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CAR DOOR

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Fig. 1

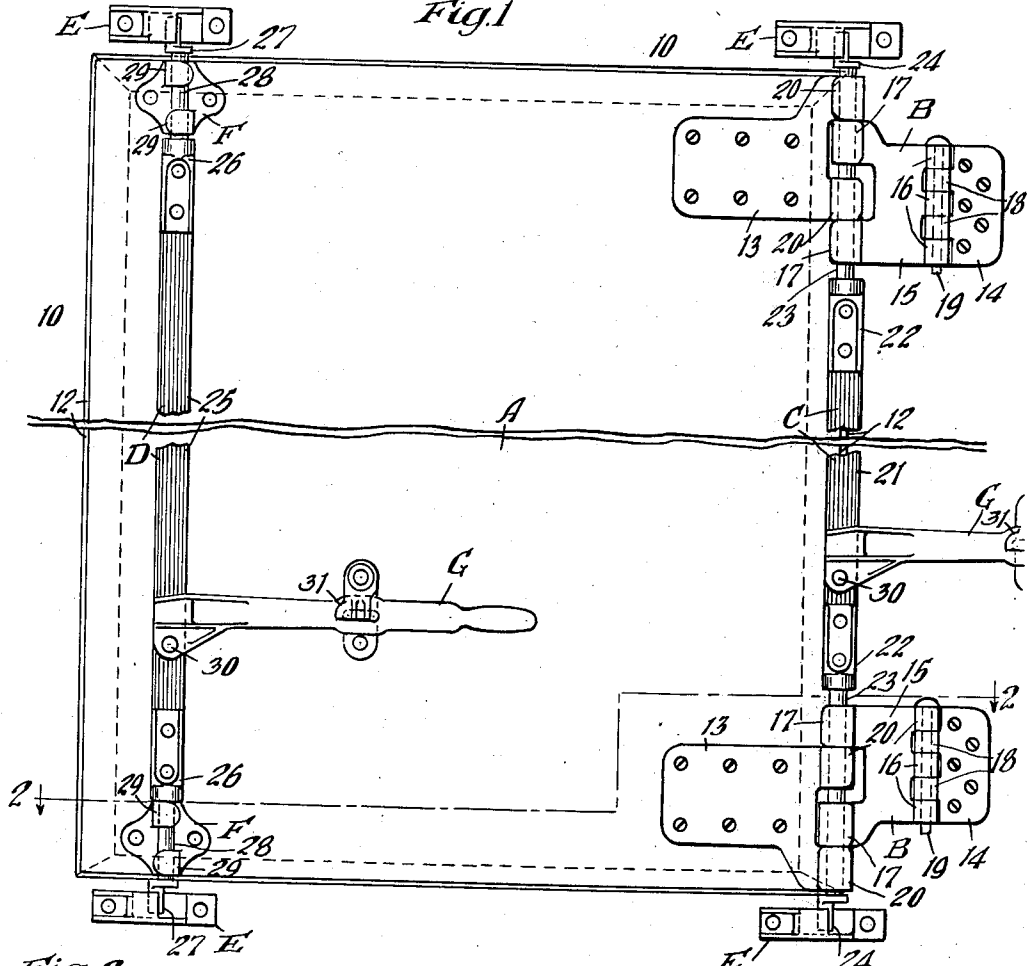


Fig. 2

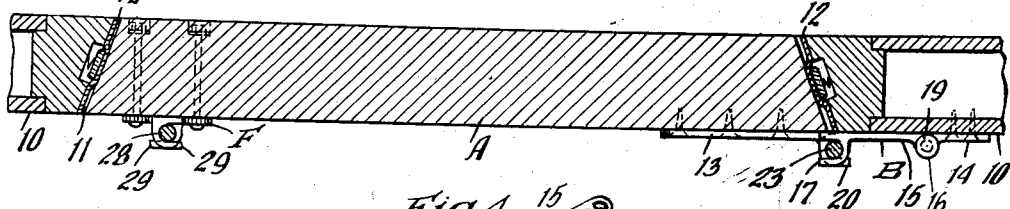


Fig. 3

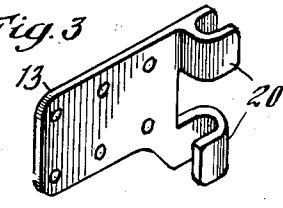
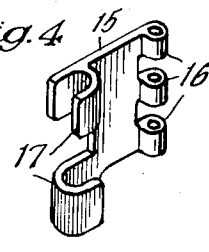


Fig. 4



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# UNITED STATES PATENT OFFICE

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## CAR DOOR

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6 Claims. (Cl. 20—21)

This invention relates to improvements in car doors.

One object of the invention is to provide a single door member for closing the door opening of a refrigerator car by being forced into said opening, wherein the door is hinged along one vertical edge by double-jointed hinge members to provide for swinging movement of the door outwardly and inwardly of the car, and also permit movement of the door on the double-jointed hinge members during the operation of forcing the door into the door opening, thereby greatly facilitating this operation and preventing binding of the hinge members and also greatly reducing the strain on the pivots thereof.

A further object of the invention is to provide a door construction of the character described in the preceding paragraph, wherein rotary locking bars, on the door, cooperating with keepers on the frame are employed to force the door to either closed or partly opened position, and one of said rotary bars also serves as pivot means between two of the sections of each double-jointed hinge member.

A still further object of the invention is to provide a single hinged door for refrigerator cars, having a rotary combined operating and locking bar cooperating therewith, wherein the door is supported for swinging movement by hinge members which also serve as bearing means for the rotary bar.

Another object of the invention is to provide in connection with a refrigerator car door having a rotary combined operating and locking bar cooperating therewith double-jointed hinge members for swingingly supporting the door, wherein each hinge member includes a strap fixed to the door frame, a strap fixed to the door, and an intermediate link strap joined to the first-named strap by a hinge pin and to the second-named strap by the operating bar, which thus forms the hinge pin connection therebetween.

Other objects of the invention will more clearly appear from the description and claims hereinafter following.

In the drawing, forming a part of this specification, Figure 1 is a front elevational view of a single door member of a refrigerator car, illustrating my improvements in connection therewith. Figure 2 is a horizontal sectional view corresponding substantially to the line 2—2 of Figure 1. Figure 3 is a detailed perspective view of one of the hinge straps employed in connection with my improved construction. And Figure 4

is a detailed perspective view of the connecting link strap which cooperates with the hinge strap shown in Figure 3.

In said drawing, 10 designates the side wall of a refrigerator car which is provided with the door opening 11 and closed by a single door member A. The cooperating meeting faces of the door and walls of the door opening are beveled, as shown most clearly in Figure 2, whereby the door is tightly wedged into the door opening when closed. The usual insulation is provided between these cooperating faces, the same being indicated generally by 12—12 in Figure 2.

My improved door construction comprises broadly the door A; a pair of double-jointed hinge members B—B; a rotary operating bar C forming part of the hinge connecting means of the hinge members B—B; a second rotary operating bar D; two pairs of keepers E—E and E—E respectively cooperating with the operating bars; two bearing brackets F—F for the bar D; and a pair of operating levers G—G, one for each bar.

The door A is supported along one vertical edge by the hinge members B—B, two such hinge members being shown. Each hinge member B includes a hinge strap 13 secured to the door, a supporting hinge strap 14 secured to the wall of the car adjacent to the door opening, and a connecting link strap 15 between the straps 13 and 14. The connecting link strap 15 of each hinge member has three hinge eyes 16—16—16 at one end thereof and a pair of hook-like hinge lugs 17—17 at the other end thereof. The hinge eyes 16—16 are spaced apart as usual, and hinge eyes 18—18 formed on the supporting hinge strap 14 engage therebetween. The hinge strap 14 and the link 15 are connected by the usual hinge pin 19 which extends through the eyes 16 and 18. The lugs 17—17 at the opposite end of the link strap 15 are spaced apart, as shown most clearly in Figures 1 and 4. As will be understood, Figure 4 shows the link strap of the lower hinge member illustrated in Figure 1, the link strap of the upper hinge member having the lugs 17—17 thereof reversely arranged. The lower lug of the link strap 15, as shown in Figure 4, has the end of the hook portion thereof bent inwardly parallel to the main body portion of the link, so that the same opens toward the inner side of said strap. This lower lug is offset downwardly with respect to the main body portion of the strap 15, as clearly shown in Figure 4 and in connection with the lower hinge in Figure 1. The upper hinge lug 17, as shown in Figure 4, is of substantially

U-shaped cross section and opens in a direction reverse to that of the lower lug.

The hinge strap 13, which is shown in Figure 3 and corresponds to the strap 13 of the bottom hinge B shown in Figure 1, has a pair of spaced hinge lugs 20—20 which are substantially the reverse of the lugs 17—17 of the link strap shown in Figure 4. The lower lug 20 is also in the form of a hook and is offset downwardly with respect to the main body portion of the strap 13. The upper lug 20 of the strap 13 is of U-shaped cross section, as clearly shown in Figure 3. When the hinge strap 13 and the corresponding link 15 are joined together, the lower lug 17 of the link 15 is embraced by the lugs 20—20 of the cooperating hinge strap 13, the upper lug 20 being entered between the lugs 17—17.

The operating bar C is disposed along the vertical edge of the door A to which the hinges B—B are connected and serves as hinge pin means for joining the hinge sections 13 and 15 of each hinge member B. As shown, the bar C includes a substantially rectangular central section 21 having end members 22—22 secured thereto, each end member having a forked portion at the inner end embracing the bar 21 and being riveted thereto. Each end section 22 is provided with an elongated cylindrical portion 23 which is journaled in the hinge lugs 17—17 and 20—20 of the link strap 15 and hinge strap 13 of the corresponding hinge member B. As will be evident, in addition to serving as hinge pin means, the end sections 23 also serve as journal members for rotatably supporting the operating bar on the door. At the upper and lower ends the bar is provided with crank members 24—24 which are formed integral with the sections 23—23 and provide keeper engaging means which is effective during opening and closing of the door.

In applying the hinge strap 13 and the hinge link 15 to the operating bar, the hinge strap 13 is preferably first attached by disposing the same at an angle to the bar with the journal portion 23 disposed between the two hinge lugs 20—20. The hinge member is then turned so as to enter the journal portion of the bar within the openings of the lugs 20—20 by bringing the same to a position at right angles to the axis of the bar. The hinge link strap 15 is applied in a similar manner, but as is evident, must be turned to a position at right angles to the strap 13 while being attached to the bar.

The operating bar D is mounted on the door at the side opposite to the bar C, adjacent to the vertical edge of said door. The bar comprises a central section 25 of substantially rectangular cross section and end members 26—26 which have cranks 27—27 at the outer ends thereof forming keeper engaging means. Inwardly of the crank member 27 each end section 26 is provided with a cylindrical journal portion 28 rotatably mounted in one of the brackets F. Each end section 26 is forked, and said forked portion receives the end of the operating bar which is riveted thereto. The bearing brackets F—F which support the bar D are of similar design, each comprising a plate-like section which is fixed to the door and a pair of spaced bearing lugs 29—29. The bearing lugs 29—29 are in the form of hook members which are reversely arranged, each hook member comprising an end section which is disposed substantially parallel to the main body portion of the bracket. As will be evident, the brackets may be assembled with the bar D before being fixed to the door by disposing each bracket at an angle to

the bar with the bearing portion 28 of the bar disposed between said lugs, the bracket being then turned to the position shown in Figure 1.

The keepers E—E which are arranged in pairs cooperating with the two bars are provided with the usual guide slots for receiving the ends of the crank members while actuating the door to open or close the same. The keeper members of each pair are disposed above and below the corresponding operating bar and are fixed to the side wall of the car. Each operating bar C and D is provided with an actuating handle lever of the usual design. As shown, each lever is pivotally connected to the central member of the corresponding bar by means of a pin 30. Each lever also cooperates with the usual latch bracket 31 which is adapted to receive the ordinary car seal.

In closing the door, the same is swung to partly closed position on the hinge members B, whereby the crank portions of the operating bars C and D are disposed to engage with the slots of the corresponding keepers upon rotation of said bars. The bar C is preferably first operated by rotating the same in the proper direction to enter the crank members thereof within the slots of the keepers E—E and cam the door into the door opening. The bar D is then operated in a similar manner to force the corresponding side portion of the door into the opening. In opening the door, the operation is substantially the reverse of that described, the bar D being first rotated to force the corresponding side of the door outwardly. The bar C is then operated to force the corresponding side of the door out of the door opening, thereby completely disengaging the door and permitting the same to be swung to fully opened position on the hinge members B—B.

I have herein shown and described what I now consider the preferred manner of carrying out my invention, but the same is merely illustrative and I contemplate all changes and modifications that come within the scope of the claims appended hereto.

I claim:

1. In a swinging door for closing the door opening of a refrigerator car, the combination with a plurality of hinge members, each including a plurality of hinge straps for swingingly supporting the door along one edge; of a rotary operating bar supported by said hinge members and forming hinge pin means for pivotally joining the straps of each hinge member, said bar having actuating means at opposite ends thereof; and keeper means on the car engageable by said actuating means for forcing the door open and closed when said bar is rotated in reverse directions.

2. In a hinged door for closing the door opening of a refrigerator car, the combination with a plurality of hinge members for supporting said door for swinging movement, each hinge member including a strap fixed to the car, a supporting strap fixed to the door, and a connecting link strap pivotally joined at opposite ends to said first-named straps by hinge pin means; of a rotary operating bar having cylindrical journal portions forming the pivotal connection between the first-named strap and the link strap of each hinge member, said bar having keeper engaging means at opposite ends thereof; and keepers on the car cooperating with said bar.

3. In a hinged door for closing the door opening of a refrigerator car, the combination with a plurality of hinge members swingingly supporting the door along one edge, each hinge mem-

ber including a strap secured to the car having hinge pin receiving lugs at the free end thereof, a strap secured to the door and having hinge pin receiving lugs at the free end thereof, and a connecting link strap having hinge pin receiving lugs at opposite ends thereof; of a hinge pin extending through the lugs at one end of said link strap and through the lugs of the first-named strap for pivotally connecting the same; a rotary operating bar having portions extending through the lugs at the other end of said link strap and the lugs of the second-named strap for pivotally connecting the same, said bar having keeper engaging means thereon; and keepers fixed to the car, said keepers being engageable by said means for actuating the door.

4. In a hinged door for closing the door opening of a refrigerator car, the combination with a plurality of hinge straps secured to said door adjacent to one end thereof, said straps having hinge pin receiving lugs at the free ends thereof; of a link strap cooperating with each of said hinge straps and having hinge pin receiving lugs at opposite ends thereof; a plurality of hinge straps fixed to the car adjacent to the door and having hinge pin receiving lugs at the free ends; hinge pins extending through the lugs of said last-named straps and the lugs at one set of ends of the link straps; a rotary operating bar extending through and journaled in the pin receiving lugs of said first-named straps and the pin receiving lugs at the opposite set of ends of said link straps, thereby pivotally connecting the same to said first-named straps, said bar having keeper engaging crank means thereon; and keepers fixed to the car engageable by said crank means of the bar.

5. In a hinged door for closing the door open-

ing of a refrigerator car, the combination with a rotary operating bar disposed along the edge of the door, said bar having keeper engaging means at opposite ends thereof; of hinge straps fixed to the door and having the bar journaled in the free ends thereof; supporting hinge straps fixed to the car; and link straps connecting said first and second-named straps, each link strap being journaled at one end on said bar and pivotally connected at the other end to one of said supporting straps.

6. In a hinged door for closing the door opening of a refrigerator car, the combination with a rotary operating bar disposed along one end edge of the door, said bar having keeper engaging means at opposite ends; of keepers fixed to the car adjacent to said door opening and cooperating with said keeper engaging means respectively; top and bottom pairs of hinge straps, one of said straps of each pair being fixed to the door, and the other strap of each pair being secured to the door frame; top and bottom connecting links, one for each pair of hinge straps; and a hinge pin member pivotally connecting one hinge strap of each pair to one end of the corresponding link, each of said links having reversely directed hooklike pivot lugs at the other end, and the other strap of each of said pairs also having hooklike pivot lugs reversely arranged to said hooklike lugs on the link, said hooklike pivot lugs of said top and bottom hinge links and said hooklike pivot lugs of said top and bottom hinge straps being engaged about said operating bar to pivotally connect said top and bottom hinge links to said top and bottom straps respectively and rotatably support said operating bar.

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