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DOOR LIFT MECHANISM

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2 Sheets-Sheet 1

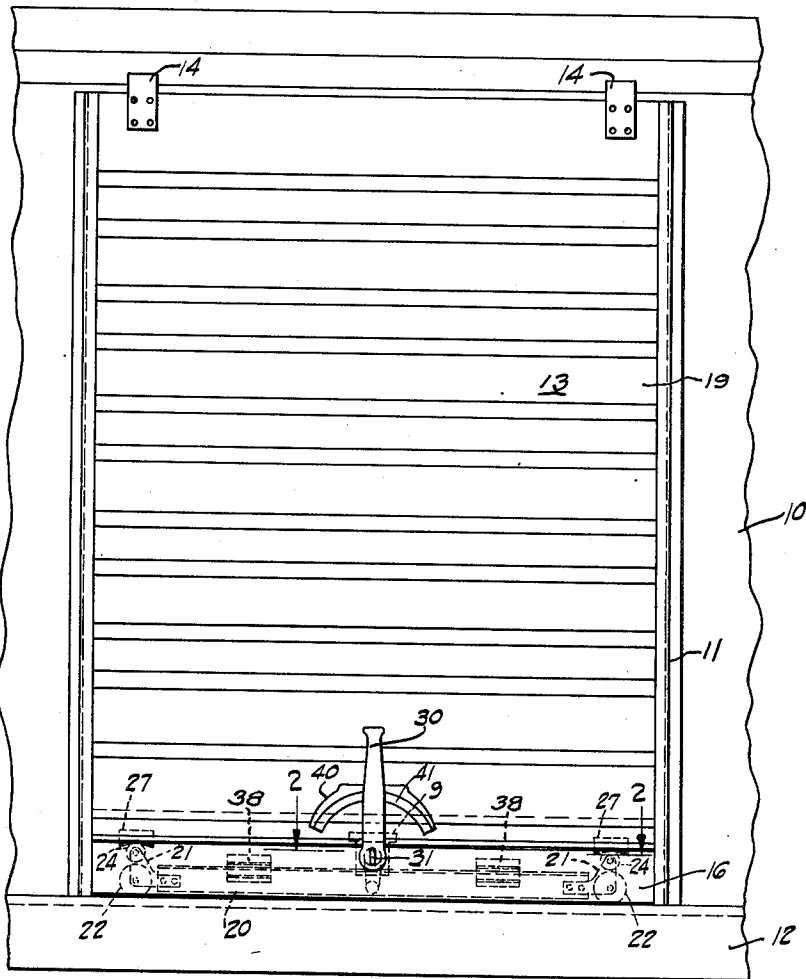


Fig-1

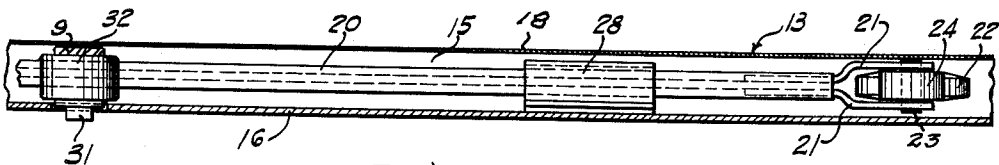


Fig-2

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DOOR LIFT MECHANISM

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2 Claims. (Cl. 16—99)

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This invention relates to lift mechanism for a car door and more particularly to mechanism for elevating and shifting the door longitudinally by a single operation requiring little physical effort.

The invention comprises the novel structure and combination of parts hereinafter described and more particularly pointed out and defined in the appended claims.

In the accompanying drawings which illustrate a preferred form of the invention:

Fig. 1 is a side elevation of a door and lift mechanism associated with a portion of a side wall of a car.

Fig. 2 is a sectional view of the door, taken on line 2—2 of Fig. 1, showing the lift mechanism.

Fig. 3 is a sectional view through the door, taken on line 3—3 of Fig. 5, showing a portion of the lift mechanism.

Fig. 4 is a sectional view through the door, taken on line 4—4 of Fig. 3, showing a portion of the actuator for the lift mechanism.

Fig. 5 is a sectional view through the door, taken on line 5—5 of Fig. 3 showing one of the door supporting rollers and lift lever structures.

Fig. 6 is a sectional view through the door, taken on line 6—6 of Fig. 3, showing one of the lift lever structures and its guide.

Referring now to the drawings by characters of reference, the box car side wall 10 is provided with opening 11. Door supporting track 12 is secured to the outside of the wall and extends below the side wall opening and beyond the sides thereof. Door 13 is mounted to be lifted and moved longitudinally on the track into positions covering and uncovering the opening. Conventional guide and retainer structures 14 are associated with the top of the door and the adjacent car side wall.

The door can be formed in a conventional manner with a suitable frame and panel wall structure. The preferred form of door includes a hollow lower frame structure or housing having a bottom wall 15, for frictionally engaging the track, side flanges 16 and 17 extending upwardly from the bottom wall and an inner closure plate 18. Corrugated metal panel 19 forms the vertical wall of the door and is secured along its lower edge to the top portion of the outer flange 16 of the lower frame housing by rivets 8. A T-shaped metal mounting plate 9 is arranged in the lower housing and its head portion is secured to the upper end of flange 16 by rivets 8. The leg portion of plate 9 extends adjacent cover plate 13, in spaced relation with flange 16, and the cover plate 13 is secured to flange 17 and panel 19 by suitable means, such as welding.

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The weight of the door normally causes the base wall 15 of the lower housing to rest on and frictionally engage track 12. Manually operable mechanism is associated with the door for lifting it above the track and for moving it along the track longitudinally of the car to cover or uncover the wall door opening.

The lift structure is mounted within the lower door base housing and includes a shiftable T-shaped bar 20 provided with end extensions each comprised of a pair of smaller spaced angle members or brackets 21 having a horizontal arm secured to the bar and a right-angularly upstanding arm. Lower rollers 22 are arranged between the pairs of extensions and are provided with bearings 22' mounted on shafts 23 carried by the outer ends of the horizontal arms, and upper camming rollers 24 are arranged between the pairs of extensions and are mounted on shafts 25 carried by the upper ends of the vertical arms. The lower housing base wall 15 is formed with slots 26 so that rollers 22, which normally lie within the base housing, can be projected to bear on track 12. Bearing members 27 are secured by rivets 8 to panel 19 and each has a bottom flange formed with oppositely extending inclined angle bearing faces 28. Members 28 are secured by rivets 29 to flange 16 of the door base housing and are spaced to receive and guide the bar 20 adjacent its ends.

The lift bar 20 is moved longitudinally in either direction by manually operable shift mechanism comprising hand lever 30 fixed on a flat end 31 of shaft 32 from which arm 33 depends. This arm has an inturned lower end 34, or trunnion, projecting into central vertical slot 35 in the lift beam 20.

The weight of the door will normally cause the base wall 15 to rest on the track and in such position of the door rollers 24 will lie in the apex of the camming faces 28 and rollers 22 will engage the track. As the hand lever 30 is shifted in either direction away from upright position, trunnion 34 will swing in an arc against the adjacent bar wall and will shift the lift structure longitudinally in the door causing the lift structure rollers 24 to ride longitudinally along inclined surfaces of members 27 and thereby cam the door upwardly. Due to the angularity of the bearing faces 28, rollers 24 will act uniformly on each end portion of the door when the lift structure is shifted longitudinally in either direction. While the door is lifted, it can be moved on rollers 22 along the track to desired position by manual pressure exerted against the lever 30.

The invention may be modified in various re-

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spects as will occur to those skilled in the art and the exclusive use of all modifications as come within the scope of the appended claims is contemplated.

What is claimed is:

1. In a railway box car having a door supporting track on one side wall beneath a door opening, the combination with a door having a housing coextensive with the lower portion thereof formed with a bottom wall adapted to normally rest on the track and having slots therein, of a bar mounted within said door housing and shiftable longitudinally thereof, bearing members within the housing fixed to the door each having oppositely downwardly inclined cam faces, angle-shaped brackets fixed to the ends of said bar having horizontally extending arms and right-angularly upstanding arms, door supporting rollers carried by the horizontally extending arms of said brackets adapted to be projected through the slots in the bottom wall of said door housing to engage said track, camming rollers carried by the upstanding arms of said brackets normally engaging the apex of said camming faces of said bearing members, a rock shaft journaled in the door housing centrally above said longitudinally shiftable bar, said bar having a central vertical slot therein, an arm integral with and depending from said rock shaft, said arm being formed with an inwardly extending trunnion engaged in said vertical slot of the bar, and a hand lever fixed to said rock shaft and swingable in opposite directions to shift said bar longitudinally whereby said camming rollers will ride on said inclined cam faces of said bearing members to lift the door to a position in which it is supported on said track rollers engaging said track through the slots in the bottom wall of said door housing.

2. In a railway box car having a door supporting track on one side wall beneath a door opening, the combination with a door having a housing extending along the lower portion thereof formed with a bottom wall adapted to normal-

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ly rest on the track and provided with slots therein, of a T-shaped bar located within the door housing and shiftable longitudinally thereof, bearing members secured within the housing on the door formed with inverted V-shaped camming faces, angle-shaped brackets fixed to the ends of said bar having horizontally extending arms and right-angularly extending upright arms, door supporting rollers carried by the horizontal arms of said brackets adapted to be projected through the slots in the bottom wall of said door housing to engage the track, angle plates fixed to the outer wall of said door housing and having depending spaced-apart guide portions between which said longitudinally shiftable T-shaped bar is arranged, camming rollers carried by the upright arms of said brackets normally engaging the apex of said camming faces on said bearing members, a shaft rotatably mounted in the door housing centrally above said bar, said bar being formed with a central vertical slot therein, an arm depending from said shaft formed with an inwardly extending trunnion engaged in the vertical slot of said bar, and a hand operating lever fixed to said shaft exteriorly of the door housing swingable in opposite directions to shift said bar longitudinally whereby to move said camming rollers in bearing engagement with said camming faces of the bearing members, said engagement of the camming rollers with the camming faces of the bearing members forcing said door supporting rollers through said slots of said door housing bottom wall into track engaging position to lift the door thereon.

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