Oct. 6, 1931. C. A. CHANDLER 1,825,992

LOAD BRACING DEVICE

Filed Aug. 16, 1929 4 Sheets-Sheet 1

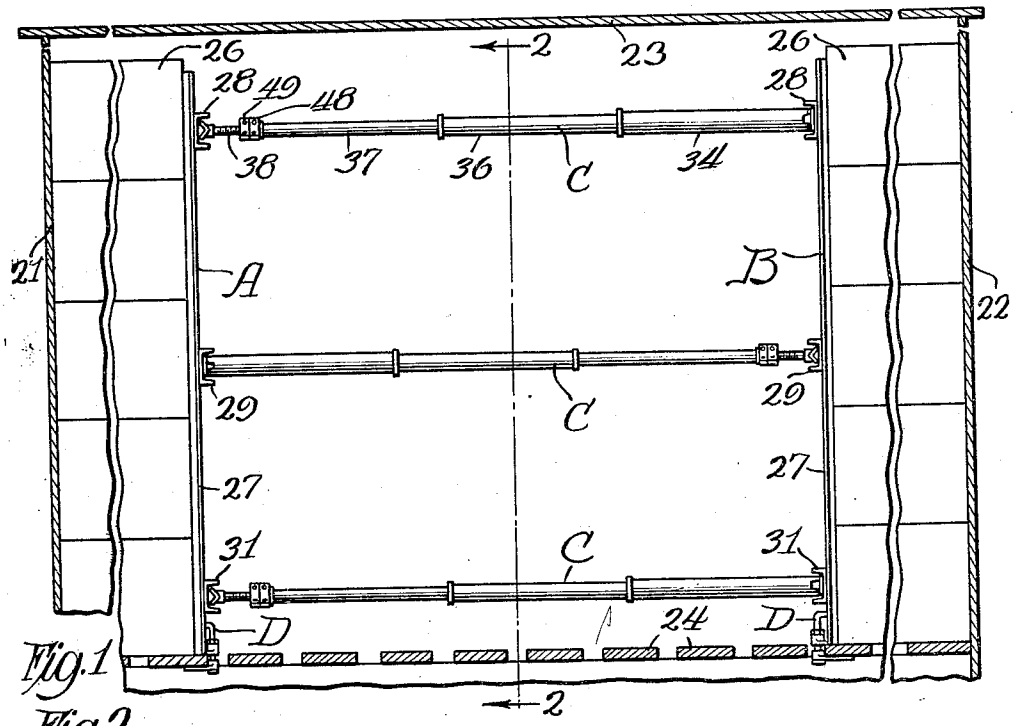
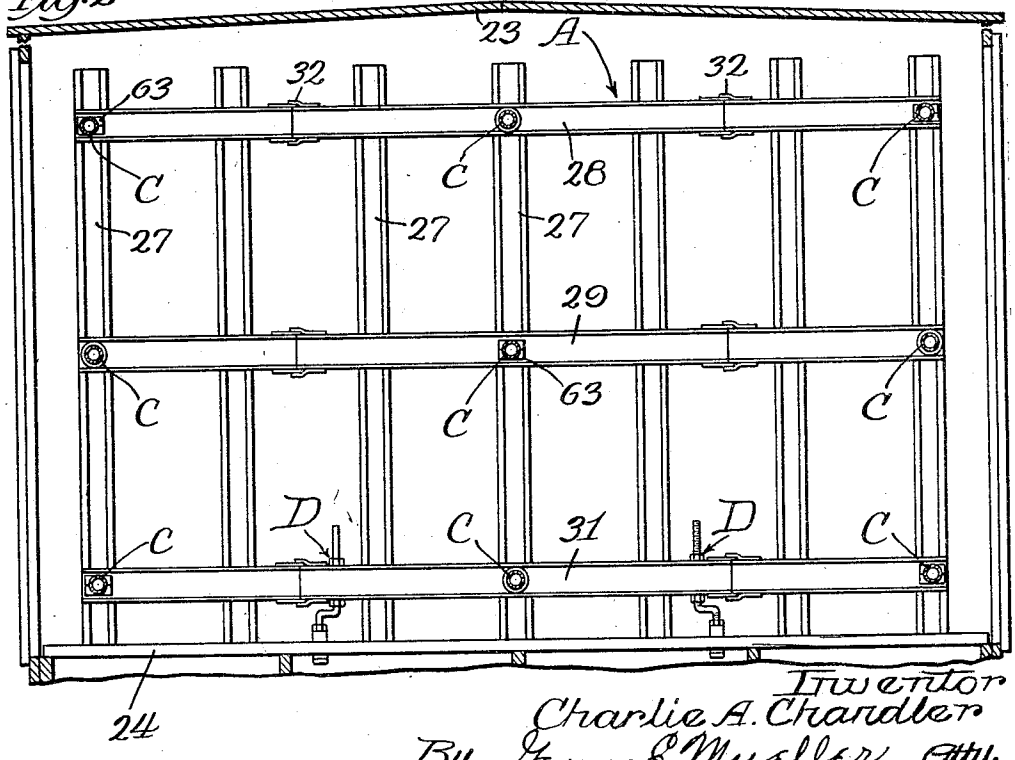


Fig. 1

Fig. 2



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Fig. 4

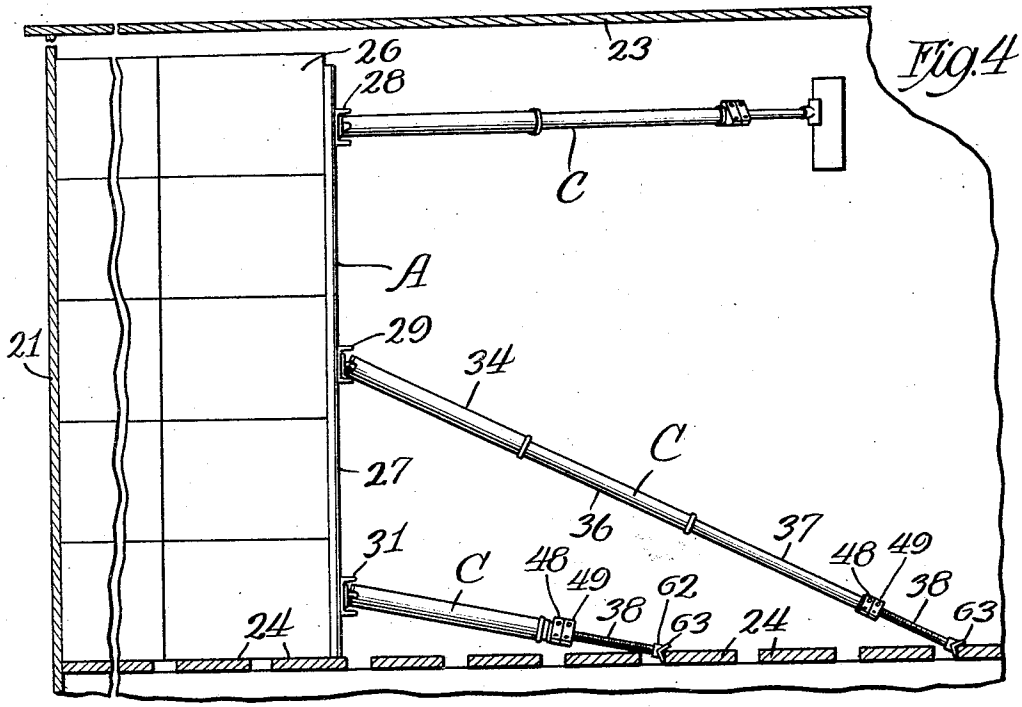
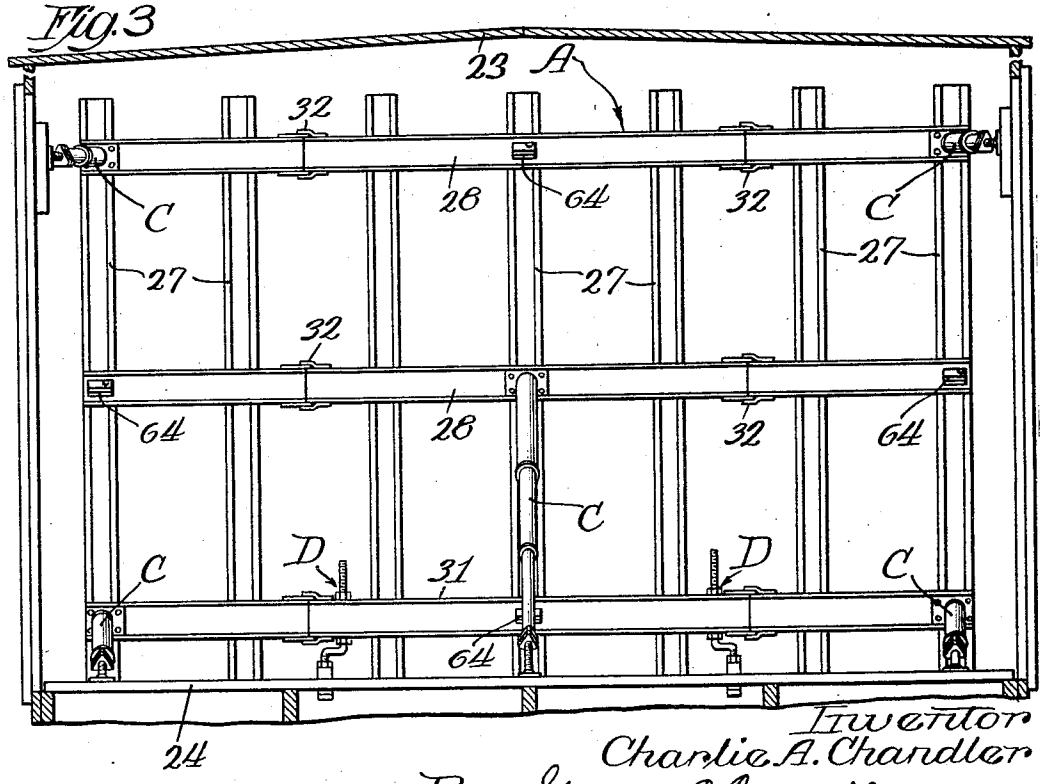


Fig. 3



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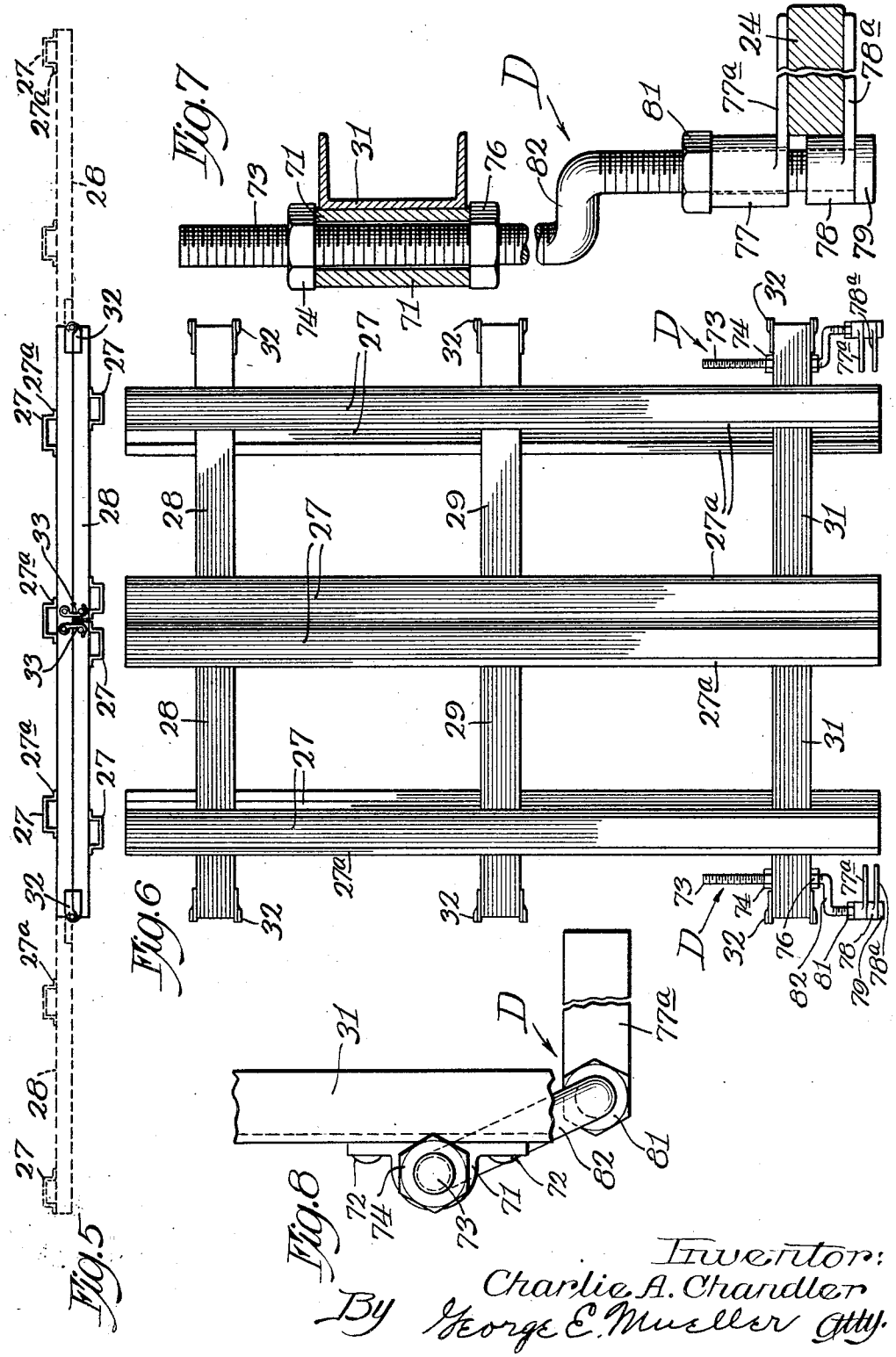


Fig. 5

Fig. 6

Fig. 7

Fig. 8

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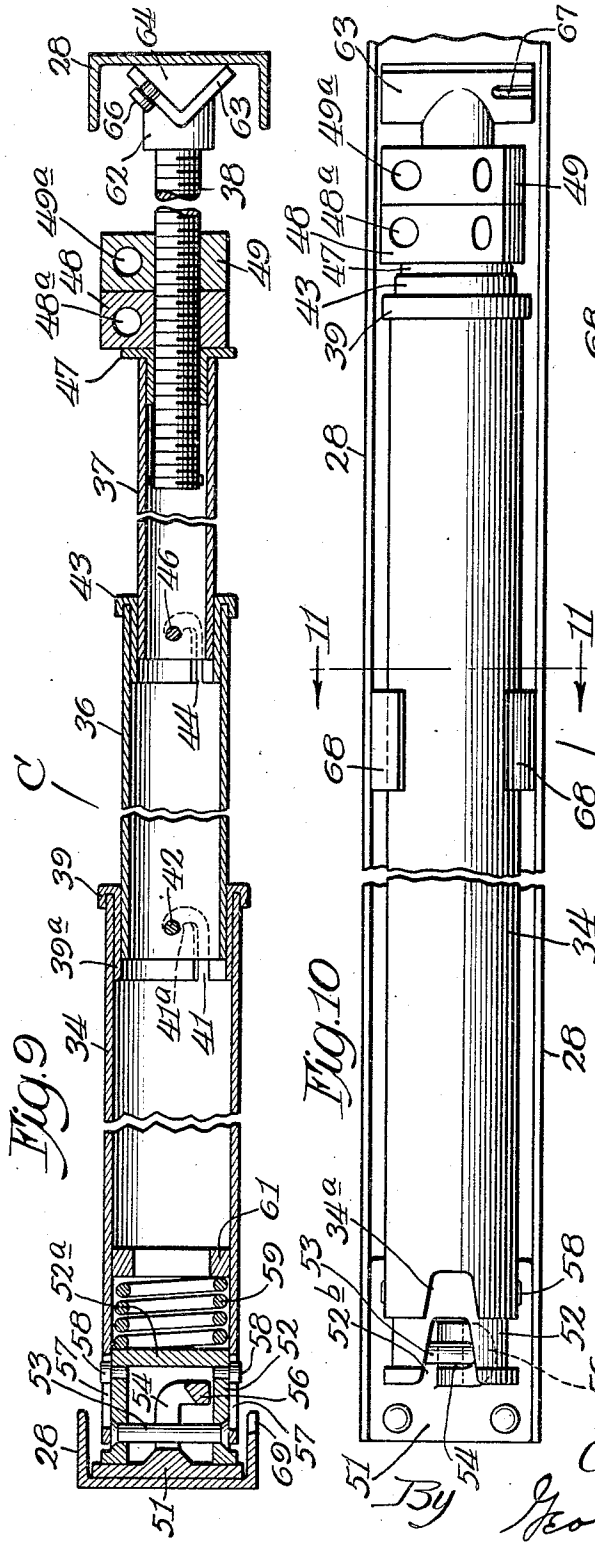


Fig. 9

Fig. 10

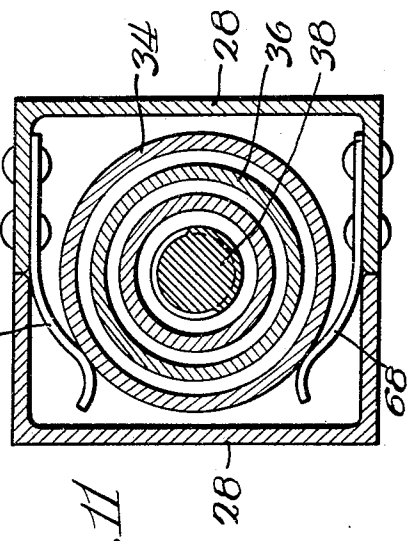


Fig. 11

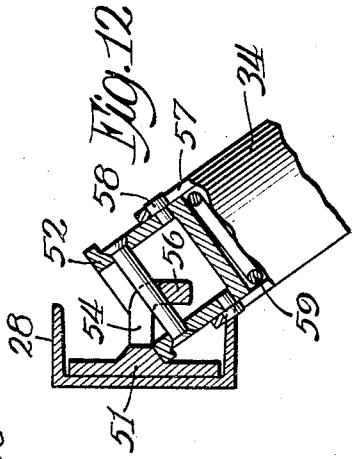


Fig. 12

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Patented Oct. 6, 1931

1,825,992

UNITED STATES PATENT OFFICE

CHARLIE A. CHANDLER, OF WAPATO, WASHINGTON, ASSIGNOR OF EIGHTY-FIVE ONE-HUNDREDTHS TO CHANDLER EQUIPMENT CO., A CORPORATION OF WASHINGTON, AND FIFTEEN ONE-HUNDREDTHS TO LEONARD O. COCKRILL

LOAD BRACING DEVICE

Application filed August 16, 1929. Serial No. 386,438.

My invention relates to load bracing devices. It relates more in particular to an improved load bracing device of a portable nature and adapted particularly for use with refrigerator cars, although of course, it may be adapted to other uses should the occasion require.

In my copending application, Serial No. 263,542 I disclosed a load bracing device adapted to be built substantially permanently into a car so as to constitute a part thereof. I find that it is not always advisable to do this, but that owing to certain conditions with which shippers are familiar, the use of a device which can be removed from the car is to be preferred.

Accordingly, one of the principal objects of my present invention is the provision of an improved portable load bracing device.

Another object is the provision of a portable load bracing device arranged to be folded in compact form for returning to the shipper.

Another object is the provision of a load bracing device adapted to be used in pairs for bracing carload shipments or adapted for use in single units for bracing only a portion of a shipment disposed in the end of a car.

Another object is the provision of a light portable load bracing device which can not shift upwardly with a load and so cause buckling and other difficulties incident to the shifting of the bracing device in a vertical direction.

Another object is the provision of an improved form of jack for applying tension to the bulkhead portion of the bracing device, with improved means for housing the jack during return transportation of the device.

Another object is the provision of a bulkhead which will brace a load tightly but at the same time provide resilient means for absorbing the shocks incident to movement thereof.

Other objects and features of the invention will be apparent from the consideration of the detailed description taken with the accompanying drawings, wherein Fig. 1 is a fragmentary longitudinal sectional view through a refrigerator car showing the device in use for bracing a full carload shipment.

Fig. 2 is a sectional view taken along the line 2—2 of Fig. 1 and showing one of the bulkheads in elevation.

Fig. 3 is a face view of the bracing device employed as a single unit for bracing a load at one end of the car.

Fig. 4 is a side view thereof.

Fig. 5 is a plan view showing one unit of the bracing device in folded position, with the open position shown in dotted lines.

Fig. 6 is a front elevational view corresponding to Fig. 5.

Fig. 7 is a detail of the means for preventing vertical movement of the bulkhead.

Fig. 8 is a longitudinal fragmentary plan view showing the mechanism of Fig. 7.

Fig. 9 is an enlarged longitudinal sectional view of the jack, parts thereof being broken away to conserve space.

Fig. 10 is an enlarged elevational view showing the manner in which the jack is housed in the bulkhead.

Fig. 11 is an enlarged sectional view taken on the line 11—11 of Fig. 10, but showing jack completely housed as when the bulkhead is folded together, and

Fig. 12 is a longitudinal sectional view showing the manner in which the jack is secured for pivotal movement to the bulkhead.

Referring now to Figs. 1 and 2 of the drawings, the device is adapted for use in any usual type of refrigerator car having end partitions 21 and 22, a roof, 23, and a floor (not shown) provided with floor racks 24. The commodity shipped will of course vary, but in the present drawings I show boxes 26 which may contain crated fruit or similar articles. The bracing device comprises bulkheads A and B each provided with a number of jacks C and anchors D for preventing vertical movement of the bulkheads. When used in the manner shown in Figs. 1 and 2, bulkheads operate in portions A and B constituting a unit pair and the jacks C being so arranged on the two bulkheads as to cooperate between the two. Specifically the jacks are arranged so that the pivotal connection of the jack to one bulkhead is di-

rectly opposite the attaching means in the other bulkhead, so that all of the jacks on the bulkheads (9 are shown) will be put to use. The jacks are also arranged (Figs. 3 and 4) so that they may be braced against the floor, side, walls or ceiling of the car where only a single bulkhead is used to brace a small load in the end of the car. The manner in which the connections are made will be determined largely by the type of load and other conditions having to do therewith. The showing of Figs. 3 and 4 for these reasons is purely illustrative.

Now as to the construction of the various parts of the device I shall refer first to the bulkhead per se. The bulkhead includes a plurality of single piece uprights 27 of general channel cross-section and a plurality of horizontal connecting and bracing members, 28, 29 and 31. The uprights 27 are seven in number although more or less may be used should it be found desirable. I have employed seven in this construction because it would be used principally for shipping fruit and the standard types of containers are all of such size that better bracing can be obtained with this number.

The uprights are secured to the horizontal or cooperating pieces in any suitable way. In the present construction side flanges 27*a* are provided on the vertical members and these flanges are either welded or riveted to the web of the cross pieces. This places the web or widest portion of the upright channels in contact with the load thereby forming a large bearing surface which will not cut, break or injure the containers in any way under ordinary load conditions.

For folding the bulkhead each one of the cross members 28, 29 and 31 is folded in three pieces secured together by hinges 32. The various sets of hinges are aligned vertically so that the side portions of the bulkhead hinge as a unit for closing completely as shown in Figs. 5 and 6. The hinges are arranged and designed to break in only one direction so that when the bulkhead is open the side pieces can not be extended beyond a position parallel and in line with the center section. Since the web of the cross pieces is in contact with the uprights the jacks are housed within the channel portion of the cross pieces as shown in Fig. 4. The details of the arrangement and the construction of the jacks will be referred to later.

When the bulkhead has been folded with the jacks housed therein the side pieces are secured in place by latches 33 (Fig. 5). These latches are designed to have some spring tension so that when closed they will remain in position.

I shall consider now the details of the jack as shown in Figs. 9 to 12 inclusive. The jack is made up of three telescoping sections, 34, 36 and 37, with a screw 38, adapted to telescope with respect to the member 37, this arrangement being employed to permit the jack being reduced in length so that it can be housed in the folded bulkhead. First, with regard to telescoping these members, a collar 39 is provided on the member 34, this collar extending down into the member 34 as shown at 39*a* and having a bayonet slot 41 (2 are provided). A pin 42, carried by the tubular member 36, is adapted to engage in the bayonet slot. This engagement is made by drawing the member out, making a partial turn of the member 36 and then allowing the pin 42 to slide down until the bayonet portion of the slot 41*a* is engaged by the pin 42. Similarly, the tubular member 36 has a collar 43 equipped with a bayonet slot 44, adapted to be engaged by a pin 46 carried by the member 37. At the outside end of the member 37, a tubular block 47 is secured, to receive the threaded bolt or screw 38. For regulating the position of the bolt 38 with respect to the block 47, a nut 48 is provided, with a lock nut 49 for maintaining the position of the nut 48 when adjusted. These nuts are provided with openings 48*a* and 49*a*, respectively, for engagement with a suitable tool, in order to apply the necessary tension.

In securing the jack to the bulkhead, I provide a construction which will permit the necessary quasi universal movement of the jack with respect to the bulkhead, while still maintaining requisite strength and rigidity at the connection, the construction also being arranged so that adequate resiliency is imparted to the bracing, with the result that unusual shocks are absorbed.

The connection proper to the bulkhead is by means of a special hinge member 51 in the shape of a forging, this member being either riveted, bolted, or welded, preferably the latter, to the inside web of the cross member. A cooperating hinge member 52, of general tubular character, is also provided, with a pin 53 extending across the same and engaging in an arcuate slot 54, extending through part of an arcuately shaped projection 56 from the member 51.

In connecting the tubular telescoping member 34 to the hinge member 52, the member 34 is provided with slots 57—57, into which pins 58—58, carried by the member 52, extend. The hinge member 52 is provided with a closed end 52*a*, against which a compression spring 59 bears, the opposite end of the compression spring engaging a stop 61 on the inside of the member 34. This stop, as shown, is in the form of a ring welded to the inside surface of the tubular member. The slots 57 permit relative movement between the hinge member 52 and the telescoping member 34; the reasons for this arrangement and the operation of which will be explained hereinafter.

The opposite or free end of the jack is

adapted to be secured either to the opposite bulkhead, or to a brace suitably arranged on the floor, sides or ceiling of the refrigerator car. The jack is arranged so that it can be utilized in either way. In the form shown, the end of the bolt 38 extends into a boss 62, formed on an angular member 63. This member is shaped with the two inside surfaces at an angle to each other, preferably about 90 degrees, and such inside surfaces will engage an angular lug or projection 64 on the opposite cross member 28. This projection 64 is in the form of a forging or casting and is preferably welded to the inside web of the channel. It is provided with a headed pin 66, this pin extending into a slot 67, carried by the angular connecting member 63, the head of the pin 66 extending beyond the slot, so that direct retractive movement cannot break the connection. The parts are assembled, of course, by sliding the member 63 with respect to the member 64, so that the shank of the pin engages in the slot 67. The construction of the bolt 38 with respect to the boss 62 may vary, depending upon the method of manufacture. The boss may be made as a part of the screw 38, and the angular portion 63 secured thereto, or the boss 62 and member 63 may be formed as a single unit, and the bolt 38 secured in a suitably provided cylindrical recess in the boss 62.

In order to prevent rattling, etc., of the jacks within the housing provided by the members 28, I provide leaf springs 68—68 which are riveted or otherwise secured to the inside of the channel and shaped so that the jack may be readily inserted therebetween, or may be quickly removed, when used, without the use of latches or other mechanical means. This arrangement also holds the jacks in place, should it be desirable to employ only a portion of the jacks when bracing a particular car of merchandise.

I wish to refer again to the hinge connection between the jacks and the bulkhead. The construction shown permits as great movement of the jack about its hinge as will be required in the operation thereof. Fig. 12 shows the extreme downward position of the jack and it will be noticed that the angle is greater than will be required at any time when employing the style of bracing shown in Fig. 4. Sideways movement of the jack with respect to the bulkhead is limited only by contact with the bulkhead; that is to say, the jack may be moved in a horizontal direction through 180 degrees. To prevent any possibility of binding when tension is applied to the jack, the member 34 is cut away at 34*a*, and the member 52 is cut away at 52*b*. This cut away construction is at both sides of these members, so that the full movement of the jack can take place either to right or left. While adequate downward movement can be obtained without special provision, the lower flange of the channel member 28 may be cut away slightly at 69.

Now, as to preventing vertical movement of the bulkhead, this may be accomplished, in general, by making use either of the floor or the ceiling. In my present design, I attach the bulkhead to the floor racks, because I have found that I can provide a considerably lighter construction in this way. Two floor clamps D are provided, in the design shown, for each bulkhead section, but a greater or lesser number can be used. I shall describe one of these jacks, since the construction of all of them will be uniform.

On the lowermost cross piece 31, preferably, a lug 71 is secured by rivets or bolts 72—72. This lug has a vertical threaded bore through which a threaded bolt 73 extends, with locking and adjusting nuts 74 and 76 above and below the lug. The lower end of the bolt 73 is provided with means for attaching it to the floor boards 24. The arrangement employed includes an upper clamping member 77 and a lower clamping member 78, the collar 79 being secured to the lower end of the bolt to serve as a support for the member 78. This member has an offset portion or foot 78*a* extending under the floor board, while the member 77 has a similar foot 77*a* extending above the floor board. The nut 81 is threaded on the bolt 73 and can be tightened down to clamp the members 77 and 78 together and so fasten them securely to the floor board. In order to provide a range of adjustments for the floor clamp, the bolt 73 is formed with an offset 82. This is advisable because the position of the bulkheads with respect to the floor boards will vary, and by means of this offset the clamps can be extended over a range of adjustments equal to twice the length of the offset portion 82. This permits the bulkheads to be attached to the floor boards independent of their positions with respect thereto.

I shall now illustrate one manner of employing the device, so that the features thereof will be made clear to those skilled in the art. Assume that a refrigerator car is to be loaded with a carload lot of boxed or crated fruit. The load is placed in the ends of the car up to the doorway (the exact distance will depend on the interior dimensions of the car and size of crates), care being taken, of course, to pack the boxes as close together as possible longitudinally. When the loading has been completed, the bracing devices, consisting of a unit of two bulkheads with their jacks, is brought into the car and the bulkheads placed against the ends of the load. The latches 33 are removed and the bulkheads opened to the position shown in dotted lines in Fig. 5. The jacks are then connected, the manner of connecting depending upon the distance between the bulkheads. If they are close together, it may be necessary to em-

ploy only one of the telescoping members; but if they are a distance apart, equal approximately to the width of the doorway, the jacks will have to be opened their full length, not considering the bolt 38 at the present time. The bolt 38 can then be withdrawn as far as necessary, in order to make the connection to the opposite bulkhead and insert the pin 66 in the slot 67. In this position, no tension whatsoever has been applied to the spring 59 and the nuts 48 and 49 have not been turned. When the jacks are in position in this manner, the nut 48 is turned up by hand until it engages against the collar 47 and takes up most of the slack in the jack itself. A suitable tool, such as a bolt or the like, is then inserted in the opening 48*a*, and the nut 48 drawn up tightly, so as to force the bulkheads firmly and rigidly against the load. Care should be taken, in tensioning the nuts 48, to equalize the movement over the entire bulkhead,—that is, the tension gradually increased on all of the nuts, rather than applying full tension on one nut and then proceeding to the others. The tension should not be so great as to take up all of the slack in the spring 49. This spring is made quite heavy, so that, although it is under some compression with the load normally braced, it will not be collapsed, but the final compression will be applied thereto, if at all, by severe shocks or jolts applied to the load during rough handling of the car. When all of the nuts 48 are drawn up with proper tension, the lock nuts 49 are tightened and the adjustment of the jacks is completed.

At any suitable time, either before or after the jacks are finally tensioned, the floor clamps are secured to the floor boards. This is accomplished by turning the offset portion of the bolt 73 to a position so that the foot 78*a* of the clamp 78 can be extended under a floor board. The nut 74 is then drawn up tightly enough to cause the clamp 78*a* to engage snugly against the underneath surface of the floor board. The clamp 77 is then placed in position and the nut 81 drawn up to force the foot 77*a* down against the top surface of the floor board and also to increase the tension between the foot 78*a* and the bottom of the floor board. In this manner, the floor board is gripped firmly by the clamp. The nut 76 is drawn up tightly also, thus serving further to lock the bolt 73 and stabilize the connection throughout. With all of the floor boards clamped in position, and the jacks in position, the car can be made ready for shipment.

Removing the bracing device from the car is accomplished, substantially, by reversing the process of applying it to the car. While still in the car, the bulkheads should be folded together so that they can be removed easily from the car and returned to the shipper, or handled in any other way, as conditions warrant at the time. It will be noticed that the side members of the bulkhead are half the width of the middle portion thereof, so that when the side members are folded in against the middle portion they lie together along the middle portion and entirely house the jacks. This produces an easily portable package which can readily be changed back to the place of first use.

I have described many details of my invention, in order that those skilled in the art may have a complete understanding thereof. I do not restrict myself, however, to the details shown and described, the invention being limited only by the scope of the appended claims.

What I claim is new and desire to protect by Letters Patent of the United States is:—

1. In a load bracing device a bulkhead, bracing means secured to the bulkhead and means for folding the bulkhead and housing the bracing means.

2. In a load bracing device, for a refrigerator car having the usual floor racks, a bulkhead, means for bracing the bulkhead against the load, and adjustable means for securing the bulkhead to the floor racks for preventing vertical movement thereof.

3. In a load bracing device, for a refrigerator car equipped with the usual floor racks, a bulkhead, a floor clamp for attachment to the floor racks and means forming a part of the floor clamp for adjusting the same to engage the floor rack independent of the position of the bulkhead with respect thereto.

4. In a load bracing device, a bulkhead and a floor clamp with an adjustable connection with respect thereto.

5. A load bracing device as defined in claim 4, wherein said floor clamp includes a bolt with threaded connection to the bulkhead, an offset portion for adjustment purposes, a bottom clamp including two clamping members, and means for applying clamping tension to said members.

6. In a load bracing device a bulkhead and a bracing jack pivotally connected thereto, said jack including a plurality of telescoping members with their alternate ends provided with bayonet slots and pins for engaging in the slots, a threaded bolt telescoping into the farthest extending telescoping member, means for adjusting the position of the bolt with respect to said telescoping member, and means on the end of the bolt for connecting to an opposite bulkhead.

7. The combination described in claim 6, wherein said means for connecting to an opposite bulkhead includes an angular member on the end of the bolt and an angular projection on said bulkhead, the angular member on the bolt being also adapted to engage suitably provided members on the floor, sides or ceiling of a car.

8. In a load bracing device a bulkhead,

and a bracing jack connected thereto, said jack including a pair of hinge members one secured to the bulkhead, a slide connection between the jack and the moving hinge member, and a compression spring interposed between such members to absorb load shocks.

9. In a load bracing device a bulkhead, an adjustable jack riveted to the bulkhead, means for connecting the outer end of the jack to an opposite bulkhead, and resilient compression means forming a part of the jack to take up load shocks, said compression means being under partial compression when the jack is adjusted in position.

10. In a load bracing device a bulkhead formed of channel members, a jack pivoted to the bulkhead on the inside of one of said channel members, means for folding the jack back to lie within the channel, means within the channel for supporting the jack in folded position, and means for folding the bulkhead to bring two channels into contiguous facing position so that the jack is completely housed thereby.

11. In a load bracing device a bulkhead formed of channel members, a jack pivoted to the bulkhead on the inside of one of said channel members, means for folding the jack back to lie within the channel, means within the channel for supporting the jack in folded position, and means for folding the bulkhead to bring two channels into contiguous facing position so that the jack is completely housed thereby, and means for fastening the bulkhead in its folded position to produce a portable package with the jacks entirely concealed and with the outside of the channel members only exposed to view.

12. In a load bracing device a bulkhead having a plurality of single piece uprights, a plurality of three part cross-pieces joined by hinges in vertical alignment, the side pieces being substantially half the width of the center pieces so that they can be folded over the center pieces and have their side edges contiguous, and latch means for maintaining the side pieces in such folded position.

13. In a load bracing device a bulkhead having a plurality of single piece uprights, a plurality of three part channel cross-pieces secured together with hinges in vertical alignment so that the bulkhead includes a center portion and side portions all equipped with uprights, a plurality of jacks pivoted to the channel cross-pieces and adapted to be folded into the channels, and means for folding the hinged side portions of the bulkhead over the center portion to completely house the jacks.

14. In a load bracing device a pair of bulkheads foldable along a vertical axis and having cross-pieces formed of channel members, a plurality of bracing jacks pivoted in the channel portion of each bulkhead, and means for securing the free end of the jacks to the opposite bulkhead so that direct retractive movement is not effective to dissociate the jack and bulkhead.

15. A load bracing device as defined in claim 14 wherein said jacks are adjustable in length having a plurality of telescoping members with a sliding connection therebetween, and have a compression spring at one of said sliding connections for equalizing load shocks.

16. A load bracing device as defined in claim 14 wherein the jacks are foldable against the channels so as to be housed by the folding of the bulkhead, the relative positions of the various jacks being such that all of them may be so housed.

17. A load bracing device as definied in claim 14 with means secured to the bulkheads for preventing vertical movement thereof while in load bracing position.

18. In a load bracing device, a pair of foldable bulkheads, jacks secured to the bulkheads for interconnection between them when in load bracing position, and adapted to be housed by the bulkheads when in folded position, and means connected to the bulkheads for preventing vertical movement of the bulkheads when in load bracing position.

19. In a load bracing device, a pair of foldable bulkheads, each bulkhead comprising a middle section, and side sections half the width of the middle section so as to lie side by side against the middle section when folded, jacks secured to the bulkheads, and means secured to the middle section of the bulkheads for preventing vertical movement thereof, whereby installing said bulkheads in a load bracing position is facilitated.

In witness whereof, I hereunto subscribe my name this 15th day of August, 1929.

CHARLIE A. CHANDLER.