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DOOR ELEVATING MECHANISM

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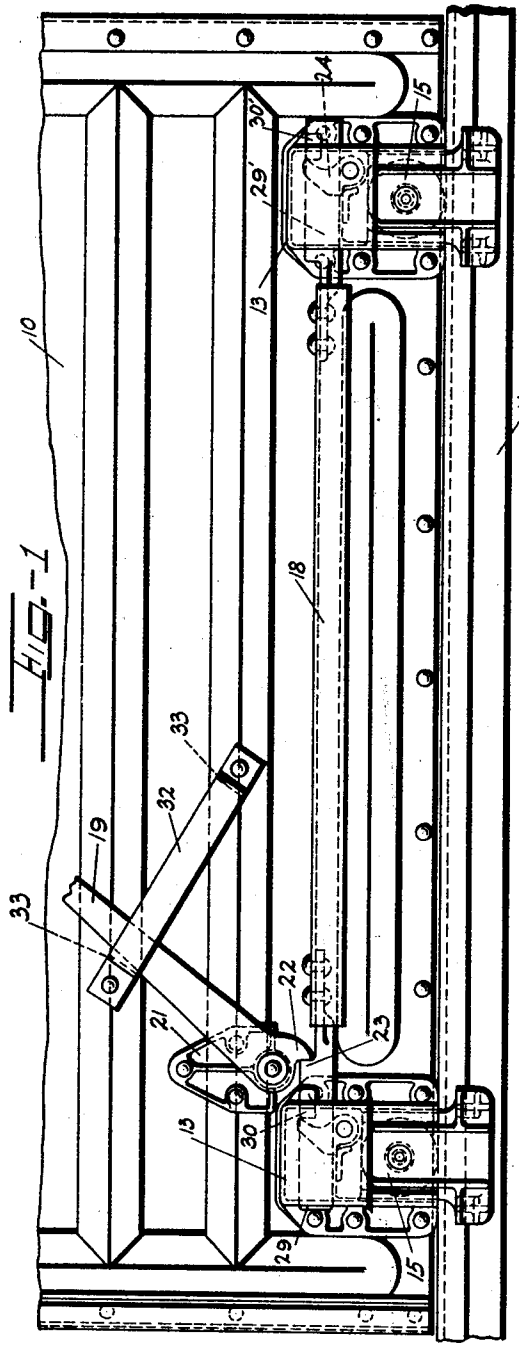


FIG. 1

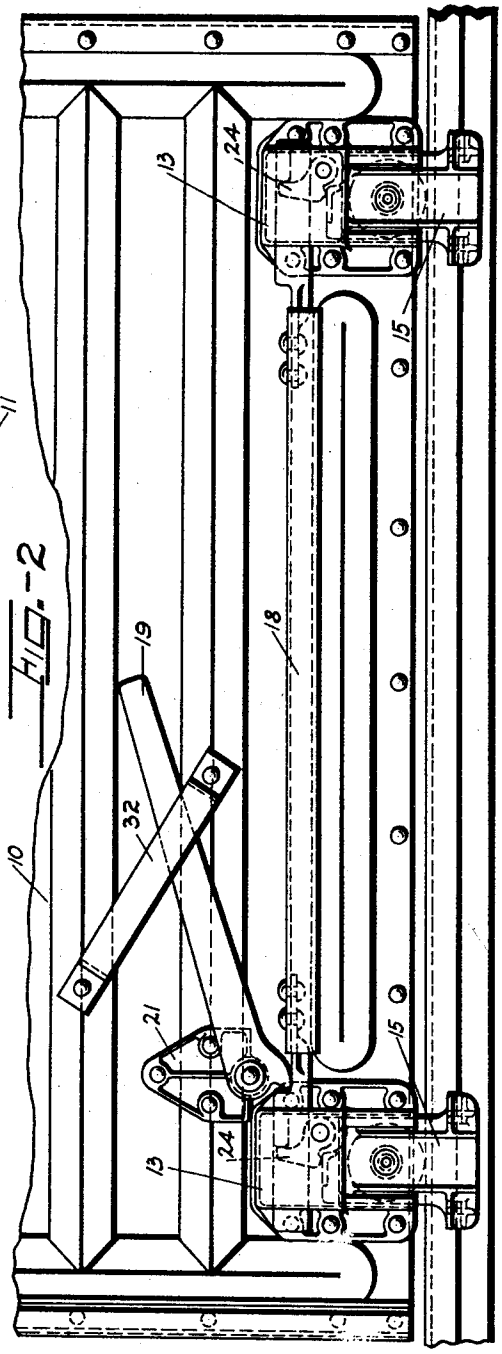


FIG. 2

-INVENTOR-
GABRIEL MADLAND
By- Samuel Reed
ATTY.

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DOOR ELEVATING MECHANISM

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FIG.-3

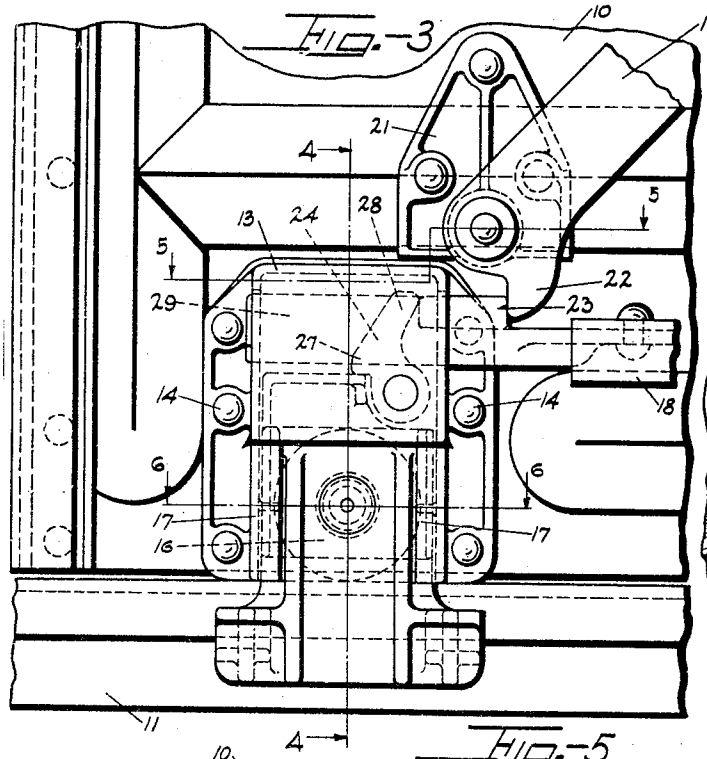


FIG.-4

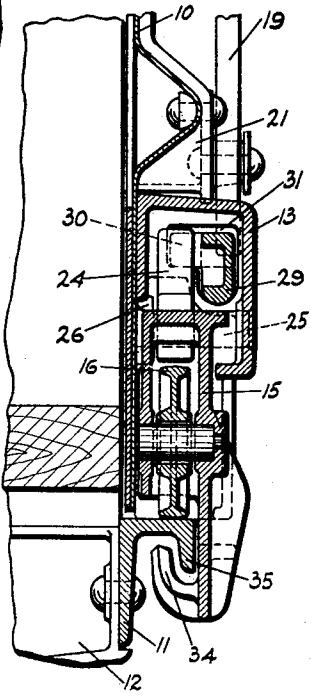


FIG.-5

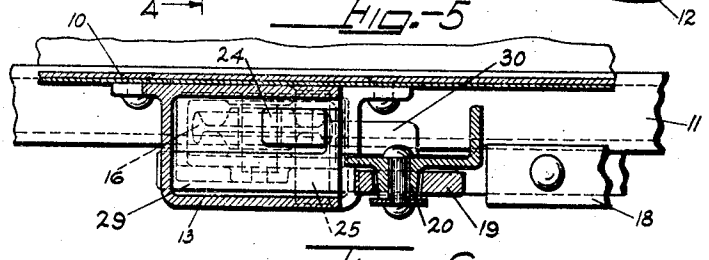
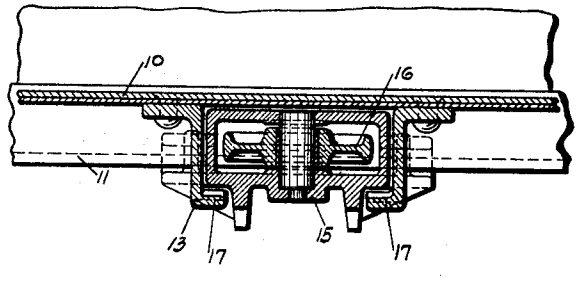


FIG.-6



-INVENTOR-
GABRIEL MADLAND

By- Samuel Reese

ATTY.

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DOOR ELEVATING MECHANISM

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FIG.-8

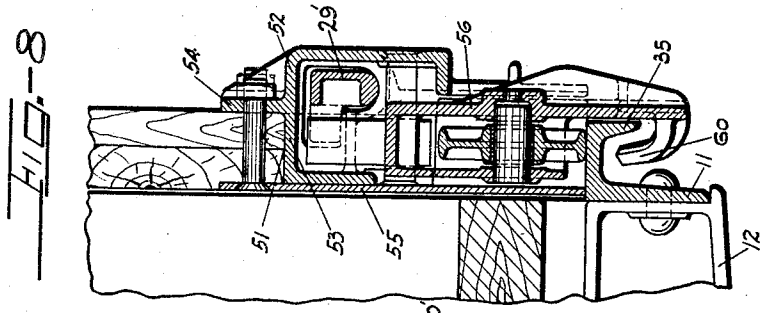


FIG.-7

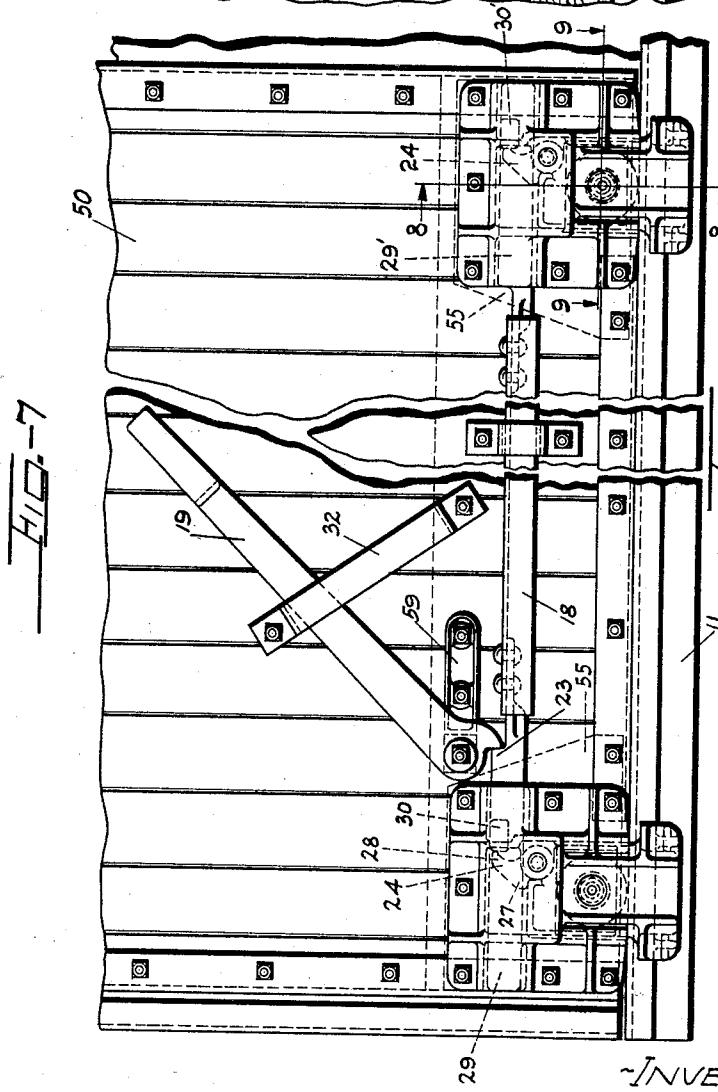
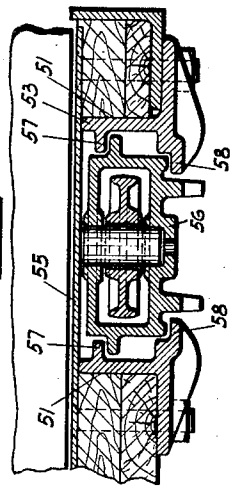


FIG.-9



~INVENTOR~
GABRIEL MADLAND

By~ Samuel Reese
ATTY.

Patented Feb. 7, 1933 1,896,636

UNITED STATES PATENT OFFICE

GABRIEL MADLAND, OF CHICAGO, ILLINOIS, ASSIGNOR TO CAMEL COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS

DOOR ELEVATING MECHANISM

Application filed February 26, 1931. Serial No. 518,333.

This invention relates to doors for railway cars and concerns itself more particularly with mechanisms for effecting elevating movement of said doors.

It is an object of this invention to provide mechanisms for elevating doors for support upon rolling means, whereby said doors may be moved to open and closed positions.

A further object is the provision of lift mechanisms which shall be capable of easy and positive operation.

Other objects of the invention as well as advantages will become apparent from the following description and drawings forming part of this specification.

In the drawings Figure 1 is a partial elevation of a metal door to which is applied a lift mechanism of the invention, the door being shown in lowered position.

Figure 2 is a view similar to Figure 1 with the door shown in elevated position.

Figure 3 is a fragmentary elevation of the lower left hand corner of the door, showing a portion of the operating lever and lifting mechanism on an enlarged scale.

Figure 4 is a sectional view on line 4—4 of Figure 3.

Figure 5 is a sectional view on line 5—5 of Figure 3.

Figure 6 is a sectional view on line 6—6 of Figure 3.

Figure 7 is a partial elevation of a wood door to which a modified form of lift mechanism is applied.

Figure 8 is a sectional view on line 8—8 of Figure 7 on an enlarged scale.

Figure 9 is a sectional view on line 9—9 of Figure 7 on an enlarged scale.

Referring to the embodiment of the invention shown in Figures 1 to 6, inclusive, a lift mechanism is illustrated in its application to a metallic door. The door 10 in the present instance is indicated as provided with corrugations, although it is apparent that any type of metallic door may be employed. It will be evident that while the lift mechanism is illustrated in its application to a single or box car door it is not limited in this respect but may be utilized as well in connection with double door constructions.

The door in the lowered position shown in Figures 1, 3 and 4 of the drawings is supported frictionally upon a track 11 secured to a side sill (not shown) by means of a plurality of track brackets 12, one of which is shown in part in Figure 4 or the drawings. The frictional engagement between the door and the track is effected in accordance with the embodiment considered by means of a plurality of housing members 13 secured adjacent the lower corners of the door by means of rivets 14, it being clear from the showing of Figure 4 that there is direct engagement between a surface of said housings and the track. It is to be understood, however, that the invention is not limited in this aspect to engagement between the housings and the track but that the frictional engagement may be effected in any manner desired.

Mounted within each of the housing members 13 is a roller support 15 within each of which is positioned a roller 16 having rolling engagement with the track. The roller supporting members 15 are maintained in sliding relationship with the door and the housing members by means of inwardly directed flanges 17 provided on said housing members having overlapping engagement with the roller supporting members as is clearly indicated in Figure 6 of the drawings. It is evident from this construction that the roller supporting member with its contained roller will remain in engagement with the track at all times even in the elevated position of the door.

In order to adapt the door for movement toward closed or open positions it is necessary that the frictional engagement between the door and the track or between the hous-

ing members and the track must be broken and the door supported upon the rollers 16. For the accomplishment of this result there is provided an operating bar 18 movable in a substantially horizontal plane. In order to impart movement to this bar an operating lever 19 is utilized. This lever, as clearly shown in Figures 1 and 5 of the drawings, is pivoted on a boss 20 formed integrally with a bracket member 21 secured to the door. The lever is provided with a nose portion 22 adapted to have engagement with an abutment portion 23 provided on the operating bar 18. A dog or trigger member 24 is pivoted in each of the housing members by means of a pin 25, said pin being supported in part by a hub 26 depending from the housing members and positioned adjacent one upper corner of the roller supporting member, said corner being removed in order to permit such positioning. As clearly illustrated in Figures 3 and 4 of the drawings, each of the dogs or trigger members is provided with oppositely extending lobes 27 and 28 positioned above the pivotal support of said dogs in the housing members. The lobe 28 of each trigger 24 extends in the path of movement of a member 29 or 29′, preferably in the form of a casting riveted directly to the ends of and forming part of the operating bar 18. The members 29, 29′ are provided with abutment portions 30, 30′, respectively, adapted to contact with the lobes 28. The members 29, 29′ extend into the housing members 13 and for this purpose slots 31 substantially angular in section are provided in said housing members. A retaining strap 32, provided with offset portions 33 which are extended for attachment to the door 10, is utilized to prevent outward displacement of the operating lever 19 and to provide stops limiting the downward and upward movements of the lever.

In Figures 7 to 9, inclusive, an embodiment of the lifting mechanism of the invention is illustrated in its application to a wooden door. The lower corners of the door 50 are gained out as indicated at 51 and into these gained portions modified housing members 52 are positioned. These housing members are provided with inwardly extending portions 53 adapted to abut the door in the gained portions thereof. An outwardly extending flange 54 is provided on said housing members in overlapping relationship with the door in order to receive a plurality of bolts extending through aligned openings in a backing or gusset plate 55, said door and said outwardly extending portions. The backing or gusset plate 55 is provided on the inside of the door and serves not only to compensate for the gained out portions of the door but provides additionally a backing member against which the housing members are adapted to abut.

A roller supporting member 56 is provided in each of the housing members 52 and is maintained in slideable engagement with said housing members and the door by means of spaced flanges 57 and 58 provided on the housing members. In other respects, the operating mechanism illustrated in Figures 7 to 9, inclusive, is the same as that shown in Figures 1 to 6, inclusive. In other words, an operating bar 18 is employed. An operating lever 19 is utilized to impart movement to said operating bar. A strap member 32 is utilized although in its application to the wooden door it assumes a somewhat different angular position relative to the door. The operating lever is pivoted on the door by means of a bracket 59. Dogs or trigger members 24 are employed, said dogs being pivotally supported in the housing members 52. The operating bar 18 has secured to it at its ends the castings 29, 29′ which are provided with abutments 23 and 30 and 23′ and 30′, respectively, for the purpose hereinbefore set forth. The abutment 30, or 30′ is adapted to have engagement with the upwardly extending lobe 28 of a dog while the lobe 27 is adapted to have engagement with the roller housing member 56. As shown in Figures 4 and 8, respectively, each of the roller housing members is provided with an upwardly extending flange 34 and 60, respectively, these flanges having interengagement with a depending portion 35 provided on the track to limit outward movement of the door.

When it is desired to move the door longitudinally of the car toward open or closed position the operator will grasp the free end of the lever 19 and exert a downward pull thereon. During this movement of the free end of the lever the nose portion 22 of the lever will exert a thrust upon the abutment portion 23 and thereby impart a substantially horizontal movement to the operating bar 18. During this movement of the bar and because of the engagement between the abutment portion 30 on said bar and the lobe 28 of the dog or trigger member 24, said trigger member will be urged in the direction of movement of the bar. The trigger member will then fulcrum about the lower lobe 27 upon the roller housing member, producing an upward movement of the pivotal portion of said trigger member. Inasmuch as the trigger member is pivoted on the door a corresponding upward movement will be imparted thereto and the door will be elevated above the track and supported for rolling movement thereupon by means of the rollers 16. It is apparent that in the upward movement of the door the roller housing members 15 remain substantially stationary. While the operation of the lift mechanism has been described with relation to the lifting movement effected by one of the dogs it is apparent that the same operation is per-

formed by the other of said dogs. Upon release of the operating lever it is manifest that the door will again seat itself frictionally upon the track because of the action of gravity.

It should be noted that the operation of the bar 18 and the lever 19 is positive both in the elevating and lowering movements of the door. The positive action of these members in the elevating movement of the door has been explained. It will be evident that no sticking of the members 18 and 19 can occur in the lowering movement of the door inasmuch as by means of the engagement between the dogs and the roller supporting members a positive thrust will be exerted by said dogs upon the abutment portions 30, 30′ provided on the castings 29, 29′ which are secured to the bar 18 so that the said bar and the operating lever, through its engagement between the abutment portion 23 and the nose 22, will be positively actuated and will assume their normal positions.

Numerous changes in the details of the embodiments of the invention set forth may obviously be made. It is to be understood, however, that all such changes falling within the invention and the scope of the claims appended hereto are deemed to be comprehended within its purview.

I claim:

1. In combination, a sliding door, a track, said door in its lowered position having frictional engagement with said track, a plurality of hangers secured to said door, each of said hangers comprising a housing member fastened to said door and a roller supporting member having vertical movement relative to said door, rollers mounted in said roller supporting members in engagement with said track, means pivotally supported on said door to swing substantially longitudinally relative to the door and having abutment upon each of said roller supporting members and means adapted to exert a force upon said pivotally supported means, whereby the latter will fulcrum upon said roller supporting members and said force will be communicated to the pivotal support of said means to lift the door.

2. In combination, a sliding door, a track, said door and said track having frictional engagement in the lowered position of said door to prevent sliding movement thereof, a plurality of housing members rigidly secured to said door, a plurality of roller supporting members maintained relative to said door by said housing members, said housing and roller supporting members being capable of relative vertical movement, rollers carried by said supporting members in engagement with said track, pivoted triggers swingable longitudinally of the door carried by said housing members and having engagement with said roller supporting members and means having abutment portions engageable with said triggers for operating said triggers to elevate the door.

3. In combination, a sliding door, a track, said door in its lowered position being frictionally retained against sliding movement by said track, roller supporting members, rollers mounted in said supporting members and adapted to have rolling engagement with said track, brackets riveted to said door, said brackets being provided with flanges confining said supporting members for relative vertical movement with respect to said door, means pivotally mounted in said brackets and having engagement with said roller supporting members and a horizontally movable operating bar, said bar being adapted to have engagement with said pivotally mounted means.

4. In combination, a sliding door, a track, said door in its normal position being frictionally retained against sliding movement, roller supporting members, rollers mounted in said supporting members and having engagement with said track, bracket members secured to said door, means provided on said bracket members maintaining said roller supporting members for vertical movement relative to said door, a horizontally movable operating bar and means converting the horizontal movement of said bar into a vertical movement to said door, said last mentioned means comprising elements pivotally supported on certain of said members and having engagement with the other of said members and said operating bar.

5. In combination, a sliding door, a track, bracket members secured to said door and having frictional engagement with said track in the lowered position of the door, aligned openings in said bracket members, an operating bar provided with abutment portions extending into said openings, roller supporting members slideably associated with said bracket members, a roller mounted in each of said roller supporting members, said rollers having rolling engagement with said track, dogs pivotally supported by said bracket members, said dogs having engagement with said roller supporting members and the abutment portions on said operating bar and means for effecting movement of said bar whereby said dogs will fulcrum upon said roller supporting members and the door will be elevated about the pivotal connection between said dogs and said bracket members.

6. In a house car, in combination, a sliding door, a track, said door and said track having frictional engagement in the lowered position of the door, a plurality of roller supporting members connected to said door, said door being capable of vertical movement relative to said supporting members, rollers mounted on said members in engagement with said track, means substantially bell

crank in shape pivotally mounted on said door and having engagement with each of said roller supporting members and means engageable with and adapted to exert a substantially horizontal thrust upon said pivotally mounted means to elevate said door above said track, said roller supporting members being stationary relative to said track during the elevating movement of said door.

Signed at Chicago, Illinois, this 25th day of February, 1931.

GABRIEL MADLAND.