Aug. 31, 1937. T. MADLAND 2,091,393

CAR DOOR SUPPORT

Filed Dec. 11, 1933 2 Sheets-Sheet 1

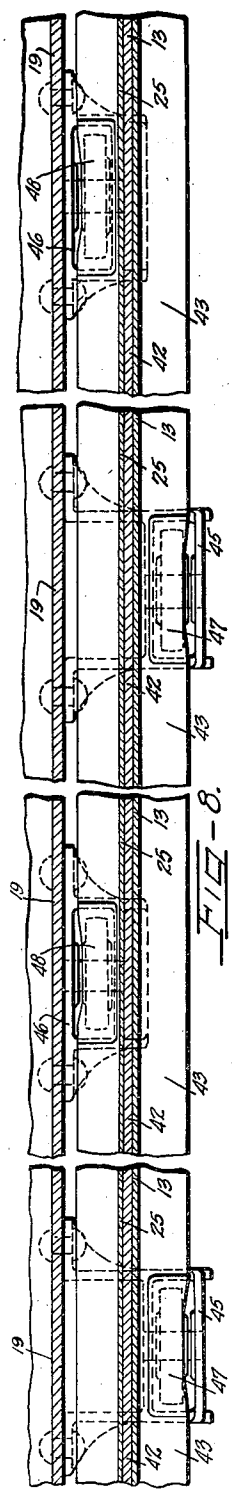


FIG. 8.

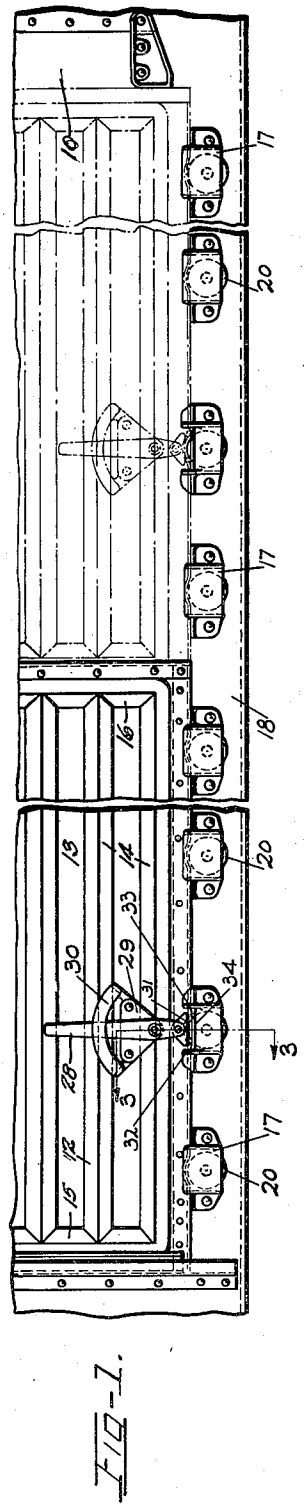


FIG. 1.

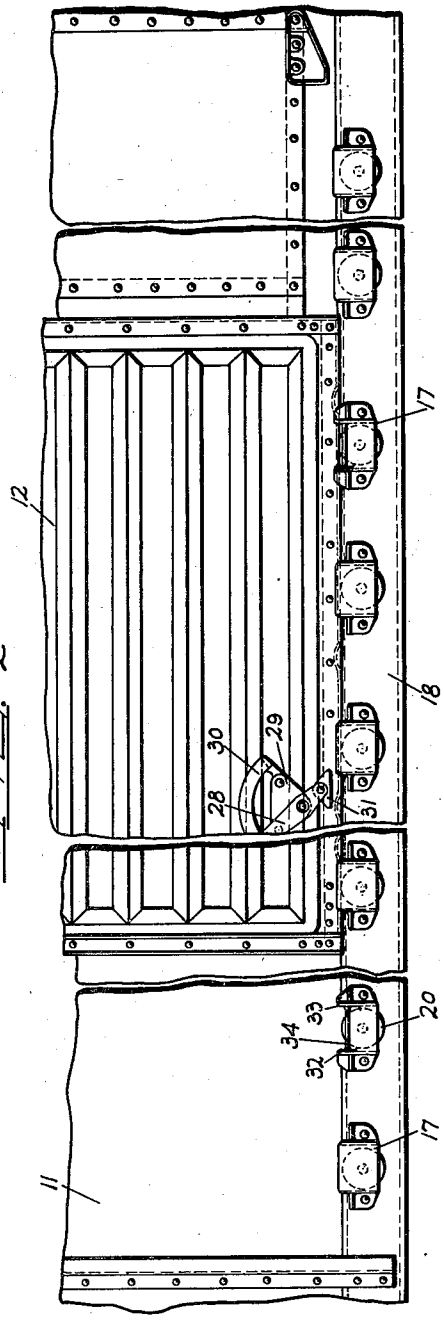


FIG. 2.

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FIG. 3

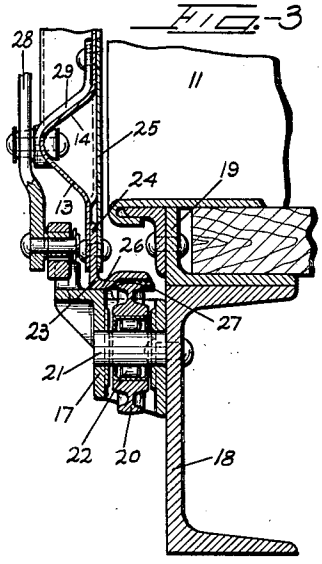


FIG. 4

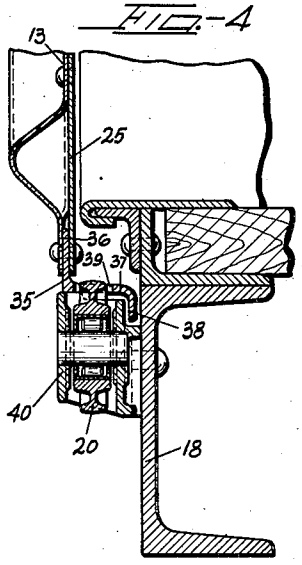


FIG. 5

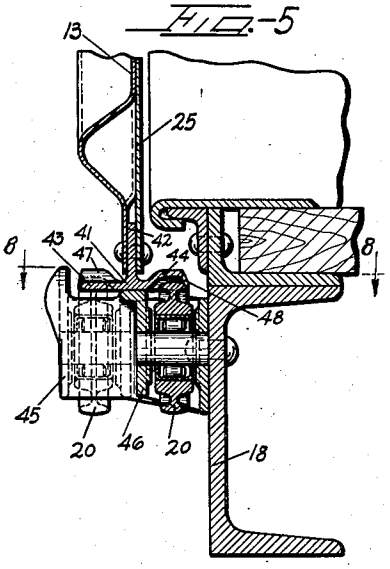


FIG. 6

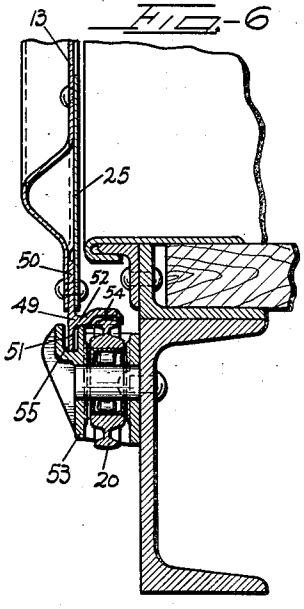
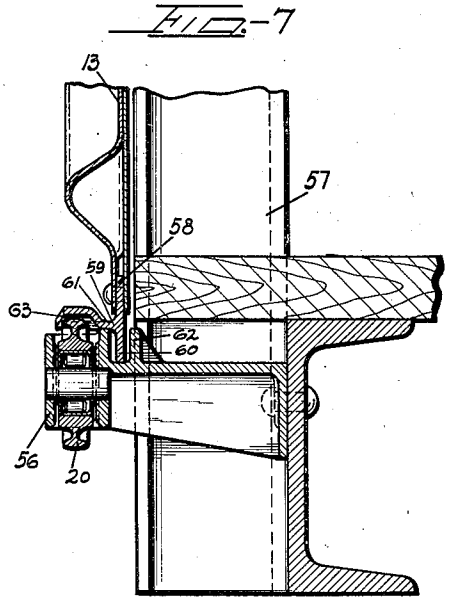


FIG. 7



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UNITED STATES PATENT OFFICE

2,091,393

CAR DOOR SUPPORT

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Application December 11, 1933, Serial No. 701,744

6 Claims. (Cl. 16—99)

This invention relates to car doors and concerns itself more particularly with car doors adapted to slide upon rollers carried by the car.

It is an object of this invention to provide car doors supported for sliding movement upon rollers carried by the cars, these doors being constructed so as to be frictionally supported in open and closed positions with the weight thereof removed from the rollers.

A further object of the invention is to provide sliding car doors frictionally supported in open and closed positions upon means secured to the car, the doors being slidable upon anti-frictional means carried by the car means for uninterrupted movement between open and closed positions.

Additional objects of the invention will become clear as the description thereof proceeds.

In the drawings forming part of this specification,

Figure 1 is a partial elevation of a railway house car showing the invention applied thereto;

Figure 2 is a view similar to Figure 1, showing the door in an intermediate position;

Figure 3 is a vertical section taken on line 3—3 of Figure 1;

Figure 4 is a vertical section of a modified form of the invention;

Figure 5 is a vertical section of a further modification of the invention;

Figure 6 is a vertical section of another embodiment of the invention;

Figure 7 is a vertical section of one form of the invention applied to a single sheathed car; and

Figure 8 is a horizontal section taken on line 8—8 of Figure 5.

Referring to the embodiment of the invention illustrated in Figures 1 to 3, inclusive, of the drawings the numeral 10 designates a side of a railway house car provided with a door opening 11 adapted to be closed by means of a sliding door 12. The door illustrated is of metallic construction and embodies a sheet metal panel 13 formed preferably with a plurality of spaced horizontal corrugations 14 which merge at their ends into vertical corrugations 15 and 16 formed in said panel adjacent the vertical edges thereof.

The door is mounted upon the car side through the agency of a plurality of spaced metallic brackets 17. These brackets, as clearly shown in Figures 1 to 3 of the drawings, are secured to a channel shaped reinforcing member 18 provided on the car and serving as a reinforcement for a side sill 19. Each of the brackets 17 is provided with a roller 20, said rollers being mounted upon a pin or axle 21 through the agency of a roller bearing 22.

It has been found to be desirable in sliding door structures for railway house cars to support the weight of the door by means having frictional engagement with a relatively fixed part of the car to thereby relieve the antifriction means, utilized to facilitate movement of the door between open and closed positions, of the weight thereof and thus eliminate wear upon said antifriction means. To this end, in the embodiment of the invention considered, there is secured to the lower margin of the door an angle member 23. The upwardly extending leg 24 of said angle member is disposed between the metallic panel 13 and a backing plate 25 extending across the lowermost horizontal corrugation 14 and secured to these parts. The horizontally extending leg 26 of the angle member 23 is directed inwardly toward the car. At spaced intervals corresponding to the spacing of the rollers 20 carried by the brackets 17, the inwardly extending horizontal leg 26 of the angle member 23 is provided with upwardly extending indentures 27. Each of these indentures is of such height that when the door has reached its closed or full open position engagement between the inwardly extending flange 26 of the angle member 23 with the corresponding roller brackets may be had without obtaining engagement between said inwardly extending flange and the rollers 20. By virtue of this fact it will be apparent that in the closed and full open positions of the door frictional engagement between the angle member 23 and the roller brackets is had so that the weight of the door 12 is carried by said roller brackets. The rollers 20 will then be relieved of such weight so that the wear incident upon such rollers and their pins in the normal application of car doors is eliminated. This frictional support of the door upon the roller brackets in both the closed and full open positions is clearly illustrated in Figure 1 of the drawings.

It is requisite, however, that the door be supported upon the rollers for easy and unimpeded movement between these positions. This characteristic obtains in the embodiment of the invention considered, the spacing and association between the indentures 27 and the roller brackets 17 and 20 being so designed that in all intermediate positions of the door it will be supported upon the rollers. One intermediate position of the door illustrating such support is clearly shown in Figure 2 of the drawings. To transfer the door from its frictional support upon the brackets to engagement upon the rollers any desired means

may be utilized. One form of such means is shown in Figures 1 to 3, inclusive. This means embodies a lever 28 pivotally mounted upon a bracket 29 secured to the door 12. The lever 28 extends behind a quadrant 30 formed preferably integral with the bracket 29 whereby to retain the lever upon the door and to limit the angular movement thereof. The lower end of the lever carries a double acting cam 31 pivotally secured thereto. One of the brackets 17, disposed below the door opening, is formed to provide a depression defined by the upwardly extending walls 32 and 33 and the horizontally extending wall 34. Similarly, one of the brackets 17, disposed beyond the door opening, is correspondingly formed. While it has been indicated that only two of the brackets illustrated are formed so as to provide depressions it will be apparent that all of said brackets may be so constructed if desired.

It will be apparent then when it is desired to move the door from its closed position, in which it is frictionally supported upon the roller brackets, toward open position that the lever 28 may be grasped and swung toward the right as viewed in Figure 1 of the drawings. This movement of the lever will effect engagement between the left hand portion of the cam 31 and the wall 32 provided upon the roller bracket. Continued swinging movement of the lever 28 will introduce a force acting upon the door through the pivotal connection between the lever and the door which will cause the door to move toward the right. During this movement engagement between the flat portions of the inwardly extending flange 26 of the angle member 23 and the rollers 20 will be had, whereby the door will be lifted above the roller brackets and supported by means of said flat portions upon the rollers. The door may then readily be moved to full open position and it will be apparent from the illustration of Figures 1 and 2 that said door will, during such movement, be supported upon said rollers so that an easy unimpeded travel of the door is obtained. When the door has reached its full open position the indentures 27 provided upon the inwardly extending flange 26 of the angle member 23 will register with the rollers secured to the channel member 18 beyond the door opening so that the door will automatically be lowered and the frictional engagement between the angle member 23 and the roller brackets will again be established. To move the door to closed position the lever 28 may again be actuated by swinging it toward the left as viewed in Figure 1, whereby the cooperation between the cam 31 and the corresponding wall provided on the bracket formed with the depressed portion will again cause the door to be supported upon the rollers for such movement.

In Figure 4 of the drawings there is illustrated a modified form of the invention. In this form a substantially Z-shaped member 35 is secured to the lower margin of the metallic panel 13. The Z-shaped member is provided with an upwardly extending flange 36 by means of which the member is secured to the metallic panel, an inwardly substantially horizontally extending flange 37 and a depending flange 38. The inwardly extending flange 37 is provided with a plurality of spaced recesses 39 through which the rollers 20 are adapted to extend in order to obtain frictional engagement between the member 35 and the roller brackets 40 in which the rollers 20 are mounted. Each of the brackets 40 in this embodiment of the invention is spaced from the channel reinforcing member 18, and the depending flange 38 provided on the Z-shaped member 35 is disposed so as to lie between the channel reinforcing member and the bracket. By this construction the lower portion of the door is guided by the brackets and disengagement of said portion of the door from the brackets is avoided. The embodiment of the invention illustrated in Figure 5 of the drawings utilizes a substantially T-shaped member 41 at the lower margin of the door. The member 41 is disposed with its stem 42 secured to the lower margin of the metallic panel 13 and with its head flanges 43 and 44 directed, respectively, outwardly and inwardly relative to the car. In this form of the invention a plurality of roller brackets 45 and 46 are utilized, the brackets 45 extending outwardly from the channel reinforcing member 18 to which they are secured to a greater extent than the roller brackets 46. The brackets 45 and 46 are preferably alternately arranged, whereby when the head flanges 43 and 44 are disposed upon the rollers so that the door may readily be moved between open and closed positions, the weight of said door will be distributed between said flanges. The door is illustrated in its lowered position in which the T-shaped member 42 is frictionally supported upon the roller brackets 45 and 46, while the rollers 20 extend into indentures 47 and 48 formed in the head flanges 43 and 44. It will be apparent that any desired arrangement of the roller brackets 45 and 46 other than the alternate arrangement indicated may be utilized.

A T-shaped member is also utilized in the embodiment of the invention illustrated in Figure 6 of the drawings. In this form of the invention the T-shaped member 49 is arranged so that the head flanges 50 and 51 thereof are disposed substantially vertically while the stem 52 of said member extends inwardly. The head flange 50 is utilized to secure the member to the metallic panel. A plurality of roller brackets 53 provided with rollers 20 are utilized to alternately support the door in frictional and antifrictional relationship with respect to the brackets. As illustrated the door is shown in its lowered position in which frictional engagement between the head flange 51 and the roller bracket obtains. In this frictional engagement the roller 20 extends into an indenture 54 provided in the stem 52 of the T-shaped member. The entire weight of the door, consequently, is carried by the roller brackets. The head flange 51 extends into a pocket 55 formed on the roller bracket 53, whereby to guide the lower margin of the door during the movement of said door and to prevent disengagement thereof from the roller brackets.

The various forms of the invention heretofore described are shown applied to a metal sheathed car. The application of the invention to a single sheathed car is illustrated in Figure 7 of the drawings. In this application each of the roller brackets 56 is extended so that the roller 20 carried thereby lies outwardly of the bracing 57 carried by the car. The lower margin of the metallic panel of the car door has secured thereto by means of the head flange 58 a substantially T-shaped member 59, the other head flange 60 of which extends downwardly while the stem 61 of said member is directed outwardly relative to the car. The door is illustrated in its lowered position in which the flange 60 frictionally supports the door upon the roller brackets. The flange 60 lies behind the portion of the roller bracket in which the roller 20 is mounted so as to guide said door during its travel and pre-

vent disengagement of the lower portion thereof from the brackets. An upwardly extending lug 62 formed on the roller bracket 56 may be utilized to aid in guiding of the door. The stem 61 of the T-shaped member 59 is provided as in the previous embodiments of the invention with upwardly extending indentures 63 in which the rollers 20 may be received when the door is frictionally supported upon the roller brackets so as to relieve the rollers 20 of the weight of said door.

It may be noted, with respect to each of the embodiments of the invention illustrated, that in its lowered position the door is frictionally supported upon the roller brackets so that the weight of said door is carried in a direct line to the brackets.

It will be apparent that numerous changes and modifications in the details of the invention will be clear to those skilled in the art. It is intended, therefore, that all such modifications and changes be comprehended within this invention, which is to be limited only by the scope of the claims appended hereto.

I claim:

1. Structure for frictionally and antifrictionally supporting a sliding door comprising a plurality of fixed unequally spaced brackets disposed below the lower edge of said door, a roller carried by each of said brackets, the lower edge of said door being provided with a plurality of spaced indentures, certain of said rollers being received in said indentures in the closed position of said door and the remaining rollers being receiving in said indentures in the full open position of said door, said door having a lowering movement when said rollers are received in said indentures and frictionally engaging said brackets, at least two of said rollers being at all times in engagement with the lower edge of said door intermediate said indentures during the sliding movement thereof between said positions, whereby said indentures will pass over said rollers and said door will have unimpeded movement.

2. In a railway house car having a door opening in a side thereof and a sliding door for closing said opening, means for frictionally and antifrictionally supporting said door comprising an angular member secured to the lower margin of said door having a horizontally extending flange of a length substantially equal to the length of said door, a plurality of spaced brackets secured to said car below said door opening and a roller carried by each of said brackets, said rollers being substantially similar, said flange being formed with a plurality of spaced indentures adapted to receive certain of said rollers in the closed position of said door and the other rollers in the full open position of said door, said flange frictionally engaging said brackets when said rollers are received in said indentures whereby said door will be frictionally supported upon said brackets in each of said door positions and means for moving said door from said frictional support upon said brackets to dispose said flange upon said rollers and said indentures above said rollers, at least two of said rollers being at all times in engagement with said flange between said indentures during sliding movement of said door between open and closed positions whereby said door has unimpeded antifrictional movement upon said rollers between closed and full open positions.

3. In a railway house car having a door opening in a side thereof, a plurality of spaced brackets secured to said car adjacent said door opening, adjacent brackets extending unequal distances from said car and alternate brackets extending the same distance from said car, antifriction means rotatably supported by each of said brackets and a sliding door for closing said opening, said door having an angular member secured to a horizontal margin thereof provided with oppositely extending horizontal flanges, spaced indentures formed in said flanges, the indentures in one flange being offset relative to the indentures in the other flange, said indentures receiving certain of said antifriction means in the closed position of said door and the remaining antifriction means in the full open position thereof, said member frictionally engaging said brackets in said positions of the door to frictionally support said door, the flanges of said member being disposed upon said antifriction means and said indentures lying above said antifriction means intermediate closed and full open positions of said door whereby to antifrictionally support said door for unimpeded movement between said positions.

4. In a railway house car having a door opening in a side thereof and a sliding door for closing said opening, a series of unequally spaced brackets exceeding two in number secured to said car below said door opening, a similar series of spaced brackets secured to said car beyond said door opening, antifriction means rotatably supported by each of said brackets, a member provided with vertical and horizontal flanges secured to the lower margin of said door, said horizontal flange being formed with spaced indentures having substantially the spacing of the brackets of each series, the brackets of each series being spaced so that in the full open and closed positions of said door said indentures will receive the rollers of a corresponding series of brackets and said member will engage said brackets to frictionally support said door, and between said positions of said door said member will be disposed upon and said indentures above said antifriction means whereby said member will support said door for unimpeded movement upon said antifriction means.

5. In a railway house car having a door opening in a side thereof, a plurality of unequally spaced brackets secured to said car below said door opening, rollers rotatably supported by said brackets, and a sliding door for closing said opening, a T-shaped member secured to the lower margin of said door, said member comprising head flanges and a stem, one of said head flanges serving as the securing means for said member, the other of said head flanges having frictional engagement with said brackets in the closed and full open position of said door, whereby said brackets support said door, said stem overlying said rollers and having spaced indentures adapted to receive certain of said rollers in the closed position of said door and the remaining rollers in the open position of the door, at least two of said rollers being at all times in engagement with said stem intermediate said indentures during the sliding movement of said door between said positions.

6. In a railway house car having a door opening in a side thereof, a plurality of unequally spaced brackets secured to said car below said door opening, rollers rotatably supported by said brackets, and a sliding door for closing said opening, a T-shaped member secured to the lower

margin of said door, said member comprising head flanges and a stem, one of said head flanges serving as the securing means for said member, the other of said head flanges having frictional engagement with said brackets in the closed and full open position of said door, whereby said brackets support said door, said stem overlying said rollers and having spaced indentures adapted to receive certain of said rollers in the closed position of said door and the remaining rollers in the open position of the door, at least two of said rollers being at all times in engagement with said stem intermediate said indentures during the sliding movement of said door between said positions, and means for imparting movement to said door to dispose said stem upon said rollers and said latter head flange out of engagement with said brackets, said stem supporting said door upon said rollers for uninterrupted movement between open and closed positions.

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