

April 4, 1961

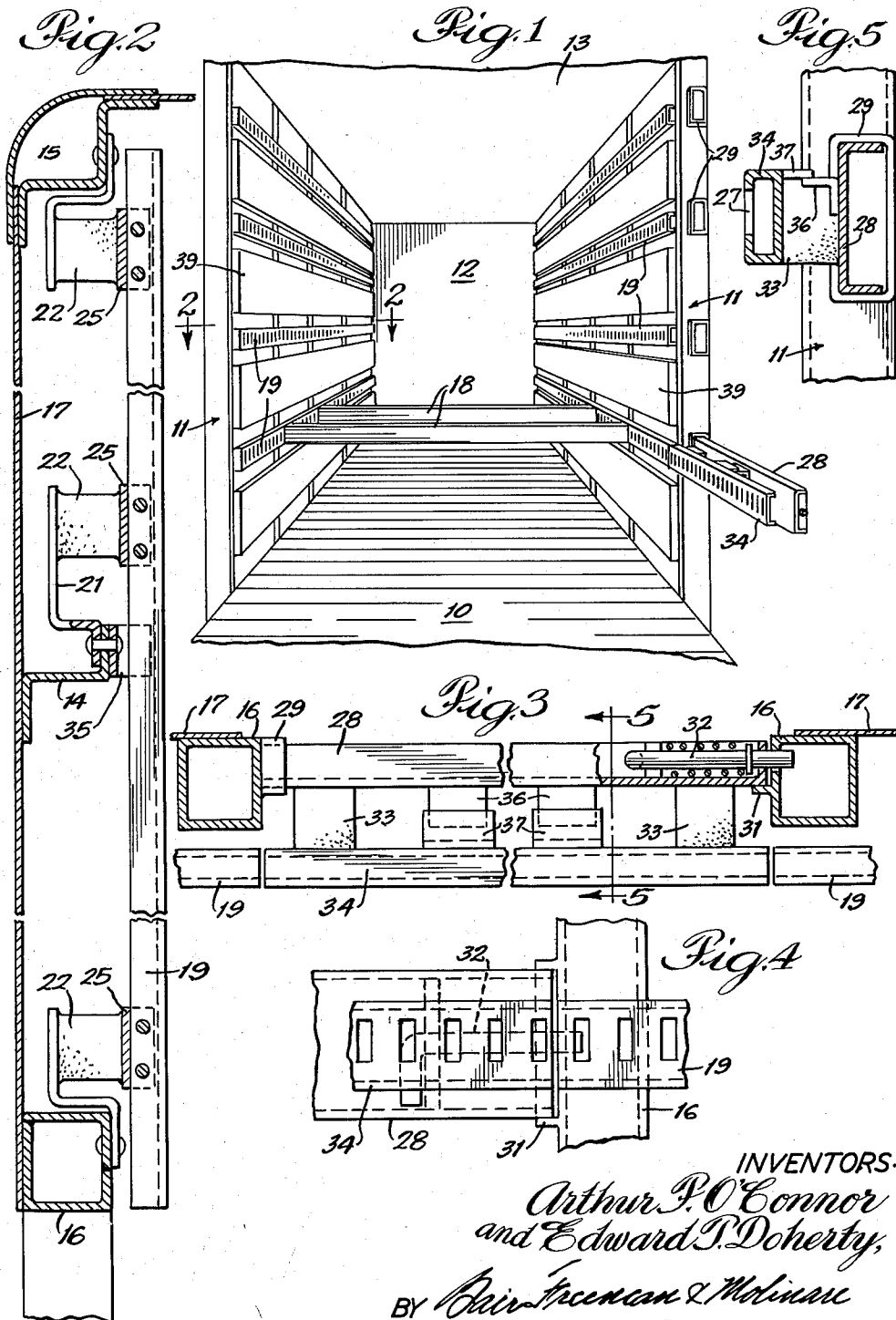
E. T. DOHERTY ET AL

2,977,899

LOAD BRACING MEANS

Filed Dec. 23, 1957

3 Sheets-Sheet 1



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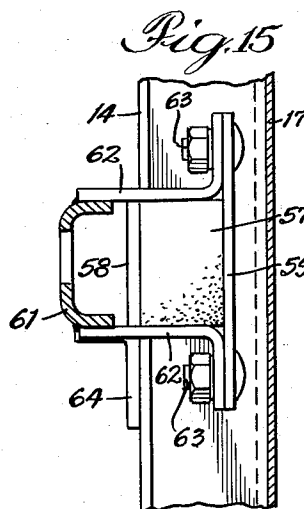
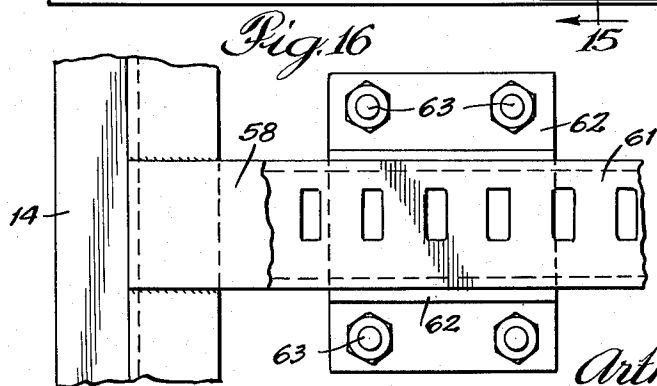
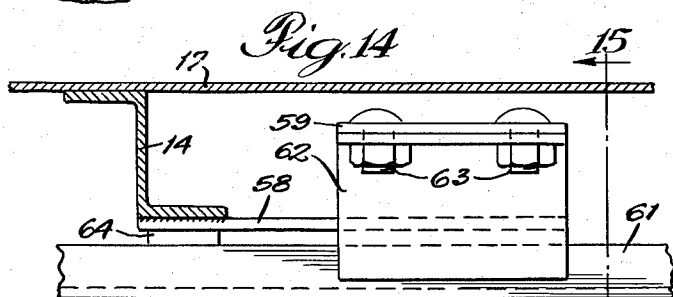
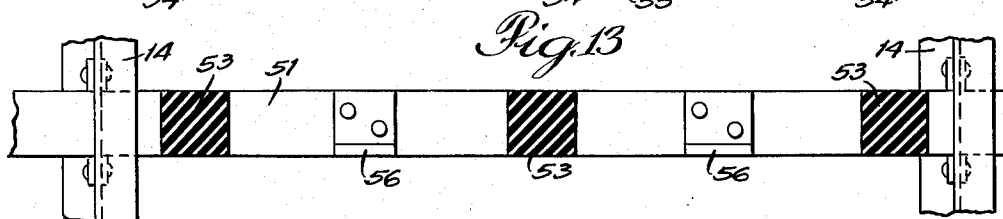
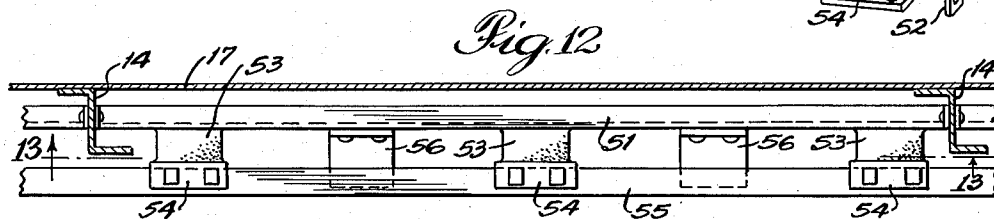
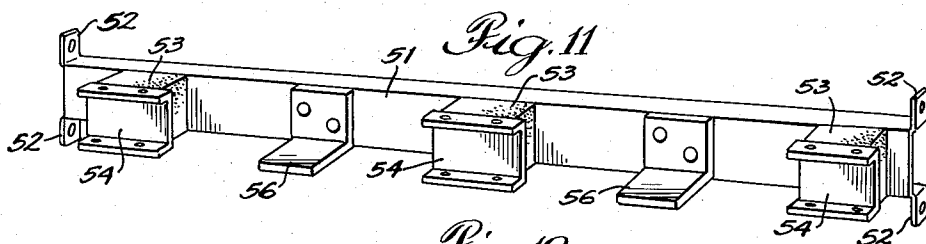
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LOAD BRACING MEANS

Filed Dec. 23, 1957

3 Sheets-Sheet 2



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April 4, 1961

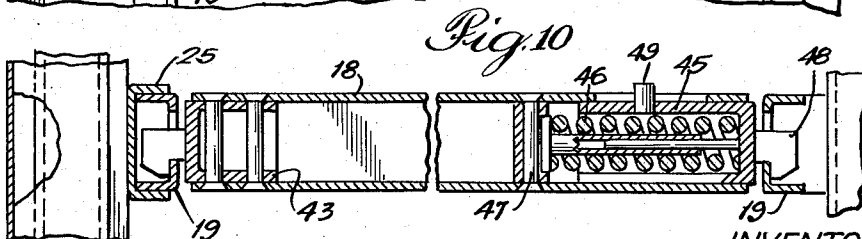
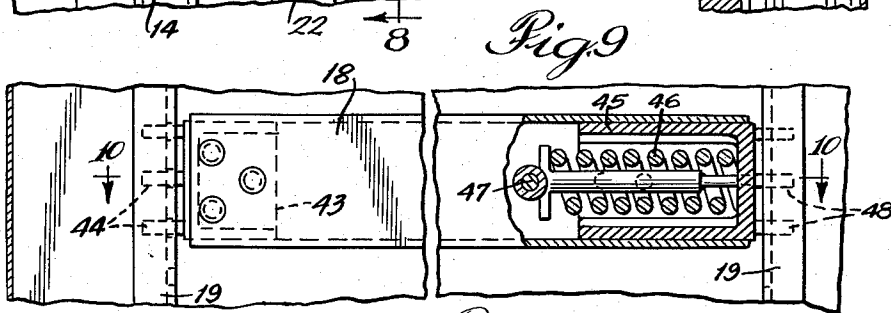
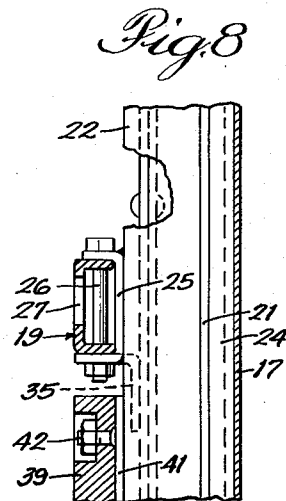
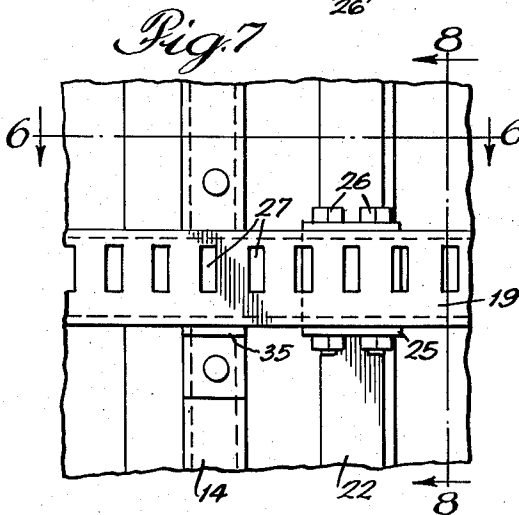
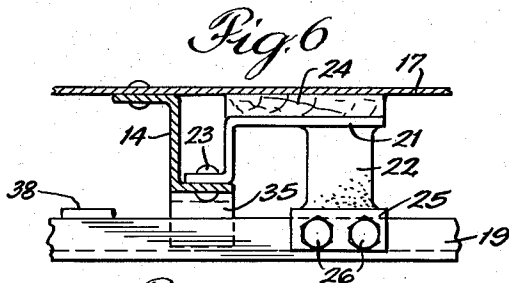
E. T. DOHERTY ET AL

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LOAD BRACING MEANS

Filed Dec. 23, 1957

3 Sheets-Sheet 3



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2,977,899

LOAD BRACING MEANS

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Filed Dec. 23, 1957, Ser. No. 704,762

14 Claims. (Cl. 105—369)

This invention relates to load bracing means and more particularly to means for yieldingly bracing the lading in a railway car against shifting and to minimize shock and damage.

In shipping freight, such as mixed freight or cartons or packages of various types, in box cars it has been the practice to provide bracing members attached to the side walls of the car and extending across the car to hold the lading against shifting. When such bracing members are rigidly secured to the car so that they cannot yield in response to shifting of the lading they themselves frequently damage the lading.

It has been proposed heretofore in the patent to Doherty, No. 2,592,666, to provide a yielding connection between the bracing members and the side walls of the car. The present invention constitutes an improvement in the construction described and claimed in the Doherty patent to provide a simpler structure more easily mounted in a car, more effective protection of the lading against shock and yielding support of the lading both longitudinally and laterally of the car.

It is a feature of the invention that the support members or belt rails in the car to which the braces are connected are supported by bodies of resilient material which resist longitudinal shifting of the lading in shear thereby to provide a relatively large degree of movement and a relatively soft cushioning action.

Another object is to provide load bracing means in which bodies of resilient material are bonded to mounting members which are secured to the side walls of the car with the bodies of resilient material carrying mounting brackets to which the supporting members or belt rails may be detachably secured. This construction provides an easy installation in a car and the bodies of resilient material further interrupt the heat transfer path between the outer and inner walls of the car to increase the heat insulating effect in refrigerated cars.

According to a feature of the invention rub boards, which may be spaced planks or continuous inner wall structures in the case of insulated cars, are carried by the resilient bodies between the belt rails to provide a yielding support for the lading between the belt rails.

A further object of the invention is to provide load bracing means in which load bracing members are detachably secured to the supporting members or belt rails simply and rapidly, but very securely in any one of a plurality of longitudinal positions.

According to another feature of the invention, sections of supporting members or belt rails are detachably mounted in the door openings of the car between adjacent door posts and are resiliently supported to provide continuations of the belt rails in the car itself.

The above and other objects and features of the invention will be more readily apparent from the following description when read in connection with the accompanying drawings, in which:

Figure 1 is a partial perspective view looking into a

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car equipped with load bracing means embodying the invention;

Figure 2 is a partial longitudinal section through a side wall of the car on the line 2—2 of Figure 1;

5 Figure 3 is a horizontal section through a door opening of the car showing load bracing means detachably mounted therein;

Figure 4 is a partial elevational view adjacent the door opening;

10 Figure 5 is a partial section on the line 5—5 of Figure 3;

Figure 6 is a partial view similar to Figure 2 illustrating mounting of the load bracing means in a car taken on the line 6—6 of Figure 7;

15 Figure 7 is a partial elevational view of a side wall of a car;

Figure 8 is a partial section on the line 8—8 of Figure 7;

20 Figure 9 is a top plan view with parts broken away showing attachment of a bracing member to the belt rails;

Figure 10 is a section on the line 10—10 of Figure 9;

Figure 11 is a perspective view of an alternative construction;

25 Figure 12 is a horizontal section showing the unit of Figure 11 mounted on a car;

Figure 13 is a section on the line 13—13 of Figure 12;

Figure 14 is a partial horizontal section illustrating another alternative construction;

30 Figure 15 is a section on the line 15—15 of Figure 14; and

Figure 16 is an elevation of the construction of Figure 14.

The load bracing means of the invention is adapted to be applied to any conventional type of freight car and is illustrated in Figure 1 as applied to a standard box car having a floor 10, side walls indicated generally at 11, and end wall 12 and a roof 13. The side walls, according to present day conventional metal car construction, are formed of a series of vertical Z-section posts 14, as shown in Figure 2, with a corner post 15 at one end of the car and door posts 16 adjacent to the door openings in the sides of the car. The outer surface of the several posts is covered by a sheet metal covering 17 and in the normal box car which is not lined or refrigerated, the posts 14 and the door and corner posts are left exposed at the interior of the car.

According to the present invention, elongated support members or belt rails are provided on the side walls of the car to which cross braces 18 may be detachably connected in different positions to support the lading and brace it against shifting in the car. As shown, the opposite ends of the cross braces may be attached at any one of a plurality of positions to elongated belt rails or support members 19 secured to the opposite sides of the car. According to the present invention, the support members or belt rails are resiliently mounted in the car so that they will yield in response to shock and minimize damage to the lading. For this purpose, as best seen in Figures 2 and 6, metal mounting members 21 are secured to the posts 14 and carry bodies of resilient material 22 upon which the belt rails are supported. The mounting members 21 are of Z-section and are secured at one end as by rivets 23 to the inner flanges of the posts 14 with the opposite ends of the mounting members displaced toward the outer side walls 17 of the car and spaced therefrom. To eliminate chafing on the side wall of the car and to spread the stresses, as well as to provide heat insulation, chafing strips 24 of wood or similar material may be placed between the end portions of the mounting members and the car side wall, as shown in Figure 6.

The bodies 22 of resilient material are bonded at one face to the inner surfaces of the mounting members and

project inwardly therefrom toward the interior of the car. At their inner surfaces the bodies of resilient material are bonded to channel section mounting brackets 25 which are relatively short horizontally and which open toward the interior of the car. In the form shown in Figures 1 to 8, the bodies 22 of resilient material are in the form of elongated continuous strips extending throughout the full height of the car with the brackets 25 being bonded thereto at spaced points depending upon where belt rails are to be mounted. It will be understood that the resilient bodies are preferably of rubber or rubber-like material which may be bonded to metal surfaces to form a very secure connection therebetween.

The belt rails 19, as best seen in section in Figure 8, are channel shaped strips which fit within the channel shaped brackets 25 and which may be secured thereto by pins or bolts 26 extending through registering openings in the channels. The belt rails 19 are formed in their inner faces with a series of spaced openings such as generally rectangular slots 27 to provide means for securing the cross braces 18 thereto, as described hereinafter. With this construction, it will be seen that the mounting members 21 can be attached to the posts in a car, including the corner and door posts, as seen in Figure 2, and that the assembly can be completed by fitting the belt rails into the brackets 25 and applying the attaching pins or bolts 26. At this time, the car is ready to receive the cross braces 18.

To provide for support of the lading opposite to the doors, detachable supporting bars 28 are provided of a length to span the door openings. The door posts, as shown in Figure 3, are generally rectangular with flat facing surfaces and sockets 29 are provided on one of the door posts opening toward the opposite door posts to receive the ends of the bars 28. The sockets 29, as seen in Figures 1 and 5, are generally rectangular of a size closely to receive the ends of the bars 28 which may be channel shaped. Similar sockets 31 are provided at the opposite door posts which are incomplete in that the outer walls thereof are omitted to leave only inner, top and bottom walls. The opposite ends of the bars 28 can therefore be slipped into the sockets 31 from outside of the car and may be held in place by pins 32 slidable in the bars so that their ends may project through openings in the last named door posts to secure the bars in place.

The bars have bonded to their inner surfaces substantially rectangular blocks of resilient material 33 and short sections of belt rails, as shown at 34, are bonded directly to the inner surfaces of the blocks 33. When the bars are installed, the belt rail sections 34 will align with and form continuations of the belt rails 19 in the car proper so that cross members can be placed at any desired position in the car, as required.

It is preferred that the weight of the belt rails and cross braces are supported independently of the resilient blocks so that they will not sag downward. For this purpose angle brackets 35 may be secured to the posts 14 and similar angle brackets 36 may be secured to the bars 28 to support the weight of the belt rails without interfering with free horizontal movement thereof. The brackets 35, as seen in Figures 2 and 8, loosely underlie the belt rails 19 to support their weight while allowing the belt rails to slide over the bracket surfaces for free horizontal movement. The belt rail sections 34 are preferably provided with short horizontal extensions 37 which loosely overlie the brackets 36 to carry the weight of the belt rail sections and cross braces secured thereto while permitting free horizontal movement.

It may be desirable to limit longitudinal movement of the belt rails 19 in response to shifting of the lading. For this purpose the mounting brackets 25, as shown in Figure 6, may lie at one side of a bracket 35 and a stop plate 38 may be secured to the belt rail at the opposite side of the bracket 35. Upon shifting of the belt rail to the left,

as seen in Figure 6, the bracket 25 will engage the bracket 35 to limit shifting movement while shifting to the right will be limited by engagement of the stop plate 38 with the bracket 35. While any desired amount of movement may be provided we have found that a movement in each direction on the order of 1½ to 2 inches is most desirable and the spacing between bracket 35 and the parts which engage therewith is therefore preferably made on the order of 1¾ inches.

In the case of lined cars, such as refrigerator cars, an internal wall construction is required between the belt rails to enclose the sides of the car and in other instances it may be desirable to provide rub rails to engage the lading. This may be accomplished, as best shown in Figures 1 and 8, by providing strips or planks 39 of wood or other desired material between the adjacent belt rails and supported by the resilient strips or blocks 22. For supporting the lining or rub rails where it is to be used flat, plates 41 may be bonded to the internal surface of the resilient blocks or strips and may have studs 42 projecting therefrom. The studs, as shown in Figure 8, may extend in recessed openings in the planks or rub boards which may be secured to the studs by nuts lying within the recesses so that there are no parts projecting beyond the smooth inner surface. The inner surfaces of the rub boards are aligned with the inner surfaces of the belt rails to provide a smooth substantially continuous interior surface in the car to engage and support the lading without damage thereto.

The cross braces 18 and the manner of attachment thereof to the belt rails 19 are best shown in Figures 9 and 10. As there illustrated each cross brace 18 is formed of an open box section of metal or the like having a hollow plug 43 secured in one end thereof and with a plurality of hook members 44 rigidly carried by the plug and projecting beyond the end of the cross brace. As shown, three hook members are provided spaced apart the same distance as the openings 27 in the belt rails to enter the openings. The hook members face downwardly and are of a maximum size to pass closely through the openings so that after they have been inserted in the openings they will tend to drop down to hook behind the web of the channel section belt rail 19. At the opposite end a slidable plug 45 is mounted within a cross brace and is urged outwardly thereof by a spring 46. The spring seats against a cross pin 47 fixed in the cross brace and tends to urge the plug 45 outward to a position in which the hook members 48 at the end thereof will project beyond the end of the cross brace. A hand piece 49 may be secured to the plug 45 and project through a slot in the cross brace for retracting the hook members 48 for mounting.

To mount a cross brace in a car the hook members 48 may be retracted and the hook members 44 may be inserted through openings in a belt rail at one side of the car. The hand piece 49 may then be released allowing the spring 46 to project the hook members 48 through openings in a belt rail at the opposite side of the car. The cross brace is now secured in place with the force of the spring 46 tending to urge the fingers 48 outward and to wedge the cross brace in place. The hook members will hold the cross brace securely against lateral displacement and due to their construction and to the spring 46 the cross braces will not be accidentally removed or jarred out of place.

In a completed installation the belt rails 19 will be supported against horizontal movement solely by the resilient blocks or strips 22 and will be held spaced inwardly slightly from the outer surfaces of the posts 14. With the cross braces in place and with lading in the car between the cross braces horizontal movement of the lading either longitudinally or laterally of the car will be yieldingly resisted solely by the resilient blocks or strips. Longitudinal shifting of the lading which is the most common and most violent will be resisted by the resilient blocks

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or strips in shear so that a relatively large degree of movement can be accommodated with substantially any desired degree of resistance and so that the resilient material is utilized most efficiently. Lateral shocks will be absorbed by the resilient strips or blocks in compression and the strips may provide adequate yielding characteristics to absorb the maximum shocks to be anticipated due to lateral shifting of the lading in the car. Thus with the present construction the lading is fully protected against shock due to shifting in transit or handling so that damage thereto will be minimized. Further the construction is such that it can be installed easily in cars either at the time of their construction or later after the cars have been in use.

Figures 11 to 13 illustrate an alternative construction and alternative mounting of the belt rails, the car parts therein corresponding to like car parts in Figures 1 to 10 being indicated by the same reference numerals. In this construction horizontally extending bars 51, which may be of channel section, are provided and are adapted to be mounted between adjacent side wall posts in the car. As shown in Figure 11, the flanges at the ends of the channel section bar 51 may be bent outwardly as shown at 52 and perforated to receive bolts or rivets. The bars are made of a length to fit between adjacent posts and may be secured thereto in horizontal alignment by suitable bolts or rivets, as seen in Figure 12.

Each bar has bonded to its outer face a plurality of blocks 53 of resilient material, such as rubber, which project toward the interior of the car and having bonded to their inner faces channel section brackets 54 similar to the brackets 25 of Figures 1 to 10. The belt rails or support members 55 may be mounted in the brackets 54 in the same manner as in Figures 1 to 10 to extend horizontally of the car and to have their motion in horizontal planes resisted solely by the resilient blocks 53.

To hold the belt rails or support members against vertical sagging, angular brackets 56 may be secured to the rail 51 with horizontal flanges projecting beneath the belt rail to support it vertically while permitting free horizontal sliding thereof. Except for the different manner of mounting, this construction functions in the same manner as that of Figures 1 to 10.

Figures 14 to 16 illustrate another alternative construction, the car parts shown therein being indicated by the same reference numerals as in Figures 1 to 10. In this construction, the resilient bodies are in the form of generally rectangular blocks 57 bonded at their outer faces to elongated straight supporting plates 58 and at their inner faces to flat mounting plates 59. The supporting plates 58 extend over the inner faces of the posts 14 and may be secured thereto by any suitable fastening means, such as welding or riveting. When so fastened, the plates 58 will extend parallel to the car side walls with the resilient blocks 57 lying on the outside thereof.

The belt rails, as shown at 61, may be formed in the same way as in Figures 1 to 10, but in this instance have welded thereto at spaced points side plates 62 which fit slidably over opposite edges of the supporting plates 58, as shown. The plates 62 are bent outward at their ends to lie flat against the mounting plates 59 and may be detachably secured thereto by fastening, such as bolts 63.

For mounting this type of construction, the plates 58 may first be secured at the desired heights to the posts 14 with the rubber blocks and mounting plates 59 previously bonded thereto. The belt rails with the side plates 62 secured thereto, as by welding or the like, may then be placed in the car with the side plates fitting over the supporting plates 58 and the blocks and the side plates may be bolted to the mounting plates, as shown. In the installation, the resilient blocks will absorb longitudinal forces in shear and will absorb lateral forces in tension. The mounting plates 62 fitting over the supporting plates 53 will hold the belt rails against vertical sagging, but if desired additional brackets 64 may be provided on the

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posts to underlie the belt rails and support them vertically.

While several embodiments of the invention have been shown and described herein, it will be understood that they are illustrative only and not to be taken as a definition of the scope of the invention, reference being had for this purpose to the appended claims.

What is claimed is:

1. In a railway car having opposed longitudinal side walls, a movable member supported by and adapted for movement in a horizontal plane parallel to each of the side walls, a body of resilient material having opposite generally parallel faces, means securing said body at one face to each of the side walls in a plane parallel thereto and projecting at a right angle thereto, and means securing said body at its opposite face to the adjacent movable member yieldingly to resist movement of the member parallel to the adjacent side wall by being stressed in shear, and a bracing member extending transversely of the car and secured at its ends to the movable members respectively to brace and yieldingly resist movement of the car lading longitudinally of the car.

2. In a railway car having opposed longitudinal side walls, a movable member supported by and adapted for movement in a horizontal plane parallel to each of the side walls, a body of resilient material having opposite generally parallel faces, means securing said body at one face to each of the side walls in a plane parallel thereto and projecting at a right angle thereto, and means securing said body at its opposite face to the adjacent movable member yieldingly to resist movement of the member parallel to the adjacent side wall by being stressed in shear, and a bracing member extending transversely of the car and secured at its ends to the movable members respectively to brace and yieldingly resist movement of the car lading longitudinally of the car, the movable members being spaced laterally from the adjacent side walls and the resilient bodies yieldingly resisting movement of the members toward the side walls thereby to brace and yieldingly resist movement of the car lading laterally of the car.

3. In a railway car having opposed longitudinal side walls, a plurality of bodies of resilient material having opposite generally parallel faces, means securing said bodies at one face thereof to the side walls respectively with the bodies projecting inward therefrom, a plurality of vertically spaced elongated support members secured to the inner surfaces of the bodies adjacent to each of the side walls and extending horizontally parallel to the adjacent side wall, rub boards secured to the inner surfaces of the bodies between adjacent support members and lying substantially flush with the inner surfaces of the support members to engage lading in the car, and bracing members extending transversely of the car and secured at their ends to opposite movable support members to engage lading in the car, the resilient bodies yieldingly resisting movements of the rub boards, support members and bracing members thereby yieldingly to absorb shocks due to movement of the lading in the car.

4. In a railway car having opposed longitudinal side walls, a plurality of vertically elongated strips of resilient material, means for securing said strips at their outer surfaces to the side walls respectively with the strips projecting freely inward therefrom, a plurality of vertically spaced horizontally elongated support members crossing and secured to the inner surfaces of the strips, the strips yieldingly resisting in shear horizontal movement of the support members relative to the side walls, and bracing members extending between and secured at their opposite ends to support members on opposite sides of the car to engage and yieldingly resist movement of lading in the car.

5. The construction of claim 4 including rub boards secured to the inner surfaces of the resilient strips ad-

adjacent to the support members with their inner surfaces substantially flush with the inner surfaces of the support members.

6. In a railway car having opposed side walls each including spaced vertical posts, mounting members secured to the posts and lying between adjacent posts, bodies of resilient material bonded at one face to the mounting members and projecting freely therefrom at right angles to the side walls, brackets bonded to the opposite faces of the bodies, elongated support members secured to the brackets and extending horizontally parallel to the side walls, and bracing members extending between and secured to support members at opposite sides of the car to engage and yieldingly brace lading in the car.

7. The construction of claim 6 in which the mounting members comprise elongated beams extending horizontally between and secured to adjacent posts.

8. In a railway car having opposed side walls each including spaced vertical posts and an outer covering over the posts, mounting members of generally Z section secured at one end to the posts with their other ends being spaced from the outer covering, chafing strips of wood or the like mounted on the outer covering and engaging said other ends of the mounting members, bodies of resilient material secured to said other ends of the mounting members and projecting inward therefrom, lading engaging members and means connecting the lading engaging members to the inner surfaces of the resilient bodies and resiliently supported thereby against horizontal movement to engage and yieldingly resist movement of lading in the car.

9. In a railway car having opposed side walls each including spaced vertical posts and an outer covering over the posts, mounting members of generally Z section secured at one end to the posts with their other ends being spaced from the outer covering, chafing strips of wood or the like mounted on the outer covering and engaging said other ends of the mounting members, bodies of resilient material secured to said other ends of the mounting members and projecting inward therefrom, elongated support members secured to the inner surfaces of the resilient bodies and extending horizontally parallel to the side walls of the car, means on the posts engaging the support members to hold them against downward vertical movement while allowing free horizontal movement thereof, and bracing members extending between and secured at their ends to the support members to engage and yieldingly resist movement of lading in the car.

10. In a railway car having vertical walls each including spaced vertical posts, elongated straight mounting strips secured to the posts and projecting horizontally therefrom parallel to the walls, a body of resilient material secured to the outer surface of each of the mounting strips, attaching plates secured to the outer surfaces of the resilient bodies, lading engaging members and means securing the lading engaging members to the attaching plates and including horizontally extending brackets spanning the mounting strips.

11. In a railway car having vertical walls each including spaced vertical posts, elongated straight mounting strips secured to the posts and projecting horizontally therefrom parallel to the walls, a body of resilient material secured to the outer surface of each of the mounting strips, attaching plates secured to the outer surfaces of the resilient bodies, elongated support members extending horizontally in the car in registry with the mounting strips, brackets secured to the support members spanning

the mounting strips and secured to the attaching plates, and bracing members extending between and secured at their ends to the support members to engage and yieldingly resist movement of lading in the car.

12. In a railway car having opposed side walls at least one of which is formed with a door opening defined by vertical door posts, horizontally elongated support members lying parallel to and spaced from the side walls, means including bodies of resilient material connecting the support members to the side walls for yielding horizontal movement relative thereto, horizontal beams extending between the door posts and detachably secured at their ends to the door posts in the same horizontal planes as the support members, bodies of resilient material secured to the inner surfaces of the beams and projecting inward therefrom, elongated support members, means securing the last named support members to the inner surfaces of the resilient bodies in alignment with the first named support members, bracing members to extend horizontally across the car, and means securing the ends of the bracing members detachably to the support members at any of a plurality of spaced points in the length thereof.

13. In load bracing means for railway cars, mounting members mounted in a railway car adjacent to the side walls thereof, bodies of resilient material bonded at one face to the mounting members and projecting freely therefrom at right angles to the walls of the car, elongated support members bonded to the opposite faces of the bodies and yieldingly supported thereby, and means on the support members for detachably connecting bracing members thereto.

14. In a railway car having spaced vertical side walls, a plurality of bodies of resilient material each having opposite generally parallel faces lying in planes parallel to a horizontal line in a side wall of the car, means securing one of said parallel faces of each of said bodies adjacent to and against horizontal movement relative to one of the side walls, a plurality of lading engaging members extending across the car between the side walls, and means connecting the ends of the lading engaging members adjacent to the side walls of the car to the other parallel faces of the resilient bodies so that the resilient bodies resiliently resist horizontal movement of the lading members parallel to the side walls of the car, the resilient bodies extending between said parallel faces thereof at right angles to the path of movement of the lading engaging members yieldingly to resist in shear movement of the lading engaging members parallel to the side walls of the car.

References Cited in the file of this patent

UNITED STATES PATENTS

1,548,053	Mead	Aug. 4, 1925
1,763,034	Bunker	June 10, 1930
1,924,504	Lee	Aug. 29, 1933
2,091,869	McCurdy	Aug. 31, 1937
2,322,193	Kaemmerling	June 15, 1943
2,467,681	McKumey	Apr. 19, 1949
2,556,302	Stough et al.	June 12, 1951
2,592,666	Doherty	Apr. 15, 1952
2,659,319	Hermann	Nov. 17, 1953
2,747,520	Brown et al.	May 29, 1956
2,769,404	Dietrichson	Nov. 6, 1956
2,834,304	Chapman et al.	May 13, 1958
2,868,368	Beach	Jan. 13, 1959