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S. J. JOHNSON.

Patented July 3, 1900.

DOOR.

(No Model.)

(Application filed July 31, 1899.)

3 Sheets—Sheet 1.

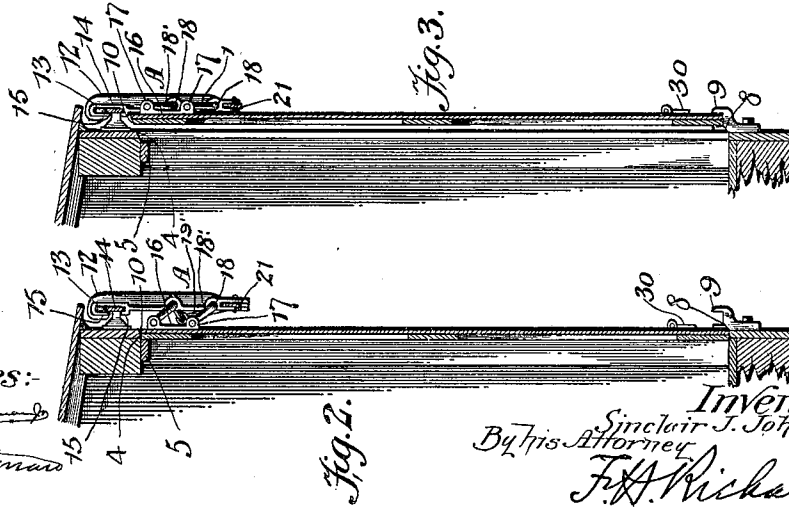
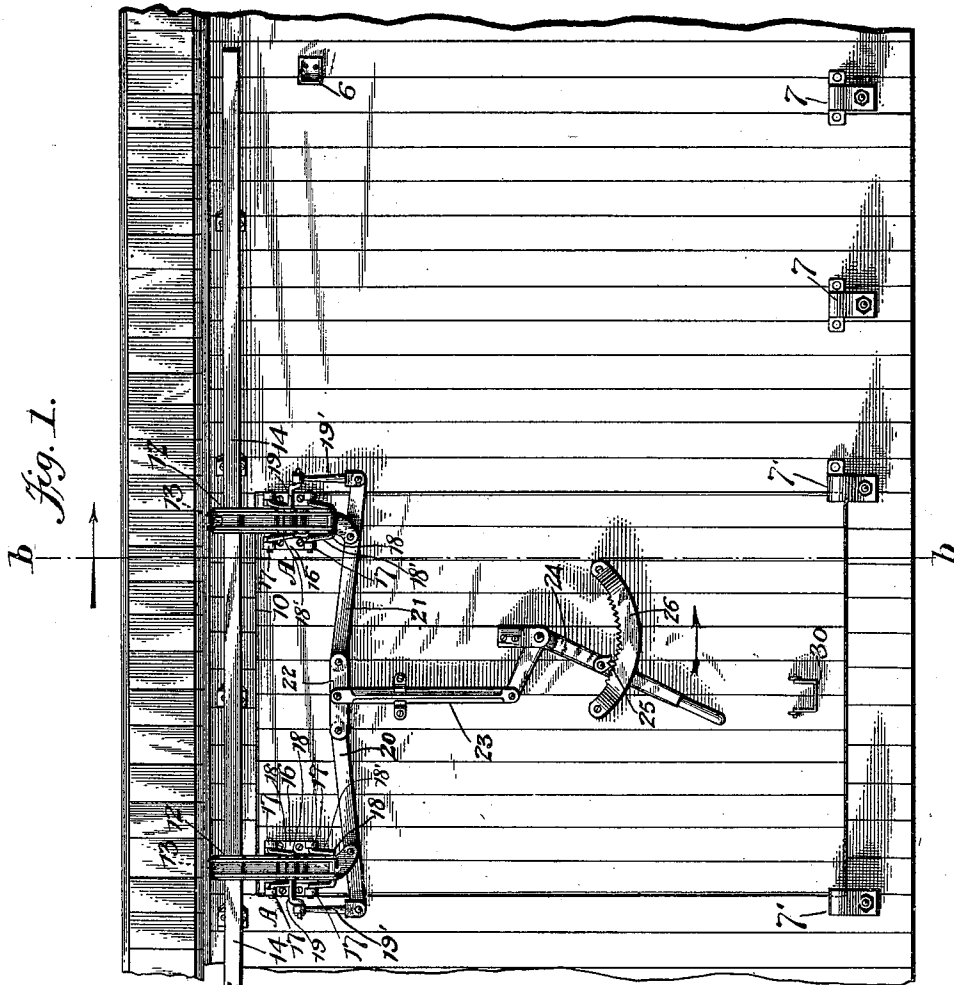


Fig. 3.

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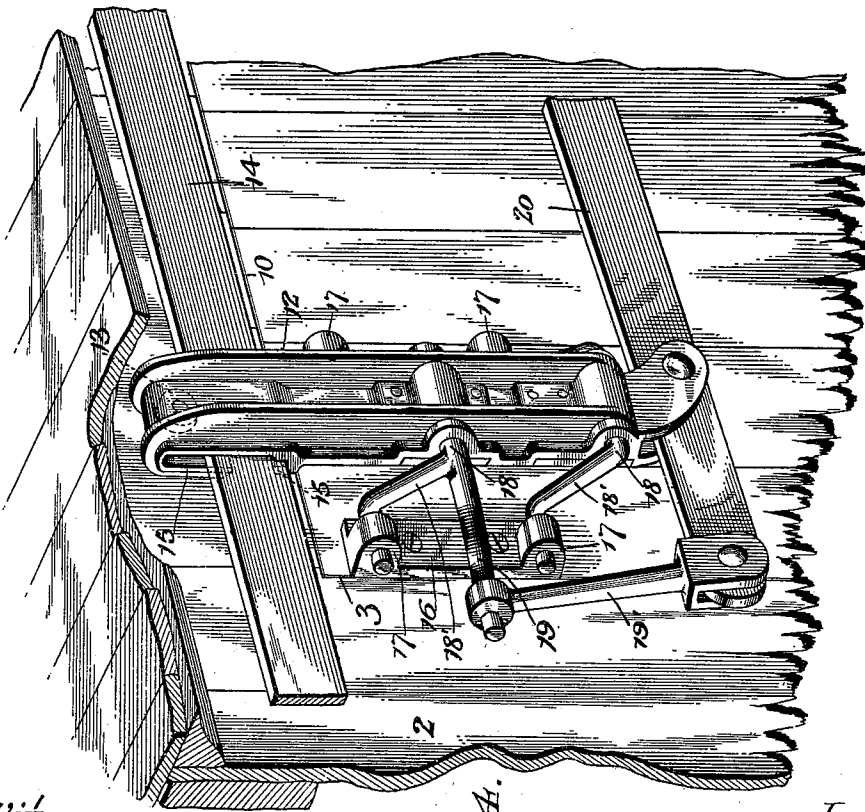
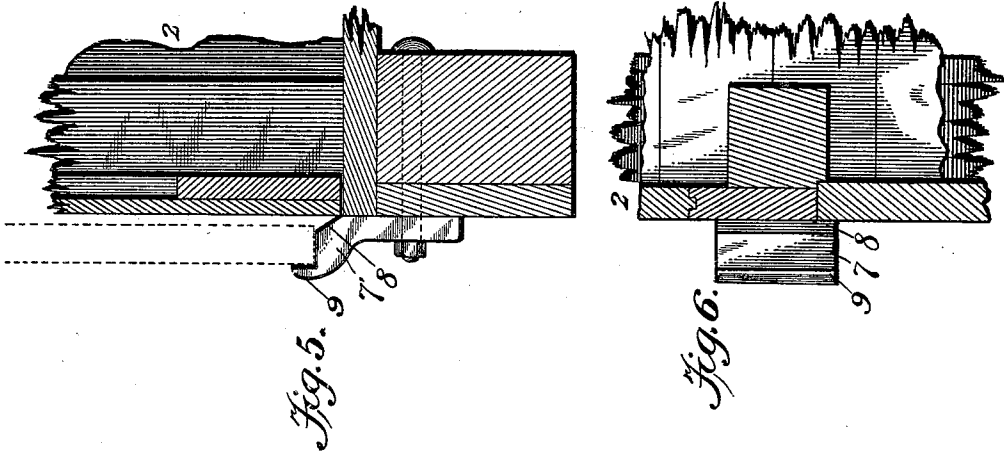
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3 Sheets—Sheet 2.



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Fig. 4.

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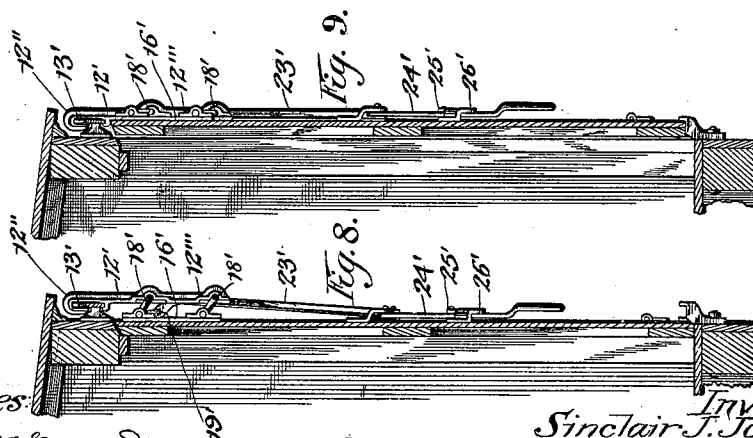
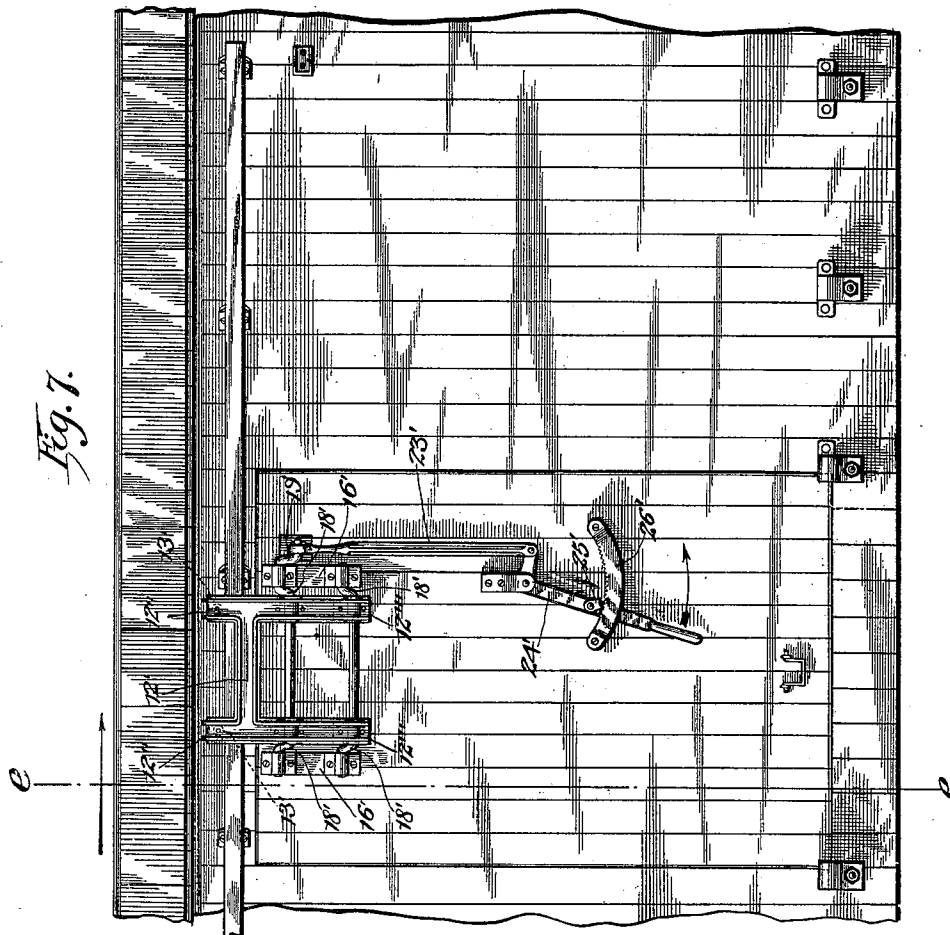
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UNITED STATES PATENT OFFICE.

SINCLAIR J. JOHNSON, OF NUTLEY, NEW JERSEY.

DOOR.

SPECIFICATION forming part of Letters Patent No. 652,932, dated July 3, 1900.

Application filed July 31, 1899. Serial No. 725,642. (No model.)

To all whom it may concern:

Be it known that I, SINCLAIR J. JOHNSON, a citizen of the United States, residing in Nutley, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Doors, of which the following is a specification.

This invention relates to doors, and more particularly to that class of doors especially adapted for use with freight box-cars; and the object of the invention is to provide an improved means for supporting and operating the door, whereby when it is in its closed position it will be flush with the door-casing or wall of the car, from which it can be shifted in a plurality of directions into position to be moved laterally away from the doorway, and when in its open position can be effectively locked against the side of the car to prevent the return movement thereof to the doorway.

In the drawings accompanying and forming part of this specification, Figure 1 is a view of one part of a car-body, showing this improved door in position flush with the door-casing. Fig. 2 is a cross-sectional view thereof, taken in line *b b*, Fig. 1. Fig. 3 is also a cross-sectional view taken in said line *b b*, showing the door in its shifted position in readiness to be moved away from the doorway. Fig. 4 is an enlarged perspective view of one of the door-carriers, said view showing a portion of the door and the car-body. Fig. 5 is a detail sectional view of one side of the door-casing, a portion of the door being shown in section in its closed position and in dotted lines in its shifted position in readiness to be moved away from the doorway. Fig. 6 is a cross-sectional view of the parts shown in Fig. 5. Fig. 7 is a view similar to Fig. 1, but showing the door supported by one carrier instead of two. Fig. 8 is a cross-sectional view taken in line *e e*, Fig. 1; and Fig. 9 is a cross-sectional view taken in line *e e*, Fig. 1, but showing the door in its shifted position in readiness to be moved away from the doorway.

Similar characters of reference designate like parts in all the figures of the drawings.

In my present improvement, which in operation is substantially similar to the improvement set forth in my contemporaneously-pending application, Serial No. 725,471, filed

July 29, 1899, the door is so hung that it is above the pivotal axes of the cranks with their hangers. Hence when the door has been shifted the crank-arms of the cranks will be substantially perpendicular, so that the tendency of the door to return to its closed position during its sidewise movement on the track is decreased, since such crank-arms are in what may be designated their "dead-center" positions. Moreover, by this construction I am enabled to provide the carrier or carriers with double cranks and to so assemble such carriers with the door that they will be inside the side edges thereof instead of outside, as in said construction above referred to, whereby the space required for the door mechanism is reduced.

As a preface to a further description of this improvement I desire to state that it may be used in connection with structures other than cars, if desired, so that the claims are not to be construed as limited to structures of that class and that the various details may be more or less modified without departing from the scope of the invention. I desire to state also that in practice the track will usually be of such length that the door can be moved to either side of the doorway, the mechanism being organized to permit this result, and that by a mere modification of details the door may be shifted toward the interior of the car, so that the term "outwardly," as used herein and in the claims, is not to be construed as a limitation.

In construction the car-body 2 is provided with the usual opening or doorway 3. The door-lintel 4, however, is preferably beveled and is provided with a stop, such as a cross-bar 5, to limit the inward movement of the door. The car-body is also provided with a stop 6 on its outer wall to limit the sidewise movement of the door. This car-body carries a series of brackets 7, disposed along its outer side adjacent to the bottom of the door, for guiding the door when moved away from the doorway, one of these brackets 7' being disposed adjacent to each lower corner of the doorway and so located that a portion thereof projects into such doorway. These doorway-brackets 7' are provided with beveled inner faces 8 and a flange 9 for the purpose hereinafter set forth.

The door is formed with its upper edge 10 beveled to correspond with the beveled door-lintel, such door being of a size to fit flush within the door-casing.

5 For supporting the door it is provided with one or more carriers, (designated in a general way by A.) In the form shown in Fig. 1 a pair of carriers are provided, each comprising a hanger 12, carrying a roll 13 in engagement with a track 14, supported on the car-body, such hanger being so constructed as to prevent its displacement from the track, and for this purpose it is provided with downwardly and upwardly extending flanges 15, overlapping the inner side of the track, and is also so constructed that it is in close engagement with the lower edge of the track, thereby to prevent lateral play of the hanger. This hanger constitutes one member of a hinge, the other member thereof being secured to the door, adjacent to an upper corner thereof, and comprises a pair of plates 16, having apertured projections or bearings 17 for the cranks. The plates are connected with the hangers by a pair of double cranks 18, located one below the other and preferably so assembled that the door is hung above the pivotal axes of such cranks with the hangers, while the journal parts, or those parts of the cranks which are carried by the bearings formed by the plates 16 and the hangers, are shown horizontally disposed and parallel to the plane of the door. On the shifting movement of the cranks the door in the present organization is thrown outwardly and upwardly into position to permit the crank-arms 18' of such cranks to be in a perpendicular or dead-center position. One crank of each set is provided with an actuating crank-arm 19, operatively connected by connecting rods 19' to a pair of levers 20 and 21, fulcrumed to said hangers, which pair of levers in turn have their inner ends pivoted to an equalizer comprising a member 22, pivotally secured to a rod 23, suitably guided on the door, the lower end of said rod being connected to an actuator, such as an angle-lever 24, pivotally secured to the door and carrying a pawl 25 in operative engagement with a ratchet 26, fixed to said door. In operation, should one side of the door meet with an obstruction, this equalizer operates to prevent the breakage or strain of the mechanism, since it is effective to operate one set of cranks while permitting the other set to remain inoperative.

The lower part of the door is provided with a handle 30 to assist in the operation thereof when necessary.

In operation, the door being flush with its door-casing, the pawl 25 is released from the ratchet 26, the actuating-lever 24 shifted to the right, thereby operating the levers 20 and 21 to throw the outer ends thereof upward, and thereby the cranks, into a substantially-perpendicular position, and consequently shift the door from its closed position out-

wardly and upwardly. This operation moves the lower portion of the door from its position in the rear of the beveled faces of the brackets 7' into the position shown in Fig. 3, which may be assisted, when necessary, by a pull on the handle 30. The pawl is then adjusted to prevent the return movement of the actuating-lever 24, and thereby maintain the door in its shifted position. The door is then moved on its track to open the car, the brackets 7 along the side of the car guiding the bottom of the door and preventing the swinging movement thereof should the door be left open while the car is running.

To prevent the return movement of the door on its track, the actuator is shifted to permit the cranks to throw the door against the side of the car, in which position the door binds and is effectively and automatically locked by its own weight and the angular position of the cranks, from which it will be seen that the door is locked open and prevented from moving on its tracks without throwing the track-rolls therefrom without the use of a separate locking means.

To return the door to its closed position, the pawl is released and the clutch is operated to shift the door outward from its binding position against the side of the car, whereupon the door can be shifted on its track into position opposite the door-opening. The bottom of the door is then pushed inward and the actuator is then shifted to the left, thereby drawing down the outer ends of the levers 20 and 21 and operating to lower and shift the door inwardly into position flush with the door-casing.

In the present structure it will be seen that since the door is supported above the pivotal axes of the cranks the weight of the door assists to close it during the closing operation, while the cranks, owing to their inclined positions, effectively and automatically lock the door closed, this being assisted by the weight of the door.

In the form shown in Fig. 7 the door is supported by means of one carrier comprising a hanger 12', having a pair of upwardly-extending arms 12'', each provided with a roll 13' in engagement with the track and with a pair of depending arms 12''', constituting bearings for a pair of double cranks 18', secured to the door by suitable plates 16'. One of the cranks is provided with an actuating crank-arm 19', in operative connection with which, by means of a connecting-rod 23', is an actuator, such as an angle-lever 24', pivotally secured to the door, said lever carrying a pawl 25', in engagement with a ratchet 26', also secured to said door. In operation the lever is shifted to the right, thereby throwing the connecting-rod inwardly and upwardly and shifting the crank-arms into a substantially-perpendicular position and moving the door outwardly and upwardly in the arc of a circle.

By the organization of crank mechanism

shown herein it will be seen that in operation the door has a parallel motion, so that the swinging or swaying thereof is avoided.

In conclusion I desire to state that by the provision of a door in which the supporting mechanism therefor is above the door all damage thereto is avoided by the backing of wagons against the car, as would be the case were such mechanism located at the bottom or sides of the door. Moreover, when the door is shiftable outwardly and upwardly it locks itself closed by its own weight, and the tendency of the door is to remain shut, which is not the case when the door is supported at the bottom or sides or when it is movable outwardly and downwardly. Furthermore, when freight become displaced or has fallen against the door such door can be more readily moved upwardly than moved downwardly, since such downward movement tends to increase the binding effect of the displaced freight, as the car-floor will prevent all movement of the freight with the door. In practice it is frequently necessary to cut into the door in order to get at the freight to release it from its binding position against the door, into which position it has fallen, and this binding effect is overcome by moving the door upwardly, since such upward movement acts to carry the freight away from the floor and to shift it sufficiently to enable the door to be opened, whereas when the door is moved in the opposite direction the freight is only wedged more firmly against the door and the floor of the car. Also by having the door shifted outwardly and upwardly, as in my construction, the manipulation of the lower end of the door is accomplished with much less labor than is the case when the door is shifted outwardly and downwardly.

Having described my invention, I claim—

1. The combination, with a car-body having a doorway, of a door therefor; a hanger shiftable supported on said car-body; a crank connecting said shiftable hanger and door and having its connection with said door above the connection thereof with said hanger, and also having its journal parts horizontally disposed and parallel to the plane of the door, and means for actuating said crank thereby to move the door outwardly and upwardly and into position to be shifted away from the doorway.

2. The combination, with a car-body having a doorway, of a door; a hanger for supporting said door; a plurality of cranks connecting said hanger with said door and having their connection with the door above the connection thereof with said hanger, and also having their journal parts horizontally disposed, and parallel to the plane of the door, and means for actuating said cranks and thereby the door outwardly and upwardly and into position to be shifted away from the doorway.

3. In combination, with a car-body having

a doorway, a door; carriers for supporting said door and embodying cranks; and means including an equalizer for actuating said cranks to shift the crank-arms thereof into a perpendicular position and thereby the door outwardly and upwardly.

4. The combination, with a car-body having a doorway, of a door; a track secured to said body; a hanger shiftable on said track; a plurality of parallelly-disposed cranks connecting said shiftable hanger and door and having their connection with said door above their connection with said hanger, and also having their journal parts horizontally disposed, and parallel to the plane of the door, and means for actuating said cranks, thereby to move the door outwardly and upwardly into position to be shifted away from the doorway.

5. In combination, with a car-body having a doorway, a hanger supported thereon and carrying crank mechanism having its journal parts horizontally disposed, and parallel to the plane of the door, a door hung on said crank mechanism above the pivotal axis thereof with said hanger; and means for actuating said crank mechanism thereby to shift the door outwardly and upwardly.

6. In combination, with a car-body having a doorway, hangers supported thereon and carrying crank mechanism; a door hung on said crank mechanism above the pivotal axis thereof with said hanger; and means embodying equalizing means for actuating said crank mechanism thereby to shift the door into position to be moved away from the doorway.

7. In combination, with a car-body having a doorway, a track carried thereby; a hanger supported thereon for shiftable movement and carrying crank mechanism having its journal parts horizontally disposed, and parallel to the plane of the door; a door hung on said crank mechanism above the pivotal axes thereof with said hanger; and means for actuating said crank mechanism thereby to shift the door outwardly and upwardly.

8. In combination, with a car-body having a doorway, a track carried thereby; a pair of hangers movable on said track; cranks supported by said hangers; a door hung on said cranks above the pivotal axes of said cranks with the hangers; and means for actuating said cranks thereby to shift the door into position to be moved away from the doorway.

9. In combination, with a car-body having a doorway, a hanger supported thereon and embodying crank mechanism having its journal parts horizontally disposed, and parallel to the plane of the door; a door hung on said crank mechanism above the pivotal axis thereof with said hanger; means for actuating said crank mechanism thereby to shift the door outwardly and upwardly; and means for maintaining the bottom of the door in its closed position.

10. In combination, with a car-body having a doorway, a track carried thereon; a door fitting flush within said doorway; a pair of hangers movable on said track; cranks supported by said hangers, and having their journal parts horizontally disposed, and parallel to the plane of the door; a door hung on said cranks above the pivotal axes of said cranks with the hangers; means for actuating said cranks thereby to shift the door outwardly and upwardly; and means for maintaining the bottom of the door in its closed position.

11. The combination, with a car-body having a doorway, of a door therefor; a hanger supported on said body; a pair of double cranks connecting said hanger with said door; and means for actuating said cranks, thereby to shift the door from its closed position into position to be moved away from the doorway.

12. In combination, with a car-body having a doorway, a track carried thereby; a pair of hangers supported thereon; two sets of double cranks secured to said hangers and to said door; and means for actuating said cranks thereby to shift the door outwardly and upwardly, said means embodying equalizing means.

13. In combination, with a car-body having a doorway, a hanger supported thereon and carrying a crank mechanism having its journal parts horizontally disposed, and parallel to the plane of the door; a door hung on said crank mechanism above the pivotal axes thereof with the hanger; means for actuating said crank mechanism to shift the door outwardly and upwardly, said means including an actuator; and means for locking said actuator in position.

14. In combination, with a car-body having a doorway, a track secured thereto; a hanger movable on said track and carrying crank mechanism having its journal parts horizontally disposed, and parallel to the plane of the door; a door hung on said crank mechanism above the pivotal axis thereof with said hanger; means for actuating said crank mechanism thereby to shift the door outwardly and upwardly, said means including an actuator secured to said door; a pawl carried thereby; and a ratchet fixed to said door.

15. The combination, with a car-body having a doorway, of a door therefor; a track carried by said body; one or more hangers shiftable on said track; crank mechanism connecting said hanger or hangers with said door, and having its journal parts horizontally located, and parallel to the plane of the door; and means for actuating said crank mechanism to move the door into position to be shifted away from the doorway, such crank mechanism being operative outwardly and upwardly and into an angular position to main-

tain the door closed or to maintain it locked open against the side of the car.

16. The combination, with a car-body having a doorway, of a door; a pair of hangers shiftable supported on said body; cranks connecting said hangers with said door and having their connection with said door above the connection thereof with said hangers; actuating means including an equalizer for actuating said cranks, thereby to move the door into position to be shifted away from the doorway; and means for locking said actuating means in position against movement.

17. The combination, with a car-body having a doorway, of a door therefor; a shiftable hanger supported on said body; a pair of double cranks connecting said hanger and door and having connection with said door at each side of said hanger; and means for actuating said cranks to move the door into position to be shifted away from the doorway.

18. The combination, with a car-body having a doorway, of a door therefor; a shiftable hanger supported on said body; a double crank connecting said hanger and door and having connection with said door at each side of said hanger; and means for actuating said crank to move the door into position to be shifted away from the doorway.

19. The combination, with a car-body having a doorway, of a door therefor; a pair of hangers shiftable supported on said body; a double crank connecting each of said shiftable hangers with the door; and means for actuating said cranks to move the door into position to be shifted away from the doorway.

20. The combination, with a car-body having a doorway, of a door therefor; a pair of hangers shiftable supported on said body; a pair of double cranks connecting each of said hangers with said door; and means for actuating said cranks, thereby to move the door into position to be shifted away from the doorway.

21. The combination, with a car-body having a doorway, of a door fitting therein flush with the car-wall; one or more carriers embodying crank mechanism for supporting said door on said body; means for actuating said crank mechanism to move the door into position to be shifted away from the doorway; and flanged brackets having beveled inner faces disposed in position to cooperate directly with the bottom of the door to maintain the same flush with the car-wall and to support the same when the crank mechanism is operated to move the door away from its closed position.

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