Nov. 5, 1929. K. J. TOBIN ET AL 1,734,755

FLUSH CAR DOOR AND SUPPORTING MEANS THEREFOR

Filed June 14, 1926 4 Sheets-Sheet 1

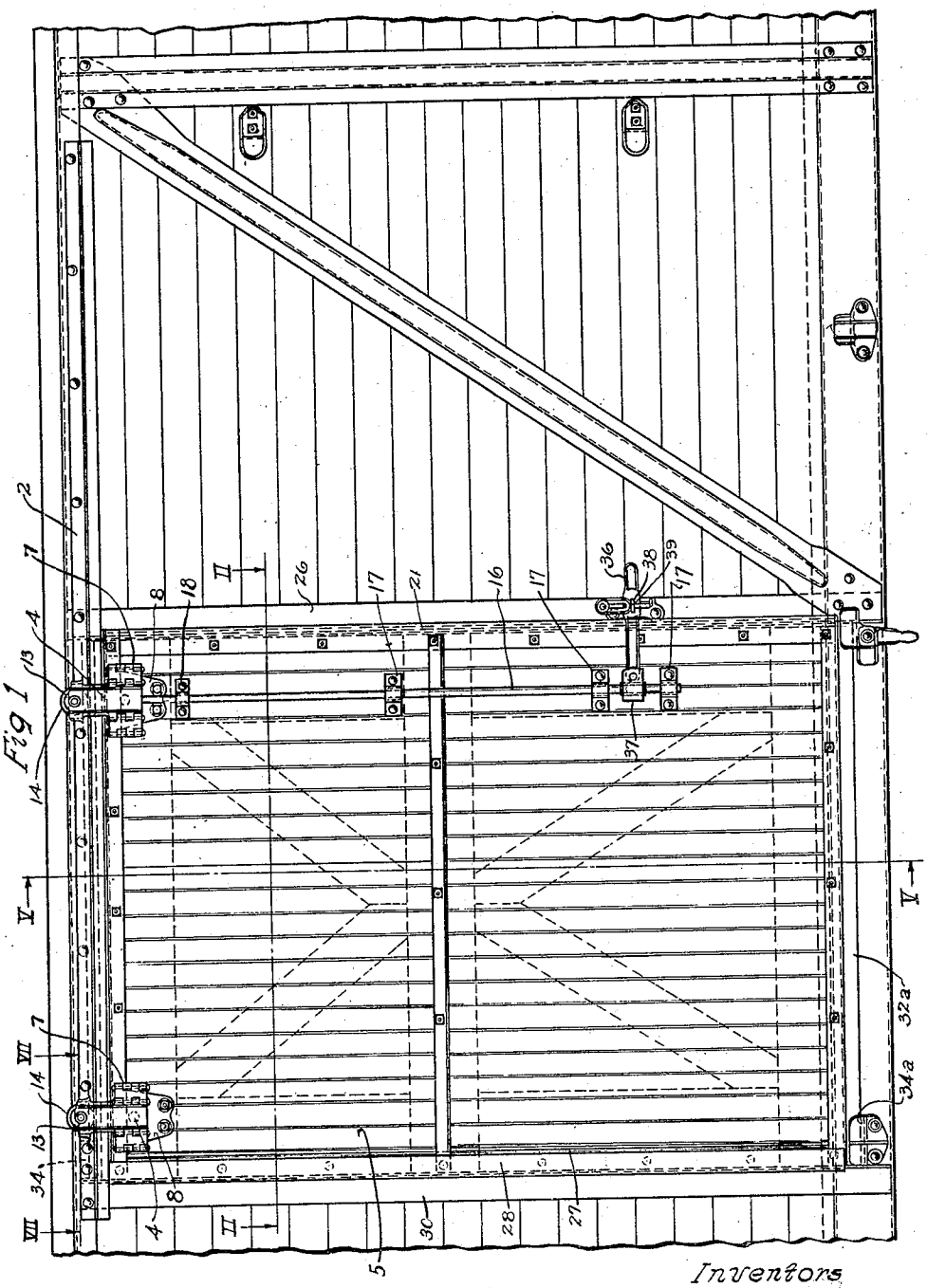


Fig 1

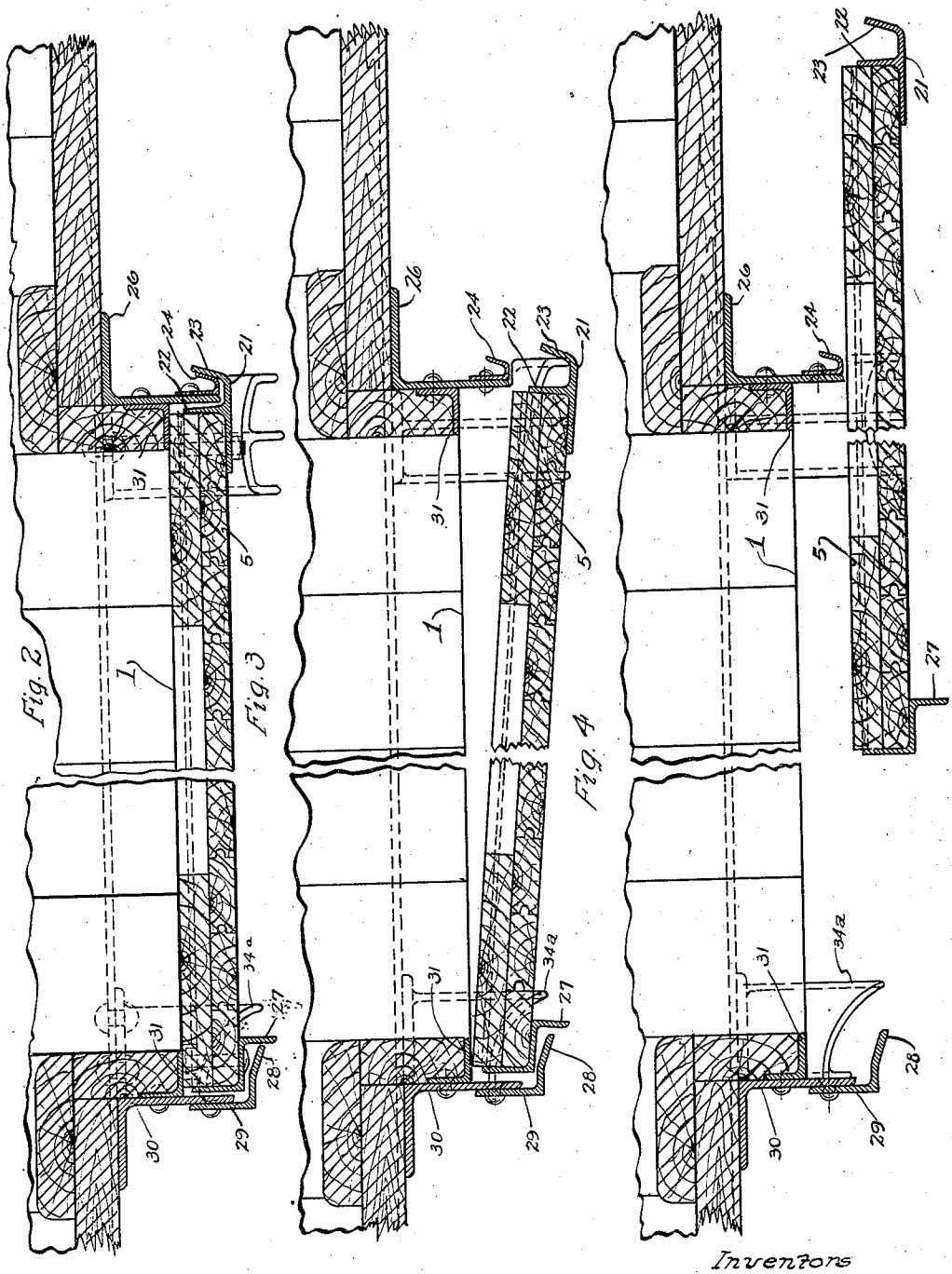
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FLUSH CAR DOOR AND SUPPORTING MEANS THEREFOR

Filed June 14, 1926 4 Sheets-Sheet 2



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FLUSH CAR DOOR AND SUPPORTING MEANS THEREFOR

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Fig. 5

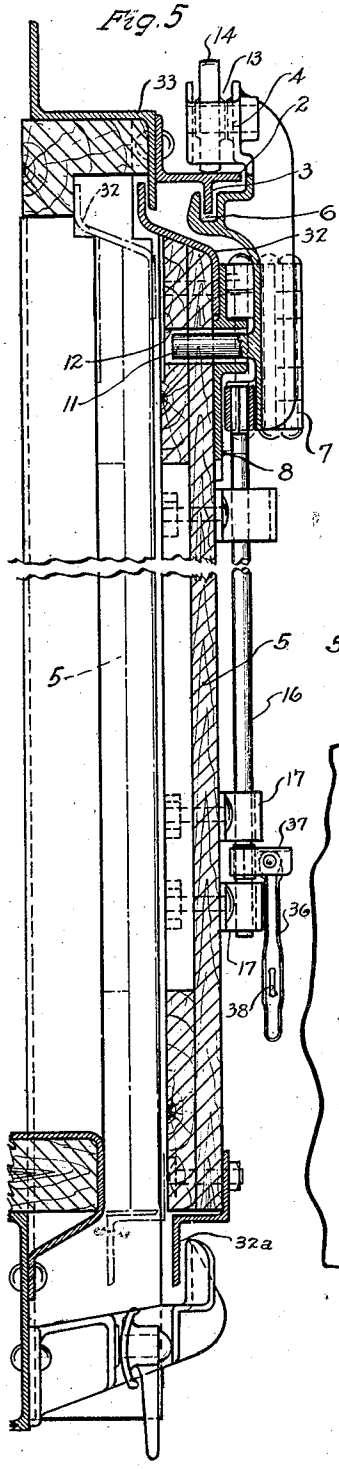


Fig. 6

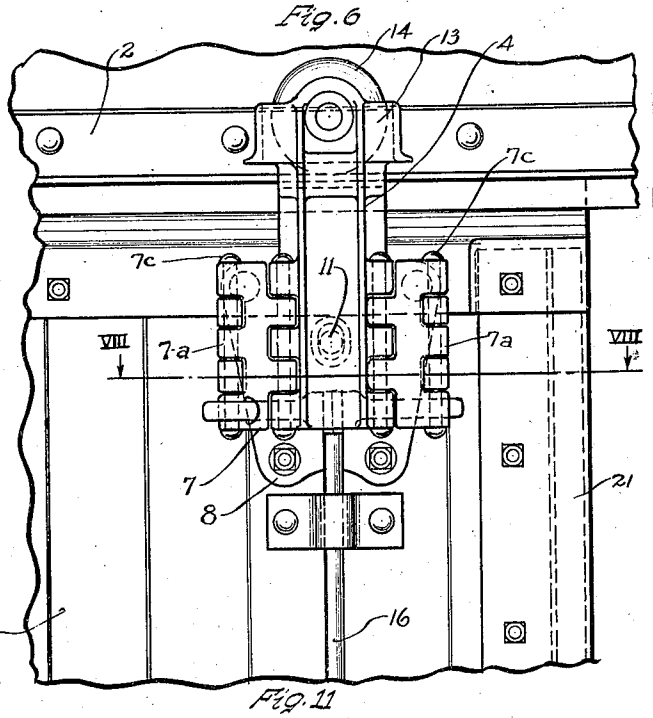
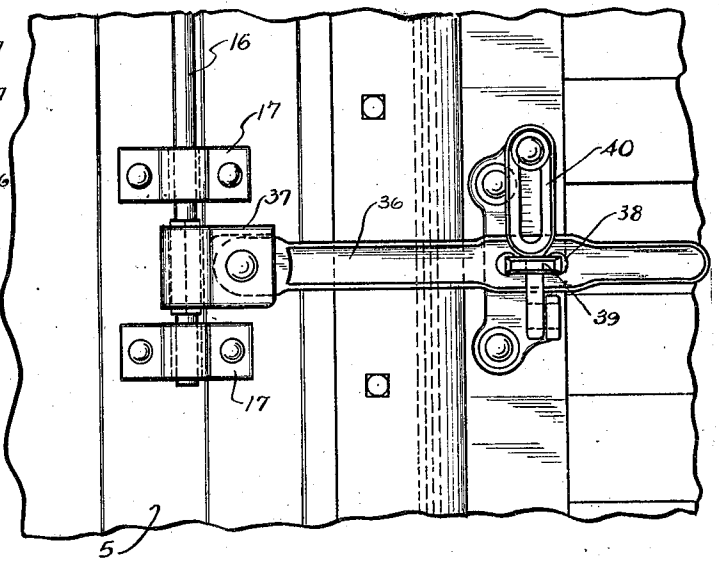


Fig. 11



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FLUSH CAR DOOR AND SUPPORTING MEANS THEREFOR

Filed June 14, 1926 4 Sheets-Sheet 4

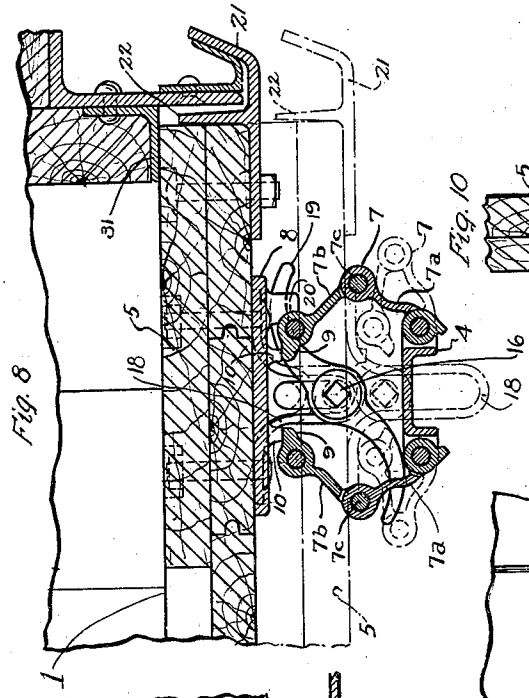


Fig. 8

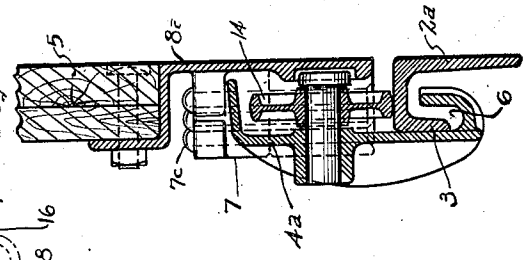


Fig. 10

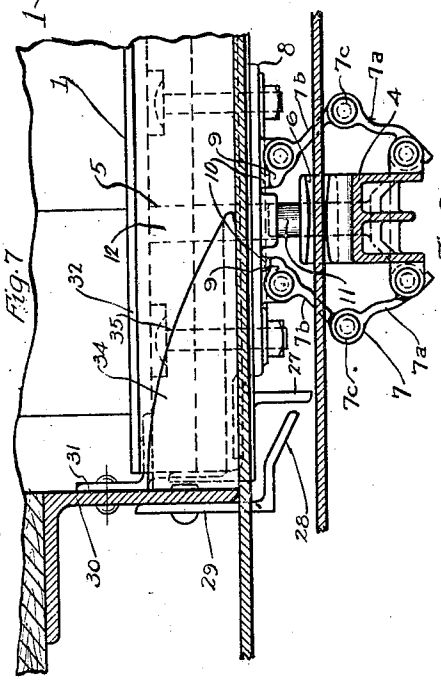


Fig. 7

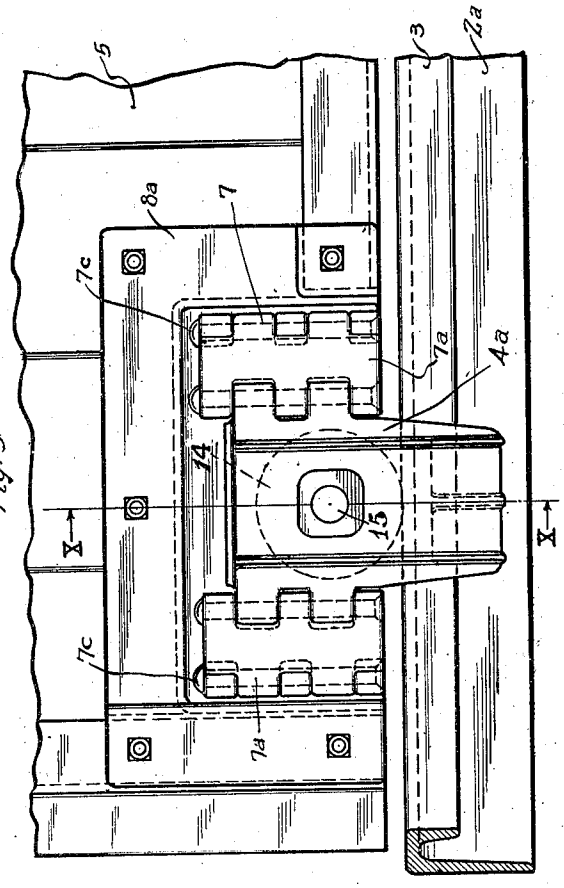


Fig. 9

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UNITED STATES PATENT OFFICE

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FLUSH CAR DOOR AND SUPPORTING MEANS THEREFOR

Application filed June 14, 1926. Serial No. 115,757.

This invention relates to a flush car door and supporting means therefor.

It is an object of this invention to provide a structure in which a straight supporting track is used, in which the door is guided into closing position and in which the door can be readily moved from its closing position without disturbing the operative relation between the supporting rollers and the track.

With these and other objects in view, which will become more apparent as the description proceeds, this 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 illustrates a preferred embodiment of this invention, and in which similar reference numerals refer to similar features in the different views:

Figurt 1 is a fragmentary side elevational view of a car having a door suspended by our novel support.

Figure 2 is an enlarged broken sectional view upon the line II—II of Figure 1 showing the door in closed position.

Figure 3 is a view similar to Figure 2 but showing the door in swung-out position.

Figure 4 is a view similar to Figure 2 but showing the door in partially open position.

Figure 5 is an enlarged broken sectional view upon the line V—V of Figure 1 showing the rear end of the door swung outwardly in full lines, and in closed position in dotted lines.

Figure 6 is an enlarged fragmentary elevational view showing the operating support.

Figure 7 is an enlarged sectional view upon the line VII—VII of Figure 1 showing parts in elevation.

Figure 8 is a sectional view upon the line VIII—VIII of Figure 6, illustrating different positions of the door and support.

Figure 9 is a fragmentary elevational view of a bottom portion of a car door showing the support applied thereto.

Figure 10 is a sectional view upon the line X—X of Figure 9.

Figure 11 is a fragmentary elevational view of the door showing the operating and locking means for the support.

In order to illustrate and explain this invention there is shown a portion of a house car having a door opening 1 for receiving a flush door. Adjacent one margin of this door opening there is a track 2 which is suitably secured to the car. The track 2 is shown as secured adjacent the upper margin of the doorway. However, instead of putting the track adjacent the upper margin of the door, it may be put at the lower margin of the door as shown in Figures 9 and 10. The track at the lower margin of the doorway is indicated by the reference 2^a. Both of these tracks are straight, i. e., their forward portions do not slope as is now common in cases where flush doors are used.

Both of these tracks 2 and 2^a are provided with a guide 3 which extends in a rectilinear direction parallel to the longitudinal center line of the car. Roller supports 4 are adapted to travel upon the track 2 and roller supports 4^a are adapted to travel upon the track 2^a. These roller supports are attached to the door 5 and sustain the same with relation to the track. Both of these roller supports 4 and 4^a are provided with a groove or guideway 6 for receiving the guide 3 on the track. The guide 3 and groove 6 constitute cooperating means for causing the supports to travel in a rectilinear path, and for maintaining the same on the track. The car door 5 is connected to its supports by flexible or collapsible connections denoted as a whole by the reference numeral 7. Preferably a pair of connections 7 extend between each support and the door, and each connection comprises a pair of links 7^a and 7^b which are pivoted or hinged together with a hinge bolt 7^c. When the door is supported upon an upper track the inner ends of the links 7^b are hinged or pivoted to a plate 8 secured to the door 5 and they are provided with shoulders 9 which are adapted to abut suitable lugs 10 projecting from the plate 8. The outer ends of the links 7^a are hinged or pivoted to the roller supports 4. It will be noted from a reference to Figure 8 that the links 7^a and 7^b are relatively

wide and are somewhat similar to a door hinge and they are hinged together similar to a door hinge so as to easily sustain the weight of the door. It will be noted that the connections 7 readily collapse or fold in an outward direction or away from each other, the coaction of the shoulders 9 and lugs 10 preventing the same from collapsing in an inward direction or toward each other so as not to interfere with the outward movement of the door. The shoulders 9 and 10 also limit the outward movement of the door to insure the proper clearance between the door and car when the door is opened to prevent binding of the rollers.

In order that the connections 7 will fold or collapse in a predetermined manner, each roller support 4 may be provided with an inwardly directed guide stud 11, best shown in Figures 5 and 7 and which projects through a suitable aperture in the plate 8 and into a suitable socket 12 in the door as shown in Figure 5.

The projecting end of each support 4 is provided with a box 13 which extends over the track and supports a roller 14.

The roller supports 4^a which it is contemplated to use when it is desired to support the door at the bottom, are connected by similar collapsible connections 7 to a plate 8^a which is attached to the lower margin of the door and is inwardly offset below the lower edge of the door. The roller supports 4^a are provided with suitably inwardly projecting trunnions or shafts 15 for supporting the rotating rollers 14.

As is well known in the art, these flush doors are provided at their rear ends with some manually operated means for moving the same outwardly and inwardly with respect to the doorway. In the present instance, a rod 16 is journalled in suitable bearing lugs 17 upon the door 5 and extends through a guide loop 18 near the upper end of the door. The upper end of the rod extends within the space defined by the collapsible connections 7 and has attached thereto a cross head 19 the arms of which are arcuate in form as shown in Figure 8. One arm slidably extends through a slot in a lug 20 on the plate 8 while the other arm extends through the link 7^a which is positioned opposite such lug. Obviously rotation of the rod 16 will move the rear end of the door outwardly as shown in Figure 8 so that the same can be slid beyond the door opening.

The rear end of the door is provided with a metal strip 21 having an inwardly directed flange 22 against which the rear ends of the boards that form the door may abut, and an inwardly and rearwardly sloping flange 23 which is adapted to cooperate with a similarly sloping flange 24 on an angle member 26 that is fastened to the car at one end of the door opening. The flanges 23 and 24 are adapted to come into abutting relation when the door is closed to exclude the weather.

A Z-bar 27 is secured upon the front end of the door for cooperation with a flange 28 on an angle member 29 that is secured to an angle member 30 which in turn is secured to the car at the front end of the door opening. Upon each outstanding flange of the angle members 26 and 30 there is secured a door seat 31 which is illustrated as being in the form of an angle bar.

The construction of the car and door is such that when the door is being moved forwardly into registry with the doorway, it will be automatically drawn inwardly through the instrumentality of cooperating means on the door and car. The means on the door consists of a plate member 32 which is bent inwardly upon an upward slope over the top of the door (Figure 5) and projects upwardly behind the upper plate 33 which constitutes a flange of a Z-bar extending along the top of the car. The means on the car comprises a cam plate 34 (Figure 7) secured to the Z-bar 30 and so arranged that when the door is closed the plate 32 will engage the cam surface 35 on said plate, thuswise drawing the door inwardly. At the same time the lower portion of the door is drawn inwardly by the coaction of the bottom guide 34^a and the lower leg of the bottom Z-bar 32^a.

As previously related, the rear end of the door is operated by the rod 16 which has attached thereto an operating handle 36 pivoted to a lug 37 on the rod. The handle 36 is provided with a slot 38 adapted to engage over a staple lug 39 on the door, and a latch pin 40 slidably supported on the door is adapted to extend through the staple for locking the operating mechanism in proper position to retain the door in closed position.

In the operation of the door, assuming the door to be closed, the handle 36 is unlatched and swung for rotating the rod 16 which through its cross head 19 will draw the rear end of the door outwardly against the support as shown in Figure 3. During such movement the connections 7 at the rear of the door will collapse as shown in dotted lines in Figure 8. The door may then be slid to one side of the opening as shown in Figure 4. During such movement, the front end of the door will automatically move outwardly and collapse the front connections 7. On the other hand, in closing the door, the plate 32 will engage the cam edge 35 of the cam plate and the part 32^a will engage the guide 34^a and automatically draw the door inwardly, and when the door is in registry with the opening, the rod 16 may be operated to swing the rear end of the door inwardly against its seat. During such movement the rear edge weather strips will engage as shown in Figure 2.

It will be appreciated that the roller sup-

ports with their flexibly attached door supporting plates and which broadly comprise opposed members joined by collapsible connections may be readily manufactured so as to constitute articles of manufacture which may be shipped to car builders and the like. It will also be appreciated that the present construction offers many advantages as to durability, operation and service than the present constructions now in use.

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

We claim as our invention:

1. In a house car having a door opening, a straight track adjacent one margin of said opening, rolling supports upon said track, a door, flexible connections between said door and supports, and means engaging said connections for guiding the same during their flexing movements.

2. In a house car having a doorway, a track adjacent one margin of the doorway, rolling supports upon said track, a door having a plurality of stop lugs, links pivoted to said door adjacent said stop lugs, and having shoulders engageable with said stops, second links pivoted to said first mentioned links, said second mentioned links being connected to said supports.

3. In a house car having a doorway, a track adjacent one margin of the doorway, rolling supports upon said track, a door, collapsible members connecting said door and supports, said door and members having cooperating means for directing the collapsibility thereof in a predetermined direction.

4. In a house car having a doorway, a track adjacent one margin of said doorway, roller supports upon said track, a door, a collapsible connection between each support and said door, and a guiding connection between each support and said door for guiding the collapsible movements of said collapsible connections.

5. In a house car having a doorway, a track adjacent one margin of the doorway, rolling supports upon said track, a door, a collapsible connection between each support and said door, a guide pin for guiding one of said connections, and manually operated means for operating the other connection.

6. In a house car having a door opening, a track adjacent one margin of said opening, a pair of roller supports upon said track, a collapsible connection between each support and door, and operating means for one of said connections comprising a rod carried by said door, and a cross head upon said rod, one arm of said cross head being anchored to the door and the other arm being connected to a collapsible connection.

7. In a car door support, a pair of opposed members, a roller carried by one member, a collapsible connection between said members, and a guide on one member for guiding the other member in a predetermined path of movement.

8. In a car door support, a plate member having a pair of spaced lugs, a link pivoted adjacent each lug, and having a shoulder contacting therewith, a second link pivoted to each of the other links, and a roller carrying member pivoted to said second links.

9. In a car door support, a pair of opposed members, a pair of collapsible connections between said members, and guide means for controlling the collapsibility of said connections in a predetermined direction.

10. In a car door support, a pair of opposed members, collapsible connections between said members providing relative movement thereof, and guiding means between said members for controlling such relative movement of said members.

11. A flush door hanger comprising opposed members, a pair of toggles connecting said members, and manually operated means connected to one member and a toggle for controlling the movements of said toggle.

12. A flush door hanger, comprising opposed members, a pair of links pivoted to one member, a pair of links pivoted to the other member, pivots connecting the free ends of said links and a guide between said members for maintaining relative rectilinear movement between said members.

In testimony whereof we have hereunto subscribed our names.

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WILLIAM W. DARROW.