United States Patent [19]

Nadherny

[11] **3,788,240**

[45] **Jan. 29, 1974**

[54] **BOX CAR HAVING BELT RAIL SUPPORTS MOUNTED ON LADING TIE ANCHORS**

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[73] Assignee: **Illinois Railway Equipment Company,** Chicago, Ill.

[22] Filed: **July 31, 1972**

[21] Appl. No.: **276,404**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 223,467, Feb. 4, 1972, abandoned.

[52] **U.S. Cl.** ..... **105/369 B,** 105/369 A

[51] **Int. Cl.** **B61d 45/00,** B60p 7/08

[58] **Field of Search** ..... 105/369 A, 369 B

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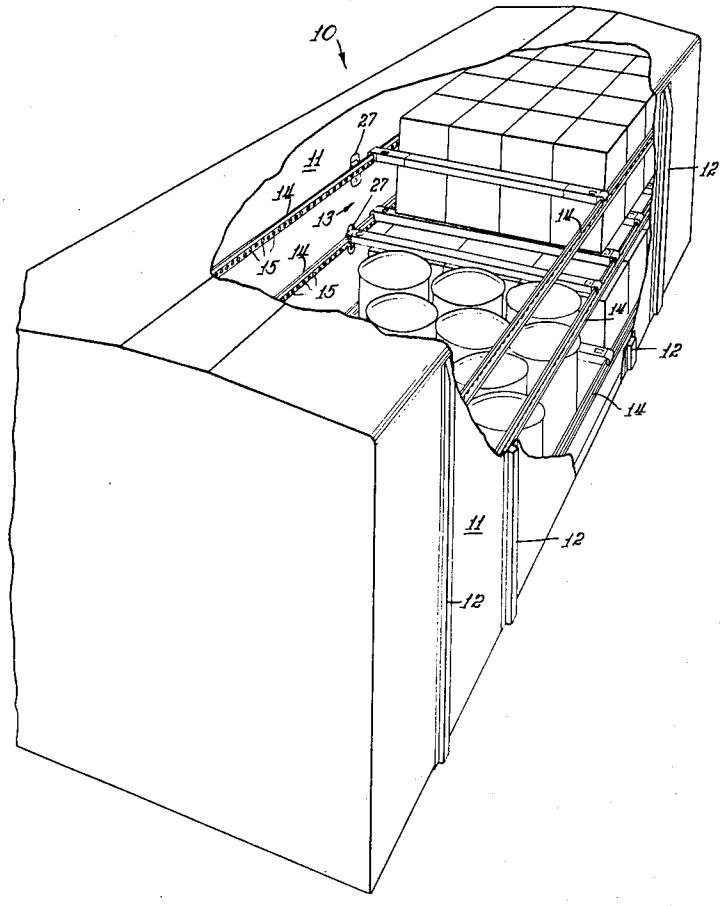
Primary Examiner—Drayton E. Hoffman

Attorney, Agent, or Firm—Robert R. Lockwood

[57] **ABSTRACT**

Lading transport means, such as a box car, is provided with lading tie anchors having associated therewith detachable belt rail supports in the form of inverted J-shaped plates, the hook portions of which overlie the upper ends of lading tie anchors secured to the car side walls. Various arrangements are employed for detachably securing the lower ends of the belt rail supports to the respective lading tie anchors. The belt rail may be secured to the belt rail supports by welding and may be removed therewith as a unitary structure. Key shaped openings are formed in lading tie anchors to receive through the circular portion the head of a bolt having a square shank that interfits with a rectangular part of the key shaped opening. Also a "Huck" bolt pin can be employed.

19 Claims, 26 Drawing Figures



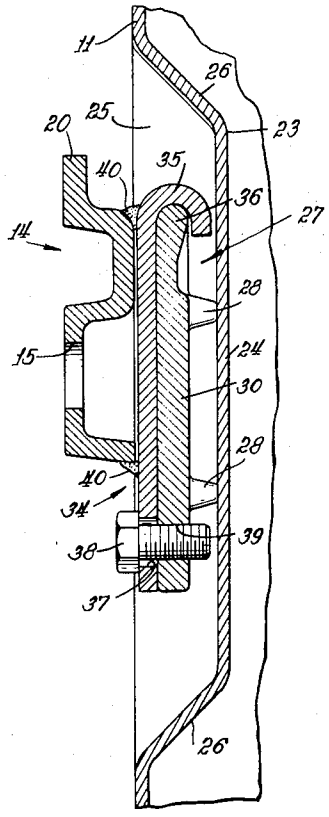


Fig. 1

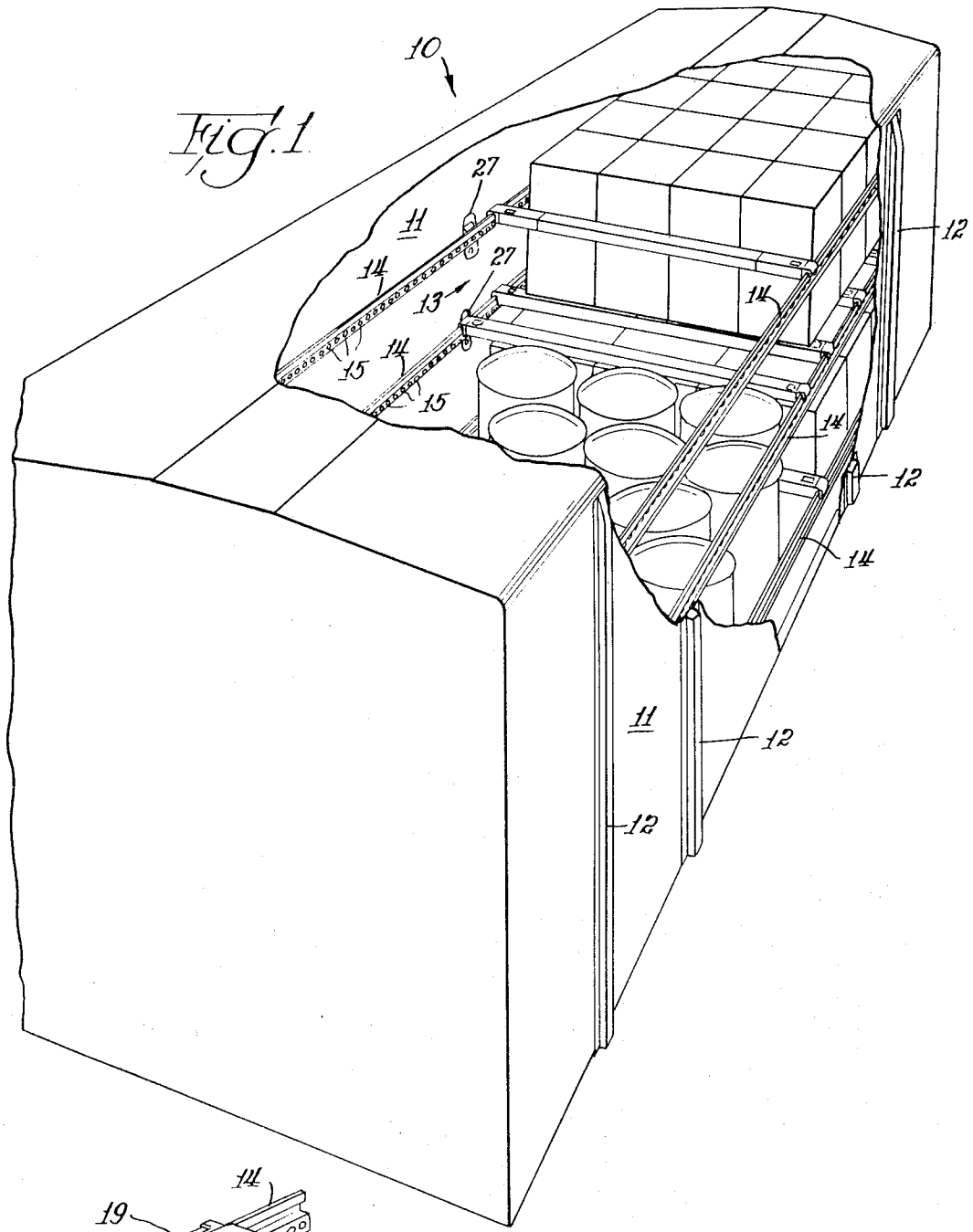


Fig. 1a

Fig. 2.

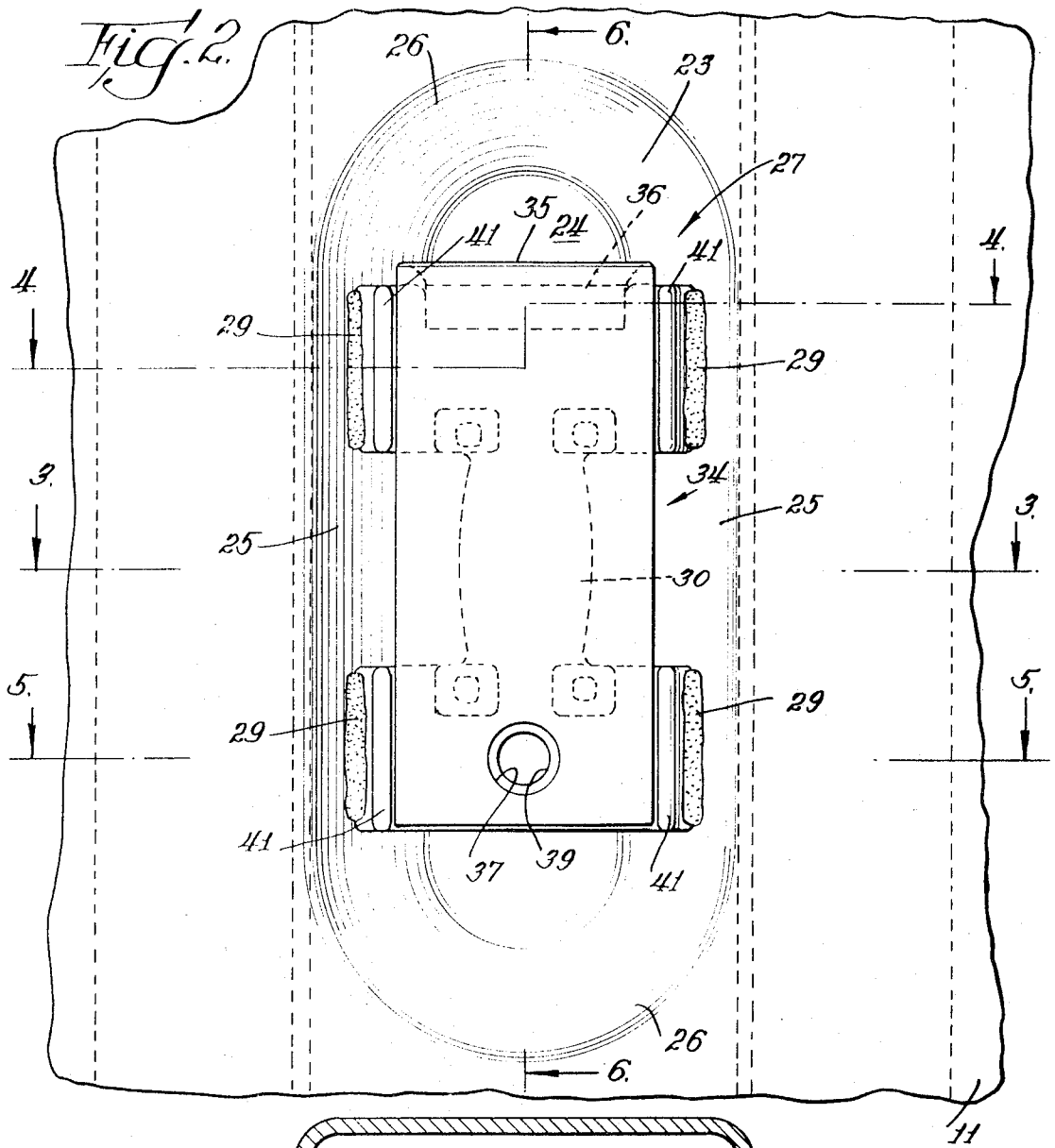

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Fig. 3.

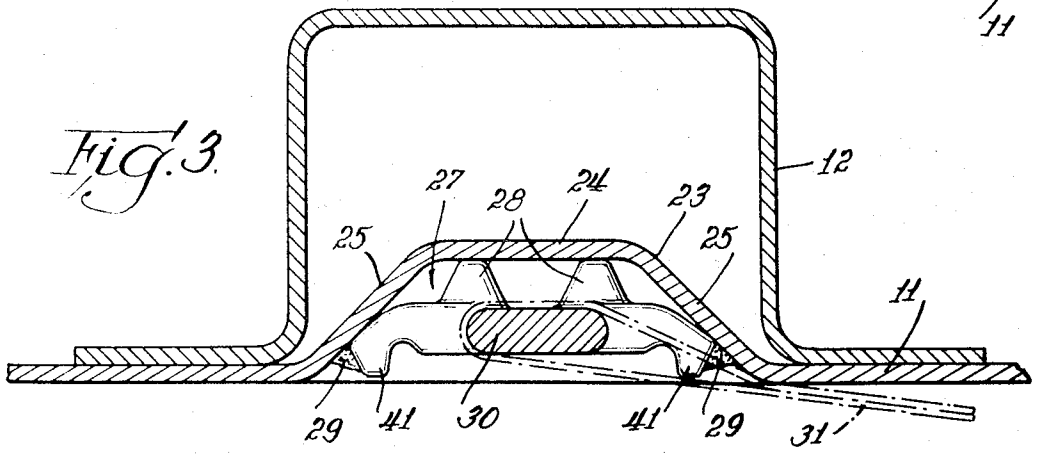

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Fig. 4

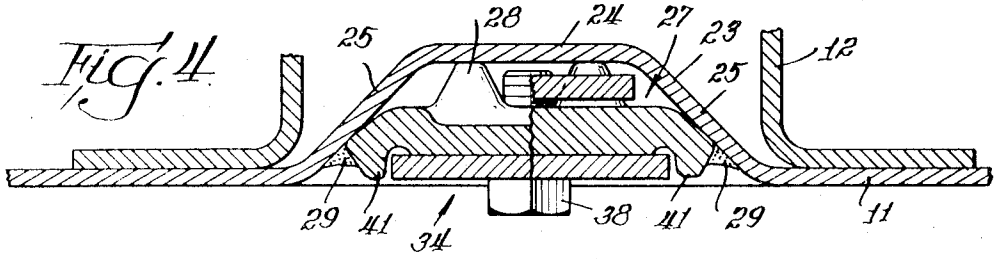


Fig. 5

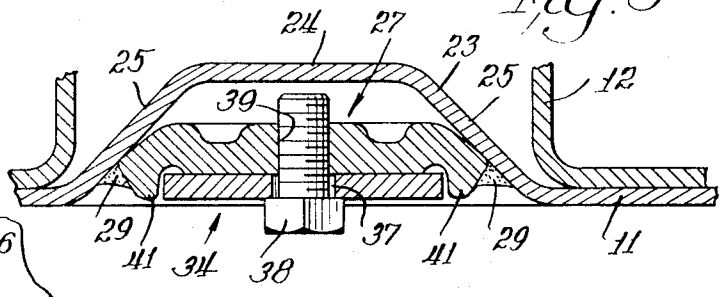


Fig. 6

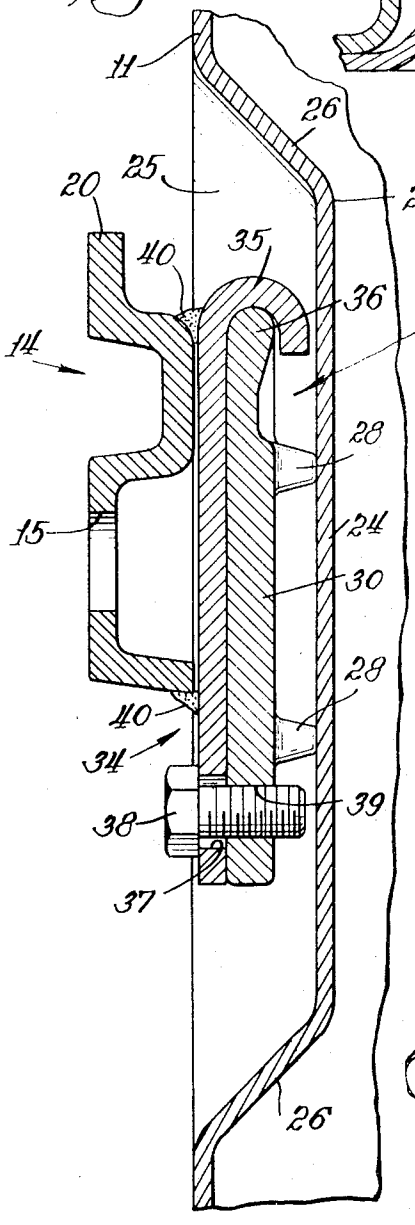


Fig. 7

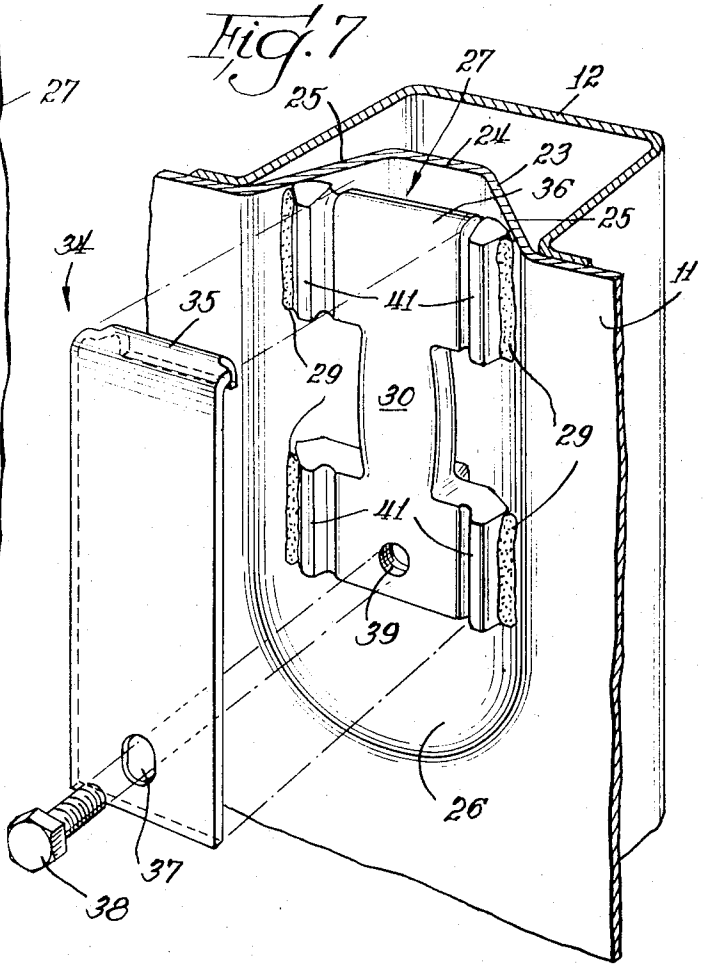
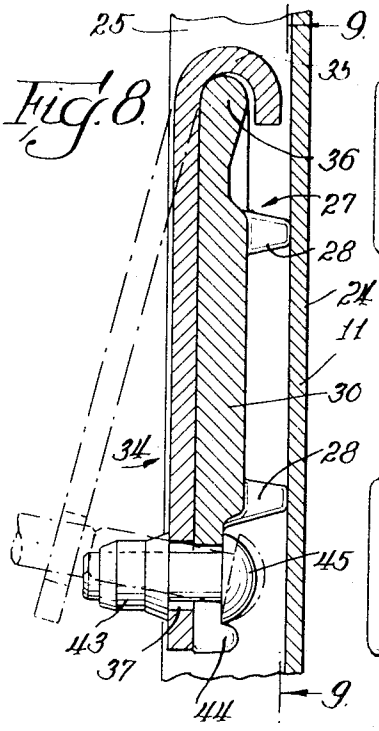


Fig. 8



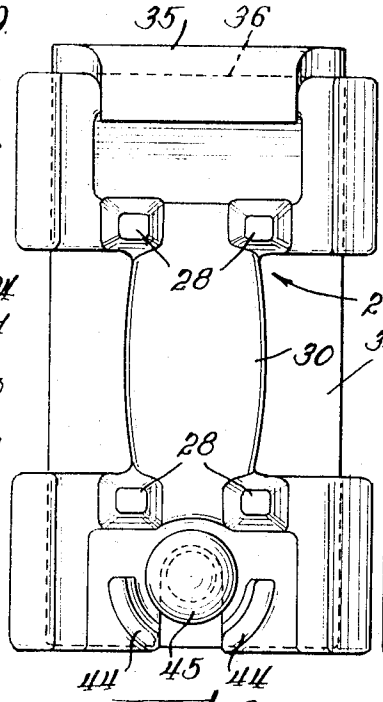


Fig. 10

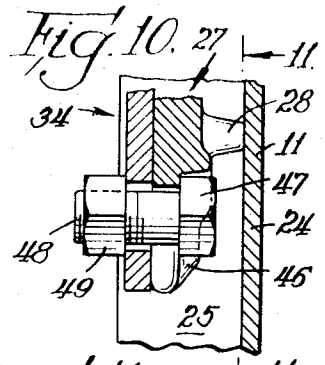


Fig. 11

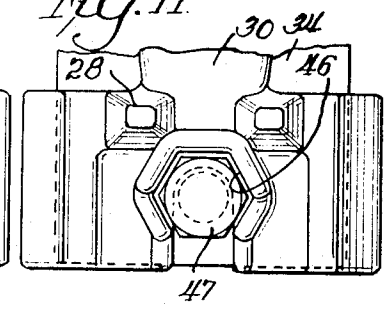


Fig. 9

Fig. 12

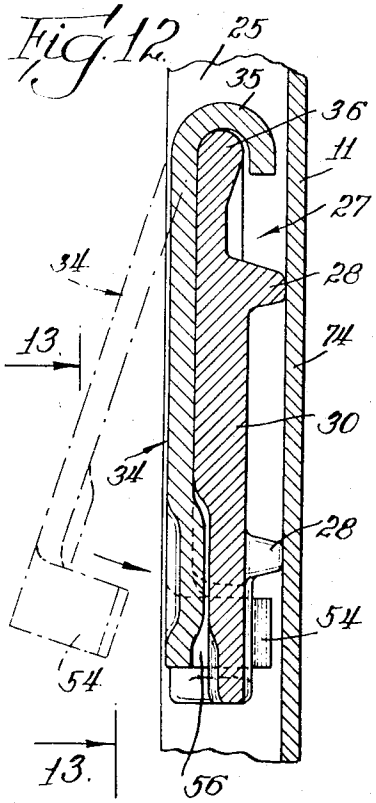


Fig. 13

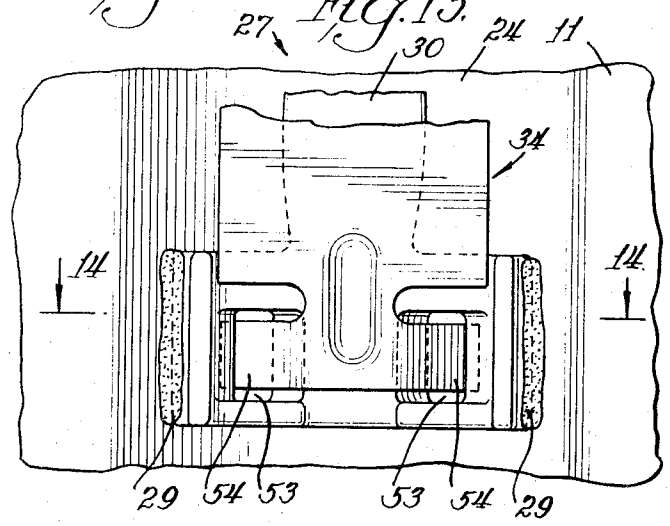


Fig. 14

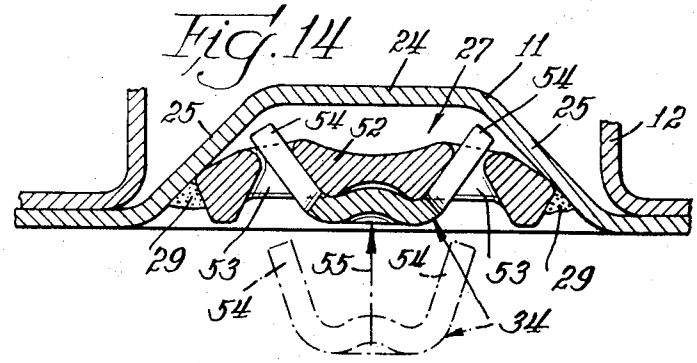
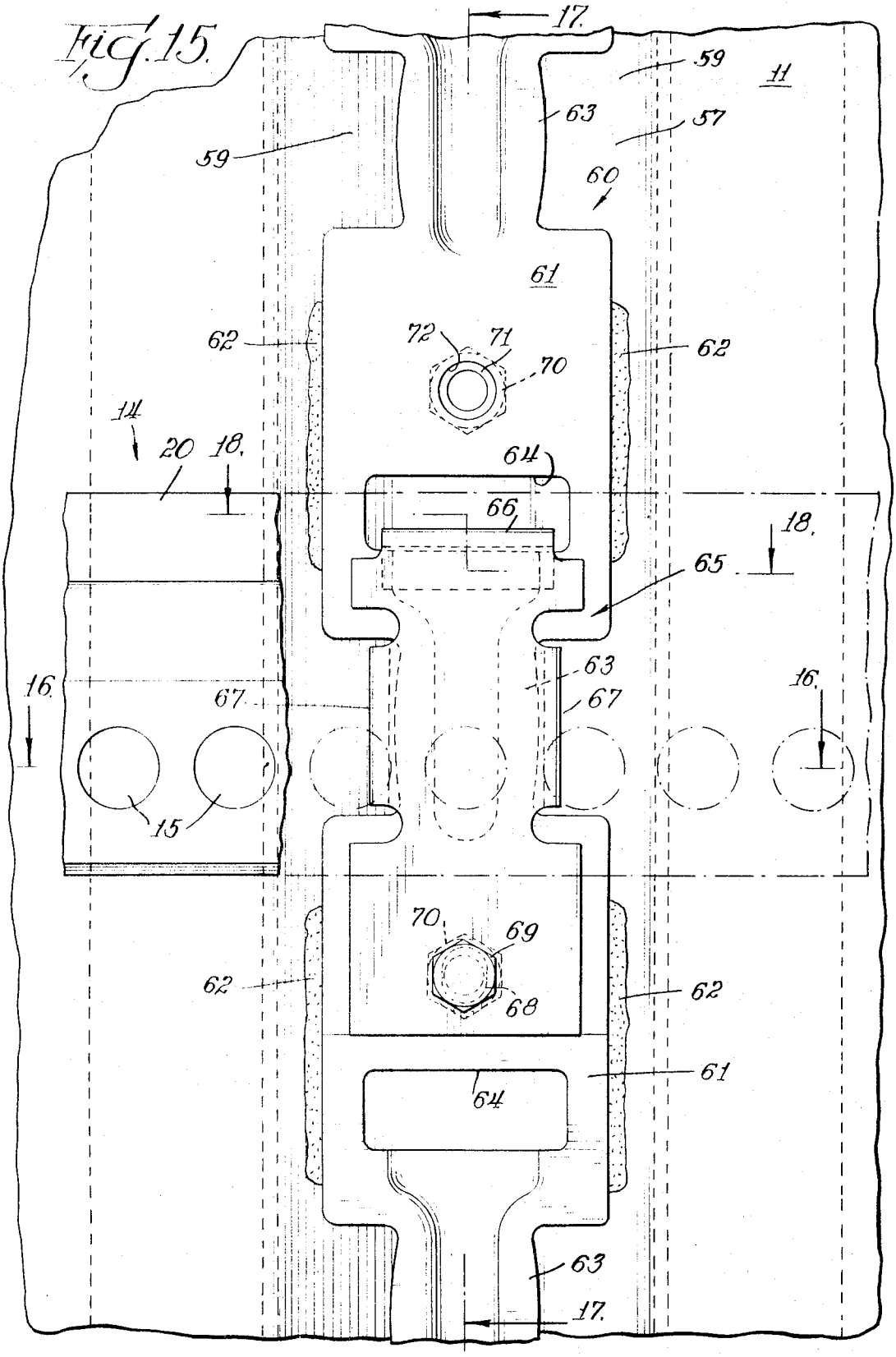


Fig. 15.


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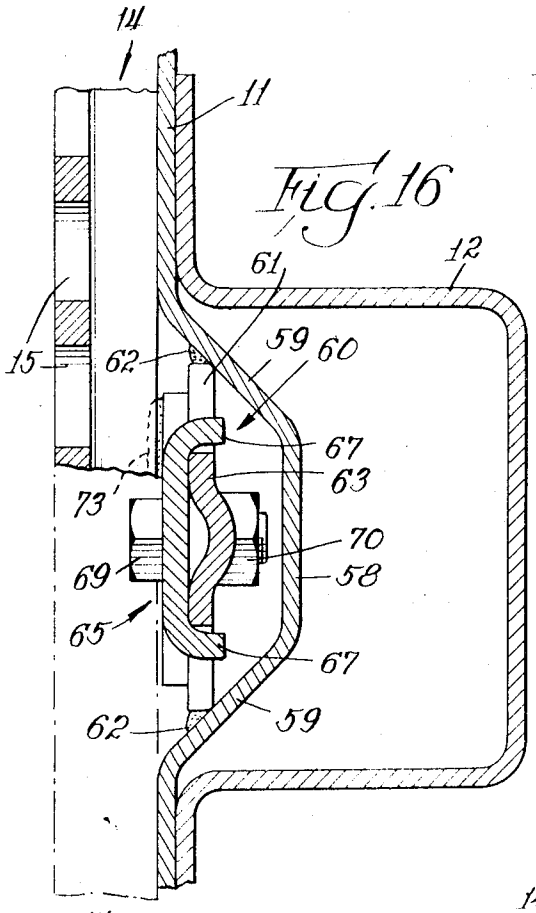


Fig. 16

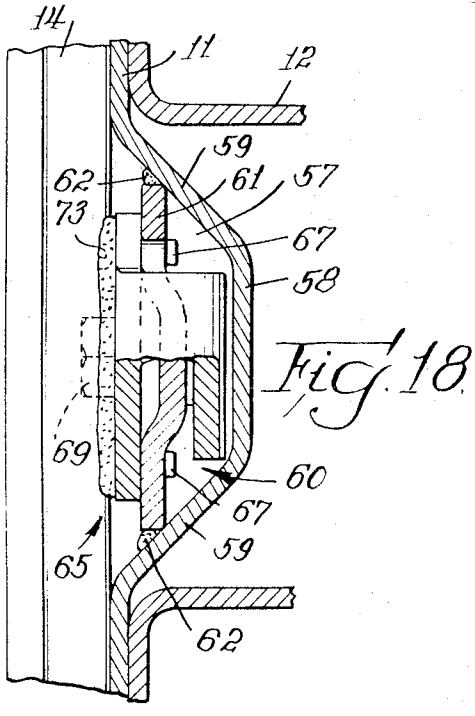


Fig. 18

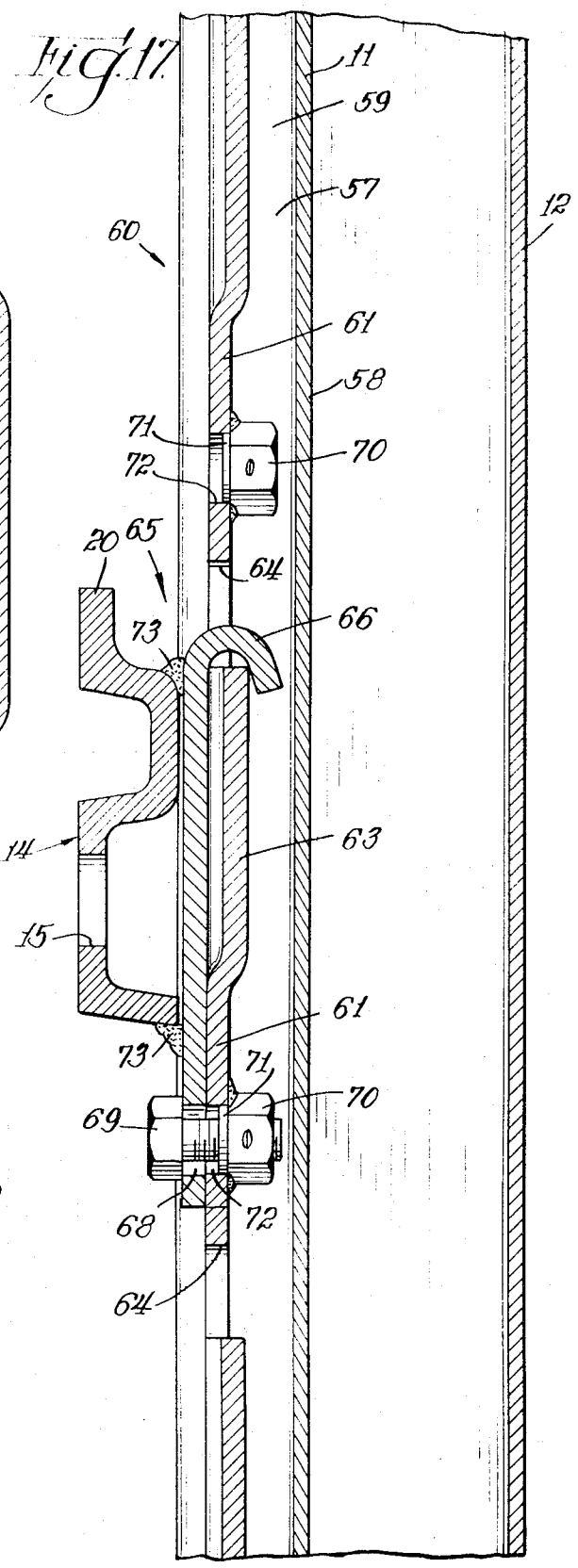


Fig. 17

Fig. 19

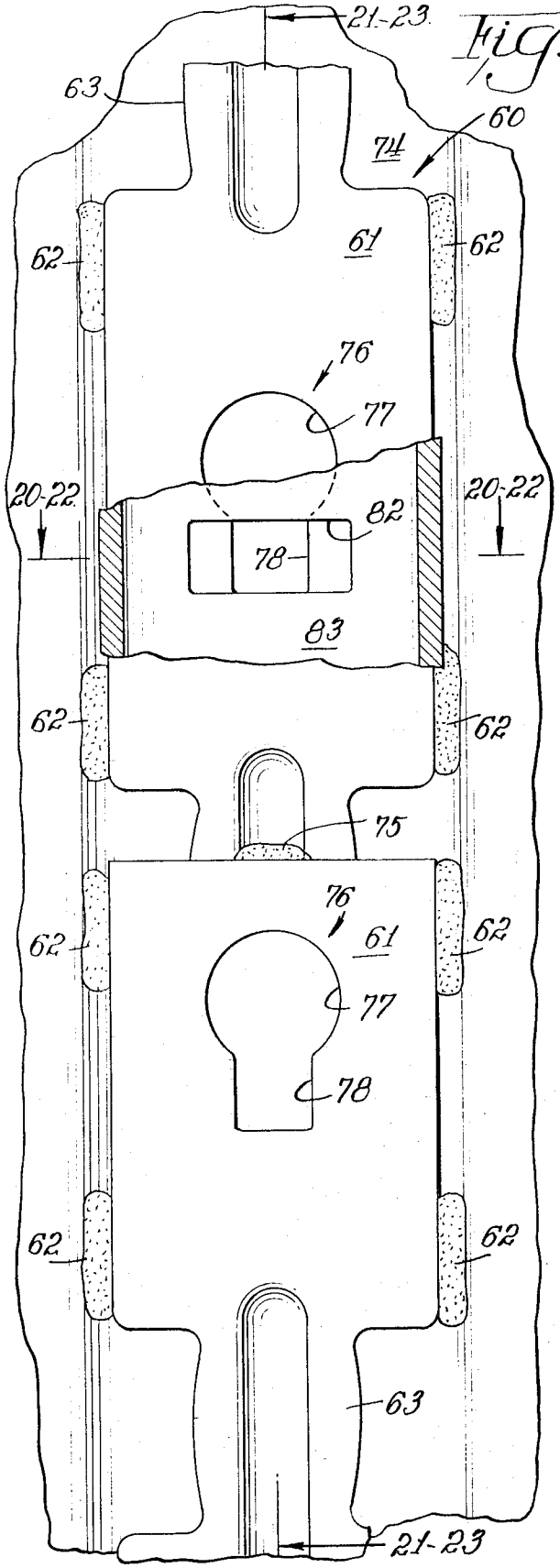


Fig. 19-A

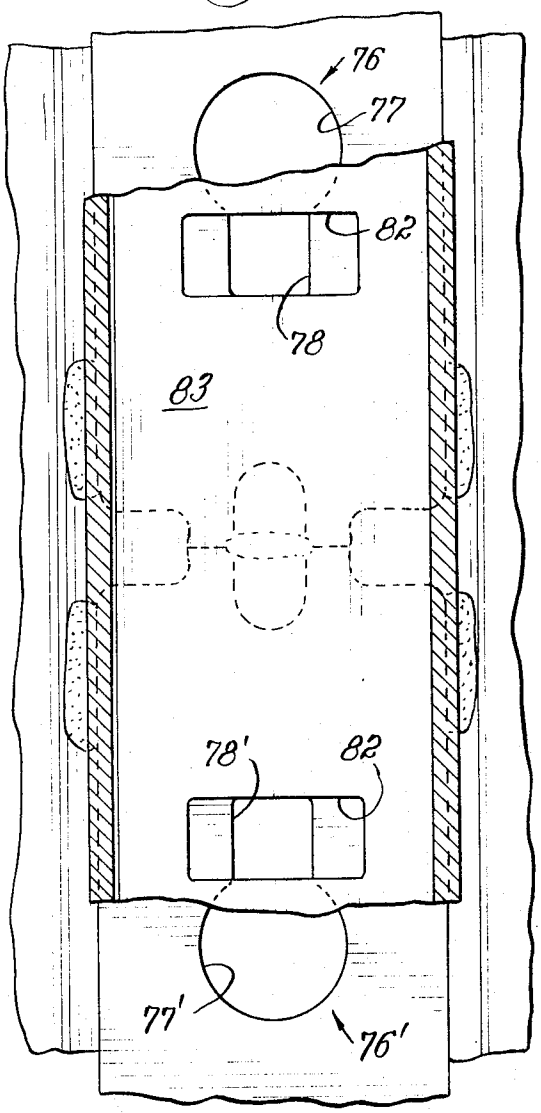


Fig. 20

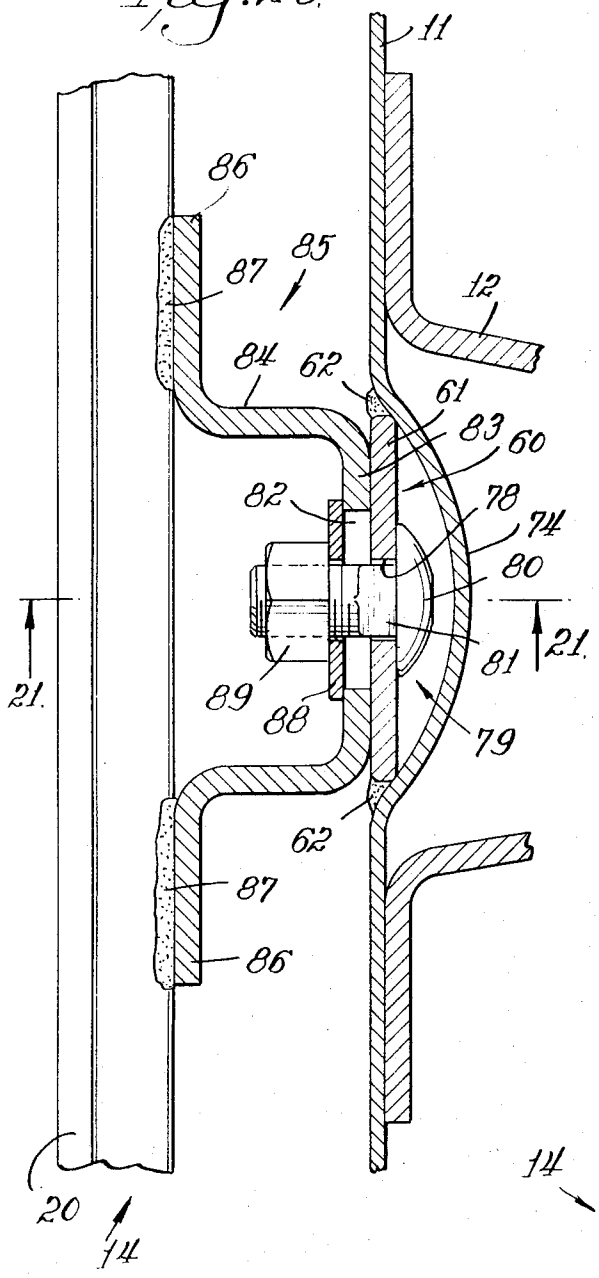

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Fig. 21

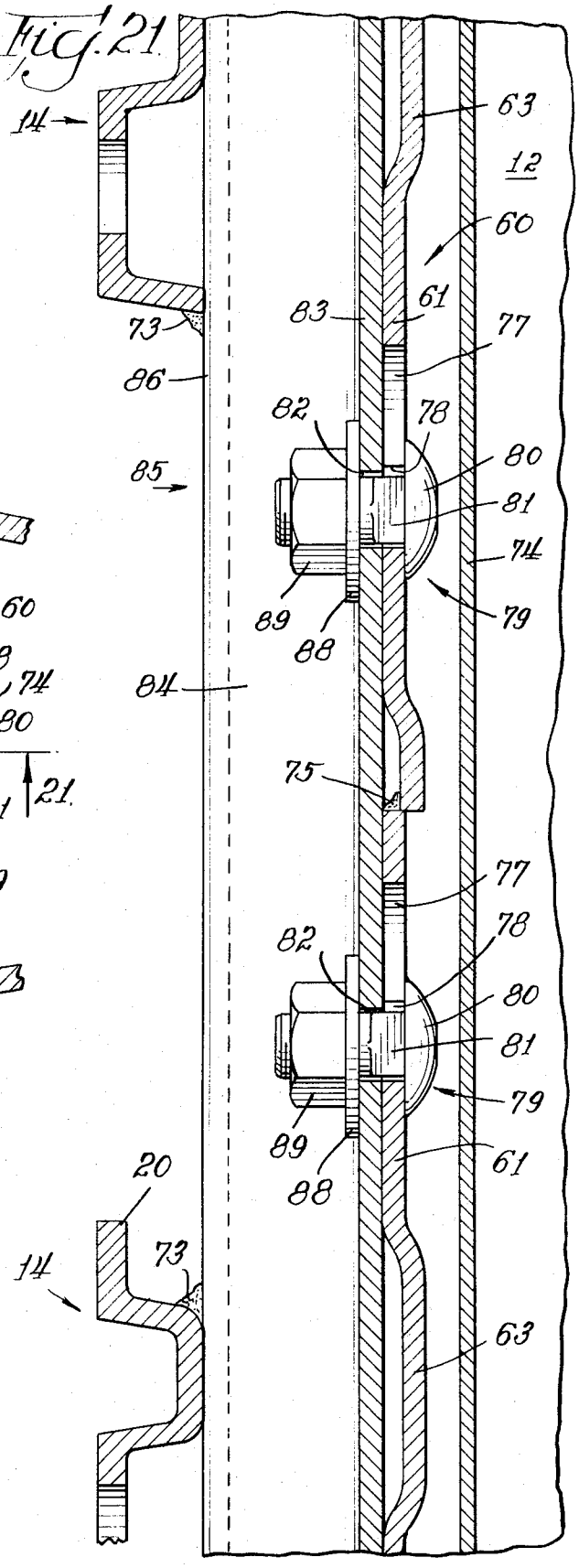

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Fig. 22

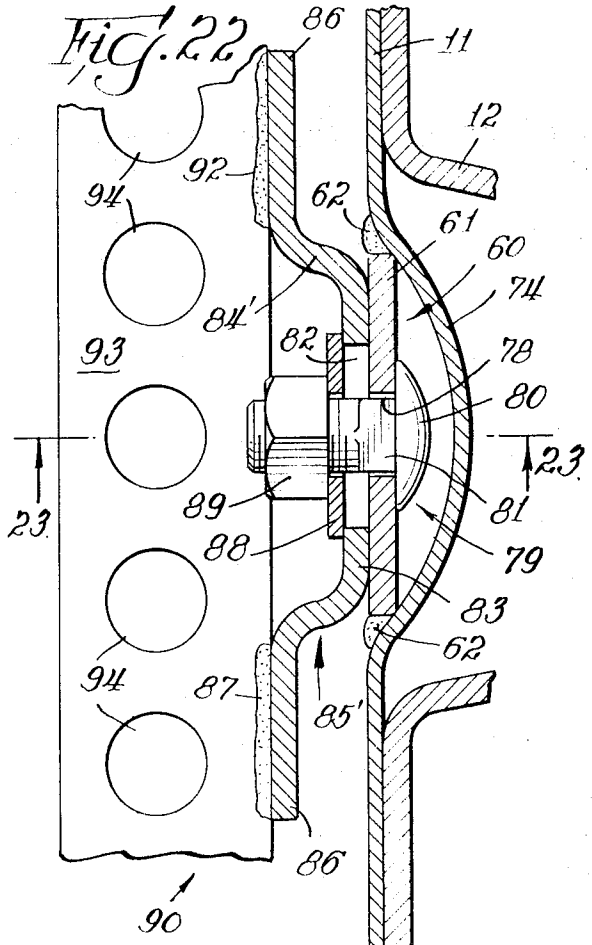


Fig. 23

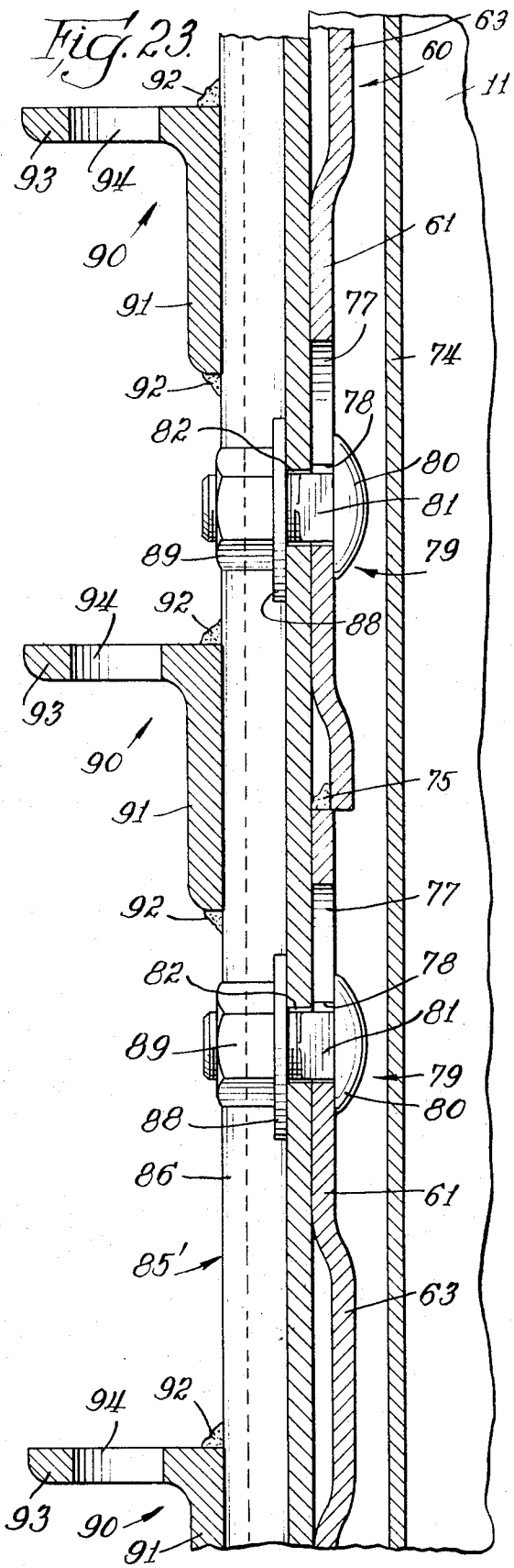
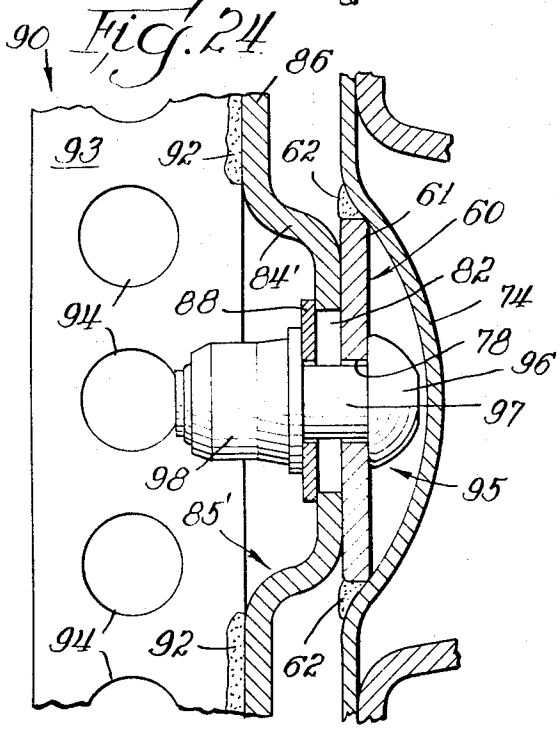


Fig. 24



BOX CAR HAVING BELT RAIL SUPPORTS MOUNTED ON LADING TIE ANCHORS

This application is a continuation-in-part of application Ser. No. 223,467 filed Feb. 4, 1972, now abandoned.

This invention relates, generally, to the construction of lading transport means, such as railway box cars, automotive trucks, trailers and the like. It has particular relation to lading tie anchors provided with belt rail supports for mounting belt rails to which cross members can be attached to hold lading in place and against movement incident to acceleration and deceleration of the transport means. Illustrative of lading tie anchor constructions to which the belt rail supports embodying the present invention can be applied are those disclosed in Johnson U.S. Pat. Nos. 3,014,436, issued Dec. 26, 1961 and 3,125,966, issued Mar. 24, 1964, and Jensen U.S. Patent No. 3,179,068, issued Apr. 20, 1965.

Among the objects of this invention are: To provide for mounting belt rails in lading transport carriers in a new and improved manner; to secure belt rail supports to lading tie anchors in box cars and the like provided with such anchors; to detachably mount the belt rail supports in such manner that they and belt rails secured thereto can be removed from the transport carrier or shifted to different positions in the transport carrier; to mount the belt rail supports on lading tie anchors individually mounted on vertical walls of a transport carrier or on continuous vertically extending metallic lading tie anchors; and to provide key shaped openings in the lading tie anchors for receiving bolts to detachably secure belt rail supports in place.

In the drawings:

FIG. 1 is a perspective view of a typical box car provided with belt rails arranged to receive cross members for holding lading in place against longitudinal movement likely to be caused by acceleration and deceleration of the box car.

FIG. 1*a* is a perspective view of a typical cross member that is adjustably mounted on the belt rails on opposite side walls for holding the lading in place.

FIG. 2 is a view, in front elevation, of a portion of an inner side wall of a box car that is provided with a lading tie anchor on which is mounted a belt rail support in which the present invention is embodied.

FIG. 3 is a horizontal sectional view taken generally along line 3—3 of FIG. 2.

FIGS. 4 and 5 are horizontal sectional views taken generally along lines 4—4 and 5—5 of FIG. 2.

FIG. 6 is a vertical sectional view taken generally along line 6—6 of FIG. 2.

FIG. 7 is a perspective view showing the application of the belt rail support of the present invention to a lading tie anchor.

FIG. 8 is a view, similar to FIG. 6, and shows an alternate arrangement for securing the belt rail support in place on a lading tie anchor.

FIG. 9 is a view taken generally along line 9—9 of FIG. 8.

FIG. 10 is a vertical section view showing a further modification of the attachment of the belt rail support to the lading tie anchor.

FIG. 11 is a view taken generally along line 11—11 of FIG. 10.

FIG. 12 is a vertical sectional view, similar to FIG. 8, and shows another manner in which the belt rail support can be secured to the lading tie anchor.

FIG. 13 is a view taken generally along line 13—13 of FIG. 12.

FIG. 14 is a horizontal sectional view taken generally along line 14—14 of FIG. 13.

FIG. 15 is a view, in front elevation, of a continuous lading tie anchor in a groove in a side wall of the box car and modified to receive the belt rail support in which this invention is embodied.

FIG. 16 is a horizontal sectional view taken generally along line 16—16 of FIG. 15.

FIG. 17 is a vertical sectional view taken generally along line 17—17 of FIG. 15.

FIG. 18 is a horizontal sectional view taken generally along line 18—18 of FIG. 15.

FIG. 19 is a view, partly in front elevation and partly in section, of a portion of a side wall of a box car showing one of the arcuate grooves along which are mounted sections of continuous lading tie receiving anchors which are modified with key shaped openings in accordance with this invention.

FIG. 19A is a view, similar to FIG. 19, and shows the key shaped openings in opposite relation.

FIG. 20 is a horizontal sectional view taken generally along line 20—20 of FIG. 19.

FIG. 21 is a vertical sectional view taken generally along line 21—21 of FIG. 19.

FIG. 22 is a horizontal sectional view taken generally along line 22—22 of FIG. 19 and shows a modified construction.

FIG. 23 is a vertical sectional view taken generally along line 23—23 of FIG. 22.

FIG. 24 is a view, similar to FIG. 22, and shows how a "Huck" bolt pin can be employed for holding the belt rail support in place on the continuous lading tie receiving anchor.

In FIG. 1 the reference character 10 designates generally a single sheath box car. It may be employed either as part of railroad rolling stock or as a part of a truck body. The box car 10 is provided with side walls 11 of sheet steel which are reinforced by vertical channel shaped side posts 12 that are welded to the outer side of the side walls 11 in accordance with conventional construction. The box car 10 is illustrated as containing lading, indicated generally at 13, which may be in the form of boxes, barrels and other containers. It is desirable to hold the lading 13 against longitudinal movement in the box car 10 resulting from forces incident to acceleration and deceleration. For this purpose belt rails 14 are provided at various elevations on the inner sides of the side walls 11 in aligned relation. The belt rails 14 have openings 15 at spaced locations therealong for receiving, locating and locking pins 16, FIG. 1*a*, that project from fittings 17 that are located at the ends of telescoping cross members that are indicated, generally, at 18. The fittings 17 have hook portions 19 which are arranged to overlie the upstanding flange 20 of the belt rail 14 as shown in FIG. 6.

Referring now particularly to FIGS. 2–14 it will be observed that the side wall 11 is deformed as indicated at 23 into the respective side post 12 to provide a lading tie receiving section having a bottom wall 24, inclined side walls 25 and inclined end walls 26. It will be understood that these deformations as indicated at 23 are located in horizontal and vertical aligned relation in the

side walls 11. They are provided for receiving lading tie anchors 27 which have projections 28 extending rearwardly therefrom and engaging the bottom wall 24. As indicated at 29 the lading tie anchors 27 are welded to the side walls 25. Each lading tie anchor 27 has a central section 30 for receiving a lading tie that is illustrated by broken lines at 31 in FIG. 3.

It is desirable in many instances to utilize the already present lading tie anchors 27 for mounting the belt rails 14. It is then only necessary to make a slight modification in the existing lading tie anchors 27 as will appear hereinafter.

Referring particularly to FIGS. 6 and 7 it will be observed that the lading tie anchor 27 has a belt rail support, indicated generally at 34, detachably mounted thereon. The belt rail support 34 preferably is in the form of a J-shaped steel plate having a hook portion 35 which overlies the upper end 36 of the lading tie anchor 27. The lower end of the belt rail support 34 may be provided with an opening 37 for receiving a bolt 38 that is threaded into a threaded opening 39 in the lower end of the lading tie anchor 27.

The belt rail 14, which extends along the inner side of the side wall 11 is spaced slightly from the outer surface of the belt rail support 34, as seen in FIG. 6, and is welded thereto as indicated at 40. It will be understood that the lading tie anchors 27 are positioned in aligned relation horizontally and vertically along the inner side of the side walls 11. One or more belt rails 14 are welded, as indicated at 40, to the belt rail supports 34 in place of the lading tie anchors 27. In this manner the belt rail supports 34 are accurately located with respect to the lading tie anchors 27. Shoulders 41 integral with the anchor 27 are engageable by the sides of the belt rail support 34 to resist longitudinal shock forces. It will be understood that the belt rails 14 can be removed as a unit with the belt rail supports 34 welded thereto in the event that it is desirable to employ the lading tie anchors 27 in conjunction with lading ties 31.

FIGS. 8 and 9 illustrate how a "Huck" bolt pin 43 can be employed for securing each belt rail support 34 to the respective lading tie anchor 27. Here it will be noted that the lading tie anchor 27 has integrally formed rearwardly extending stops 44 for holding the head 45 of the "Huck" bolt pin 43 in place. The "Huck" bolt pin 43 is inserted after welding of the lading tie anchor 27 in place in the deformation in the side wall 11. When the belt rail support 34 is applied, as shown by the broken lines in FIG. 8, the "Huck" bolt pin 43 can be shifted to enter the opening 37 in the belt rail support 34 and then is tightened in place by a suitable tool.

FIGS. 10 and 11 show another manner in which the lading tie anchor 27 can be modified for subsequent application of the belt rail support 34. Here it will be observed that the lower end of the lading tie anchor 27 is provided with a socket 46 for receiving a hexagonal head 47 of a bolt 48. It will be understood that bolt 48 is held in place by the socket 46 after the lading tie anchor 27 has been welded in position. Subsequently, after application of the belt rail support 34, a nut 49 can be tightened to hold it in place.

FIGS. 13 and 14 illustrate still another manner in which the belt rail support 34 can be applied to the lading tie anchor 27. Here the lower end of the lading tie anchor 27 has a wedge shaped intermediate section 52 between openings 53. The belt rail support 34 is provided with outflared wings 54 for insertion in the openings 53 and against the wedge shaped section 52. As illustrated in FIG. 12 and shown by broken lines, the belt rail support 34 provided with the out flared wings 54 is swung from the broken line position to insert the wings 54 in the opening 53. As the wings 54 are swung inwardly in the direction indicated by arrow 55 their distal ends engage the wedge shaped section 52 and, as they move through the openings 53, they are spread outwardly to provide a friction grip with the lading tie anchor 27. As shown in FIG. 12 a recess 56 is provided in the lower end of the belt rail support 34 for receiving a suitable tool to permit removal of the belt rail support 34 provided with the wings 54.

In FIGS. 15–18 it will be observed that a vertical groove 57 is formed in the side wall 11 by deforming it into the space enclosed by the respective side post 12. The vertically extending groove 57 provides a lading tie receiving section having a bottom wall 58 and inclined side walls 59. Located in the groove 57 is a continuous lading tie receiving anchor 60 having spaced wide sections 61 which are welded at 62 to the side walls 59 of the groove 57. The continuous lading tie receiving anchor 60 has spaced narrow lading tie receiving sections 63 around which the lading tie 31 can be positioned as will be understood readily.

When the continuous lading tie receiving anchor 60 is to mount belt rails 14, belt rail support receiving openings 64 are formed in the wide section 61 for receiving belt rail J-shaped support plates 65 as shown more clearly in FIG. 17. The support plate 65 has the hook portion 66 applied through the belt rail support receiving opening 64. The belt rail J-shaped support plate 65 has outwardly extending side portions 67 that are arranged to overlie the lading tie receiving section 63 for the purpose of resisting longitudinal shock forces applied to the belt rail 14. Near its lower end the belt rail support plate 65 has an opening 68 for receiving a bolt 69 which may be threaded into a self-locking nut 70 that is welded to the rear side of the continuous lading tie receiving anchor 60 before it is installed in the groove 57. It will be noted in FIG. 17 that the nut 70 has a flange 71 which extends into an opening 72 in the lading tie receiving anchor 60. This arrangement facilitates proper location of the nut 70 prior to welding of it in place. Subsequently the continuous lading tie receiving anchor 60 is welded in place with the nuts 70 in position to receive the bolt 69 for securing the belt rail support plate 65 in position on application of the bolt 69.

The belt rail 14 is welded as indicated at 73 to the front side of the belt rail support plate 65 and extends along the inner surface of the side wall 11. The belt rails 14 are horizontally aligned on opposite sides of the box car 10 for receiving the cross members 18. If it is desired to remove the belt rails 14 and the belt rail support plates 65 welded thereto, this can be accomplished readily by merely unscrewing the bolts 69 and removing the assembly to permit use of the lading tie receiving anchor 60 for receipt of conventional lading ties 31.

Referring now particularly to FIGS. 19, 20 and 21 it will be observed that the side wall 11 is provided with a vertical arcuate groove 74. The arcuate groove 74 is formed by deforming the side wall 11 and it will be understood that a number of the arcuate grooves 74 is

provided along the side wall **11**. The groove **74** constitutes a lading tie receiving section for the continuous lading tie receiving anchor **60**. The lading tie receiving anchor **60** is formed in sections which are welded together at **75** and, as previously described, are welded at **62** to the side wall **11**. As before the narrow lading tie receiving section **73** can be employed for receiving the lading tie **31** as illustrated in FIG. **3**.

It is desirable that the lading tie receiving anchors **60** be provided with a minimum of adaptation for receiving belt rails. The reason for this is that there is the possibility that the box car may never be modified to receive belt rails. Accordingly the wide sections **61** have formed therein key shaped openings indicated generally at **76** which comprise a circular portion **77** and a rectangular portion **78**. In fabricating the continuous lading tie receiving anchors **60** it is only necessary to punch out the key shaped openings **76** which can be accomplished readily in their formation. Then it is unnecessary to provide an additional element, such as the self locking nut **70**, FIG. **17**, which may never be employed.

It will be understood that the box car is built with the side walls **11** in place having the vertical arcuate grooves **74** therealong. The sections of lading tie receiving anchors **60** are welded in place at **62** with the key shaped openings **76** in the wide section **61** thereof.

When it is desired to convert the box car for use with a belt rail, bolts **79** are applied. Each bolt **79** has a round head **80** of such diameter that it can be inserted edgewise through the circular portion **77** and rectangular portion **78** of the respective key shaped openings **76**. Then, as shown in FIGS. **20** and **21** a square shank **81** of the bolt **79** can interfit with the rectangular portion **78** of the key shaped opening **76** so as to hold the bolt **79** against turning. The shank **81** of the bolt **79** is arranged to extend through a transverse elongated opening **82** in a bottom wall **83** of an intermediate offset section **84** which forms a part of a belt rail support as indicated, generally, at **85**. It will be observed that the belt rail support **85** is generally hat shaped and it will be understood that it extends in overlying relation along the lading tie receiving anchor **60** to the to the extent desired depending upon the number of belt rails **14** that are to be employed. The belt rail support **85** has oppositely extending flanges **86** which are welded at **87** to the belt rail **14**. The square shank **81** of the bolt **79** extends through a circular washer **88** which has a sufficient diameter to overlie the elongated opening **82** and a nut **89**, threaded on the shank **81**, can be tightened to hold the belt rail support **85** in place.

It will be understood that the belt rails **14** can be assembled on the belt rail supports **85** by welding thereto as indicated at **73**. Then the assembly can be applied to the lading tie receiving anchor **60** and secured thereto by the bolts **79** in an obvious manner.

Referring now particularly to FIGS. **22, 23** and **24** it will be observed that a belt rail angle **90** is employed as an alternate to the belt rail **14** previously described. In connection with the belt rail **90** there is provided a belt rail support that is indicated, generally, at **85'**. It is essentially the same as the belt rail support **85** except that its intermediate offset section **84'** is slightly shallower. The belt rail angle **90** comprises a downwardly extending flange **91** that is welded at **92** to the oppositely extending flanges **86**. Also it includes a horizontal flange **93** that is provided with apertures **94** to receive locating pins of cross members which are similar to the cross members **18** previously described.

FIG. **24** shows how a "Huck" bolt pin, indicated generally at **95**, can be employed in lieu of the bolt **79**. The pin **95** is provided with a round head **96** and a round shank **97** which extends through the rectangular portion **78** of the key shaped opening **76**. Also it extends through the transverse elongated opening **82** and the washer **88**. A sleeve **98** is deformed unto the round shank **97** in accordance with conventional practice.

FIG. **19A** shows key shaped opening **76'** in the anchors **60** in opposite relation to upper key shaped opening **76**. The circular portion **77'** is below the rectangular portion **78'**. With this arrangement of the key shaped openings and the square shanks **81** of the bolts **79** in the rectangular portions **78** and **78'**, the belt rail support **85** is held against vertical movement in either direction which might occur should the bolts **79** become loose or sufficient upward force be applied to the arrangement shown in FIGS. **19, 20** and **21** to shift the bolts **79** out of the key shaped openings **76** all disposed in the same direction. The key shaped openings **76** and **76'** can alternate along the anchors **60**.

I claim:

1. In a box car construction or the like, in combination, a plurality of vertical channel shaped side posts, a lining overlying and secured to said side posts having outwardly extending lading tie anchor receiving sections aligned with the channel of the respective side posts, lading tie anchors secured to said sections in aligned horizontal relation, and belt rail supports secured to said lading tie anchors for receiving horizontally extending belt rails, each belt rail support comprising a J-shaped plate with the hook portion overlying the upper end of the respective lading tie anchor, and holding means securing the lower end to the respective lading tie anchor.

2. Box car construction according to claim **1** wherein said holding means comprises a bolt.

3. Box car construction according to claim **2** wherein the lower end of each lading tie anchor has integral outwardly extending stops to hold the head of the respective bolt in place while the belt rail support is being applied.

4. Box car construction according to claim **1** wherein the lower end of each lading tie anchor has a pair of spaced openings on opposite sides of a wedge shaped section, and the lower end of each belt rail support has a pair of out flared wings for interfitting with said openings and to be spread apart by said wedge shaped section to hold the respective belt rail support in place.

5. In a box car construction or the like, in combination, a plurality of vertical channel shaped side posts, a lining overlying and secured to said side post having outwardly extending vertical lading tie receiving grooves aligned with the channels of the respective side posts; a continuous lading tie receiving anchor secured along its sides to the sides of each of said grooves, having lading tie receiving sections therealong, and a belt rail support receiving opening above each lading tie receiving section; a belt rail support overlying each lading tie receiving section having a hook shaped upper end extending through the respective belt rail support receiving opening and overlying the upper end of the respective lading tie receiving section, and means for se-

curing the lower end of each belt rail support to the respective lading tie anchor.

6. Box car construction according to claim 5 wherein each belt rail support has a pair of intermediate outwardly extending side portions overlying the respective lading tie receiving section to resist longitudinal shock forces applied to a belt rail secured to the belt rail supports.

7. Box car construction according to claim 5 wherein said means for securing the lower end of each belt rail support to the respective lading tie anchor comprises a bolt extending through registering openings in said belt rail support and said lading tie anchor and threaded into a nut welded to the rear side of said lading tie anchor.

8. Box car construction according to claim 5 wherein said belt rail supports are horizontally aligned on the inner sides of opposite side walls of said box car, and belt rails are secured to said belt rail supports for receiving cross members therebetween.

9. Box car construction according to claim 8 wherein said belt rail supports are removably secured to said lading tie receiving anchors whereby said belt rails can be applied and removed together with said belt rail supports.

10. In a box car construction or the like, in combination, a plurality of vertical channel shaped side posts, a lining overlying and secured to said side posts having outwardly extending vertical lading tie receiving grooves aligned with the channels of the respective side posts, a continuous lading tie receiving anchor secured along its sides to the sides of each of said grooves and having lading tie receiving sections therealong, a key shaped opening above each lading tie receiving section, a belt rail support overlying said key shaped opening and having fastening means cooperating with said key shaped opening to secure said belt rail support to the lading tie receiving section.

11. Box car construction according to claim 10 wherein said fastening means comprises a bolt having a head and each key shaped opening has a circular portion for receiving therethrough said head of said bolt merging with a dependent rectangular section for receiving a square shank of said bolt.

12. Box car construction according to claim 10 wherein said belt rail support extends along said continuous lading tie receiving anchor, has an intermediate offset section juxtaposed to said anchor, and oppositely extending flanges for mounting belt rails.

13. Box car construction according to claim 12 wherein said intermediate offset section has a transversely extending slot aligned with each key shaped opening.

14. Box car construction according to claim 10 wherein the shank of said bolt has a sleeve deformed thereon to hold said belt rail support in place.

15. Box car construction according to claim 10 wherein at least one key shaped opening in said continuous lading tie receiving anchor extends in a direction opposite to that in which an adjacent key shaped opening extends.

16. Box car construction according to claim 15 wherein alternate key shaped openings in said continuous lading tie receiving anchor extend in opposite directions.

17. In a box car construction or the like, in combination, a plurality of vertical channel shaped side posts, a lining overlying and secured to said side posts having outwardly extending lading tie anchor receiving sections aligned with the channel of the respective side posts, lading tie anchors secured in said sections in aligned horizontal relation, and belt rail supports secured to said lading tie anchors for receiving horizontally extending belt rails, said lading tie anchors having spaced shoulders extending toward the interior of the box car for receiving therebetween the respective belt rail support to resist longitudinal shock forces applied to the belt rail secured to the belt rail supports.

18. In a box car construction or the like, in combination, a plurality of vertical channel shaped side posts, a lining overlying and secured to said side posts having outwardly extending lading tie anchor receiving sections aligned with the channel of the respective side posts, lading tie anchors secured in said sections in aligned horizontal relation, and belt rail supports secured to said lading tie anchors for receiving horizontally extending belt rails, each of said lading tie anchors having a key shaped opening for receiving the head and body of a bolt for holding said belt rail supports in place.

19. Box car construction according to claim 18 wherein each key shaped opening has a circular portion for receiving therethrough said head of said bolt merging with a depending rectangular section for receiving a square shank of said bolt.

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