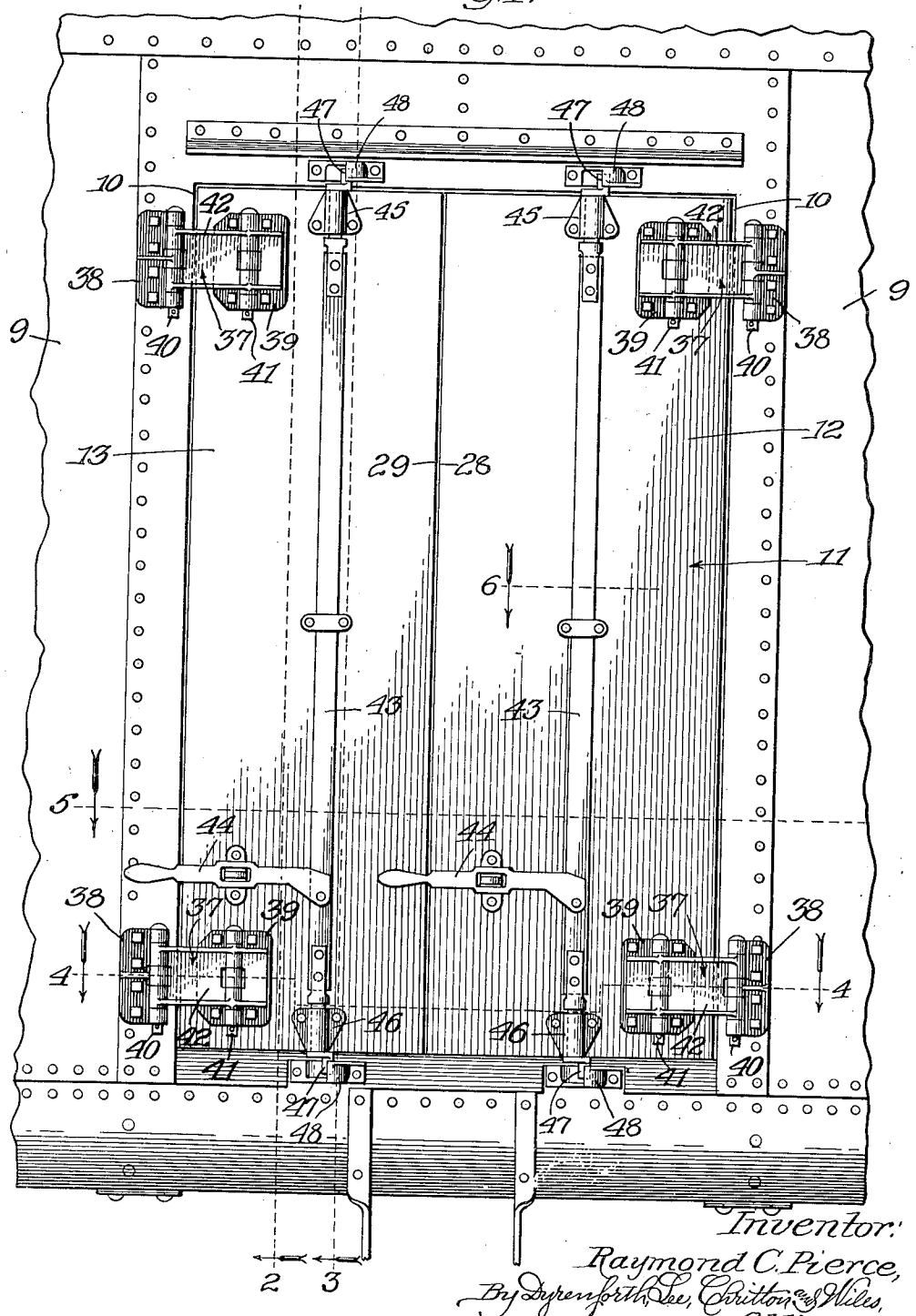
Feb. 16, 1937. R. C. PIERCE 2,071,236

REFRIGERATOR CAR

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Fig. 1.



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REFRIGERATOR CAR

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Fig. 2.

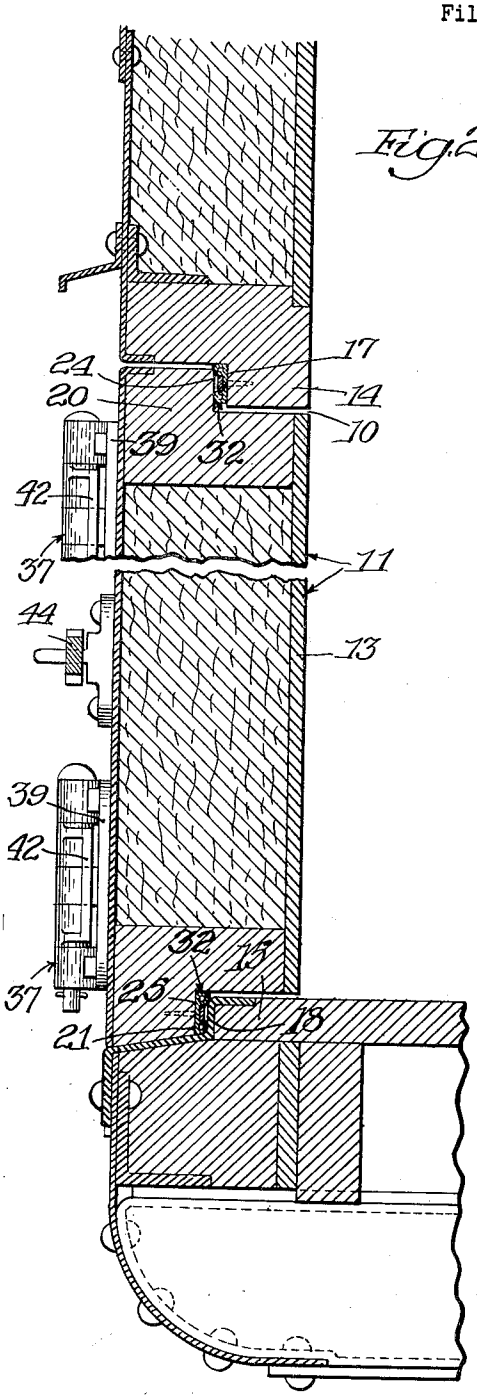
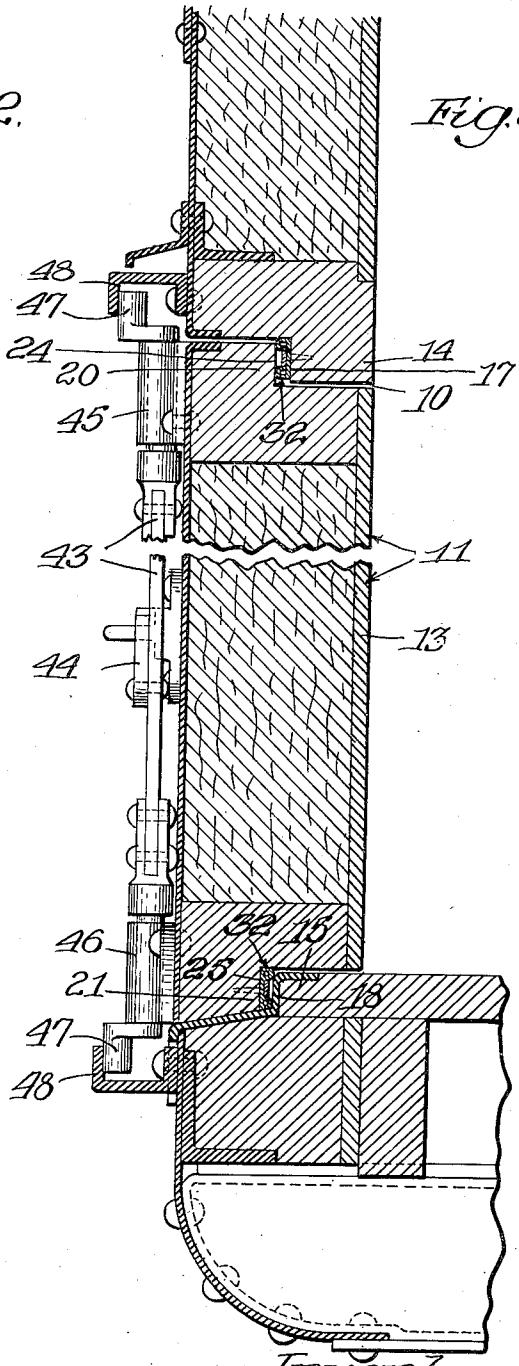


Fig. 3.



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REFRIGERATOR CAR

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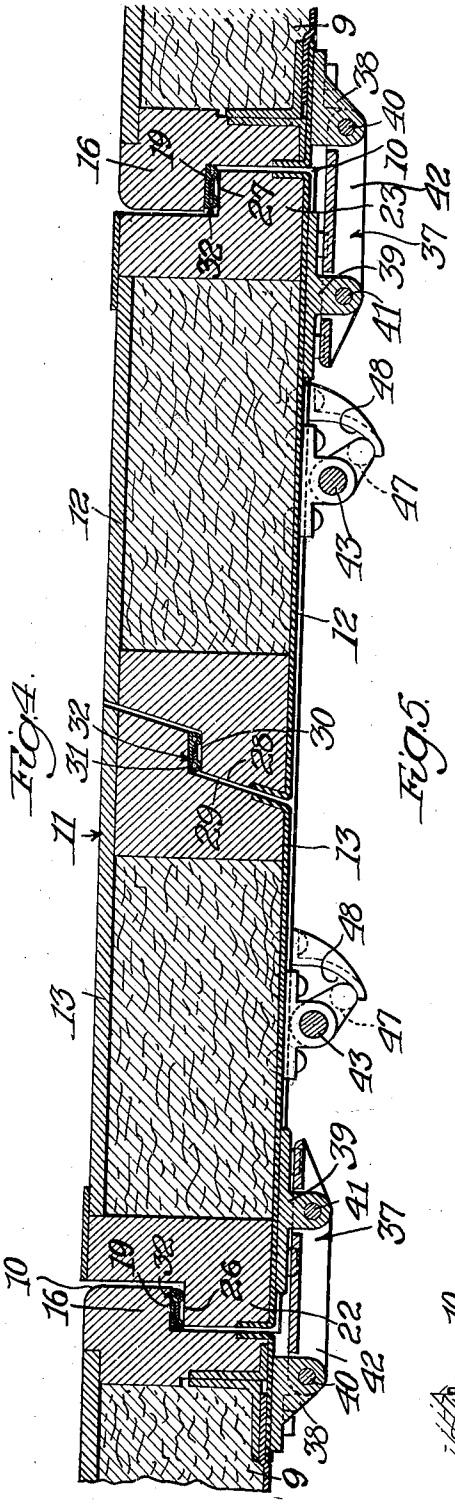


Fig. 4.

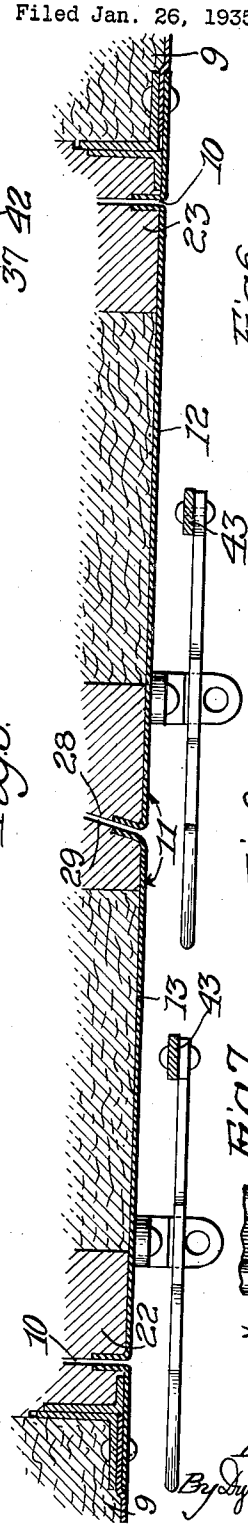


Fig. 5.

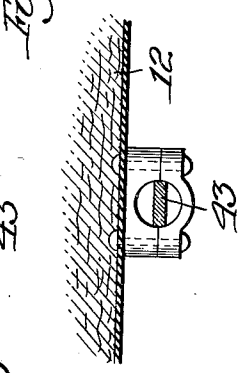


Fig. 6.

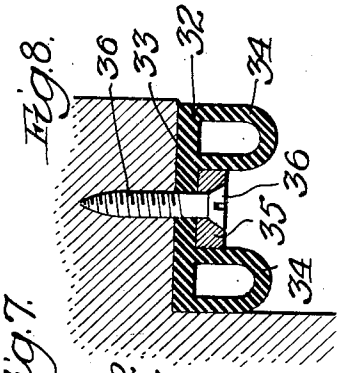


Fig. 8.

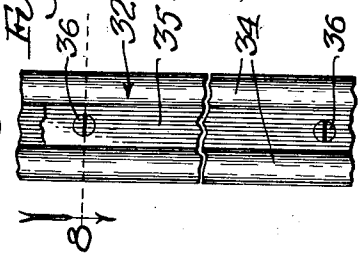


Fig. 7.

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Patented Feb. 16, 1937 2,071,236

UNITED STATES PATENT OFFICE

2,071,236

REFRIGERATOR CAR

Raymond C. Pierce, Chicago, Ill., assignor to General American Tank Car Corporation, a corporation of West Virginia

Application January 26, 1935, Serial No. 3,671

9 Claims. (Cl 20—21)

My invention relates more particularly to the matter of the sealing or packing joints between the doors and the walls of the door openings of refrigerator cars and the sections of the doors when so provided and as is preferred.

My objects generally stated are to provide for the effective sealing of the joints referred to and the maintenance of such seals in the vertical weaving movement to which the cars are subjected in transit; to provide for such sealing by simple and economical means and of such character as to permit of replacements or substitutions of sealing or packing strips (as in the event of damage thereto through wear or by accident) with ease and by a quickly performed operation; to provide for the production of water tight joints; to provide a construction which, while capable of producing such sealed joints, will permit the door to be opened and closed with ease; and other objects as will be manifest from the following description.

Referring to the accompanying drawings:

Figure 1 is a view in side elevation of the side, door equipped, portion of a refrigerator car constructed in accordance with my invention.

Figure 2 is an enlarged vertical cross sectional view of the door equipped portion of the car, the section being taken at the line 2 on Fig. 1 and viewed in the direction of the arrow.

Figure 3 is a similar view, the section being taken at the line 3 on Fig. 1 and viewed in the direction of the arrow.

Figure 4 is an enlarged broken sectional view taken at the irregular line 4—4 on Fig. 1 and viewed in the direction of the arrows.

Figure 5 is a broken enlarged sectional view taken at the line 5 on Fig. 1 and viewed in the direction of the arrow.

Figure 6 is an enlarged broken cross sectional view taken at the line 6 on Fig. 1 and viewed in the direction of the arrow.

Figure 7 is a broken face view illustrating the type of packing strip, together with the securing strip therefor, which it is preferred be used at the joints; and

Figure 8, an enlarged sectional view taken at the line 8 on Fig. 7 and viewed in the direction of the arrow.

Referring to the particular illustrated embodiment of my invention, a side wall of a refrigerator car of general construction as commonly provided, is represented at 9 and the opening therein through which the lading is introduced into, and withdrawn from the car is shown at 10, the opening 10 being controlled by a door represented at 11 and shown as formed of two hingedly supported sections 12 and 13.

The wall surrounding the opening 10 is formed with an inwardly extending continuous flange the upper, lower and vertical side portions of which are represented at 14, 15 and 16, respectively, this flange being set back from the outer face of the wall and presenting outwardly facing surfaces 17, 18 and 19, respectively, disposed in a plane substantially parallel with the outer face of the refrigerator side wall 9.

The door sections 12 and 13, hingedly supported on the wall 9 as hereinafter described, are provided across their upper, lower and outer edges with outwardly extending flanges 20, 21, 22 and 23 presenting rearwardly facing surfaces 24, 25, 26 and 27, respectively, which are substantially parallel with the forwardly facing surfaces of the above referred to flanges on the wall surrounding the opening 10 which they lap throughout the perimeter of the door, the inner adjacent edges of the door sections 12 and 13 being reversely stepped as represented at 28, and 29, respectively, in Fig. 4 to provide opposing surfaces 30 and 31 disposed substantially parallel with the surfaces 17—19.

Located at the joints between the door sections 12 and 13 and between these door sections and the wall surrounding the opening 10, is packing or sealing material preferably provided of a strip form as shown. The strip packing or sealing material represented at 32 and which is flatwise disposed between the opposing surfaces of the joints referred to, is formed of comparatively soft material, as for example soft rubber and comprises a base portion 33 provided on one face thereof, adjacent its opposite edges, with spaced apart parallel tubular bead portions 34. Securing strips 35, as for example of metal, are positioned in the channels between the beads 34 and against the adjacent face of the base portion 33 and are engaged by screws 36 passing therethrough and into portions of the structure at which the joints are located. In the particular construction illustrated all of the packing strips 32, except those along the joint at the bottom of the door, are provided on the outwardly facing surfaces of the joints referred to, those at the bottom of the door being secured to the rearwardly facing joint surfaces of the door to remove them from a position in which they might be damaged in the open position of the door.

It may here be stated that it is intended that the door sections 12 and 13 in being moved to

closed position be free to conformingly adjust themselves to the packing strips at the joints and permit of the door closing force being substantially uniformly distributed over the packing, thereby producing a substantially uniform and tight seal coextensive with the joints between the door and the walls of the door opening and between the door sections themselves, it being understood that the tubular bead portions **34** under the pressure exerted against them by the door sections would become distorted and somewhat flattened and thereby produce a highly effective seal.

As a desirable means for pivotally supporting the door sections **12** and **13** while permitting of the desired freedom of movement thereof for automatically adjusting conformingly to the packing, I provide link hinges as shown at **37** each comprising members **38** and **39** carrying pintles **40** and **41** and rigidly secured to the walls surrounding the opening **10** and to the adjacent door sections, respectively, and a link **42** pivoted at its opposite ends to the pintles **40** and **41**, the construction being such as shown as to permit of restricted rocking movement of the door sections **12** and **13** relative to the links **42**, but to a degree sufficient to permit the door sections to automatically conformingly adjust themselves to the packing.

Means are provided for forcing the door sections **12** and **13** together at their packing joint **30**, **31** and at the packing joints between these door sections and the wall surrounding the opening **10**, these means, which may be provided of any desirable construction and are so constructed as to permit rocking movement of the door sections relative thereto, being shown as of a construction commonly used in car doors and comprising a vertical bar **43**, having an operating handle **44**, journalled in bearings **45** and **46** on the upper and lower ends of the door sections **12** and **13** midway between their vertical side edges, the upper and lower ends of the bar **43** being provided with cranks **47** adapted to be rotated against cams **48** secured to the upper and lower portions of the wall surrounding the opening **10**, for forcing the door sections **12** and **13** against the packing between them and said surrounding wall and the door section **12** against the packing between it and the door section **13**.

As will be understood, the rotation of the bars **43**, relative to which the door sections are rotatable, from the locking position shown in Fig. 1 to releasing position, by drawing the operating handles **44** forwardly, causes the cranks to engage and cam against the forwardly facing surfaces of the wall surrounding the opening **10** with the result of exerting great force against the door in an outward direction to overcome such adherence as may exist at the packed joints, the door section **12** being opened first, and in the closing of the door, the door section **13** closed first.

The forming of the structure in such a way as described that the joints required to be packed extend substantially parallel with the side wall of the car and consequently the longitudinal axis thereof, is of great advantage, as compared with a structure in which the joints around the door and between the door sections when used, are disposed angularly to such wall; inasmuch as the vertical weaving action of the car in transit will cause the opposing surfaces at the joints to move relatively in parallel planes, thus preserving the tightness of the joints, whereas when the joints are crosswise of the wall this weaving action results in the separation of the walls at the joints thus opening up the joints with consequent impairment of the refrigerating effect.

The feature of providing the double beads **34** is not only of advantage in providing a double line seal but, in combination with the securing strip located between the beads, minimizes, in the opening of the door, the tendency to displacement of the securing strip in the case of the freezing of the packing to the part which engages with it to form the seal.

The feature of the freedom of the door sections for movement thereof automatically in conformance with the packing with substantially uniform exertion of pressure against the packing throughout its extent, makes for uniformly tight joints and, when provided with supporting and operating means for the door as described, permits of the opening and closing of the door with ease.

While I have illustrated and described a particular construction embodying my invention, I do not wish to be understood as intending to limit it thereto as the same may be variously modified and altered without departing from the spirit of my invention.

What I claim as new, and desire to secure by Letters Patent, is:

1. In a refrigerator car, the combination with its wall having an opening, of a door for said opening formed of separate sections, packing between said door and the wall of said opening and between the meeting edges of said sections, and means hingedly connecting said sections with said wall and adapting said sections at each longitudinal edge portion for automatic adjustment against said packing and means coacting with each door-section substantially midway of the longitudinal edges thereof to clamp said edge portions with equalized pressure against said packing.

2. In a refrigerator car, the combination with its side wall having an opening, of a door for said opening, said door and the wall of said opening having lapping surfaces in planes substantially parallel with said wall, packing between said lapping surfaces, and means hingedly connecting said door with said wall for movement on a plurality of parallel axes and adapting said door for automatic adjustment at its side edge portions against said packing and means coacting with the door spaced at a distance from each edge portion thereof to clamp said edge portions with equalized pressure.

3. In a refrigerator car, the combination with its wall having an opening, of a door for said opening formed of separate sections, packing between said door and the wall of said opening and between the meeting edges of said sections, means hingedly connecting said sections with said wall each on a plurality of parallel axes, one of said axes of each section being disposed between the side edges of that section and adapting said sections for automatic adjustment at each longitudinal edge portion against said packing, and means for exerting force against said door sections substantially midway between opposite edges of each thereof to move said sections to closed position against said packing and relative to which said sections are adapted to rock in seating against said packing.

4. In a refrigerator car, the combination with its wall having an opening, of a door for said opening, packing between each vertical edge portion of said door and the wall of said opening, link

hinge members crossing the junction line of said door with said wall and spaced outwardly from said door and wall, means pivoting said members to said wall, means pivoting said members to said door located intermediate the side edges of the door permitting the door to swing on an axis between said vertical edge portions and the door and the link hinge members to move bodily from the wall, portions of said members extending beyond said last-named means over, but spaced from, the face of said door for the purpose set forth and means for exerting equalized closing force on said door intermediate the side edge portions thereof.

5. In a refrigerator car, the combination with its wall having an opening, of a door for said opening, packing between the vertical side edge portions of said door and the wall of said opening, link hinge members crossing the junction line of said door with said wall and spaced outwardly from said door and wall, means pivoting said members to said wall, and means pivoting said members to said door, whereby said door may swing on two axes to equalize the pressure on said packing, and means for applying pressure to said door substantially midway between said edge portions for moving said door toward closed position against said packing and relative to which said door is adapted to rock in seating against said packing.

6. In a refrigerator car, the combination with a door opening, a door for said opening, packing at opposite side edge portions of the door and adjacent parts of the car, means mounting said door for swinging movement toward and away from said opening and for additional movement relative to said opening in a direction normal to the axis about which said door swings, and means disposed intermediate the opposite side edge portions of said door and operable to apply equalized pressure against the same and said packing.

7. In a refrigerator car, the combination with a door opening, a door for said opening, packing at opposite side edge portions of the door and adjacent parts of the car, means mounting said door for swinging movement toward and away from said opening and for additional movement relative to said opening in a direction normal to the axis about which said door swings, and means disposed intermediate the opposite side edge portions of said door and operable to apply equalized pressure against the same and said packing consisting of a rod parallel with said packing and located substantially midway therebetween, and means coacting with the rod through movement of the rod to apply the pressure.

8. In a refrigerator car, the combination with its wall having an opening, of a door for said opening, packing at opposite side edge portions of said door between said door and the wall of said opening, means hingedly mounting said door on said wall for swinging movement toward and away from said opening and additional movement relative to said opening in a direction normal to the axis about which said door swings adapting said door for automatic adjustment at longitudinal edge portions against said packing comprising link hinge members, elements pivoting said hinge members to said wall, elements pivoting said hinge members to said door located intermediate the said edges thereof, and means for forcing said door to closed position with equalized pressure against said packing and relative to which said door is adapted to rock in seating against said packing.

9. In a refrigerator car the combination with its wall having an opening, of a door for said opening, packing at opposite side edge portions of the door between said door and the wall of said opening, means hingedly mounting said door on said wall for swinging movement toward and away from said opening and additional movement relative to said opening in a direction normal to the axis about which said door swings adapting said door for automatic adjustment at longitudinal edge portions against said packing, and means for exerting equalized force against said door substantially midway between opposite edges thereof to move said door to closed position against said packing and relative to which said door is adapted to rock, in seating against said packing.

RAYMOND C. PIERCE.