

Oct. 14, 1952

S. M. NAMPA

2,613,615

FREIGHT LOADING

Original Filed March 12, 1942

5 Sheets-Sheet 1

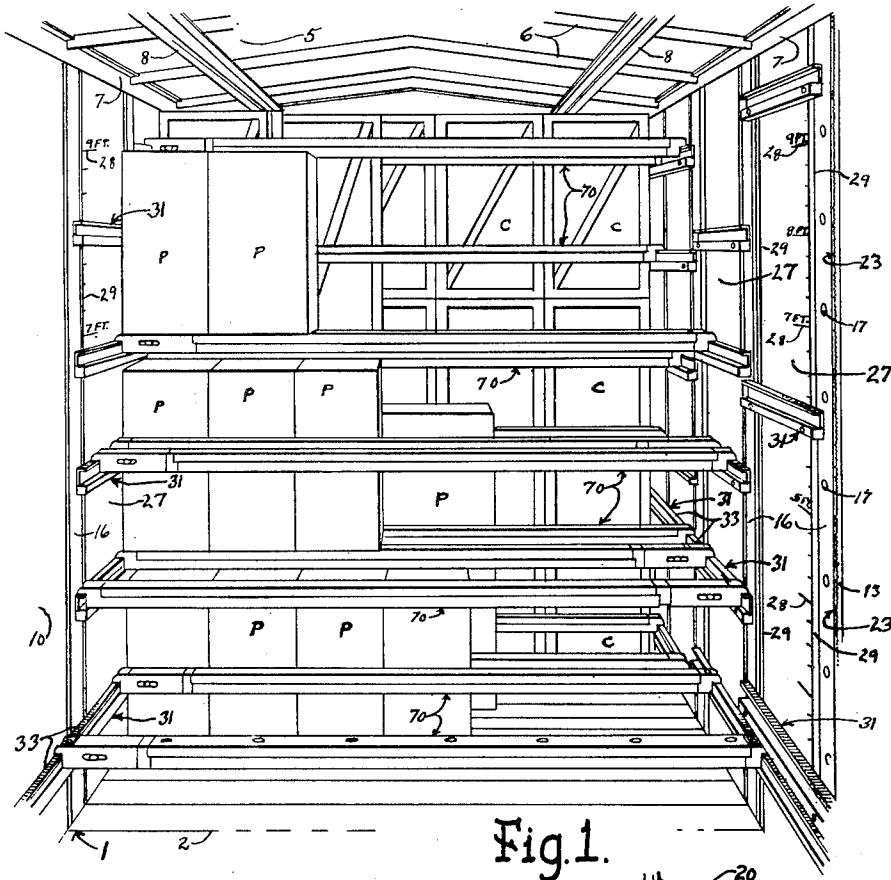


Fig. 1.

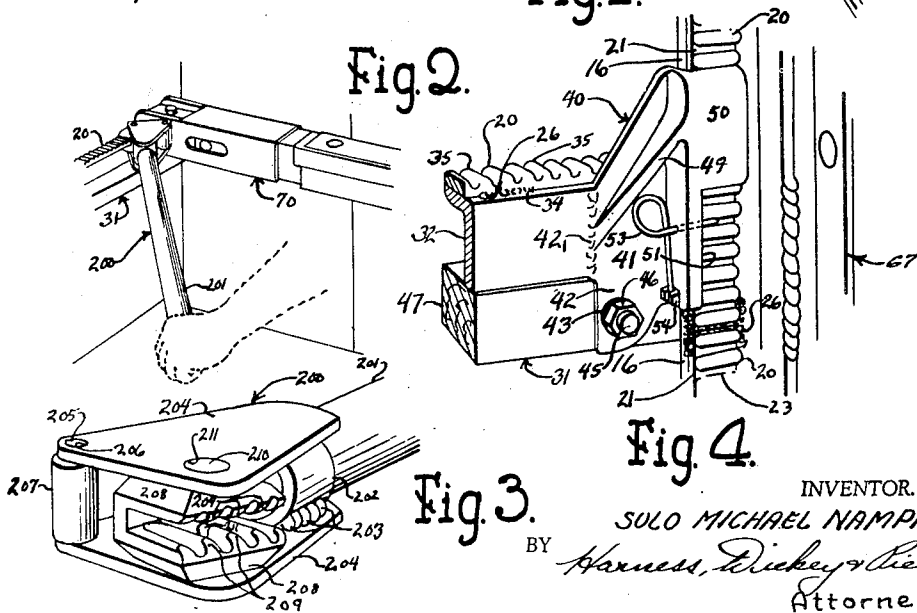


Fig. 2.

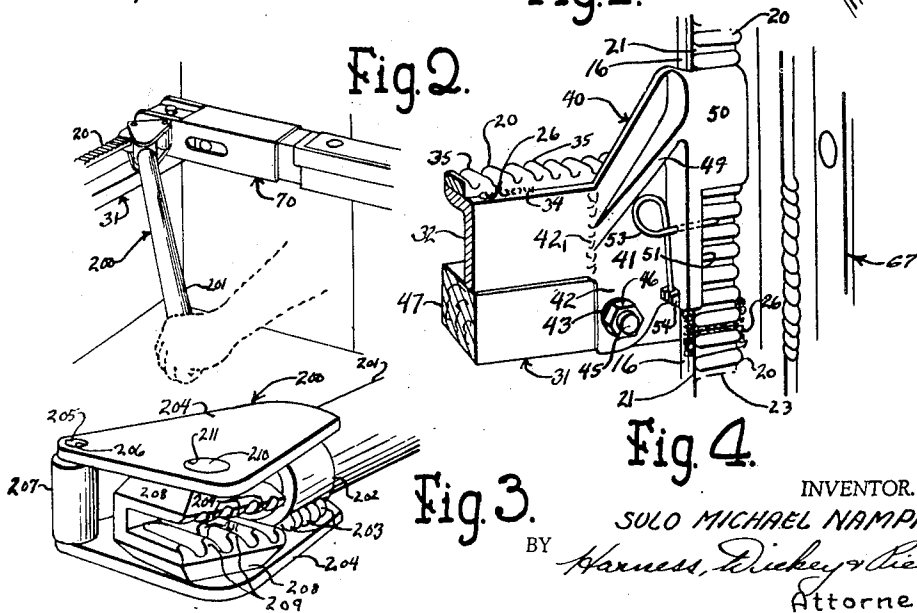


Fig. 3.

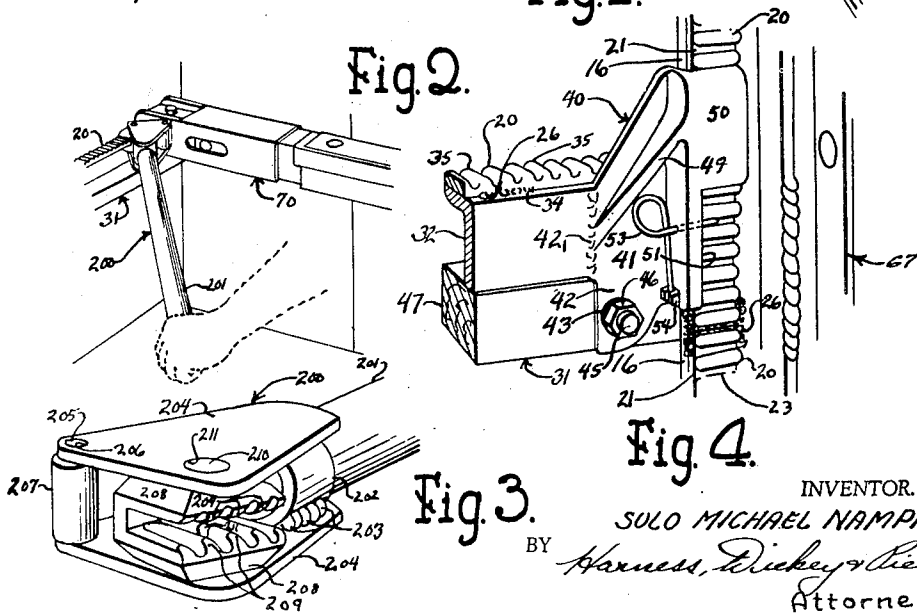


Fig. 4.

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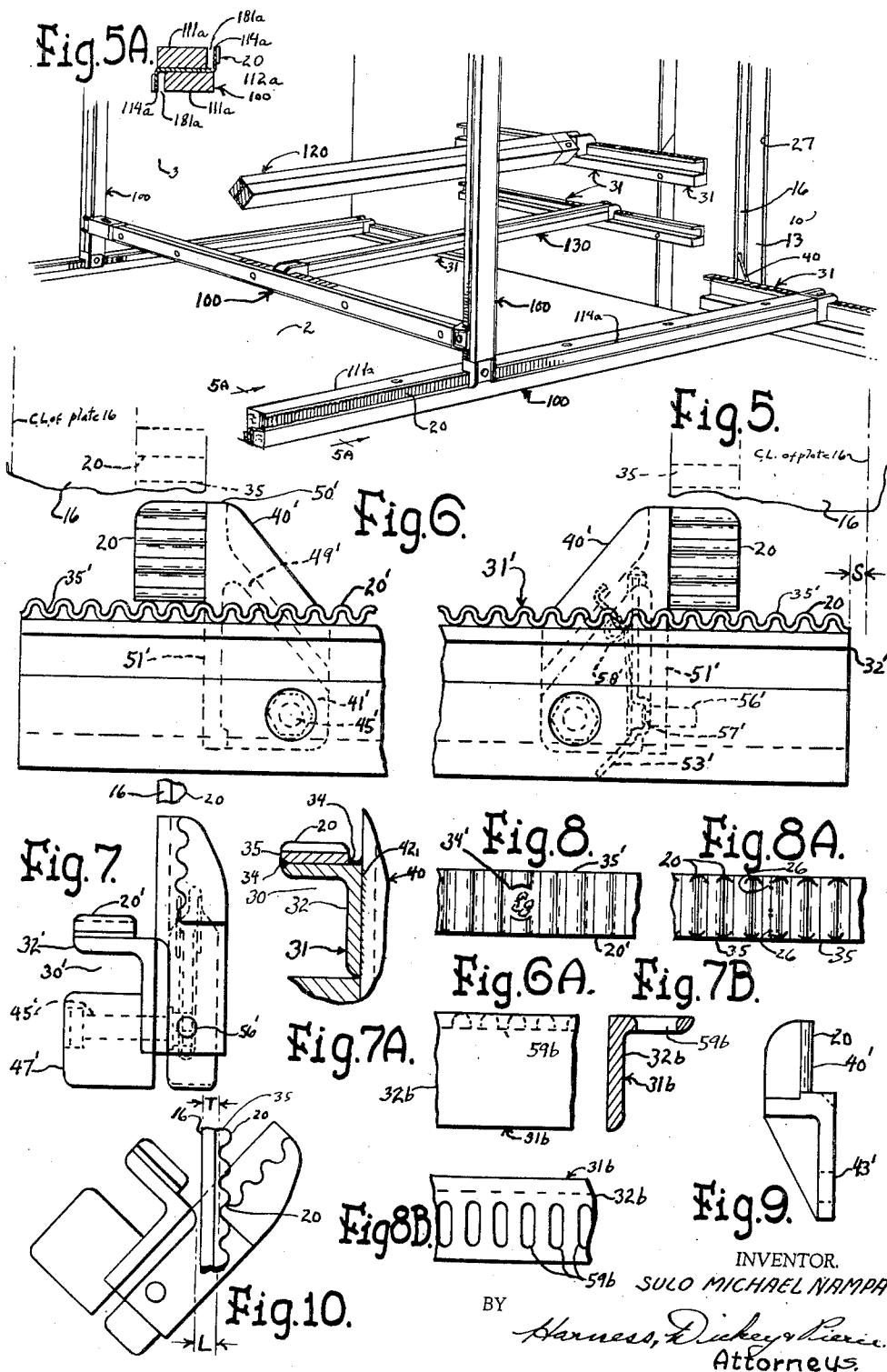
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5 Sheets-Sheet 2



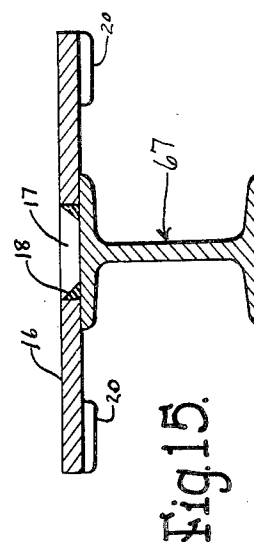
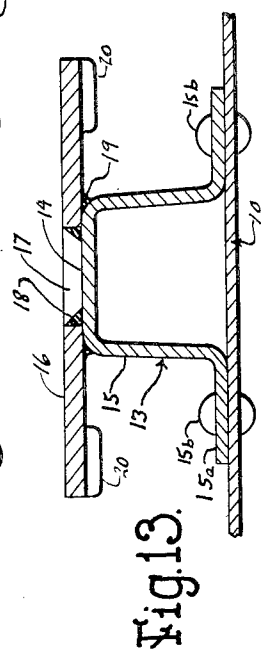
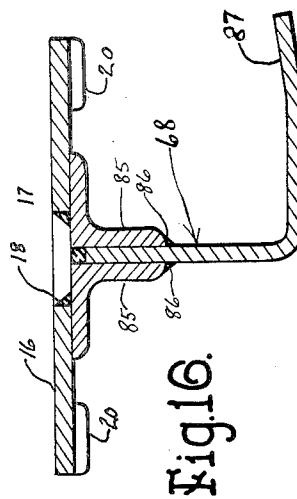
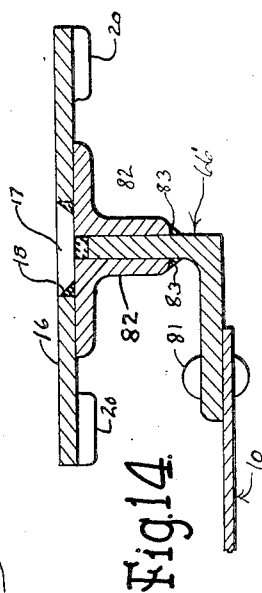
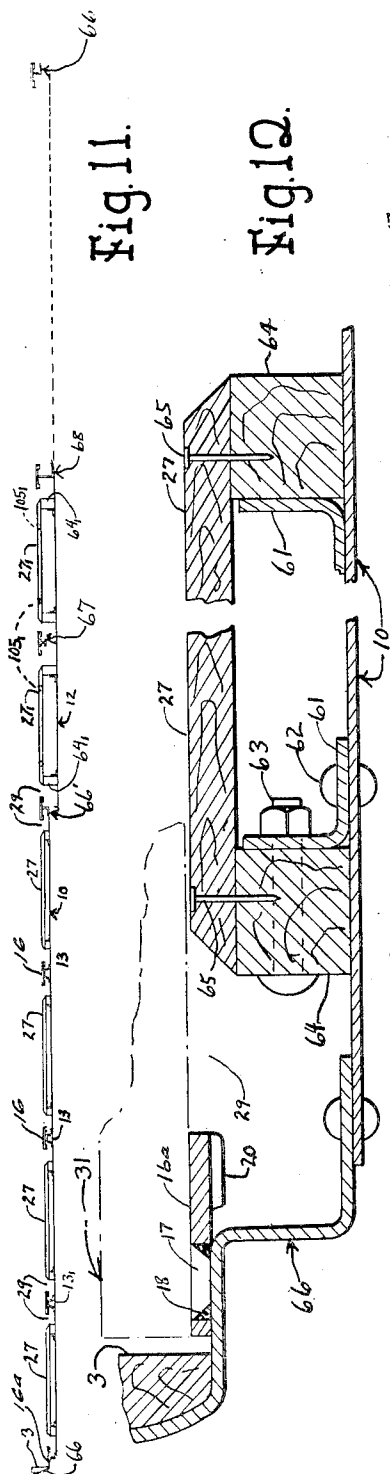
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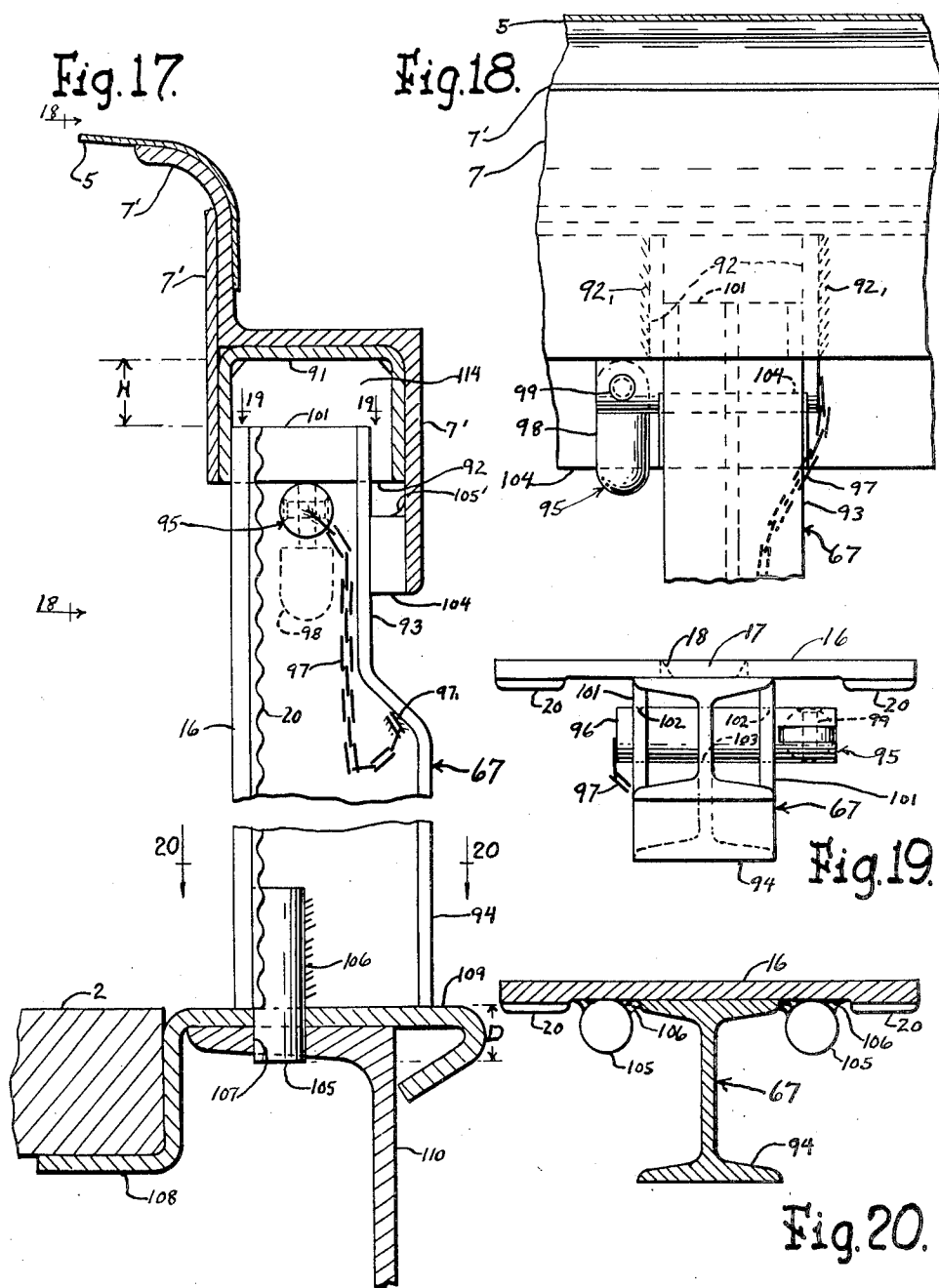
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5 Sheets-Sheet 4



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5 Sheets-Sheet 5

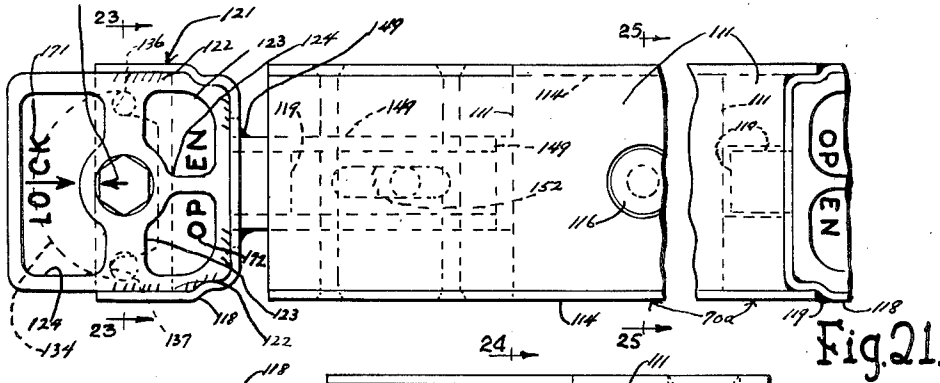


Fig. 21.

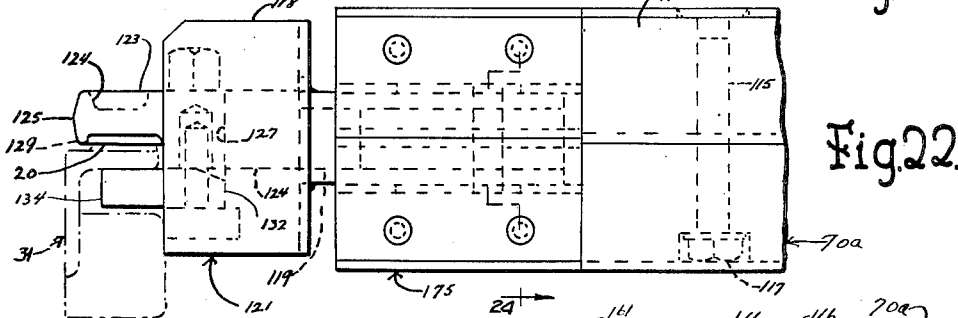


Fig. 22.

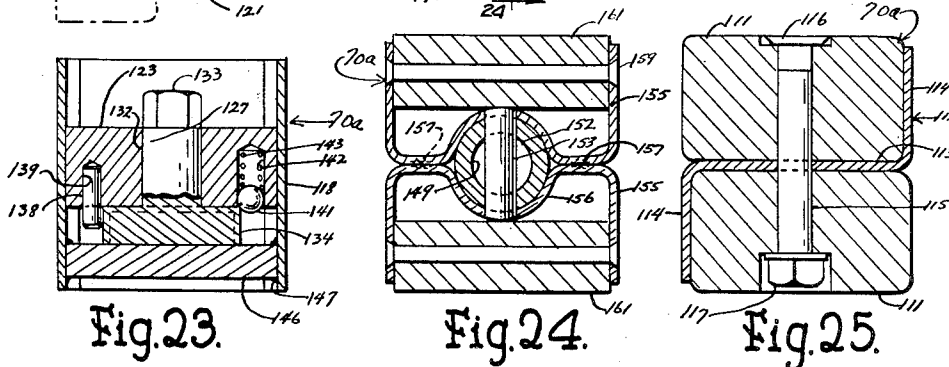


Fig. 23.

Fig. 24.

Fig. 25.

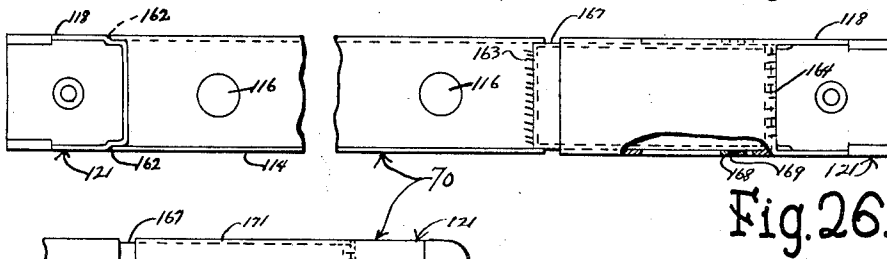


Fig. 26.

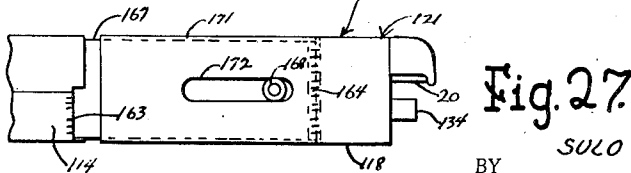


Fig. 27.

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UNITED STATES PATENT OFFICE

2,613,615

FREIGHT LOADING

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poration of Delaware

Original application March 12, 1942, Serial No.
434,357. Divided and this application February
3, 1945, Serial No. 576,051

22 Claims. (Cl. 105—369)

1

This invention relates to improved loading apparatus adjustable and widely adaptable to hold freight articles of different types in vehicles or storage spaces, and more particularly to improved equipment of this nature built into or combined with a vehicle, such as a railway freight car, to hold (that is, to brace, support or carry, space, wedge, or to provide shelves, partitions, or bins for) a wide variety of packages or parts during shipment.

The present application is a division of applicant's copending application Serial No. 434,357, filed March 12, 1942, now abandoned but, prior to abandonment, replaced by a continuation application Serial No. 740,330, which has issued into Patent No. 2,519,846.

An object of my invention is to provide apparatus or equipment of the type described above, which is advantageously combined with the structure of a railway freight car (although it will be understood that this or similar equipment may be used in other vehicles or spaces), to be of minimum practical weight and cost and yet be sturdy enough for all service demands.

Another object is to provide such equipment so that the several portions to be adjusted may be released, moved to their new positions, and re-locked or fixed with a minimum in effort and without extensive tools or special equipment. More particularly, it is desired here to use a double tilting motion comprising a new method for removing or adjusting certain of the members.

Another object is to provide equipment of this type which is strong and also low in cost and weight because of the use of tooth-like projections to form the engaging portions to hold the several parts in adjustment, and, more particularly, to permit a very close spacing (of the order of $\frac{1}{2}$ inch) between adjusted positions, moving vertically or horizontally, this to be achieved by the above teeth.

Another object is to provide an improved removable freight bracing structure for the car doorways.

Other objects of this invention will become apparent from the following specification, the accompanying drawings, and the claims hereinafter set forth.

For a better understanding of the invention, reference may be had to the accompanying drawings forming a part of the specification, wherein:

Figure 1 is a perspective view looking into one end of a partly loaded freight car equipped with the present invention;

2

Fig. 2 is a perspective view showing the use of a preferred wedging tool to exert powerful leverage in manually adjusting the ends of the cross bars longitudinally;

Fig. 3 is a perspective view of the other end of this same tool;

Fig. 4 is a side or partly perspective view looking in through the door opening at one end of a side bay member or horizontal side member in place;

Fig. 5 is a perspective view generally like Fig. 1, but showing special vertical bars and horizontal bars forming part of a central longitudinal partition for bins, or the like, and also a rotatable or tiltable cross bar in the foreground;

Fig. 5A is a section taken on the line 5A—5A of Fig. 5 and showing the intermediate structure of a modified form of cross bar;

Fig. 6 is a side view of one of the horizontal side bay members;

Fig. 6B is a view similar to part of Fig. 6, showing a second modified form of this bay member;

Fig. 7 is an end view of the bay member shown in Fig. 6;

Fig. 7A is a similar view of a modified form of the bay member of Fig. 7;

Fig. 7B is a view in vertical section of the bay member of Fig. 6B;

Fig. 8 is a plan view of part of the top of the rack on the bay member of Fig. 7;

Fig. 8A is a similar view of a modified form of the top part or teeth of Fig. 8;

Fig. 8B is a plan view of the bay member shown in Fig. 6B;

Fig. 9 is a top view of the hanger portion of Fig. 7;

Fig. 10 is a view similar to Fig. 7, showing the bay member tilted to disengage the two sets of teeth;

Fig. 11 is a schematic partial sectional view of one side of one end of the wall of a freight car equipped with this invention;

Figs. 12, 13, 14, 15 and 16 are enlarged views in horizontal section, based on Fig. 11;

Fig. 17 is a transverse sectional view showing a removably mounted door post;

Fig. 18 is an elevational view taken along the line 18—18 of Fig. 17;

Fig. 19 is a top plan view of the post outside of its holding sockets in the car;

Fig. 20 is a section on the line 20—20 of Fig. 17;

Fig. 21 is a plan view of the cross bar assembly with portions broken away;

Fig. 22 is an elevation of the structure of Fig. 21;

Fig. 23 is a section taken on the line 23—23 of Fig. 21;

Fig. 24 is a section taken on the line 24—24 of Fig. 22;

Fig. 25 is a section taken on the line 25—25 of Fig. 21;

Fig. 26 is a plan view of a modified form of cross bar with a portion broken away; and

Fig. 27 is an elevational view of a portion of the structure of Fig. 26.

Referring to the invention and to the drawings in general, and mainly to Figures 1, 2, 5, 11 and 13, it will be seen that my loading or holding apparatus as combined into the structure of a vehicle, here shown as the conventional type freight car 1, consists fundamentally of spaced elongated members 16 extending along the sides 10 of the car and specifically being uprights which here form a part of 10 by being parts of and stiffening side posts 13, and the like.

These uprights 16 carry an improved form of holding or engaging shapes which are very closely spaced. In this apparatus as built and very successfully operated under many and varied adverse test conditions of service, this spacing is $\frac{1}{2}$ " for the vertical adjustment, and all the other adjustments are of the same pitch or module. Yet with this close adjustment and with a relatively light structure there is a high strength, due to the arrangement of the holding means as projections or rounded teeth 20 elongated parallel to the car length and normal to the main loads thereon, and due to the use of such projections here in lieu of holes or openings. The uprights 16 thus carry hanging side bay members 31 by an improved and simple organization operated by only two types of tilting to remove or insert members 31 and to change their vertical adjusted positions. No extra latches, or the like, need be relied on to hold or to take loads on members 31.

Members 31 have along their top surfaces a similar form of teeth (or here I may use openings as shown in Figs. 6B, 7B and 8B, although I do not now prefer this last form) and are in turn engaged by a few similar downwardly-projecting teeth on the holding or securing end fittings on the ends of the specially designed cross bars 70. As will be seen, bars 70 rest on the toothed tops of members 31 and may be slid along thereon to any desired adjusted position where the corresponding teeth are engaged and then locked or held against vertical dislodgments (which might occur in the absence of vertical loads on the bars, due to vibrations or vertical bumping of the car) by a means such as a swing-out latch as hereinafter disclosed in detail. This arrangement so that bars 70 rest on members 31, and especially the use of easily curved or rounded teeth, is important since it permits a ready sliding of 70 along members 31 to any desired position without having to lift bar 70 or going through other difficult operations. Even when 70 is pressing against heavy freight, it may be easily wedged, especially by the tool as shown in Figs. 2 and 3.

Note, however, that with bars 70 no extra holding or locking latch is truly essential; or, stated in another way, under normal loads all of the major parts of this organization (i. e., the side bay members and the cross bars) are held in place even more firmly by the normal loads themselves.

As seen in Fig. 5, special types of cross bars 100 are provided (usually in limited numbers for each car) to permit the construction of central

partitions or bins, or the like, since bars 100 carry two rows of teeth and thus can support other bars. Also, the shorter or half length bars 130 are sometimes useful in bridging across only one half of the car width. Particularly in bars 100 or 130, and to a considerable extent in all of the bars, it is quite important that they may be slightly extensible or telescopic between their firmly fixed ends, to thus correct for various dimensions and especially changes or errors in the car widths. Also, the rotatable or tiltable feature of bar 120 is of value in conforming the flat faces of the bar to tilted or angular freight surfaces.

Other advantageous features will be found in the wooden buffer panels 27 and the buffer strips 47 and in the removable door posts and the removable panels 271. Still other advantages will be set forth in the following more detailed description.

It may be noted again that constructions according to the disclosures herein have proved themselves to be quite advantageous in service conditions and that numerous advantages accrue from the particular features taught here. For example, cars with loading equipment for the same general purposes are in use and others have been proposed, but the present invention gives appreciable savings in weight and steel required, in cost, in labor time in loading or unloading, and in less damage to freight due to closer adjustments and tighter and more universally adaptable holding or packing in crates (such as C in Fig. 1), packages (such as P in Fig. 1), and many others.

Among the light or heavy and various shaped articles readily handled have been such things as curved automobile doors, rear axles, storage batteries, refrigerators, stoves, and things in light cardboard cartons. As will be seen, the members 70 may also serve as shelves for multiple decking and as temporary platforms for the loading crews.

The even or horizontal positioning of members 70 is facilitated by the level indicia or level numbers in feet and fractions thereof which are conveniently marked on each edge of each wood panel 27, as shown at 28 in Fig. 1.

Referring more particularly to the drawings (particularly Figs. 1, 4 and 5), the numeral 1 designates a freight car which, as shown herein, may be of the conventional, wide, double door or automobile type. When equipped with the apparatus of the present invention, the car's floor 2 and its wood-lined end walls 3 are not changed, but the conventional roof 5 may be strengthened and stiffened by the arched or inclined cross channels 6—6 welded together at the center of the car and welded to the upper side members 7 of the side wall structure. These channels 6—6 carry the welded-on, laterally spaced trolley rails 8—8 extending the length of the car for handling heavy freight in the car, as is well known in this art.

This automobile type car's side walls 10 have the longitudinally offset double side doors 12, as indicated in Fig. 11. With or without the present apparatus installed, the car is symmetrical or identical end-for-end, so that only one side of one-half of the length of the car is shown in Fig. 11. In installing the apparatus of the present invention in an existing freight car of the general type shown, the changes are in the inner portions of the car's side walls 10 and their doors 12.

5

It should be noted that Figs. 1, 4 and 5 show a somewhat earlier form or a first embodiment of certain of the parts corresponding to Figs. 7A and 8A and in which the teeth on the upright plates 16 and on the side bay members 31 are in the form of relatively short cast strips welded in place.

The conventional wooden inner lining for the side walls, not shown, is removed to expose the upright, inwardly-projecting intermediate side posts 13, which form the main upright strengthening members and roof supports of the car side walls and which in this particular car are in the form of outwardly-opening steel channel type members (see Figs. 11 and 13) having the flat inner portions or webs 14, the side portions 15, and the flange portions 15a suitably secured to the side walls 10 as by the rivets 15b, as shown. These uprights or posts 13 are equally spaced along each side of the car except at the wide openings for doors 12. It is desirable to use existing uprights, such as the posts 13, suitably modified, as the main longitudinally and laterally spaced upright support members of my freight holding apparatus in order to make the useful space within the car as wide as possible and to save additional weight and expense. However, it will be appreciated that although certain features of this invention are peculiarly applicable to and have a particular cooperation with freight car structure, yet most of the features of this invention may be applied not only to many types of freight cars but to other vehicles or enclosures, such as trucks, holds of ships, cargo airplanes, storage rooms, and the like; and the application of apparatus of the general type disclosed herein to other types of side uprights will be apparent from the present teachings. Also, if properly spaced, side uprights are not available or readily usable, it is intended that there will be supplied suitable uprights carrying the two rows of rack teeth, or the like, as hereinafter described in greater detail.

The vertical steel post plates 16a having vertically spaced holes 17 (Fig. 13) are suitably secured to the side uprights of the vehicle, as by being welded at the holes 17, along their other exposed edges, if desired, or to the inner face of the web member 14 of each of the uprights or channels 13, extending from the car floor to its roof. Thus, any rough projections formed by the welds will be countersunk in the holes so that there will be no sharp projections which would tear freight packages.

An important feature of this invention is the provision of a continuous row or series of uniform teeth, projections or corrugations 20 carried in a strong manner by suitable uprights, such as the channels 13 here, and with these teeth facing in a direction normal to the car sides either in or out, but preferably facing outwardly or away from the inside or center of the vehicle or storage space, as shown. As will be seen in the drawings, the teeth are uniformly curved or rounded in cross section and are evenly spaced, as shown, so one set of such teeth will easily fit into another such set and so the thick base portion of each tooth will give a strong securing means. As will be understood by those skilled in this art, teeth of the general type described herein will be materially stronger than perforations in a plate and are not as apt to be torn out as are various shaped holes or perforations. This is particularly true of the teeth along the side uprights 13 and on the corresponding side hangers

6

of the members 31. Also, the use of such projections or teeth will, as a practical matter, permit a lighter structure to be built within the usual cost limitations.

As shown in Fig. 13, plates 16 are materially wider than web portions 14 so that they extend out an equal distance to each side of the side portions 15. Plates 16 carry on their inner surfaces the rack members. In this form the teeth 20 are cast in a plurality of short lengths of cast steel rack bars, which are welded onto the plate 16, as shown. The bars are uniformly arranged end-to-end to each other, so as not to interfere with the uniform spacing of the teeth 20 throughout the entire length of the long rack thus formed, and which rack extends from adjacent the floor to adjacent the roof of the car. As will be apparent, these members 16 not only form a strong support for the teeth 20, but are also integrally united with uprights 13 to materially strengthen the car walls. It will, of course, be understood that these teeth 20 may be formed by forging or by other known methods.

The foregoing arrangement enables use of the short lengths of cast rack bars and requires little initial expenditure in tooling; however, for quantity production it is preferred to integrally form the outwardly-extending holding means or the teeth on the side posts or the side post plates 16, as shown in Figs. 14 to 16, inclusive, in which the teeth 20a (which are of identical form with teeth 20) are formed integral with plate 16a by rolling in suitably formed rolls when the plates are rolled at the steel mill, as will be understood by those versed in this art.

As shown, the plates 16a of $\frac{1}{4}$ " thickness (except at the teeth) have a width in this particular form of 7" and may be suitably secured directly to the inner faces of the web portions 14, for example, by welding 18a at the spaced holes 17 and also at the exposed edges as at 19 (Fig. 13), if desired. Thus, the separate rack pieces are omitted. The teeth 20a are formed much more cheaply and in or as a part of a continuous piece of any desired length so that there is no welding between the teeth from floor to ceiling. It will be apparent that this method and arrangement is not only materially cheaper and stronger but saves an appreciable weight of steel.

In general, it is to be understood that any of the various known or desirable standard structural steel shapes or specially formed shapes may be employed for the normal side posts and the two types of door posts, as well as for the side or bay members and other portions of this organization; and it will be apparent that where this equipment is to be manufactured and installed at the time the car is originally built, it will be economical, if sufficient numbers are made, to have the teeth for the various members initially or originally rolled into the structural steel shapes themselves, instead of being rolled into separate plates like 16a. Of course, the structural steel shapes may be made extra strong to take care of the extra loads, if desired.

Referring to Figs. 1, 11 and 12, the one-piece plywood lining panels 27, which here are of $\frac{3}{4}$ " plywood, are permanently secured to the car walls between the uprights 13 by any suitable means. As shown in Figs. 1, 11 and 12, these wooden lining members 27 have less width than the space between the edges of plates 16 or 16a, as the case may be, to provide a clearance space 29, which is quite important and necessary to permit entry of the tooth-carrying projecting portions of

hangers 40 (Fig. 4) on the ends of the horizontal longitudinally-extending side support members 31 when members 31 are tilted about a transverse axis into their entry or removal position, as hereinafter described.

The inner surfaces of the wooden lining members 27 are, as shown, not quite flush with or are spaced slightly ($\frac{1}{8}$ to $\frac{1}{2}$ inch) outwardly from the smooth inner surfaces of plates 16 to serve as cushioning or buffer surfaces over most of the area of the car sides and thus prevent injury to the freight packages. This outward spacing of members 27 prevents interference with the flat outer surfaces of members 31, which would be apt to occur due to manufacturing inaccuracies or warping if the surfaces were to be made flush originally. If desired, and as an alternative, the intermediate lengths of the outer surfaces of the horizontal side members 31, which would engage the inner surfaces of the wooden lining members 27, may be recessed to form inwardly-projecting surfaces to prevent this possibility of interference and so that the wooden lining members may project inwardly slightly beyond the inner surfaces of the steel plates 16 so that most all freight packages will contact only wood and not steel plates 16a or their corners.

Referring to the modification of Figs. 1 and 4, each of the horizontal side members or the bay members designated as a whole by 31 is formed by standard structural steel angles 32 extending from end-to-end thereof and being of a length nearly equal to the centerline-to-centerline distance of the freight car posts 13 or their equivalents with only sufficient clearance so that they may, if desired, be mounted in an end-to-end horizontal row, as shown at 33 in Fig. 1. The lengths of cast steel racks 35, which may be the same as the previously described rack bars, and which have identical teeth 20, are similarly welded at their edges, as at 34, and end-to-end, to the upper outer surfaces of the short leg of the angle 32, with the exposed weld at the joint 26 recessed in a suitably formed groove between the teeth to prevent rough projections and interference with the proper meshing of the teeth.

Figs. 7A and 8A show this same modification that is shown in Fig. 4. As shown, the cast teeth 20 on members 35 have smoothly rounded ends, as seen in plan view.

It should be noted here that in order to save cost and weight, as discussed in connection with plates 16a, it is quite feasible to form teeth like or identical with teeth 20 integrally rolled into one flange of the structural steel angle itself, thus eliminating the separate rack pieces 35 and the welds, such as the welds at joints 26. Thus the angle of member 31 and its teeth 20 may be formed by suitably formed rolls in the rolling mill, or, if preferred, this angle member with its teeth may be formed by cutting the toothed plate member 16a in half down its longitudinal centerline and bending it into angle form, thus effecting fabrication savings.

Referring again to the modification of Figs. 1 and 4, the structural steel angle 32 has welded to the back or the outer surface of its long leg and near each end thereof two right and left-hand, but otherwise identical, one-piece hanger members (which are preferably drop forged, but may be of suitable cast steel) generally indicated by 40, each having a central flat portion 41 welded at its edges, as at 42', to the back of the long leg of angle 32 and having a down-

wardly-projecting portion 42 with a hole 43 to receive a carriage bolt 45 having nut 46 and with its head countersunk in and securing the rectangular wooden buffer or pad member 47, which projects out even with or preferably slightly beyond the outer surface of angle 32 and its teeth 20 to prevent injury to freight by contact with these metal corners. It will be apparent that wooden buffer members 47 are strongly held but may be readily replaced. In addition, hanger member 40 has a thick integral strength or web portion 49 supporting the tooth-carrying projecting portion 50. The flat side or end portion 51 abuts against the corresponding flat edge surface of the tooth-carrying plate 16 or the corresponding surface of plate 16a to act as lateral stops and to thus prevent lateral movement of side members 31. The teeth 20 are identical with the previously described teeth and are here shown as consisting of four teeth, although five have been found to be a satisfactory number in the designs shown.

These teeth 20 on member 40 are adapted to mesh or engage with any of the outwardly-facing identical teeth 20 on the inside of, or on the flanges formed by, plate 16 on uprights 13 in any desired position of vertical adjustment.

As will appear from Figs. 4, 6, 7 and 10, the teeth 20 on member 40 engaging the similar teeth 20 on uprights 13 are spaced above and outwardly from the outermost surface of the long leg of angle 32 which engages and rests against or is pressed against the outer surface of plates 16 or 16a. As shown in Fig. 10, the distance L between the lowermost inner corner portion of toothed member 40 or the rounded crown of the end tooth 20 (which may act as pivot here during the tilting) and the uppermost portion or corner of the outer surface of the lower or longer leg of angle 32 is appreciably greater than the thickness T of the plate 16 plus the maximum thickness of toothed or rack member 35, so that when the side member 31 is manually tilted about a longitudinally-extending axis, the two sets of teeth 20 come out of engagement with or clear each other.

As will be apparent from Fig. 10, this will permit a very easy manual vertical adjustment of the side members 31 up or down to any desired vertical portion on the uprights 13, it only being necessary to grasp the side member 31 and tilt its inner portion inwardly to the desired vertical position, move 31 to the desired position, and then tilt it back again to engage the teeth 20 on members 40 at each end with the corresponding teeth 20 on uprights 13. Also it will be apparent that the side members 31 may be tilted in substantially the same way as just described and as shown in Figure 10 but with the uppermost outer corner of the angle 32 pushed in to engage the face of plate 16 and so that this corner serves as the pivot point during the tilting. Thus by only a tilting motion or by a pure tilting or rotation the interfitting and interengaging holding members or teeth 20 are disengaged and the member 31 is then in position for free up or down sliding or adjustment along the side posts. No second or other motion would be necessary here in releasing or moving the member 31 to position for adjustment.

Referring again to Fig. 4, considered with Figs. 7 and 10, it will be seen that the weight of the member 31 hangs down from the interengaging teeth 20 and is held against further turning or swinging by the abutting of the outer surface of

16 against 32. This stable member 31 is also held in place by any weight or load applied down on member 31 so that, in general, no additional securing or holding means is required. However, for occasions when there is little load on certain members 31, or to keep them from jumping or vibrating in the moving freight car, I provide a suitable extra latch to prevent 31 from swinging out, such as the simple spring latch comprising spring 53 bent as shown, in which one end projects through a hole in 51 to serve as the latch while the other end is pivotally held between ears 54. This sort of latch may be partly automatic; that is, it will snap in when 31 is swung into engaged position, but the latch must be pulled out to disengage 31.

It will be noticed that Fig. 4 is a view looking in through the open door 12, so that plate 16 is welded onto the movable end door post, as shown in Figs. 11 and 15. However, everything else here looks as it would if the view were from behind the posts 13.

The wedging or leverage tool shown in use in Fig. 2 and in more detail in Fig. 3, and combinations and methods which may be practiced thereby are described and claimed in applicant's copending application Serial No. 475,082, filed February 8, 1943, as a division of the aforesaid patent application Serial No. 434,357. The tool is designated as a whole by the numeral 200 and comprises a suitable handle 201 suitable secured into a short sleeve 202 which is secured as by welds 203 to the side or main frame plates 204. These relatively heavy stiff plates are rigidly spaced apart by these welds and by pin 205 which is secured into holes 206 in each plate and also serves as a pivot of the freely rotatable sliding roller sleeve 207. The forged steel jaw member 208 is generally U-shaped with opposing faces and with two opposed sets of identical curved teeth 209, which are just like and mesh with teeth 20 or 20a. As will be seen, this one tool with its two opposed sets of teeth can be used on the right or left hand sides of the car. The space between the crowns of one of the sets of teeth 209 and the roots of the opposite set corresponds to the thickness of upper or shorter leg of the angle 32 plus the full thickness of rack 35, or the equivalent member. The member 208 is freely pivotally mounted in, and also secured between, plates 204 by pins 210 in holes 211. Note that holes 211 go through 208.

The manner of using the wedging tool 200 is shown in Fig. 2. In this view, a cross bar 70 is supported at its left-hand end upon a previously described wall member 31, and it will be understood that the opposite end thereof may be similarly supported. One face of the cross bar 70 lies against the face *a* of a freight article, and it will be understood that before resorting to the wedging tool 200, the bar 70 may have been manually moved to a position in which it freely abuts the freight article. With the parts thus preliminarily positioned, the wedging tool 200 may be applied to the wall member 31, by fitting the jaw 208 thereof over the toothed portions of the wall member 31. This brings one series of teeth 209 into meshing engagement with the teeth 20 and brings the other series of teeth into abutting relation, or immediately adjacent, the underside of the flange on which the teeth 20 are supported. Preparatory to this operation, the jaw 208 is rotated relative to the handle 201 so that, when the jaw is applied, as aforesaid, the handle 201 is spaced at a relatively wide angle

from the cross bar 70, and the roller 207 is in abutting engagement with the bar 70. Thereafter the handle 201 may be forced in a counterclockwise direction, as viewed in Fig. 2, which action causes the roller 207 to roll along the face of the bar 70 from its initial point of engagement to a point nearer the end thereof. During and by virtue of this movement, the bar 70 is forced toward the freight article, causing a take-up of any space between it and adjacent articles, or between it and the end of the car or an associated bulkhead. If one such advancing movement of the handle is not sufficient to take up all of the space, it will be appreciated that the tool may be removed and re-applied to the wall member 31 at a point further therealong. In most cases the user will find it convenient to retain the tool in its wedging position until after the locking member 134, associated with the bar 70, and described below, has been turned into the locking position.

Referring again to the side or bay members, such as 31, I have described above, in connection with Figs. 4, 7A, 8A and 10, a first form using the welded-on cast rack strips and with other details being somewhat different. The general form of this member 31 is, of course, otherwise the same as the second and preferred form of bay member 31¹, as shown in more detail in Figs. 6, 7, 8 and 9.

In this preferred modified form the most important differing feature is the formation of the rack or teeth 35¹ extending along the top surface of the angle 32¹ by a single, continuous, long strip of corrugated steel, or the like, as shown in Figs. 6, 7 and 8. This corrugated tooth-forming strip has teeth 20¹ which are of the same cross-sectional shape as teeth 20, but (as shown in Fig. 8) they do not have the rounded edge since this would be difficult to form with the corrugating rolls and is not essential here. In all of these embodiments, these teeth 20 and 20¹ have been made 1 1/8" long. As indicated at 34¹ (Fig. 8) the strip 35¹ has, at suitably spaced intervals of a few inches, flat or recessed portions formed in an upwardly-projecting tooth to give a flat area for the weld 34¹ and thus firmly secure the strip 35¹ to the angle 32¹. As will be apparent, this weld 34¹ will be within the contour of the tooth and will not interfere with proper meshing of the teeth. This strip 35¹ may, of course, be had in strips as long as desired and can be readily cut off to proper lengths. This arrangement produces a strong and yet very cheap set of teeth for an organization of this sort, and it will be apparent that it may, if desired, be used to replace the teeth of the other toothed portions of this whole organization.

As will be seen in several figures, this second form of bay member has the same type of teeth 20 carried on the projecting portion 50¹ of the hanger member 40¹, which is generally similar to hanger 40 although it differs somewhat in shape, as indicated below. Here the angle 32¹ has a longer depending leg which extends down into a cut-out recess in the buffer strip 47¹, to which it is bolted by similar carriage bolts 45¹ with recessed heads as shown. Accordingly, the depending portion 41¹ of the hanger is slightly longer, although the portions 49¹ and 51¹ are otherwise of generally similar shape. This hanger member 40¹ is secured to the angle by welds in the same fashion as shown in Fig. 4, and one or both of the hanger members 40¹ may

have a spring-pressed latch with operation generally similar to that described with respect to Fig. 4. However, its structure is slightly different in that the spring 53¹ is bent and shaped as shown and holds and biases the plunger 56¹ to which the intermediate portion of the spring 53¹ is secured. The upper end portion 58¹ of this spring is suitably anchored to the hanger; for example, by being held in a hole through web 49¹. The shape of the hanger member 40¹ is made clearer by a consideration of Fig. 9.

A third form or modification of this bay member is indicated as a whole by 31b in Figs. 6B, 7B and 8B, which show only the features which are different from the disclosure of Figs. 6-9. Here the row of closely spaced holding means along the top of the angle 32b is formed by pierced openings 59b or slots which may extend partly or all the way through the top of the angle, as shown. Preferably, these slots are punched all the way through by a multiple punch on 1/2" centers to give the same pitch as mentioned above. It is important that these openings 59b have rounded ends and filleted or rounded edges, as shown. It will be understood that the downwardly-projecting teeth 20 on the ends of the cross bars 76, or the like, will mesh with these openings. If necessary, the projecting portion which extends over the outside edge of the teeth along the members 31 may be modified to reach over the outside edge of the angle 32b.

Figs. 11-16 show the arrangement of the several types of modified side posts in the freight car structure. Somewhat schematic Fig. 11 shows a plan view of one end of one side of the freight car in which the usual metal outer side wall 10 is braced by the intermediate side posts 13¹, 13², 13³.

Figs. 11 and 12 show a member 66 forming part of the end wall of the car and having the car's wooden end lining 3 secured therein. Plate 16a is cut or may be specially formed to provide a plate 16a of lesser width which is secured by welds 18a in holes 17a to member 66 to provide only one row of teeth 20a which are engaged by the corresponding teeth on the ends of dotted-in member 31. The inside car walls have been stripped, as previously noted, and suitable clips or angles 61 are secured thereto as by rivets 62 and carry, as by the bolts 63, wooden furring strips 64 of suitable thickness, which in turn carry the 3/4" thick plywood buffer panels 27 secured by suitable means, such as the nails 65. Note the provision of the clear space or slot 29 to permit entry and the tilting for removal of the tooth-carrying portion 50 of the bay member 31. The width of 29 is sufficient to permit 31 to be tilted for removal. It should be noted, however, that if this width were made too small for removal of portion 50 and the members such as 27 (which might be edged with metal along this slot) were put in position after members 31 were in position (or members 31 might be entered through a blocked recess), then it would be impossible to remove members 31 without breaking some parts, and this would make them pilfer-proof.

As shown in detail in Fig. 13, these side posts are here in the form of channels, although it will be understood, particularly by the disclosure of Figs. 14-16, that other forms of structural steel members may be attached thereto, and hence the present invention may be applied to various types of freight car posts. In Fig. 13 the channel 15,

which has been described above, carries and is stiffened by the plate 16a which has the teeth 20a rolled therein as disclosed above, plate 16a being secured by welds 18a partly or wholly filling the holes 17a provided for this purpose. The welds 19 may also be used if desired.

Fig. 14 shows structural steel angle 66' riveted at 81 to wall 10 and forming one of the two similar posts on either side of the wide double doors 12, only one of which is shown in Fig. 11. Angle 66 is stiffened by steel angles 82-82 welded as shown at 83 to carry plate 16a, as disclosed above.

Fig. 15 shows an I-beam 67 which is not a part of the original car structure and which carries the plate 16a, as disclosed above. This I-beam 67a forms a removable tooth or rack-carrying doorway post which may be mounted about in the middle of the openings for one of the doors 12 when the full width of the doors is not necessary and additional loading space is desired. This removable post 67 is disclosed in more detail in Figs. 17-20.

Fig. 16 shows the angle 68 which forms an end of the removable door 12 and has the bent-in portion 87. This angle 68 is modified by the additional angles 85 welded on as at 86 to carry plate 16a in the manner disclosed above.

Thus bay members 31 may be mounted between the modified posts 66 and 67 and between posts 67 and 68 and, in addition, extra long bay members may be mounted between post member 68 and the extreme right-hand post member 66, as shown in Fig. 11, to close the doorway otherwise left open and thus permit full utilization of all space in the car.

In Figs. 17-20 the roof of the car 5 has the side plate or structural member 7, which is secured to structural member 7' forming therewith a downwardly-opening channel-like space whose members are part of the original structure. A suitable length of downwardly-opening channel 91 is secured in this space, as by welding, and this channel 91 has two 1/4" steel web plates 92 secured across this channel 91, as by welds 92₁ to form a rectangular box-like recess to receive the reduced upper end portions 93 of the I-beam posts 67. Note that the width of the inside to the outside of this box-like recess is greater than the corresponding width of the top of the post portion 93.

In addition, the lower depending portion of member 7 has a spacer member 104 of suitable thickness welded thereto, as at 105'. The post's enlarged lower end portion 94 carries two heavy steel pins 105 welded thereto, as at 106, and these pins project downwardly a depth D, as shown in Fig. 17, and are to be received in suitable holes 107 through the threshold plate 108 and the car frame member 110. Numeral 2 shows the wood car floor.

It will be noted that the normally unused height H in this box-like recess 114 is appreciably greater than the depth D. Thus, to put this post 67 into position it is tilted inside the car and its upper end 101 slid into this box-like space 114 so that 101 nearly reaches the top of this space. Thereafter the lower end is moved outwardly until pins 105 drop into holes 107 and the outer surface of post portion 93 abuts against spacer strip 104. Thus all normal downward or outward loads will tend to hold this post in position since it can only move upwardly. To prevent upward movement due to bumps, vibration, or the like, there is provided a heavy steel hinged retainer pin 95 having the main post portion 96

secured against loss by the chain 97 welded to pin 95 and to the post, as at 97'. This retainer has the hinged retainer portion 98 pivoted by pin 99. As will be seen, when in position retainer 95 will prevent upward movement by abutting against the lower portions of welded-in plates 92.

Referring again to Fig. 11, the panels 27₁ which are mounted in two open bays inside the door 12 or in its doorway, are not permanently fastened in place but are removably fastened like post 67. These panels 27₁ may rest against similar furring strip 64₁ but are not secured thereto. Thus it will be seen that the door 12, which when unencumbered can be slid past the post 66 to open it, has the deeper or thicker but otherwise similar furring strips 64, removably secured thereon as by means such as the bolts 63 and brackets 61 used for strips 64 in Figure 12. The removable buffer panels 27₁ are thus supported by but necessarily otherwise secured to the wood strips 64. These panels are removably fastened in the same or similar manner as disclosed in Fig. 18 for post 67; that is, the panels 27₁ are provided at their bottoms with pins 105₁ (Fig. 11) which are received in suitable recesses in the threshold plate of the doorway, and the upper ends of these panels 27₁ are received in the downwardly-opening channel-like space between members 7 and 7' (Fig. 17) and are put in and taken out by a sliding up into a clearance space like member 67. Hinged retainer pins like 95 of Fig. 17 may be provided to prevent vertical dislodgement except that here the pins would come through the panels from front to back. It is thought that since the organization here is the same as Figs. 17-20, additional illustration is not required, as this structure will be quite apparent from this description to those skilled in the art. Here then we have an easily removable doorway closing arrangement providing the removable or movable posts with their holding means for the side bay members 31 and with the removable buffer panels 27 which are removably secured to the car itself at their tops and bottoms but are supported throughout their heights by engagements with the furring strips 64 which are removably carried by the movable door 12 which can always be readily cleared for normal use as a door by removing the panels and the strips 64. It will also be seen that the door 12 (carrying strips 64) is held or locked in exactly fully open position by the bay members 31 when they are mounted between posts 66 and 67 and posts 67 and 68. Note that members 31 between the post 68 carried on and by the movable door 12 and the removably fixed post 67 will lock the door 12 in open position.

Referring back again to Figs. 4 and 6-10, it should be noted that when members 31, 31_a and 31', or the like, are in end-to-end alignment along the car to form a continuous side rack, the end teeth 20, or the like, do not abut; that is, there is a one-tooth skip since there is a space S, as indicated in Fig. 6, between the centerline of plate 16 and the end of member 31', or the like. Thus the accurate positioning of the teeth of adjacent members 31' is controlled by surfaces 51', which can be made quite accurate, and it is not necessary to try to have abutting teeth in adjacent members 31', which would, of course, be difficult manufacturing operations.

Figs. 21-25, inc., disclose one of the more recent preferred forms of cross bar, designated as a whole by 70_a. The intermediate portion of the main length of the bar consists of two similar oak

strips 111 which are here shown about half size. These wooden strips are stiffened and separated by a steel Z-member which may be rolled or bent into shape. Member 112 has the intermediate portion 113 between the wooden strips and the oppositely disposed side flanges 114 which do not extend out to the edges of the strips 111 so that there are two complete faces of the bar 70_a in which there is no exposed metal to injure freight. In the other two places, the metal is either flush with or slightly behind the wooden surfaces. Members 111 and 112 are secured together by carriage bolts 115 having heads 116 and nuts 117 recessed or countersunk in suitable recesses in the wooden members. Jaws or holding units are secured at the respective ends of the bar. The holding unit 121 comprises a generally U-shaped bent steel member 118 shaped as shown. The base portion of the U-member has a stub shaft 119 secured thereto, as by welding. In the middle portion of member 118, welds 122 secure toothed member 125 which is preferably a forging but may be a steel casting.

This member has a stiffening web 123 across its top with an enlarged central portion for the hole 127. The front top portion of this member is recessed as at 124. The lower portion of this recess carries an arrow 171 and the word "lock" to indicate the locking position for the arrow 133₁ on the top of the member 133. The back top portion of member 121 has two recesses 123 separated by the stiffening web 124. The bottoms of these recesses carry the indicia "open," as shown by numeral 172. The lower face of forged member 125 is substantially flat, except for the front portion which has a suitable number (shown here as seven) of teeth 20 formed therein. These teeth are, of course, identical in form to mesh with the other teeth of this organization. It is important that the extreme lower outer edge of member 125 forms a downwardly-projecting hook 129 to engage over the corresponding teeth 20 on member 31. Thus the outer ends of the several teeth 20 are joined together by a rib-like member 123 which, consequently, closes the outer ends of the grooves between the several teeth 20. The rib 129 is thus effective to interlock with the ends of the several teeth which mesh with the teeth 20 and prevent axial movement of the head 121 to the right relative to the member 31, as viewed in Figs. 21 and 22. The other ends of the grooves between successive teeth 20 are closed by the adjacent body portion of the member 125, which body portion, consequently, serves to prevent or limit movement of the head 121 to the left relative to the member 31.

It will be appreciated that in view of the rounded character of the teeth, the cross members 70 may, after having been seated upon the cooperating oppositely disposed members 31, be pushed lengthwise of the members 31, during which movement the cross bar 70 moves vertically sufficiently to enable the crests of the teeth 20 thereon to ride over the crests of the teeth 20 on members 31.

As disclosed above, and in order to prevent vertical dislodgement, there is provided a rotary latch 134 which has an integral pin 132 whose upper portion is formed into a hex 133 to be engaged by a suitable wrench. This latch member may also be a forging. The lower portion of the latch 134 is shaped as shown in the left-hand end of Fig. 21, with a part-circular portion and with the sides cut away to provide two recesses 136 and 137 to engage the pin 138 and the ball

141. Pin 138 is suitably fixed in recess 139, while ball 141 is slidable in the larger hole 142 and is biased downwardly by a suitable spring 143. After the latch member 134 is positioned, it is permanently locked in place by flat bar 146 which is welded to 118 as at 147. The parts are shown in Figs. 21, 22 and 23 in the locked position, in which the rounded locking portion is disposed below and in substantially abutting relation to the underside of the flange on the cooperating wall member 31. In this position, the pin 138 engages the surface 136 and prevents further rotation of the latch member 134 in a clockwise direction, as viewed in Fig. 21. In this position, also, the detent 141 engages the surface 137 and yieldably resists rotation of the latch member 134 in a counterclockwise or unlocking direction. It will be understood, however, that by rotating the nut 133 in a counterclockwise direction, the latch 134 is correspondingly rotated, during which rotation the detent 141 rides along the upper surface. 180° of such rotation brings the latch 134 to the unlocked position in which the pin 138 cooperates with the surface 137 to prevent further such rotation, and in which the detent cooperates with the surface 136 to yieldably hold the latch 134 in the unlocked position. This unlocking movement brings the member 134 out from under the flange on the wall member 31 and enables the corresponding end of the bar 70 to be freely lifted away from the wall member.

At the right-hand end of the bar 70, as shown in these figures, the unit is welded directly to the Z-member 112, the member 118 being welded to portions 114 as shown at 119.

As described and claimed in applicant's copending application Serial No. 121,424, filed October 14, 1949 (as a continuation of abandoned application Serial No. 469,719, filed December 21, 1942, which abandoned application was a continuation-in-part of the aforementioned parent application Serial No. 434,357) there is provided a telescopic or extensible means designated as a whole by 175. This unit includes a sleeve 149 which is welded, as at 149', on the stub shaft 119 to secure it to unit 121. This sleeve carries in suitable holes pin 153 having projecting ends which have a limited axial motion in the opposed guide slots 152, which are here shown in half scale, to permit ample travel to take care of any variation of freight car widths, or the like. These guide slots are formed in an outer sleeve-like member 156 which is, in turn, formed by the two generally U-shaped members 155 which are welded together as at 157. Members 155 have in their open ends wooden buffer strips 161 which project beyond their ends, as shown, and are secured by through rods 159.

The somewhat earlier form of cross bar, designated as a whole by 70 and shown in Figs. 26 and 27, is in many instances identical with that just described. The intermediate portion and its cross-section through the wooden portion correspond to Fig. 25, while the gripping or holding units 121 are also identical. Here at one end, shown as the left-hand end, the holding unit 121 is welded, as at 162, to the Z-portion 112. The other end of the Z-portion carries, as by welds 163, the rectangular box member 167 which forms the inner slide of the telescopic unit, also claimed in said copending application Serial No. 469,719. This member 167 carries on opposite sides the lost motion member which is here designated by the steel washer 168 welded in its similar opening to the sides 167. This washer operates in

the relatively short slot 172 which is formed in the sides of the generally similar bent-up steel box member 171 whose outer end is welded at 164 to the other holding unit 121.

As shown in Figs. 5 and 5A, the special type of cross bar 100 is otherwise like bar 70 (or it may be like bar 78) except that this bar 100 has teeth 20 along all or substantially all of the exposed faces of flanges 114a of the modified Z-bar. These teeth may be so positioned by means of cast tooth-carrying racks 35 welded on as disclosed in connection with Fig. 4, or they may be rolled into the Z-bar 112a while it is flat and before it is bent into Z-shape in the manner similar to that disclosed in connection with plate 16a. The wooden buffer strips 111a are otherwise like strip 111 except that they are narrower to provide slots or openings 181a behind each set of teeth 20, to receive the latch 134. As will be seen, there is a space provided for the hook portion 129 to engage over the teeth 20. The uses for this type of bar 100 in forming bins, central partitions, and the like, are disclosed above and will be apparent from the suggestions given in connection with Fig. 5.

There may also be provided another special bar 130 which will be identical with bar 100 and, like it, will have the telescopic portion, except that bar 130 is of a reduced or half length so that it may extend partly or halfway across the car width, as shown in Fig. 5.

Another special type of bar 120, shown generally in Fig. 5, may be constructed like bars 70, 70a, 130 or 100 except that, as described and claimed in said copending application Serial No. 469,719, it also includes a rotary or tilting feature which is achieved by building into the bar an axially extending pin received in the sleeve to provide an axial pivot. These two members are secured between the two end portions 121 and the intermediate portions of the bar, and this sleeve and pin include suitable stop means to prevent the bar from coming apart axially.

As noted above, this invention may be employed in other places than freight cars, and accordingly the terms "freight car" or the like are intended to include other applications where this invention may be usefully employed, as disclosed herein.

Although only several forms of the invention have been illustrated and described in detail, it will be appreciated by those skilled in the art that various further modifications may be made without departing from the scope of the appended claims.

What I claim is:

1. In a freight loading system, the combination with a chamber having a body structure provided with a doorway and movable door therefor, an adjustable freight loading member and means for supporting said member in any of a plurality of freight loading positions comprising supporting means carried by and movable with said door, said member and said last-mentioned means each having holding elements which are releasably but interlockingly co-engageable to effect said support in each of said plurality of positions.

2. In a freight loading system, the combination with a chamber having a body structure provided with a doorway and movable door therefor, an adjustable freight loading member and means for supporting said member in any of a plurality of freight loading positions comprising a plurality of spaced uprights at least

certain whereof are carried by said door, said member and said uprights having holding elements which are releasably but interlockingly co-engageable to effect said support in each of said plurality of positions.

3. In a freight loading system, the combination with a chamber having a body structure provided with a doorway and movable door therefor, an adjustable freight loading member and means for supporting said member in freight loading position comprising a pair of spaced uprights, one said upright being secured to said body structure, and the other being secured to and carried by said door, said member and said uprights having holding elements which are releasably but interlockingly co-engageable to effect said support in each of said plurality of positions.

4. In a freight loading system, the combination with a chamber having a body structure provided with a doorway and movable door therefor, an adjustable freight loading member and means for supporting said member in freight loading position comprising a pair of spaced uprights, one said upright forming part of the said body structure and the other upright forming part of the structure of said door, said member and said uprights having holding elements which are releasably but interlockingly co-engageable to effect said support in each of said plurality of positions.

5. The combination of claim 2 wherein said uprights are provided respectively with a succession of said holding elements distributed lengthwise thereof and wherein said freight loading member is adjustably supported by and extends between a said closure carried upright and an adjacent said upright.

6. The combination of claim 2 wherein said uprights are provided respectively with a succession of said holding elements distributed lengthwise thereof, wherein said freight loading member is adjustably supported by and extends between a said closure carried upright and an adjacent said upright, and wherein said loading member is provided with a succession of holding means adapting it to support associated cooperating freight engaging means.

7. In a door for association with a freight holding chamber, a member forming a part of the frame of the door, said member having in combination a plurality of holding elements distributed along the body thereof for cooperation with associated freight loading means.

8. In a door for association with a freight holding chamber, a member forming a part of the frame of the door, said member having in combination a substantially planar surface which faces inwardly of the chamber and having a surface which faces outwardly of the chamber and is provided with a succession of holding elements for cooperation with associated freight holding means.

9. In a door for association with a freight holding chamber, a post forming a part of the door frame, said post having in combination a row of toothlike projections extending throughout a substantial portion of its height, the crests of said projections being rounded in a plane parallel to the length of the row.

10. The combination of claim 2 wherein said uprights are provided respectively with a succession of said holding elements distributed lengthwise thereof, wherein said freight loading member is adjustably supported by and extends between a said closure carried upright and an ad-

jacent said upright, and wherein said loading member when so supported is effective to retain said door in substantially fixed position relative to said body structure.

11. In a freight loading system, the combination with a chamber having a body structure provided with a doorway and a movable door therefor, freight loading means comprising at least three uprights, one said upright being secured to and forming part of said body structure, a second said upright being removably secured to said body structure so that it extends across said doorway from top to bottom and intermediate the sides thereof, and the remaining said upright being carried by said door, each said upright having a plurality of holding means distributed lengthwise thereof.

12. In a freight loading system, the combination with a chamber having a body structure provided with a doorway and a movable door therefor, freight loading means comprising a pair of uprights, one said upright being removably secured to said body structure so that it extends across said doorway from top to bottom and intermediate the sides thereof, and the other upright being carried by said door.

13. The structure of claim 12 wherein said freight loading means further comprises a loading member which extends between and is adjustably supported by said uprights and restrains the door-carried upright and the door against movement.

14. In a freight loading system, the combination with a chamber having a body structure provided with a doorway and a movable door therefor, freight loading means comprising a pair of uprights, one said upright being removably secured to said body structure so that it extends across said doorway from top to bottom and intermediate the sides thereof, and the other upright being carried by said door, said uprights having surface portions which project inwardly of the inner face of the door, and protective panel means removably secured to the body structure in the space between said uprights, said panel means defining a substantially planar inner surface which is approximately flush with said surface portions.

15. In a freight car or the like, having a side doorway, a sliding door therefor carrying along its inner edge an upright post having means thereon to retain freight-holding means, a removable post mounted in said doorway to form with said first post a side bay in said doorway, and having means thereon to retain freight holding means, and a nonmetallic freight protecting buffer panel removably mounted in said bay.

16. In a freight loading system, the combination with a chamber having a body structure provided with a doorway and movable door therefor, an adjustable freight loading member and means for supporting said member in freight loading position comprising supporting means carried by said door, said loading member when so supported acting to brace said door against movement.

17. In a freight loading system, the combination with a chamber having a body structure provided with a doorway and movable door therefor, an adjustable freight loading member and means for supporting said member in freight loading position comprising a pair of spaced uprights, one said upright being secured to said body structure, and the other being secured to and carried by said door, said loading member when so sup-

ported acting to hold said door in predetermined position with respect to said doorway.

18. In a freight loading system, the combination with a chamber having a body structure provided with a doorway and movable door therefor, an adjustable freight loading member and means for supporting said member in freight loading position comprising a pair of spaced uprights, one said upright being removably secured to said body structure, and the other being secured to and carried by said door.

19. In a freight car having a side doorway and combined freight bracing apparatus comprising freight holding cross bars secured between vertically spaced apart, longitudinally and horizontally extending side rail members, a removable post in said doorway having side rail securing means along its height and spaced to match said side rail members, said car at the doorway having a downwardly opening upper socket and an upwardly opening lower socket, the upper end of said post having an upwardly projecting portion to normally extend into said upper socket to hold the upper end of the post against lateral motions and to permit swinging motion of said post therein in a direction transverse to said lateral motion and to the length of the post, the lower end of said post having a downwardly projecting portion to extend into said lower socket in its operative position to hold the lower end of said post against lateral motions, and cooperating stop surfaces at the lower end of said post and on said car to limit downward motion of said post whereby its weight holds it in operative position, the entire post being removable from said doorway by raising it as a whole in its sockets to remove the lower projection from the lower socket swinging the lower end of said post to laterally displace its lower projecting portion from over its socket and moving the upper end downwardly to entirely remove the upper projecting portion from its socket, thus permitting complete removal of the post.

20. In a freight car having a side doorway and combined freight bracing apparatus, a removable post in said doorway having vertically spaced securing means for spaced apart freight securing side rails, said car at the upper part of the doorway having a downwardly directed socket and the upper end of said post having an upwardly projecting portion removably fitted into said socket to permit swinging of the lower end of said post for removal but to limit lateral motions in all directions and detachable means to secure the lower end of said post and permit its removal upon a raising and swinging motion of the post.

21. In a chamber for the storage of freight, said chamber having upper and lower horizontal frame members, an upright post member, an elongated element forming a part of a freight carrying system extending transversely to the post and adapted to receive vertical loads of freight, vertical load transmitting means mounting the element on the post for vertical adjustment, said post member resting on the lower frame member whereby loads on the post are transferred to the frame member, first disconnectible means for pre-

venting transverse shifting of the lower end of the post member relative to the lower frame member comprising a recess in one of the members and a rigid portion on the other member fitting in said recess whereby upon vertical movement of the post to remove the portion from the recess said lower post end may be shifted transversely, means for preventing transverse shifting of the upper end of the post member relative to the upper frame member comprising an aperture in one of the members and a rigid portion on the other member projecting into said aperture and removable therefrom upon vertical movement of the post whereupon the upper end of the post may be shifted transversely.

22. In a chamber for the storage of freight, said chamber having upper and lower horizontal frame members, an upright post member, an elongated element forming a part of a freight carrying system extending transversely to the post and adapted to receive vertical loads of freight, vertical load transmitting means mounting the element on the post for vertical adjustment, said post member resting on the lower frame member whereby loads on the post are transferred to the frame member, first disconnectible means for preventing transverse shifting of the lower end of the post member relative to the lower frame member comprising a recess in one of the members and a rigid portion on the other member fitting in said recess whereby upon vertical movement of the post to remove the portion from the recess said lower post end may be shifted transversely, second disconnectible means for preventing transverse shifting of the upper end of the post member relative to the upper frame member comprising a downwardly opening recess in the upper frame member, the upper end of said post projecting into the recess but terminating short of the top of the recess whereby the post may be lifted into the recess by vertical movement in one direction to disconnect the first means and may be completely removed from the recess upon vertical movement in the other direction, said upper member recess being transversely larger in one direction than the post but in other directions the sides of said post engaging the sides of the recess, and a transverse projection on the upper frame member below said recess in abutment with the side of said post to prevent transverse shifting of the post in the recess in the direction in which said recess is transversely larger.

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