

March 10, 1942.

A. WASBERG

2,275,707

RAILWAY SLIDING DOOR STRUCTURE

Filed Sept. 22, 1938

3 Sheets-Sheet 1

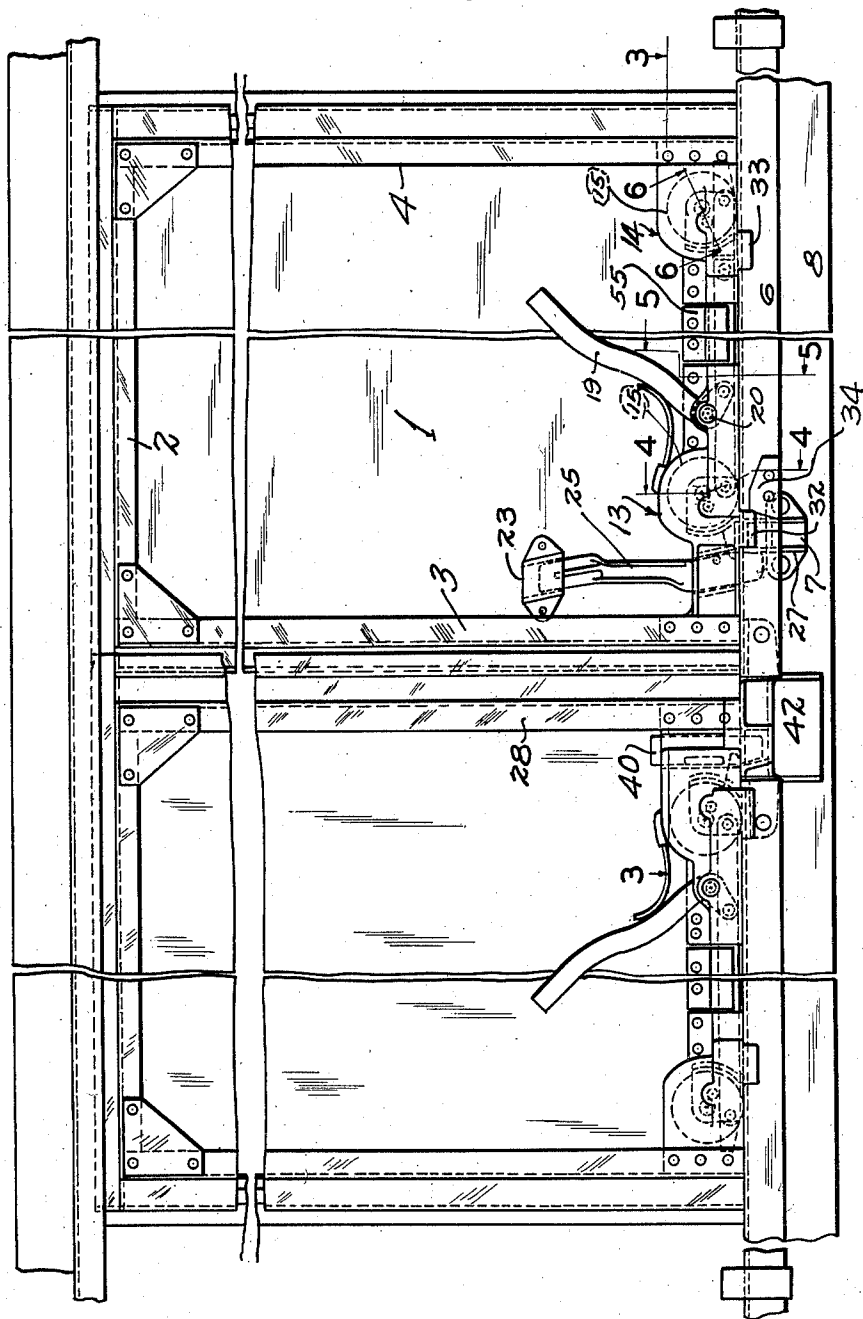


FIG. 1.

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3 Sheets-Sheet 2

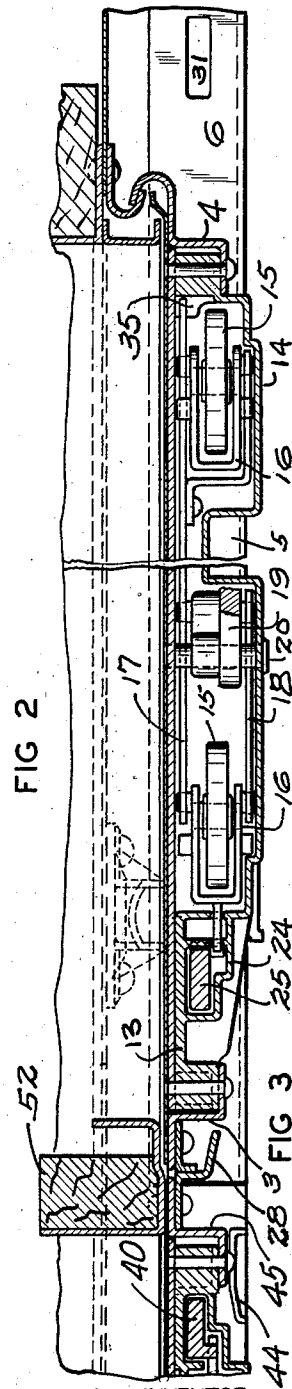
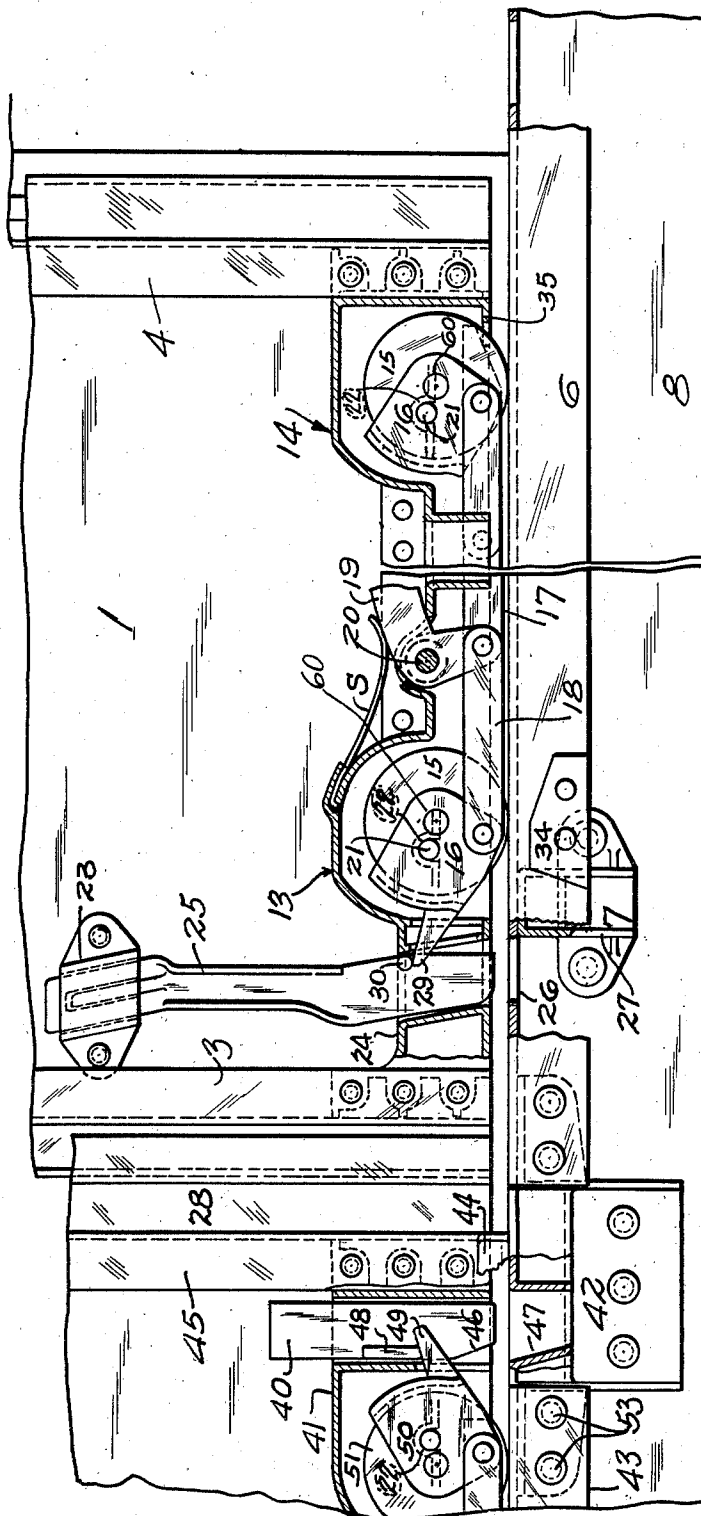


FIG 2

FIG 3

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3 Sheets-Sheet 3

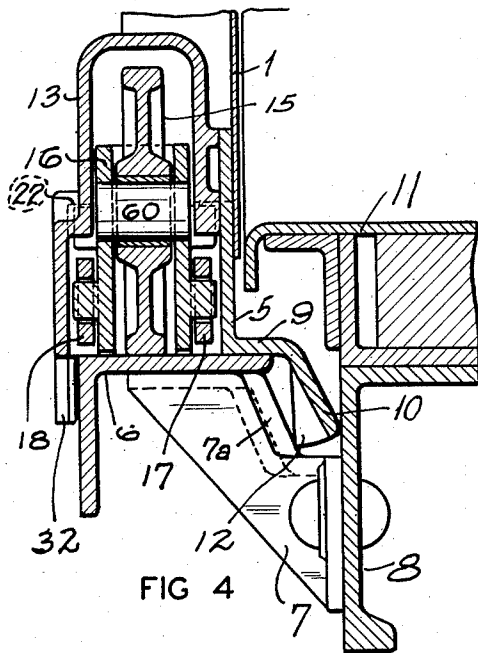


FIG 4

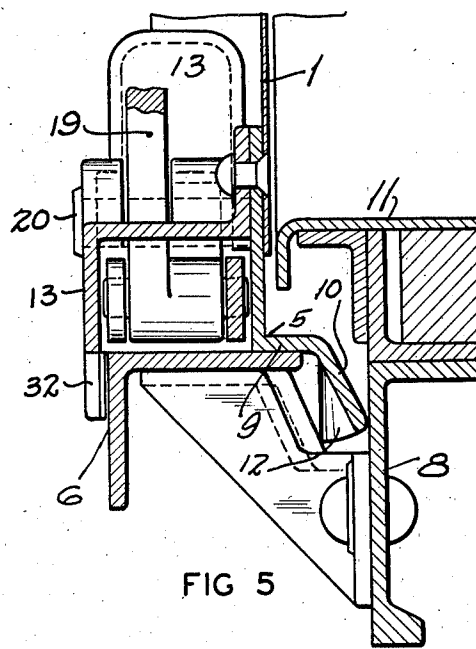


FIG 5

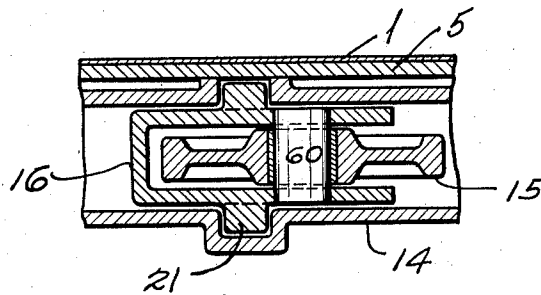


FIG 6

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UNITED STATES PATENT OFFICE

2,275,707

RAILWAY SLIDING DOOR STRUCTURE

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Application September 22, 1938, Serial No. 231,141

13 Claims. (Cl. 16—99)

The invention relates to sliding doors and associated structure for railway house cars and in some respects relates more particularly to lift type doors which normally rest upon a supporting track but when they are to be moved to open or closed position they are raised from the track and supported upon anti-friction rolling elements.

The invention comprises all of the novel structure and features described below as particularly pointed out in the appended claims.

One object of the invention is to facilitate the assembly of a lift and roller mechanism with an otherwise complete door structure and incidentally to facilitate the removal of such lift mechanism from the door for repairs or replacements without removing portions of the door structure which receive and mount the mechanism.

Another object of the invention is to improve the application and releasing of holding means for securing the door in closed, and open, positions.

Another object of the invention is to maintain door supporting rollers in alignment with each other and the door track, without journalling the same in fixed bearings on the door.

Another object of the invention is to baffle the passage of an air stream laden with dirt, moisture, etc., beneath the door to the interior of the car.

These and other detailed objects as will be apparent from the following description are attained by the structure detailed in the accompanying drawings illustrating one embodiment of the invention and in which:

Figure 1 is a side view of the main and auxiliary door and associated structure, of an automobile type car, the door panels being broken and condensed to facilitate the showing of the novel features on an enlarged scale, the doors being shown in normal lowered position;

Figure 2 is an enlarged detail side elevation of the door lift and roller mechanism showing the door in elevated position and supported by the rolling elements the housing therefor being sectioned for clearer illustration;

Figure 3 is a horizontal section taken approximately on the line 3—3 of Figure 1 just below the top of the housing structure;

Figures 4 and 5 are vertical transverse sections taken on the corresponding lines of Figure 1; and

Figure 6 is an inclined transverse section taken on the line 6—6 of Figure 1.

The following description of the main door shown at the right of Figure 1 applies generally to the auxiliary door shown at the left of Figure 1 and the latter will not be described except insofar as there is some difference in details.

The door body comprises a panel 1, and top, front, rear and bottom framing members 2, 3, 4 and 5 respectively. Normally the lower ends of front and rear framing or edging members 3 and 4 rest upon and frictionally engage the upper surfaces of an angle track member 6, carried by brackets 7 from the car body side sill 8. Bottom frame member 5 includes a horizontal portion 9, which rests upon the inner part of track 6, and a downwardly and inwardly inclined portion 10 which cooperates with side sill 8 and a threshold plate 11 to form a baffle for air streams tending to pass beneath the door into the car. Inclined portion 10 is indented at 12 to oppose inclined element 7a on bracket 7 and guide the door inwardly as it is lowered onto the track, when closed, to narrow or eliminate the gap between the door angle flange 10 and side sill 8.

The bottom of the door is provided with two housing structure members 13 and 14, near the front and rear of the door respectively and this housing structure opens downwardly to receive rollers 15 and mechanism for carrying the door on the rollers comprising roller retainers 16, an operating bar 17 connecting them and an operating link 18 by which one of the retainers is connected to a handle lever 19 having a pivot pin or rivet 20 seated in the opposite sides of housing member 13.

Each roller retainer 16 is of U-section receiving the roller between its legs and mounted on the roller to rotate about the roller axis. This mounting is here shown as an axle 60 seated in the legs of the retainer and journalling the wheel.

The retainer has laterally projecting lugs 21 disposed, when moved upwardly, to engage downwardly facing shoulders 22 in the housing to lift the door to the position shown in Figure 2. Such movement of lugs 21 is effected by the clockwise movement of handle lever 19 about its pivot 20 and the resulting thrust by bar 17 and link 18 to the left swinging retainers 16 about roller axes 60. A spring S seated in a pocket in casing 13 thrusts against lever 19 to prevent its oscillations due to jostling of the car. This reduces noise and wear on the connections between the parts with resulting undesirable loose play.

A bracket 23, attached to the door panel, and a vertically apertured portion 24 of housing 13, receive and guide a holding bar 25. When the

door is closed bar 25 may drop through an opening 26 in track 6 to the position shown in Figure 1 in which its lower portion engages the front face 27 of the forward track bracket 7. Due to the inclination of the bar guiding elements, the dropping of the bar, and any later downward movement due to the jarring of the car, will wedge the door more tightly closed, thrusting its forward edging 3 against the opposing member 28 of the auxiliary door.

The front roller retainer 15 has a forwardly extending finger 29 disposed to underlie a lug 30 on bar 25 and when handle lever 19, link 18 and retainers 16 are operated to raise the door, finger 29 engages lug 30, raising bar 25 to door releasing position. Hence, the movement of bar 25 to door holding position when the door is closed or to door releasing position when the door is opened, is automatic, although bar 25 may be gripped and lifted or lowered manually.

When the door is moved to open position, bar 25 may drop into the opening 31 in track 6 to hold the door against unintentional movement and against pounding on the door-way rear post (not shown).

Housing structure members 13 and 14 have depending lugs 32 and 33, respectively, overlapping the outer face of track 6 and serving to retain the door against movement inwardly across the track, particularly when the door is opened and is not positioned by the threshold plate 11 as it is in closed position. Lug 32 near the front edge of the door cooperates with a stop 34 on track 6 to hold the door against opening movement and in this function elements 32 and 34 supplement the holding and wedge action of bar 25 and forward stop 7.

Housing member 14 has an inturned lip 35 on its rear wall and operating bar 17 normally overlies this lip so that when the door and operating gear are detached from the car, the gear is retained in the housing, although by removal of pin 20 the gear may be removed readily from the bottom of the housing for repair or replacement. It is never necessary to detach any part of the housing from the door to get to the operating gear.

The auxiliary door has a similar housing and door lift and roller mechanism. The holding bar 40 for the auxiliary door is shown without the handle and there is no upper guide corresponding to guide 23 on the main door. However, holding bar 40 has extended bearings on housing member 41 and on the combination track bracket, door guide and stop casting 42, which supports the forward end of track 43 and has an upstanding inwardly inclined lug 44 for engaging the outer flange of the door forward Z bar frame 45 guiding the door inwardly towards the threshold plate.

Holding bar 40 slides vertically in housing member 41, but its lower end is inclined at 46 and opposes a similarly inclined surface 47 on casting 42, whereby the downward movement of the bar 40 and the jolting of the car tends to move the auxiliary door towards the main door. Bar 40 has a lug 48 disposed to be engaged by a finger 49 on roller retainer 50, whereby the bar is automatically lifted out of door holding position when the auxiliary door is raised from the track to be moved on its rollers 51. Some of the features of this bracket casting are disclosed and covered in applicant's co-pending application, Serial No. 124,723, filed February 8, 1937, now Patent No. 2,236,328, issued March 25, 1941. A Z-shaped

piece 55 extends between housing structures 13 and 14 and covers and protects bar 17 from dirt, snow, ice, etc.

The rear edge structure of each door cooperates with the adjacent door-way post structure to supply a series of pockets or baffles for sealing the rear edge of the door to prevent passage of dirt and moisture to the interior of the car, this structure being covered by applicant's Patent No. 2,114,756, issued April 19, 1938, and more specifically detailed in applicant's co-pending application Serial No. 260,921, filed March 10, 1939, now Patent No. 2,226,419, issued December 24, 1940.

Obviously, the structures covered by the patents and applications referred to may be changed or eliminated without affecting the retention and functioning of the features claimed herein.

The above described structure embodies a door lifting arrangement which automatically raises the door holding bar 25 and maintains the same in raised position while the door is being moved by the operating handle 19. Neither the rollers nor the roller retainers are journaled in the door structure, but their connection through operating bar 17 which parallels the adjacent housing walls, maintains the rollers in alignment with each other and with the track upon which they ride. The elements cooperating with the door holding bar 25 to hold the door in closed and open position are below the level of the car floor and comprise slots in the door track, but these slots are located inwardly of the car from the plane of the rollers and do not impede the movement of the rollers along the track. The entire roller and lift mechanism is located substantially between the inner and outer planes of the door structure, thereby providing for maximum interior width of car for a given clearance limit.

By removing the usual back stop (not shown) for the main door, the latter may be moved rearwardly over its track 6 and removed from the car without disturbing the track or the track supporting brackets. The auxiliary door cannot be so removed because of the auxiliary door post 52 striking the corresponding door-way post (not shown), and to remove the auxiliary door it is necessary to remove its track, but this may be accomplished by cutting rivets 53 and without disturbing member 42 or the main door track.

These and other advantages of the structure described above will be apparent to those skilled in the art. It will be understood that some of the details may be varied and, with respect to some of the advantages, some of the structure may be omitted without departing from the scope of the invention generally and the exclusive use of such modifications, as come within the scope of the claims, is contemplated.

What is claimed is:

1. In combination with a sliding door and a track beneath the same, a stationary stop beneath said track, a holding bar movable on said door to oppose said stop, a roller having an axle, a bell crank pivoted on said axle, manually operable means for rotating said bell crank on its pivot to raise and lower said door relative to said roller and track, said bell crank having an element arranged to lift said bar from stop-opposing position when said bell crank is moved to support said door on said roller.

2. In combination with a door track and a sliding door having body structure normally resting on said track, a stationary stop, a bar movable on the door to oppose said stop to hold said door against sliding movement, a door-support-

ing roller on said track, a bell crank pivoted on said roller, a handle lever pivoted on the door, and a link connecting said lever and bell crank, said lever being movable in door-opening direction to swing said bell crank on said roller to engage and elevate the door and to move the door towards open position, there being a finger on said bell crank disposed to engage said bar and move it out of stop-opposing position when said handle lever is moved in said direction.

3. In a lift type sliding door, downwardly opening housing structure on the lower portion of the door, door-supporting rollers spaced apart longitudinally of said door, axles therefor, bell cranks pivoted on said axles, said rollers, axles and bell cranks being enclosed in said structure, each of said bell cranks having an element movable upwardly to engage a shoulder on said structure, bar structure connecting said bell cranks, a lever connected to said bar structure, a pivot pin for said lever, said lever, bar structure, bell cranks, rollers and roller axles comprising a lift mechanism and anti-friction support for said door and being removable as a unit from said door and housing structure when said pivot pin is withdrawn.

4. In a railway car door, a body including framing and paneling, downwardly facing housing structure on said body, a handle lever having a pivot pin extending transversely through said structure, an operating bar extending longitudinally of the door and connected to said lever, one end of said structure having a ledge underlying one end of said bar, rollers in said structure, and roller retainers in said structure pivotally mounted on said rollers and connected to said bar, means on said structure for lifting said door by pivotally moving said retainers by said bar, said bar, rollers and retainers and means being supported in position in said housing by said pin and said ledge and being removable from said housing when said pin is withdrawn.

5. In combination with a sliding door and a track beneath the same, rollers spaced longitudinally of the door for supporting the same on said track, individual retainers for said rollers seated on the roller axles and each having a lateral trunnion, a member extending between said retainers and holding them and said rollers in alignment with each other, said door having a housing extending longitudinally of the door and opening downwardly to receive said rollers, retainers and member, said side walls having downwardly facing shoulders arranged to be engaged by said trunnions, a lever having an arm connected to said member, a pin fulcruming said lever on said housing and acting through said member, retainers and fulcrums to hold said member, retainers and rollers assembled with said housing, said lever and member being shiftable about said pin to rotate said retainers on the roller axles and lift said door through said trunnions and shoulders, said pin being readily detachable and said lever, member, retainers and rollers being removable through the bottom of said housing upon detachment of said pin.

6. In combination with a railway car sliding door, an inverted U-shaped housing at the bottom of the door, rollers and axles detachably received in said housing, members pivoted on said axles and having laterally projecting lugs, there being downwardly facing shoulders on the inner walls of said housing arranged to oppose upward movement of said lugs, a manually operable device for engaging said members below said

axles to swing said members about said axles to thrust said lugs into contact with said shoulders to support said door on said rollers, and readily removable elements holding said device, rollers, axles and members in position in said housing, the space beneath said rollers, axles, members, lugs and device being substantially unobstructed whereby said rollers, axles, members and device may be dropped from said housing when said elements are removed.

7. In combination with a railway car sliding door, an inverted U-shaped housing at the bottom of the door, rollers and axles detachably received in said housing and spaced apart longitudinally of the door, members pivoted on said axles and having laterally projecting lugs, there being downwardly facing shoulders on the inner walls of said housing arranged to oppose upward movement of said lugs, other laterally projecting lugs on said members below said shoulder engaging lugs, a linkage extending along the lower part of said housing and engaging said latter mentioned lugs, and a lever for operating said linkage insertible from below said housing into the same and including a handle projecting through the top thereof, and a pivot pin extending through the sides of said housing and said lever and thereby suspending said linkage, members and rollers in said housing.

8. In a lift type sliding door, a door panel, an inverted U-shaped housing secured to said panel and opening downwardly, spaced rollers, individual retainers for said rollers pivoted on the roller axles, a linkage connecting said retainers, a handle lever operatively connected to said linkage, said rollers, retainers, linkage and lever being insertible as a unit from below into said housing, and a detachable pin for securing said unit in said housing, there being interengaging elements on said housing and retainers whereby said door may be lifted by rotation of said retainers by said lever when said door and rollers are supported on a track.

9. In combination with a sliding door for a railway house car and a supporting track therefor, rollers mounted on said door and spaced longitudinally thereof, a manually operable device for shifting the door from direct support on said track to support on said rollers, there being a stationary element on said track, a holding bar mounted on the door in the same vertical plane as said rollers and device but positioned between the end of the door and said rollers and device and movable into and out of engagement with said element, and a connection between said device and said bar for disengaging said bar from said element when said device is operated to support the door on said rollers.

10. In combination with a door track and a door, rollers on said track, mechanism for raising said door to ride on said rollers and for lowering said door to frictionally engage said track, and an automatic take-up device including bracket structure on said door, a latch bar of substantial weight slidable upwardly and downwardly in said bracket structure, and an element on said track for engaging the side of said latch bar, said bracket structure and bar including opposing parts inclined from the vertical longitudinally of the door whereby the weight of said bar causes it to continually thrust said door towards closed position, there being a connection between said mechanism and latch bar for raising the latter to disengage said track element when said door is raised to ride on said

rollers, and said bar being movable upwardly manually independently of said mechanism.

11. In a lift type sliding door, an inverted U-shaped housing secured to the door body and having a downwardly opening bottom, lift and roller mechanism for supporting the door and including a lever projecting through the upper portion of said housing and accessible for manual operation from the exterior of the door, said mechanism, including said lever, being insertible and removable as a unit through the open bottom of said housing without disassembly of its elements or of said housing and the remainder of the door, and readily detachable means supporting said mechanism in said housing.

12. In a lift type sliding door, an inverted U-shaped housing extending lengthwise of the door and having a downwardly opening bottom, lift and roller devices spaced apart lengthwise of the door, mechanism for operating said devices and including a lever projecting through the upper portion of the housing and accessible for manual operation from the exterior of the door, said devices and mechanism, including said lever, being insertible and removable as a unit through the

open bottom of said housing without disassembly of said devices and mechanism or disassembly of said housing from the remainder of the door, and readily detachable means supporting said devices and mechanism in said housing.

13. In a lift type sliding door, an inverted U-shaped housing extending lengthwise of the door and having a downwardly opening bottom, lift and roller devices adjacent to the forward and rear portions of the door, mechanism for operating said devices and including a connection between said devices and an operating lever positioned between said devices and engaging said connection and projecting through the upper portion of the housing and accessible for manual operation from the exterior of the door, said devices and mechanism, including said connection and lever, being insertible and removable as a unit through the open bottom of said housing without disassembly of said devices and mechanism or disassembly of said housing from the remainder of the door, and readily detachable means supporting said devices and mechanism in said housing.

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