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S. M. NAMPA

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APPARATUS FOR LOADING FREIGHT OR THE LIKE

Filed July 9, 1947

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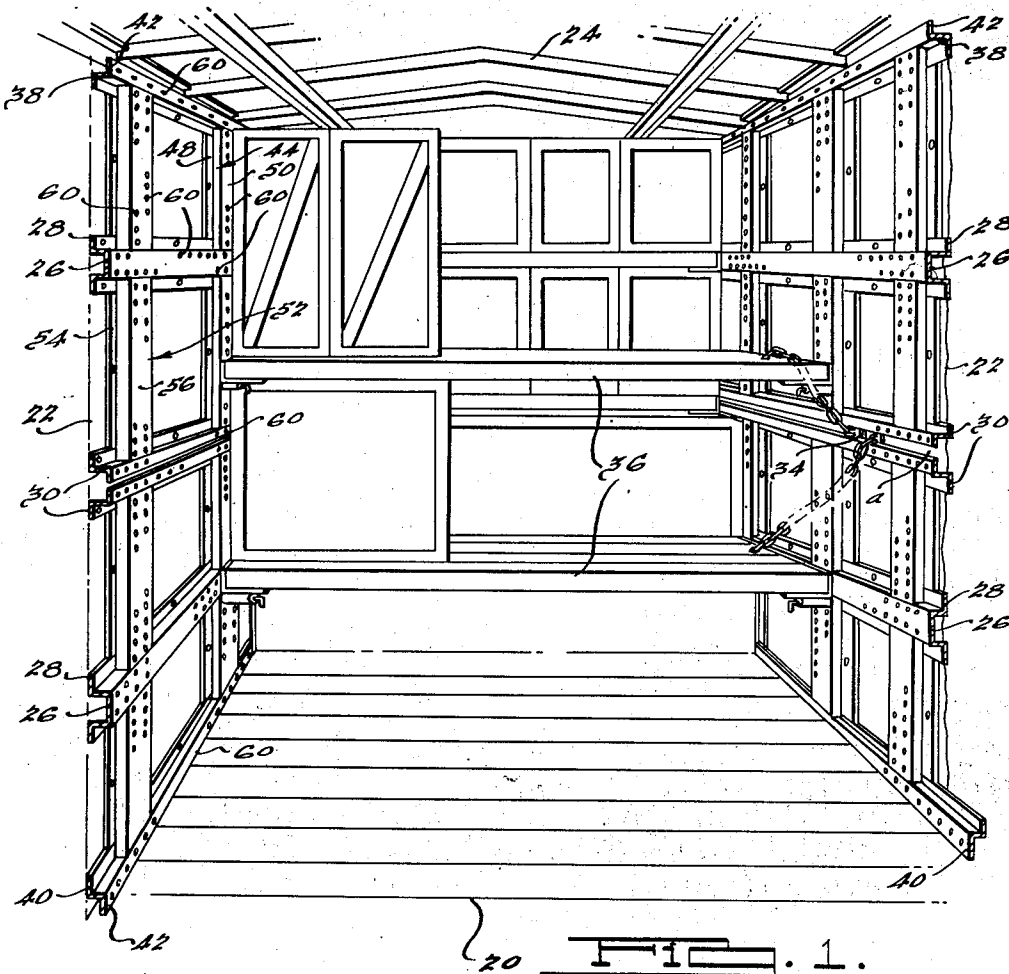


FIG. 1.

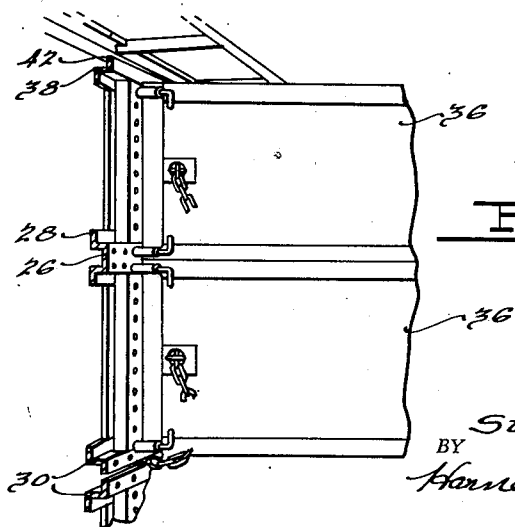


FIG. 2.

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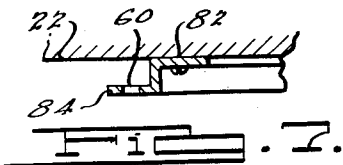
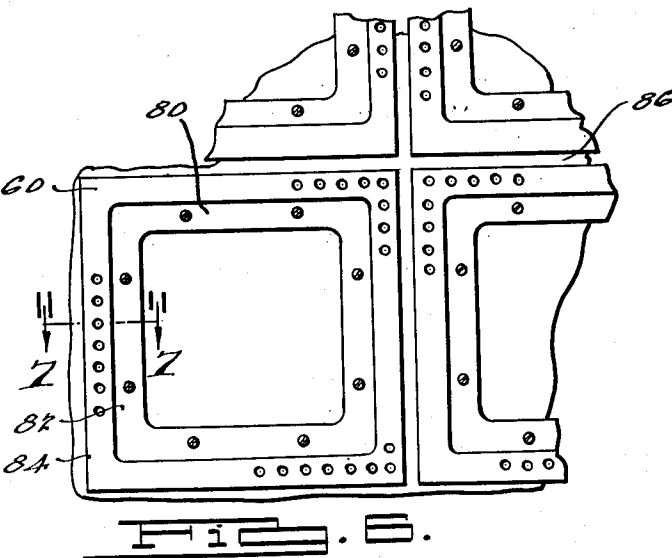
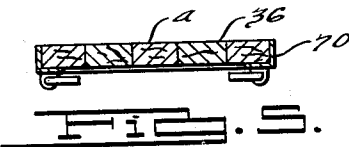
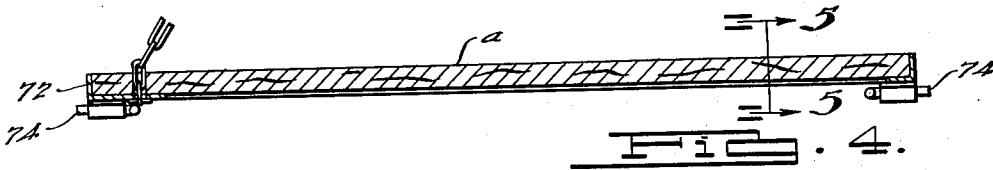
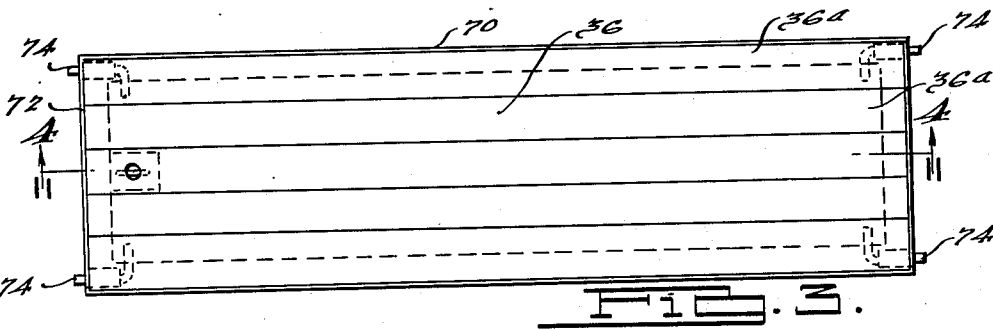
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APPARATUS FOR LOADING FREIGHT OR THE LIKE

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4 Sheets-Sheet 2



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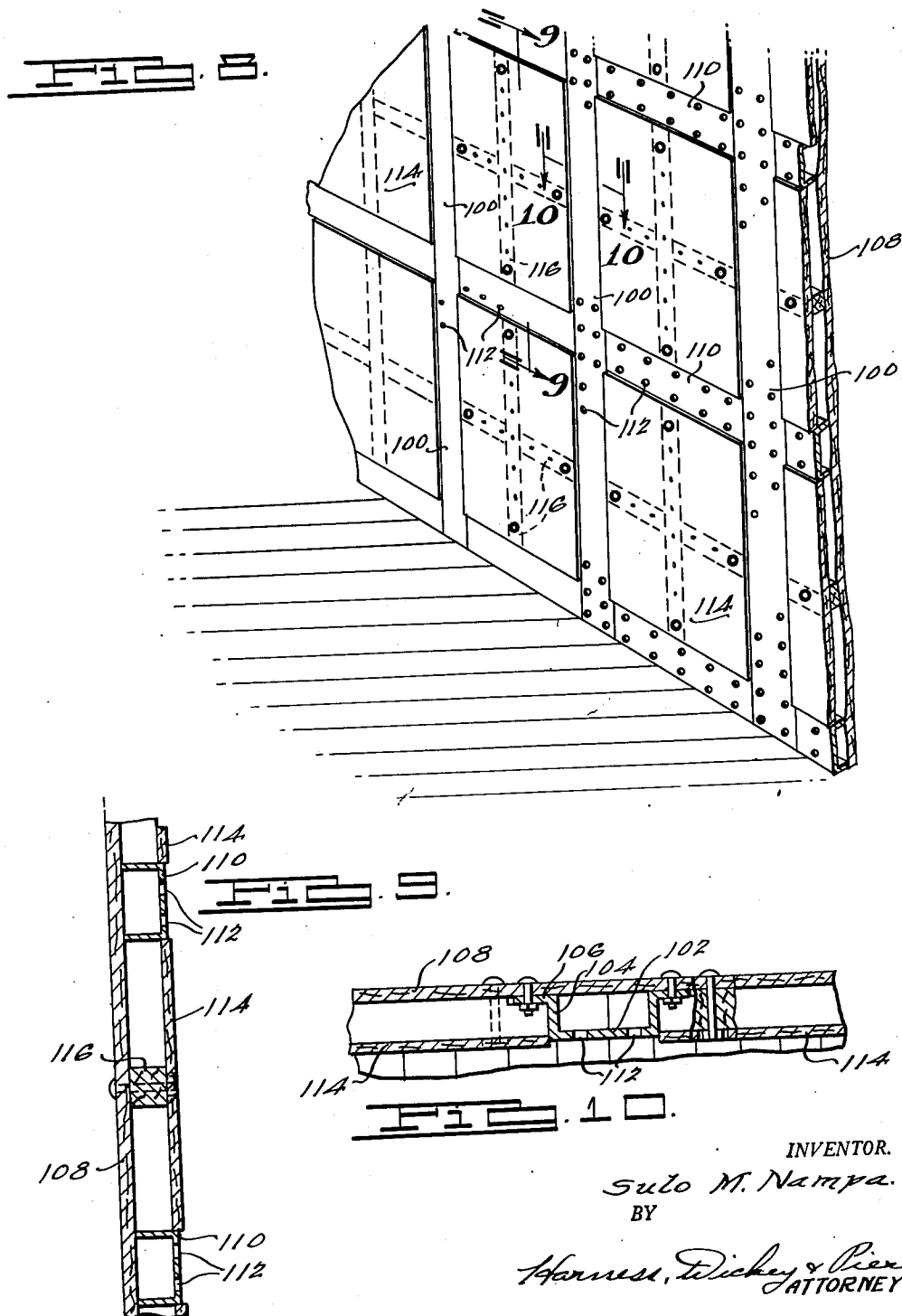
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APPARATUS FOR LOADING FREIGHT OR THE LIKE

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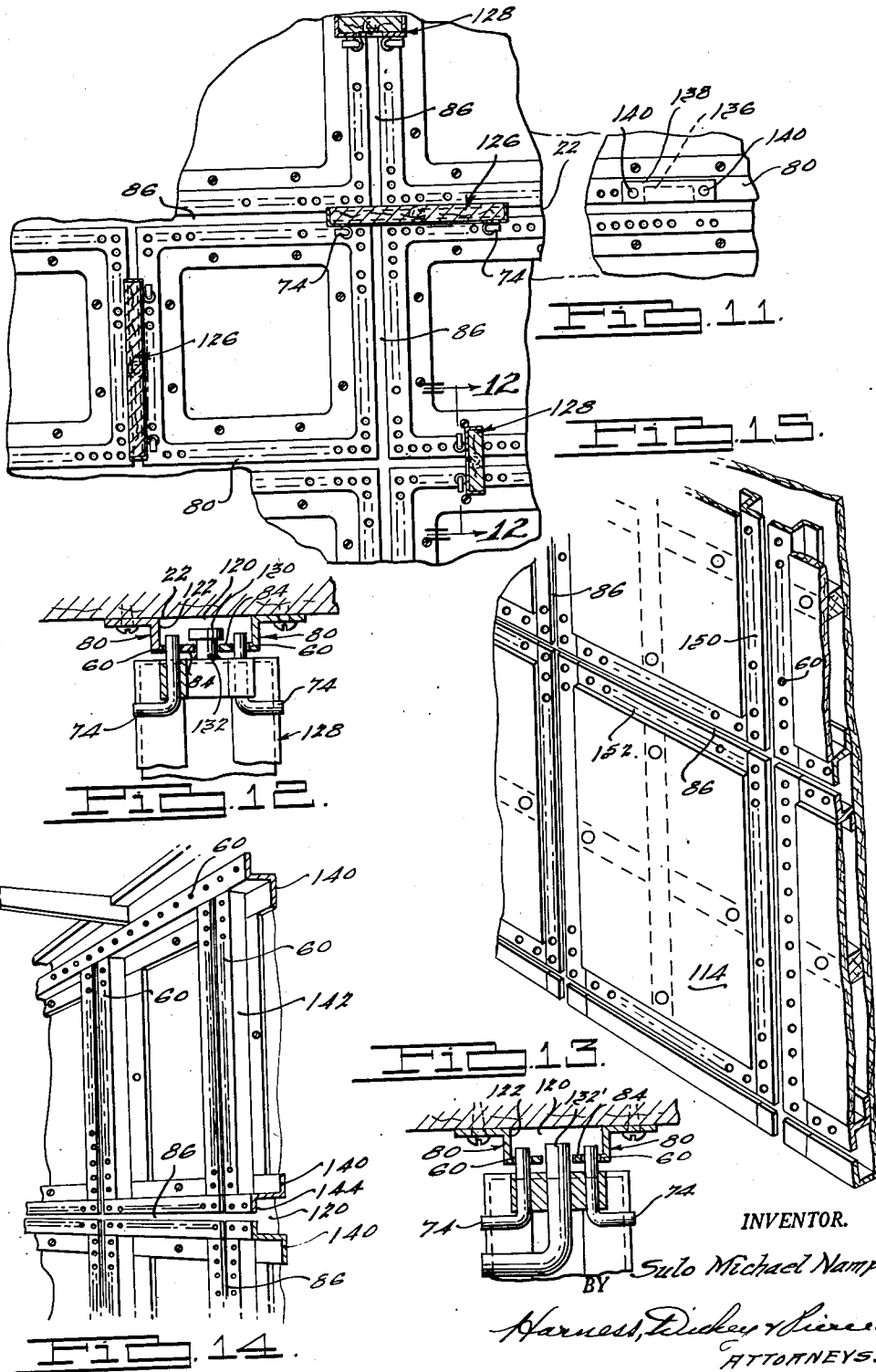
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APPARATUS FOR LOADING FREIGHT OR THE LIKE

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UNITED STATES PATENT OFFICE

2,616,375

APPARATUS FOR LOADING FREIGHT
OR THE LIKE

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Application July 9, 1947, Serial No. 759,887

22 Claims. (Cl. 105—369)

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The present application is a continuation-in-part of my abandoned application, Serial No. 499,973, filed August 25, 1943.

The present invention relates to improved loading apparatus for holding freight articles of different types in vehicles or storage spaces and, more particularly, to improved equipment of this nature having certain parts which are built into or combined with a vehicle, such as a railway freight car, or other storage space, and having certain other parts which are adjustably and variously cooperable with the built-in parts, the several parts of the equipment cooperating to hold (that is, for example, to brace, support or carry, space, wedge, or provide shelves, partitions, or bins for) a wide variety of freight articles.

It has heretofore been proposed, for example, in prior patents, such as the patent to Thomas No. 2,030,773, to provide the side walls of a freight car or other storage space with plate-like members provided with relatively closely spaced perforations for cooperation with pins or similar attaching means provided at the ends of cross bars disposed to extend across a car and serve as decking members, bulkheads and the like, the object being to enable the cross members to be secured to the supporting side walls in any of a plurality of positions of vertical and horizontal adjustment. Such arrangements have the decided disadvantage that if the plate-like side members are made heavy enough to withstand the relatively severe duty to which they are subjected in service, they add materially to the weight of the associated car, thus reducing, for a given maximum allowable wheel loading, the freight capacity of the car.

In accordance with the arrangement disclosed in applicant's copending application, Serial No. 740,330, filed April 9, 1947, (now Patent 2,519,846) as a continuation of application, Serial No. 434,357, filed March 12, 1942, the above objection is obviated by providing upright side posts in spaced relation along the respectively opposite sides of the car, and in further providing side members which may be adjustably secured to the uprights in desired positions of vertical adjustment. The side members, in turn, support the cross members. This arrangement materially reduces the over all weight of the freight loading equipment without sacrificing any operating advantages, but, it will be noted, involves the use of at least three sets of members, two of which are movable. These members are, of course the uprights, the side members and the cross members.

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The present invention is directed to the provision of a system which achieves a substantial reduction in weight, as compared to the first-mentioned system and, while maintaining sufficient flexibility or adaptability for many loading purposes, enables the movable side members of the second-mentioned system to be dispensed with. More particularly, in accordance with the illustrated embodiments of the present invention, the side walls of the car or other storage space are provided with a gridiron-like arrangement of retaining means, which are fixed in position relative to the car, and to which cooperating cross members may be applied in any of a variety of vertically and horizontally adjusted positions, so as to function efficiently as decking members, bulkheads, and the like.

The basic concept of a loading system employing permanently applied grid-like arrangements of vertically and horizontally disposed intersecting supporting members, in aligned relation at opposite sides of the car, also affords a basis for distinct improvements in loading systems of the belt line type. More particularly, a belt line system may, for the purposes of the present description, be characterized as one in which a series of horizontally extending load supporting members of substantial continuous length, so that they may unbrokenly extend from the end to the door of the car, or at least past a plurality of upright car-side-frame posts, are secured to the opposite side walls of a freight car or the like, the two series being in aligned relation, and the supporting members of each series being arranged at different elevations. In such systems the individual supporting members may be provided with closely spaced holding means distributed along their length in closely spaced relation, so as to cooperate with and hold cross bars or the like at desired adjusted positions vertically or horizontally of the car. In accordance with one important aspect of the invention the horizontal supporting members at one of a particular series are bridged at desired intervals by vertical members. In accordance with some aspects of the invention, these verticals may serve primarily to give structural support to the horizontals, they may also be provided with closely spaced holding means so as to hold the cross bars at desired elevations thereon. They may also, as a separate function, or as an added function, serve as a means for permitting a guided transfer of a cross bar from one horizontal level to another. Thus, even in those instances in which, in accordance with the invention, as described below, the cross cars are made nonremovable

from the supporting members, a particular cross bar can be moved from any one belt line level to any other belt line level, while guidably supported.

With the above as well as other considerations in view, the principal objects of the present invention are to provide a freight loading arrangement which is simple in construction, low in weight, and efficient and reliable in operation; to provide such an arrangement wherein the side walls of a freight car, or other storage chamber are provided with retaining means arranged in geometric patterns which enable co-operating freight holding members to be engaged and supported thereby in any of a plurality of positions; to provide such an arrangement in which the retaining means are constituted in part by members which form a part of the side walls of the freight car; to provide such an arrangement wherein the retaining means are constituted by members arranged in a gridiron pattern and in which the area within each such pattern is provided with a lining panel, the surface whereof is approximately flush with the surfaces of the gridiron defining members, so that the side walls of the car present relatively smooth freight engaging surfaces; to provide such an arrangement wherein the retaining means are arranged in a square gridiron pattern, so that holding members in the form of relatively wide but thin bars may be secured thereto in either horizontally or vertically disposed positions; and to generally improve and simplify the construction and arrangement of freight loading systems.

Further objects of the invention are to provide a loading system of the belt line type, particularly characterized in that cross bars can be guided by supporting members at opposite sides of the car, for movement along the supporting members at desired elevations, and also for movement while guidingly supported or guidingly retained from one belt line level to another; to provide such systems wherein the guided movement from one belt line level to the next is afforded by vertical members which interconnects the horizontal side supporting members, and wherein such vertical members are also provided with holding means for retaining the cross bars at desired elevations thereon; to provide such systems in which the cross bars can be moved horizontally past a plurality of upright car side posts, or thus horizontally and also vertically from one level to another without removal from guided engaging relation with the car sides, and, if desired, with such removal prevented, so as to make the system pilfer-proof; to provide such systems wherein the vertical and horizontal supporting members define grids which are rectangular, and, in some cases, square; to provide such systems in which horizontal guiding and retaining members extend continuously past a plurality of upright car side posts to uninterruptedly transmit bracing loads in tension; to provide such systems employing vertical guiding and retaining members which extend uninterruptedly past a plurality of similar horizontal members to carry decking loads in compression; to provide such systems wherein the faces of the supporting members which are presented to the interior of the car occupy a substantially flush relation with respect to each other, thereby avoiding freight engaging protuberances, and wherein further the grid-like spaces may be provided with lining panels, the surfaces of which may be substantially flush, or

may extend slightly inwardly of the car, from the faces of the supporting member.

With the above as well as other objects in view, which appear in the following description and in the appended claims, preferred but illustrative embodiments of the invention are shown in the accompanying drawings throughout the several views of which corresponding reference characters are used to designate corresponding parts and in which:

Figure 1 is a view in perspective of one end of an otherwise conventional freight car equipped with the invention;

Fig. 2 is a fragmentary view based upon Fig. 1, but showing the freight holding members in a different position;

Fig. 3 is a plan view of one of the freight holding members of Figs. 1 and 2;

Fig. 4 is a view in longitudinal section, taken along the line 4—4 of Fig. 3;

Fig. 5 is a view in horizontal section, taken along the line 5—5 of Fig. 4;

Fig. 6 is a fragmentary view in side elevation of a modification of the invention;

Fig. 7 is a fragmentary view in section, taken along the line 7—7 of Fig. 6;

Fig. 8 is a fragmentary view in side elevation of a further modification of the invention;

Figs. 9 and 10 are views in vertical and horizontal section, taken, respectively, along the lines 9—9 and 10—10 of Fig. 8;

Fig. 11 is a fragmentary view, utilizing the grid structure of Figs. 6 and 7, and showing an improved combination thereof with cross bars;

Fig. 12 is a fragmentary view in horizontal section, taken along the line 12—12 of Fig. 11;

Fig. 13 is a fragmentary view of a further modification of the invention; and

Figs. 14 and 15 are fragmentary views in perspective, utilizing the general structures of Figs. 1 and 8, respectively, arranged to embody the guiding and transfer features of Figs. 11 and 12.

It will be appreciated from a complete understanding of the present invention that the improvements thereof may, in a generic sense, be embodied in or used with a wide variety of freight holding systems, and may also partake of various different constructions. The disclosure herein of particular embodiments of the invention, applied to a railway freight car, is consequently to be regarded in an illustrative and not in a limiting sense.

Referring first to Figs. 1 and 2, the illustrative freight car is illustrated as being of usual construction, having a conventional planked floor 20, side panels 22, and a roof structure 24. The hereinafter described supporting structure is shown as being applied only to the side walls of the car, and as extending from the floor to the roof structure, it being understood that it is contemplated that this structure will extend along each side of the car from end-to-end thereof, except at the door openings, which may, if desired, be provided with removable but otherwise similar structure.

The illustrated supporting structure comprises a series of outwardly presenting channel-shaped members 26, arranged in vertically aligned pairs at the respectively opposite sides of the car. The channels 26 are provided with outwardly turned flanges 28, by which these members may be secured to the side panels of the car structure. Intermediate the channels 26 at each side, a pair of members 30, each of Z-section, are secured to the side walls 22 in opposed relation to each

other, and with the spaces *a* between the inner flanges thereof defining a slot through which chains 32 may be passed for connection to associated heads 34. The heads 34 are slidable lengthwise of the car within the slot thus provided and the other ends of the chains 32 are secured to the freight holding members 36, so as to prevent their unauthorized removal from the car.

Each side wall of the car is also provided with upper and lower supporting members 38 and 40, also of Z-shape. One flange of each of the members 38 and 40 is secured to the associated car wall and the other flanges 42 thereof project into the car to a position in which the outer surfaces thereof are coplanar with the outer surfaces of the webs of the members 26 and with the surfaces of the inner flanges of the member 30.

At the extreme end of the car and at each side thereof, a series of vertically disposed members 44, preferably of Z-shape, are secured in place between the successive members 38, 26, 30, 26 and 40. The ends of the outer flanges 48 of these members are notched so that such flanges may be directly secured to the side panels 22 of the car and so that the surfaces of the inner flanges 50 thereof lie flush with the surfaces of the webs of the members 26.

At successive, spaced points from the members 44, additional series of upright members 52 are provided at the respectively opposite sides of the car and are connected between the successive horizontal members 38, 26, 30, 26 and 40. The members 52 are shown as being of outwardly presenting channel-shape, having outwardly turned flanges 54. As in the case of the members 44, the ends of the flanges 54 are cut back, so that these flanges may be secured to the side panels 22 of the car with the associated webs 56 lying in flush relation to the webs of the members 26. It will be understood that the upright members immediately adjacent the door openings may be of either the single type, corresponding to the members 44, or the double type corresponding to the members 52, or otherwise, depending upon the manner in which the door openings are to be treated.

It will be noted from the description thus far given that the respectively opposite side walls of the car are provided with supporting structure arranged in a geometric pattern, particularly a rectangular gridiron pattern, and that the overall weight of this supporting structure is materially less than the weight of the continuous plates utilized in the first-mentioned prior system.

In accordance with the present invention, the vertically and horizontally arranged supporting members 26, 30, 38, 40, 44 and 52 are provided with attaching means for cooperation with attaching means carried by the cross members 36. As shown, these attaching means take the form of perforations 60, there being one row of the perforations 60 in each of the members 30, 38, 40 and 44, and there being two rows of the perforations 60 in each of the remaining members. For the reason mentioned below, the distribution of the horizontally and vertically disposed perforations is preferably such that the vertical spacing between the upper row of perforations on, for example, an upper member 26 and the row of perforations on the adjacent member 38 is equal to the horizontal spacing between the vertical row of perforations 60 on an end member 44 and the adjacent vertical row of perforations 60 on the adjacent upright member 52. The geometric pattern defined by the perforations is, consequently,

a square pattern having vertically and horizontally disposed sides, with equal spacing between the perforations thereof. Each such square pattern may for convenience be referred to as a bay, and it is to be noted that the spacing between an opening in one bay and an adjacent opening in an adjacent bay is preferably the same as the spacing between successive openings in the same bay.

Referring particularly to Figs. 1 through 5, the cross members 36 are illustrated as being built up of a number of timbers 36*a* and as being provided with reinforcing side and end angle irons 70 and 72. The cross members thus have one exposed surface *a*, which is free of projecting metal surfaces, which surface acts as a cushion for direct engagement by the freight articles. The respectively opposite ends of the members 36 are provided with retractable pins 74. The spacing between the pins 74 at one end of each cross member 36 is equal to the length of the sides of the above-mentioned bays. With this arrangement, by retracting the pins 74, a cross member 36 may be positioned between corresponding bays at opposite sides of the car and, by releasing the pins, so that they project through corresponding perforations 60, may be secured thereto in any of a variety of vertically and horizontally adjusted positions. For example, by turning the member 36, so that the pins 74 lie in a horizontal plane, the member 36 may be located at any desired position lengthwise of any of the horizontal members 26, 30, 38, and 40; or may be positioned between adjacent uprights such as 52—52 at any desired elevation thereon. When so disposed, the member 36 may function as a decking member, as shown in Fig. 1. Similarly, by turning the member 36, so that the pins 74 lie in a vertical plane, the member 36 may be connected to an adjacent pair of horizontal members, such as 26 and 30, at any desired position of adjustment therealong. Again, with the pins 74 arranged in a vertical plane, the member 36 may be secured at any desired vertical position along any of the opposed pairs of vertical members 44 and 52. The members 36 are thus susceptible of a fine adjustment lengthwise of the car at any of a plurality of locations.

In the modified embodiment shown in Figs. 6 and 7, the supporting structure is formed of a plurality of members 80 which are rectangular in form. Such members 80 have an inwardly directed flange portion 82 which defines a central opening therethrough and also an outwardly spaced and outwardly directed flange 84. The members 80 are secured to the walls 22 by screws or the like passed through openings in the flanges 82. The flanges 84 are formed with the openings 60 therethrough. The members 80 are disposed on the wall 82 in spaced relation to each other to provide spaces 86 therebetween. Thus the members 36 may be mounted on the members 80 at suitable locations by disposing the pins 74 within the proper opening 60 in flanges 84.

In the embodiment of the invention shown in Figs. 8, 9 and 10, the supporting structure associated with the side walls of the car is again arranged to define a rectangular grid pattern. In this instance, the supporting structure is constituted by a series of spaced uprights 100, which in accordance with the invention may and preferably do constitute the upright posts which form part of the car structure. In accordance with the invention described in the aforesaid copending application Serial No. 740,330, these posts 100

may, if desired, be provided with reinforcing elements to further strengthen them and better enable them to sustain the substantial vertical loads to which freight loading structure of the present type is subjected. To simplify the present drawings, such reinforcing structure is not shown. As illustrated, the uprights 100 are conventionally formed as outwardly presenting channel members having webs 102, flanges 104 and auxiliary flanges 106. The outer paneling 108 of the car may be conventionally secured to the auxiliary flanges 106, as will be understood. The horizontal parts of the supporting structure are constituted by outwardly presenting channel members 110, which, except for their horizontal disposition, may and preferably do correspond in construction and in their method of attachment to the previously described members 56. Thus the outer surfaces of the webs of the members 100 and 110 lie in substantially flush relation. As in the previous embodiments, the just-mentioned webs are provided with a series of perforations 112, which correspond in function and arrangement to the previously described openings 60, and which similarly cooperate with the freight holding elements.

It will be noticed that the present arrangement is particularly advantageous in that the supporting structure for the freight holding elements does not extend inwardly of the car any further than the inner surfaces of the upright side posts of the car. Accordingly, the present arrangement does not reduce the usable space within the car.

A further feature of the present embodiment resides in the provision of relatively light lining panels 114, the backs whereof may be provided with suitably distributed furring strips 116, by which the panels 114 may be secured within the individual bays. In accordance with the arrangement described and claimed in the aforesaid copending application Serial No. 740,330, the outer surfaces of the lining panels 114 may lie substantially flush with the outer surfaces of the webs of the supporting members 100 and 110. Alternatively, these panel surfaces may be disposed slightly outwardly of the web surfaces or slightly inwardly thereof. The last-mentioned arrangement is preferred. The lining panels afford, with the webs of the supporting structure, a substantially uninterrupted surface for engagement by the freight articles.

It will be appreciated that in erecting the present embodiment, the usual car lining is first removed so as to expose the upright posts 100, after which the horizontal members 110 and the lining panels 114 may readily be secured in place.

As thus far described, the cross bars 36 are freely removable (except to the extent that they are restrained by the chains 32 to give an optionally usable pilfer-proof movable mounting) from the wall-mounted, vertically and horizontally extending supporting members. In accordance with certain further aspects of the invention, the arrangement is such that the cross bars may be guided for movement along the supporting members from one position of adjustment to another and wherein further a cross bar, while so guided, can be transferred from one vertical or horizontal supporting member to another. This feature makes it possible to make the bars optionally removable from the supporting members at any point, to make them always removable only at certain specifically constructed points, or removable only at such certain points by the use of special

tools, or to make them entirely nonremovable and pilfer-proof. The grid structure of Figs. 6 and 7 can be used with modified cross bars so as to achieve the aforesaid features of transferability and desired degrees of nonremovability. Various forms of the improved resulting combination are shown in Figs. 11 through 15.

Referring first to Figs. 11 and 12, a portion of a grid structure is illustrated as being secured to and forming a part of one car side wall 22. It will be appreciated that this pattern is duplicated at the opposite side of the car, and that the resulting pair of supporting structures may extend from one end of the car, past a plurality of the usual side posts (such as 100, Fig. 8) to the doorways, a similar pair being provided at the other end of the car in vertically aligned relation. Each supporting structure is composed of rectangular members 80, constructed as described with reference to Figs. 6 and 7, and it will be noticed that the spaces 86 define narrow slot-like entrances to wider recesses 120, which are bounded by the car side wall 22, the webs 122 of members 80, and the flanges 84 of such members. These recesses and slots, which run both vertically and horizontally, and all of which openly communicate with each other, are utilized in the present embodiments to provide the aforesaid feature of transferability and where the slots are narrower than the recesses they act, as described below, to prevent removal of cross bars.

In the present embodiment various different forms of cross bars may be utilized. Wide and narrow bars 126 and 128, respectively, are illustrated. These bars may duplicate bar 36 in so far as the general structure and the arrangement of pins 74 is concerned. However, bars 126 and 128 are each provided, at each end, with a centrally disposed retaining head 130, which is joined to the corresponding end of the bar by a somewhat smaller neck 132. The necks 132 have relatively loose fits in the slot-like entrances 86, and the heads 130, though smaller than the recesses 120, are larger than the entrances 86. Like the pins 74 the necks 132 are long enough, and the recesses 120 are deep enough to accommodate both variations in width of freight cars and weaving motions of the car sides in transit.

In the embodiment now being described, it is desired that the bars shall be entirely nonremovable from the supporting members, except at certain selected points in the car, and by the use of special tools. To accomplish this, one of the members 80 at each end of the car is provided with a notched out area 136 which is normally closed by a removable cover plate 138. Plate 138 may normally be held in place by retaining studs 140, which may be of a type which require the use of special tools (analogous to a key for a lock) in moving or applying them. The notches 136 at opposite sides of the car are, of course, located in aligned relation so that, by removing the corresponding plates 138, the heads 130 at the opposite ends of a bar 128 may be readily inserted into the recesses 120. All of the bars to be utilized at a particular end of the car are, of course, inserted at the same point.

If complete nonremovability is desired, the plates 138 may, of course, be nonremovably secured in place. If freely optional removability is desired, but at only certain points in the car, the plates 138 may be omitted. Finally, if freely optional removability is desired at many points in the car, a corresponding number of notches 136 may be provided, or, alternatively, the heads 130

on the cross bars 128 may be omitted and the necks 132' may be made retractable in the manner shown in Fig. 13.

In certain of its broader aspects, the foregoing arrangement is characterized by a slidably supported, and if desired, nonremovable embracing or male and female engaging relation between the ends of the cross bars and the supporting and guiding members extending horizontally and vertically along the car side walls. In the embodiments illustrated, the cross bar ends are received and are embraced by the guiding and supporting members.

Because of the communicating nature of the slots 86, it will be understood that a particular cross bar, with its holding pins 74 retracted, can be freely moved, while guided, to any desired position on the corresponding grid-like supporting structure so as to permit it to be located in any desired position lengthwise or vertically of the car. Having been so moved also, either a wide or narrow cross bar can be secured in place at the desired position by inserting the pins 74 in co-operating pairs of holes 60. With the illustrated narrow bars 128, the pins 74 are inserted in aligned holes at opposite sides of a slot 86, to horizontally or vertically position the bar, depending upon whether the bar is located on a horizontal or vertical run. With the side cross bars 126 the pins 74 are more widely spaced and these bars may be vertically positioned on vertical runs, or horizontally positioned on horizontal runs.

The aforesaid features of guided transferability and partial or complete nonremovability may also be readily incorporated into structures of the type shown in Figs. 1 and 8, which arrangements are illustrated in Figs. 14 and 15, respectively. In Fig. 14, each side of each end section of the car is provided with a plurality of horizontally extending supporting members 140 which may be located at desired elevations on the car wall, and secured thereto in the previously described manner so as to form a part of and reinforce the side wall structure of the car. Successive pairs of continuous horizontals 140 are interconnected by correspondingly shaped but shorter, vertical members 142, which may also be secured to and form a part of the side wall structure of the car.

Members 140 and 142 are illustrated as being of Z section, the members 140 at intermediate levels, and the members 142 at intermediate positions lengthwise of the corresponding end section of the car, being arranged in opposed pairs, so as to define narrow guiding slots 86 between the opposed edges of the flanges 144 thereof. As before, the narrow slots open into wider retaining recesses 120.

So far as the arrangement of supporting members is concerned, the arrangement of Figure 15 duplicates that of Figure 14, with the exception that, in Figure 15, the verticals 150 are continuous, being located at desired spacings horizontally of the car, and the horizontals 152 are short sections, and serve to span the space between verticals.

In both Figures 14 and 15, communication between the vertically and horizontally extending slots 86 is achieved, at junctions between horizontals and verticals, by notching the flanges and webs of the continuous members, as will be seen.

In each of the embodiments of Figures 11 through 15, it is desired that both the horizontals and verticals be arranged to support the cross bars such 126 and 128, at desired positions both horizontally and vertically of the car. Accord-

ingly, both the horizontals and the verticals are provided with the pin receiving openings 60. In all these embodiments, also, the inner faces of the vertically and horizontally extending supporting members are substantially flush with respect to each other, thereby eliminating freight engaging protuberances. As illustrated in Figure 15, the rectangular spaces defined by the horizontals and verticals may, if desired, be filled with buffer panels 114, the inner faces of which may and preferably do extend slightly inwardly of the car from the faces of the horizontals and verticals. With this arrangement, which also may be utilized in Figures 11 and 14, the entire side wall surfaces of the car are free of freight engaging protuberances, and have the major part of their areas buffered with wood panels.

Considering now the belt line aspects of the systems of Figures 11 through 15, it will be noticed that each of these embodiments provides a series of horizontally disposed supporting members, the members of each series being arranged at desired elevations on the car wall. In each of these embodiments the verticals, which afford the transfer routes from one horizontal level to another, are illustrated as being relatively closely spaced. In the broader aspects of the invention if only a small number of vertical transfer routes are desired, the number of verticals may, of course, be reduced, and in such cases, the continuous horizontals of Figure 14 are, of course, preferred.

Further, in connection with cars of the belt line type, the structure of Figure 14 has certain additional important advantages resulting from the use of the continuous horizontal members. These members, it will be noted, permit a direct load transfer along the members, so that when freight is wedged in place, as by the cross bars, the wedging load is directly transmitted, through the horizontals, to the entire side wall structure of the car, or, depending upon the nature of the connections between the horizontals and the car side walls, or the relative resistance to elongation, under tension of the car side walls, part or even all of the several bracing loads applied to these horizontals, from several cross bars, will be carried in tension through the horizontals back to the end of the car, since conventionally, the car is loaded from the end to the center and the several parts of the load are successively braced toward the car-end as the loading progresses.

Similarly, and employing the arrangement shown in Figure 15, the vertical guiding and supporting members 150 may be continuous and extend past a plurality of short similar horizontal members 152 having communicating recesses and slots. This arrangement is preferred in cases when decking loads are of greater importance, and here the vertical loads are carried in compression by uninterrupted or continuous vertical members 150.

Although only several specific embodiments of the invention have been described in detail, it will be appreciated that various modifications in the form, number, and arrangement of parts may be resorted to without departing from the spirit and scope of the invention.

What is claimed is:

1. In a freight car loading system for a freight car or the like, in combination, means on and extending along the car side walls defining a series of vertically spaced, horizontally extending paths and a series of horizontally spaced vertical paths intersecting and in open communication with said horizontal paths, said vertical and

horizontal paths comprising elongated recesses having continuous narrow slot-like entrances opening only into the freight car interior and having their interiors wider than their said entrances.

2. In a freight car loading system for a freight car or the like, in combination, means on and extending along the car side walls defining a series of vertically spaced, horizontally extending paths and a series of horizontally spaced vertical paths intersecting and in open communication with said horizontal paths, said vertical and horizontal paths comprising elongated recesses having continuous narrow slot-like entrances opening only into the freight car interior and having their interiors wider than their said entrances, at least certain of said path forming means being provided with engaging elements for cooperation with freight holding cross bars in releasably securing said bars in freight supporting positions.

3. In a freight car loading system for a freight car or the like, in combination, means on and extending along the car side walls defining a series of vertically spaced, horizontally extending paths and a series of horizontally spaced vertical paths intersecting and in open communication with said horizontal paths, said vertical and horizontal paths comprising elongated recesses having continuous narrow slot-like entrances opening only into the freight car interior and having their interiors wider than their said entrances, at least certain of said path forming means being provided with engaging elements for cooperation with freight holding cross bars in releasably securing said bars in freight supporting positions, and one or more said cross bars extending between and supported by said path forming means, said cross bars having holding elements for cooperation with said engaging elements, to effect said securement of said bars.

4. In a freight car loading system for a freight car or the like, in combination, means on and extending along the car side walls defining a series of vertically spaced, horizontally extending paths and a series of horizontally spaced vertical paths intersecting and in open communication with said horizontal paths, said vertical and horizontal paths comprising elongated recesses having continuous narrow slot-like entrances opening only into the freight car interior and having their interiors wider than their said entrances, the horizontal path forming means having a plurality of relatively closely spaced cross bar engaging means therealong and between each pair of vertical paths.

5. In a freight car loading system for a freight car or the like, in combination, means on and extending along the car side walls defining a series of vertically spaced, horizontally extending paths and a series of horizontally spaced vertical paths intersecting and in open communication with said horizontal paths, said vertical and horizontal paths comprising elongated recesses having continuous narrow slot-like entrances opening only into the freight car interior and having their interiors wider than their said entrances, the grid spaces defined by said intersecting paths being provided with buffer panels the surfaces whereof are spaced, inwardly of the car, from the plane which includes said path forming means.

6. In a freight loading system for a freight car or the like, in combination, means on and extending along the respectively opposite car side

walls forming a series of vertically spaced horizontally extending guiding and retaining paths and a series of horizontally spaced vertically extending guiding and retaining paths, the paths of said second series intersecting and communicating with the paths of the first series and said paths at opposite sides of the car being in opposed aligned relation, freight holding cross bars having means at each end to engage said path defining means, one of said bar-end means or said path forming means being formed to slidably embrace the other means to provide a transfer of a said cross bar from a horizontal to a vertical path or vice versa while the bar is guided for sliding motion and retained against removal by said embracing relation.

7. In a freight loading system for a freight car or the like, in combination, means on and extending along the respectively opposite car side walls forming a series of vertically spaced horizontally extending guiding and retaining paths and a series of horizontally spaced vertically extending guiding and retaining paths, the paths of said second series intersecting and communicating with the paths of the first series and said paths at opposite sides of the car being in opposed aligned relation, freight holding cross bars having means at each end to engage said path defining means, one of said bar-end means or said path forming means being formed to slidably embrace the other means to provide a transfer of a said cross bar from a horizontal to a vertical path or vice versa while the bar is guided for sliding motion and retained against removal by said embracing relation, and additional means on said bar ends and on said path defining means for releasably locking a said cross bar in load supporting position along said path.

8. In a freight bracing and/or decking system for a freight car or the like, the combination of means forming, in opposed aligned relation on opposite side walls of the car and rigidly secured to and forming part of the strength structure of said side walls, a pair of sets of supporting members, each set comprising a series of parallel horizontally spaced vertically extending members and a series of parallel vertically spaced horizontally extending members, the members of one series being continuous and extending between the ends of members of the other series, and a plurality of closely spaced cross bar holding means along each member of said one series and between adjacent members of the other series.

9. The structure of claim 8 in which the members of the non-continuous series are relatively short and are connected in intersecting abutting relation with the members of the other series.

10. The structure of claim 8 in which the surfaces of the members of both series which face the interior of the car are substantially flush with each other to eliminate freight engaging protuberances.

11. The structure of claim 8 in which the horizontally extending members are continuous and run from one end of the car to the central door opening to transmit stresses throughout their entire length.

12. The structure of claim 8 in which the horizontally extending members are continuous and run past a plurality of upright members forming part of the car sides to transmit stresses throughout their entire length.

13. The structure of claim 8 wherein the spacing between successive ones of said vertically ex-

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tending members is substantially equal to the space between the successive ones of said horizontally extending members.

14. The structure of claim 8 wherein the open spaces defined by and lying between said vertically and horizontally extending members are provided with buffer panels the surfaces whereof are spaced inwardly of the car from the plane of said members.

15. In a freight loading system for freight cars or the like, the combination of a plurality of elongated support means in opposed aligned relation on opposite side walls of the car and rigidly secured to and forming part of the strength structure of said car side walls, said support means being parallel, horizontally extending and vertically spaced with respect to each other, said means extending substantially from an end to adjacent the center of the car and having relatively closely and uniformly spaced cross bar securing means throughout their lengths, freight holding cross bars having at each end means to engage said support means in embracing relation for guided slidable support thereon and means to selectively securingly engage said securing means, and means secured to said car side walls permitting a slidable transfer of a cross bar from one level of support means to another with its ends guided during said transfer.

16. The structure of claim 15 in which the said embracing relation prevents a removal of said cross bars from said support means.

17. The structure of claim 15 in which said support means, said cross bar end means, and said transfer means prevent undesired removal throughout said horizontal adjustment on said transfer.

18. In a freight securing system for freight cars or the like having a plurality of spaced uprights forming part of the car sides, the combination of a plurality of aligned levels of elongated, horizontally extending members extending uninterruptedly past a plurality of said uprights and constructed to guidingly engage and support freight securing cross bars for sliding adjustment therealong and to secure them in adjusted positions, said members being secured to and forming part of the strength structure of said car side walls, and upwardly extending members providing for guidingly engaged transfer of said cross bars from one level to another of said horizontal members, the intersections of said upwardly extending and said horizontal members being constructed and arranged to permit transfer of cross bars from one to the other without removal.

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19. In a freight loading system for a freight car or the like having opposite side walls, the combination of a series of vertically extending and a series of horizontally extending support members attached to the opposite side walls, said vertical and horizontal members cooperating to form a grid structure, and means formed on at least some of the members for engaging and supporting freight holding members whereby said grid structure serves as a supporting structure for freight in the freight car.

20. The invention set forth in claim 19 wherein the side walls are formed by panels secured to said members and said grid structure thus serves as the supporting structure for the side walls.

21. In a freight bracing and/or decking system for a freight car or the like, the combination of means forming, in opposed aligned relation on opposite side walls of the car and rigidly secured to and forming part of the strength structure of said side walls, a pair of sets of supporting members, each set comprising a series of parallel horizontally spaced vertically extending members and a series of parallel vertically spaced horizontally extending members, the members of one series being continuous and extending between the ends of members of the other series, a plurality of closely spaced cross bar holding means along each member of said one series and between adjacent members of the other series, and a plurality of freight holding cross bars extending across the freight car and having their ends supported by corresponding ones of said members at opposite sides of the car, said cross bars having holding means to engage said first-mentioned holding means to support the bars in desired positions of adjustment and being further constructed and arranged so that while they are adjustable along said members, they are not removable therefrom.

22. The structure of claim 21 wherein said horizontally and vertically extending members are provided with recesses which non-removably receive engaging elements carried by said bars, to effect said non-removable relation.

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REFERENCES CITED

The following references are of record in the file of this patent:

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