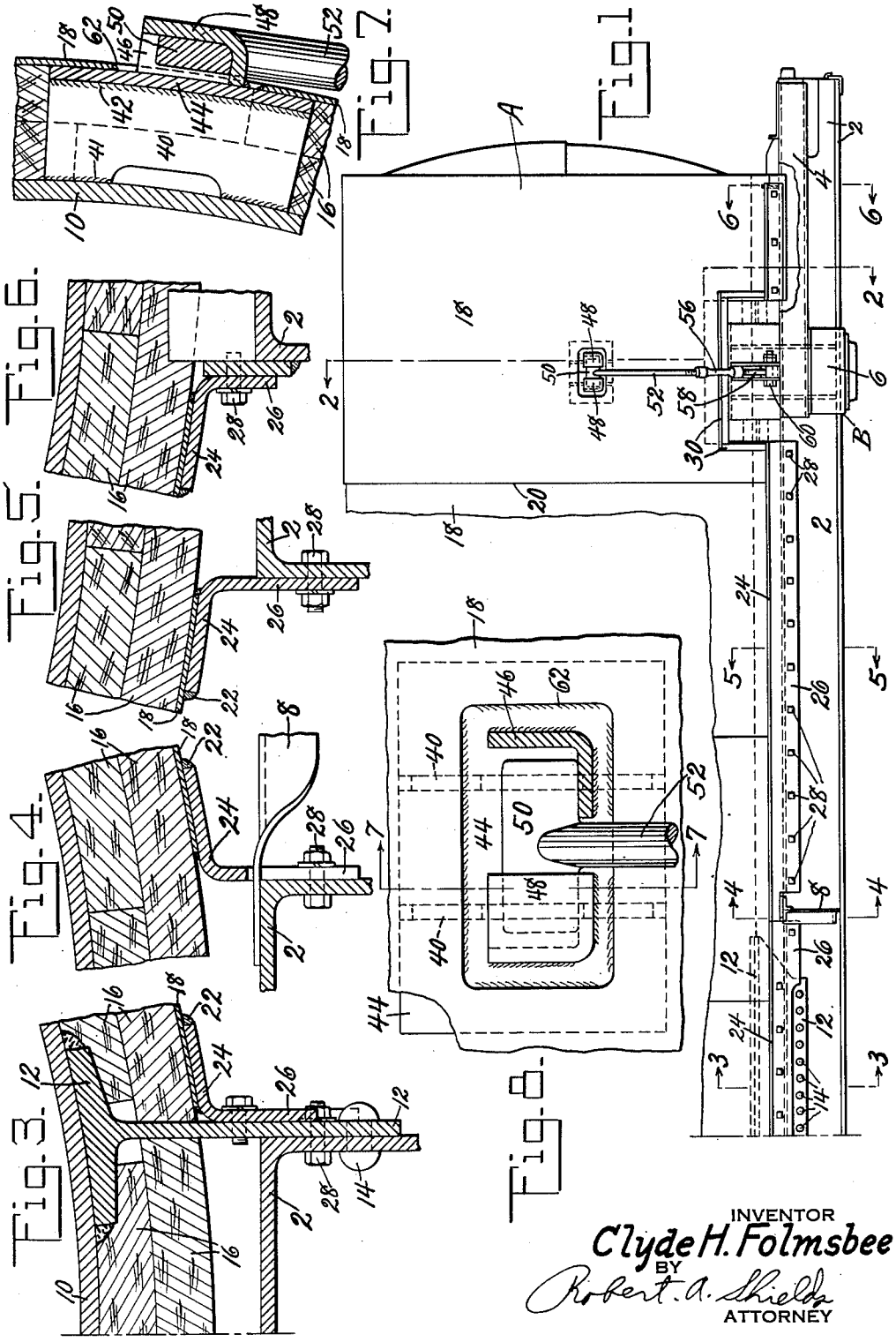
May 6, 1952 C. H. FOLMSBEE 2,595,835

INSULATED TANK CAR

Filed March 13, 1946 2 SHEETS--SHEET 1



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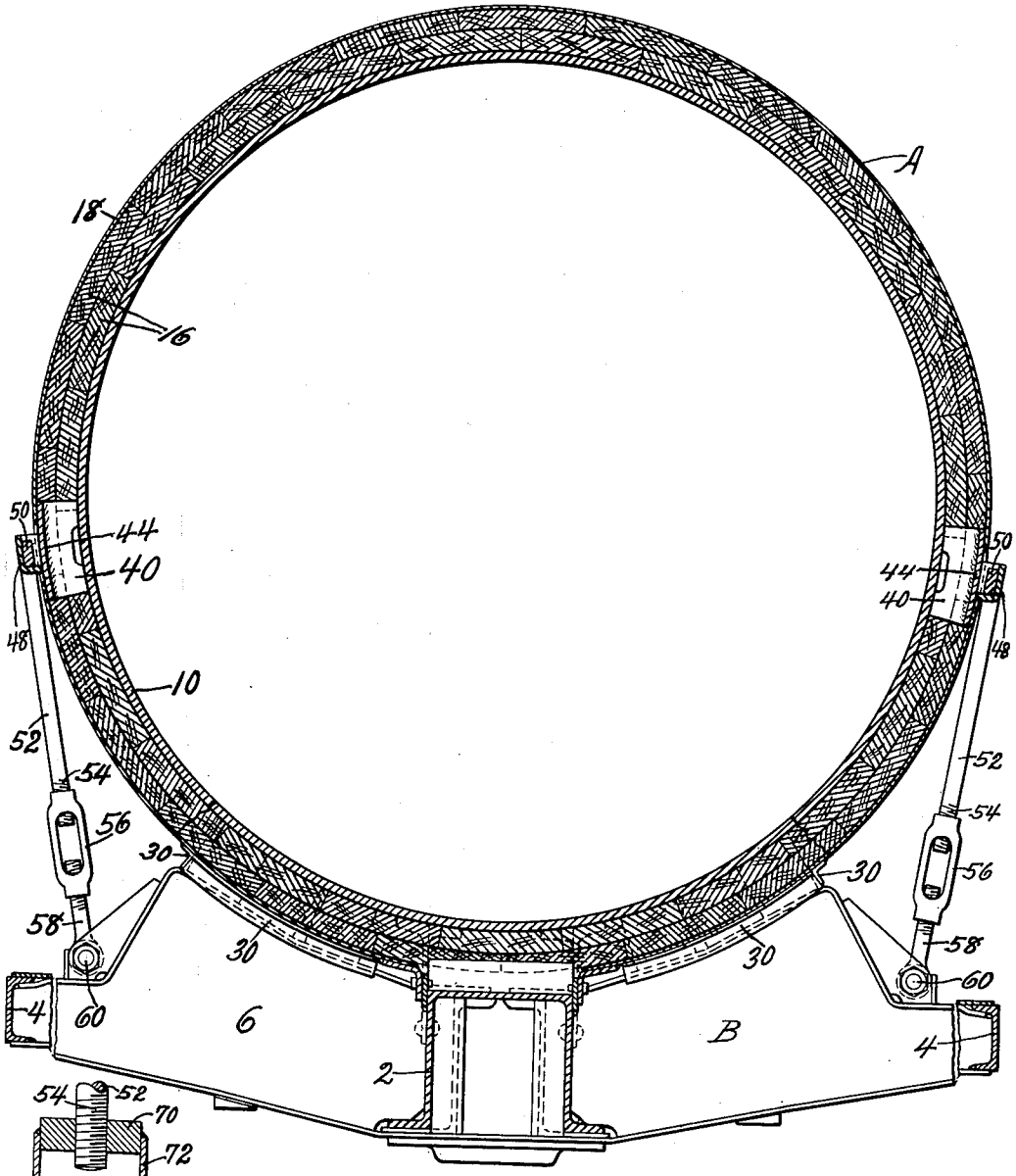
2 SHEETS—SHEET 2

Fig. 2.



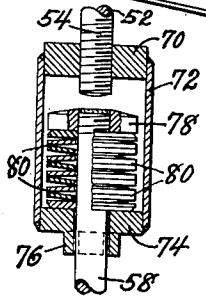


Fig. 9.

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INSULATED TANK CAR

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11 Claims. (Cl. 105—362)

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This invention relates in general to tank cars and in particular to insulated tank cars.

It is necessary for tanks of railway cars to be anchored to the sills by means preventing longitudinal shifting, as well as by means at the bolsters holding the tank downward onto the cradle blocks. The customary means of hold-down has been tank bands which encircle the tank and have their ends anchored to the ends of the bolsters. One design has been proposed and used wherein short anchors or stabilizers extend in a vertical direction from the bolster to diametrically opposite points on the tank shell. However, in both of these cases considerable difficulty is met with when it becomes necessary to insulate the tank in order to transport certain ladings. The bare tank must be mounted upon and anchored to the underframe, after which the insulation is applied and the protective jacket put on with cutouts provided for the tank bands and anchors. This requires that the jacket be applied in two or more parts. Furthermore, with the old construction the protective covering can not be securely anchored to the car structure, with the result that the jacket or shell will shift and be ruptured or torn adjacent the bolsters, tank bands, etc. It is an object, therefore, of the present invention to provide an insulated tank car in which the protective jacket can be made in one piece encircling the tank and its insulation and anchored to the underframe throughout its length.

A further object of the invention is the provision of an insulated tank having bands or stabilizers applied exterior of the protective jacket.

A still further object of the invention is the provision of an insulated tank structure which can be applied to or removed from the underframe as a unit.

These and other objects of the invention will be apparent to persons skilled in the art from a study of the following description and accompanying drawings, in which

Fig. 1 is an elevational view of substantially one-half of the improved tank;

Fig. 2 is a section taken substantially on line 2—2 of Fig. 1;

Figs. 3, 4, 5 and 6 are enlarged sectional views taken substantially on lines 3—3, 4—4, 5—5 and 6—6 of Fig. 1;

Fig. 7 is a sectional view taken substantially on line 7—7 of Fig. 8;

Fig. 8 is an enlarged elevational view of the tank band mount or stabilizer, and

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Fig. 9 is a sectional view of a modified turnbuckle and spring structure.

Referring now to the drawings in detail, it will be seen that the tank structure A is applied to an underframe unit B, which unit is of more or less standard construction having center sills 2, side sills 4, bolsters 6 and crossbearers 8. The tank in general consists of a load retaining pressure shell 10 to which is welded or otherwise secured T members 12 constituting tank anchors which can be riveted or otherwise attached as at 14 (Figs. 1 and 3) to the center sill structure. These heavy tank anchors will, of course, prevent longitudinal shifting of the tank proper. The pressure shell 10 is protected against heat loss by layers of insulation 16 completely surrounding the tank shell and this insulation is partially held in place and protected against injury by means of a light, protective jacket 18. This protective jacket is preferably made up of a plurality of sheets, either butt-welded or lap-welded together to form seams 20 (Fig. 1) and each of these strips substantially encircles the entire insulated tank. The lower edges of the sheets are welded or otherwise secured as at 22 to pressed angle members 24 having downturned legs 26 bolted or otherwise secured as at 28 to either the center sill structure or the tank anchor structure. The downturned legs or flanges 26 are, of course, notched out to straddle the crossbearer structures and are made discontinuous at the bolster structures as clearly shown in the figures. At the bolster structures the edges of the jacket shell surrounding the bolsters are reenforced by small angle or other shaped members 30.

In order to hold the ends of the tank downward upon the cradle structure or bolster elements tank band stabilizer structures are provided. Each of these tank band or stabilizer structures include a pair of flat plates 40 welded as at 41 to the tank shell 10 at either inner ends and at their outer ends welded as at 42 to a curved plate 44, preferably conforming in curvature to the curvature of the protective jacket 18. The plates 40 and 44 together will form substantially channel shaped members welded to the tank structure. On the outer side of plate 44 is welded or otherwise secured a pair of opposed angle shaped members having legs 46 welded to the plate 44 and merging into and joined by a flat plate 48. These opposed angle shaped members when applied to the plate 44 provide spaced apart pocket members adapted to receive the T-head 50 of a tank band or stabilizer bolt 52,

the lower end of which is threaded as at 54. The lower threaded end is adapted to be engaged by a turnbuckle element 56 which in turn is threaded onto a short bolt 58 anchored as at 60 to the bolster structure 6. From the preceding description it will be seen that the tank can be built as a unit, then insulated and the protective jacket applied, after which the structure could be lowered onto the underframe and securely anchored thereto by driving the rivets 14 and tightening turnbuckles 56. Application of fastening means 28 will securely anchor the protective jacket to the center sill structures and prevent any possible longitudinal shift of the jacket relative to the underframe. As shown, particularly in Fig. 8, the tank protective jacket is welded as at 62 to the curved plate 44, this being done to prevent entrance of any moisture. This welding can be done either before or after application of the shell to the underframe structure but is preferably done after the anchoring means 28 has been applied and the jacket is anchored in position on the underframe.

As is generally customary the ends of the tank are supported at the bolster structures by means of wooden cradle blocks (not shown) and since these shrink or crush slightly during use, it may be necessary at some later date to tighten turnbuckles 56. In some cases rather than trust to owners to tighten these turnbuckles, it may be desirable to substitute the improved turnbuckle shown in Fig. 9. In this structure the threaded ends 54 of the T-headed bolt are threaded into a heavy washer element 70 which is welded securely to a pipe section 72, which in turn is welded at its lower end to a lower washer member 74 having a wrench-engaging portion 76. The short bolt 58 extends upwardly through the washer structure 74 and is threaded or otherwise engaged with a head member 78 to which it is also securely welded or anchored in some manner to prevent its movement relative to bolt 58. Between head member 78 and washer 74 is a plurality of dished washers or discs 80 made of spring steel, thus providing a resilient connection between bolts 52 and 58. This unit will be applied and the weld between either washer 70 and shell 72 or washer 74 and shell 72 being made after assembly of the parts. It will be evident that on the first assembly a wrench can be applied to the portion 76 and the unit turned until the desired compression is obtained upon the discs 80. These discs will exert a constant pressure tending to hold the tank onto the cradle blocks (not shown).

In case repair is necessary to either the underframe or tank structure the same can be readily accomplished by merely removing the fastening means 14, 28 and the stabilizers or tank bands, after which the tank structure may be lifted from the underframe. In case of breakage or injury to any of the tank bands or stabilizers, it will be only necessary to unscrew either the turnbuckle 56 or the similar spring type turnbuckle shown in Fig. 9, after which either the turnbuckle structure, T-head bolt 52, or short bolt 58 can be easily replaced without in any way necessitating any changes or operations on the tank shell or protective insulation jacket 18.

It will be apparent to persons skilled in the art from the preceding description that various modifications and rearrangements of parts may be made and all such modifications and rearrangements of parts are contemplated as will fall within the scope of the following claims defining my invention.

What is claimed is:

1. In a railway tank car the combination of an underframe including a center sill as the main structural element thereof, a lading retaining shell supported on the underframe adjacent the ends of the underframe, heat insulation covering said shell and supported thereby, and a metallic jacket protecting said heat insulation and anchored to the center sill substantially throughout its length.

2. A railway tank car having an underframe including a center sill as the main structural element thereof, a cylindrical lading retaining tank supported on the underframe adjacent the ends of the underframe, heat insulation covering said tank and supported thereby, a jacket protecting said heat insulation, and means directly connecting said jacket to the center sill substantially throughout its length.

3. A railway tank car having an underframe including a center sill as the main element thereof, a cylindrical lading retaining tank supported on the underframe adjacent the ends of the underframe, heat insulation covering said tank and supported thereby, a substantially cylindrical jacket protecting said heat insulation, and means directly connecting said jacket to the center sill substantially throughout its length, said jacket being made up of one-piece metal sheets encircling the tank from one side of the center sill to the other.

4. A railway tank car having an underframe including a center sill as the main structural element thereof, a lading retaining tank shell supported on the underframe adjacent the ends of the underframe, heat insulation covering said tank shell and supported thereby, a jacket protecting said heat insulation and including said center sill as a part thereof to fully protect the insulation, means fastened directly to said tank shell adjacent its ends at opposite sides thereof and having parts of limited area projecting outwardly through said jacket, said outwardly projecting parts including pocket members, and tank stabilizing bolts connected to said underframe and engaging said pocket members exterior of the jacket.

5. A railway tank car having an underframe including a center sill as the main structural element thereof, a lading retaining tank shell supported on the underframe adjacent the ends of the underframe, heat insulation covering said tank shell and supported thereby, a jacket protecting said heat insulation, said jacket including said center sill and being connected to the sides of said center sill, means rigidly fastened to said tank shell adjacent its ends and at opposite sides thereof and having parts of limited area projecting outwardly through said jacket, and tank stabilizing bolts engageable with and disengageable from said parts exterior of the jacket and connected to said underframe, said tank stabilizing bolts including means for adjusting the length thereof.

6. A railway tank car having an underframe including a center sill as the main structural element thereof, a lading retaining tank anchored to the center sill adjacent the longitudinal center thereof and supported by the underframe adjacent the ends of the underframe, heat insulation covering said tank, a substantially cylindrical jacket protecting said heat insulation, said jacket being split to accommodate the center sill,

and means fastened to said jacket and center sill and connecting the same together whereby said center sill becomes a part of the jacket protecting said heat insulation.

7. A railway tank car having an underframe including a center sill as the main structural element thereof, a lading retaining tank anchored to the center sill adjacent the longitudinal center thereof and supported by the underframe adjacent the ends of the underframe, heat insulation covering said tank, a substantially cylindrical jacket protecting said heat insulation, said jacket being split to accommodate the center sill, and means fastened to said jacket and center sill and connecting the same together whereby said center sill becomes a part of the jacket protecting said heat insulation, said means comprising angle form members extending substantially from end to end of the jacket.

8. A railway tank car having an underframe, a lading retaining tank supported by the underframe, heat insulation covering said tank, substantially channel shaped members having their flanges fastened on the tank on either side thereof and of a depth substantially equal to the thickness of the heat insulation, pocket forming members fastened to the webs of said channel shaped members and extending laterally outward from the outer surface of the heat insulation, and stabilizer bolts connecting said pocket forming members and underframe and being insertable into and removable from said pocket members without disturbing said heat insulation.

9. A railway tank car having an underframe, a lading retaining tank supported by the underframe, heat insulation covering said tank, substantially channel shaped members having their flanges fastened on the tank on either side thereof and of a depth substantially equal to the thickness of the heat insulation, pocket forming members fastened to the webs of said channel shaped members and extending outwardly from the outer surface of the heat insulation, and two-part stabilizer bolts connecting said pocket forming members and underframe and being insertable into and removable from said pocket members without disturbing said heat insulation, said two-part stabilizer bolts being connected by means for modifying their length.

10. A railway tank car having an underframe, a lading retaining tank supported by the underframe, heat insulation covering said tank, substantially channel shaped members having their flanges fastened at spaced apart points on the tank on either side thereof and, said flanges being of a depth substantially equal to the thickness of the heat insulation, pocket forming members fastened to the webs of said channel shaped members and extending outwardly from the outer surface of the heat insulation, and two-part stabilizer bolts connecting said pocket forming members and underframe outwardly of the heat insulation, the two parts of said stabilizer bolts being connected together by a resilient turnbuckle device and separable in their entirety from said pocket members without disturbing said heat insulation.

11. A railway tank car having an underframe, a lading retaining tank supported by the underframe, heat insulation covering said tank, substantially channel shaped members having flanges with parts thereof removed to provide spaced apart portions fastened on the tank on either side thereof, said channel shaped members being of a depth substantially equal to the thickness of the heat insulation, pocket forming members fastened to the side of the webs opposite from the flanges of said channel shaped members and extending outwardly from the outer surface of the heat insulation, a T headed bolt resting in said pocket forming members and depending therefrom outwardly of the heat-insulation, an eye bolt connected to said underframe, and a resilient turnbuckle device connecting said T headed bolt and eye bolt.

CLYDE H. FOLMSBEE.

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