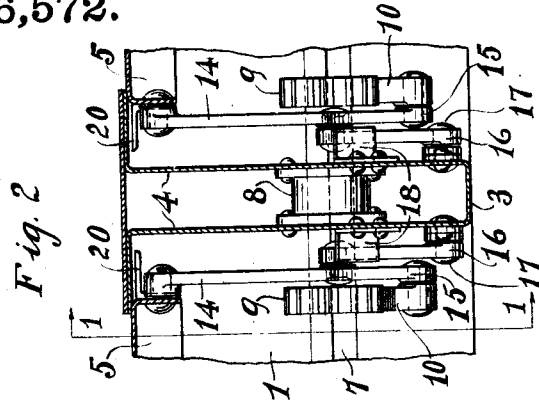
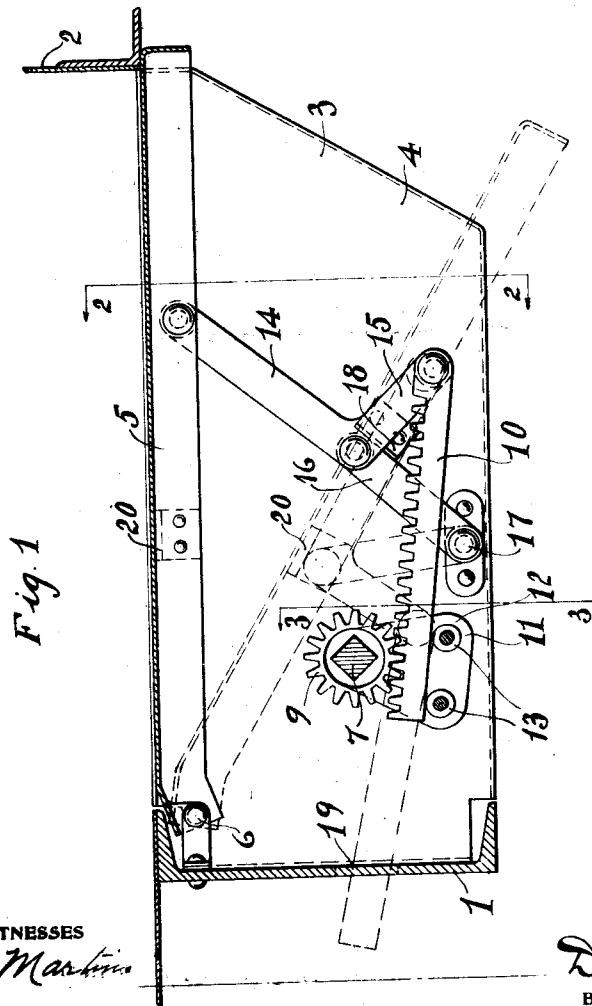
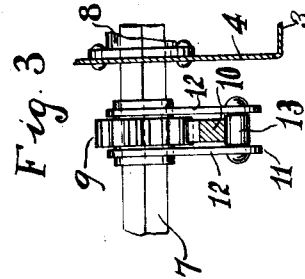


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DOOR OPERATING DEVICE.
APPLICATION FILED JULY 6, 1911.

Patented July 8, 1913.

1,066,572.



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DOOR-OPERATING DEVICE.

1,066,572.

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To all whom it may concern:

Be it known that I, DONALD S. BARROWS, residing at Paterson, Passaic county, New Jersey, and being a citizen of the United States, have invented certain new and useful Improvements in Door-Operating Devices, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and to use the same, reference being had to the accompanying drawings, which illustrate the preferred form of the invention, though it is to be understood that the invention is not limited to the exact details of construction shown and described, as it is obvious that various modifications thereof will occur to persons skilled in the art.

In said drawings: Figure 1 is a transverse sectional view through a portion of a car underframe, illustrating one of the drop or dumping doors in the floor thereof and the mechanism, comprising this invention, applied thereto for operating said door. Fig. 2 is a detail sectional view showing the door operating mechanism connected to doors upon opposite sides of the cross bearer of the underframe, said section being taken on the plane of line 2—2 of Fig. 1. Fig. 3 is a vertical sectional view through the cross bearer illustrating details of and the manner of connecting a retaining member, or support for a rack bar, to said cross bearer.

The object of this invention is to provide a mechanism for operating the drop doors of railway cars which mechanism is simple of construction and, in the design of which no slots are required in the diaphragms of the car underframe, which slots would necessarily weaken the cross bearers.

Referring to the drawings, 1 indicates one of the center sills, 2 one of the side sills and 3 one of the cross bearers of ordinary gondola car construction. The cross bearer 3 is preferably a vertical plate member formed of a single sheet of metal bent to form a U-shape as shown in Fig. 2, or a pair of diaphragms spaced apart in such manner as to present vertical walls 4—4 upon which the lever mechanism comprising the invention is supported.

The drop doors 5—5 are pivotally connected along their inner edges to the center sill as at 6 and it will be understood that

there may be as many doors in the length of a car as may be desired, and that each of said doors is provided with a lever operating mechanism fixed to each of its sides, adjacent opposite sides of the cross bearers and bolsters.

The operating shaft 7 extends through suitable bearings 8 secured to the cross bearers, below the doors. Adjacent the outer surface of each of the cross bearer walls 4—4 the operating shaft is fitted with a pinion 9, the teeth of which are held in constant engagement with a reciprocatory rack bar 10 through the office of a retaining member 11, pivotally supported upon the operating shaft. The retaining member 11 comprises two plates 12 fitted with a pair of rollers 13—13 adapted to engage an outer surface of the rack bar 10. A bell crank 14 is pivotally connected by the end of its long arm preferably with a depending flange formed upon the edge of the door. The opposite arm, as 15, of the bell crank is pivotally connected to the end of the rack bar 10. The central pivot of the bell crank is movably supported upon the free end of a link 16 which link is, in turn, rockably mounted upon a fixed pivot 17 carried upon the wall 4 of the cross bearer. The link 16 with the long arm of the bell crank 14 comprises a toggle, which when the door is open, is folded beneath the door as shown by dotted lines in Fig. 1 and which, when the door is closed, is straightened out in such manner that the middle pivot and the opposite end pivots of the toggle are in alinement, or preferably until the middle pivot has moved slightly beyond a line between the opposite end pivots. A stop 18 is fixed to the wall 4 of the cross bearer for engaging the free end of the link 16 in the path of the middle pivot of the toggle for limiting the movement of said middle pivot when the toggle is straightened and the door is locked. From this description it will be apparent that, assuming the door to be open, rotation of the operating shaft and gears 9 in a counter-clockwise direction Fig. 1 will force the short arm 15 of the bell crank toward the outer side of the car, such movement not only serving to swing the bell crank upon its central pivot but also to move said central pivot, in the free end of the link 16, to

the position shown by full lines in Fig. 1 where the door is positively locked in closed position and the thrust thereof is transmitted directly through the toggle described and to the pivot 17 thus relieving the operating shaft of all tendency to rotate.

An aperture 19 is formed through the web of the center sill 1 for admitting the end of the rack bar 10 when the door is opened.

It will be noted that, when the door is open, its weight is supported directly upon the upper end of the link 16 which is arranged to engage a lateral projection, as 20, formed upon the edge of the door, the long arm of the bell crank, when in this position, being in tension and serving to retain the link 16 in supporting position.

Only such parts of a car structure as are necessary to an understanding of the construction, preferred location and operation of the door operating means are illustrated in the accompanying drawings, but it is to be understood that any suitable car frame may be used and the apparatus constituting the present invention applied thereto. It will also be understood that the doors may be supported upon transversely extending members of the underframe where the car framing is adapted to such disposition of the doors.

What I claim is:—

1. In a door operating device, the combination of a car underframe including a cross-bearer, a door, a toggle link connection between said cross-bearer and said door, a laterally projecting arm formed upon one link of said toggle, and means engaging said arm for operating said toggle to close said door.

2. In a door operating device, the combination comprising an underframe, a door, a toggle link connection including a bell crank lever between said underframe and said door, a laterally projecting rack bar pivotally connected to said lever, and means engaging said bar for operating said toggle to lock said door in closed position.

3. In a door operating device, the combination comprising a car underframe, including a center sill having an aperture therein, a door, a toggle link connection between said underframe and said door, a projecting arm connected with one link of said toggle and adapted to extend through the aperture in the sill, and means engaging said arm for operating said toggle to close and lock said door.

4. In a door operating device, the combination comprising a car underframe including a vertical plate member, a door, a toggle link connection including a bell crank lever pivoted to said door and a link pivoted to the underframe, a laterally projecting arm formed upon said lever, a shaft supported

in said plate member, and means engaging said shaft and said arm for moving said toggle into one position for closing and locking said door and into another position for opening said door.

5. In a door operating device, the combination comprising a car frame including a vertical plate member, a door, a bell crank pivotally connected by one of its arms to said door, a link pivotally supported upon said car frame and having its one end connected with the middle pivot of said bell crank, means connected with the other arm of said bell crank for swinging said bell crank and link to operate said door, and a shaft supported in said plate member for actuating said last mentioned means.

6. In a door operating device, the combination comprising a car frame including a cross-bearer, a door, a bell crank pivotally connected by one of its arms to said door, a swinging link pivotally supported at one end, the middle pivot of said bell crank being coupled with and movable with the other end of said link, a shaft supported in said cross-bearer, and means engaging said shaft and said bell crank for moving said bell crank and link to operate said door.

7. In a door operating device, the combination comprising a car frame including a cross-bearer, a door, a bell crank pivotally connected by one of its arms to said door, a swinging link pivotally supported at one end, the middle pivot of said bell crank being coupled with and movable with the other end of said link, a shaft supported in said cross-bearer, means engaging said shaft and said bell crank for moving said bell crank and link to lock said door, and means for limiting the movement of said bell crank and link to retain said door in locked position.

8. In a door operating device, the combination comprising a car frame, a door, a toggle link connection between said car frame and said door, one of the links of said toggle being pivotally connected with said door and the other link of said toggle being pivotally connected to said car frame, and means operatively engaging said toggle for operating said door, said last mentioned toggle link being adapted to be engaged by said door for limiting the opening movement of said door.

9. In a door operating device, the combination comprising a car underframe, including a cross bearer, a door, a pivot on said cross bearer beneath the door, a toggle link connection between said pivot and said door, means engaging said toggle for opening said door, said toggle link serving to form a support for said door.

10. In a door operating device, the combination comprising a car frame, a door, a toggle link connection between said car

frame and said door, a laterally projecting arm formed upon one link of said toggle, an operating shaft, and rack and pinion mechanism between said operating shaft and said arm for moving said toggle to operate said door.

11. In a car door operating device, a door, an underframe, a bell crank lever connected with said door and said underframe, means for actuating said bell crank lever including a rotatable member and a reciprocatory member in engagement therewith, and pivoted means for supporting one end of said reciprocatory member.

12. In a car door operating device, a door, an underframe, a bell crank lever connected with said door and said underframe, means for actuating said bell crank lever including a rotatable member and a reciprocatory member, a swiveled support for said reciprocatory member in engagement therewith,

and pivoted means for supporting one end of said reciprocatory member.

13. In a car door operating device, a door, a bell crank lever connected with the lower side of said door, a reciprocatory bar connected near one end with said bell crank lever, means for actuating said bar, and means for supporting the opposite end thereof.

14. In a car door operating device, a door, a bell crank lever connected with the lower side of said door, a reciprocatory bar connected near one end with said bell crank lever, means for actuating said bar, and pivotally supported means for supporting the opposite end thereof.

In witness whereof I have hereunto set my hand in the presence of two witnesses

DONALD S. BARROWS.

Witnesses:

G. V. WASHINGTON,
A. KASSLER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."