June 18, 1946. G. E. DATH 2,402,241

DOOR OPERATOR

Filed Sept. 27, 1943

Fig. 1

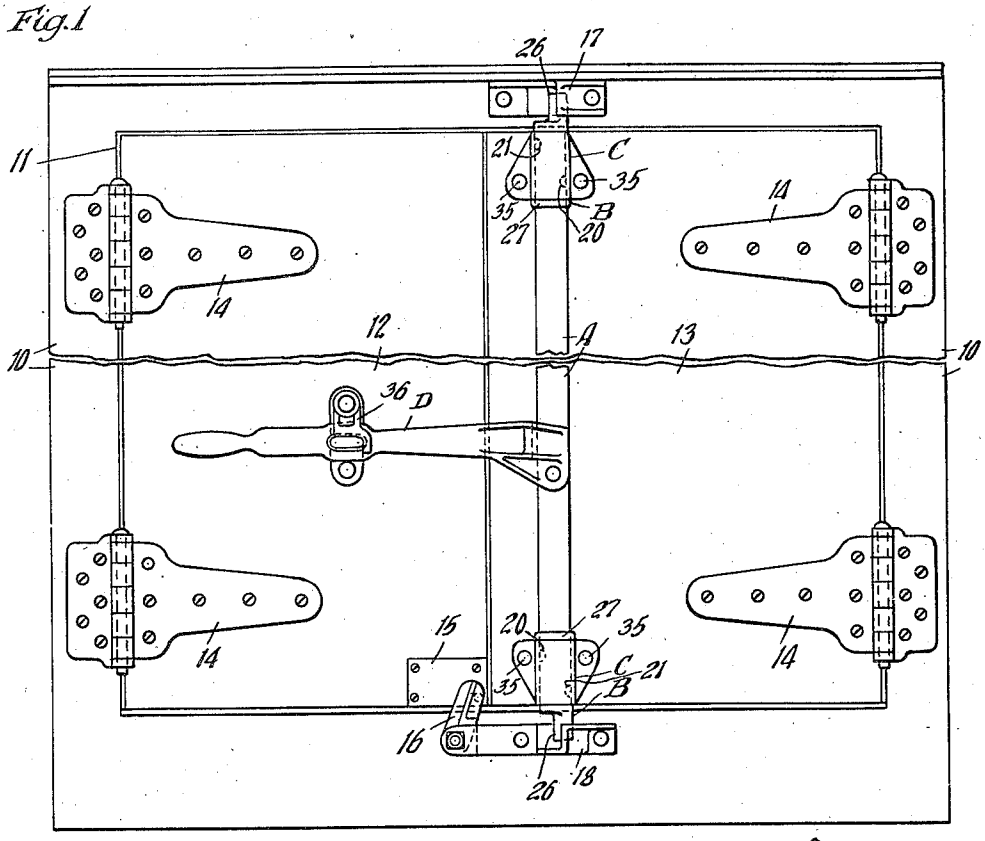


Fig. 2

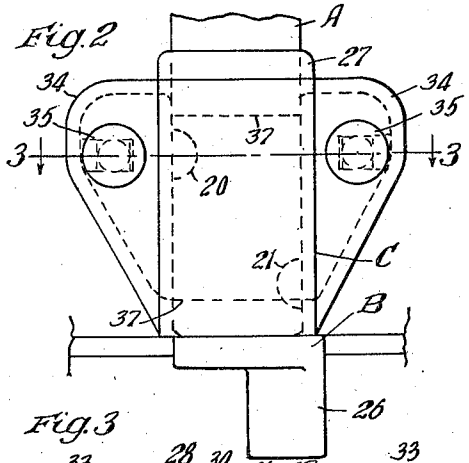


Fig. 3

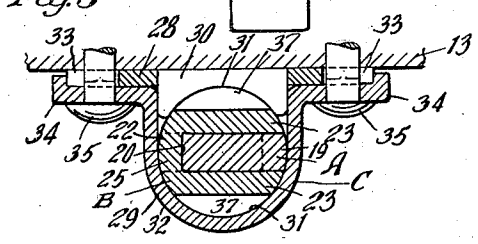
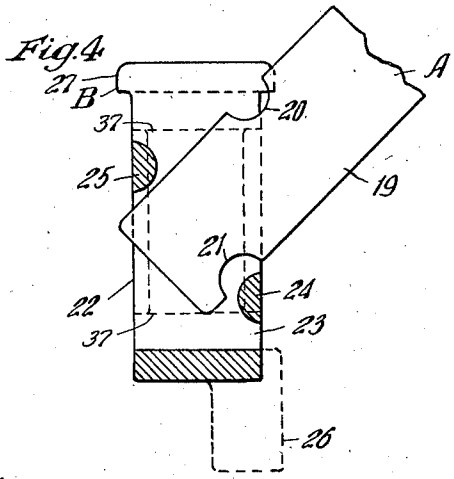


Fig. 4



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DOOR OPERATOR

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Application September 27, 1943, Serial No. 503,867

6 Claims. (Cl. 292—218)

1

This invention relates to improvements in door operators especially designed for use in connection with refrigerator cars.

One object of the invention is to provide a rotary operating means for forcing the doors of refrigerator cars either open or tightly closed, including a rotary bar and end members secured thereto, the end members having camming engagement with keepers on the car wall, wherein the end members and bar have interengaging means thereon for connecting the same in assembled condition, thereby greatly simplifying the construction and materially reducing the cost of manufacture, the usual labor involved in fixedly securing the end members to the bar being eliminated.

A further object of the invention is to provide a door operating means, as described in the preceding paragraph, wherein the assembled bar and end members are maintained in their connected condition by having the connected portions thereof embraced within the usual bearing brackets for rotatably supporting the door operator.

A more specific object of the invention is to provide an operating means comprising a rotary bar and separate end members having forked portions embracing the ends of the bar, wherein the cooperating end portions of the bar and the forked portions of the end members have interengaging lugs and seats for anchoring the end members to the bar, the connected portions of the end members and seats being held against separation by being confined within the usual bearing brackets for mounting the operating means on the door.

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 an elevational view of a pair of hinged doors mounted on a refrigerator car and illustrating my improvements in connection therewith. Figure 2 is an enlarged elevational view of the lower end portion of the operating means comprising my improvements as illustrated in Figure 1. Figure 3 is a horizontal sectional view, corresponding substantially to the line 3—3 of Figure 2. Figure 4 is a central vertical sectional view through the end member at the lower end of the operator, showing the lower end of the operating bar in elevation and illustrating the manner of assembling the parts, the section being on a plane parallel to the

2

planes of the members of the forked portion of said end member.

In said drawing, 10 designates the side wall of the car, provided with the usual door opening 11, which is closed by a pair of hinged doors 12 and 13. The hinged doors are of the usual design having beveled edges which cooperate with correspondingly beveled edges of the door frame. The meeting edges of the two doors are also beveled and all of the cooperating engaging faces of the doors and door frame are provided with the usual insulating material. The door 12 is the first closed, the beveled edges being so arranged that the inner edge of the door 13 overlaps the inner edge of the door 12. As shown, each door is supported by a pair of hinges 14—14 of the usual type employed in connection with double doors of refrigerator cars. The door 12 is provided with a protecting wear plate 15 at the lower inner corner thereof, as clearly shown in Figure 1, over which a pivoted latch member 16 is adapted to engage to hold the door closed.

The usual top and bottom keepers 17 and 18 are employed in connection with my improved operating means, the same being provided with cam slots within which the offset end members of the operating bar are adapted to engage. As shown in Figure 1, the lower keeper is extended to the left and has the pivoted latch 16 mounted on the outer end thereof.

My improved operating means comprises broadly a vertically disposed, substantially flat bar A; a pair of top and bottom end members B—B forming the keeper engaging means of the actuating mechanism; a pair of top and bottom bearing brackets C—C secured to the door; and an operating lever D.

The bar A is of substantially rectangular transverse cross section throughout its length and has the edges rounded off so as to be accommodated for rotary movement in the corresponding bearing brackets C—C. In Figure 3, which shows the rounded edged bottom end portion of the bar A, said bottom end portion is indicated by 19. As shown most clearly in Figures 1, 2, and 4, the top and bottom end portions 19—19 of the bar have the opposite side edges thereof provided with notches 20—21, said notches being diagonally opposite, the notch 21 being located close to the corresponding end of the bar at one side thereof and the notch 20 being spaced inwardly from said first named notch and located on the opposite side of the bar. The notches 20 and 21 provide semi-cylindrical, laterally, out-

wardly opening seats, as clearly shown in Figure 4.

The top and bottom end members B—B are of similar design, each comprising a forked portion 22 embracing the corresponding end of the bar at opposite sides. The spaced arms or members forming the fork portion 22 of the bottom end member are indicated by 23—23 in Figures 3 and 4. Each end member is provided with a pair of lugs 24 and 25 of semi-cylindrical cross section. The lugs 24 and 25 span the opening between the arms 23—23 of the forked portion, extending from one member to the other and being integral therewith. As shown in Figures 2 and 3, the lugs 24 and 25 are located at opposite sides of the corresponding end member, the lug 24 being near the lower end and the lug 25 being near the upper end thereof. In the assembled condition of the bar, the end members B—B are in longitudinal alignment with the bar A, with the arms 23—23 of said respective end members embracing the top and bottom ends of the bar at opposite sides, and with the lugs 24 and 25 of each end member seated respectively in the notches or seats 21 and 20. As will be evident, when the parts are thus aligned with the lugs of the end members engaged in the notches of the bar, the parts are securely anchored to each other. Each end member B is provided with the usual crank arm 26 at the outer end thereof adapted to engage with the cam slot of the corresponding keeper member to force the door partly open or tightly closed, as is well known in this art. At opposite ends thereof, the arms 23—23 of the forked portion of each bracket B are provided with enlargements 37—37 which are rounded to fit the bearing portions of the corresponding bearing bracket C. At the inner end each end member B is provided with transversely aligned, horizontally disposed, curved flanges 27—27 extending laterally from the arms 23—23 of the fork, adapted to engage the inner end face of the corresponding bearing bracket to hold said end member against endwise movement outwardly of said bracket.

The bearing brackets C—C, which are secured to the door 13 adjacent the top and bottom ends thereof, are of two piece construction, each comprising a back plate 28 and a cover plate 29. The back plate 28 is provided with bearing projections 30—30 at the inner and outer ends thereof, which present concave bearing surfaces 31—31. The cover plate 29 is in the form of a strap having a central, partly cylindrical, outwardly offset portion 32 presenting concave bearing surfaces opposed to the concave bearing surfaces 31—31 and complementary thereto. The plates 28 and 29 are respectively provided with laterally extending securing ears 33—33 and 34—34, the ears 34—34 of the plate 29 overlying the ears 33—33 of the plate 28. The two part bearing brackets C—C are held assembled and secured to the door 13 by bolts 35—35 extending through the door 13 and ears of the plates 28 and 29 of the respective brackets. The bearing brackets C—C serve to rotatably mount the device on the door 13 and house the opposite ends of the bar A and the forked portions of the end members B—B, thus confining these parts against relative displacement sidewise, thereby retaining the lugs of the members seated in the notches of the bar.

As shown in Figure 3, the edges of the arms of the fork of each end member are rounded off to correspond with the bar A to properly fit the circular bearing portions of the bearing brackets, to mount the parts for easy rotative movement therein.

In assembling the parts of my improved door operating means, the end members B—B are first attached to the bar A in the manner indicated in Figure 4. In attaching each end member, the same is disposed at an angle to the longitudinal axis of the bar, as shown in Figure 4, and the bar end is entered flatwise between the arms 23—23 to the extent shown, so that the notch 21 of the bar is closely adjacent the lug 24 of the end member B. The end member B is then swung into longitudinal alignment with the bar, thereby engaging the lugs 24 and 25 in the notches 21 and 20, securely anchoring the end member to the bar. After both end members have been thus applied to the bar A, the assembly is mounted on the door by the brackets C—C, the separable plates 28 and 29 of each bearing bracket being applied at opposite sides of the connected bearing portions of the end member and bar at the corresponding end of the bar and secured together and fixed to the door 13 by the securing bolts 35—35.

The operating lever D is pivotally secured to the bar A, as is well known in this art, and is normally locked with the doors in closed position by means of well known latch means, which is indicated by 36, sealed with the usual car seal in a well known manner.

In the operation of my improved door actuating means, rotation of the bar A in the proper direction forces the door either open or closed by camming engagement of the crank members of the end members B—B of said bar A with the keepers 17 and 18 in a manner well known.

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 device of the character described, the combination with a two piece bearing bracket comprising front and rear plate elements, said bracket having a substantially cylindrical bearing opening formed partly on each of said elements thereof; of a rotary bar member having one end thereof extending into said bracket; an end member on said bar member having a bearing portion extending into said bracket between the elements thereof in overlapping relation to said end of the bar member, said end member having a radially extending keeper engaging projection thereon; and means for anchoring said end member to the bar member comprising a notch in the edge of the overlapping portion of one of said members, and a lug at the edge of the overlapping portion of the other of said members engaged in said notch, said lug being engageable with said notch by relative lateral displacement of said members, said overlapping portions of said members fitting in the opening of said bracket and being confined between said elements thereof against lateral displacement to hold said lug seated in said notch.

2. In a device of the character described, the combination with a vertically split bearing bracket comprising front and rear plates, said bearing bracket having a substantially cylindrical bearing opening formed partly on each plate thereof; of a rotary bar member having one end thereof extending into said bracket between the plates thereof and rotatable therein; an end

member on said bar member having a bearing portion extending into said bracket between said plates thereof in overlapping relation to said end of the bar member, said end member having a radially extending keeper engaging projection thereon; means anchoring said end member to the bar member, comprising longitudinally spaced notches in the opposite edges of the overlapping portion of one of said members; and spaced lugs at the opposite edges of the overlapping portions of the other of said members engaged in said notches respectively when said members are in axial longitudinal alignment, said lugs being engageable in said notches by relative sidewise and angular displacement of said members, said overlapping portions of said members fitting said bracket and being confined between the plates thereof against lateral displacement to hold said lugs seated in said notches.

3. In an operating means for forcing a swinging door either closed or open, the combination with top and bottom vertically split, two part bearing brackets mounted on the door; of an elongated, vertically disposed, rotary operating bar member having its top and bottom ends rotatably mounted in said brackets embraced by the parts thereof; forked end members at opposite ends of the bar having the forked portions thereof embracing the corresponding ends of the bar within said split, two part brackets, said end members having radially projecting keeper engaging means thereon; and means for anchoring said forked portions of the end members to the bar members, comprising interengaging lugs and notches on said members respectively, said lugs and notches being retained in engaged condition between the parts of said vertically split brackets.

4. In a device of the character described, the combination with vertically disposed, two part bearing bracket having a bearing opening; of a rotary bar member having one end thereof extending into said bracket and embraced between the parts thereof; a forked end member on said end of the bar member having the forked portion thereof extending into said two part bracket in embracing relation to said end of said bar member, said end member having a radially extending keeper engaging projection thereon at the outer end thereof; and means on said forked

portion and embraced end of the bar member for securing said end member to said bar member comprising a notched seat in the edge of one of said members, and a cooperating, laterally projecting lug on the other member engaged in said notch, said lug and notched seat being engageable with each other by relative lateral displacement of said forked end of the end member and said end of the bar member, said forked end and said end of the bar member fitting the opening of said bearing bracket and being embraced between the two parts of said bracket and held against relative lateral displacement thereby.

5. In an operating means for forcing a swinging door either closed or open, the combination with an elongated operating bar; of keeper engaging end members at opposite ends of said bar overlapping the ends of said bar, said keeper engaging members having radially projecting crank arms at their outer ends; means for anchoring said end members to the bar comprising interengaging lugs and notches on said overlapping portions of said bar and end members; and two piece bearing brackets comprising front and rear sections secured to the door with said front and rear sections embracing said overlapping portions therebetween and mounting said operating bar for rotary movement.

6. In an operating means for forcing a swinging door either closed or open, the combination with top and bottom bearing brackets mounted on the door, each bracket comprising front and rear separable members; of an elongated, vertically disposed, rotary operating bar having its top and bottom ends rotatably mounted in said bearing brackets and embraced between said front and rear members thereof; keeper engaging end members at opposite ends of said bar extending into said brackets in overlapping relation to the ends of said bar, said end members having radially projecting crank arms at their outer ends; and means for anchoring said end members to the bar comprising interengaging lugs and notches on said overlapping portions of said bar and end members, said lugs and notches being retained in engaged condition by said front and rear members of said brackets.

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