

Feb. 3, 1942.

R. A. NORBOM

2,271,660

DEMOUNTABLE FREIGHT CONTAINER FOR LIQUIDS

Filed Jan. 4, 1938

4 Sheets-Sheet 1

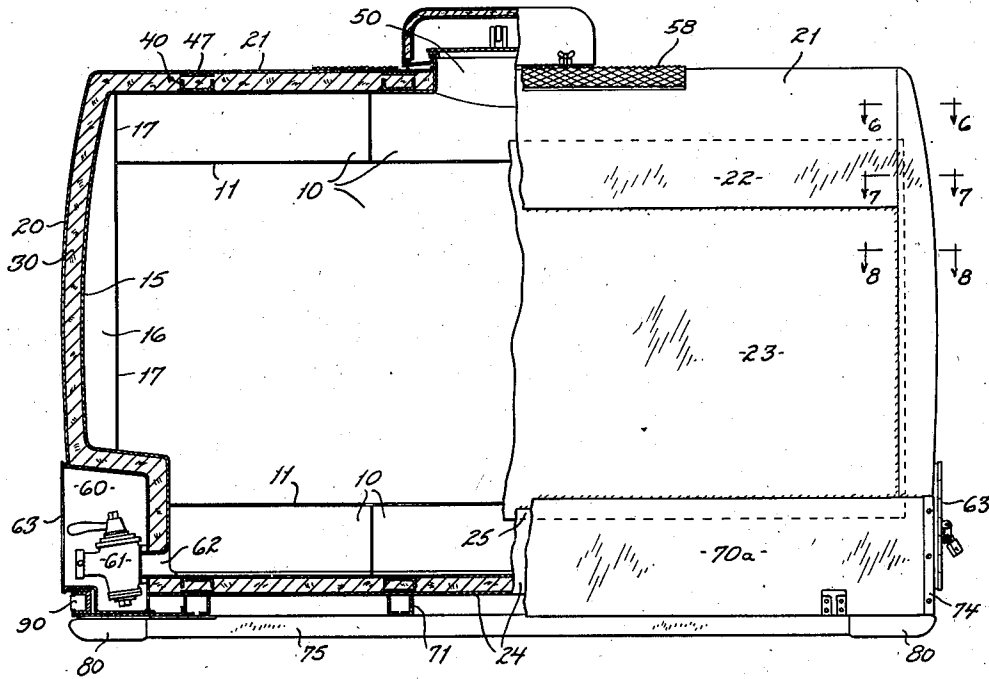


FIG. 1

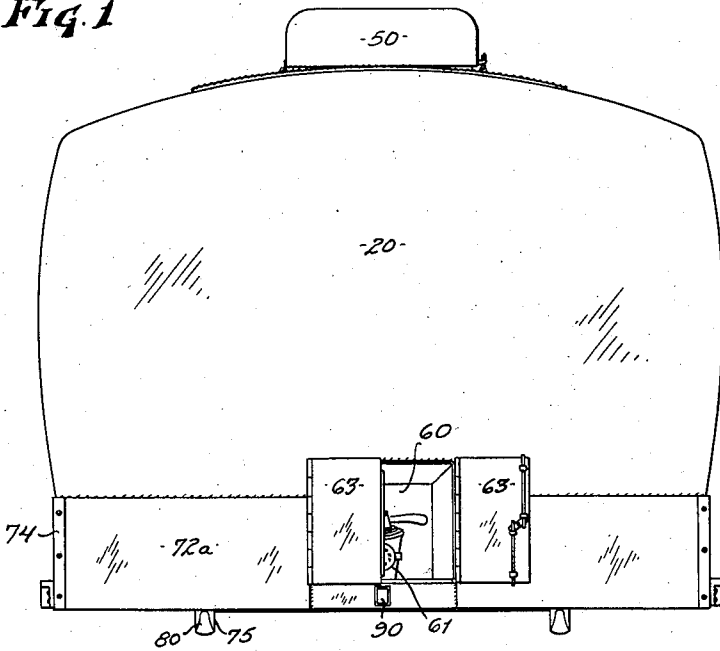


FIG. 2

INVENTOR.
Ragnar A. Norbom
BY
Bales, Gohrick & Teare
ATTORNEYS.

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R. A. NORBOM

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4 Sheets—Sheet 2

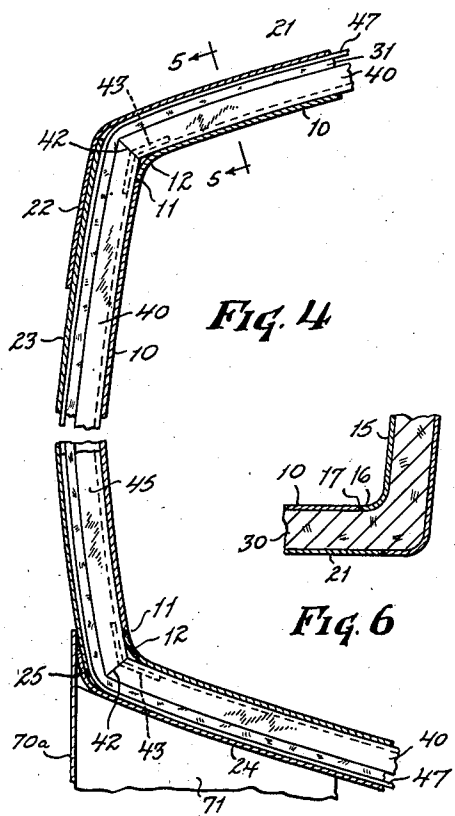
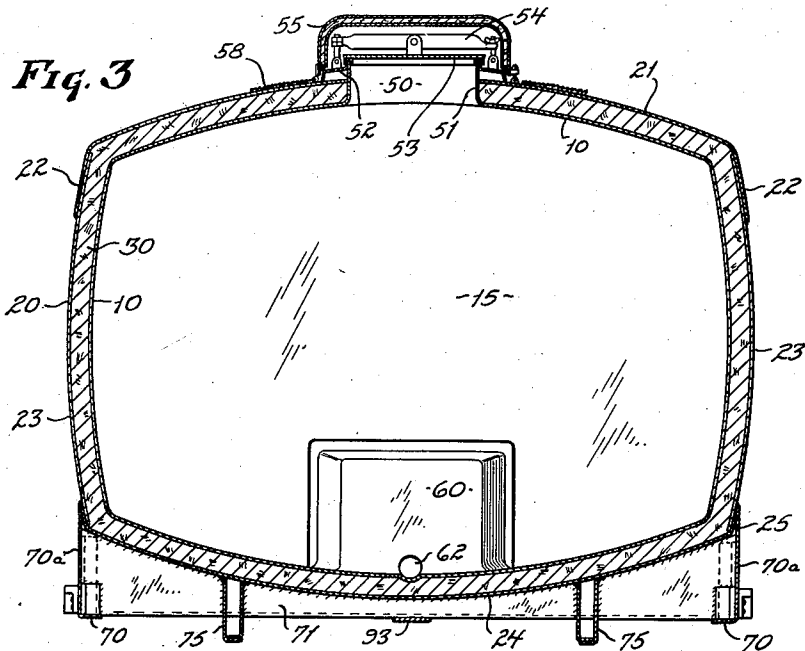


Fig. 4

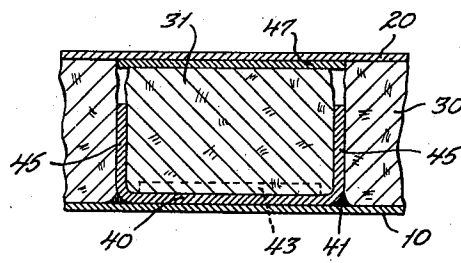


Fig. 5

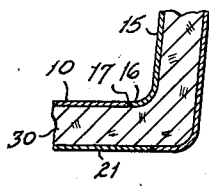


Fig. 6

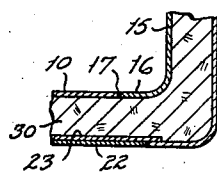


Fig. 7

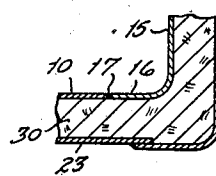


Fig. 8

INVENTOR.
Ragnar A. Norbom
BY
Doris Golrick Stearns
ATTORNEYS.

Feb. 3, 1942.

R. A. NORBOM

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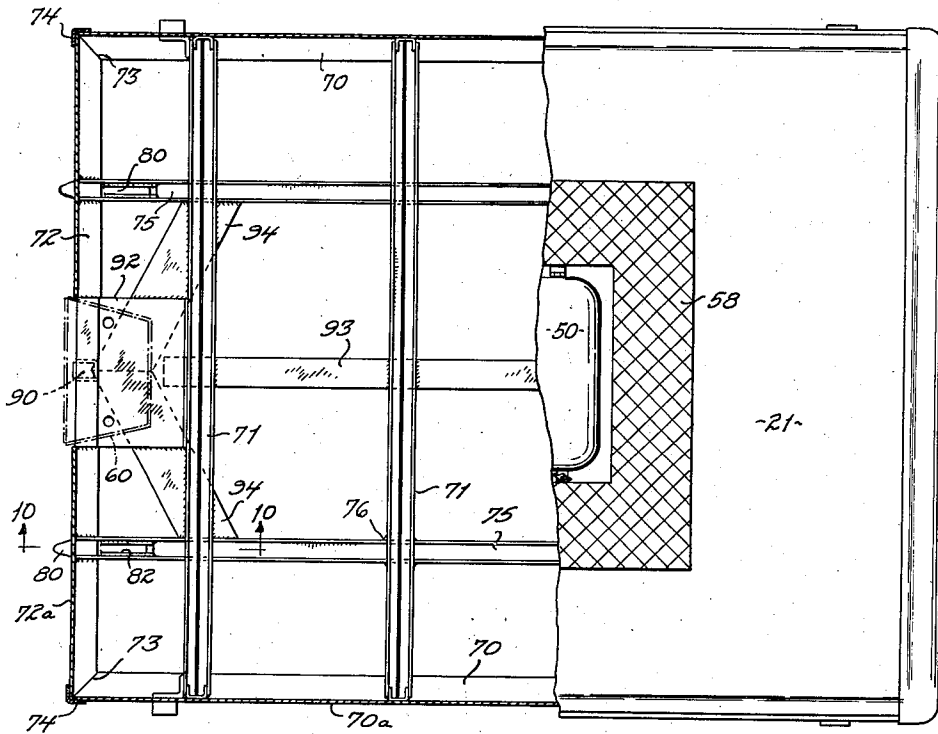


Fig. 9

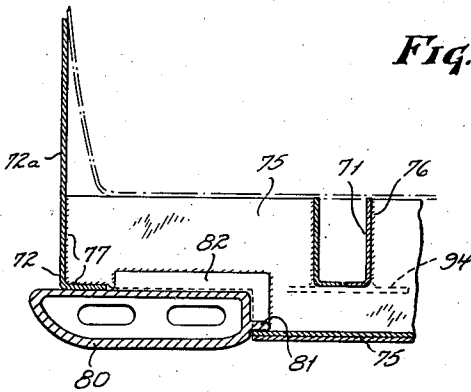


Fig. 10

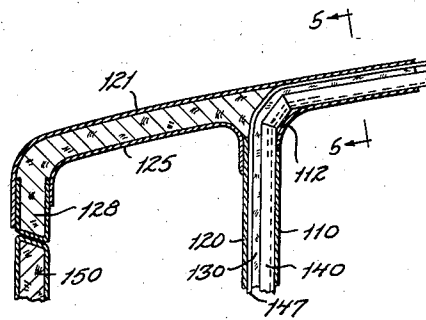


Fig. 13

INVENTOR.
Ragnan A. Norbom
BY
Dale Golrick & Tearal
ATTORNEYS.

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R. A. NORBOM

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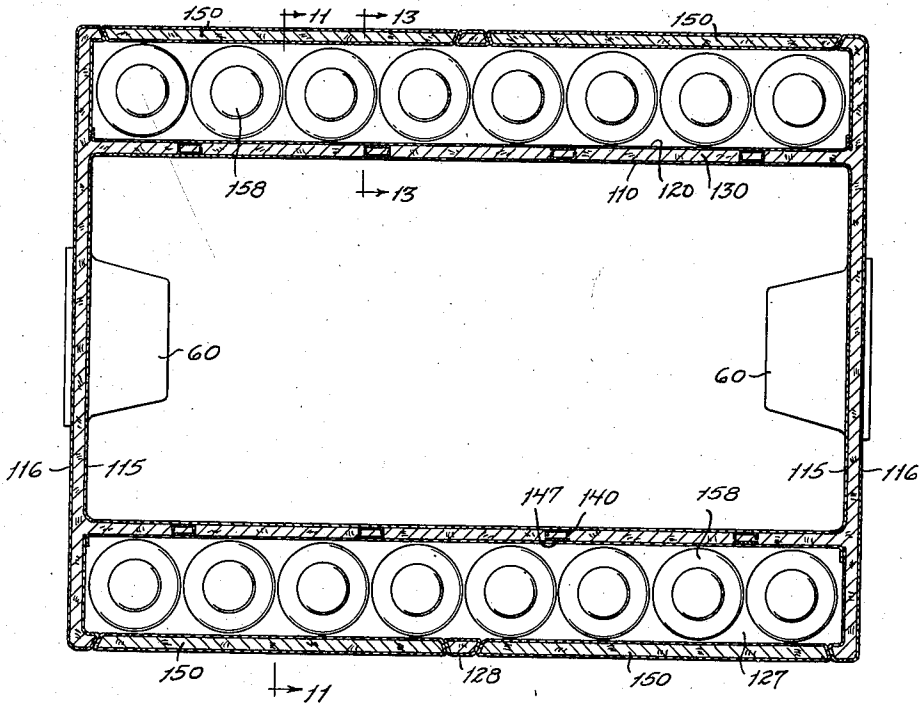


Fig. 12

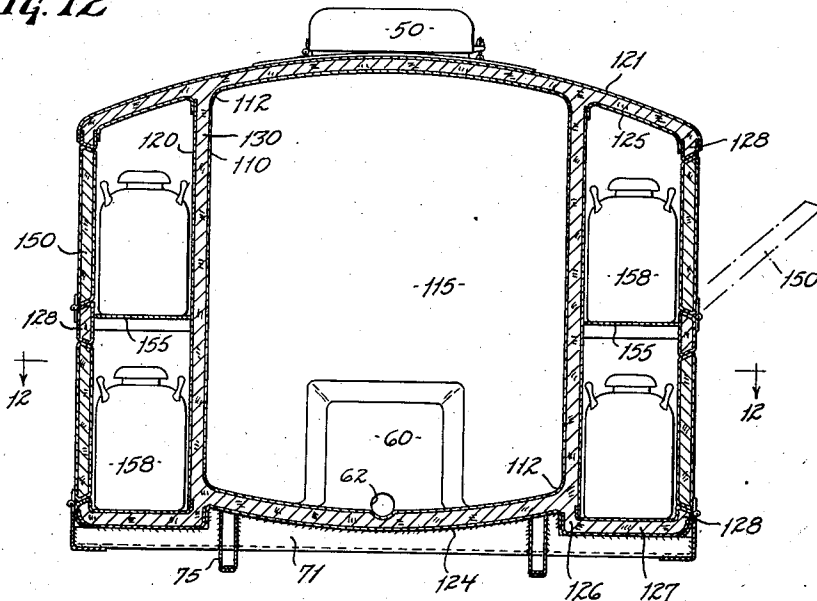


Fig. 11

INVENTOR.
Ragnar A. Norbom
BY
Dale Golnick & Sears
ATTORNEYS.

UNITED STATES PATENT OFFICE

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DEMOUNTABLE FREIGHT CONTAINER FOR LIQUIDS

Ragnar A. Norbom, Clifton, N. J., assignor, by mesne assignments, to National Fitch Corporation, New York, N. Y., a corporation of Delaware

Application January 4, 1938, Serial No. 183,273

4 Claims. (Cl. 220—9)

This invention relates to a demountable tank body comprising a horizontal tank and a supporting cradle arranged to be slid as a unit from one vehicle to another, such as from a highway truck to a railway vehicle or vice versa, or between a vehicle and a shipper's platform. My tank, which has a double shell tank with intermediate insulation, is designed particularly for the carrying of milk but may be used for other purposes. The tank is mounted on supporting bolsters which are secured to the under-portion of the outer shell, these bolsters carrying parallel skid rails whereby the whole tank construction may be readily shifted from one support to another.

If desired, the tank proper may constitute the intermediate portion of a body designed for carrying liquid in bulk, and also for carrying a number of comparatively small independently removable containers, such for instance, ordinary milk cans.

One of the objects of the invention is to provide a tank of such form that it may carry the maximum quantity within the limits of available width and height and at the same time shall have no sharp corners on the inside, thus enabling it to be readily cleaned.

Another object of my invention is to so brace the tank by means of members between the shells and plate members carried by the shells, that a very firm construction will be provided, notwithstanding lightness.

Another object of my invention is to provide a double walled tank of a form directly cooperating with the supporting bolsters of comparatively low height, thus lowering the center of gravity and reducing the height of the skirting which houses the bolsters.

Other features of the invention will be apparent from the following description of preferred embodiments illustrated in the drawings.

Fig. 1 is a side elevation partly in section, of a full size tank body embodying this invention; Fig. 2 is an end view thereof; Fig. 3 is a vertical section on a plane parallel with Fig. 2, and just behind the end of the tank; Fig. 4 is an enlarged vertical section broken away through the two walls of the tank adjacent the upper and lower corners thereof; Fig. 5 is a detail of the internal bracing for the two tank walls, as illustrated by line 5—5, Figs. 4 and 13, but on a larger scale; Figs. 6 and 7 and 8 are horizontal cross-sections, at the junction of the tank side and end as indicated by the correspondingly numbered lines on Fig. 1; Fig. 9 is a plan of the tank body of the

preceding figures broken away to illustrate the bolster frame; Fig. 10 is a detail illustrating the skid rail and shoe, being a vertical section on the line 10—10 on Fig. 9; Fig. 11 is a vertical section of a modified form of a tank body formed with compartments on each side for carrying removable containers; Fig. 12 is a horizontal section of the tank body of Fig. 11, as indicated by the line 12—12 of Fig. 11; Fig. 13 is a detail in section illustrating the construction of the wall of the tank proper and the adjacent portions of the container compartment at either side of the tank proper.

The tank of the embodiment shown in Figs. 1 to 10 is of approximately rectangular form in cross-section, but with each wall bowed outwardly as illustrated in Fig. 3. This rectangular tank has an inner metal wall 10, and an outer wall 20, and an intermediate insulation 30. The inner wall of the tank is composed of sheets in edge abutment welded together as indicated at lines 11 in Fig. 4. The line of weld is just above, or just below the corner of the tank and the top sheet is curved downwardly above the corner to the weld, and the bottom sheet is curved upwardly to its weld, as indicated by the lines 12 in Fig. 4. This provides a smooth, uninterrupted interior for the full height of the tank. Convex heads 15, flanged at their edges as at lines 16 in Fig. 6, have abutting engagement with the ends of the sides, top and bottom to which they are welded at 17.

The curved surface 12 at the junction of the sides with the top and bottom, and the curved surface 16 at the junction of sides, top and bottom with the ends eliminate any abrupt junction within the tank, allowing it to be readily cleaned.

On its outer side the inner shell is braced by channel-shaped bars 40, which in their complete form embrace the inner shell and are welded to it, as indicated at 41 in Fig. 5. Each of these bars is made up of four parts concaved on its base and bevelled at the ends to produce miter joints 42, as shown in Fig. 4. At these joints the channel-shaped brace bars are effectively secured together by straps 43 lying in the channels and welded to them.

The outer shell is composed essentially of sides, bottom, top and ends located parallel with the inner shell. As shown, the top plate 21, Fig. 3, has downwardly extending side flanges 22 which overlap the side plates 23, and the bottom plate 24 has upwardly extending flanges 25 overlapping the side plates 23. The side plates, top and bot-

tom plates are welded together with these overlapping flanges.

Contacting with the inner face of the outer shell are flat straps 47 having a width corresponding to the channel braces 40 of the inner shell, extending completely about the interior of the outer shell in registration with the channels on the inner shell.

The intermediate insulation between the shells comprises blocks of cork, or similar material, so shaped as to practically fill the space between the shells and be somewhat compressed when the outer shell is put in place. These cork blocks thus for the most part engage the outer surface of the inner shell and the inner surface of the outer shell, and also abut the flanges 45 of the channel-shaped brace bars and the edges of the straps 47. Between these flanges of the brace bars are somewhat smaller cork blocks 31 which fill the channels and are abutted and compressed by the brace straps 47.

The top shell, at the top of the tank, is provided with a man-hole, designated generally 50, and at one or both ends near the bottom, with a pocket 60 formed by inwardly diverting the walls and which contains the discharge valve. These features, which are not specifically concerned with the present invention, will be hereafter briefly described.

As illustrated, it will be seen that, disregarding the man-hole entrance and the pocket exit, my tank is of approximately rectangular form, and at the same time, is outwardly bowed at the top, bottom, sides and ends. By this means, I materially increase the cubic capacity of the tank, over that of the usual elliptical tank, and at the same time, I provide a structure which has material advantages over a tank having straight surfaces, as the stresses from the surging of the contents in transit are better resisted; also the tank is more readily adaptable for cleaning at the junctions of the various walls.

The tank described is carried on a suitable bolster frame which is welded to the bottom plate 24 of the outer wall of the tank. This bolster frame is shown in Figs. 1, 3 and 9, and is made up of longitudinal side sills 70, consisting of angle bars, transverse bolsters 71, each in the form of two angle bars facing each other and with their bases resting on the horizontal flanges of the angle bars 70. The side bars 70 are connected by end sills 72, also inwardly facing angle bars, which form mitered joints with the side sills at 73. There may also be external reinforcing caps 74 at the corners. The top edges of the transverse angle bars 71 are concave of a curvature corresponding to that of the bottom of the tank and are welded directly to the bottom plate 24 so that each bolster in effect forms a box girder across the tank. The vertical flanges 70a and 72a on the side and end sills are extended to a sufficient height to constitute skirts leading from the bottom of the base frame to the outer shell of the tanks and protecting the base frame from snow and dirt.

Between the successive bolsters 71 are welded longitudinal members 75 of effective U-shape, though composed of two angle beams facing each other and with the horizontal flange of one on top of the flange of the other. These members rise to the full height of the bolsters at that location and extend well below them as indicated in Fig. 3. These U-shaped members in effect extend from end to end of the base frame, but are periodically notched to receive the bol-

sters as indicated in Fig. 10. At these notches, end surfaces of the U-shaped bar 75 abut the outer faces of the bolsters and are welded to them as shown at 76, Figs. 9 and 10. The ends of these longitudinal sills extend over the horizontal flanges and abut the vertical flanges at the end sills 72, and they are welded to both the horizontal and vertical portion of such sills, as indicated at 77, Fig. 10. It will be seen that this makes a very firm construction and produces a light and at the same time rigid base frame.

The depending portions of the longitudinal members 75 of the base frame form skid rails for the tank, and to this end, I mount in each of these members at its ends, a cast steel shoe 80, which extends below the bottom of the U-shaped member, and is thus able to support the tank in four regions adjacent its two ends. As shown in Fig. 10, the shoe lies between the vertical flanges of the U-shaped member 75, and reaches from flange to flange, and has a projecting portion 81 resting on the upper horizontal flange of the member 75. Flanges 82 rise from the shoe and are welded to the side walls of the member. This shoe is likewise welded to the under side of the horizontal flange of the end sill 72. The shoe is thus very effectively held in place.

In the travel of the tank body from one vehicle to another, it is pushed or pulled by a suitable bar attached to the end of the base frame. To effect this attachment, I have secured a steel pocket member 90 to the center of each end sill; I reinforce the end sill at this region by gusset plates 92, the gusset plates at the opposite ends being connected by a longitudinal strap 93 and each gusset plate being connected by two diagonal straps 94 to the longitudinal U-shaped bars 75. Thus the stresses of pushing the tank body or pulling it from one vehicle or platform to another will be effectively distributed throughout the base frame.

In assembling a demountable tank in the form illustrated in Fig. 3, I find it convenient to proceed as follows: The base frame is completed and the sheet 24 of the outer shell is welded to the top of the base frame, thus forming a complete unit. The inner shell is completed with the channel-shaped braces welded on its exterior, then the insulation is placed within the channel-shaped braces and the same is bound in place by the application of the external flat brace bar about such insulation. Now the main portion of the bottom insulation is placed on top of the plate 24, spaced to receive the bottom brace bars of the inner shell, and the inner shell is put into place; then the main part of the side insulation is applied and the side sheets of the outer shell are put into place with their lower edges extending inside of the upturned edges of the bottom sheet 24. The lower edges of the side sheets, and the upper edges of the bottom sheets, and of the side skirts are now all welded together. Then the insulation may be applied on top of the inner shell and the top sheets applied with their downwardly extending flanges overlapping the side sheets, these overlapping flanges being then welded to the side sheets. Thereafter the man-hole closure and the doors for the discharge valve pocket may be applied. A similar order of procedure may be followed in assembling the embodiment of Fig. 11.

For certain classes of work, particularly in the transportation of milk, it is sometimes desirable to narrow the tank and make provision at its

opposite sides for carrying individual milk tanks. Such a construction is illustrated in Figs. 11, 12 and 13, where the tank proper has an inner wall 110, and outer wall 120, and intermediate insulation 130, and inner and outer ends 115 and 116. The outer side of the inner shell 110 is braced by channel-shaped brace bars 140. The inner shell is composed of plates curved at the corners as at 112, and abutted and welded similarly to that heretofore described. The tank proper, as thus provided has an entrance man-hole feature 50, and exit pocket feature 60, the same as in the other embodiment.

In the construction shown in Figs. 11, 12 and 13, the top plate 121 of the outer shell continues beyond the side walls of the tank proper, and extensions are made of the outer shell 120 at its top outwardly in parallelism with the inner shell, as shown at 125. The side wall of the tank proper continues below the base portion 124 as shown at 126 and then extends outwardly horizontally at 127. At the ends of the top extension 125 and the bottom extension 127 is an outer skeleton wall frame 128 carrying suitable doors. The outer wall of the tank proper in this instance is preferably flat, and thus parallel with the outer frame, 128. Opposite the channel-shaped brace 140 about the inner shell 110 are bracing straps 147.

It will be seen that the arrangement described provides a compartment at each side of the tank proper. This is preferably made double deck by an intermediate platform 155, and enables the mounting of four horizontal rows of individual milk tanks 158. These may be readily put in place and removed through the openings in the side walls 128 normally closed by insulating doors 150, which are indicated as mounted on horizontal hinge axes at their lower edges.

The side compartments of the embodiment being described rest on and are carried by the bolsters 71, the flanges of which are cut down adjacent the ends to provide space for such compartments as shown in Fig. 11. The intermediate portions of the bolsters are the same as heretofore described, and such intermediate portion is provided with longitudinal intermediate U-shaped rails, which carry skid shoes, and there is the push-and-pull bar socket with its reinforced gussets, all of the same form as heretofore described.

The external dimensions of the tank shown in Figs. 11 and 12 may be substantially the same as that shown in Fig. 3, and the skid rails have the same spacing, so that this compartmented tank body may be mounted on the vehicle interchangeably with the single-compartment tank of Fig. 3.

Reverting now to the man-hole construction 50, which is the same as in the embodiment of Figs. 3 and 11, this may be of any convenient form. I have shown it in Fig. 3 as made by a substantially square sleeve 51 extending vertically as a continuation of the inner top late 10, and at its upper end the sleeve is shown braced by an outside reinforcement 52. A suitable inner cover 53 is shown as resting on the top of the reinforced sleeve and held down by a clamping bar 54, and the whole covered by a suitable cap 55 with double walls and intermediate insulation.

Around the exterior of the man-hole I have placed a suitable roughened mat 58 which forms a cat-walk. This may be of metal welded, or otherwise secured directly to the top plate 21,

which is nearly enough horizontal to enable the mat to lie directly on the top plate and still form a convenient support for the attendant.

At one, or both ends of the tanks of Figs. 3 and 11, near the bottom, I have provided a pocket 60 formed by diverting inwardly the end wall of the tank, both the inner and outer shell, and the insulation as shown in Fig. 1. In this pocket, I have mounted a suitable discharge valve 61 connected by a conduit 62 at the interior of the tank. A pair of hinged doors 63 normally close this pocket, these doors being hinged to the end skirt. The construction in this regard is substantially the same for both types of tank.

Reference is made to my divisional application, No. 244,716, filed December 9, 1938, and now matured into Patent #2,237,310, for claims relating to the base frame features herein shown and described.

I claim:

1. A double walled tank comprising the two walls spaced apart and having insulation between them, the tank being approximately rectangular in cross-section but having curved top and bottom portions, channel-shaped brace bars on the sides, top and bottom having their bases conforming in shape to the shank plate and meeting adjacent the corners, and straps at the corners overlapping the adjacent brace bars and welded to them.

2. A double walled tank with intermediate insulation, said tank being approximately rectangular in cross-section but having its bottom bowed downwardly, its top bowed upwardly and its sides bowed outwardly, the inner shell being comprised of plates, some of which are linearly curved about the corner of the tank and are welded in abutting relation to other plates adjacent the corner, brace bars on the outer side of the inner shell composed of four flanged bars having their bases curved in correspondence with the shell plates and welded thereto, the ends of the bars abutting each other adjacent the corners being there connected by straps.

3. A double walled tank having a downwardly curved bottom and an upwardly curved top and vertical sides, double deck compartments on the outer sides of the tank, the lower compartments having their inner walls composed of the side walls of the tank with a downward extension and an outward extension forming the bottom of said compartment, the upper compartment having its inner wall composed of the tank side and its top a continuation of the tank top, and closure for the outer sides of the compartment.

4. A double walled tank of approximately rectangular cross-section but with all walls bowed outwardly, the plates of the inner shell being connected by butt joints welded together, the plates of the outer shell having lap joints welded together, brace bars of channel form between the shells, each brace bar being composed of four bars mounted end to end and respectively associated with the top, the bottom, and the two sides, said bars meeting adjacent the corners of the tank and there connected by straps between the shells, a flat strap on the inner side of the outer shell curved about the corner opposite the channels, insulation between the shells, and insulation within the channels between the straps and the base of the channels.

RAGNAR A. NORBOM.