

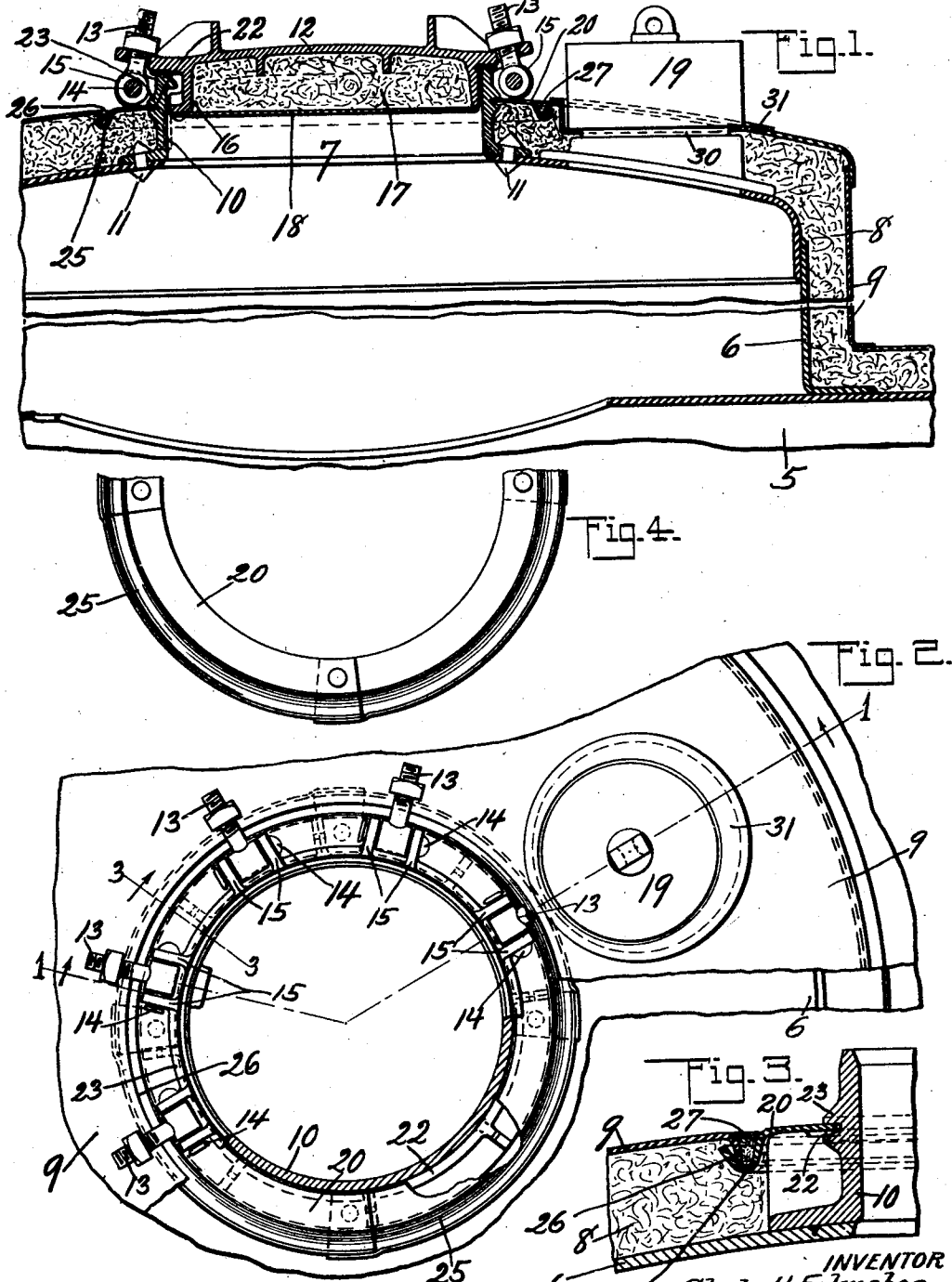
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C. H. FOLMSBEE

TANK MANHOLE ARRANGEMENT

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INVENTOR  
Clyde H. Folmsbee  
BY *F. H. Libes*  
ATTORNEY

# UNITED STATES PATENT OFFICE.

CLYDE H. FOLMSBEE, OF BAYONNE, NEW JERSEY, ASSIGNOR TO AMERICAN CAR AND  
FOUNDRY COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

## TANK-MANHOLE ARRANGEMENT.

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In the drawings:

Fig. 1 shows a vertical section through a dome and manhole of an insulated tank car, illustrating the application of my invention to the manhole, and also to a safety valve;

Fig. 2 is a fragmentary plan view of the parts shown in Fig. 1, a portion of the tank cover and its securing means being broken away to expose parts beneath;

Fig. 3 is a fragmentary view on a larger scale than Figs. 1 and 2, showing a vertical radial section through a portion of the manhole ring and associated parts;

Fig. 4 is a fragmentary plan view of one of the parts shown in Figs. 1 and 2.

This invention relates to manhole constructions and the like for insulated containers, such as manholes and safety valves in the domes of insulated railway car tanks. The object is to provide a simple, convenient, rugged, and inexpensive construction. I also aim to minimize the necessity for special parts, by employing parts that are equally applicable and satisfactory for uninsulated tanks.

In the construction of a manhole in the dome of a tank car, there is generally employed a flanged ring secured to the tank shell around the manhole opening therein, to which ring the manhole cover is suitably secured. Such a ring is known as a "dome ring" or "manhole ring."

In the case of ordinary uninsulated tank cars, a single plain, unscrewthreaded main dome ring is used, with lugs for the manhole cover fastenings (eye-bolts) cast integral with it.

In the case of insulated tank cars, a double dome ring is employed, consisting of an externally screw threaded flanged inner main ring fastened to the tank shell, and an internally screw threaded flanged outer ring applied after the insulation and its protective cover or sheathing have been installed, and screwed down tight on the sheathing so as to make a watertight joint. This outer ring carries means of attachment for the manhole cover fastenings (eye-bolts), in the form of apertured lugs cast integral with said outer ring;

Owing to the outer ring being a separate part, the apertures in the eye bolt lugs have been further away from the center of the manhole in the case of the insulated tank than in the case of the uninsulated one. Hence different covers have been required for the two types.

The embodiment of this invention here shown and described obviates these disadvantages of present practice, making it feasible to use one and the same "main" ring and one and the same cover for both types of tanks, and doing away altogether with the outer ring,—in anything approaching its present form, at any rate. It also avoids all necessity for the screwthreading of the rings heretofore required in the case of insulated tanks.

The drawings show a portion of a railway car tank shell 5 equipped with the usual dome 6, which is provided with a manhole opening at 7. The tank shell 5 and the dome 6 have a thermo-insulative covering 8 of any suitable fibre or other material, with a covering or sheathing 9 (usually of sheet metal) over the insulation. At the manhole 7, there is a flanged dome ring or manhole ring 10, secured to the sheet metal dome wall 6 by any suitable means (such as rivets 11), and projecting up through corresponding openings in the insulation 8 and the (sheet metal) covering or sheathing 9. A manhole cover 12 of any suitable or preferred construction may be employed: it is shown seated on the upper edge of the ring 10 and secured by eye-bolts 13 pivoted on pins 14 extending through pairs of lugs 15; 15 which may be cast integral with the ring 10. The cover 12 has a depending flange 16 that lies inside the ring 10. It may also be provided with internal insulation 17 held in place within the flange 16 by a lining plate 18 secured to the flange 16 at its edges. A safety valve 19 is shown (conventionally) mounted over an opening in the dome wall 6 and extending up through corresponding openings in the insulation 8 and in the sheathing 9.

Because of irregularities in the tank 5 and in the dome 6 as commercially constructed, as well as in the insulation 8 and its sheath-

ing 9, it is difficult or practically impossible to secure a reasonably good fit of the sheathing 9 around the manhole ring 10, or around the safety valve 19.

5 In the construction here illustrated, this is taken care of (for the manhole 7) by providing a relatively large opening in the sheathing 9 around the manhole ring 10, with a separate jacket or sheathing ring 20 to close the excessive opening. Such a separate sheathing ring 20 can easily be cut and fitted to the annular cover opening around the manhole ring 10, notwithstanding any irregularities in either the location or the outline of this opening. The inner and outer edges of the sheathing ring 20 may be tightly sealed or jointed around the manhole ring 10 and with the inner edge of the sheathing 9.

20 As shown in Figs. 1, 2, and 3, the manhole ring 10 has an external groove 22 machined in an annular enlargement or thickening 23 on its exterior, to take the inner edge of the sheathing ring 20, which is fitted and jointed or sealed therein, if necessary. Preferably, this groove 22 is of V shape, or flaring, with its lower side sloping outward and downward, and is narrow enough to wedge tight on the inner edge of the sheathing ring 20 without allowing the latter to "bottom" in the groove. The joint between the outer edge of the sheathing ring 20 and the surrounding edge of the sheathing 9 comprises an upward open trough or groove 25, on one of the sheathing parts (as here shown, on the sheathing ring 20) and a corresponding down-turned flange 26 on the other part (as here shown, on the main portion of the sheathing 9 around the manhole opening), with a filling of sealing material 27 in said trough. As shown in Figs. 2 and 4, the sheathing ring 20 may be initially formed in a plurality of segments (preferably two or more, but not more than four) fitted and secured together around the manhole ring 10 after the latter has been secured in place on the tank shell dome 6, and the insulation 8 and sheathing 9 applied. These segments may be united by riveting or/and welding, as shown in Fig. 4. A close, accurate fit of the flanges 26 in the trough or groove 25 is not required, because the hot-poured molten sealing medium 27 (such as roofing cement) insures a permanently sealed water-tight joint.

As shown in Figs. 1 and 2, the safety valve 19 is similarly mounted on its opening in the sheathing 9. That is to say, the annular safety valve casing (or "ring") has an annular groove 30 in which is fitted (and jointed or sealed, if necessary) the inner edge or flange of a sheathing ring 31. The outer edge of this sheathing ring 31 overlaps the sheathing 9, and may be sealed or

secured thereto in any suitable or preferred manner, so as to assure a water-tight joint. As here shown, the sheathing ring 31 is dished inward toward one side, to accommodate it to the slope of the dome sheathing 9 as well as to the horizontal position of the safety-valve groove 30.

What is claimed is:

1. An insulated tank construction of the character described comprising the combination with the tank shell and its insulation and jacket or sheathing, and an opening therein, of an externally grooved dome ring at said opening, and a jacket ring with its inner edge in the ring groove and its outer edge sealed with the edge of said sheathing.

2. An insulated tank construction of the character described comprising the combination with the tank shell and its insulation and jacket or sheathing, and an opening therein, of a dome ring around said opening, and a jacket ring around said dome ring sealed therewith, and also extending under and sealed with the sheathing.

3. An insulated tank construction of the character described comprising the combination with the tank shell and its insulation and jacket or sheathing, and an opening therein, of a dome ring around said opening, and a jacket ring of segments joined together around said ring, and sealed with the edge of the sheathing around said opening.

4. An insulated tank construction of the character described comprising the combination with the tank shell and its insulation and jacket or sheathing, and an opening therein, of a dome ring around said opening, and a jacket ring around and interlocked with said dome ring; said sheathing and sheathing ring having the one an annular sealing trough and the other a down-turned flange sealed in said trough.

5. An insulated tank construction of the character described comprising the combination with the tank shell and its insulation and jacket or sheathing, with an opening therein and a downturned flange on the sheathing around said opening, of an externally grooved ring for said opening, and a jacket ring having its inner edge in the ring groove and a trough at its outer edge with said downturned sheathing flange sealed therein.

6. In an insulated tank construction having a dome provided with an opening, a dome ring around said opening, a sheathing for said dome having its upper edge circumferentially spaced from said dome ring, and a jacket ring interposed between the dome ring and said sheathing and interlocked therewith.

7. In an insulated tank construction hav-

ing a dome provided with an opening, a dome ring around said opening, a sheathing for said dome extending around and over said dome with its upper edge circumferentially spaced from said dome ring, and a jacket ring interposed between the dome ring and said sheathing and sealed therewith.

ing a dome and a dome ring, means for effecting a close and accurate connection of sheathing with said dome comprising a segmental jacket ring sealed to said dome ring and sheathing.

In witness whereof I have hereunto set my hand.

8. In an insulated tank construction hav-

CLYDE H. FOLMSBEE.