Dec. 31, 1940. C. H. FOLMSBEE 2,226,713

TANK CRADLE

Filed May 20, 1938

Fig. 1.

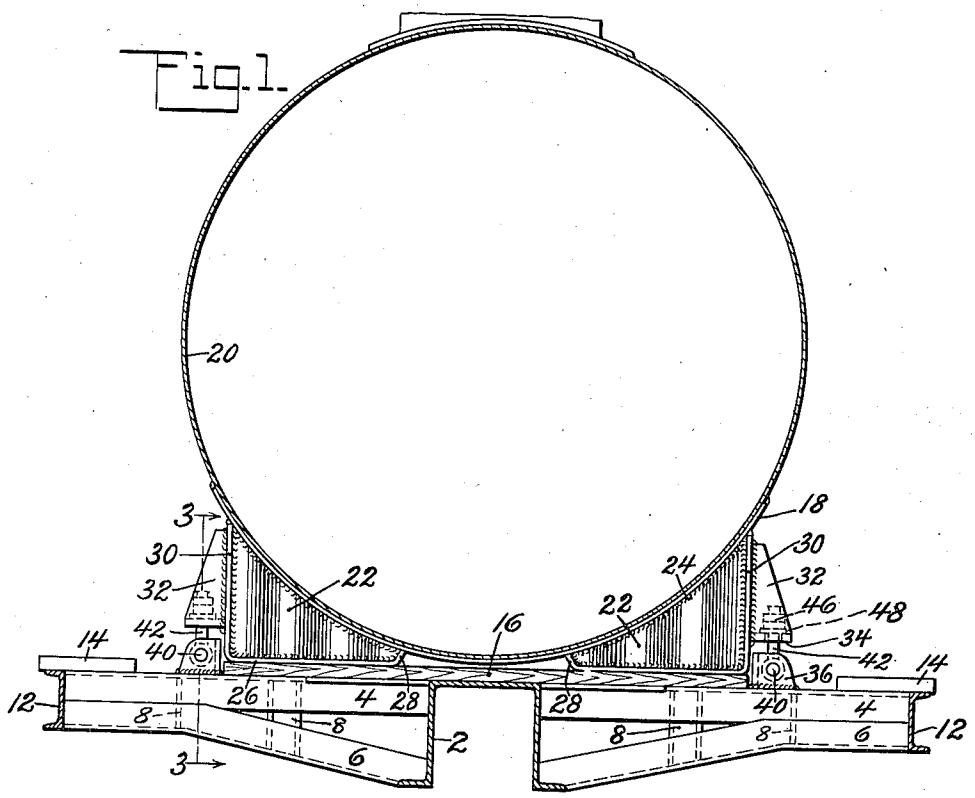


Fig. 2.

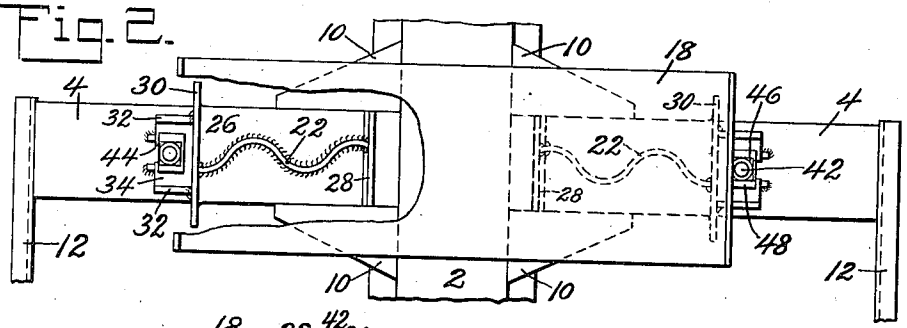


Fig. 3.

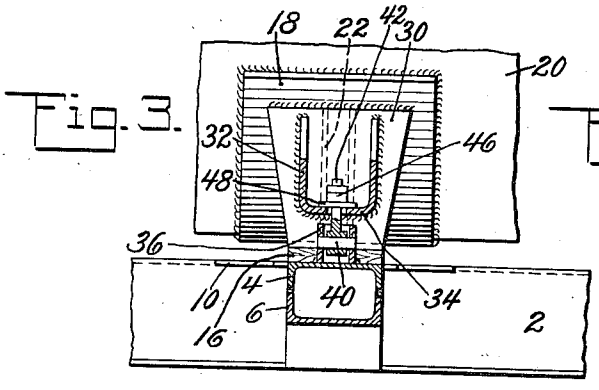
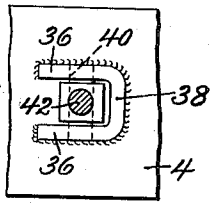


Fig. 4.



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TANK CRADLE

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7 Claims. (Cl. 105—362)

This invention relates to tank supports in general and in particular to tank supporting and retaining members intended particularly for railway use.

In the past railway tanks for transport of oil and other commodities have been supported adjacent their ends at the bolster area by means of cradles secured to the underframe and carrying on their upper surface a plurality of wooden blocks, which wooden blocks provided a cushioning and friction mounting for the tank and distributed the load stresses evenly from the tank shell to the underframe. With these prior constructions extreme care was necessary in shaping and preparing the wooden blocks to properly support the tank and evenly distribute the stresses. Even when the tanks were properly supported it was found in certain instances that unequal wood strengths, moisture content, etc., so affected the mount that the stresses were no longer evenly distributed to the tank shell after the car had been in service. Also in repair of the cars it was found almost impossible for the average repair shop to properly mount the tank which necessitated great expense in sending the entire car back to the manufacturer for repair. It is an object, therefore, of the present invention to provide an improved tank retainer and cradle member utilizing substantially horizontal cushioning members which may be readily replaced at a minimum cost and trouble.

A further object of the invention is the provision of an improved tank retainer and cradle member which is securely carried by the tank and arranged to be supported on the underframe through substantially plane cushioning members.

A yet further object of the invention is the provision of a tank retainer and cradle member which is secured to the tank with its parts so arranged as to evenly and more efficiently absorb the load stresses from the tank shell without setting up localized stresses in the shell.

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 drawing, in which

Figure 1 is a sectional view taken through a tank vehicle adjacent the bolster or other support member;

Fig. 2 is a plan view of the cradle member with tank removed and with parts broken away to more clearly disclose the construction thereof;

Fig. 3 is a sectional view taken substantially on line 3—3 of Figure 1, and

Fig. 4 is an enlarged view showing the retaining member secured to the underframe bolster or support member.

Referring now to the drawing in detail, it will be seen that the underframe is of more or less conventional construction having a center sill 2 of the AAR type to which is fastened a bolster formed in the present instance by upper and lower channel members 4 and 6 respectively. These channel members have their flanges directed toward each other to provide a substantially box section braced and tied together by bracing members 8 and having the area of contact to the center sill increased by means of gussets 10 which also brace the members against longitudinal forces transmitted thereto. The bolster carries at its outer ends the customary short side sills 12 and running board 14, the latter being mounted upon the upper surface of the bolster which has been made substantially coplanar with the upper portion of the center sill in order to provide a flat unobstructed top surface for application of a wood or other cushioning block 16. It is obvious that since the top surfaces of the bolster and center sill are substantially horizontal, a substantially horizontal cushioning member may be used which will require no special preparation.

The improved tank retainer and cradle member consists of an upper plate 18 curved to conform to the tank shell 20 and of sufficient width and length to give the necessary bearing area for support of the tank and contents. The upper curved plate is preferably rigidly secured at its edges to the tank shell and carries on its under surface a pair of retaining members, each including web plates 22 having their upper edges curved to conform to the plate and being welded to the same as at 24. These web plates are preferably corrugated as clearly shown in Fig. 2 to give added strength thereto and prevent distortion of the same under both vertical and horizontal stresses. The lower edges of the web plates are welded or otherwise secured to a substantially horizontal bearing portion 26 of a plate having its inner ends deflected upwardly as at 28 to be welded to the upper plate, while the outer end is deflected substantially vertically upward as at 30 for welding to the outer edge of the web plate and to the upper curved plate. It is thus seen that the upper curved plate of the cradle member is supported at its ends by roughly triangular shaped members having a corrugated web and plane bearing areas to support the cradle member upon the cushion block or blocks.

It will be noted that the upper curved plate is of considerable width relative to the vertical portions **28**, **30** and the web plate, thus providing a considerable overhung portion which will act more or less as a cantilever beam to support the tank shell and evenly distribute the stresses therebetween without localizing the same at the edges of the curved supporting plate.

Since the cradle member is securely attached to the tank it is obvious that if the same is secured to the underframe the ends of the tank will be held down and the present customary expensive tank bands may be eliminated. To this end roughly U-shaped plates are provided having upwardly directed flanges **32** and a horizontal connecting web portion **34**, all securely welded to the vertical flange **30** previously referred to. Immediately below each of these U-shaped plates another roughly U-shaped plate is provided having flanges **36** and web portion **38**, all securely welded to the top surface of the bolster. The flanges of this lower U member are pierced in order to receive a pin **40** extending through or formed on the lower end of a bolt **42**, thus pivotally mounting the same for swinging movement relative to the member. The web plate **34** of the upper or cradle carried U-shaped member is formed with an outwardly opening slot **44** into which the bolt may be swung and the cradle clamped to the underframe by means of nuts **46** and elongated washer **48** spanning the slot in the web plate. The slot in the web plate is made sufficiently large in order to provide clearance between the bolt and slot, thus permitting slight longitudinal movements of the tank relative to the underframe as is customary and necessary.

With the construction as shown and described the tank may be readily removed from the underframe by loosening the nuts **46** and swinging the bolts outwardly about their pivot points. With the tank so loosened from the underframe it may either be completely removed by loosening the usual center anchor (not shown) or the ends may be lifted slightly without removal of the anchor to permit insertion of new cushion blocks. It will be obvious that the construction described may be also formed by riveting or otherwise securing the parts together, and this change in construction as well as other modifications and rearrangements of parts are contemplated as fall within the scope of the following claims:

What is claimed is:

1. In a tank car, a tank, an underframe provided with bolsters and a center sill having their upper surfaces located substantially in a common horizontal plane, a substantially plane cushion means extending longitudinally of the bolster and resting thereon and on the center sill, a tank cradle resting upon the cushion means and adapted to receive the tank to support the same upon the said cushion means, said cradle being secured to the tank, and means connecting said cradle directly to said underframe to prevent relative vertical movements therebetween, said last named means being so constructed and arranged as to permit limited relative horizontal movements between the tank and underframe.

2. In a tank car, a tank, an underframe provided with bolsters and a center sill having their upper surfaces located substantially in a common horizontal plane, a substantially plane cushion means resting upon the underframe, and a tank cradle resting upon the cushion means and adapted to receive the tank to support the same upon the said cushion means, said cradle including independent substantially triangular shaped corrugated plates located adjacent each end of the cradle.

3. In a tank car, a tank, an underframe provided with bolsters, cushion means supported by the bolsters, a tank cradle supporting the tank upon the cushion means, said cradle comprising an upper plate conforming to the tank contour, spaced lower plates having a bearing portion resting upon said cushion means, and intermediate triangular shaped plates joining said upper and lower plates, said intermediate plates being formed with vertically extending corrugations joining said upper and lower plates.

4. In a tank car, a tank, an underframe provided with bolsters, cushion means supported by and extending longitudinally of the bolsters, a tank cradle supporting the tank upon the cushion means, said cradle comprising an upper plate conforming to the tank contour, spaced lower plates having a bearing portion resting upon said cushion means, intermediate triangular shaped plates joining said upper and lower plates, a flange formed on said lower plates and each being joined to the adjacent intermediate plate, and hold down means connecting the flanges and underframe to prevent vertical separating movement between the cradle and underframe.

5. In a tank car, a tank, an underframe provided with bolsters, a tank cradle supporting the tank, and a connection between the cradle and underframe comprising a member having spaced portions secured to the underframe, bolts pivoted to the spaced portions and adapted to swing vertically, and upwardly facing U-shaped members connected to the cradle above the bolts and formed with slots adapted to receive the said bolts to prevent vertical separating movements between the underframe and cradle, said slots being of substantially greater width than said bolts to permit longitudinal movements between the cradle and underframe.

6. A cradle for supporting tanks comprising, an upper plate curved to conform to the tank contour, a substantially plane lower bearing plate in spaced relation to the upper plate, and an intermediate plate secured to the upper and lower plates to transfer stresses therebetween, said intermediate plate being formed with vertically extending corrugations to materially stiffen the plate for transfer of the stresses between the plates.

7. A cradle for supporting tanks comprising, an upper plate curved to conform to the tank contour, a pair of substantially plane lower bearing plates having bearing portions located in spaced relation to each other and to the upper plate, and a pair of intermediate plates secured to the upper and lower plates to transfer load stresses therebetween, said bearing portions being located substantially in a single plane and adapted to rest upon cushion means, and said intermediate plates being corrugated to increase the stiffness thereof.

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