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DOOR LIFT DEVICE

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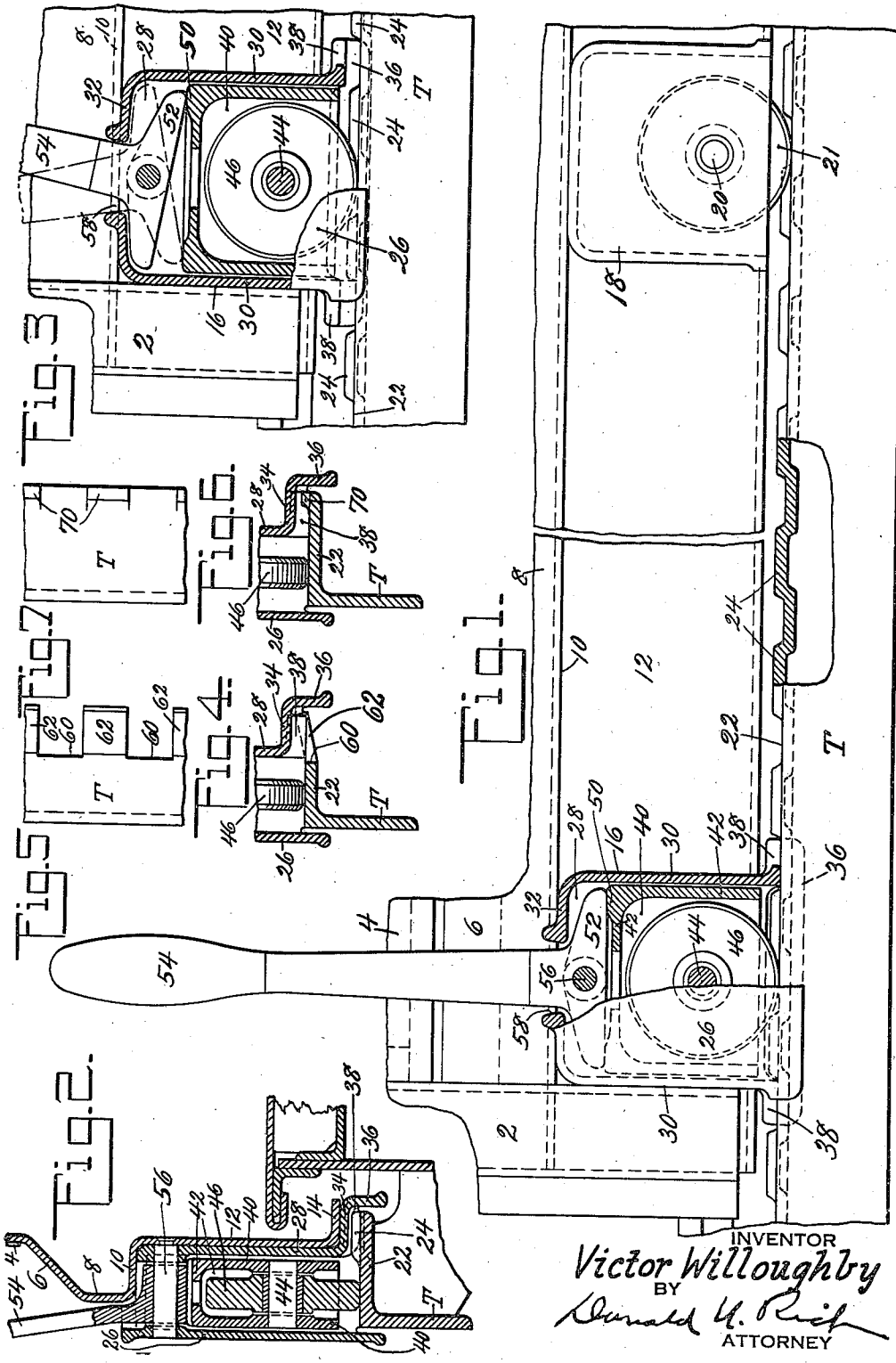


Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

Fig. 7.

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DOOR LIFT DEVICE

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6 Claims. (Cl. 16—99)

This invention relates to door lift devices in general and in particular to such devices intended for use with sliding railway car doors.

In recent years the majority of sliding railway car doors have been equipped with lift devices permitting the door to be raised during sliding yet permitting it to rest on the supporting track when in locked or partially open position to prevent sliding of the door with the resultant damage thereto during transit. The lift devices as now applied to cars lift both edges of the door; in other words, the mechanism must be made sufficiently strong to lift the entire door weight. These doors were also permitted to rest, when in the lowered position, directly on the smooth upper surface of the track and the doors could accordingly slide when a heavy impact was received by the car. It is an object, therefore, of the present invention to provide a door lift device and cooperating track which will positively prevent shifting of the door along the track under impact.

A further object of the invention is the provision of an inexpensive simple door lift device which need lift only half the door weight.

A still further object of the invention is the provision of a door lift device in which the lift is accomplished by means of a vertically sliding carriage or slide block.

These and other objects of the invention will be apparent to persons skilled in the art from a study of the following description and accompanying drawing, in which:

Figure 1 is an elevational view of the lower portion of the door with parts thereof being shown in section to more clearly disclose the construction;

Fig. 2 is a vertical sectional view taken substantially at the door operating handle of Figure 1;

Fig. 3 is a sectional view of the improved lift device shown in Figure 1 but with the parts in door lifted position;

Figure 4 is a partial sectional view showing a modified form of roller housing and door track;

Fig. 5 is a plan view of a portion of the door track shown in Fig. 4;

Fig. 6 is a partial sectional view showing a still further modified door track and housing arrangement, and

Fig. 7 is a plan view of the modified door track shown in Fig. 6.

Referring now to the drawing in detail, it will be seen that the improved lift device and track is used in connection with a more or less conventional form of door having front stile 2 joined to the bottom rail and to the door panel 4. The bottom rail is provided with an inclined portion 6 merging into a vertically extending portion 8 from which a substantially horizontal ledge 10 extends inwardly to merge into a web portion 12 which terminates in an inwardly directed stiffening flange 14. In the angle between the ledge 10 and web 12 are secured roller housings 16 and 18 located respectively adjacent the front and rear edges of the door. The roller housing 18 is provided with openings for reception of an axle 20, upon which is rotatably mounted the roller or other antifriction device 21 adapted to roll on the smooth upper surface of leg 22 of angle-shaped track T. The inner edge of this upper leg of the track is preferably deformed to provide partial corrugations or projections 24 extending upwardly above the smooth surface of the track for a purpose later to be referred to.

The roller housing 16 is preferably formed as a one-piece member having an outer wall 26 overlapping a portion of the track and joined to inner wall 28 by end walls 30 and top wall 32. The lower edge of the inner wall 28 is provided with an inwardly directed flange 34 merging into a downwardly directed reinforcing and door retaining flange 36. The inwardly directed flange 34 is formed with projections 38 of such a width as to engage in these spaces between the partial corrugations or projections formed in the inner edge of the track. In this manner it will be seen that since the housing is securely fastened to the door, the door will be unable to shift along the track due to the interlocking of the projections on the roller housing and track. In order to separate the projections and permit movement of the door, a door lift device has been provided consisting of a box-like roller carriage or slide block formed by inner and outer side walls 40 joined together by end and top walls 42 and of such a size as to freely slide within the cavity formed by the inner and outer and end walls of the roller housing 16. The inner and outer walls of the roller carriage or slide block have holes provided therein to receive axle 44 upon which is rotatably mounted a roller or other antifriction device 46 adapted to roll on the upper surface of the track when the block is forced into contact with the track. The corners at which the end walls and top wall of the slide block meet are thickened as at 50 in order to provide bearing pads for the ends of oppositely directed operating arms 52 preferably formed integral with an operating handle 54. The handle and operating arms are pivoted to the roller housing by means of pin 56 extending through the inner and outer walls of the housing. In the present instance the operating handle extends upwardly through an opening 58 formed in the upper wall of the housing, but it is obvious that if desired the operating handle may be positioned outside of the housing and non-rotatably secured to the operating arms in any suitable manner. It will be seen that by moving the operating handle in either direction, namely, to either the full or line

and dash position of Fig. 3, will cause one of the operating arms to in effect force the slide block downwardly, but since the slide block can not move downwardly, due to the door track, then the door must move upwardly, permitting the projections formed on the flange **34** to clear the projections formed on the track and thereby permit free sliding motion of the door along the track. It will be noted that the door rail is parallel to the track when the door is in lowered position, but is at an angle relative thereto when the door is in a raised or sliding position. This will, of course, cause the stile to be at an angle to the sealing strips and give a powerful leverage to break the sealing contact between the stile and seal strips which, in the present instance, have not been shown.

Under some conditions it may be impossible to form the projections as shown in Figs. 1, 2 and 3, in which case the inner edge of the door track may be notched as at **60** (Figs. 4 and 5), with the remaining metallic tongues **62** deflected upwardly thereby providing teeth or projections adapted to engage the projections **38** formed on the roller housing.

Some shops will be unable to deform or notch the track as previously described, in which case the inner edge of the track may be formed with projections **70** to cooperate with the projections **38** formed on the roller housing carried by the door. These projections **70** (Figs. 6 and 7) may be cast on the track, if a cast track is used, or may be placed thereon by welding in case a rolled track is utilized.

In any event, the door will normally be engaged with the track projections and any shifting movement of the door will be prevented, but when it is desired to shift the door this may be readily accomplished by merely grasping the operating handle and moving it in the direction which it is desired to move the door thereby causing one of the operating arms to force the slide block and roller downwardly, thereby lifting the door and disengaging the interlocked projections. It will, of course, be obvious that the lift mechanism may be placed at the rear edge of the door instead of at the forward edge as shown, although the latter is preferable since it will be adjacent the door locking mechanism.

While the invention has been described more or less in detail, it will be obvious that various modifications and rearrangements of parts, other than those shown and described, will suggest themselves to persons skilled in the art and all such modifications and rearrangements of parts are contemplated as will fall within the scope of the appended claims which define my invention.

What is claimed is:

1. In a door lift device the combination of a roller, a roller slide block substantially inclosing said roller, an axle connecting said roller and slide block, a housing secured to the door and substantially inclosing said slide block, and operating means carried by said housing to shift said slide block vertically in the housing to lift the door, said operating means being substantially of flat headed inverted T shape with the stem thereof forming an operating handle and the flat headed portion providing spaced bearings normally bearing on spaced portions of said slide block.

2. In a door lift device the combination of a roller, a roller slide block substantially inclosing said roller, an axle connecting said roller and slide block, a housing secured to the door and substantially inclosing said slide block, an opening in the upper central portion of said housing, an operating handle extending upwardly through said opening, a pivot connecting said handle and housing for relative rotation, and oppositely directed arms connected to said handle and presenting substantially coplanar surfaces normally bearing on said slide block to limit vertical shifting of said slide block within the housing, and one of said surfaces causing vertical shifting of the slide block within the housing upon movement of the handle, irrespective of the direction of movement of said operating handle about the pivot.

3. In a door lift device the combination of a roller, a roller slide block substantially inclosing said roller, an axle connecting said roller and slide block, a housing secured to the door and substantially inclosing said slide block, an operating handle pivotally carried by said housing upon a pivot located above said axle, and oppositely directed operating arms within said housing and connected to said operating handle, said arms normally bearing on said slide block at points equally spaced from said pivot to limit upward movement and control tilting of the slide block in the housing, one of said arms operating to shift the slide block vertically in the housing upon movement of the operating handle in either direction to thereby lift said door.

4. A lifting mechanism for sliding doors of railway cars, supported on tracks having spaced projections extending upwardly above the track surface thereof, said mechanism including spaced housings secured as units to the door and inclosing rollers adapted to roll on the track surface, spaced projections formed on one of said housings and engageable between the track projections to lock the door against sliding movement, a vertically movable slide block carried within said one housing formed with the projections and rotatably carrying the inclosed roller, and operating means for shifting the slide block in the housing to lift the door and disengage the said projections on the track and door.

5. In a door lift device the combination of an antifriction device, a slide block supported on said antifriction device, a housing secured to the door and inclosing said slide block for relative vertical movement and an inverted T shaped operating means carried by said housing with the arms of the T presenting substantially coplanar surfaces bearing on said slide block to limit upward movement and preventing tilting thereof, said operating means forcing said slide block downward in the housing during movement thereof to thereby lift said door.

6. Lift mechanism for a car door slidably supported on tracks having spaced projections extending upwardly above the track surface, said mechanism comprising spaced housings secured to the door one of said housings having spaced projections engageable between the track projections to lock the door against sliding movement, rollers carried in said spaced housings and adapted to roll on the track surface, a vertically movable slide block carried within one of said housings and rotatably carrying the enclosed roller, and operating means carried by said one housing for shifting the slide block and roller in the housing to lift the door and disengage said projections.

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