A. E. OSTRANDER.

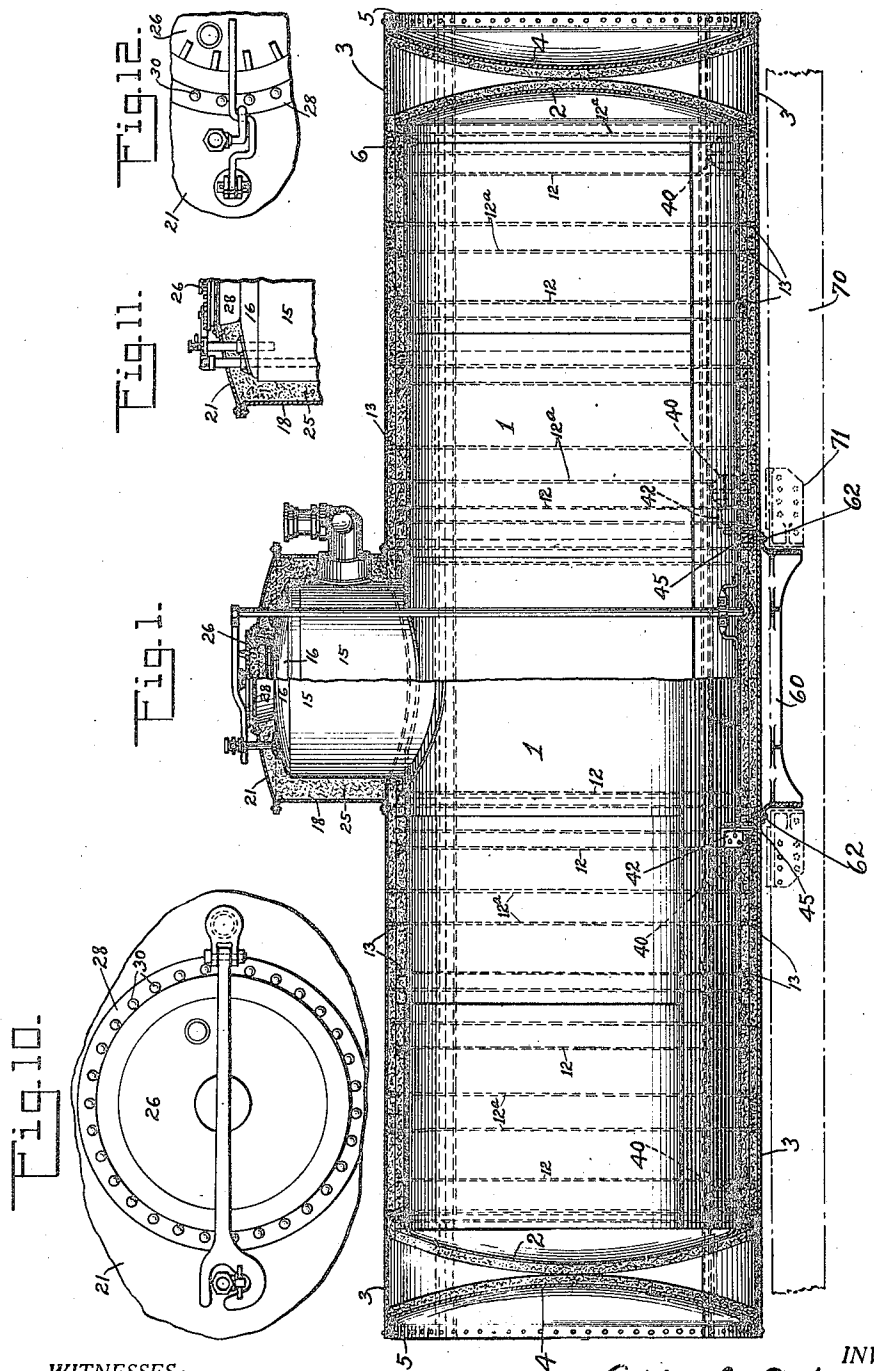
TANK CAR.

APPLICATION FILED NOV. 5, 1914.

1,199,816.

Patented Oct. 3, 1916.

3 SHEETS—SHEET 1.



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3 SHEETS—SHEET 2.

Fig. 8.

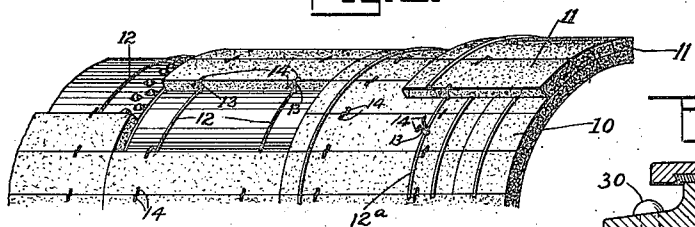


Fig. 4.

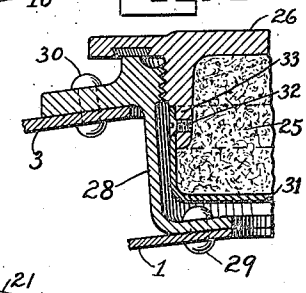
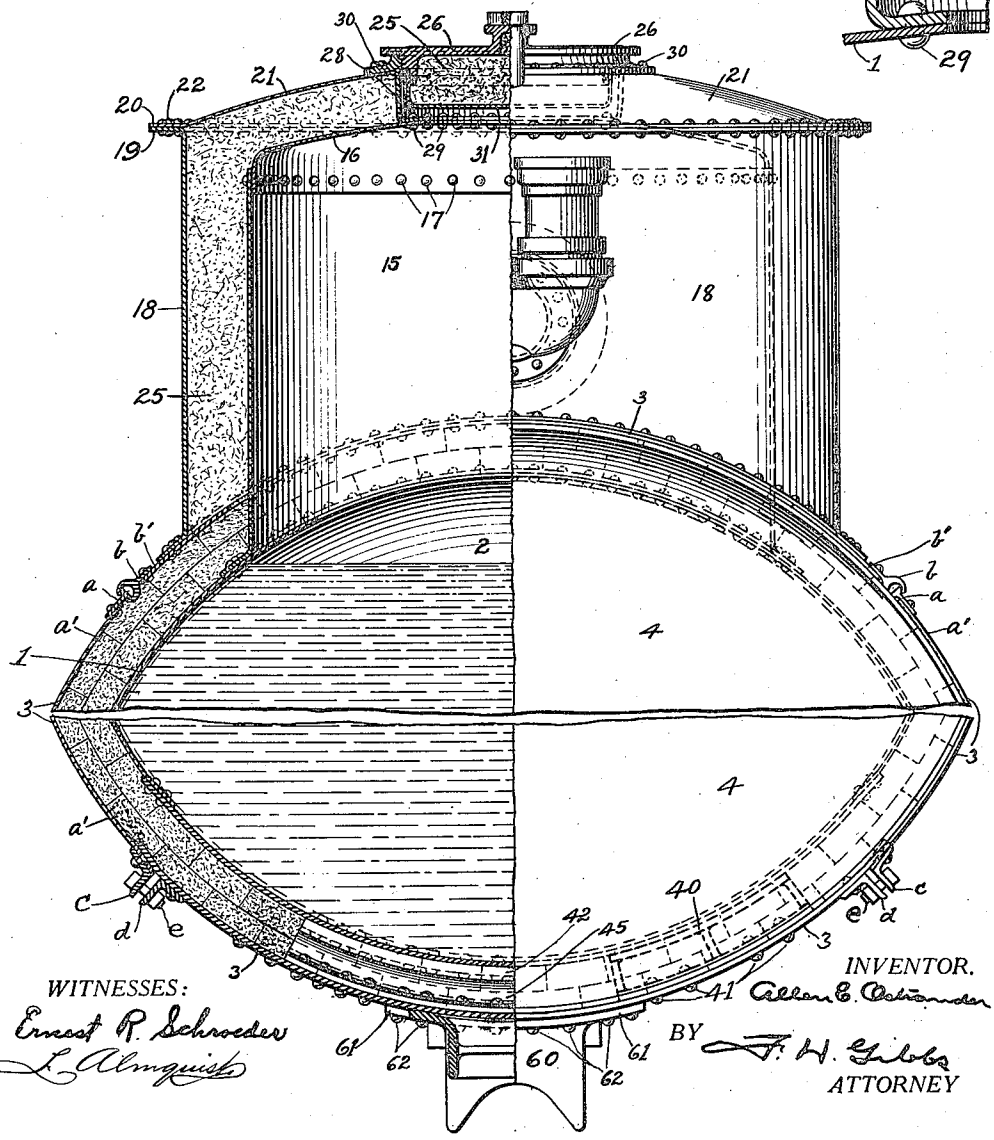


Fig. 2.



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3 SHEETS—SHEET 3.

Fig. 3.

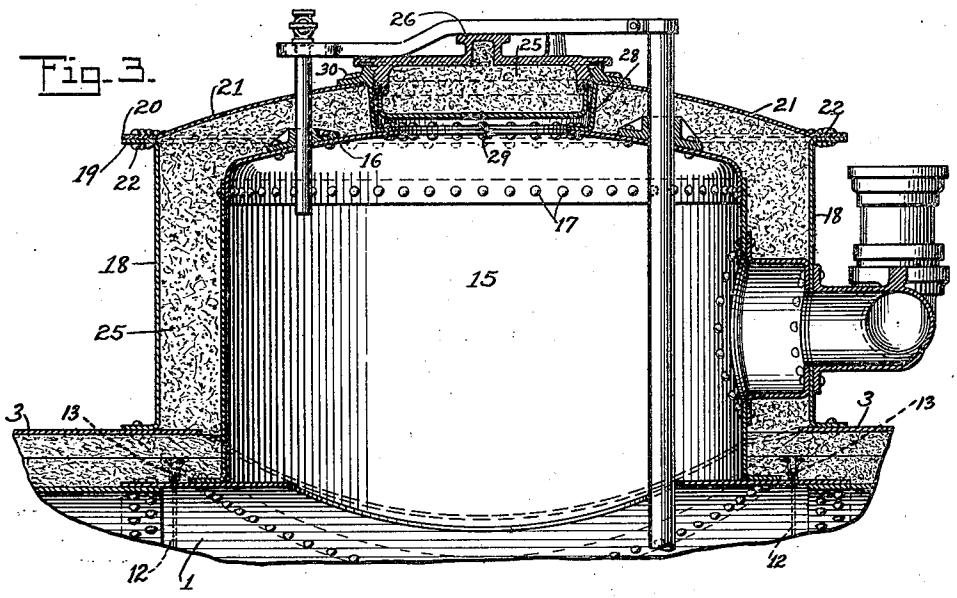


Fig. 5.

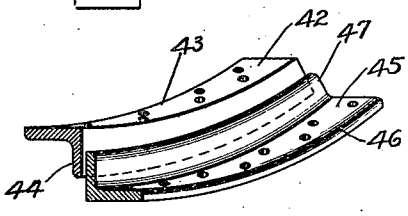


Fig. 6.

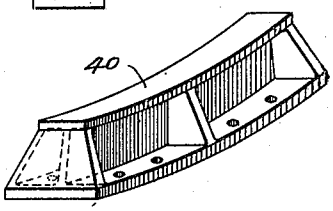


Fig. 9.

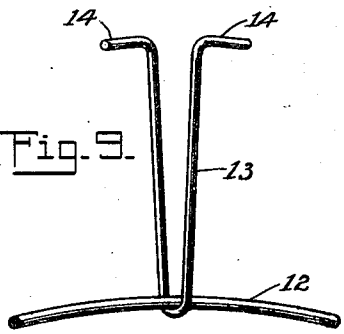
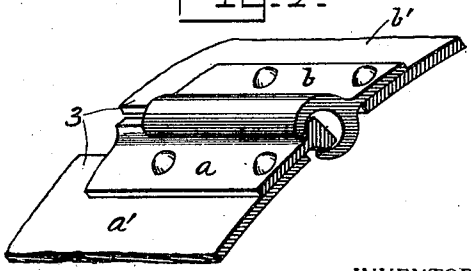


Fig. 7.



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TANK-CAR.

1,199,816. Specification of Letters Patent. Patented Oct. 3, 1916.

Application filed November 5, 1914. Serial No. 870,413.

To all whom it may concern:

Be it known that I, ALLEN E. OSTRANDER, residing at Ridgewood, Bergen county, New Jersey, and being a citizen of the United States, have invented certain new and useful Improvements in Tank-Cars, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and to use the same, reference being had to the accompanying drawings, which illustrate the preferred form of the invention, though it is to be understood that the invention is not limited to the exact details of construction shown and described, as it is obvious that various modifications thereof will occur to persons skilled in the art.

In said drawings: Figure 1 is a central vertical longitudinal sectional view. Fig. 2 is a central vertical transverse view of the tank and tank anchor at the left of the figure and an end elevational view at the right of the figure, the tank being broken to permit showing details in larger section; Fig. 3 is a vertical sectional view of a fragment of the tank and showing the tank dome in detail; Fig. 4 is an enlarged fragmentary detail view of part of the dome; Fig. 5 is an isometric perspective showing part of the tank anchoring means hereinafter described. Fig. 6 is a similar view showing a filler between the tank shells adapted to be connected to the outer shell and on which rests the inner tank shell; Fig. 7 shows a detached detail of the manner of connecting sheets of the outer shell near the top of the tank. Fig. 8 illustrates in detail a fragment of the inner tank shell and how the insulation for the body portion of such shell is secured in position; Fig. 9 illustrates in enlarged detail one of the binding wires and insulation-securing clips hereinafter described. Fig. 10 is a detail plan view of part of the outer dome head, the dome cap and means so locking the latter in closed position that gaseous pressure relief must be obtained in the inner tank before said cap can be opened; Fig. 11 is a fragmentary vertical section through a portion of the outer dome and an elevation of part of the inner dome and the dome cap and shows modified locking means for the cap; and Fig. 12 is a fragmentary plan view of the outer dome head, the cap, the modified locking means and the pressure-relieving device.

The object of the present invention is to provide a tank adapted for use in tank cars, which tank is thoroughly insulated and which is of such construction that it may be readily assembled for use and it possesses an additional feature of advantage in that should it become necessary to repair the inner tank shell, or the outer tank shell, the outer shell may be removed from the inner shell with a minimum amount of labor, and the insulation may be removed so as to expose the inner shell which may be repaired and the parts reassembled or the inner shell may be used as a tank of a tank car without the outer shell, if such outer shell has been removed.

The invention comprises two complete tanks, one of which is larger than the other, the inner tank being removably mounted in position within the elements comprising the outer tank.

Another object of the invention is to provide means for insulating the interior tank and for securing such insulation in position.

Other features of advantage are that the elements comprising the outer tank may be reassembled to form a tank independently of the inner tank, if for any reason that should become desirable, and the invention also comprises means for anchoring the inner tank in position upon a car underframe by means of devices common to the art associated with special attachments for holding the two tank shells in proper position.

Referring specifically to the parts, 1 indicates the inner tank shell which is preferably provided with a cylindrical body portion and with convex heads 2 of the type commonly found in tank cars.

3 indicates the outer shell which is provided with concave heads 4. It will be noted that the tank shell 3 is of considerably greater length than is the tank shell 1 so that the flanges 5 of the concave head 4 may be riveted to said outer shell. It is understood that the flanges 6 of the inner head 2 are likewise riveted to the shell 1 of the inner tank.

Interposed between the outer and inner shells are secured sheets or blocks 10 and 11

of insulation which may be of any preferred type but it is to be noted that the sheets or blocks 10 and 11 are arranged so as to "break joints",—that is, so that the joints between the sheets 10 shall be covered by the body portions of the sheets 11.

To secure the insulation 10—11 in position, binding wires 12 are wrapped about the inner tank shell 1 in the first instance, and secured, at convenient intervals apart, on such wires 12, are clips 13 which clips are provided with outstanding projections 14, which projections, as will be noted from Fig. 8, overlap contiguous sheets 10 of the insulation, and likewise lapped about the inner course of insulation 10 are binding wires 12^a which have strung thereon similar clips with similar offset portions adapted to overlap the insulation sheets 11 thereby securing both inner and outer layers of insulation firmly in position upon the inner tank shell.

The inner tank shell is provided with a dome 15 and a dome head 16 which telescopes with the dome 15 and is secured thereto by rivets 17.

The outer tank shell is provided with a dome 18, which dome 18 has outstanding flanges 19 secured to outstanding flanges 20 of its dome head 21 by vertical rivets 22 and intermediate the domes 15 and 18 insulation 25 is packed so as to thoroughly insulate such dome portions of the tank though it is to be noted that the insulation 25 is not of the block or sheet form. The dome cap 26 is also filled with insulation 25 and this dome cap which is secured in position by suitable screw threads is of peculiar construction.

Referring to Fig. 4 it will be noted that the inner tank shell 1 and the outer tank shell 3 are spaced apart a considerable distance, and that a pan 28 is secured by vertical rivets 29 to the inner tank shell and by rivets 30 to the outer tank shell.

Connected to the dome cap 26 is a pan 31 which is secured in position by machine screws 32 extending through the shell of the pan and through the depending flange 33 of the dome cap, thereby providing secure means for holding the insulation 25 for such dome cap.

Secured to the outer shell 3 at convenient intervals are fillers or supporting blocks 40, shown detached in Fig. 6, which blocks 40 are preferably riveted by vertical rivets 41 to the shell of the outer tank and are preferably not riveted to the inner tank shell, but the inner tank shell preferably rests upon such supporting blocks and is secured in position by other means as follows: At convenient distances from the longitudinal middle portion of the tank, angular members 42 are riveted to the bottom shell of the inner tank through the legs 43 while the legs 44 depend vertically below the inner tank shell. Riveted to the inner face of the outer tank shell are angular members 45 whose horizontal legs 46 are riveted to the outer tank shell and whose vertical legs 47 project upwardly approximately in contact with the depending legs 44 of the member 42 and as the members 42 are riveted to the inner tank shell and the members 45 are riveted to the outer tank shell, it will be evident that independent longitudinal movement of the inner tank shell with relation to the outer tank shell is thereby prevented. It is therefore apparent that angular members 42 and 45 constitute an internal anchor for the inner tank shell. Such longitudinal movement is likewise prevented by the fact that there is interposed between the convex heads 2 and the concave heads 4 a filler of insulation which is intended to substantially fill the gap between such heads 2 and 4 though it is preferred that the anchor members 42 and 45 shall be of sufficient strength to prevent shifting of the tank.

To secure the tank in position I employ a conventional tank anchor indicated at 60 in Figs. 1 and 2, which tank anchor is provided with flanges 61 extending longitudinally and transversely of the member 60 and through the flanges 61 are extended rivets 62 which pass through the outer tank shell and through the horizontal leg 46 of the members 45 before referred to, thus securing such tank anchor in position positively to the outer tank shell and due to the contact of the flanges 44 and 47 before referred to anchoring the inner tank in position with reference to the underframe.

As the underframe details form no part of the present invention and the tank forming the subject matter of this application is adapted to be used with various types of underframes, I have indicated the underframe diagrammatically in dot and dash lines in Fig. 1, which dot and dash lines indicate a car sill 70 which may be of any form, and on the sill 70 I have indicated anchor stops 71 adapted to coöperate with the tank anchor 60 to hold the tank in proper position and prevent excessive movement of the tank on the underframe.

To permit removal of the outer shell of the tank it is made separable as follows: Attached to the contiguous edges at the upper side of the body of the tank are sections of what are commonly known as steel sheet piling *a*—*b* one part *a* of a sheet being secured to one tank sheet *a'* and the other part *b* of the sheet being secured to the contiguous sheet *b'*.

The sheet piling is commonly formed with edge portions adapted to interlock with other piling sheets of the same shape, but in the present use of it the piling sheets are cut so that one portion *a* may be attached

to the tank sheets and another portion *b* of the same piling sheet may be attached to other tank sheets and when brought together by longitudinal movement of the tank sheets the piling will interlock and thereby connect such tank sheets together.

To connect other contiguous edge portions of the outer shell of the tank angles *c*, *d*, are riveted thereto as shown in Fig. 2, and bolts *e* or equivalent securing means are projected through the outstanding legs of such angles.

It is evident that the outer tank shell is thus formed so as to be separable when desired, one manner of causing such separation being to remove the rivets or bolts connecting the concave heads to the sheets of such outer tank shell.

One of the objects of removing the outer tank shell is to permit the inspection and repair of the insulation and the inner tank shell, and more frequently than otherwise it is not necessary to remove the entire outer shell. The usual inspection will require nothing more than the removal of bolts *e*, disconnecting tank angles *c* and *d*, and the rivets or bolts connecting sheets *a'* with the concave heads 4, whereupon the tank sheets *a'* will be pivotally suspended from the interlocking sheet piling sections *a* and *b*. Tank sheets *a'* may then be swung outwardly and upwardly, such displacement of said tank sheets exposing to view a large area of the insulation, which may be repaired or replaced if necessary.

Should there be any leakage in the upper part of the inner tank, the seepage of liquid therefrom will find its way through the joints of the insulation to the exterior thereof, and cause a plainly discernible ferrous discoloration. The upper portion of the outer tank shell comprising the outer dome and outer tank sheets *a'* and *b'* may be lifted as an integer, by a crane or other hoisting means, after the rivets or bolts connecting outer tank sheet *b'* and the concave heads 4 have been removed. The repair of the upper part of the inner tank shell may then be made, or the contiguous insulation may be inspected, replaced or mended.

Often, the bottom of the inner tank consists of a single metallic sheet as shown in Fig. 1, and, in such case, there is little or no danger of repairs being needed in this portion of said tank, but, where exceptions occur, dome cap 26 may be removed and a short beam be inserted into the interior of the inner tank shell. Such beam is then turned to a horizontal position to more than span the dome opening in the inner tank shell, and the chains or cables of a crane or hoist are then passed through the dome and attached to or about said beam. A winding up of the chains or cables will then lift the inner tank shell and all the insulation covering the same way from the car underframe and the bottom sheet of the outer tank shell. The upper part of the outer tank shell having been removed, all of the insulation is exposed and the entire inner tank shell is readily accessible.

The insulated tank here illustrated is designed to hold volatile inflammable products having a vapor tension of over 10 lbs. per square inch at a temperature of 100 degrees Fahrenheit. Therefore, the dome cap 26 is not only screwed into pan 28, but is locked against withdrawal by means, best shown in Figs. 1, 3 and 10. In said figures, a vent pipe 75 extends from the interior of the inner tank shell 1 through and above the dome head 21 of the outer tank shell, having a cock or other valve 80 attached to its upper end. A discharge pipe 76 is positioned on the opposite side of pan 28, preferably diametrically opposite vent pipe 75, and also projects above dome head 21 of the outer shell and downwardly to the bottom of the interior of inner tank shell 1, where it is held by a clamping device 77, seen best in Fig. 1.

A closing cap 78 is screwed or otherwise secured to the upper end of discharge pipe 76 and has spaced outstanding lugs carrying a pivot pin. One end of a locking bar 79 is pivoted to said pin and extends across the top of dome cap 26, bearing against an upward extension thereof. The other end of locking bar 79 is bifurcated to pass downwardly over cock 80, a handle 81 of which is placed in a vertical position to the passage of locking bar 79, after which cock handle 81 is turned horizontally to lock the locking bar 79 in dome cap-retaining position.

Assuming a condition wherein the lading has established a relatively high vapor tension within inner tank shell 1, and desiring to remove dome cap 26, it is first necessary to turn cock handle 81 to vertical position, when locking bar 79 may be swung out of the path of withdrawal of dome cap 26. But such turning of cock handle 81 opens cock 80, allowing a rapid exhaust of the vapor creating the tension in the inner tank shell 1. By the time dome cap 26 has been unscrewed the vapor tension has been dissipated, removing the otherwise present danger of the dome cap being blown into the face of the trainman or laborer removing it.

The discharge of the fluid lading in inner tank shell 1 is accomplished by making an air hose connection to cock 80 and opening the latter, it being necessary to release locking bar 79, and, using it as a handle, unscrew discharge pipe cap 78. Pneumatic pressure being caused to pass through vent pipe 75 forces the fluid lading to pass up through discharge pipe 76, to the upper end

of which a hose is usually connected to convey the lading to any desired receptacle.

Figs. 11 and 12 show a modified dome cap-locking means, the vent and discharge pipes 75 and 76, respectively, being on the same side of pan 28. Locking bar 79ª extends partly over dome cap 26, the latter being provided with upstanding lugs, 82, which are adapted to engage said locking bar upon a slight rotary movement of dome cap 26, and to so prevent its further turning. Opposite cock handle 81ª, locking bar 79ª is bent to clear said handle, which, when in its valve-closing position, extends over a part of said bent portion of locking bar 79ª and prevents it from being swung to a dome cap-releasing position without opening cock 80ª.

Discharge of the lading is brought about in the manner already described in connection with the other dome cap-locking means.

What I claim is:—

1. An insulated tank comprising an inner and an outer shell, means for securing said tank on the underframe of a railway car and for preventing independent movement of said inner and outer shells including an anchor member projecting below the top plane of said underframe and interconnected with the latter.

2. In a tank car, a center sill, an insulated tank comprising inner and outer shells, shell-connecting means and means connected with said shell-connecting means adapted to anchor said tank in position.

3. In combination, car sills, an insulated tank comprising inner and outer shells, an insulating filler interposed between said shells, a plurality of rigid supports for the inner shell resting on the outer shell, an inner shell anchor comprising parts connected to each shell and an anchor member coöperating with said sills to hold the tank in position.

4. In combination, car sills, a tank mounted thereon and means for retaining said tank in position, said tank comprising inner and outer shells connected together intermediate their ends and an anchor for the tank connected with means connecting said shells.

5. In combination, car sills, an insulated tank comprising inner and outer disconnected shells removably mounted above said sills and an anchor for said inner shell comprising angles secured respectively to each of said shells.

6. In combination, an insulated tank for a tank car, said tank comprising an inner shell with convex ends and an outer shell with concave ends opposing said convex ends, car sills above which said tank is mounted, and an anchor connected to said outer shell depending below the top plane of said sills and held in substantially fixed relation to said sills.

7. In combination, a center sill, an insulated tank comprising inner and outer metallic shells mounted above said sill and means secured to each of said shells to prevent excessive movement of one shell within the other.

8. In a tank car, an underframe, an insulated tank comprising inner and outer shells, internal anchoring means preventing substantial movement between said shells and an external anchor preventing substantial movement between said outer shell and underframe.

9. In a tank car, an underframe and an insulated tank comprising a plurality of metal shells anchored in fixed relation to each other and removably anchored in position with respect to said underframe.

10. In a tank car, an underframe and an insulated tank mounted thereon, comprising inner and outer metal shells and interposed insulation, mutually interlocking tank-movement-preventing means secured to each shell, said tank being anchored in position by means depending from said outer shell into the planes of said underframe.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

ALLEN E. OSTRANDER.

Witnesses:

H. C. LUNGER,

J. D. ANDERSON.