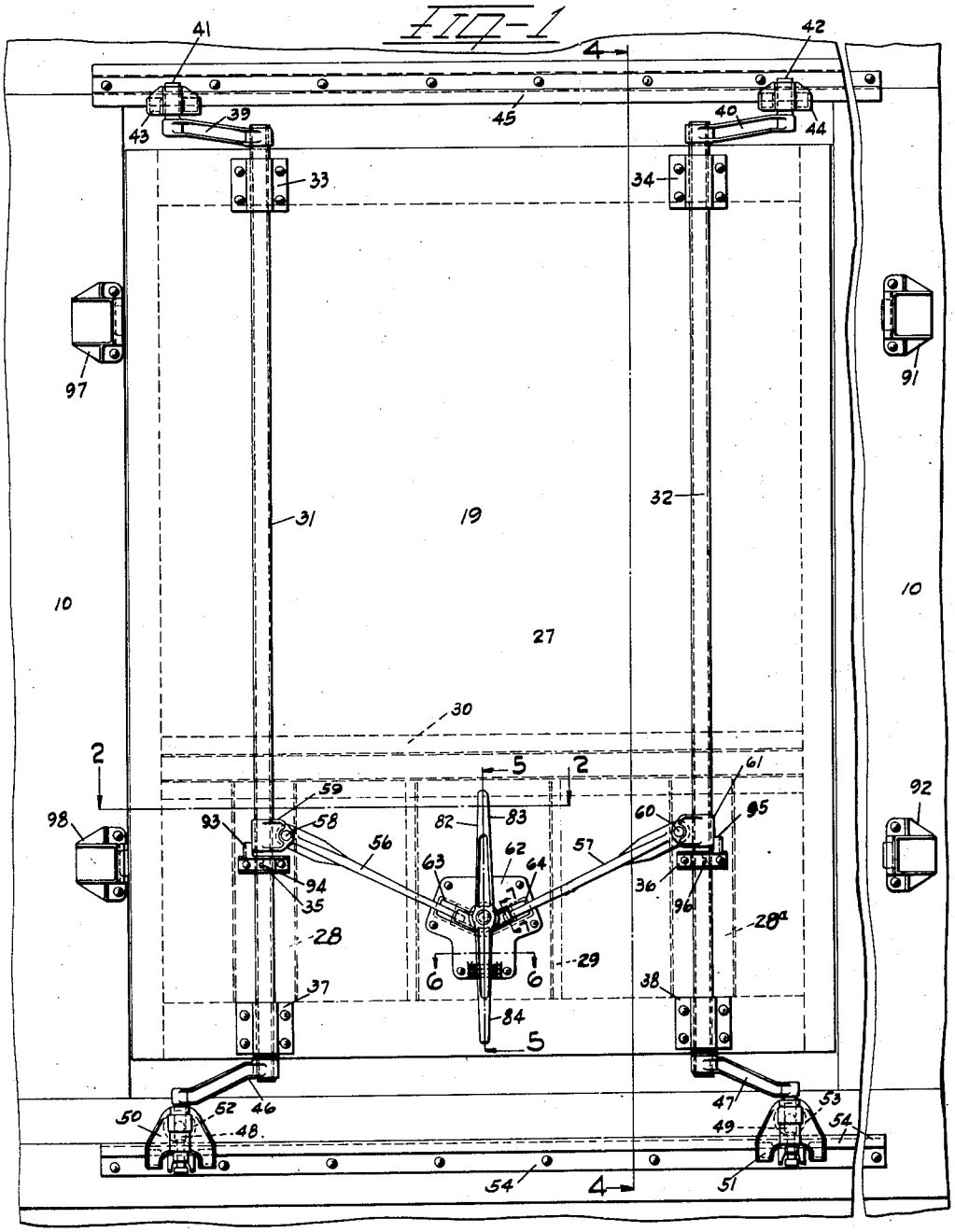
Aug. 5, 1952 W. A. BEAUCHAMP 2,605,515

LATERALLY MOVABLE DOOR

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FIG-1



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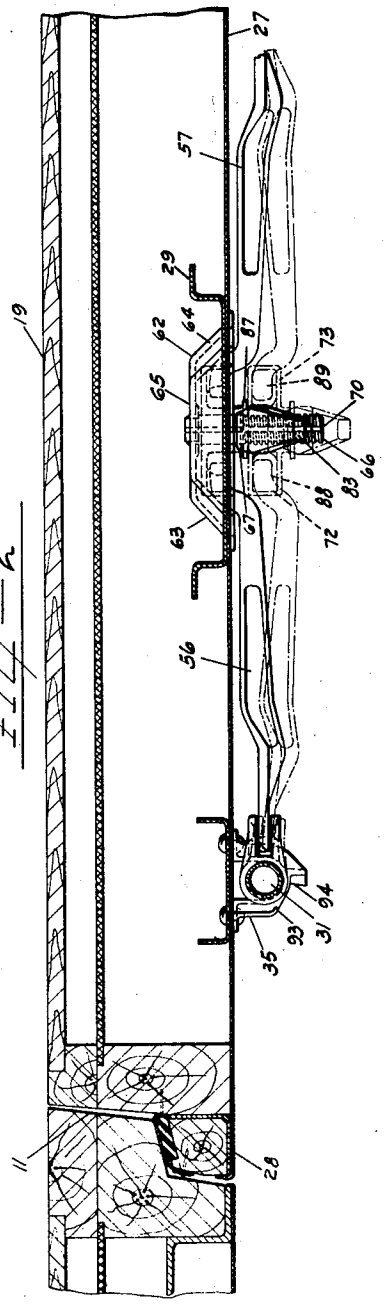
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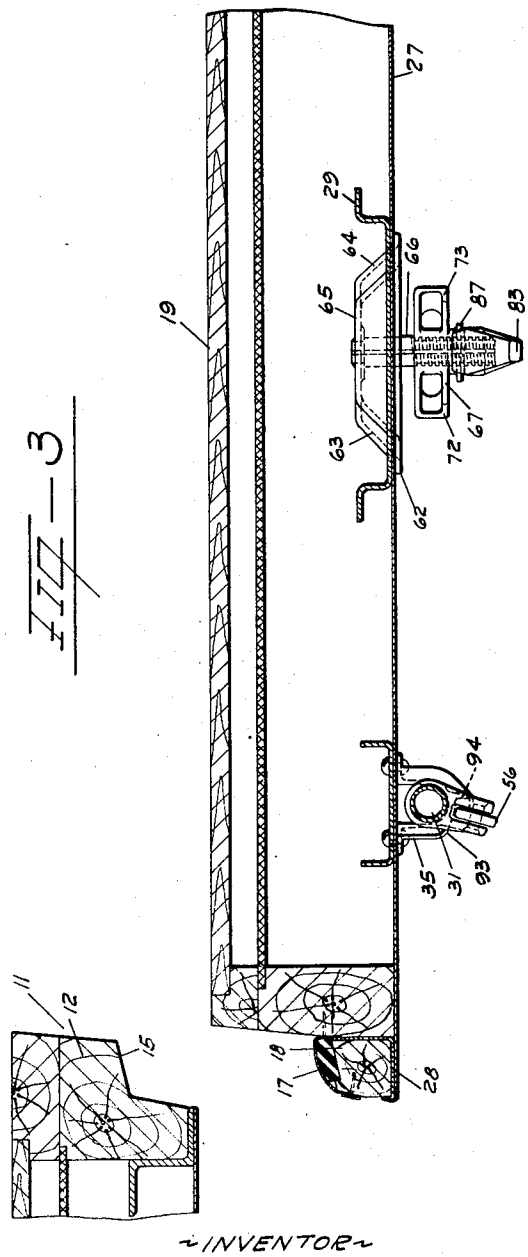
LATERALLY MOVABLE DOOR

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FIG—2



FIG—3



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LATERALLY MOVABLE DOOR

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FIG-4

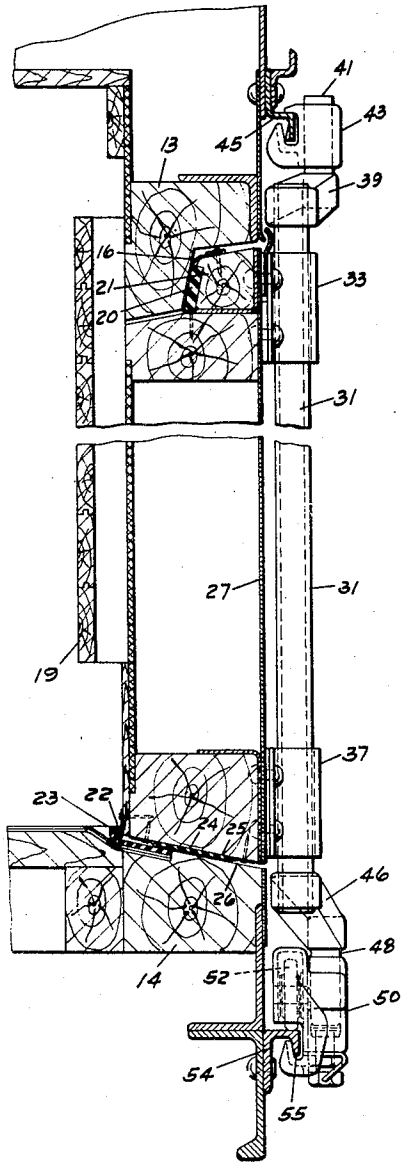


FIG-5

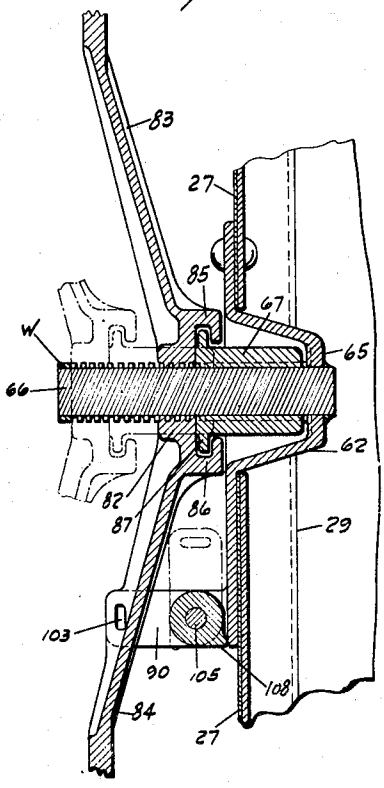
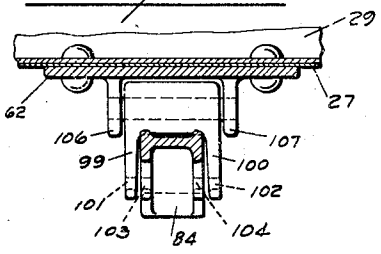


FIG-6



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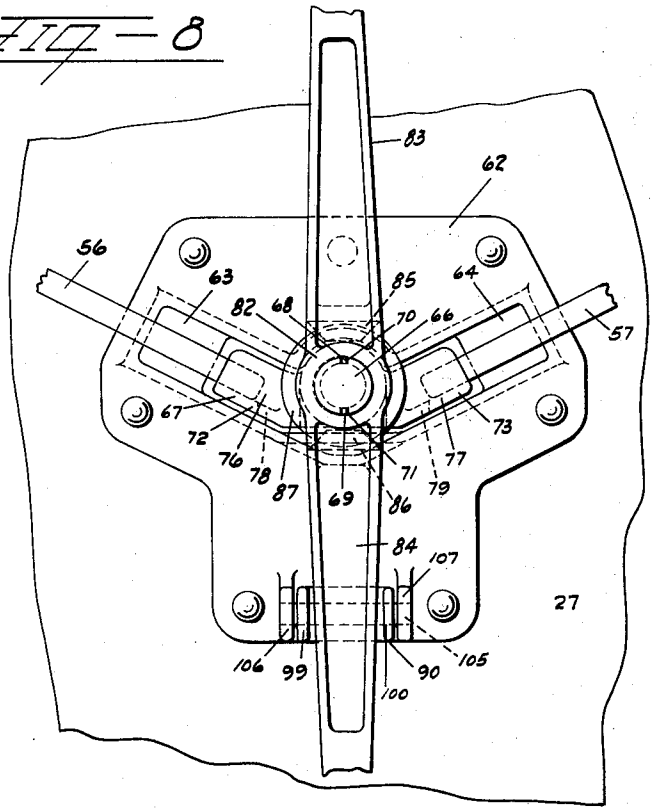
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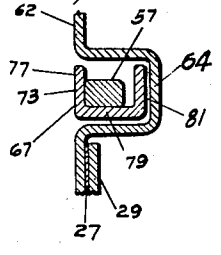
LATERALLY MOVABLE DOOR

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FIG—8



FIG—7



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Patented Aug. 5, 1952

2,605,515

UNITED STATES PATENT OFFICE

2,605,515

LATERALLY MOVABLE DOOR

Wilfred A. Beauchamp, Chicago, Ill., assignor to The Youngstown Steel Door Company, Cleveland, Ohio, a corporation of Ohio

Application September 9, 1948, Serial No. 48,392

11 Claims. (Cl. 20—23)

1

This invention relates to laterally movable doors.

It is an object of this invention to provide doors for railway freight cars including refrigerator and box cars which shall be movable laterally into and out of door openings formed in the side walls of the cars and longitudinally along said walls, and mechanism which shall be readily accessible both from the ground and from platforms for effectively and conveniently applying force to impart such lateral movement to the doors.

A further object is to provide doors and mechanism of the character defined above wherein the mechanism shall include a lever operable in a plane parallel to the doors for effectively and conveniently exerting force to impart lateral movement to the doors.

A further object is to provide laterally movable doors having mechanism embodying vertical bars rotatably mounted on the doors and operable by levers pivotally secured to the bars which levers shall be so arranged as to be more readily operable from the ground without increasing the torque upon the bars.

A further object is to provide doors and mechanism of the character stated immediately above wherein the mechanism shall also embody readily accessible means for effectively and conveniently exerting force upon the levers for imparting lateral movement to the doors.

Other objects of the invention will become clear as the description thereof proceeds.

In the drawings forming part of this specification:

Fig. 1 is a fragmentary elevation of a side wall of a refrigerator car equipped with a laterally movable and longitudinally sliding door embodying the instant invention.

Fig. 2 is a horizontal section taken on line 2—2 of Fig. 1.

Fig. 3 is a view similar to Fig. 2 showing the door movement laterally entirely out of the door opening.

Fig. 4 is a vertical section taken on line 4—4 of Fig. 1.

Fig. 5 is a vertical section taken on line 5—5 of Fig. 1.

Fig. 6 is a horizontal section taken on line 6—6 of Fig. 1.

Fig. 7 is a vertical section taken on line 7—7 of Fig. 1.

Fig. 8 is an enlarged elevation with parts broken away of the portion of the mechanism operable to impart swinging movement to the levers thereof.

Referring to the drawings, the instant invention is shown for the purpose of illustration as embodied in a laterally movable and longitudinally slidable door of a refrigerator car. The wall 10 of this car is formed with a door opening 11 defined by a forward jamb 12, a rear jamb (not shown) similar in construction to the jamb 12, a header 13 and a lintel 14. The jambs are rabbeted to provide shoulders such as 15 adapted to engage sealing strips such as 17 secured to shoulders, one of which is shown at 18 formed on the vertical edges of the door 19. A sealing strip 20 is secured to a shoulder 21 formed on the upper edge of the door and is adapted to engage the shoulder 16 formed on the header 13. A sealing strip 22 is secured to the inner face of the door along the lower edge thereof for engagement with member 23. In this manner the movement of the door into the door opening is limited so that the inner and outer faces of the door lie flush with the inner and outer faces of the car wall and the door is weatherstripped. The lower edge of the door is inclined as shown at 24 and carries a sealing strip 25 which is adapted to engage the inclined upper edge 26 of the door lintel. In this manner the lower edge of the door is also weatherstripped.

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The main body portion of the door 19 and the insulation therefor (not shown) may be of any desired or well-known structure. The main body portion of the door is covered by means of a metallic panel 27 reinforced by means of a vertical channel member 28 secured to the inner face of the panel adjacent to the forward edge of the door and by means of a similar channel member 28a secured to the inner face of the panel adjacent to the rear edge of the door. The metallic panel 27 is also reinforced by a substantially channel-shaped member 29 secured to the inner face of the panel along the vertical center line of the door and by means of a horizontal substantially channel-shaped member 30 also secured to the inner face of the door.

For the purpose of supporting the door for lateral movement into and out of the door opening and for longitudinal sliding movement a pair of vertical bars 31 and 32, preferably in the form of pipes, are mounted upon the outer face of the door by means of top brackets 33 and 34, intermediate brackets 35 and 36, and lower brackets 37 and 38. The upper ends of the bars 31 and 32 are in the form of cranks 39 and 40, the spindles 41 and 42 of which are rotatably mounted in carriages 43 and 44 slidably associated with a guide 45 secured to the wall 10 above the door opening. Similarly, the lower ends of the bars 31 and 32 are in the form of cranks 46 and 47, the spindles 48 and 49 of which are rotatably mounted in car-

riages 50 and 51 carrying supporting rollers 52 and 53. Rollers 52 and 53 are adapted to run along a track 54 secured to the wall 10 below the door opening and interlocked with the carriages 50 and 51 as shown at 55.

In order to impart rotation to the bars 31 and 32 and lateral movement to the door into and out of the door opening, levers 56 and 57 are utilized. The lever 56 is pivoted vertically as indicated at 58 to a clevis 59 secured as by means of welding to the rotatable bar 31. The lever 57 is pivoted vertically as indicated at 60 to a clevis 61 secured as by means of welding to the rotatable bar 32.

Associated with the levers 56 and 57 is a bracket member 62 secured to the metallic panel 27 as by means of rivets. Portions of the bracket member 62 are offset as indicated at 63 and 64 so as to lie inwardly of the metallic panel. The portion of the bracket member between the offsets 63 and 64 is also offset inwardly of the metallic panel as indicated at 65. The bracket member 62 carries a screw member 66 which is secured as by means of welding to the inwardly offset portion 65 and which extends outwardly beyond the panel 27.

A member or device 67 is slidably mounted upon the screw member. For this purpose the member 67 is formed with vertically arranged keys 68 and 69 slidably received within keyways 70 and 71 formed in the screw member 66. Extending from the central portion of the member 67 are the U-shaped wings 72 and 73 which comprise outer vertical walls 76 and 77, lower horizontal walls 78 and 79 and inner vertical walls 80 and 81.

Also mounted upon the screw member 66 in threaded engagement therewith is a member 82. Oppositely extending operating handles or levers 83 and 84 project from the threaded member 82. The threaded member is also formed with spaced jaws 85 and 86 within which a circumferential flange 87 formed on the sliding member 67 is received. In this manner the threaded member 82 is interlockingly and rotatably associated with the sliding member 67.

As is clearly shown in Fig. 1 of the drawings, the levers 56 and 57 are inclined downwardly from their pivotal securement to the bars 31 and 32 so as to make the ends of the levers more readily accessible from the ground. In view of this arrangement of the levers the inwardly offset portions 63 and 64 of the bracket member 62 and the wings 72 and 73 of the slidable member 67 are similarly inclined. Moreover, the free ends of the levers which are engaged by the wings 72 and 73 are offset as indicated at 88 and 89 so that the ends of the levers and the wings may be received within the offset portions 63 and 64 of the bracket member and thereby decrease the extent to which the mechanism projects beyond the outer face of the door. In this position of the levers the upper walls of recesses 63 and 64 prevent the disengagement of the ends of the levers from the U-shaped wings 72 and 73.

The operation of the mechanism to impart lateral movement to the door into and out of the door opening is as follows:

Beginning with the door in its closed position and seated within the door opening, the arrangement of the parts of the mechanism is as illustrated in full lines in Figs. 1, 2, 4 and 5. To easily and conveniently move the door out of the door opening and into position for longitudinal movement along the car side the latching device 90 is swung upwardly from its horizontal position to a vertical position so as to be disengaged from the operating handle or lever 84. The operating handles or levers 83 and 84 are then rotated counterclockwise causing the threaded member 82 to rotate and move outwardly along the screw member 66, such rotation being limited in any desired way as by welding as shown at W. This movement of the threaded member 82 effects an outward sliding movement of the slidable member or device 67 because of the interlocking engagement between the jaws formed on the screw member and the radial flange formed on the slidable member.

The free ends of the levers 56 and 57 which are supported upon the lower horizontal walls 78 and 79 of the wings 72 and 73 are engaged by the inner vertical walls 80 and 81 so that the levers 56 and 57 are swung from the full line position shown in Fig. 2 to the broken line position. Partial rotation of the bars 31 and 32 and movement of the door out of the door opening are thereby produced. The free ends of the levers 56 and 57 are then disengaged from the wings 72 and 73. The levers 56 and 57 are now free for swinging movement in order to complete the rotation of the vertical bars 31 and 32 and the movement of the door 19 entirely out of the door opening. The door may then be moved longitudinally to open position, this movement being limited by the back stops 91 and 92 fastened to the side wall of the car. Before longitudinal movement of the door is begun the levers 56 and 57 are dropped to a vertical position where they are engaged by the abutments 93 and 94 on bracket 35 and abutments 95 and 96 formed on bracket 36.

To close the door it is first moved longitudinally until it is positioned over the door opening 11. This movement of the door is limited by means of the front stops 97 and 98. At this time the levers 56 and 57 are released from their respective abutments and swung toward each other, thereby imparting rotation to the vertical bars 31 and 32 and partial movement of the door into the door opening. The free ends of the levers 56 and 57 are then engaged with the wings 72 and 73 and supported by the lower horizontal walls 78 and 79 of the wings. The operating levers or handles 83 and 84 are then swung in clockwise direction thereby imparting movement to the threaded member 82 along the screw member toward the door. The threaded member 82 by its engagement with the slidable member 67 moves the latter along the screw member toward the door as well. The movement of the slidable member applies pressure against the free ends of the levers 56 and 57 and continued rotation to the bars 31 and 32 thereby effectively and conveniently forcing the door completely into the door opening against the resistance offered by the sealing strips carried by the door. When the door is closed, the wings 72 and 73 and the offset ends 88 and 89 of the levers 56 and 57 are received within the offset portions 63 and 64 of the bracket member 62 which is engaged by the wings to limit further inward sliding movement of the member 67.

Preferably, though not necessarily, the operating levers 83 and 84 are designed to lie in a vertical plane when the door is closed and to be secured against rotation by means of the latch member 90. Upon completion of the operation of the levers 83 and 84, the latch member 90 which has been disposed vertically during the closing movement of the door is now swung to a horizontal position so that the operating lever

84 is disposed between the spaced flanges 99 and 100 formed on the latch member. In this position the latch member is sealed to the operating lever 84 by means of a seal (not shown) which is adapted to extend through the alined openings 101 and 102 formed in the flanges 99 and 100 and openings 103 and 104 formed in the operating lever 84. The latch member 90 is pivoted as shown at 105 between ears 106 and 107 formed preferably as part of the bracket member 62. Horizontal swinging movement of the latch member 90 is limited by means of a lug 108 formed on the member and engageable with the bracket member.

It will be apparent that numerous changes and modifications in the details of the invention will be clear to those skilled in the art. By way of example it may be mentioned that the screw member may be formed as a part of the threaded member and that a nut or similar device adapted to cooperate with the screw member may be fastened to the door. It is apparent also that a single operating lever and ratchet device may be used in place of the oppositely extending operating levers above described and that, if desired, the operating levers may be dispensed with entirely and holes provided in the threaded member into which bars may be placed in order to rotate the threaded member. It is intended that these modifications as well as others which will occur to those skilled in the art be comprehended within this invention which is to be limited only by the scope of the claims appended hereto.

I claim:

1. In a railway freight car having a wall provided with a door opening, a door for closing said opening, mechanism embodying vertical bars rotatably mounted on said door for supporting said door for lateral movement into and out of said door opening and longitudinal movement along said wall, levers secured to said bars for imparting rotation thereto, a screw projecting from said door, a member slidably secured on said screw, means on said door restricting said member to sliding movement, the free ends of said levers being seated in said member, and means threaded upon said screw, said means being engageable with said member and operable to slide said member along said screw and impart swinging movement to said levers and rotation to said bars.

2. In a railway freight car having a wall provided with a door opening, a door for closing said opening, mechanism embodying vertical bars rotatably mounted on said door for supporting said door for lateral movement into and out of said door opening and longitudinal movement along said wall, levers secured to said bars for imparting rotation thereto, a threaded member carried by said door, a member slidably secured on said threaded member, means on said door restricting said second-mentioned member to sliding movement, the free ends of said levers being seated in said slidable member and means having threaded engagement with said threaded member, said latter means being engageable with said slidable member and operable to move said slidable member along said threaded member and impart swinging movement to said levers and rotation to said bars.

3. In a railway freight car having a wall provided with a door opening, a door for closing said opening, mechanism embodying vertical bars rotatably mounted on said door for supporting said door for lateral movement into and out of said door opening and longitudinal movement along said wall, vertically pivoted levers on said bars for imparting rotation thereto, a threaded member carried by said door, a member slidably mounted on said threaded member, said slidable member having wings, each of said wings comprising an outer vertical wall, an inwardly extending horizontal wall, and an inner vertical wall spaced from said outer vertical wall, said horizontal walls being adapted to support the free ends of said levers, and means having threaded engagement with said threaded member, said means being interlocked with said slidable member and rotatable relative thereto, said means being operable in one direction to move said slidable member along said threaded member toward said door, said outer vertical walls of said wings engaging said ends of said levers and imparting swinging movement thereto in one direction, said means being operable in the opposite direction to move said slidable member along said threaded member away from said door, said inner vertical walls of said wings engaging said ends of said levers and imparting swinging movement thereto in the opposite direction.

4. In a railway freight car having a wall provided with a door opening, a door for closing said opening, mechanism embodying vertical bars rotatably mounted on said door for supporting said door for lateral movement into and out of said door opening and longitudinal movement along said wall, levers secured to said bars for imparting rotation thereto, said levers converging downwardly, a recess formed in said door having upwardly diverging portions, a threaded member secured to said recessed portion of said door, a member slidably mounted on said threaded member, upwardly diverging wings on said slidable member, the free ends of said levers being offset and engageable with said wings, and means having threaded engagement with said threaded member, said means being operable to move said slidable member along said threaded member and impart swinging movement to said levers and rotation to said bars to close said door, said wings and said offset ends of said levers lying in said diverging portions of said recess in said door when said door is closed.

5. In a railway freight car having a wall provided with a door opening, a door for closing said opening, mechanism embodying vertical bars rotatably mounted on said door for supporting said door for lateral movement into and out of said door opening and longitudinal movement along said wall, levers secured to said bars for imparting rotation thereto, a threaded member carried by said door, a member slidably mounted on said threaded member, said slidable member being engageable with the free ends of said levers, and means having threaded engagement with said threaded member, said means being interlockingly and rotatably engaged with said slidable member and operable to move said slidable member along said threaded member and impart swinging movement to said levers and rotation to said bars.

6. In a railway freight car having a wall provided with a door opening, a door for closing said opening, mechanism embodying vertical bars rotatably mounted on said door for supporting said door for lateral movement into and out of said door opening and longitudinal movement along said wall, levers secured to said bars for imparting rotation thereto, a threaded member car-

ried by said door, a member slidably mounted on said threaded member, said slidable member being engageable with the free ends of said levers, and means having threaded engagement with said threaded member, a circumferential flange on said slidable member, spaced jaws on said means interlockingly and rotatably engaging said circumferential flange, said means being operable to move said slidable member along said threaded member and impart swinging movement to said levers and rotation to said bars.

7. In a railway freight car having a wall provided with a door opening, a door for closing said opening, mechanism embodying vertical bars rotatably mounted on said door for supporting said door for lateral movement into and out of said door opening and longitudinal movement along said wall, levers secured to said bars for imparting rotation thereto, a threaded member carried by said door, a member slidably mounted on said threaded member, said slidable member being engageable with the free ends of said levers, and means having threaded engagement with said threaded member, said means being interlockingly and rotatably engaged with said slidable member, oppositely extending levers on said means for imparting rotation thereto and movement to said slidable member along said threaded member.

8. In a railway freight car having a wall provided with a door opening, a door for closing said opening, mechanism embodying vertical bars rotatably mounted on said door for supporting said door for lateral movement into and out of said door opening and longitudinal movement along said wall, levers secured to said bars for imparting rotation thereto, a threaded member carried by said door, a member slidably mounted on said threaded member, said slidable member being engageable with the free ends of said levers, and means having threaded engagement with said threaded member, said means being interlockingly and rotatably engaged with said slidable member, oppositely extending levers on said means for imparting rotation thereto and movement to said slidable member along said threaded member, said levers on said means being disposed substantially vertical when said door is closed, and means on said door engageable with one of said levers on said means in the vertical position thereof to prevent rotation of said threaded means.

9. In a railway freight car having a wall provided with a door opening, a door for closing said opening, mechanism embodying vertical bars rotatably mounted on said door for supporting said door for lateral movement into and out of said door opening and longitudinal movement along said wall, levers secured to said bars for imparting rotation thereto, a threaded member carried by said door, a member slidably mounted on said threaded member, said slidable member being engageable with the free ends of said levers, and

means having threaded engagement with said threaded member, said means being interlockingly and rotatably engaged with said slidable member, oppositely extending levers on said means for imparting rotation thereto and movement to said slidable member along said threaded member, said levers on said means being disposed substantially vertical when said door is closed, and means on said door engageable with one of said levers on said means in the vertical position thereof to prevent rotation of said threaded means, said last mentioned means being pivoted vertically and comprising spaced flanges, said one lever being received between said flanges.

10. In a railway freight car having a wall provided with a door opening, a door for closing said opening, mechanism embodying a vertical bar rotatably mounted on said door supporting said door for lateral movement into and out of said door opening and longitudinal movement along said wall, a lever secured to said bar for imparting rotation thereto, a threaded member carried by said door, a member slidably secured on said threaded member, means on said door restricting said second-mentioned member to sliding movement, the free ends of said levers being seated in said slidable member, and means having threaded engagement with said threaded member, said latter means being engageable with said slidable member and operable to move said slidable member along said threaded member and impart swinging movement to said lever and rotation to said bars.

11. In a railway car having a wall member provided with a door opening, a door member for closing said opening, mechanism embodying a vertical bar rotatably mounted on said door member for imparting movement thereto into and out of said door opening, a lever secured to said bar for imparting rotation thereto, a threaded member carried by one of said members, a device slidably secured on said threaded member, means on said door restricting said device to sliding movement, the free ends of said levers being seated in said device, and means having threaded engagement with said threaded member, said latter means being engageable with said device and operable to slide said device along said threaded member and impart swinging movement to said lever and rotation to said bars.

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