

No. 649,344.

J. T. NORMAN.

Patented May 8, 1900.

CAR DOOR.

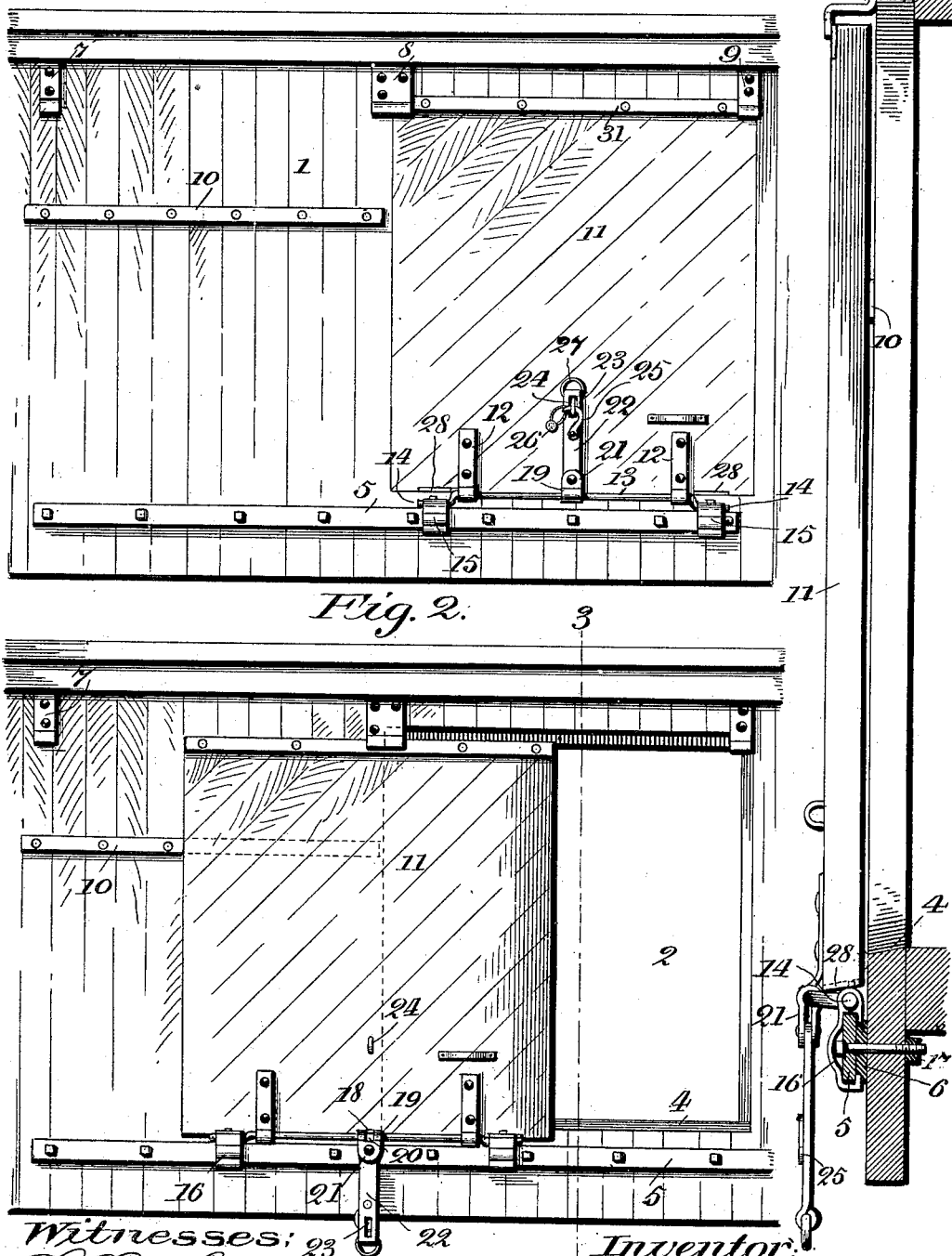
(No Model.)

(Application filed Aug. 31, 1899.)

3 Sheets—Sheet 1.

Fig. 1

Fig. 3



Witnesses:
L. C. Hills
J. B. Teuffer

Inventor:
John T. Norman,
By James L. Norman,
Atty.

No. 649,344.

J. T. NORMAN.

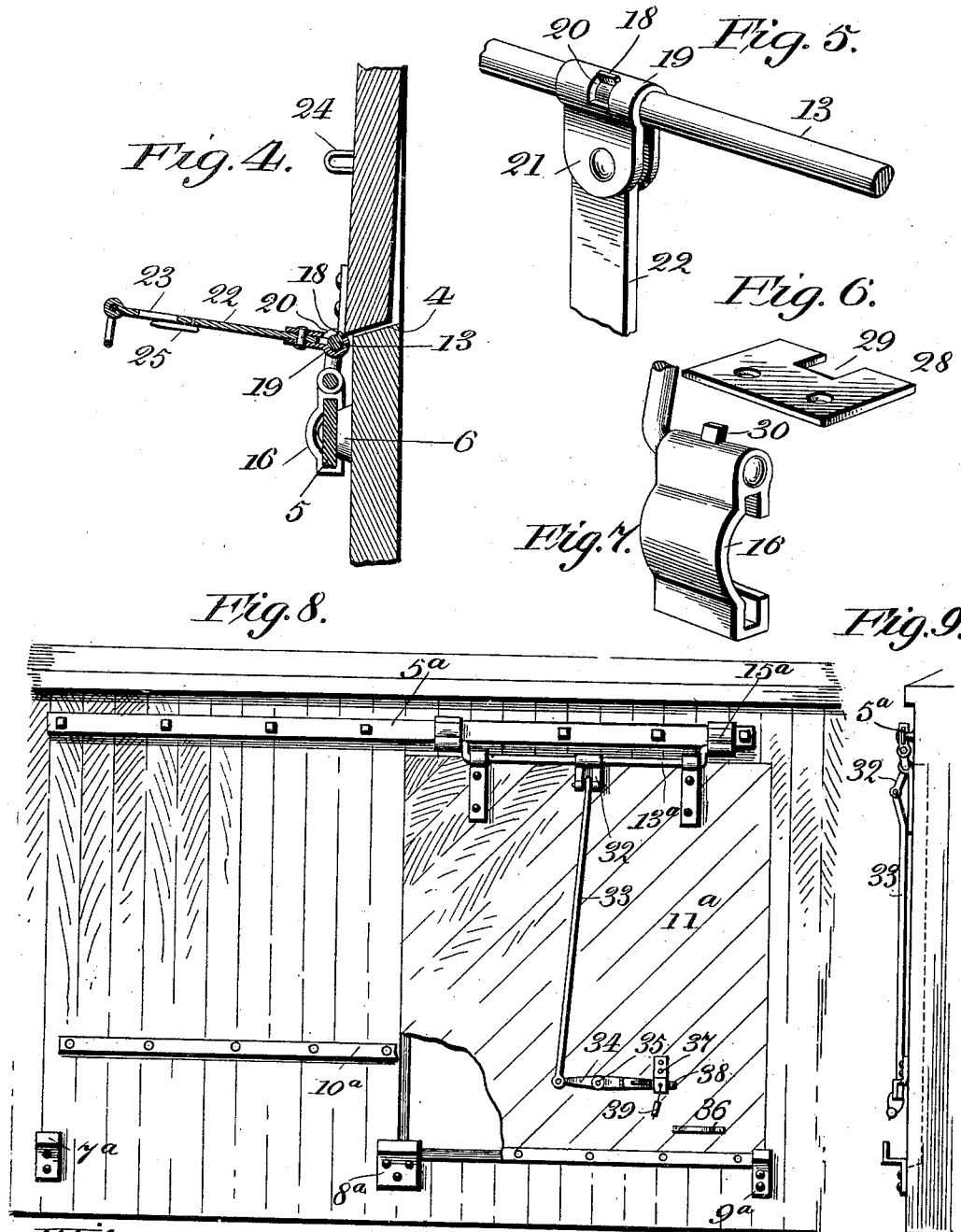
Patented May 8, 1900.

CAR DOOR.

(No Model.)

(Application filed Aug. 31, 1899.)

3 Sheets—Sheet 2.



Witnesses:
L. C. Hills.
W. K. Keefe

Inventor:
John T. Norman,
By James L. Norman,
Atty.

(No Model.)

(Application filed Aug. 31, 1899.)

3 Sheets—Sheet 3.

P. C. Hills
J. B. Keefe

By John T. Norman,
James L. Norris,
Atty.

UNITED STATES PATENT OFFICE.

JOHN T. NORMAN, OF ROANOKE, VIRGINIA, ASSIGNOR OF TWO-THIRDS TO
ELIZA S. GALE, OF SAME PLACE.

CAR-DOOR.

SPECIFICATION forming part of Letters Patent No. 649,344, dated May 8, 1900.

Application filed August 31, 1899. Serial No. 729,111. (No model.)

To all whom it may concern:

Be it known that I, JOHN T. NORMAN, a citizen of the United States, residing at Roanoke, in the county of Roanoke and State of Virginia, have invented new and useful Improvements in Car-Doors, of which the following is a specification.

My invention relates to car-doors of that class wherein the door is seated in a recess around the door-opening of the car-body and its outer surface lies flush with the outer surface of the car-body when said door is in its closed position.

One object of the invention is to provide novel means whereby the door may be withdrawn from and inserted into the recess in the car-body, so that it may be moved longitudinally of the car, on the outside thereof.

A further object of the invention is to provide means whereby the upper end of the door may be automatically thrown outward beyond the recess in which it fits when the lower end thereof has been withdrawn.

A further object of the invention is to provide a novel method of mounting the door upon the rail-slides, which will prevent the occurrence of dead-centers during the action of the operating and releasing mechanism.

A further object of the invention is to provide means whereby a solid or imperforate door and an open-work or ventilated door may be employed, one to be applied to the door-opening at one time and the other at another time.

Other objects and advantages of the invention will hereinafter appear, and the novel features thereof will be set forth in the claims.

In the drawings forming part of this specification, Figure 1 is a side elevation of a portion of a car-body, showing the door in its closed and locked position. Fig. 2 is a similar view of the same, showing the door partly open. Fig. 3 is a vertical section on an enlarged scale, said section being taken on the line 3-3 of Fig. 2. Fig. 4 is a detail sectional view of the lower end of the door and the sill, showing the operating-lever for the door in position to act thereon to throw said door outwardly. Fig. 5 is a detail perspective view showing the connection between the crank-shaft and the operating-lever. Fig. 6 is a

similar view of one of the slotted wear-plates on the lower edge of the door. Fig. 7 is a similar view of one of the slides which move upon the supporting-rail. Fig. 8 is a view similar to Fig. 1, showing a modified construction. Fig. 9 is an end view of the same. Fig. 10 is a side elevation of the car, showing the application of a plurality of doors thereto, said doors being shown in their open positions and the locking and operating mechanism being similar to that illustrated in Fig. 8. Fig. 11 is a view similar to Fig. 10, except that the locking and operating mechanism shown therein is like that illustrated in Fig. 1 of the drawings.

Like reference-numerals indicate like parts in the different views.

The side 1 of the car-body is formed with a door-opening 2 therein, the same being provided with a recess 3, formed by rabbeting or otherwise, and a sill 4, the upper surface of which is inclined, as shown. Beneath the door-opening 2 and extending horizontally is a supporting-rail 5, which projects slightly beyond the side 1 of the car-body, being held in this position by means of washers 6. At points substantially in line with the upper end of the opening 2 are overhanging brackets 7 8 9, the brackets 8 and 9 being located at the upper corners of the opening 2, with the base portions thereof projecting into said opening. Also secured to the side 1 of the car is a wear-plate 10, which extends from one side of the opening 2 parallel to the rail 5.

The door 11 may be of any suitable construction. It is shaped, however, to correspond with the opening 2, and when in place in the recess 3 around said opening the outer surface thereof lies flush with the outer surface of the side 1 and its upper corners lie directly beneath and are engaged by the bases of the brackets 8 and 9. The said brackets therefore serve to prevent the outward movement of the upper end of said door, as will be apparent. The lower edge of the door 11 is beveled to conform to the bevel of the sill 4, so that when the door is in place it will completely close at all points the opening 2.

Mounted to turn in the hangers 12, secured to the lower end of the door 11, is a rock-shaft 13, the same being provided with crank-arms

14 14, which extend through and are free to turn in sockets or bearings in the ends of slides 15 15. The said slides embrace and are free to move upon the rail 5 and are outwardly curved, as shown at 16, in order to free the heads of the securing-bolts 17, through which the rail 5 is secured to the body of the car. By the construction shown it will be seen that by rocking the shaft 13 outwardly through approximately a quarter-revolution the lower end of the door 11 will first be thrown outwardly beyond the sill 4, and then the whole door will be dropped bodily, so that the upper end thereof will be free from engagement with the bases of the brackets 8 and 9. In order to effect this rotation of the shaft 13, I form on said shaft at a point intermediate its ends a lug or projection 18 and surround the shaft with a freely-rotatable sleeve 19, formed with a slot 20 therein, into which the lug or projection 18 extends. To the projecting ears 21 of said sleeve is pivotally mounted an operating-lever 22, having a slot 23 near its free end, which is adapted to receive a staple 24 on the door 11, through which staple is adapted to be passed a pivotally-mounted hook 25, the said hook serving to hold the operating-lever 22, and consequently the door 11, in locked position. In lieu of or in addition to the hook 25 a seal-lock 26 may be employed. On the free end of the operating-lever 22 is pivoted a bail 27, which serves as a handle by means of which said lever may be moved.

It will be observed that the connection between the shaft 13 and the operating-lever therefor is through the lug 18 and the slotted sleeve 19, above referred to. It will also be noted that the engagement between these parts takes place only when the sleeve 19 is moved to bring one end or the other of the slot 20 into engagement with said lug. Provision for a small degree of lost motion between these parts is thereby made. This is done in order to provide for the pivotal movement of the operating-lever 22 through an arc of one hundred and eighty degrees and a simultaneous rotation of the shaft 13 through an arc of but approximately ninety degrees.

In Fig. 4 of the drawings the operating-lever 22 is shown in the position at which it begins to act upon the shaft 13 upon its outward movement—that is, the outward movement of the lever 22 from contact with the door 11 to the position shown in Fig. 4 of the drawings is without action upon the rock-shaft 13. In the position shown, however, one end of the slot 20 is brought into engagement with the lug 18, and further outward movement of the lever 22 will cause the rotation of the rock-shaft 13, enabling said operating-lever to assume a substantially-vertical position, as illustrated in Figs. 2 and 5 of the drawings. Were this provision for lost motion not made the end of the outward stroke of the lever 22 would leave the same in a substantially-horizontal position, as shown in

Fig. 4 of the drawings, and then there would be danger of breaking or otherwise marring or jamming said lever by contact with a platform or other object with which the car came into close relation.

The construction just described constitutes the means whereby the lower end of the door 11 is moved outwardly and the said door is bodily lowered. In connection with these parts I have also provided means whereby the upper end of the door will be automatically thrown outwardly simultaneously with the lowering thereof. To effect this purpose, I secure to the lower beveled edge of the door 11 wear-plates 28, which when the door is thrown to its outermost position, as shown in Fig. 3 of the drawings, abut against the upper ends of the slides 15. The said plates are formed with slots 29 adjacent to the inner surface of the door 11, which slots are adapted to receive projecting lugs 30 upon the upper ends of the slides 15. It will be observed that as the door 11 is suddenly depressed or lowered the same will be brought into engagement with the lugs 30 adjacent to the inner surface of said door, and the action will be to throw upwardly the lower inner corner of said door, and consequently throw outwardly the upper end thereof. This feature of construction is important, as it enables the door to be moved longitudinally of the car out of the way of the door-opening 2 as soon as the operating-lever 22 has been actuated. In this longitudinal movement of the door it will be observed that the same is supported upon the rail 5 through the shaft 13 and the slides 15 and is guided along its upper edge by the overhanging portions of the brackets 7, 8, and 9. In order to prevent wear between said brackets and the upper end of said door, the front or outer side thereof is provided with a wear-plate 31.

In the construction shown in Figs. 8 and 9 of the drawings the rail 5^a, the wear-plate 10^a, and the brackets 7^a, 8^a, and 9^a are reversed from the positions in which they are shown in the preceding figures of the drawings. The door 11^a is also constructed and arranged to be moved outwardly and upwardly for the purpose of moving it from its position in the door-opening, and in this respect, also, the construction is a reversal of that shown in the preceding figures. The slides 15^a fit and are adapted to move upon the rail 5^a, and the rock-shaft 13^a is pivoted to said slides at the lower ends thereof. The said rock-shaft is provided at a point intermediate its ends with a supplemental crank-arm 32, which is forked, as shown, and between the branches of the fork is pivoted a connecting-rod 33, pivoted at its lower end to an operating-lever 34, fulcrumed at 35 to the door 11^a and provided with a handhold 36, by means of which it may be rocked. The operating-lever 34 when the door 11^a is in its closed position lies horizontally, and the free end thereof fits beneath a bracket 37 on the door 11^a, which is provided

with a slot or opening 38, through which and said lever 34 a seal-lock 39 may be passed. The door 11^a is further provided with a handle 40, by means of which it may be shifted in one direction or the other. The action of this form of my invention is similar to that of the preferred construction. By depressing the free end of the operating-lever 34 the crank-arm 32 on the rock-shaft 13^a will, through the connecting-rod or pitman 33, be turned through an arc of approximately forty-five degrees, the action of which will be to draw outwardly the upper end of the door 11^a from the door-opening and permit the same to free the side 1 of the car-body in its longitudinal sliding movement on the rail 5^a.

It will be observed that in both forms of my invention the connection between the crank-arm pivoted to the door and the slides which move upon the supporting-rail is at one end of said slides. This is essential, as the connection of said rock-shaft to said slides at any other point would not permit of the inward movement of the door into the recess around the door-opening. If longer or curved connecting pieces or links were provided, it would necessitate a movement of the rock-shaft through a greater arc, and this would tend to produce dead-centers between the operating-lever and said rock-shaft, as will be readily apparent.

In the construction heretofore described I have provided for the use of one door only. It may be found desirable at times to employ in addition to the ordinary solid or imperforate door a door providing for the ventilation of the interior of the car. To provide for this, I form the door-opening at a point intermediate the ends of the car, preferably at the center, and extend the supporting-rail for the doors an equal distance on opposite sides thereof. This construction is clearly illustrated in Figs. 10 and 11 of the drawings. The doors 11^a and 41 in Fig. 10 are mounted and operated in all respects similar to the door illustrated in Figs. 8 and 9 of the drawings. The door 41, however, is provided with panels 42, of wire-netting or other open-work material, which provides for the passage of air for ventilating purposes therethrough. In this form of the invention, however, it is necessary to employ additional brackets, beneath which the doors pass. I have shown in the drawings two brackets 43 44, located at the lower corners of the door-opening, which are similar in all respects to the brackets 8^a and 9^a, heretofore referred to. In addition to these brackets other guide-brackets nearer the ends of the car are provided. In Fig. 10 the doors 11^a and 41 are shown in their open positions. If it be desired to close the car tight, the door 11^a is moved to a position opposite the door-opening in the car and the operating-lever 34 thereon actuated as heretofore described. If, however, it be desired to close the car and at the same time provide for the ventilation thereof, the door 41 is utilized, the same being

moved inwardly opposite the door-opening and the lever 34 actuated to throw the door 41 inwardly beneath the brackets 43 and 44.

The construction shown in Fig. 11 is similar in all respects to that shown in Fig. 10, except that for the locking and operating mechanism shown in Fig. 10 that illustrated in Figs. 1 and 2 of the drawings is substituted.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination with a car having a door-opening therein, of a bracket having a base secured to the car and projecting over said opening and having an engaging portion which projects beyond the plane of the car and overhangs said opening, a door adapted to fit within said opening, a support providing for the sliding movement thereof, and means for moving said door into and out of said opening, the said bracket serving as a guide for the door in its longitudinal movements along the outside of the car and as a lock for retaining one end thereof in place when the door is in said opening.

2. The combination with a car having a door-opening therein, of a supporting-rail, slides thereon, a plurality of brackets, each having a base secured to the car and projecting over said opening and having an engaging portion which projects beyond the plane of the car and overhangs said opening, a door adapted to fit within said opening, a rock-shaft pivoted to said door and having crank-arms thereon pivoted to the ends of said slides, and means for rocking said shaft, the said brackets serving as guides for the door in its longitudinal movements along the outside of the car and as a lock for retaining one end thereof in place when the door is in said opening.

3. The combination with a car having a door-opening therein and a recess surrounding said opening, of a supporting-rail on the outside of the car, slides thereon, a plurality of brackets, each having a base secured to the car substantially in line with one side of said opening but projecting over said opening at two of the corners thereof, and having an engaging portion which projects beyond the plane of the car and overhangs said opening, a door adapted to fit within said recess and close said opening, a rock-shaft pivoted to said door and having crank-arms thereon pivoted to the ends of said slides, and means for rocking said shaft, the said brackets serving as guides for the door in its longitudinal movements along the outside of the car and as a lock for retaining one end thereof in place when the door is in said opening.

4. The combination with a car having a door-opening therein, of a supporting-rail, slides thereon, a door adapted to fit within said opening, a rock-shaft pivoted to said door and having crank-arms thereon pivoted to the ends of said slides, and an operating-lever for said rock-shaft operating in a plane at right

angles to the door and connected to said rock-shaft with a provision for lost motion around said shaft, as and for the purpose set forth.

5 5. The combination with a car having a door-opening therein, of a supporting-rail, slides thereon, a door adapted to fit within said opening, a rock-shaft pivoted to said door and having crank-arms thereon pivoted to said slides, a lug on said rock-shaft, a sleeve
10 surrounding said shaft and having a slot therein in which said lug fits extending at right angles to said shaft and an operating-lever connected to said sleeve, as and for the purpose set forth.

15 6. The combination with a car having a door-opening therein, of a supporting-rail, slides thereon, a door adapted to fit within said opening, a rock-shaft pivoted to said door and having crank-arms thereon pivoted to
20 said slides, a lug on said rock-shaft, a sleeve surrounding said shaft having a slot therein in which said lug fits extending at right angles to said shaft, an operating-lever connected to said sleeve having a slot therein for receiving
25 a staple on said door, and locking means for retaining said lever in contact with said door.

7. The combination with a car having a door-opening therein and a recess surrounding said opening, of a supporting-rail on the
30 outside of the car beneath said opening, a plurality of brackets secured to the car substantially in line with the upper end of said opening, each having a base projecting over said opening at the two upper corners thereof,
35 and having an engaging portion which projects beyond the plane of the car, slides on said supporting-rail, a door adapted to fit within said recess and to close said opening, a rock-shaft pivoted to said door and having
40 crank-arms thereon pivoted to the ends of said slides, and means for rocking said shaft, the said brackets serving as guides for the

door in its longitudinal movements along the outside of the car and as a lock for retaining one end thereof in place when the door is in
45 said opening, as and for the purpose set forth.

8. The combination with a car having a door-opening therein and a recess surrounding said opening, of a supporting-rail on the
50 outside of the car beneath said opening, brackets secured to the car substantially in line with the upper end of said opening, slides on said rail having lugs or projections on their upper ends, a door adapted to fit within said recess and close said opening, a rock-shaft
55 pivoted to said door and having crank-arms thereon pivoted to the ends of said slides, and means for rocking said shaft, the lugs on said slides adapted to engage the lower edge of said door adjacent to the inner surface there-
60 of, as and for the purpose set forth.

9. The combination with a car having a door-opening therein and a recess surrounding said opening, of a supporting-rail on the
65 outside of the car beneath said opening, brackets secured to the car substantially in line with the upper end of said opening, slides on said rail having lugs or projections on their upper ends, a door adapted to fit within said recess and close said opening, wear-plates se-
70 cured to the lower edge of said door opposite said slides provided with slots adjacent to the inner surface of said door for receiving the lugs on said slides, a rock-shaft pivoted to said door and having crank-arms thereon pivoted
75 to the ends of said slides, and means for rocking said shaft, as and for the purpose set forth.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

JOHN T. NORMAN.

Witnesses:

W. A. GRIFFITH,
W. B. FRANKLIN.