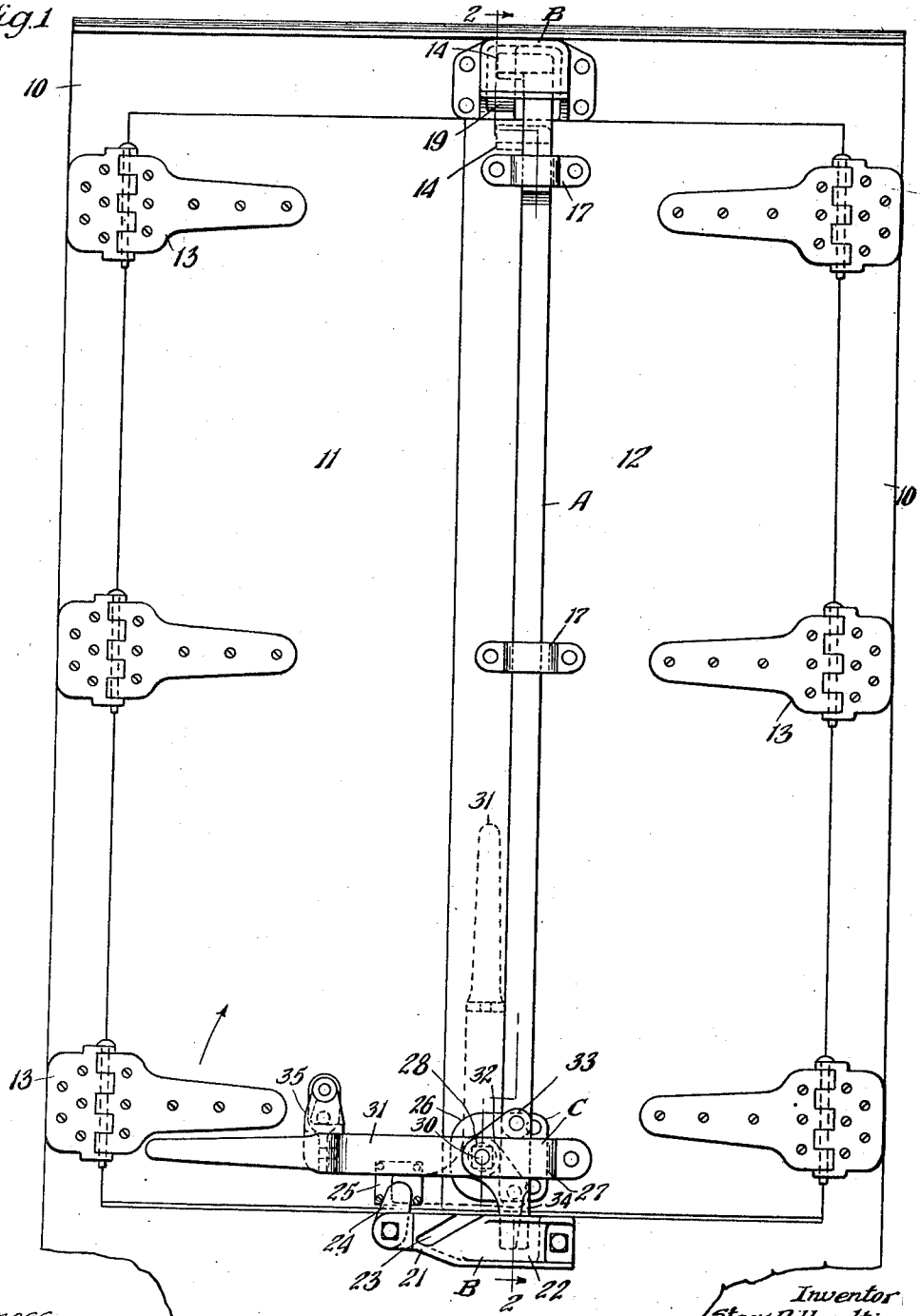
Dec. 10, 1929. S. B. HASELTINE 1,738,702

DOOR OPERATING MECHANISM

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Fig. 1



Witness
Wm. Geiger

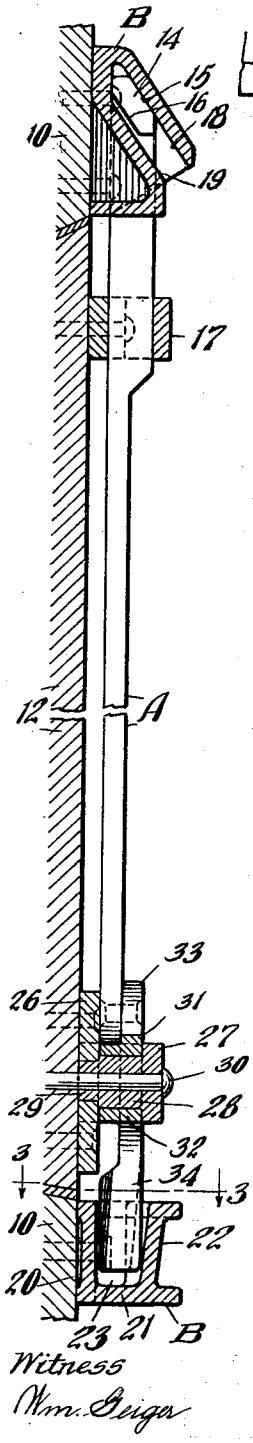
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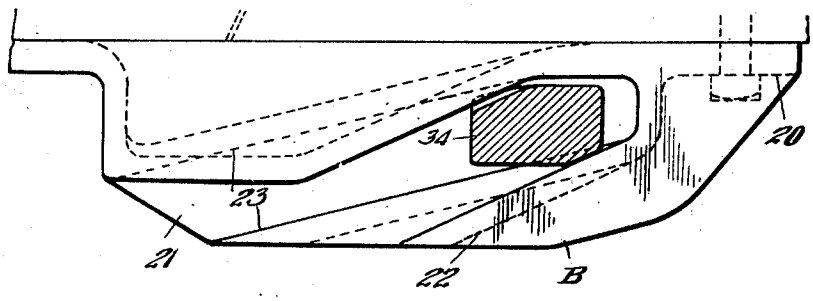
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Fig. 2



Witness
Wm. Geiger

Fig. 3



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UNITED STATES PATENT OFFICE

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DOOR-OPERATING MECHANISM

Application filed June 10, 1926. Serial No. 115,060.

This invention relates to door operating mechanisms.

One object of this invention is to provide a simple and efficient arrangement of door operating mechanism, especially adapted for refrigerator cars, for forcing the doors to tightly closed position, for holding the same closed, and which also will be effective in starting the door opening operation.

Another object of the invention is to provide a mechanism of the character described, especially designed for operating doors of the swinging type and including an operating bar reciprocably mounted upon the door and having an end portion adapted to cooperate with a suitable keeper adjacent the top edge of the door, in conjunction with a lever pivotally mounted on said door and provided with an integral operating extension adapted to engage a keeper adjacent the lower edge of said door, said lever being operatively connected with the reciprocable bar so as to effect simultaneous movement of said bar and said extension to cause traverse of the keepers and effect movement of said door in opening and closing directions.

Another object of the invention is to provide a door operating mechanism of the character described, including the reciprocable bar, and the lever with an operating extension thereon for engaging the lower keeper, and provide a connection between said bar and lever whereby upon operation of the lever to open the door the operating extension of said lever is retracted from its projecting position below the bottom edge of the door to a position within the confines of said door and maintained in this position, when the door is opened, by the weight of the reciprocable bar, so as to leave the lower edge of the door free of depending obstructions to enable the same to clear the usual car loading platforms.

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

In the drawings, forming a part of this specification, Fig. 1 is a side elevation of a portion of a refrigerator car showing my improvements in connection therewith. Fig. 2 is a vertical, sectional view on an enlarged scale, partly broken away, corresponding substantially to the line 2—2 of Fig. 1. And Fig. 3 is a part sectional and part elevational view of the lower keeper and operating lever extension, taken substantially upon the line 3—3 of Fig. 2.

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

As shown, the improved door operating mechanism comprises broadly a reciprocable bar A; upper and lower keepers B—B; and an actuating mechanism C.

The operating bar A preferably is in the form of a flat member of a length corresponding substantially to the longitudinal extent of the door, the upper end of said member being provided with a lateral extension 14, which in conjunction with the end portion of the member provides an inclined cam face 15, while the inner face of the extension is disposed substantially parallel with the outer face and provides a cam surface 16, the cam faces 15 and 16 being adapted to cooperate with the upper keeper B. The bar A is mounted for longitudinal sliding movement by means of two part, spaced, guide brackets 17—17, which permit slight lateral swinging of the bar A in a direction substantially parallel to the face of the door.

The upper keeper B is secured by suitable bolts to the door frame adjacent the top edge of the door 12 in line with the upper end of the bar A. The upper keeper is provided with a front wall, the inner surface of which provides a cam face 18 adapted to coact with outer cam face 15 on the upper end of the bar A. Said housing is also provided at one side with an inclined cam surface 19 adapted to coact with the inner cam surface of the extension 15 on the upper end of the member A. The cam surfaces 18 and 19 of said upper

keeper extend outwardly from the plane of the door frame and are disposed in a vertical direction.

The lower keeper B is secured to the door frame adjacent the lower edge of the door 12, and includes a back wall 20 secured to the frame by suitable bolts, and is provided with a bottom wall 21 and outer wall 22, the walls of the keeper being arranged to provide parallel spaced cam surfaces which define a cam slot 23 as best shown in Fig. 3, said cam slot being inclined outwardly from the door frame, and opening in a direction toward the forward edge of the door 12, said cam slot being adapted for the reception of the operating extension upon the actuating means C as hereinafter referred to. The left hand portion of the lower keeper B is extended as shown in Fig. 1, beyond the edge of the door 12 and has pivotally mounted thereon a latch member 24 adapted to coact with the plate 25 secured to the door 11 adjacent the lower corner of the free edge thereof. The latch 25 serves to retain the door 11 in position when closed.

The actuating means C comprise a lever having means for engagement with the lower keeper B and having a connection with the bar A for reciprocating the same. Said means include a bracket having a base plate 26 secured to the left lower corner of the door 12 by suitable bolts, and a front plate 27 secured to the door and overhanging the base plate, said front plate being provided with an integral spacer 28 which has a reduced portion 29 adapted to fit into an appropriate recess in the base plate 26. A lever 31 is provided having an opening fitting over the spacer 28 which forms the pivotal mounting therefor, and said lever has formed thereon a boss 32 which spaces the lever outwardly from the plate 26 of the bracket. A securing bolt 30 is extended through the front plate, the lever, base plate, and door, as shown. The head of the lever at a point in line with the bar A, and at one side of the pivotal connection of the lever to the bracket has an ear 33, which is pivotally connected to the lower end of the bar A. The lever 31 is also provided with an operating arm 34 extending at a right angle with the body portion of the lever and which is suitably formed so as to engage the cam surfaces provided by the cam slot 23 in the lower keeper B. The handle of the lever 31 is adapted to be secured in position by locking and sealing mechanism 35.

In operation, assuming the doors to be closed as illustrated in full lines in Fig. 1, and it is desired to open the door, the lever 31 is first released from the locking means 35, after which the same is swung in a clockwise direction, or upwardly, which results in downward reciprocation of the bar A with a consequent travel of the upper end of the bar over the vertical guide surfaces of the upper keeper B, and during this action the integral extension 34 on the lever 31 traverses the horizontally arranged surfaces of the cam slot 23 of the lower keeper, the combined action of the bar and operating extension effecting movement of the door 12 in an opening direction, and it should be noted that the weight of the bar A bearing upon the head of the lever at one side of the pivotal connection thereof with the door, maintains the operating portion 34 of the lever in a position above the lower edge of the door where the same will not interfere with a loading platform. When the door 12 has been thus forced partly open to clear the insulation, the same may be easily swung to fully opened position. The latch 24 may be then disconnected and the door 11 swung to fully opened position.

When it is desired to close the doors, the door 11 is first swung nearly closed, and the door 12 swung in a closing direction to such position that the upper end of the bar A is in line with the upper keeper B and ready to enter the same, which also positions the door so that the operating portion 34 of the lever is also in position to enter the cam slot 23 of the lower keeper. Upon counter-clockwise swinging of the lever 31, the bar A is forced upwardly, and the operating portion 34 of the lever 31 enters the lower keeper B, continued movement of the lever 31 causing the upper end of the bar A and the operating portion 34 of the lever to traverse the cam slots of their respective keepers and force the door to closed position. The lever then again may be connected with the locking mechanism 35.

While I have herein shown and described what I now consider the preferred manner of carrying out the invention, 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, the combination with a door frame and a pivoted door; of keeper means provided with cam surfaces mounted on said door frame adjacent opposite edges thereof, one of said keeper means having the cam surfaces disposed at an angle to the other cam surfaces of the keeper means; a lever swingingly mounted on a pivot fixed to the door and provided with an extension adapted to engage the cam surfaces of one of said keeper means; and an operating bar reciprocably mounted on said door and having one end eccentrically connected to said lever means, and having the other of said ends adapted to engage the cam surfaces of said other keeper means to effect movement of said door in opening and closing directions when said lever is operated.

2. In a door operating mechanism, the com-

bination with a door frame and a pivoted door; of an operating lever pivotally mounted on a fixed pivot on said door and having an operating extension adapted to project beneath the lower edge of said door; a bar slidably mounted on said door and pivotally connected with said lever means on one side of said first named pivot, whereby said operating extension is held within the confines of said door by the weight of said bar when said door is open; and keeper means having actuating portions cooperating with said operating extension and with said bar to effect movement of said door in opening and closing directions upon actuation of said lever means.

3. In a door operating mechanism of the character described, the combination with a door frame and pivoted door; of operating means including a rotatable member having an operating portion, and a reciprocable member having an operating portion; means for imparting simultaneous movements to said rotatable and reciprocable members; and keeper means arranged to coact with the operating portion of said rotatable member and with the operating portion of said reciprocable member to effect movement of said door in opening and closing directions upon movement of said reciprocable and rotatable members.

4. In a structure having a door frame and a pivoted door, door operating and locking means, said means comprising: keepers secured to the door frame at the opposite ends of the door, said keepers being provided with cam slots; a locking bar longitudinally slidably mounted on said door and having one end thereof projecting beyond the corresponding end of the door and cooperable with the adjacent keeper; a second locking member pivotally mounted adjacent the opposite end of said door and having a portion adapted to project beyond the corresponding end of the door and cooperate with the adjacent keeper; and means for effecting, simultaneously, reciprocation and rotation of said two locking members.

In witness that I claim the foregoing I have hereunto subscribed my name this 26th day of May, 1926.

STACY B. HASELTINE.