Feb. 1, 1944. G. C. GEORGE 2,340,374

LADING BRACE

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Fig. 1.

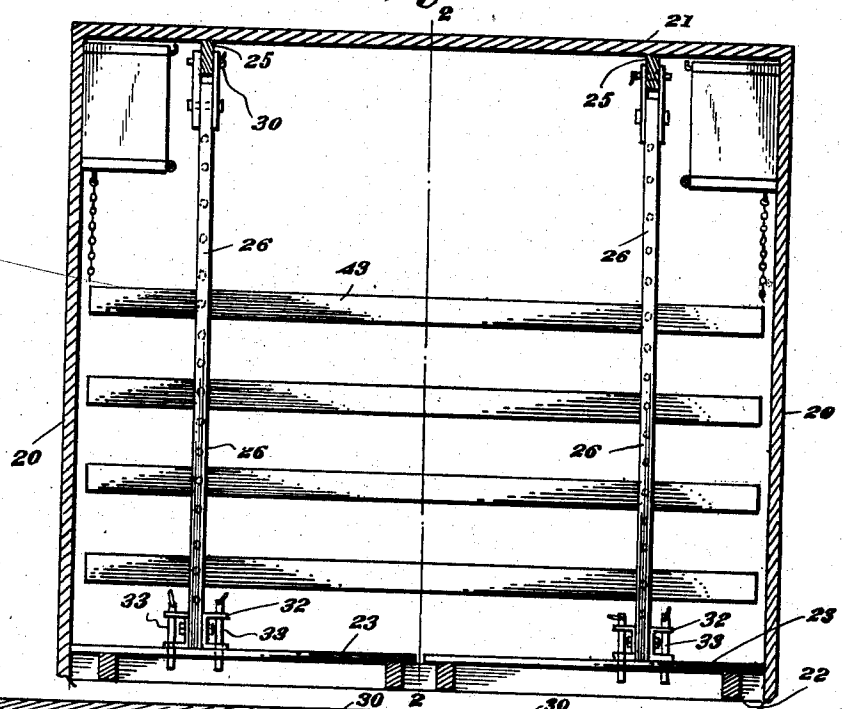
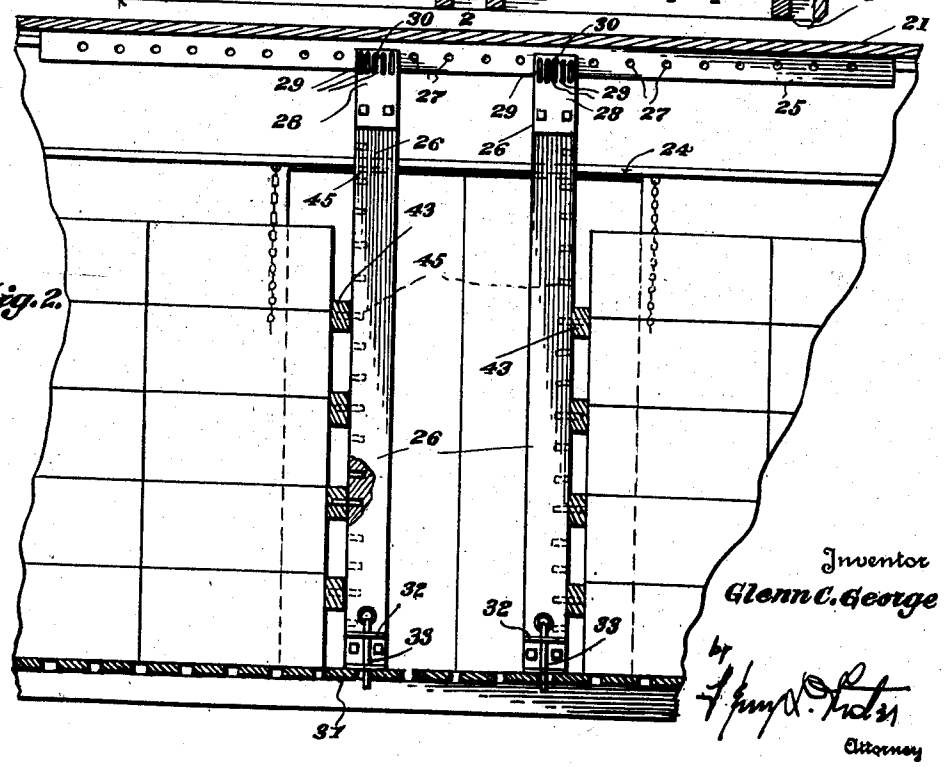


Fig. 2.



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Fig. 3.

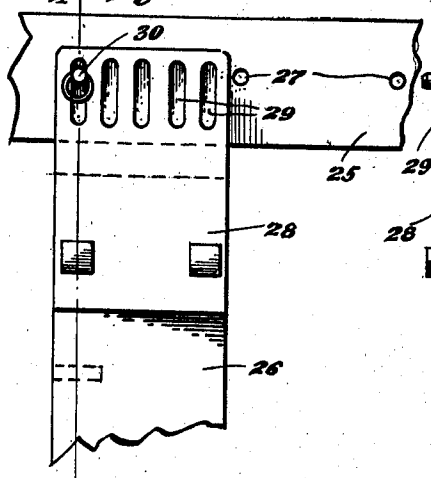


Fig. 4.

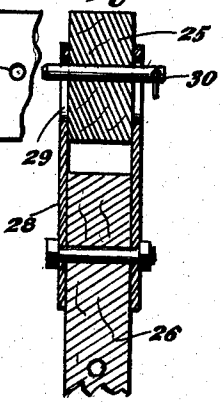


Fig. 7.

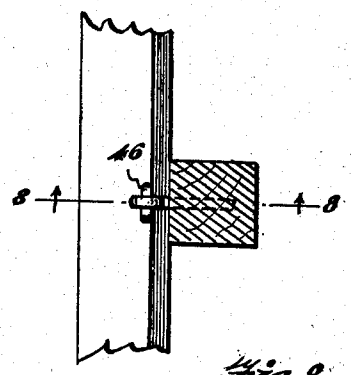


Fig. 5.

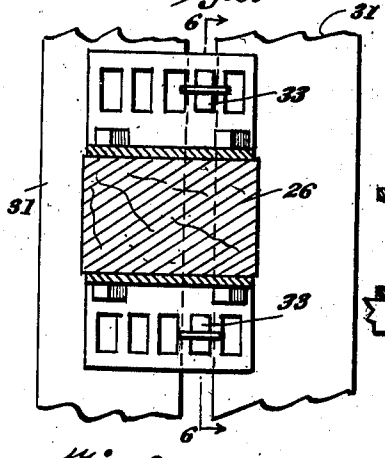


Fig. 6.

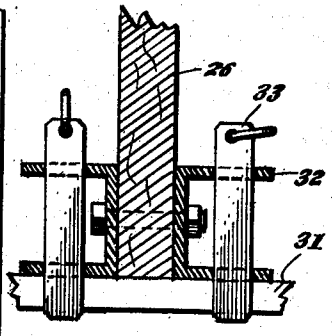


Fig. 8.

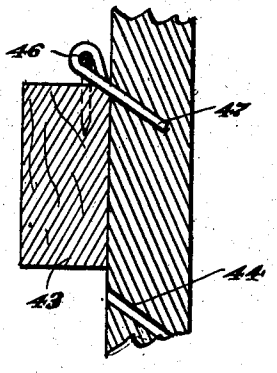


Fig. 9.

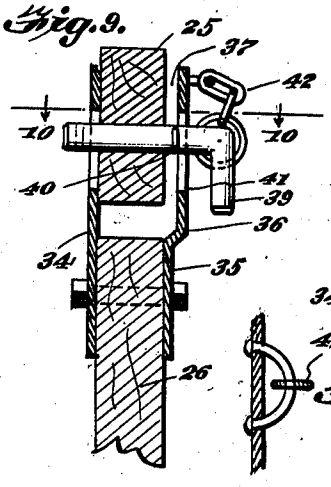


Fig. 10.

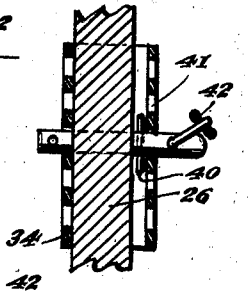


Fig. 12.

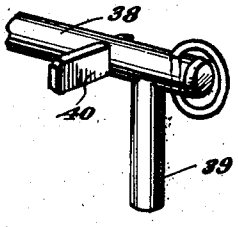


Fig. 11

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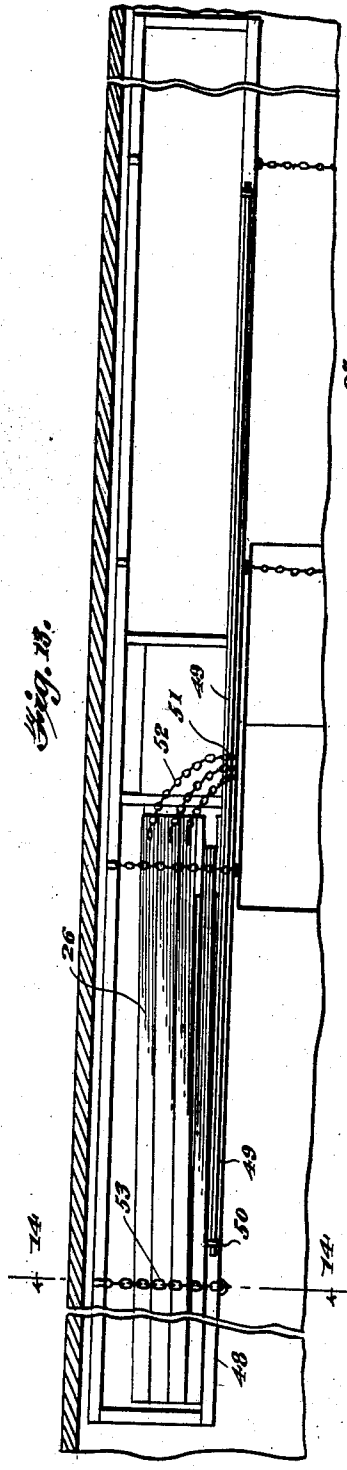
Glenn C. George

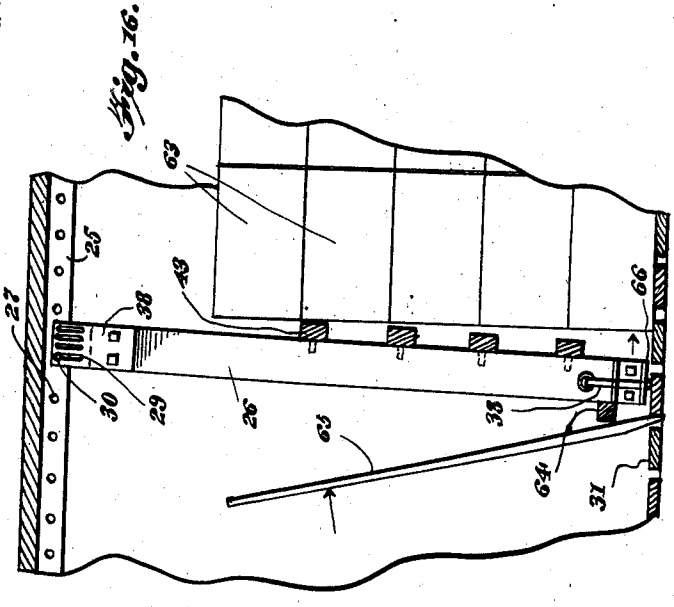
Attorney

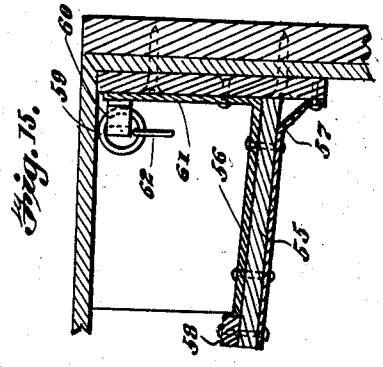
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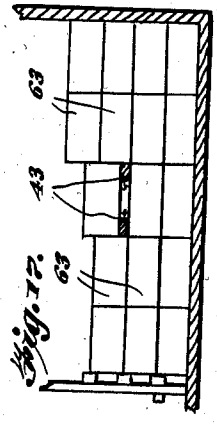
LADING BRACE

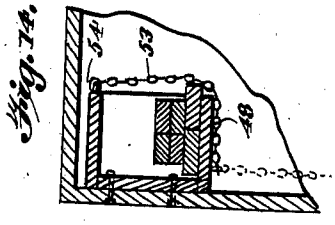
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2,340,374

UNITED STATES PATENT OFFICE

2,340,374

LADING BRACE

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Application March 17, 1942, Serial No. 435,093

2 Claims. (Cl. 105—369)

This invention relates to bracing systems for ladings in freight cars, that is to say, assemblies arranged to be organized in a freight car in such a way as to bear against the lading and prevent the latter from shifting in the car.

Numerous assemblies for the same purpose have been heretofore proposed, and the present invention is in the nature of an improvement by means of which a great many serious difficulties and objectionable features of the previous assemblies are eliminated. There are certain definite requirements that must be met in a device of this kind if the device is to be useful, and additional requirements must be met if the device is to be safe, convenient and effective. In general, it may be said that a lading brace must be of such a character as to not encroach upon the useful lading space of the car, either by the projection of attachments or fixtures into such space, or by requiring a large amount of room for mounting and dismounting, or assembly. Additionally, the device must not comprise permanent fixtures attached to the car in such a way as to block any portion of the lading doors. To render the application of a lading brace practical, it should be capable of being forced against the lading with considerable force, so that pressure upon the lading may be exerted to force it to a permanent position and to effectively secure it against any sort of motion during travel of the car. Finally, a lading brace should be of such character as to eliminate so far as possible the danger of injuries occurring to the people who install it and remove it.

The foregoing requirements are all met by the structure that forms the subject matter of this invention. In general, the lading brace embodies rack bars that are permanently attached to the car in such positions as to be out of the lading space and outside of the areas of the car doors. These rack bars extend longitudinally of the car and provide means of attachment in various longitudinal locations of a comparatively light framework that serves as the means engaging the lading to hold it against shifting. The framework itself is of a knockdown character and is of a novel arrangement that permits it to be assembled or disassembled in a very small alleyway extending transversely of the car, so that the use of the structure does not involve the necessary loss of a large space, such as the space required to mount and dismount or adjust certain of the permanently assembled bulkhead type of braces that have been previously proposed. The top of the frame, as indicated above, is engaged with the rack bars. The bottom of the frame is provided with a type of latching device that permits engagement with the floor rack that forms a standard element of equipment of all refrigerator freight cars; and the latching device is so arranged that it enables the bottom portion of a frame to be moved towards the lading by a lever and thereby be forced against the lading, and to be latched in position when the bottom has been forced to its correct position. The frame also comprises cross elements that are removably mounted upon upright members of the frame in a novel way, the respective cross elements engaging the lading at spaced points throughout its vertical extent.

In the accompanying drawings:

Figure 1 is a fragmentary, vertical, transverse section of a freight car having the assembly embodying the invention mounted therein.

Figure 2 is a sectional view on line 2—2 of Figure 1.

Figure 3 is a detailed view showing one form of connection of vertical members and horizontal rack bar members that extend longitudinally of the car.

Figure 4 is a sectional view on line 4—4 of Figure 3.

Figure 5 is a horizontal sectional view showing in plan the floor rack-engaging elements.

Figure 6 is a sectional view on line 6—6 of Figure 5.

Figure 7 is a detailed view showing the means for mounting transverse lading-engaging bars on the uprights.

Figure 8 is a sectional view on line 8—8 of Figure 7.

Figure 9 is a vertical, sectional, detailed view showing a modified connection between vertical uprights and longitudinal, horizontal rack bar members.

Figure 10 is a sectional view on line 10—10 of Figure 9,

Figure 11 is a detailed view of a keeper device for the pin forming a part of the assembly shown in Figures 9 and 10.

Figure 12 is a perspective view of a specialized pin that may be used for engaging the upright members with the rack members.

Figure 13 is an elevation showing the supporting arrangement for the device.

Figure 14 is a sectional view on line 14—14 of Figure 13.

Figure 15 is an enlarged sectional view similar to Figure 14, showing a modification.

Figure 16 is a fragmentary, longitudinal, sec-

tional view illustrating the manner in which the brace may be forced into position against the lading in a freight car.

Figure 17 is a diagrammatic view taken on a vertical plane extended longitudinally of a freight car and indicating a method of bracing lading to which the assembly is adapted.

Describing the drawings in detail, and referring first to Figures 1 and 2: The side walls of a freight car are designated 20, and a ceiling structure is designated 21. The car is provided with a floor 22 upon which floor racks elements 23 are supported. This structure is standard in freight cars, and is illustrated diagrammatically. In Figure 2, the central portion of the car is shown, the usual central side door being indicated at 24.

The lading bracing system that comprises this invention includes a pair of rack elements 25 that are mounted to the ceiling 21 and extend closely adjacent the under surface of the ceiling and longitudinally of the car throughout its central portion, and towards either end as far as may be desirable. These elements are secured directly against the ceiling, and their vertical extent below the ceiling is limited so that their undermost extremities are well above the tops of the doors and above the portion of the cargo space that is normally used, it being well known that lading of freight cars is so arranged that spaces are always left between the top of such lading and the top of the car. Thus the elements 25 do not interfere in any way with loading or unloading.

Cooperatively assembled with the longitudinal elements 25 are upright members 26, preferably in the form of beams that are positioned relative to the length of the car by engagement with the elements 25, and that afford a bracing to hold the lading against movement. Advantageously, securing of the members 26 in adjusted position is accomplished by means of plural spaced pin holes 27 in the rack elements 25 and opposed plates 28 that are secured to opposite side surfaces of the members 26 to receive between them the elements 25. The opposed plates 28 are provided with a series of matching apertures 29 arranged for registration with the holes 27, so that pins 30 may be inserted through the openings 29 and holes 27. For ready mounting of the pins, the openings 29 are preferably elongated as illustrated, and are provided in sufficient number and at such intervals that longitudinal adjustment of the members 26 in degrees smaller than the spacing between the holes 27 may be accomplished.

In order to fix the position of the bottoms of the members 26 relative to the lading, and to accomplish this fixing of position without requiring the presence of rack elements or any other engaging devices occupying a portion of the useful cargo space, latching devices carried by the members 26 are arranged for engagement between the bars 31 of U-shaped keepers 32 mounted upon opposite surfaces of each vertical member 26, and the flanges of which are perforated for slidable reception of latching pins 33 that may be projected between the bars 31 to lock the uprights, or retracted to release them.

Figures 3 to 6 and 9 to 12 illustrate the details of the assembly just described. Figures 3 and 4 show the upper ends of the elements 26 and the plates 28, secured to opposite sides of such elements and provided with the openings 29 through which are projected the pins 30, the pins extending through the holes 27 of the longitudinal bars 25.

Figures 5 and 6 show the bottom assembly as above described. Figures 9 and 10 show a modified form of assembly for securing the upper ends of the uprights 26 in assembly with the bars 25. This modified form is arranged so that the assembly is securely locked against accidental displacement. Upon one side of the upright 26 is a straight plate 34 that is in every way similar to the plates 28 of Figures 3 and 4. The opposite plate 35, however, is outwardly offset above the end of the member 26, as shown at 36, in order to provide a clearance space at 37 between the inner surface of the plate and the bar 25. The pin that is used in this assembly is illustrated in Figure 12, and comprises a shank 38, a weighted arm 39 extended at right angles from the shank, and a locking keeper 40. In assembling this pin with the rest of the structure, the weighted arm 39 is turned to a horizontal position so that the keeper 40 may be inserted through the vertical opening 41 of the plate 35. When the keeper 40 is through the plate 35 and in the clearance space 37, the weight 39 is released so that it turns to vertical position, as shown in Figure 9, turning the keeper 40 to a horizontal position transversely related to the opening 41, and therefore in locking relation to the plate 35. A chain 42 may be attached to the plate 35, as shown in Figure 11, and secured to the pin to prevent its loss.

As illustrated in Figure 1, two of the members 26 are arranged in transversely spaced relation in the car, and these members are adjustable longitudinally of the car in accordance with the arrangement of the lading. For bracing contact with the lading, horizontal elements 43 are supported upon the elements 26. These horizontal members are in the form of beams and are mountable upon the members 26 in adjusted position, this being preferably accomplished by pin and socket assemblies, the members 26 having sockets 44 in which pins 45, carried by the members 43, may be removed and mounted. Preferably, the form of pin shown in Figures 7 and 8 is employed, this comprising a staple or eye 46 secured in the upper edge of the element 43, and a pin 47 that has an end looped around the eye or staple 46 upon which it is pivoted. Preferably, the sockets 44 are inclined inwardly and downwardly, so that engagement of the pins 47 is secure. The flexibility of the swivel connection between the member 46 and the pin 47 provides for ready mounting of the elements 43 by insertion of the pins 47 into the holes 44, but has another advantage which will be described later in connection with Figure 17.

Figures 13 to 15 show in detail the mounting by means of which the bracing assembly above described is secured to a freight car, and which also provides for convenient support of the vertical elements 26 and horizontal elements 43 when they are not in actual use in the car. This support comprises essentially a shelf 48 extended longitudinally of the car and projecting horizontally from the side wall, such shelf being of limited width and located adjacent the ceiling and above the top of the car door. A rod 49 is supported in brackets 50 upon the edge of the shelf 48 and in spaced relation to such edge, and upon the bar 49 are slidable keepers 51 to which the vertical elements 26 are secured by chains 52. The chains are of sufficient length to permit the uprights to be manipulated in mounting and dismounting, and to permit them to be laid in a horizontal position upon the shelf 48, as indicated in

Figure 13. Chains 53 are secured to the shelf 48, and hooks 54 are provided at the top of the structure to which the chains 53 may be hooked to provide holding means for the elements 26 when they are upon the shelves. The transverse elements 43 may also be supported upon the shelf 48 when not in use, and secured there by the chains 53.

In Figure 15, which discloses a modified shelf assembly, the shelf is designated 55 and comprises angle brackets 56 and 57 between which the shelf is supported. A lip is provided at 58 by a strip secured along the edge of the shelf to hold elements 26 or 43 that may be placed upon it. In this assembly, the travelers 59 are slidable along a strip 60 that is secured to the upright portion 61 of the angle brackets 56 and 57, and the upright members 26 of the bracing may be secured to the travelers 59 by chains indicated fragmentarily at 62.

In Figure 16, the upright elements 26, having the transverse elements 43 secured in proper position to engage both overlying and underlying boxes, designated 63, are shown being forced into tight engagement with the stacked boxes. In this figure, the top of the upright 26 has been correctly positioned by engaging the pin 30 in one of the holes 27 of the bar 25 and through opposite openings 29 of the plate 38. This pin engagement provides a pivot point for the element 26, which may swing along a vertical plane in directions extending longitudinally of the car. The pins 33 of the bottom-latching member are in withdrawn position, so that the bottom of the upright 26 may move over the cross bars 31 of the floor rack as the upright is swung. A transverse element 64 is mounted upon the rear of the uprights 26 and adjacent their bottoms. This transverse element 64 provides a thrust member against which may be exerted the thrust of a lever 65, the lower end of which is inserted between two bars 31 of the floor rack to provide a fulcrum, and then thrust in the direction of the arrow to move the lower ends of the uprights 26 toward the lading, thereby forcing the transverse members 43 against the lading with relatively great pressure. When the swinging motion of the assembly comprising the uprights 26 and the transverse member 64 has progressed to a point at which the pins 33 reach the slot 66 in the floor rack, the pins are thrust into the slot, and thereby the assembly is locked in engaged position. This method of mounting the assembly and forcing it into position permits a high pressure to be exerted upon the lading to compress it, whereby it may be securely fixed against movement during transit. The pin arrangement for securing the lower ends of the uprights in this forced position permits ready fixing of the assembly in its compressed position, and also provides for ready removal when unloading is necessary, and assures that such removal may be made without damage either to the bracing assembly or to the lading. The combination of the spaced holes 27 of the bars 25, and the more closely spaced openings 29 of the plates 38 carried by the uprights provides for a fine adjustment of the position of the uprights 26 along the car, so that, regardless of variations in the longitudinal dimensions of the lading, a correct positioning of the uprights 26 of the transverse members 43 may always be accomplished. Elongation of the openings 29 permits the uprights 26 to ride upwardly while being forced into position, preventing jamming against the floor rack during their swinging movement.

In Figure 17 is shown a method of arranging lading when the car is not completely filled, and to which the system herein disclosed is applicable. In this instance, it is assumed that the number of boxes 63 is such that it is not possible to stack them in rows having a uniform number of boxes in height. To provide bracing for all of the boxes in a lading of this kind, it is customary to pile the boxes higher at the ends of the cars, and, towards the center of the car where the bracing is located, to insert spacers in the tiers of boxes so that as the stacks decrease in height towards the center of the car, an overlapping is provided which will brace the stacks nearer the ends of the car. Thus the end stacks of Figure 17 are shown as containing four boxes, and the more central stacks as containing three boxes. The central stack that is adjacent the first four-box stack contains spacers by means of which the top box is raised to a height that will engage the topmost box of the adjacent stack, as well as the next highest box. The specific form of pin disclosed in Figures 7 and 8 is useful in an arrangement of this kind as it permits the transverse bracing members 43 to be used as the spacers by means of which the upper limit of height of a stack of boxes may be raised. If pins are rigidly extended from the sides of such members, they cannot be used for this purpose because they will pierce or damage the article with which they are in contact. By attaching the pins to the edge of the members, however, such damage is avoided, as the pins 47 may be swung to occupy the space that is between members used for this purpose.

Referring more generally to the assembly, it will be noted that the supporting structure shown in Figures 13 to 15 is entirely outside of the useful cargo space of the car, being adjacent the side walls of the car and close to the ceiling. It is also located above the level of the top of the door, so as not to interfere with loading or unloading of the car, even when large objects that approach the height of the car door are loaded.

It will be appreciated from inspection of the drawings that the assembly is inexpensive since the parts are all simple and easily manufactured—comprising straight bars, pins, and plates that may be made from standard structural bar shapes. Furthermore, all of the elements of the assembly are light in weight, thereby eliminating the very real danger that is present to workmen engaged in loading cars when heavy bulkheads or other weighty assembly must be handled. This is particularly important in view of the provision for supporting the disassembled elements in overhead position upon the shelves 48 or 55.

There is a further important advantage in this assembly, which arises partially from the demountable character of the transverse bars 43, and partially from the cooperative securing arrangements for the tops and bottoms of the uprights 26. Referring to Figure 16, it will be seen that each of the uprights 26 may be secured to one of the bars 25 in a space that is very narrow in directions extended longitudinally of the car, since only a very small pivotal movement of the bar is necessary to place it in engaging position relative to the bars 25. Similarly, only a very narrow space is necessary to mount the cross elements 43 upon previously mounted uprights 26. When the cross elements 43 have been mounted, only a very limited space is required to force the

assembly into position by the lever means illustrated in Figure 16. The same considerations apply to disassembling the brace. This small space requirement is very important because it necessitates only a very narrow alleyway being left at the door and between portions of lading lying forward and aft of the door. In certain previously devised bracing assemblies, pivoting at the roof of a permanently assembled bulkhead has been required. This has required the leaving of a space sufficient for swinging of a structure of practically the height of the car, and the radius upon which such swinging occurs necessitates that a very wide alleyway be left, thus requiring the loss of a significant portion of the cargo space.

I claim:

1. A lading brace assembly for use in a freight car having a floor provided with two pairs of spaced rows of alined openings extending longitudinally of the car and a pair of spaced ceiling supported rack bars extending longitudinally of the car, each being vertically alined with respect to one of the pairs of rows of openings in said floor and each provided with a row of spaced openings each alined with the openings in the other of said bars, including a frame structure composed of a pair of uprights and a plurality of interconnecting horizontal bars, a pair of spaced opposed plates secured to the upper end of each upright and having upwardly extending free end portions between which an associated ceiling supported rack bar is adapted to be received, the upper free end portions of each pair of plates being of substantially the width of the distance between any adjacent pair of openings in the rack bar and each having a row of spaced vertically extending slots alined with similar slots in the opposed one of the plates of a pair and adapted for selective alinement with anyone of the openings of the associated rack bar, means extending through each pair of plates and its cooperating rack bar to connect the same for relative pivotal and vertical sliding movement, and means mounted on the lower end of each of the uprights for selective engagement in anyone of the spaced openings in the car floor.

2. A lading brace assembly in accordance with claim 1, in which the means mounted on the lower end of each upright includes a pair of spaced U-shaped brackets, the horizontally extending free legs of each bracket each having a row of spaced openings alined with the row of spaced openings in the opposed leg, and a latch pin extending through each pair of legs of each U-shaped bracket and having a part thereof engageable in any one of the openings in the floor of the car.

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