Oct. 15, 1935. T. MADLAND 2,017,601

SLIDING CAR DOOR GUIDE CLOSURE

Filed May 16, 1934 2 Sheets-Sheet 1

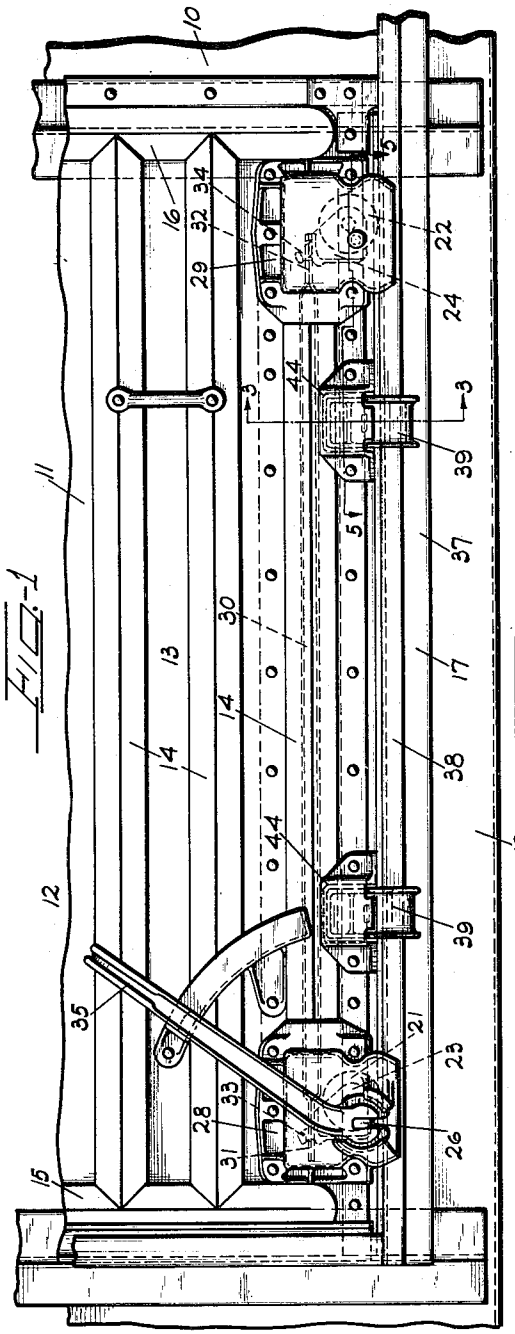


FIG. 1

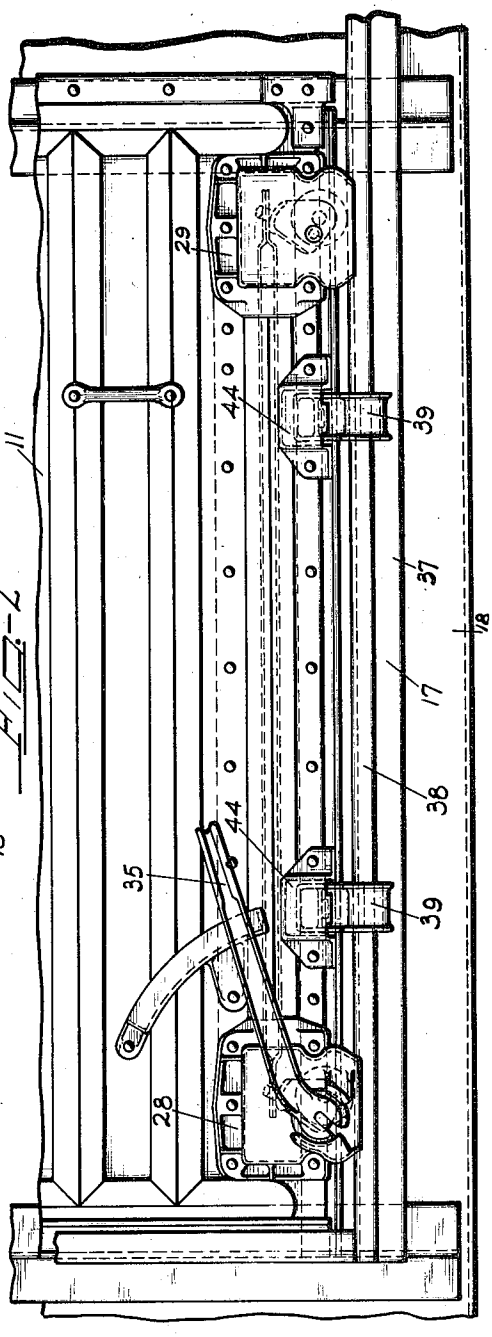


FIG. 2

~INVENTOR~
THORVALD MADLAND
By~ Samuel Reese
ATTY.

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FIG.-3

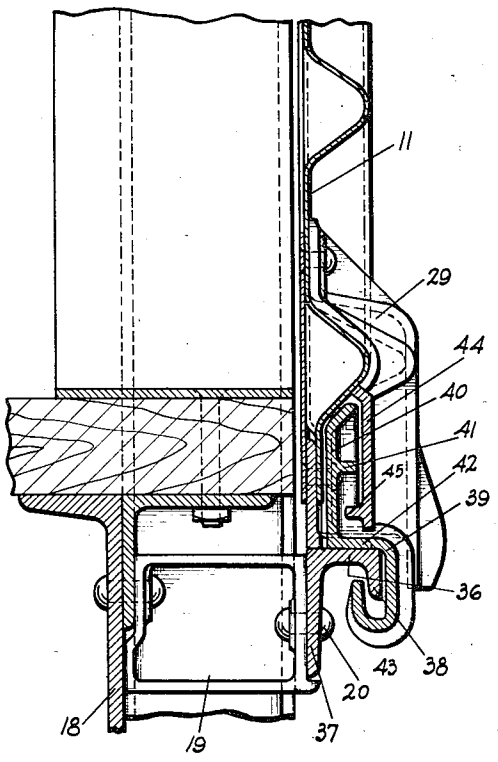


FIG.-4

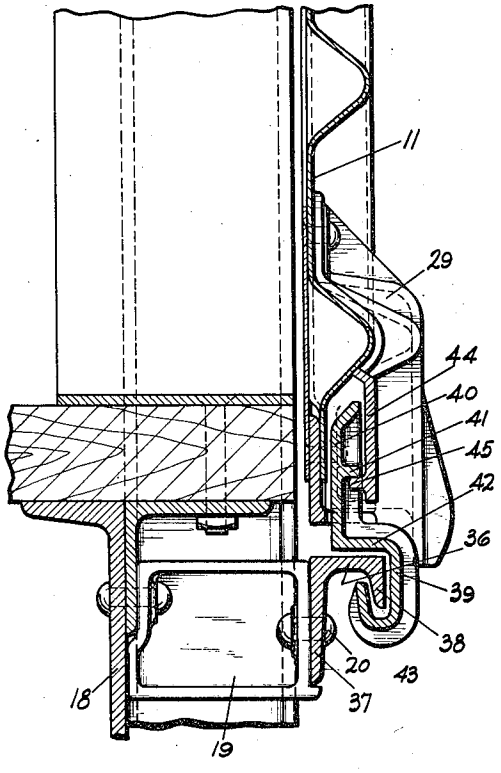
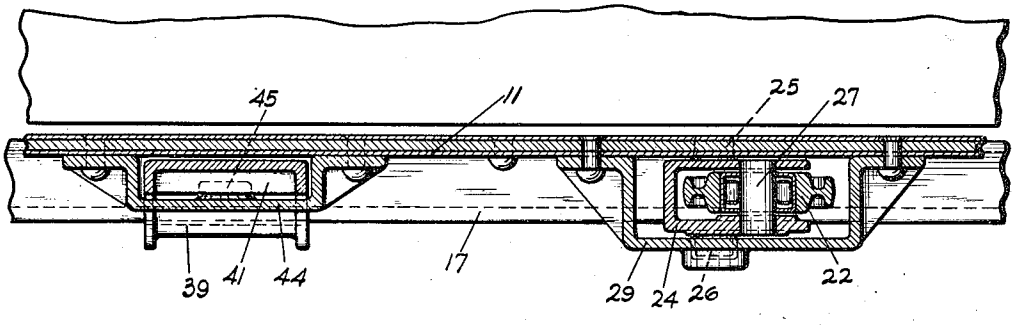


FIG.-5



-INVENTOR-
THORVALD MADLAND
By- Samuel Reese
ATTY.

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SLIDING CAR DOOR GUIDE CLOSURE

Thorvald Madland, Chicago, Ill., assignor, by mesne assignments, to The Youngstown Steel Door Company, Cleveland, Ohio, a corporation of Ohio

Application May 16, 1934, Serial No. 725,841

18 Claims. (Cl. 16—99)

This invention relates to guides for sliding doors and is directed primarily to guides for sliding car doors of the type which must be elevated relative to a supporting track for disposition upon antifriction means prior to sliding movement.

Car doors of the straight sliding kind have long been utilized upon railway house cars. These doors utilize hangers embodying antifriction means such as rollers for supporting the doors for sliding movement upon tracks carried by the cars below the door openings controlled by the doors. The antifriction means in straight sliding doors of this character carry the weight of the doors at all times. One form of track frequently employed with these doors is substantially channel shaped in section, the flanges of which are of unequal size. The larger of the flanges is utilized to fasten the track to the car while the web of the track serves as the tread. The smaller flange is disposed outwardly of the attaching flange and cooperates with hook shaped formations provided on the door hangers which receive said flange to guide the door in its movement upon the track and to prevent disengagement of the door from the track.

Experience has proved the desirability of this type of track and the cooperative relationship between the track and hanger above set forth. However, with the commercial introduction of sliding car doors of the lift type embodying rollers and roller housings therefor which are journaled eccentrically to the door there developed certain conditions which were believed to preclude the use of this track. The door of the left type is frictionally supported upon the track except when the door is actually being moved upon the track when it is supported upon antifriction means. The door is normally biased to frictional engagement with the track and may be elevated above the track and supported upon antifriction means by lift mechanism incorporating the antifriction means. When the channel shaped tracks were attempted to be used with doors including such lift mechanism while maintaining the interlocking relationship between the hangers and the smaller flange of the track it was found that the desired elevation of the door could not be obtained and at the same time maintain a sufficient interlocking relationship to insure against disengagement of the door from the track. Increasing the depth of the smaller flange to provide for proper conditions resulted in interference with the fastening of the track to the car since said flange prevented driving of the securing rivets which extended through the larger flange. There was necessitated, consequently, an increase in the depth of the larger flange and an increase in the size of the track brackets which supported the tracks upon the cars. This increase in size involved an increase in cost which was prohibitive. As a consequence, the art was compelled to adopt an angle shaped track, one leg of which was arranged horizontally for securement to the car and the other leg disposed vertically and extending downwardly. A modification in design of track supporting brackets was necessitated and even with this track an increase in depth of the downwardly extending flange was required to insure proper engagement thereof with the hook shaped portions of the hangers and to permit desired elevation of the door.

Similarly, attempts were made to design a lift mechanism of the character described which would effectively cooperate with the channel shaped track and which could be utilized with the angle shaped track while eliminating the increase in depth of the downwardly extending flange. These attempts, however, led only to more complex and expensive hangers which failed of solution of the problem.

It will be apparent, however, that while the invention is concerned primarily with lift mechanism of the character above described certain features of construction of the guide closures are such as to permit the use of these closures with doors of the lift type regardless of the particular characteristics of the lift mechanism utilized upon such doors.

This invention has for its object to provide a lift door capable of utilizing the simple and comparatively inexpensive form of lift mechanism set forth and together with the channel shaped track above referred to or the angle shaped track; to provide such a door constructed to insure satisfactory engagement with said track for the retention of said door upon the track

without necessity of increasing dimensions of said track; to provide for the desired amount of elevation of the door and to provide such a door construction which shall not impede the sliding movement of said door.

In the attainment of these objects and others which will become clear as the description of the invention proceeds it is preferred to utilize a plurality of guides carried by the door in such manner as to be capable of vertical movement relative to the door and constructed to present hook shaped portions which sufficiently interlock with the smaller of the flanges of the described channel shaped track to guide the door and prevent its disengagement from the track.

In the drawings forming part of this specification:

Figure 1 is a fragmentary elevation of a railway house car having a sliding lift door mounted thereon embodying the invention, the door being illustrated in its lowered track engaging position;

Figure 2 is a view similar to Figure 1 showing the door in its elevated position;

Figure 3 is a vertical section taken on line 3—3 of Figure 1, the door being in lowered position;

Figure 4 is a view similar to Figure 3 showing the door in elevated position;

Figure 5 is a horizontal section taken on line 5—5 of Figure 1.

Referring to the drawings which illustrate a preferred embodiment of the invention, the numeral 10 designates a portion of a railway house car upon which is mounted a door 11 adapted to control the opening 12 formed in the side of said car. As illustrated, the door may be of metallic construction and may embody a metallic panel 13 provided with spaced horizontal corrugations 14, the ends of which preferably merge into vertical corrugations 15 and 16 formed adjacent the vertical edges of the door.

The door 11 which, as illustrated, is of the lift type, is adapted to be supported upon the car side by means of a track 17 secured to the side sill 18 of the underframing of the car by means of a plurality of brackets 19 to which the track is secured as by means of rivets 20. In Figures 1 and 3 of the drawings the door is illustrated in frictional engagement with the track, a position which it automatically assumes whenever the door is not being moved upon the track to open or closed position. For the purpose of obtaining such opening or closing movement of the door mechanism is provided upon the door which is customarily known as lift mechanism.

The particular lift mechanism illustrated comprises a plurality of spaced rollers 21 and 22. These rollers are disposed upon the track 17 and are rotatably mounted in roller housings 23 and 24, each of which is provided with oppositely extending trunnions 25 and 26 by means of which the roller housings are adapted to be journaled eccentrically upon the door. It is to be observed that these trunnions are disposed in offset relationship to the pins 27 by means of which each roller is mounted upon its roller housing. The roller housing 23 is journalled in the panel of the door and in a cover plate 28 secured to the door while the roller housing 24 is journaled to the metallic panel 13 and to a cover plate 29 secured to the door. Simultaneous operation of the roller housings 23 and 24 is obtained by means of a connecting bar 30 which is preferably disposed in the lower of the horizontal corrugations 14 provided in the door panel. The connecting bar extends through the open ends of the horizontal corrugation, the ends of said bar being flat as indicated at 31 and 32 for engagement in any desired manner with projections 33 and 34 provided, respectively, on the roller housings 23 and 24. An operating lever 35, secured to the roller housng 23 preferably by engagement with the trunnion 26, which extends outwardly of the cover plate 28 through an opening provided therein, is utilized to effect rotation of the roller housings 23 and 24 about their rollers as fulcrums and consequent elevation of the door above the track for support upon said rollers. When the support of the door has been transferred from the track to the rollers the door may then very readily be moved toward open or closed position.

The track 17 utilized to support the door upon the car side is the conventional channel shaped track disposed with its web 36 in a horizontal plane so as to serve as the tread for the track and the legs 37 and 38 thereof extending downwardly in spaced vertical planes. In this conventional type of track the leg 37 is of greater depth than the leg 38 and constitutes the attaching leg for the track. It is to be observed from Figure 3 of the drawings, that the relationship of the depth of the legs 37 and 38 of the track 17 is such as to permit of driving of the fastening rivets 20 without interference from the leg 38. The smaller leg 38 in tracks of this character is customarily utilized for interlocking relationship with hook shaped members provided on the door in order to prevent accidental disengagement of the door from the track and consequent loss of the door from the car. This is true where such tracks are used to support doors upon railway house cars, these doors being of the straight sliding type. However, great difficulty was experienced in attempting to carry this construction into doors of the lift type without considerably increasing the cost of the door. This is particularly true when the lift mechanism used upon the lift type of door embodied roller housings journaled upon the door.

The instant invention overcomes the difficulty above noted. To this end there is provided a plurality of guides 39 secured to the door adjacent the cover plates 28 and 29. Each of these guides comprises preferably a vertically extending flange 40 provided with an outwardly directed rib 41. A horizontal flange 42 extends outwardly from the lower portion of the vertically extending flange 40 and is adapted to be supported upon the tread 36 of the track 17. A substantially hooked shaped portion 43 extends downwardly from the horizontal flange 42 and is adapted to be disposed in interlocking relationship with the downwardly extending flange 38 of the track 17, as clearly illustrated in Figure 3 of the drawings.

Each of the guides 39 is maintained upon the lower margin of the door 11 by means of a bracket 44 which is rigidly secured to the door. The bracket 44 is associated with its guide in such manner that the door is capable of relative vertical movement with respect to the guide. Each bracket 44 is provided with an inwardly extending rib 45 spaced vertically below the rib 41 provided upon the guide. In other words, each guide is loosely retained upon the door between the metallic panel and the bracket 44, disengagement of the guide from the door being obviated by means of the overlapping ribs 41 and 45 provided, respectively, upon the guide and its brack-

et. These ribs in addition serve for a purpose hereinafter set forth.

It will be apparent from the foregoing description that lift mechanism of the character described may be utilized in conjunction with a track of the character set forth. The door in its normal position is frictionally supported upon the track, as clearly shown in Figure 3 of the drawings. It will be apparent from this figure that sufficient overlap is provided between the hook shaped portion 43 of each guide and the depending flange 38 of the door supporting track to preclude disengagement of the door from the track. The door may be elevated above the track for support upon the rollers 21 and 22 by exerting a downward pull upon the operating lever 35. By virtue of the connection provided between the roller housings 23 and 24 by the connecting bar 30 these housings will have imparted thereto simultaneous movement of rotation about the rollers 21 and 22. As a result of this rotation of the roller housings the trunnions 25 and 26 provided thereon will impart a lifting movement to the door and inasmuch as the door may move vertically relative to the guide 39 it will be apparent that complete elevation of the door may be obtained without interference between the guides and the supporting track. It is manifest, therefore, that the dimensions of the track need not be increased in order to provide for elevation of the door. It is preferred, however, to lift the guide 39 slightly above the track in order to insure unimpeded movement of the door longitudinally along the track. For this purpose the ribs 41 and 45 are so disposed that engagement between them occurs during the final elevating movement of the door so that in the final elevating movement of the door lifting is imparted to the guide. However this slight lifting of the guide is not sufficient to impede sliding movement of the door. It will be apparent, however, that this lifting of the guides above the track need not be resorted to if not desired.

It will be apparent that numerous changes and modifications in the details of the instant invention may be made by those skilled in the art without departing from the spirit of the invention. It is intended, therefore, to comprehend all such changes and modifications within the purview of this invention, which is to be limited only by the scope of the claims appended hereto.

I claim:

1. In a railway house car, a track, a sliding door adapted to be frictionally supported upon said track, lift mechanism comprising roller housings journaled eccentrically upon said door and rollers mounted on said housings, guide means for said door, said guide means being secured to said door so that said door is capable of vertical movement relative thereto, said guide means having interlocking relationship with said track, said mechanism being operable to elevate said door relative to said guide means and said track for support upon said rollers.

2. In a railway house car, a track having a vertical downwardly extending flange, a sliding door adapted to be frictionally supported upon said track, lift mechanism comprising roller housings journaled eccentrically upon said door and rollers mounted on said housings, guide means for said door, said guide means being secured to said door so that said door is capable of vertical movement relative thereto, said guide means having interlocking relationship with said track flange, said mechanism being operable to elevate said door relative to said guide means and said track for support upon said rollers.

3. In a railway house car, a channel shaped track having vertical downwardly extending flanges of unequal depth secured to the car, a sliding door adapted to be frictionally supported upon said track, lift mechanism comprising roller housings journaled eccentrically upon said door and rollers mounted on said housings, guide means for said door, said guide means being secured to said door so that said door is capable of vertical movement relative thereto, said guide means having interlocking relationship with the smaller flange of said track, said mechanism being operable to elevate said door relative to said guide means and said track for support upon said rollers.

4. In a railway house car, a track, a sliding door adapted to be frictionally supported upon said track, lift mechanism comprising roller housings journaled eccentrically upon said door and rollers mounted on said housings, guide means for said door, said guide means being slidably secured to said door so that said door is capable of vertical movement relative thereto, said guide means having interlocking relationship with said track, said mechanism being operable to elevate said door relative to said guide means and said track for support upon said rollers.

5. In a railway house car a channel shaped track having vertical downwardly extending flanges of unequal depth secured to the car, a sliding door adapted to be frictionally supported upon said track, lift mechanism comprising roller housings journaled eccentrically upon said door and rollers mounted on said housings, guide means for said door, said guide means being slidably secured to said door so that said door is capable of vertical movement relative thereto, said guide means having interlocking relationship with the smaller flange of said track, said mechanism being operable to elevate said door relative to said guide means and said track for support upon said rollers.

6. In a railway house car, a track, a sliding door adapted to be frictionally supported upon said track, lift mechanism comprising roller housings journaled eccentrically upon said door and rollers mounted on said housings, guide means for said door, said guide means being secured to said door so that said door is capable of vertical movement relative thereto, said guide means being supported upon said track and having a hook shaped portion disposed in interlocking relationship with said track, said mechanism being operable to elevate said door relative to said guide means and said track for support upon said rollers.

7. In a railway house car, a track, a sliding door adapted to be frictionally supported upon said track, lift mechanism for said door comprising roller housings carrying rollers adapted to support said door for sliding movement upon said track, guide means secured to said door in longitudinally spaced relation to said roller housings so that said door is capable of vertical movement relative thereto, said guide means having a hook shaped portion disposed in interlocking relationship with said track, said mechanism being operable to elevate said door relative to said guide means and said track for support upon said rollers.

8. In a railway house car, a track, a sliding door adapted to be frictionally supported upon said track, lift mechanism for said door com-

prising roller housings carrying rollers adapted to support said door for sliding movement upon said track, guide means supported upon said track and slidably secured to said door in longitudinally spaced relation to said roller housings, said guide means having a hook shaped portion disposed in interlocking relationship with said track, said mechanism being operable to elevate said door relative to said guide means and said track for support upon said rollers.

9. In a railway house car, a track, a sliding door adapted to be frictionally supported upon said track, lift mechanism comprising roller housings journaled eccentrically upon said door and rollers mounted on said housings, guide means for said door, said guide means comprising a vertically extending flange, a horizontal flange and a hook shaped portion, means secured to said door and associated with said vertically extending flange for slidably fastening said guide means to said door, said horizontal flange resting upon said track and said hook shaped portion having interlocking engagement with said track, said mechanism being operable to elevate said door relative to said guide means and said track for support upon said rollers.

10. In a railway house car, a track, a sliding door adapted to be frictionally supported upon said track, lift mechanism comprising roller housings journaled eccentrically upon said door and rollers mounted on said housings, guide means for said door, said guide means comprising a vertically extending flange, a horizontal flange and a hook shaped portion, means secured to said door and associated with said vertically extending flange for slidably fastening said guide means to said door, said horizontal flange resting upon said track and said hook shaped portion having interlocking engagement with said track, said mechanism being operable to elevate said door relative to said guide means and said track for support upon said rollers, said vertically extending flange and the fastening means associated therewith having cooperating flanges engageable in the final elevating movement of the door to raise said horizontal flange above said track.

11. In a railway house car, the conventional channel shaped track characterized by legs of unequal depth secured to said car, a sliding door adapted to be frictionally supported upon said track, lift mechanism comprising roller housings journaled eccentrically upon said door and rollers mounted on said housings, guide means for said door, said guide means being slidably secured to said door in spaced relation to said roller housings so that said door is capable of vertical movement relative thereto, said guide means having a hook shaped portion disposed in interlocking relationship with the smaller of the track flanges, said mechanism being operable to elevate said door relative to said guide means and said track for support upon said rollers.

12. In a railway house car, the conventional channel shaped track characterized by legs of unequal depth secured to said car, a sliding door adapted to be frictionally supported upon said track, lift mechanism comprising roller housings journaled eccentrically upon said door and rollers mounted on said housings, guide means for said door, said guide means being slidably secured to said door in spaced relation to said roller housings so that said door is capable of vertical movement relative thereto, said guide means having a hook shaped portion disposed in interlocking relationship with the smaller of the track flanges, said mechanism being operable to elevate said door relative to said guide means and said track for support upon said rollers, said guide means being supported upon said track, said door and guide means being provided with cooperating flanges engageable in the final elevating movement of said door to raise said guide means vertically relative to said track.

13. In a railway house car, the conventional channel shaped track characterized by legs of unequal depth secured to said car, a sliding door adapted to be frictionally supported upon said track, lift mechanism comprising roller housings journaled eccentrically upon said door and rollers mounted on said housings, guide means for said door, said guide means being disposed in spaced relation to said roller housings, comprising a vertically extending flange, a horizontal flange and a hook shaped flange, a bracket secured to said door and associated with said vertically extending flange for slidably fastening said guide means to said door, said horizontal flange being supported upon said track and said hook shaped flange having interlocking relationship with the smaller of the track flanges, said mechanism being operable to elevate said door relative to said guide means and said track for support upon said rollers.

14. In a railway house car, the conventional channel shaped track characterized by legs of unequal depth secured to said car, a sliding door adapted to be frictionally supported upon said track, lift mechanism comprising roller housings journaled eccentrically upon said door and rollers mounted on said housings, guide means for said door, said guide means being disposed in spaced relation to said roller housings, comprising a vertically extending flange, a horizontal flange and a hook shaped flange, a bracket secured to said door and associated with said vertically extending flange for slidably fastening said guide means to said door, said horizontal flange being supported upon said track and said hook shaped flange having interlocking relationship with the smaller of the track flanges, said mechanism being operable to elevate said door relative to said guide means and said track for support upon said rollers, said bracket and said guide means being provided with horizontally overlapping flanges to prevent disengagement of said guide means from said door.

15. Guide means for horizontally sliding lift doors comprising a member having a flange, a second flange extending from said first flange and a hook shaped portion depending from said second flange, and a member adapted to be secured to a door and associated with said first mentioned member whereby said door will have relative vertical movement wiht respect to said first mentioned member during the vertical movement of said door.

16. Guide means for horizontally sliding lift doors comprising a member having a flange, a second flange extending from said first flange and a hook shaped portion depending from said second flange, and a member adapted to be secured to a door and slidably associated with said vertical flange whereby said door will have relative vertical movement with respect to said first mentioned member during vertical movement of said door.

17. Guide means for horizontally sliding lift doors comprising a member having a flange, a

second flange extending from said first flange and a hook shaped portion depending from said second flange, and a member adapted to be secured to a door and slidably associated with said first flange whereby said door will have relative vertieal movement with respect to said first mentioned member during vertical movement of said door, said first flange having a rib disposed in overlapping relationship with a rib provided on said second mentioned member.

18. Guide means for lift doors adapted to be supported for horizontally sliding movement upon a track comprising a member having a flange, a hook shaped portion adapted to have interlocking engagement with said track and a shoulder for supporting said member upon said track, and a bracket adapted to be secured to said door, said bracket slidably engaging said flange.

THORVALD MADLAND.