washers **45** held in position as by a packing nut **46**, the parts being held in related assembly as by an apertured cap **47** threadedly secured to the lower portion of the housing **36**.

The upper portion of the casing **36**, which as previously stated extends through a suitable aperture in the shield **11**, in fluid tight relationship therewith is provided with a peripheral flange **48** on the upper surface of which is a dial **49** marked with suitable indicia. Each of the operating handles **38** and **41** is provided with an aperture **50** and **51**, respectively, through which the indicia on the dial **49** may be viewed.

It may be here pointed out that the interior and exterior threads of the sleeve **40** are oppositely disposed, in such manner that the sleeve **40** may be rotated by the operating handle **41** independently of rotation of rod **35** by operating handle **38**. That is to say, that rotation of the operating handle **41** will, through movement of the sleeve **40**, vary the position of the float **33**, and hence the adjustment of the valve **29** to a lesser degree than were rotation of the operating handle. Accordingly, the handle **38** may be set as may be desired until a desired numeral on the dowel **49** is visible through the aperture **50**, such numeral indicating the temperature of the fluid, or the surrounding atmosphere, as previously determined, and the operating lever **41** correspondingly adjusted until a desired numeral on the dial **49** is visible through the aperture **51**, such numeral indicating the specific gravity of the fluid with which the tank is to be filled. After the setting has been obtained, which latter setting may be determined mathematically by means of charts or formulae or the like, the float valve is so arranged that the float **33** is positioned to close the valve when the exact quantity of fluid in accordance with temperature and specific gravity has been admitted into the tank **10** to fill the same completely.

Thus, it will be seen that when the tank is

filled in the manner above described, the contents thereof are maintained substantially constant regardless of variations in temperature by means of the overflow mechanism and float valves **25** previously described.

Additional buoyancy and stability compartments extend entirely along the sides of the tank, and are formed by arcuate baffles **52** welded to the sides of the tank as indicated at **53**, to form elongated buoyancy chambers, which also serve as bumpers in the event of collision between the tank and other objects. Still further compartments are formed at each end of the tank as by means of exteriorly positioned baffles **54**, similarly welded to the tank, and thus serve further to stabilize, float, and protect the tank.

As best shown in Figure 6, suitable lugs **55** are positioned at opposite sides of the pressure head **10'**, between which are adapted to extend links **56** for connecting a series or a plurality of tanks in longitudinal alignment. Additional lugs **57** positioned on the sides of the tanks, adjacent the extremities, are adapted to accommodate similar lugs **58** on opposite tanks to secure a plurality of tanks in transverse alignment. Similarly, lugs on the tops of the tanks **59** may accommodate transverse bars **60** to provide lateral stability of associated tanks.

Thus, it will be seen that a plurality of tanks may be assembled into a tank train, in any desired arrangement, a relatively wide body of tanks being utilized, if desired, in a broad sheet of water, while a single or double line might be more advantageously utilized in a relatively restricted stream.

The lugs are so arranged that, if desired, a rudder **61** (see Figure 7) may be positioned on the rearmost tank or tanks of the train to assist in steering the same. Similarly, the lugs **57** may be advantageously utilized for securing the tanks to a vehicle, such as a truck or train when the same is removed from the water.

The tank is particularly designed to be utilized in conjunction with a transportation system, whereby the tank may be filled at the refinery or the like, and conveyed by any suitable means to a body of water, where a plurality of tanks may be assembled into a train and towed to a desired distribution point. As the distribution point is passed or approached, a selected quantity of tanks may be detached from the train, which then continues on its course, and the tanks towed to shore where they may be removed from the water by means of suitable tracked behicles or the like, and loaded upon trucks or freight cars for suitable further distribution. Obviously, the process may be repeated until all of the tanks of the shipment have been distributed as desired.

From the foregoing it will now be seen that there is herein provided an improved shipping tank for fluids, such particularly as fluid fuels, characterized particularly by stability when immersed in water, by constant volume of content, and by adaptability to land transportation with a minimum of difficulty, which accomplishes all the objects of this invention and others including many advantages of great practical utility and commercial importance.

As many embodiments may be made of this inventive concept, and as many modifications may be made in the embodiment hereinbefore shown and described, it is to be understood that all matter herein is to be interpreted merely as illustrative and not in a limiting sense.

We claim:

1. In a tank for the transportation of fluids, the combination of a cylindrical tank body closed at its ends, an arcuate shield secured in fluid tight relationship to the interior of said tank defining a vapor and buoyancy chamber, means defining a recess in said chamber, valve means for filling said tank in said recess, and a float control for said valve.

2. In a tank for the transportation of fluids, the combination of a cylindrical tank body closed at its ends, an arcuate shield secured in fluid tight relationship to the interior of said tank defining a vapor and buoyancy chamber, means defining a recess in said chamber, valve means for filling said tank in said recess, a float control for said valve, and means for adjusting said float in accordance with the specific gravity of said fluid.

3. In a tank for the transportation of fluids, the combination of a cylindrical tank body closed at its ends, an arcuate shield secured in fluid tight relationship to the interior of said tank defining a vapor and buoyancy chamber, means defining a recess in said chamber, valve means for filling said tank in said recess, a float control for said valve, and means for adjusting said float in accordance with the temperature of said fluid.

4. In a tank for the transportation of fluids, the combination of a cylindrical tank body closed at its ends, an arcuate shield secured in fluid tight relationship to the interior of said tank defining a vapor and buoyancy chamber, means defining a recess in said chamber, valve means for filling said tank in said recess, a float control for said valve, and means for adjusting said float by independent adjustments in accordance with a plurality of conditions.

5. In a tank for the transportation of fluids, the combination of a cylindrical tank body closed at its ends, an arcuate shield secured in fluid tight relationship to the interior of said tank defining a vapor and buoyancy chamber, means defining a recess in said chamber, valve means for filling said tank in said recess, a float control for said valve, means for adjusting said float in accordance with the temperature of said fluid, and an overflow pipe extending from said tank into said chamber.

6. In a tank for the transportation of fluids, the combination of a cylindrical tank body closed at its ends, an arcuate shield secured in fluid tight relationship to the interior of said tank defining a vapor and buoyancy chamber, means defining a recess in said chamber, valve means for filling said tank in said recess, a float control for said valve, means for adjusting said float in accordance with the temperature of said fluid, and an overflow pipe extending from said tank into said chamber, said pipe having a plurality of spaced baffles therein.

7. In a tank for the transportation of fluids, the combination of a cylindrical tank body closed at its ends, an arcuate shield secured in fluid tight relationship to the interior of said tank defining a vapor and buoyancy chamber, means defining a recess in said chamber, valve means for filling said tank in said recess, a float control for said valve, means for adjusting said float in accordance with the temperature of said fluid, and an overflow pipe extending from said tank into said chamber, said pipe having a plurality of spaced baffles therein, and terminating in an arcuate pipe conforming to the contour of the tank above said shield, the extremity of the pipe

extending to a point below the inlet of said first-named pipe to form a syphon bond.

8. In a tank for the transportation of fluids, the combination of a cylindrical tank body closed at its ends, an arcuate shield secured in fluid tight relationship to the interior of said tank defining a vapor and buoyancy chamber, means defining a recess in said chamber, valve means for filling said tank in said recess, a float control for said valve, means for adjusting said float in accordance with the temperature of said fluid, and an overflow pipe extending from said tank into said chamber, said pipe having a plurality of spaced baffles therein, terminating in an arcuate pipe conforming to the contour of the tank above said shield, the extremity of the pipe extending to a point below the inlet of said first-mentioned pipe to form a syphon bond, and float valve means adapted to be closed when immersed in fluid operable to permit escape of fluid in said chamber when the fluid level in said tank falls below a predetermined point.

9. In a tank for the transportation of fluids, the combination of a cylindrical tank body closed at its ends, an arcuate shield secured in fluid tight relationship to the interior of said tank defining a vapor and buoyancy chamber, means defining a recess in said chamber, valve means for filling said tank in said recess, a float control for said valve, and means for adjusting said float in accordance with the temperature of said fluid, said last-mentioned means including a lever secured to said float and said valve, a fulcrum for said lever, a rod rotatably secured to said fulcrum, and means for rotating said rod.

10. In a tank for the transportation of fluids, the combination of a cylindrical tank body closed at its ends, an arcuate shield secured in fluid tight relationship to the interior of said tank defining a vapor and buoyancy chamber, means defining a recess in said chamber, valve means for filling said tank in said recess, a float control for said valve, and means for adjusting said float by independent adjustment in accordance with a plurality of conditions, said last-mentioned means including a lever secured to said float and said valve, a fulcrum for said lever, a threaded rod rotatably secured to said fulcrum, means for rotating said rod, an internally and externally threaded sleeve surrounding said rod, said last-mentioned threads being opposite, a threaded housing surrounding said sleeve, and means for rotating said sleeve independently of said rod.

11. In a tank for the transportation of fluids, the combination of a cylindrical tank body closed at its ends, an arcuate shield secured in fluid tight relationship to the interior of said tank defining a vapor and buoyancy chamber, means defining a recess in said chamber, valve means for filling said tank in said recess, a float control for said valve, and means for adjusting said float in accordance with the temperature of said fluid, said last-mentioned means having a lever secured to said float and said valve, a fulcrum for said lever, a rod rotatably secured to said fulcrum, and means for rotating said rod, and dial means containing indicia for indicating the position to which said rod is rotated.

12. In a tank for the transportation of fluids, the combination of a cylindrical tank body closed at its ends, an arcuate shield secured in fluid tight relationship to the interior said tank defining a vapor and buoyancy chamber, means defining a recess in said chamber, valve means for filling said tank in said recess, a float control for said valve, and means for adjusting said float by independent adjustment in accordance with a plurality of conditions, said last-mentioned means including a lever secured to said float and said valve, a fulcrum for said lever, a threaded rod rotatably secured to said fulcrum, means for rotating said rod, an internally and externally threaded sleeve surrounding said rod, said last-mentioned threads being opposite, a threaded housing surrounding said sleeve, means for rotating said sleeve independently of said rod, and dial means containing appropriate indicia designating the condition to which said rod and said sleeve are adjusted.

13. In a tank for the transportation of fluids, the combination of a cylindrical tank body closed at its ends, and an arcuate shield secured in fluid tight relationship to the interior of said tank defining a vapor and buoyancy chamber, said arcuate baffle being of a greater radius of curvature than said tank, to define a crescent shaped chamber in the upper portion thereof.

14. In a tank for the transportation of fluids, the combination of a cylindrical tank body closed at its ends, an arcuate shield secured in fluid tight relationship to the interior of said tank defining a vapor and buoyancy chamber, means defining a recess in said chamber, valve means for filling said tank in said recess, a float control for said valve, and means defining additional buoyancy chambers extending along each side of said tank to full length thereof.

15. In a tank for the transportation of fluids, the combination of a cylindrical tank body closed at its ends, an arcuate shield secured in fluid tight relationship to the interior of said tank defining a vapor and buoyancy chamber, means defining a recess in said chamber, valve means for filling said tank in said recess, a float control for said valve, and means defining buoyancy chambers positioned at each end of said tank.

16. In a tank for the transportation of fluids, the combination of a cylindrical tank body closed at its ends, an arcuate shield secured in fluid tight relationship to the interior of said tank defining a vapor and buoyancy chamber, means defining a recess in said chamber, valve means for filling said tank in said recess, a float control for said valve, means defining additional buoyancy chambers extending along each side of said tank to full length thereof, and means defining buoyancy chambers positioned at each end of said tank.

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