Oct. 1, 1929. C. LUTE ET AL 1,729,954

ELEVATING MEANS FOR CAR DOORS

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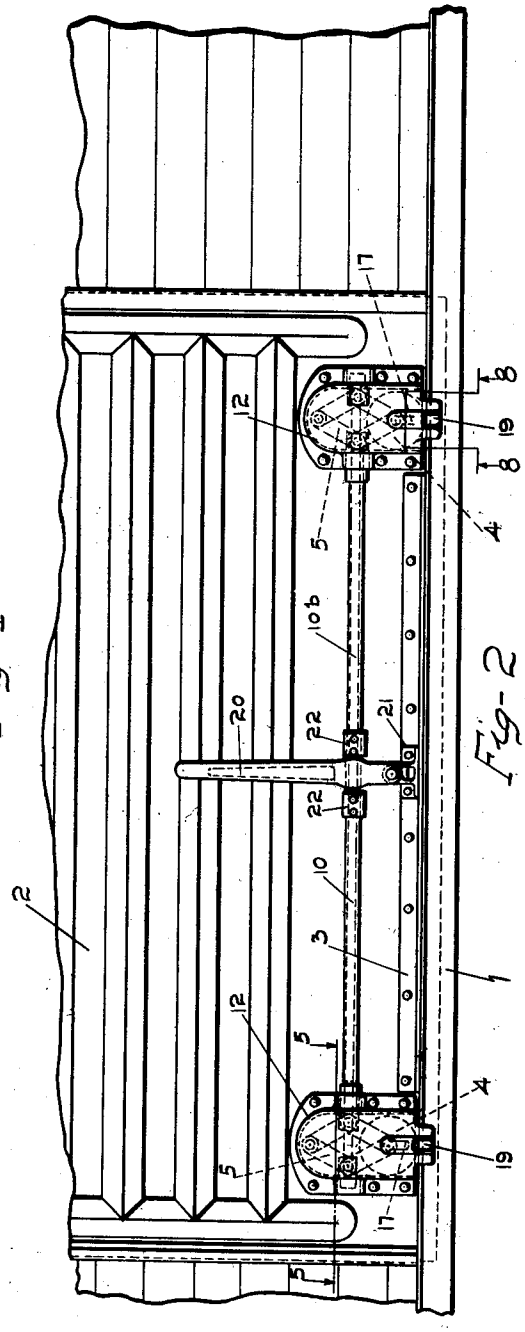


Fig-1

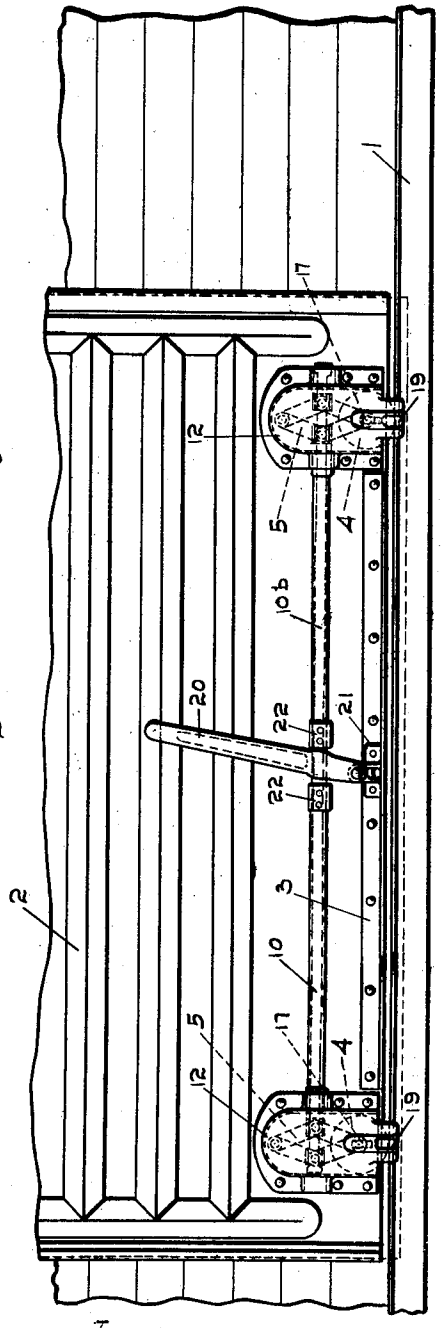


Fig-2

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Fig-3

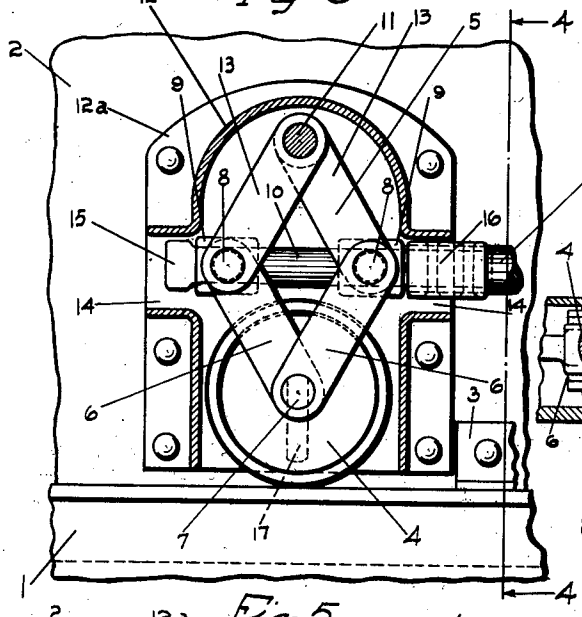


Fig-4

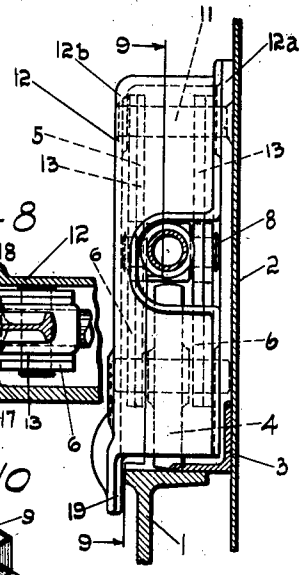


Fig-8

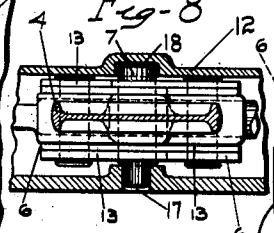


Fig-10

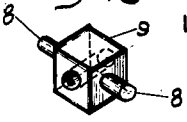


Fig-5

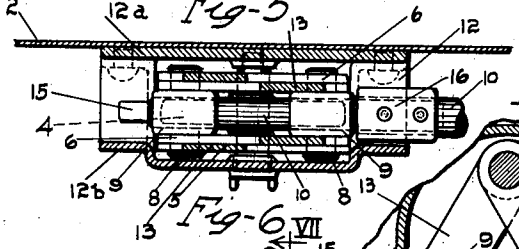


Fig-9

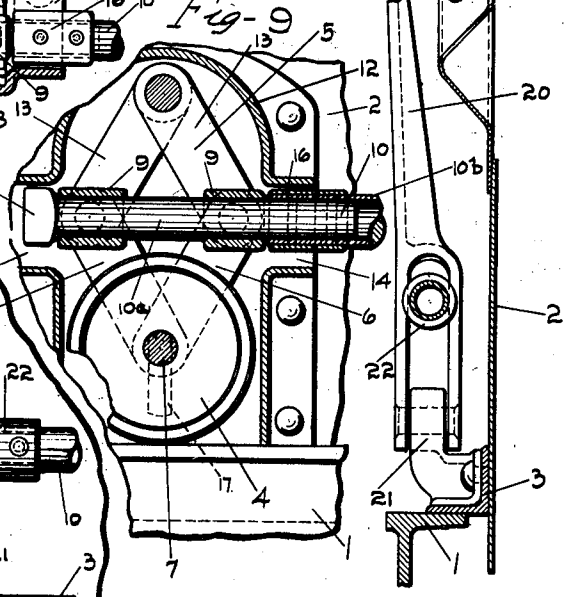
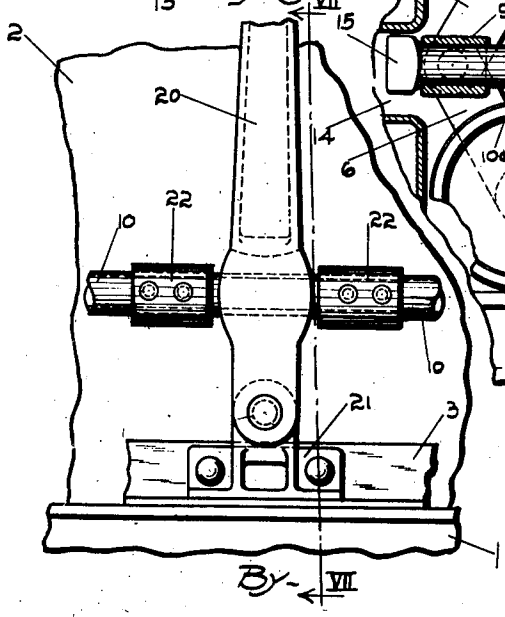


Fig-7

Fig-6



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UNITED STATES PATENT OFFICE

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ELEVATING MEANS FOR CAR DOORS

Application filed February 16, 1928. Serial No. 254,704.

This invention relates to door elevating means and concerns itself primarily with roller supporting means for the door, which means are expansible and collapsible, together with operating means for operating said expansible and collapsible means for elevating the door above said track, said roller supporting means automatically collapsing upon release of said operating means, to allow said door to descend upon said track.

According to this invention, the car door is supported upon the rollers only when it is being moved to open or closed position; at other times it rests firmly upon some supporting means and cannot be readily moved thru shunting or sudden starting, consequently, the fixtures upon the door or contiguous thereto are relieved from the constant wear and strain during the traveling movements of the car, or when the same is standing idle.

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 embodiment of this invention and in which similar reference numerals refer to different features in the similar views:

Figure 1 is a fragmentary side elevational view of a freight car, including a door mounted according to this invention, with the door in lowered position.

Figure 2 is a view similar to Figure 1, showing the door in elevated position.

Figure 3 is an enlarged sectional view thru the roller housing, showing the roller and toggle mechanism in elevation.

Figure 4 is an enlarged view taken upon the line 4—4 of Figure 3.

Figure 5 is an enlarged sectional view taken upon the line 5—5 of Figure 1.

Figure 6 is an enlarged fragmentary elevational view of the shifting lever.

Figure 7 is an enlarged, part sectional and part elevational view, taken upon the line 7—7 of Figure 6.

Figure 8 is a sectional view taken upon the line 8—8 of Figure 1.

Figure 9 is an enlarged sectional view taken upon the line 9—9 of Figure 4, looking in the direction of the arrows, and showing the door resting upon the track.

Figure 10 is a perspective view of a bearing block for connecting the toggle links with the operating rod therefor.

Referring now to the drawings, which illustrate one embodiment of this invention, it will be observed that there is illustrated a car door track 1, which is mounted at the lower margin of the car door opening. The term track is intended to include a supporting means for the door when the same is not supported by the rollers. A car door 2, which may be of any suitable design, normally rests upon the track 1. For this purpose, the car door is provided with an angled member 3 attached to the lower margin thereof, with the outstanding flange of such angled member resting upon the track.

A plurality of rolling elements 4 are attached to the door by an expansible and collapsible mechanism, generally denoted by the reference character 5. Means are provided for expanding or extending this mechanism for elevating the door above the track, in order that it may be supported upon the rollers for sliding movement. This means is so related to the mechanism that, upon its release, the door automatically sinks upon the track.

While the expansible and collapsible mechanism may assume different forms, as a matter of illustration, there is shown a pair of toggle links 6 on each side of each roller 4, which are connected at their lower ends to the axle 7 of the roller. The upper ends of the links 6 are connected to pintles or trunnions 8 (Fig. 10), extending from lateral sides of bearing blocks 9 which are slidably mounted upon an operating rod 10. Above the operating rod 10 there is a stud 11 which projects from the door 2 and which is supported in the walls of a housing 12 which surrounds the roller. This housing consists of a back plate 12^a secured to the door and a front member 12^b secured to the back plate. These parts may be separately forged, pressed or cast and assembled upon the door to provide a self-retained unit.

Two pairs of links 13 are pivoted at their

upper ends upon the stud 11 and the lower ends of the links 13 are pivoted upon the pintles or trunnions 8 extending from the bearing blocks 9. The aforementioned rod 10 extends thru suitable axially aligned openings 14 in the housing 12 and the ends of the rod 10 are provided with enlarged abutments 15 for a purpose that will later appear. Adjacent the right-hand bearing block 9 the rod is provided with a collar 16, one end of which forms an abutting shoulder with respect to the adjacent bearing block 9, as will later more fully appear.

The rod 10 may be of any desired construction. In the present instance, it is shown as made of sections, consisting of terminal solid portions 10^a for supporting the bearing blocks 9, and an intermediate hollow portion 10^b which telescopes over the solid portions and is connected thereto. Within the scope of this invention, any equivalent structure may be used for performing the functions and operations of this rod.

To guide the roller in a vertical path, the ends of the roller axle 7 project beyond the hub of the roller and operate in guideways 17 and 18 formed in the walls of the housing 12. It will be obvious that the aforementioned links 6 and 13 form an expansible and collapsible connection, in the form of a toggle mechanism or polygonal linkage, between the rollers 4 and the door. The connection of this toggle mechanism with the operating rod 10 is such that the toggle links may be expanded or extended by pulling or pushing against the sides thereof for elevating the door above the track and supporting the same upon the rollers. As soon as the operating rod is released, the slidable feature of the blocks 9 on the operating rod will allow the toggle mechanism to collapse thru the weight of the descending door, which automatically sinks upon the track as soon as the operating rod 10 is released, as will later more fully appear.

In order to maintain the door upon the track against lateral movement, suitable retaining clips 19 may be secured to the door for overlapping the outer margin of the track, as shown in Figure 4, and, to operate the rod 10 which connects the toggle mechanisms of the respective rollers, there is provided an operating lever 20, which is bifurcated at its lower end for straddling the rod 10 and which is pivoted at its lower end upon a lug 21 attached to the side of the car door. The operating rod 10 is provided with abutting collars 22 (Fig. 6), upon each side of the operating lever 20, for coaction therewith.

On account of the automatic collapsible feature of the toggle mechanisms that connect each roller 4 with the door, it will be obvious that the door normally rests directly upon the track 1. When it is desired to elevate the door for sliding movement upon the rollers, the operator will swing the handle 20 in the direction that he desires to shift the door. Assuming it is desired to shift the door to the right, as shown in Figure 2, the operator will swing the lever 20 to the right, thereby moving the rod 10 to the right. As the rod 10 is thuswise moved, the enlarged abutment 15 at the left-hand end of the rod will engage the adjacent sliding block 9 to expand or extend the toggle mechanism, while at the other end of the door, the abutment 16 will engage the adjacent slidable bearing block 9 and shift the same for expanding or extending the right-hand toggle mechanism. Obviously, as the toggle mechanisms are thuswise expanded or extended, they will elevate the door above the track so that said door is supported upon the rollers for sliding movement, and the continued pull on the lever 20 will naturally cause the door to travel along the track.

As soon as the operator releases the lever 20, the weight of the door acting upon the toggles will immediately cause the same to collapse, due to the slidable characteristic of the bearing blocks 9 on the operating rod 10, until the lower edge of said door again rests upon the track 1. It is, therefore, obvious that the door is only in elevated position above the track and supported upon the rollers when held in such position by the swinging of the lever 20. Consequently, the door will always be supported directly upon the track against any accidental shifting movement, except when it is being shifted during its opening or closing movements.

We are aware that many changes may be made, and numerous details of construction may be varied through a wide range without departing from the principles of this invention, and we, therefore, do not propose limiting the patent granted hereon, otherwise than necessitated by the prior art.

We claim as our invention:

1. In a structure of the character described, a track, a door normally resting upon said track, a roller, polygonal linkage connecting said roller and door, and means for extending said linkage for elevating the door above said track.

2. The combination with a track, of a door normally resting upon said track, a pair of rollers, toggle mechanism connecting each roller with said door, a rod for connecting said toggle mechanisms, and a lever for actuating said rod for simultaneously expanding said toggle mechanisms for elevating the door with respect to said rollers.

3. The combination with a track, of a car door normally resting upon said track, a pair of rollers, an operating member, a pair of links pivoted at the axis of each roller and slidably connected to said operating member, a second pair of links connected to said first mentioned links, a common pivot

support for said second mentioned links, and means for operating said operating member for extending said links.

4. In a structure of the class described, a track, a door normally resting upon said track, a roller, a supporting axle therefor, a rod, bearing blocks slidably mounted upon said rod, each bearing block having pintles, a pair of links pivoted at one end to the axle of said roller and pivotally connected at the other end to said pintles, a second pair of links having a common pivotal connection above said rod and connected with said pintles, an abutment in the path of one slidable bearing block and an enlargement on said rod adjacent the other bearing block, whereby said links may be expanded or collapsed.

5. In a structure of the class described, a track, a door normally resting directly upon said track, a pair of sectional housings attached to said door, a slidable rod extending thru said housings, a roller in each housing, links pivotally attached to said rollers and slidably attached to said rod, and means for shifting said rod.

6. The combination with a track, of a door having an edge normally resting upon said track, a plurality of rollers, expansible and collapsible connections between said door and rollers, and means including a longitudinally extending bar connected to said connections for simultaneously moving said rollers relative to said door.

7. The combination with a track, of a door having an edge normally resting upon said track, a plurality of rollers, expansible and collapsible connections between said door and rollers, and horizontally movable means for expanding said connections for elevating the door above said track and moving said door upon said track.

In testimony whereof, we have hereunto subscribed our names.

CARL LUTE.
KENNETH J. TOBIN.