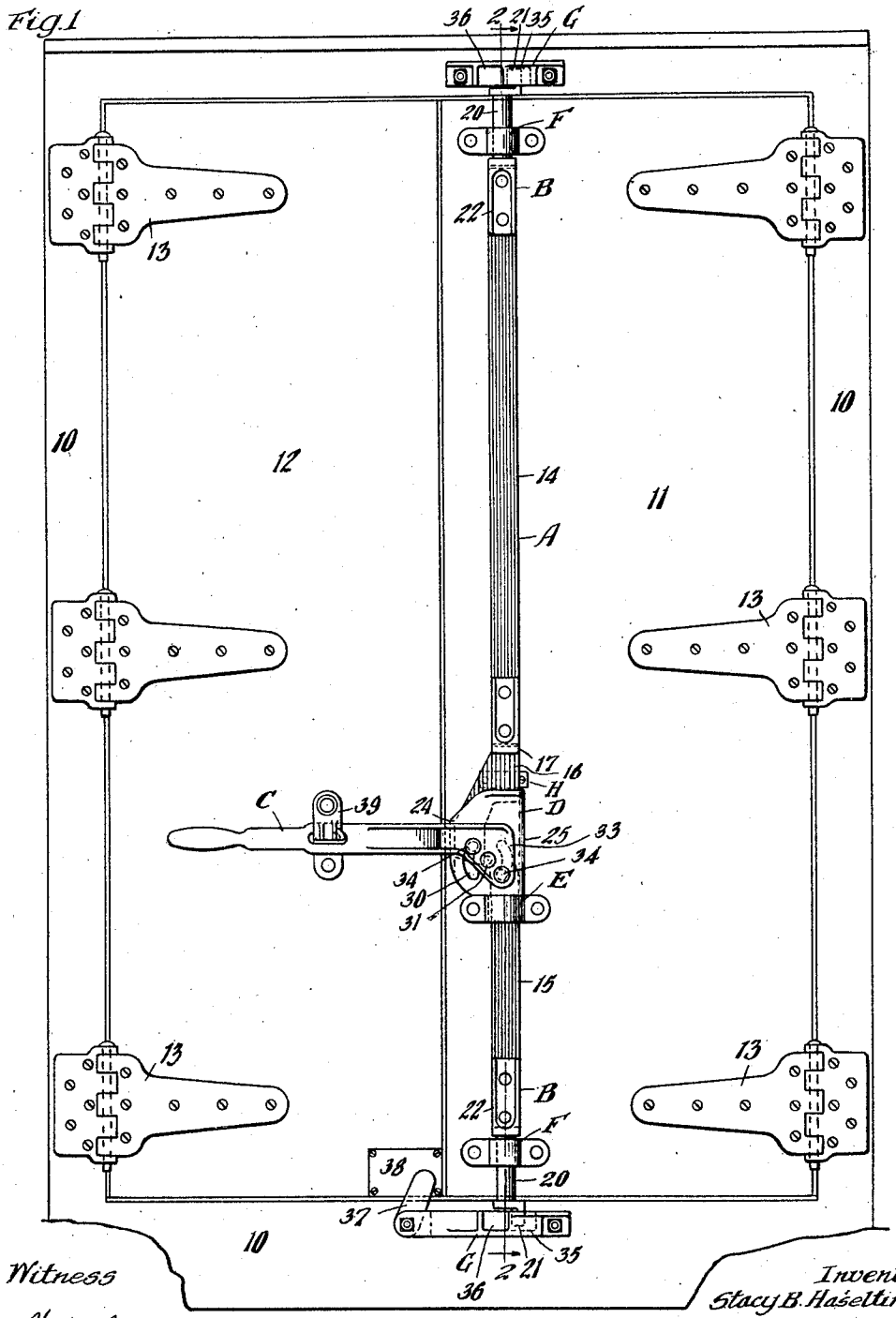
June 3, 1930. S. B. HASELTINE 1,761,208

DOOR OPERATING MECHANISM

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Fig. 1



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DOOR OPERATING MECHANISM

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Fig. 2

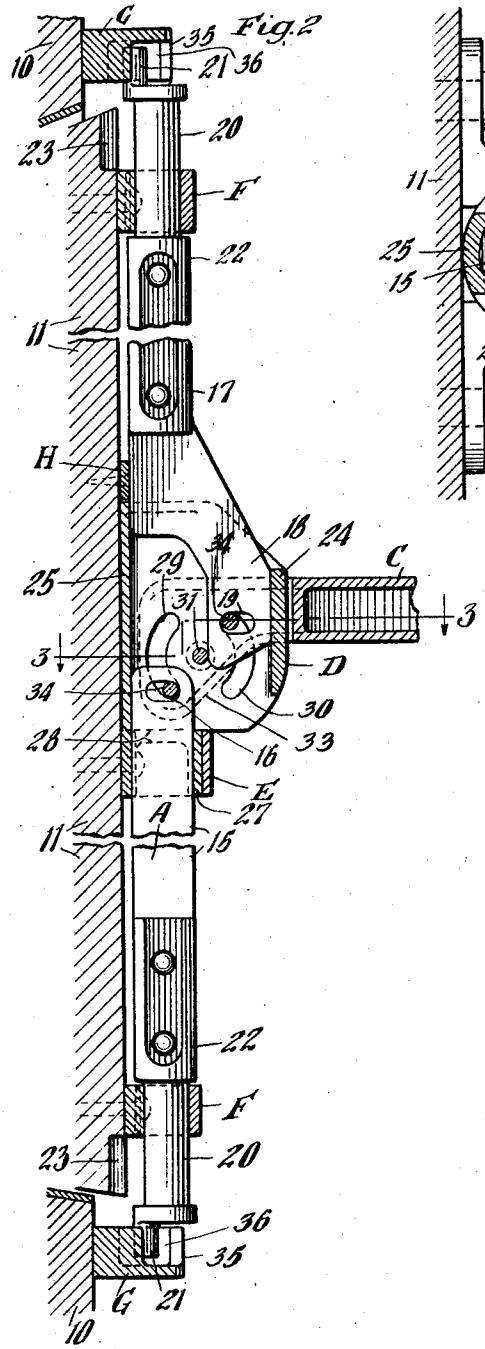


Fig. 3

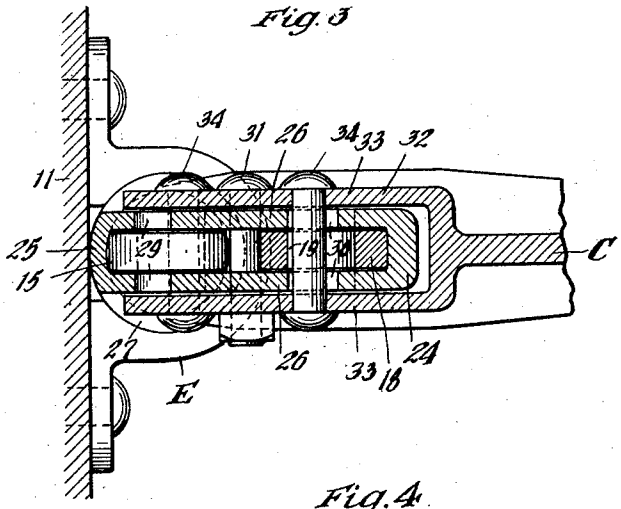
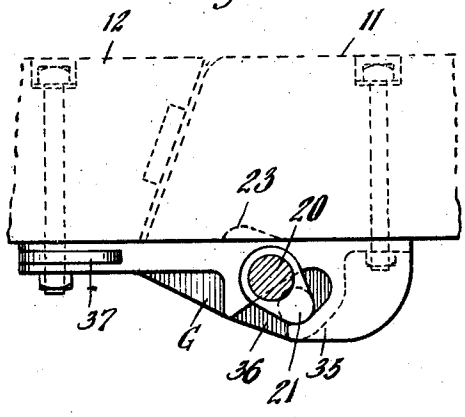


Fig. 4



Witnesses

Wm. Geiger

Inventor
Stacy B. Haseltine

By George S. Haight
His Atty.

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UNITED STATES PATENT OFFICE

STACY B. HASELTINE, OF CHICAGO, ILLINOIS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO W. H. MINER, INC., OF CHICAGO, ILLINOIS, A CORPORATION OF DELAWARE

DOOR-OPERATING MECHANISM

Application filed February 18, 1924. Serial No. 693,648.

This invention relates to improvements in door operating mechanisms.

In the operation of refrigerator cars having swinging side doors, it is frequently found impossible to open and close the doors when the car is at the loading platform, due to the end portion of the shaft of the usual operating mechanism with which the doors are provided extending below the level of the platform, thereby obstructing the movement of the doors. This difficulty exists in spite of the fact that loading platforms are ordinarily so designed as to provide clearance below the normal level of the lower edges of the doors to accommodate the projecting operating devices, because the lower edges of the doors of the cars are not always at a uniform level above the road bed, and the amount of clearance actually provided in practice is so little as to be inadequate to take care of these variations. This irregularity in height is due to the difference in height of the bodies of the different cars above the rails and also the difference in height of the body of the same car above the road bed under varying load conditions, it being evident that the car body will be suspended by the truck springs at a lower level when fully loaded than when empty. The most common form of door operating mechanism now generally used includes a shaft mounted on one of the doors having crank portions projecting beyond the top and the bottom edge of the door, cooperating with keepers mounted at the top and bottom of the door frame opening. In this type of operating mechanism, the projecting lower crank portion frequently interferes with the door opening operation as hereinbefore pointed out.

The principal object of the invention is to overcome the defects above pointed out by providing a door operating mechanism especially adapted for refrigerator cars, wherein the protruding portions of the operating mechanism may be withdrawn beyond the top and bottom limits of the doors to properly clear the loading platform.

A more specific object of the invention is to provide an operating mechanism of the character indicated, comprising a two-part, vertically disposed, operating shaft, rotatably mounted on one of the doors, having extensions which may be projected beyond the top and bottom edges of the door to coact with keepers on the door frame and which are adapted to be withdrawn inwardly beyond the edges of the door to clear the loading platform after the door has been forced partly open, so that the latter may be freely swung entirely open.

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

In the drawings forming a part of this specification, Figure 1 is a side elevation of a portion of a refrigerator car, showing my improvements in connection therewith. Figure 2 is a vertical sectional view, on an enlarged scale and partly broken away, corresponding substantially to the line 2—2 of Figure 1, showing the operating shaft revolved through 90° from the position shown in Figure 1. Figure 3 is a horizontal, sectional view, on a further enlarged scale, corresponding substantially to the line 3—3 of Figure 2. And Figure 4 is an enlarged, horizontal, sectional view through the lower end of the operating shaft showing in detail the lower keeper.

In said drawing, the side of the car is shown as provided with a door frame 10 and two pivoted doors 11 and 12 having meeting beveled edges in the usual manner. The customary insulation or packing is employed between the meeting edges of the doors and door frame and also between the meeting edges of the doors themselves. The doors 11 and 12 are mounted for swinging movement about vertical axes, being supported by suitable hinges 13.

As shown, the improved door operating mechanism comprises broadly, a two-part operating shaft A, provided with two end castings B—B; an operating handle C; an operating handle support D; a bearing bracket E; upper and lower bearing members F—F; and upper and lower keepers G—G.

The operating shaft comprises upper and lower flat bars 14 and 15 of substantially rectanguar cross-section throughout their

length. Adjacent the upper end, the bar 15 is provided with a horizontally disposed opening 16 elongated in the direction of the width of the bar. The bar 14 has fixed to its lower end a head 17 in the form of a casting having a slotted upper end portion adapted to receive the bar and secured thereto by rivets or any other suitable fastening devices. The lower end of the head 17 is in the form of a flat plate having the lower end portion 18 thereof offset outwardly in the direction of the width of the plate. Adjacent the lower end, the offset portion 18 is provided with an opening 19 elongated in the direction of the width of the plate.

The two end castings B, which are of like construction, are fixed respectively to the upper end of the bar 14 and the lower end of the bar 15. Each casting B. as shown, is preferably in the form of a crank member having a cylindrical journal portion 20 and an offset cylindrical end portion 21 of relatively smaller diameter forming the crank arm proper. At the end opposite to the crank arm, each casting B is provided with a head 22 which is vertically slotted to receive the end of the corresponding bar of the two-part shaft A, to which it is fixed by rivets or any other suitable form of securing devices.

The bearing brackets F—F which are of like construction, and each made in two parts, comprising a front and back plate, are secured to the door 11 adjacent the free edge thereof, one of the brackets being disposed closely adjacent the top and the other closely adjacent the bottom edge of the door. The brackets F are each provided with a central enlargement having a vertically disposed bearing opening therein adapted to rotatably and slidably receive the journal 20 of the corresponding end casting, each of the journals 20 being of such a length as to allow sufficient vertical movement to permit the crank arms to be projected into engagement with the keepers G and to be withdrawn inwardly beyond the corresponding edge of the door. As clearly shown in Figure 2, the outer surface of the door 11 is recessed slightly at the top and bottom as indicated at 23 to accommodate the crank arms when the bars 14 and 15 are retracted, and the operating handle C is swung through 180° from the position shown in Figure 1.

The operating handle support D comprises a rectangular housing having vertically disposed front and rear walls 24—25, and spaced vertical side walls 26—26, the rear wall 25 being curved transversely to properly clear the outer surface of the door when the housing is rotated by means of the handle C. At the lower end, the housing D is provided with a hollow cylindrical boss 27 formed integral with the rear and side walls, the boss 27 being journaled in the bearing bracket E fixed to the door 11 by any suitable form of securing devices. The boss 27 is formed with a vertically disposed guide opening 28 of rectangular cross-section, adapted to accommodate the upper end of the bar 15 for vertical sliding movement. Each of the side walls 26 is provided with a pair of concentric arc shaped slots 29 and 30, for a purpose hereinafter described. The two sets of slots 29 and 30 of the side walls are disposed in alinement as clearly shown in Figures 2 and 3. The housing D acts as a guide for the adjacent ends of the bars 14 and 15, the lower end of the former and the upper end of the latter extending into the same and working between the side walls 26. To retain the housing D in position, a suitable stop plate H is provided. The stop plate H engages the upper end of the housing with a slight clearance normally therebetween and is fixed to the door 11.

The handle or lever C is pivotally mounted on the housing D by means of a bolt 31, the lever C being provided with a forked head 32, the arms of which straddle the housing and are adapted to receive the opposite ends of the pivot bolt. Each of the arms of the head is enlarged at its outer end in the direction of its width, thereby providing an offset portion as indicated at 33. A pair of transversely disposed guide pins 34 are fixed to the head 32, the same being disposed on opposite sides of, and equally spaced from the pivot bolt 31. One of the pins 34 is located at the outer end of the head 32 and extends through the opening 16 of the bar 15 and the slots 29 of the housing, having its opposite ends fixed in the offset portions 33 of the arms of the head. The other pin 34 is located at the inner end of the head and extends through the opening 19 of the arm 18 and the alined slots 30 of the housing. The handle C is thus operatively connected to the bars 14 and 15 by the pins 34 to effect reciprocation of the bars upon oscillation of the handle on its pivot, the pins being guided in the slots 29 and 30, and the elongated openings in the bars within which the pins work permitting sufficient play to prevent binding of the parts.

The upper and lower keepers G—G are substantially the same construction, each being in the form of a plate having an outwardly offset enlargement 35 provided with an inclined slot or double acting cam groove 36. The keepers G are fixed to the door frame 10 adjacent the top and bottom of the opening therein, being so disposed as to cooperate with the upper and lower crank arms 21 respectively of the two-part shaft A.

The plate of the lower keeper G is extended to the left as seen in Figure 1 beyond the edge of the door 11 and has pivotally mounted thereon a latch member 37 adapted to coact with a plate 38 fixed to the door 12 adjacent the lower outer corner thereof. The latch 37 serves to retain the door 12 in posi-

tion when closed and to prevent the doors from jamming in the door opening when opening the right hand door 11. The handle C is adapted to be locked, as shown in Figure 1, by any suitable locking device as indicated at 39, and sealed in any suitable manner customary in connection with railroad cars.

In the operation of my improved device, the door 12 will be first moved to closed position and secured by the latch 37. The door 11 is then swung inwardly, with the shaft A and ends B being first swung through 180° from the position shown in Figure 1. At this time the handle C is in its lower position and the crank arms are in their retracted position disposed within the upper and lower edges of the door 11. The door is moved inwardly until the crank arms are in approximate registration with the keepers G, whereupon the handle C is swung upwardly, thereby projecting the cranks beyond the top and bottom edges of the door and bringing them into engagement with the keepers G. After the crank arms have been engaged with the keepers, the shaft A is rotated by swinging the handle C to the left to the position shown in Figure 1, thereby forcing the door tightly closed through the medium of the cranks coacting with the cam slots of the keepers. The handle C is then locked by the device 39 and sealed in the usual manner.

To open the door 11, the handle C is swung outwardly and to the right as seen in Figure 1, thereby rotating the shaft A in the reverse direction to that just described, the crank portions of the shaft A forcing the door partly open. The handle C is then forced downwardly, thereby reciprocating the bars 14 and 15 and withdrawing the crank arms inwardly beyond the top and bottom edges of the door. The door 11 may be then swung fully open, there being no danger of the lower crank engaging the platform as the same is disposed inwardly above the lower edge of the door.

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 door operating mechanism for railway cars, the combination with a car structure having a door opening and provided with a pivoted door for closing said opening; of keepers at opposite sides of the door opening; a rotatable shaft mounted on said door, said shaft being provided with eccentric actuating means at each end adapted to co-act with said keepers and operable to impart pressure to said door to positively move the same when said shaft is rotated; and means operable to withdraw said eccentric actuating means to a position within the boundaries of the door, said means being at all times operable, whereby said eccentric means will be positioned to clear a platform or the like in any position of the door.

2. In a door operating mechanism, the combination with a member having a door opening and provided with a pivoted door; of a keeper fixed to the door frame; a rotatable element mounted on said door, said element being provided with actuating means adapted to co-act with said keeper to positively move the door when said element is rotated; means by which said eccentric actuating means may be withdrawn from engagement with said keeper at any point throughout the range of movement of said rotatable element; and common means associated with said rotatable element and said actuating means for selectively effecting rotation of said element and engagement and disengagement of said actuating means with said keepers.

3. In a door operating mechanism, the combination with a member having a door opening and provided with a pivoted door; of keepers fixed to the door frame at opposite sides of the door opening; a rotatable shaft mounted on said door and having cranks at each end adapted to co-act with said keepers to effect positive movement of said door upon rotation of said shaft, said shaft being provided with means permitting shortening of said shaft to withdraw said cranks from engagement with said keepers; and means for rotating said shaft, said means being arranged to effect engagement and disengagement of said cranks when the door is in closed position.

4. In a door operating mechanism for railway cars, the combination with a car structure having a door opening and provided with a pivoted door for closing said opening; of keepers at opposite sides of the door opening; a rotatable shaft mounted on said door, said shaft being provided with eccentric actuating means at each end adapted to co-act with said keepers and operable to impart pressure to said door to positively move the same when said shaft is rotated; and means operable to shorten said shaft and withdraw said eccentric actuating means to a position within the boundaries of the door so as to clear a platform or the like when the door is open.

5. In a door operating mechanism, the combination with a member having a door opening and a door; of a pair of keepers fixed to said member adjacent opposite edges of said door; an operating shaft having means intermediate its ends for lengthening or shortening said shaft, said means being arranged to rotate said shaft, said shaft being provided with elongated journal por-

tions adjacent its opposite ends, each of said journal portions being provided at its extremity with an eccentric actuating member adapted to detachably engage said keepers; and means mounted on said door and engaging said journal portions to support the same for combined rotatable and reciprocable movements.

6. In car door latching means, a latching bar supported for rotation and reciprocation, a keeper, laterally projecting means on said latching bar for engaging in said keeper, and operating means adapted to rotate and reciprocate said bar in the latching operation.

7. In car door latching means, the combination of a pair of latching bars supported for axial rotation, keepers for said bars, laterally projecting members on the ends of said bars for engaging in said keepers, and a lever having a pivotal connection to both bars.

8. In car door latching means, the combination of a pair of latching bars, keepers for said bars, laterally projecting members on the ends of said latching bars for engaging in said keepers, and a lever having a pivotal connection to both bars, said bars being reciprocated through movement of said lever in one plane and being rotated through movement of said lever in another plane.

In witness that I claim the foregoing I have hereunto subscribed my name this 14th day of February 1924.

STACY B. HASELTINE.