

No. 769,687.

PATENTED SEPT. 13, 1904.

J. R. CARMER.  
OPENING AND CLOSING MECHANISM FOR CAR DOORS.

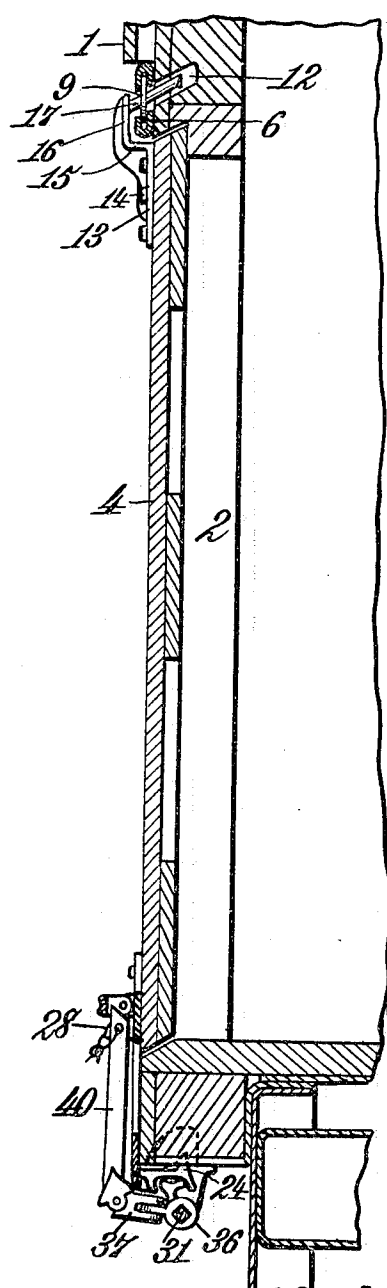
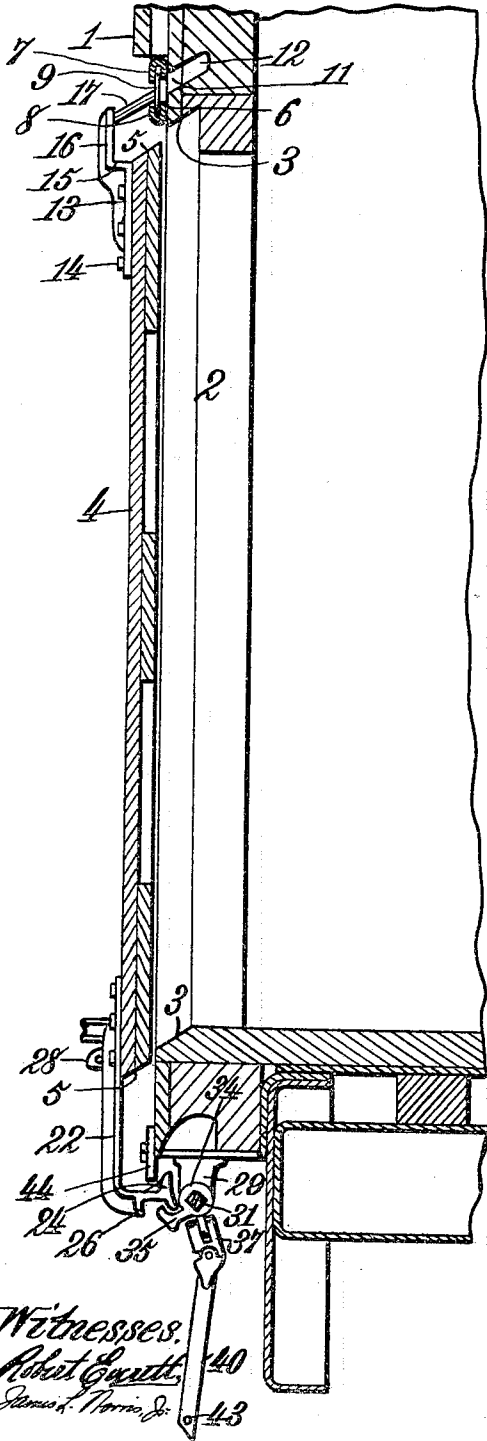
APPLICATION FILED NOV. 24, 1903.

NO MODEL.

2 SHEETS—SHEET 1.

*Fig. 1.*

*Fig. 2.*



Witnesses.  
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2 SHEETS—SHEET 2.

Fig. 3.

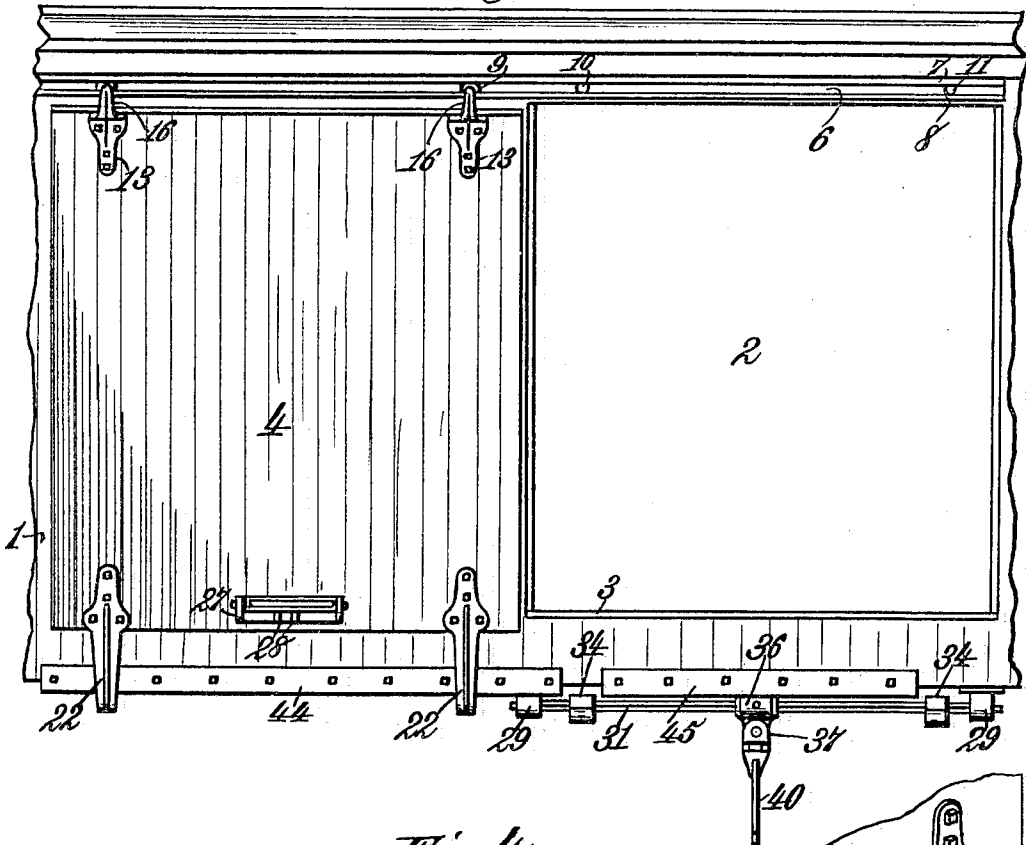


Fig. 4.

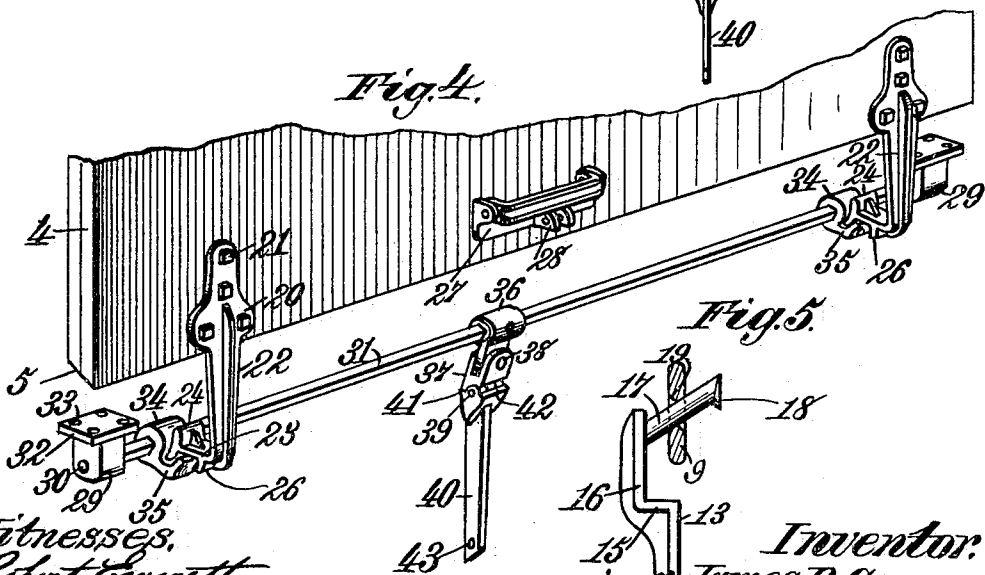
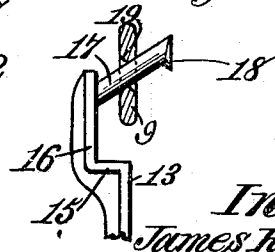


Fig. 5.



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# UNITED STATES PATENT OFFICE.

JAMES R. CARMER, OF WASHINGTON, DISTRICT OF COLUMBIA.

## OPENING AND CLOSING MECHANISM FOR CAR-DOORS.

SPECIFICATION forming part of Letters Patent No. 769,637, dated September 13, 1904.

Application filed November 24, 1903. Serial No. 182,507. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES R. CARMER, a citizen of the United States, residing at Washington, in the District of Columbia, have invented new and useful Improvements in Opening and Closing Mechanism for Car-Doors, of which the following is a specification.

This invention relates to certain new and useful improvements in opening and closing mechanism for car-doors designed especially for use in connection with freight-cars; and the objects thereof are to provide certain new and novel means for supporting and guiding a door whereby when closed it occupies a position flush with the side of the car or with the outer surfaces of the battens secured to the side of the car, to provide new and novel means for securing a door in the door-opening whereby an approximately air-tight joint is formed, to provide a new and novel means whereby the door can be removed from the door-opening, and to provide new and novel means whereby the dismantling of the door when closed is prevented.

The invention further aims to construct an opening and closing mechanism for car-doors which shall be simple in construction, strong, durable, efficient in its use, readily set up, and comparatively inexpensive to manufacture.

With the foregoing and other objects in view the invention consists of the novel combination and arrangement of parts hereinafter more specifically described, illustrated in the accompanying drawings, and particularly pointed out in the claims hereunto appended.

In describing the invention in detail reference is had to the accompanying drawings, forming a part of this specification, wherein like reference characters denote corresponding parts throughout the several views, and in which—

Figure 1 is a section taken through the car-door opening, showing the door at the front of the opening. Fig. 2 is a similar view showing the door within the opening. Fig. 3 is a side elevation of a portion of the car, showing the door shifted from in front of the opening. Fig. 4 is a perspective view of a portion of the door and the opening and closing mechanism therefor. Fig. 5 is a side elevation of one of

the hangers, showing the inclined trunnion upon which is mounted a shifting sheave or pulley.

Referring to the drawings by reference characters, 1 denotes the side of a car provided with a door-opening 2, having its wall beveled, as at 3, and 4 denotes the door having its edges beveled, as at 5. Secured to the outer face of the side 1 of the car, near the top thereof and over the opening 2, as well as arranged at and above one side of said opening, is a runway or track 6, formed of a strip of suitable material bent so as to have upper and lower flanges 7 8, and within the track 6 are adapted to operate the shifting-rollers or track-wheels 9, the latter being retained within the runway or track 6 through the intervention of the flanges 7 and 8. The runway or track 6 above the door-opening 2 is formed with a pair of openings 10 11, arranged a suitable distance apart and each of which registers with an inclined recess 12 formed in the side 1 of the car, near the top thereof. The function of the openings 10 and 11 and recess 12 will be hereinafter referred to.

The car-door 4 is suspended from the runway or track 6 through the medium of a pair of hangers carrying trunnions for the shifting-rollers or track-wheels 9. Each of the hangers consists of a plate 13, secured to the top of the door 4 a suitable distance apart by means of holdfast devices 14. The upper end of the plate 13 extends at right angles, as at 15, and terminates in a vertically-extending arm 16, which at its upper end terminates in an inwardly and upwardly inclined trunnion 17, having the free end thereof enlarged, as at 18. Each of the trunnions 17 carries one of the shifting-rollers or track-wheels 9, and the wall of the opening in the rollers or track-wheels 9, through which the trunnions 17 extend, is constructed substantially V-shaped in cross-section, as at 19. By such a construction the proper bearing by the trunnions is given the rollers or wheels. The enlarged end 18 of the trunnion 17 is beveled, so as to fit one half of the wall of the opening in the rollers or wheels, and the other half of the opening of the rollers or wheels engages its respective trunnion when the sheave or pul-

ley is rotated. This will be evident owing to the construction and arrangement of the trunnions and the V-shaped cross-section of the walls of the openings in the rollers or wheels.

5 Secured to the lower end of the door 4 is a pair of combined elevating and retaining arms, each of which consists of a plate 20, secured to the door by any suitable holdfast devices, as at 21, and the said plate 20 has depending therefrom an elongated projection 22, having its lower end bent at right angles, as at 23, and terminating in vertically-extending members 24. The lower face of the right-angular portion of the elongated projection 22 is provided with a depending lug 26, the function of which will be hereinafter referred to.

15 Attached to the outer face of the door 4, near the bottom thereof, is a bracket 27, forming a handle and which is provided with a pair of apertured lugs 28, the function of which will be hereinafter referred to.

20 Secured to the bottom of the car at a point below the opening 2 is a pair of bearing-brackets 29, which receive the cylindrical ends 25 30 of the elongated rocking bar 31, which, preferably, is square in cross-section. The brackets 29 are each formed with a rectangular plate 32, having openings 33 to receive holdfast devices for securing the brackets 29 in position to the bottom of the car. The rocking bar 31 carries a pair of sleeves 34, each provided with a substantially L-shaped protuberance 35. These protuberances 35 when in their normal position project outwardly from the bar 31. The outer portions of the protuberances 35 have their inner faces beveled, and the protuberances 35 act as a support for the vertically-extending member 24 when the combined elevating and retaining arms are in their normal position—that is to say, when the protuberances 35 are supporting the members 24. The protuberances 35 are also adapted to elevate and lower the elevating and retaining arms. The lug 26 is adapted to be engaged by the outer portion of the protuberances 35 to assist in removing the door from its opening, and the lower portion of the member 24 is adapted to be engaged by the outer portion of the protuberances 35 to assist in returning the door into the opening 2. The first operation is caused when the bar 31 is rocked in one direction and the second operation when the bar 31 is rocked in an opposite direction. The manner in which the bar 31 is rocked will now be referred to.

55 Secured upon the bar 31, approximately centrally thereof, is a sleeve 36, having a link or other suitable means pivoted thereto, as at 38, and to the said link is pivoted, as at 39, the lever 40. The pivot 38 extends in an opposite direction to that of the pivot 39, and the handle 40 at its upper end is provided with the shoulders 41 42. The link 37 is so constructed that the shoulders 41 and 42 will engage therewith to arrest, respectively, the up-

ward and outward and downward and inward movement of the handle 40; but the link 37 has its outer portion cut away, so that a greater range of movement can be had for the lever 40 when it is moved upwardly and outwardly than when the lever 40 is moved inwardly. The lower end of the lever 40 is provided with an opening 43, and when the lever is moved to its inoperative position the end thereof is seated between the apertured lugs 28 of the bracket 27, and a seal or other suitable device is passed through the apertured lugs 28 and opening 42, so as to connect the lever 40 to the bracket 27. The construction of the forward part of the link 37, so as to permit of a greater range of movement for the lever 40 when swung outwardly and upwardly, permits of the end of the lever being seated between the lugs 28, and when in such position it will extend in a vertical manner. The function of the pivot 38 enables the lever to be moved to between the lugs 28 if it should be necessary—that is say, if the lever when moved to its inoperative position should through some cause or other not have its end enter between the lugs 28 it can move on the pivot 38, so the end of the lever can be seated between the lugs 28. It will be evident that when the lever is moved toward the lugs 28 the bar 31 will be rocked, and the outer portion of the protuberances 35 will engage the lower portion of the member 24, and the protuberances 35 will lift the door, and the outer portion of the protuberances 35 will engage with the lower portion of the member 24 and cause the door 4 to enter the opening 2. When the lever is swung in an opposite direction, the outer portion of the protuberances 35 will engage the lugs 26 and move the door 4 from the opening 2. The hangers will then suspend the door away from the side of the car, and the door can be shifted from the front of the opening by simply shoving it to one side. This will be evident owing to the manner of suspending the door in connection with the rollers or track-wheels 9.

To provide for the prevention of the swinging out of the lower portion of the door when it is shifted from in front of the car-door opening, the lower portion of the side 1 of the car is provided with a pair of arresting-plates 44 45. The plate 44 has a portion of one end arranged below the opening 2, and the plate 45 is entirely arranged below the opening 2 and has one end removed a suitable distance from the end of the plate 44. When the door 4 is removed and lowered from the opening 2 and moved to one side from the opening 2, the upper portion of the member 24 extends back of the plate 44. Consequently if the door were swung outwardly the upper portion of the member 24 would engage with the plate 44 and the movement of the door would be arrested. The plate 45 also arrests outward movement of the door 4 when the operator

begins to shift the door away from the opening 2. The plate 45 does not extend the entire length of the opening 2, and consequently does not arrest the operation of one of the combined elevating and retaining arms, the latter when in its normal position being arranged adjacent to one end of the plate 45. The plate 45, as before stated, has one end removed a suitable distance from the end of the plate 44, and this intervening space between the adjacent ends of the plates 44 45 permits of the operation of the other combined elevating and retaining arm, the latter in its normal position being arranged between the ends of the plates 44 45.

The elongated trunnions 17 of the hangers not only act as a bearing for the rollers or wheels 9, but also act as a guide for the car-door 4 when the latter is swung into the opening 2. The length of the trunnions 17 is such that when the door 4 is swung into the opening 2 the trunnions will not prevent the door from being moved to a flush position. When the door is shifted from one side of the opening to the front thereof, its movement will be arrested by a suitable stop secured to the side of the car, and the enlarged ends of the trunnions 17 will then be at the front of the openings 10 and 11, and when the door is elevated and swung into the opening 2 the trunnions 17 will pass through the openings 10 and 11 and into the recesses 12, the latter being of such depth as to receive the trunnions 17, so that the door when swung into the opening 2 will be flush with the side of the car. The bottom of the side of the car is suitably cut away to permit of the operation of the various parts of the mechanism which is suspended below the side of the car. The inclined wall of the car-door opening 2, as well as the beveled edges of the door, permits of the ready entering of the door and also causes a snug fit when the door is swung to its closing position.

From the construction hereinbefore described, and illustrated in the accompanying drawings, it will be evident that an opening and closing mechanism for car-doors is set up by which the door can be swung to opening and closing position very readily, that when swung to its closing position the beveled edges of the door and beveled edges of the door-opening will cause the door to enter the opening very readily, and when in the opening and the lever secured to the apertured lugs 28 the outer face of the door will be flush with the outer face of the side of the car, and it will, furthermore, be evident that owing to the construction and arrangement of the shifting means the door can be readily swung from its closed position to an open position free of the side of the car and when in such position can be shifted from the front of the car-door opening and when in its shifted position pre-

vented from swinging outwardly owing to the providing of the arresting-plates 44 45, which are engaged by the upper part of the vertically-extending member if the door is swung outwardly at its bottom, so that said swinging movement will be arrested, and it is thought the many advantages of my new and improved opening and closing mechanism for car-doors can be readily understood from the foregoing description, taken in connection with the accompanying drawings, and it will, furthermore, be evident that changes, variations, and modifications can be resorted to without departing from the spirit of my invention or sacrificing any of its advantages, and I therefore do not wish to restrict myself to the details of construction hereinbefore described and set forth in the annexed drawings, but reserve the right to make such changes, variations, and modifications as come properly within the scope of the protection prayed.

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

1. In a car-door opening and closing mechanism, a pair of shiftable hanger devices for the door, each of said devices consisting of a plate carrying an inwardly and an outwardly extending inclined door-supporting trunnion and a track-wheel carried by the trunnion, combined with a track for the wheels, and an elevating mechanism for the door.

2. In a car-door opening and closing mechanism, a pair of shiftable hanger devices for the door, each of said devices consisting of a plate carrying an inwardly and an outwardly extending inclined door-supporting trunnion having an enlarged free end and a track-wheel carried by the trunnion, combined with a track for the wheels, and an elevating mechanism for the door.

3. In a car-door opening and closing mechanism, a pair of shiftable hanger devices for the door, each of said devices consisting of a plate carrying an inwardly and an outwardly extending inclined door-supporting trunnion and a track-wheel mounted upon the trunnion, said track-wheel having the walls of its opening **V**-shaped in cross-section, combined with a track for the wheels, and an elevating device for the door.

4. In a car-door opening and closing mechanism, a pair of shiftable hanger devices for the door, each of said devices consisting of a plate carrying an inwardly and an outwardly extending inclined door-supporting trunnion having an enlarged free end and a track-wheel mounted upon the trunnion, said track-wheel having the walls of its opening **V**-shaped in cross-section, combined with a track for the wheels, and an elevating device for the door.

5. In a car-door opening and closing mechanism, shifting track-wheels for the door, a

track for the wheels, combined with door-hangers having inclined bearing devices for the wheels.

6. In a car-door opening and closing mechanism, shifting track-wheels for the door, a track for the wheels, in combination with door-hangers having inclined trunnions for the wheels.

7. In a car-door opening and closing mechanism, shifting track-wheels for the door, a track for the wheels in combination with door-hangers having inclined trunnions for the wheels, said trunnions further provided with an enlarged free end for retaining the wheels thereon.

8. In a car-door opening and closing mechanism, the combination with a car having a door-opening, a door for said opening, and a pair of inclined recesses, of combined shifting and hanging devices connected with the upper portion of the door and adapted to engage in said recesses when the door is closed and free of said recesses when the door is out of its opening, combined elevating and retaining arms connected to and projecting below the lower portion of the door, means beneath the bottom of the car for elevating and lowering said arms causing thereby the swinging in and the swinging out of the door from its opening, and arresting-plates secured to the car-sill and projecting below the same and adapted to arrest the outward movement of said arms.

9. In a car-door opening and closing mechanism, the combination with a car having a door-opening, a door for said opening, and a pair of inclined recesses, of combined shifting and hanging devices connected with the upper portion of the door and adapted to engage in said recesses when the door is in its opening and to be free of said recesses when the door is out of its opening, elevating-arms connected to and projecting below the lower portion of the door, a rocking bar arranged below the bottom of the car, a pair of sleeves carried thereby and provided with protuberances adapted to engage said arms for operating them, a lever carried by the bar and adapted when operated to rock the bar, imparting movement to said protuberances, and plates secured to the sill of the car and projecting below the same and adapted to arrest the outward movement of said arm.

10. In a car-door opening and closing mechanism, the combination with the side wall of a car having a door-opening, a door for said opening and further provided with a pair of inclined recesses arranged above the opening, of a track secured to said side wall and provided with openings registering with said recesses, shifting-wheels operating in said track, hangers attached to the door and having in-

clined trunnions for said wheels, said trunnions adapted to extend through the openings in the track and be seated in said recesses when the door is closed and to be shifted out of said recesses and track-openings when the door is clear of the door-opening, a pair of combined elevating and retaining arms carried by the door and provided with a vertically-extending member and a depending lug, a rocking bar suspended below the side wall of the car, sleeves carried by said bar and provided with protuberances adapted when the bar is rocked to engage said member and lug for elevating and lowering said arm, a lever carried by the bar for operating it, and a pair of arresting-plates for said arm adapted to be engaged by said vertically-extending members to prevent the swinging out of the door.

11. A car-door opening and closing mechanism, comprising a track, shifting-wheels operating in said track, hangers adapted to be attached to a door and provided with inclined trunnions for said wheels, a pair of combined elevating and retaining arms adapted to be carried by the door and having a vertically-extending member and a depending lug, a rocking bar supported by the car, sleeves carried by the bar and provided with protuberances adapted when the bar is rocked to engage said member and lug for elevating and lowering said arms, a lever carried by said bar for operating it, and arresting means for said arm adapted to be engaged by said vertically-extending member.

12. In a car-door opening and closing mechanism, the combination with a door and its opening, said door having beveled edges and the walls of said opening being correspondingly beveled, of a track, shifting-wheels carried thereby, hangers secured to the door and provided with inclined trunnions for said wheels, a pair of combined elevating and retaining arms carried by the door and provided with a vertically-extending member and a lug, a rocking bar, suitable supporting means therefor, sleeves carried by the bar and provided with protuberances, said protuberances adapted to engage said member and lug for elevating and lowering said arms, a lever carried by the bar and adapted to operate it causing thereby the rocking thereof and arresting-plates adapted to be engaged by said vertically-extending member to prevent swinging out of the door.

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

JAMES R. CARMER.

Witnesses:  
JAMES L. NORRIS, Jr.,  
GEO. W. REA.