

No. 685,376.

Patented Oct. 29, 1901.

S. J. JOHNSON.

CAR DOOR.

(Application filed Sept. 13, 1900.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

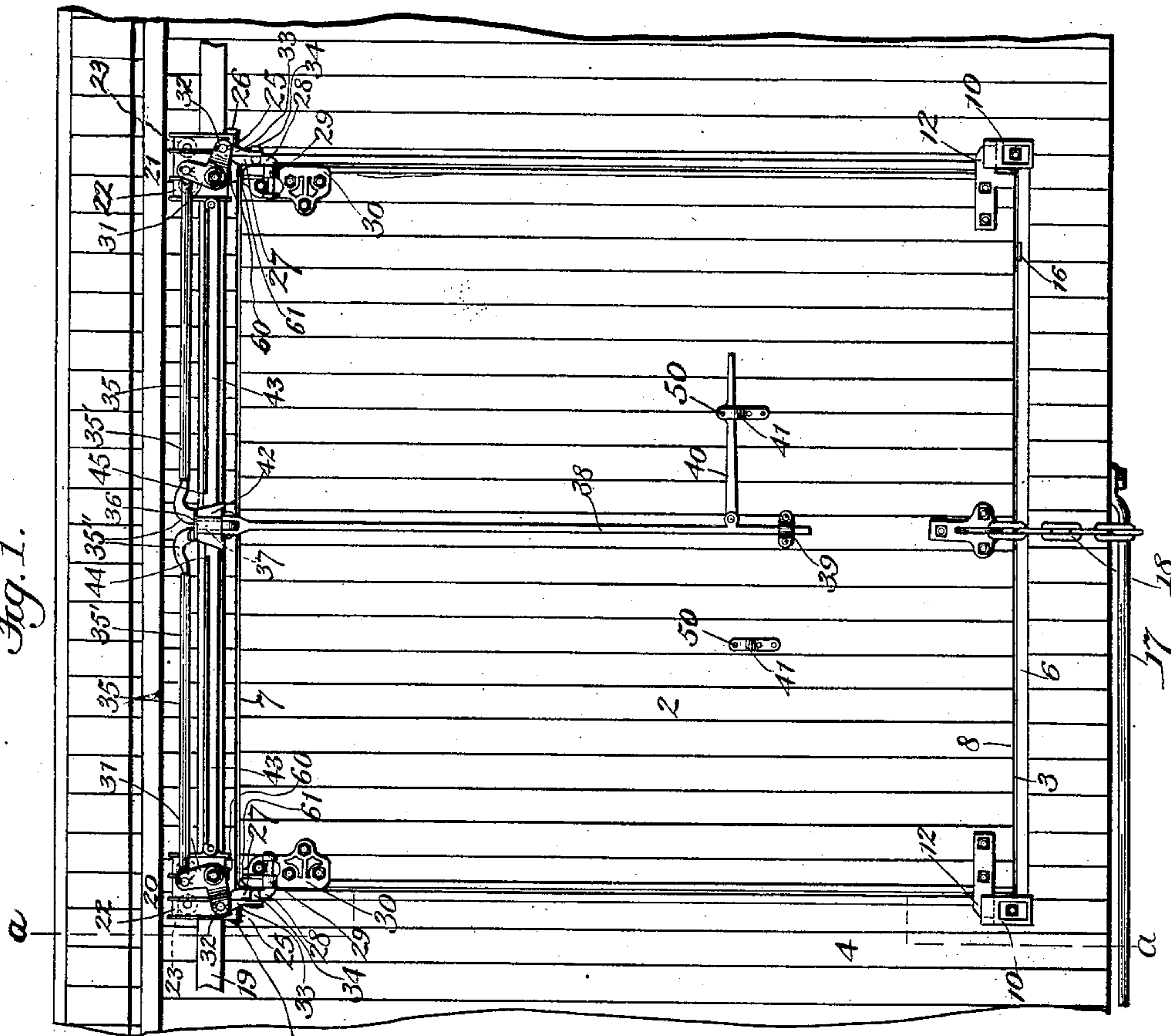


Fig. 2.

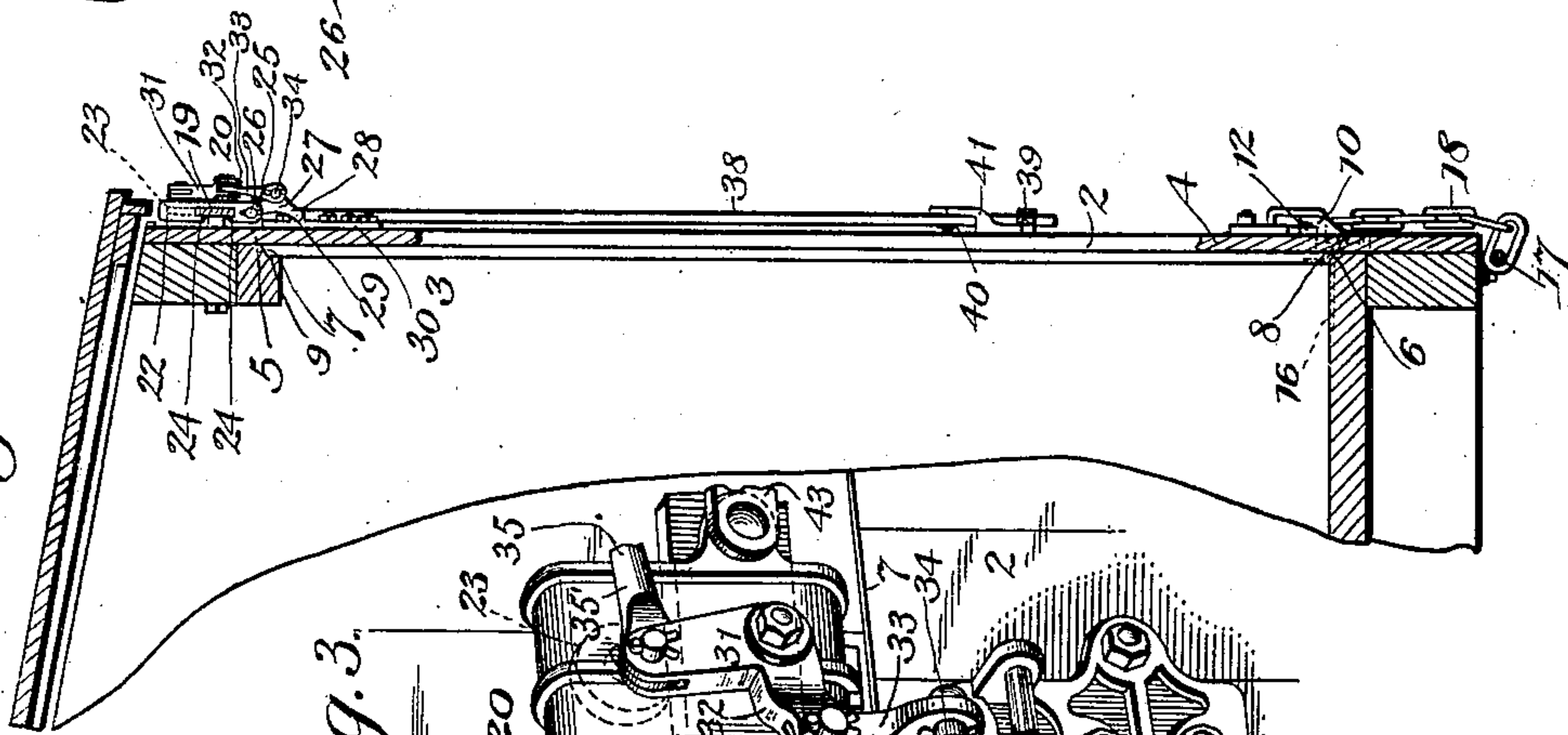
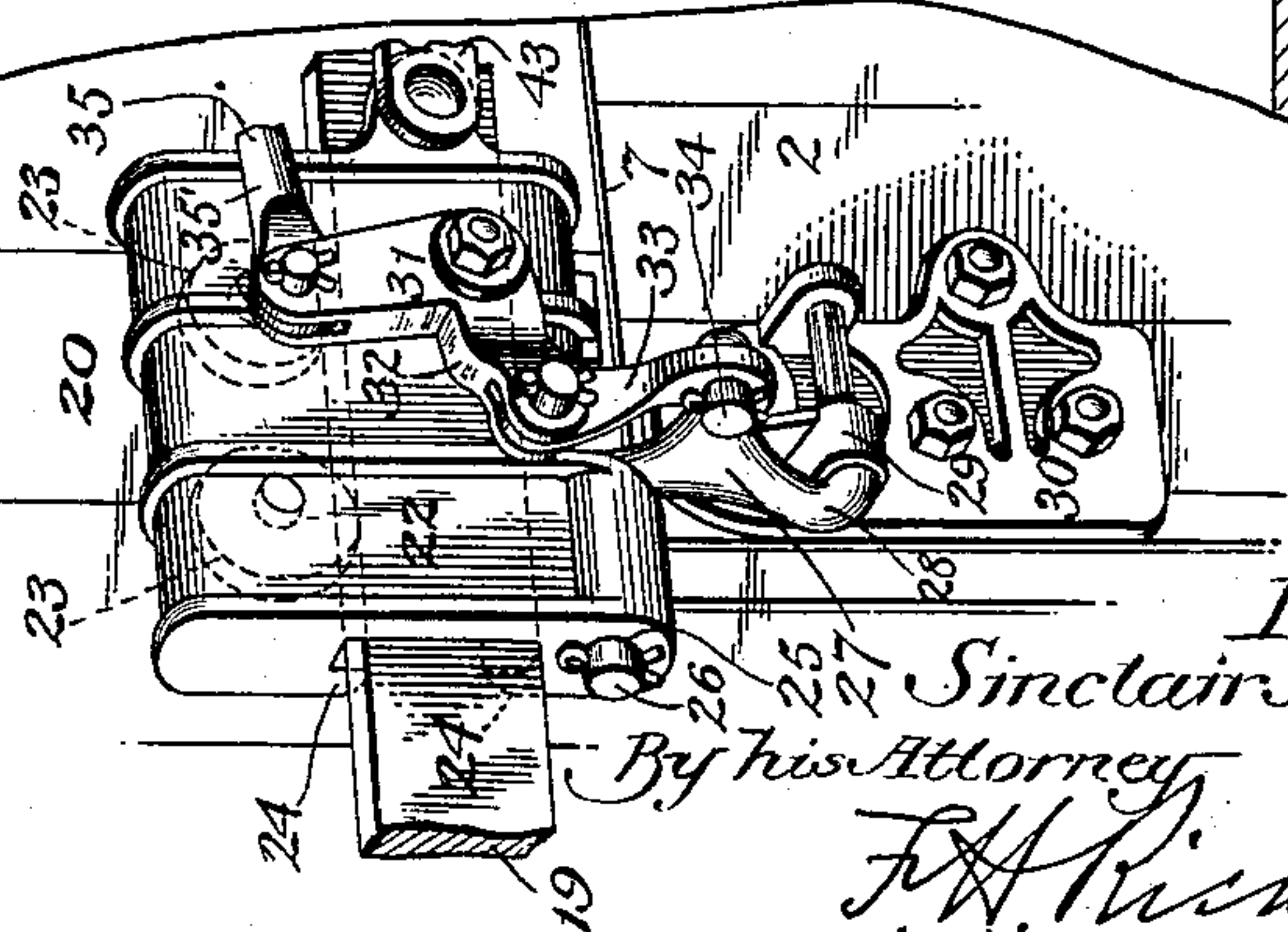


Fig. 3.



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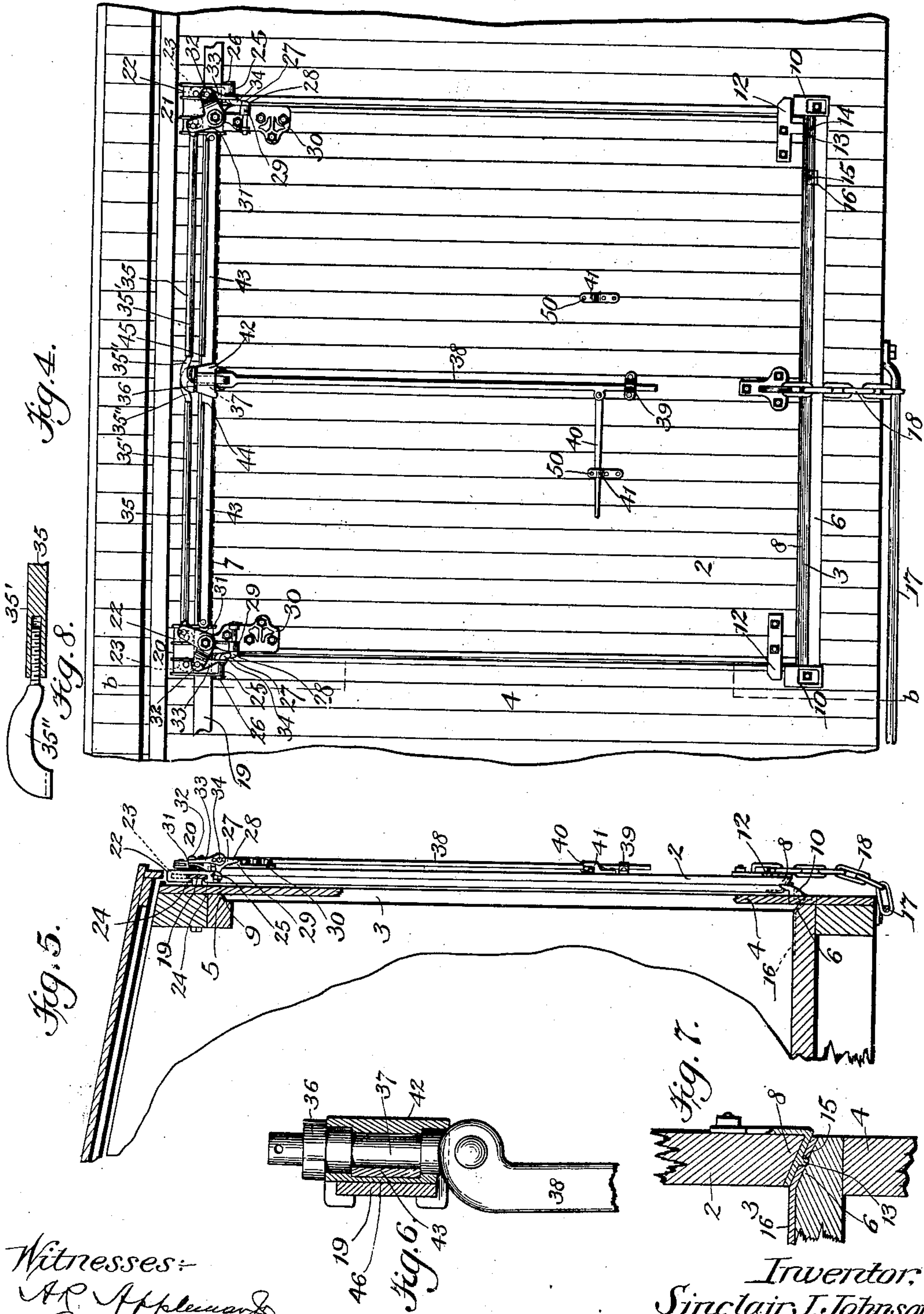
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2 Sheets—Sheet 2.



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UNITED STATES PATENT OFFICE.

SINCLAIR J. JOHNSON, OF NUTLEY, NEW JERSEY.

CAR-DOOR.

SPECIFICATION forming part of Letters Patent No. 685,376, dated October 29, 1901.

Application filed September 13, 1900. Serial No. 29,879. (No model.)

To all whom it may concern:

Be it known that I, SINCLAIR JOSEPH 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 Car-Doors, of which the following is a specification.

This invention relates to doors, especially to that class of doors adapted for use in freight-cars, the object of the invention being to provide an improved car-door which in its closed position may be flush with the door-casing or wall of the car-body and which can be moved into its open position with facility and with comparatively little labor, the present organization being an improvement in part upon the car-doors recently patented by me.

In the drawings accompanying and forming part of this specification, Figure 1 is a view of part of a car-body, showing this improved door in position flush with the door-casing or wall thereof. Fig. 2 is a sectional view thereof, taken in line *a a*, Fig. 1. Fig. 3 is a perspective view of the means located at one corner of the door for supporting the same on the car-body. Fig. 4 is a view similar to Fig. 1, showing the door shifted from its closed position into position to be moved away from the doorway. Fig. 5 is a sectional view taken in line *b b*, Fig. 4. Fig. 6 is a detail view of the equalizing or compensating means connecting the rotary actuator with the connecting-rods of the crank mechanism. Fig. 7 is a cross-sectional view of a portion of the car body and door, showing the means for locating the door in a partly-open position; and Fig. 8 is a detail view of one of the connecting-rods.

Similar characters of reference indicate corresponding parts throughout the several views.

The present organization is an improvement upon the constructions recently patented by me, Nos. 652,931, 652,932, and 652,933, dated July 3, 1900, and it is designed to provide a car-door which in its closed position will be flush with the door-casing or wall and which can be moved outwardly and upwardly into position to be shifted away from the door-opening, the supporting mechanism therefor embodying crank mechanism and the operating mechanism embodying a rock-shaft actuator for actuating said crank mechanism.

In the organization herein shown and de-

scribed and which may be its preferred form thereof, if desired, the door 2 may comprise the usual structure ordinarily used in freight-cars, and, in fact, the supporting and actuating mechanism is such that it can be readily assembled and applied to doors as ordinarily constructed and in present use. The door is shown of a size completely to close the doorway 3 and fit flush with the wall or casing of the car-body 4, and for this purpose the door-lintel 5 and door-sill 6 are each shown beveled, the upper and lower edges 7 and 8 of the door being correspondingly beveled. The door-lintel is also so formed that a part thereof acts as a stop 9 to limit the inward movement of the door. In the present instance the door-lintel 5 and door-sill 6 are inclined or beveled in the same direction. It is to be understood, however, that the beveling of the sill and the bottom of the door is not necessary for the proper working of such door.

For supporting the bottom of the door in its proper closed position the car-body is shown provided with a pair of brackets 10, secured to the body, one adjacent to each lower corner of the doorway, while the door is provided with a pair of laterally or sidewise extending members 12, cooperating with such brackets when the door is in its closed position to prevent the outward swinging of the door.

In freight cars it is frequently necessary to leave the door part way open for the admission of air to the interior of the car, and for this purpose the door is provided at its bottom edge with a projection 13, extending into an opening 14, located in the sill when the door is closed, and into an opening 15, formed in a plate 16, secured to such sill when the door is partly open. Any desired number of these plates may be provided, located any desired distance apart. In the present instance only one of such plates is shown, and in practice this may be located about six inches from one of the sides of the doorway. In the present instance the projection is shown formed as a part of one of the laterally-extending arms 12, secured to the door. When the door is moved outwardly and upwardly and then sidewise, that corner of the door which carries the projection can be then moved inwardly until such projection is in position to enter the opening in the sill, whereupon on the operation of the crank mechanism, here-

inafter described, this side of the door will be lowered to permit the entrance of such projection into the opening, whereupon it will be maintained in such position.

5 To guide the door during sidewise movement away from the doorway and to prevent the swinging of the bottom of the door, a bar 17 is secured to the under side of the car or at any other suitable place, while a flexible
10 device, such as a cable or chain 18, is secured to the door, one link of which is shiftable on such bar.

Secured to the car-body above the door is a track 19 for supporting the door-carriers.
15 This track may be of such a length that the door may be shifted thereon away from either side of the doorway, the mechanism being organized to permit this, or such track may carry additional doors, if found desirable.

20 In the form thereof shown the supporting means for the door comprises a pair of carriers 20 and 21, each comprising a hanger 22, having suitable means, such as rolls 23, for engaging the track. These hangers are so
25 constructed that they will not be thrown from the track during the shifting of the door, and for this purpose each hanger is provided with downwardly and upwardly extending flanges 24, overlapping the inner side of the track,
30 whereby the hangers are maintained in close engagement with the track, so as to prevent play thereof. In the present instance one part of each hanger is located beyond the side edge of the door and preferably projects
35 below the other part of such hanger and is provided with a bearing or opening 25 for the reception of one arm 26 of the door-supporting crank 27, the opposite arm 28 of which is located in a bearing 29, carried by a plate
40 30, bolted to the door. Pivotaly secured to each of these hangers is a bell-crank 31, one arm 32 of which is connected by a link 33 with a supplemental arm 34 of the supporting-crank. The other arm of each bell-
45 crank is pivotaly secured to a connector 35. The inner ends of these connectors are bolted to a rotatable plate 36, having a depending spindle 37, pivoted to the end of a rock-shaft actuator 38, shown with its axis substan-
50 tially parallel with the plane of the door, the lower end of which is secured to the door by a keeper 39. This pivotal connection of the actuator and spindle permits the outward movement of the door. This rock-shaft ac-
55 tuator 38 is rocked by means of a suitable swinging arm or lever 40, pivoted thereto, maintained in its proper position by a pair of brackets or keepers 41, bolted to the door. For maintaining the rock-shaft actuator in
60 proper position to operate the connecting-rods, so as to shift the ends thereof into overlapping engagement on the rotation of the plate 36, a supporting device 42, effective also as a compensating or equalizing means to
65 prevent breakage and straining of the crank mechanisms, is provided. This supporting device comprises a sliding member, through

which the spindle 37 of the rotary plate extends, being mounted for sliding movement on the hanger-supporting track, the rear sides
70 of such device overlapping such track. In front of the track the hangers are connected by a brace or track 43, shown as an angle-bar, which brace is provided with a pair of stop-faces 44 and 45, one located at each side
75 of such supporting device 42. The supporting device also slides upon this brace intermediate the stop-faces. Intermediate this brace and the track a suitable clamping device 46 is maintained in engagement with en-
80 larged portions of the spindle 37 for holding the same in its proper working position.

It may be desired at times to lengthen or shorten the connecting-rods 35, and for this purpose each connecting-rod is shown com-
85 prising a pair of members, one member 35' having an internally-threaded end for the reception of a threaded shank of the other member 35".

In use when it is desired to open the door
90 the lever 40 is swung upwardly away from its bracket 41, Fig. 1, whereupon the actuator 38 can be rocked to rotate the plate 36, to which the inner ends of the connecting-rods 35 are bolted, whereupon a pull is exerted on
95 each of said connecting-rods, throwing the inner ends thereof into overlapping position and actuating the bell-cranks to operate the supporting-cranks, and thereby shift the door
100 upwardly and outwardly, simultaneously with which the bottom of the door may be pulled out. The door can then be moved laterally on its track away from the doorway, the bottom of the door being guided by the
105 chain, hereinbefore described, after which the door may be lowered by rocking the actuator, so that such door will rest against the side of the car.

In operating the actuator should the crank mechanism at one side of the door stick or
110 otherwise fail to operate it will be seen that the compensating or equalizing device 42 will be shifted toward such non-operative mechanism until it comes into engagement with one of the stop-faces of the brace 43, where-
115 upon such crank mechanism will be operated. This organization thus provides equalizing means for preventing the breakage or straining of one crank mechanism during the oper-
120 ation of the other, while also providing a multiplication of power for the crank mechanism should the same not operate in the first instance.

Each of the brackets 41, provided for the reception of swinging lever 40, may be fur-
125 nished with an opening 50 for the reception of a seal, thereby to lock such lever, and consequently the operating mechanism, against manipulation.

In conclusion I desire to state that this im-
130 provement may be used in all kinds of freight and box cars—such as refrigerator-cars, &c.—and can also be used in connection with structures other than freight-cars, if desired, so

that the term "car-body" as used herein and in the claims is not to be construed as a limitation to structures of that class.

By locating the supporting mechanism 5 above the door all damage thereto is avoided by the backing of wagons against the door, as would be the case were such mechanism located at the bottom or sides of the door. Moreover, when the door is supported at the 10 top and is shiftable outwardly and upwardly it is maintained closed by its own weight, the tendency of the door being to remain shut, which is not the case when the door is supported at the bottom or sides or when it is 15 movable outwardly and downwardly. Furthermore, when freight becomes displaced or has fallen against the door such door can be more readily moved outwardly and upwardly than outwardly and downwardly, since such 20 downward movement tends to increase the binding effect of the displaced freight, as the car-floor will prevent all movement of the freight in a downward direction with the door.

By organizing the mechanism so that the 25 upper end of the actuator 38 is supported above the door it is practicable to connect such actuator with the supporting-crank mechanism by connecting mechanism, which is likewise supported above or free of the 30 door, and thus free the door of a very large part of the actuating mechanism, and so decrease the weight of the door, and therefore the power necessary to operate it, thereby facilitating the shifting of such door.

By the provision of the compensating or 35 equalizing means set forth one side of the door can be lowered to permit the projection to enter the opening in the door-sill, even though the opposite side of the door is limited 40 in its movement by engaging with the car-wall.

In practice it is desirable to limit the upward movement of the door, and for this purpose I provide a pair of stops 60, shown in the 45 present instance carried one by each of the crank-hangers and in position to engage a part of the door, such as a pair of stops 61, formed on the plates 30. By this means the upward movement of the door is limited and the re- 50 turn or sagging of one side of the door also prevented. These stops may also be used to permit the proper operation of the equalizing or compensating means when it is not desirable to provide the stops 44 and 45 on the 55 brace or when desired to dispense with such brace, since it will be seen that should one of the crank mechanisms fail to operate the other side of the door will be shifted upward until the stop-faces 60 and 61 at such side en- 60 gage, whereupon the other crank mechanism will be forced to operate. When the brace-stops are provided, however, they are operative prior to the operation of the stops 60 and 61 and prevent undue strain on the door.

65 Having thus described my invention, I claim—

1. The combination, with a car-body hav-

ing a doorway and a door, of means supporting said door on said body for movement up- 70 wardly and outwardly; and a rock-shaft located substantially vertically of the door for shifting said door upwardly and outwardly.

2. The combination, with a car-body having a doorway and a door, of crank mechanism for supporting said door on said body for 75 movement upwardly and outwardly; and a rock-shaft projecting toward the top and bottom of the door and connected with said crank mechanism for operating the same, thereby to shift the door upwardly and outwardly. 80

3. The combination, with a car-body having a doorway and a door, of crank mechanism for supporting said door on said body and 85 having its journal parts extending horizontally; and a rock-shaft projecting toward the top and bottom of the door and connected with said crank mechanism for operating the same, thereby to shift the door.

4. The combination, with a car-body having a doorway and a door, of means for sup- 90 porting said door on said body for movement in one direction; a rock-shaft projecting toward the top and bottom of the door for effecting the movement of said door, and having its direction of movement transverse to the 95 direction of movement of the door, and means connecting such rock-shaft with said supporting means and organized to transfer the motion of said shaft in a direction transverse to the direction of movement of said shaft so as 100 to shift the door in the direction of its plane.

5. The combination, with a car-body having a doorway and a door, of mechanism for supporting said door on said body; a rock- 105 shaft having its axis substantially parallel with the plane of the door; and a bell-crank connected with said supporting mechanism and rock-shaft and having its direction of movement parallel to the plane of the door.

6. The combination, with a car-body hav- 110 ing a doorway and a door, of crank mechanism for supporting said door on said body; a bell-crank connected with said crank mechanism and having its direction of movement parallel to the plane of the door; a rock-shaft 115 projecting toward the top and bottom of the door; and a connector connecting said rock-shaft and bell-crank.

7. The combination, with a car-body having a doorway and a door, of a track support- 120 ed on said body; a pair of devices mounted on said track; crank mechanism connecting said devices and door; a rock-shaft having its axis substantially parallel with the plane of the door; means located free of the door 125 for supporting one end of said rock-shaft; and a pair of connecting-rods having their outer ends connected to said crank mechanism and their inner ends connected to said rock-shaft, whereby on the rocking of said 130 shaft the crank mechanism will be operated to move the door.

8. The combination, with a car-body having a doorway and a door, of a track support-

ed on said body; a pair of hangers mounted on said track; crank mechanism connecting each of said hangers with the door; a bell-crank having its direction of movement parallel with the plane of the door for each of said crank mechanisms; a rock-shaft having its axis substantially parallel with the plane of the door; means located free of the door for supporting the upper end of said rock-shaft; and a pair of connecting-rods having their outer ends connected with said bell-cranks and their inner ends with said rock-shaft, whereby on the rocking of said shaft the crank mechanisms will be operated to move the door.

9. The combination, with a car-body having a doorway and a door, of a track secured to said body; a pair of hangers shiftable on said track; cranks connecting said door and hangers; bell-cranks mounted above the door; a pair of connectors connected with said bell-cranks; means located above the door for supporting the inner ends of said connectors whereby the door is free of the major part of the actuating mechanism; and an actuator for operating said connectors.

10. The combination, with a car-body having a doorway and a door, of a track secured to said body; devices shiftable on said track; crank mechanisms connecting said devices with said door; a pair of connectors connected with said crank mechanisms for shifting the same; means located outside of the edge of the door for supporting the inner ends of said connectors whereby the door is free of the major part of the actuating mechanism; and means for actuating said connectors thereby to actuate said crank mechanisms and shift the door into position to be moved away from the doorway.

11. The combination with a car-body having a doorway and a door, of a track carried by said body; a pair of hangers mounted on said track; a pair of cranks free of rigid connection with each other, connecting said hangers with the door, one carried by each hanger, and having their journal parts horizontally located, whereby the door is shiftable upwardly and outwardly, said pair of cranks constituting the sole connection between the hangers and the door; and means for operating said cranks to shift the door upwardly and outwardly and capable of permitting variable degree of movement of the two cranks.

12. The combination, with a car-body having a doorway and a door, of a track secured to said body; a pair of hangers mounted on said track; crank mechanism connecting each of said hangers with said door; a pair of bell-cranks, each having its direction of movement parallel to the plane of the door; a pair of adjustable connectors secured to the bell-cranks; and a rock-shaft projecting toward the top and bottom of the door and connected with said connectors, thereby to operate the crank mechanism and shift the door.

13. The combination, with a car-body hav-

ing a doorway and a door, of a plurality of means for supporting the door on said body for movement into position to be shifted away from the doorway; an actuator projecting toward the top and bottom of the door and having one end located outside the edge of the door and connected with both of said supporting means by a pair of shiftable connectors likewise located outside the edge of the door, whereby the actuator is supported from a point beyond the door, in consequence of which the door is free of the major part of such mechanism.

14. The combination, with a car-body having a doorway, of a door therefor; a track supported on said body; a pair of hangers mounted on said track; a crank mechanism connecting each of said hangers with said door; a pair of connectors connected with said crank mechanisms and with a compensating or equalizing device mounted on said track; a pair of stop-faces in position to limit the movement of said compensating device; and a rock-shaft effective to operate said connectors thereby to shift the door into position to be moved away from the doorway.

15. The combination, with a car-body having a doorway, of a track supported on said body; a door for said doorway; a pair of hangers shiftable supported on said track and connected by a brace having a pair of stop-faces; crank mechanism connecting each of said hangers with said door and embodying a bell-crank; a pair of connecting-rods secured to said bell-cranks; an actuator for said connecting-rods; and a device shiftable on said brace and track for supporting said actuator and adapted to engage said stop-faces whereby it is adapted to act as compensating or equalizing means for the crank mechanism.

16. The combination, with a car-body having a doorway and a door, of means for supporting said door on said body; a rock-shaft actuator projecting toward the top and bottom of the door for shifting said door; and a compensator or equalizer effective to prevent straining or breakage of the mechanism.

17. The combination, with a car-body having a doorway, of a track supported on said body; a door for said doorway; carriers mounted on said track and embodying supporting means connected with the door; a track connected to said carriers; a compensator or equalizer mounted on said last-mentioned track and connected with said supporting means; and an actuator connected with said compensator for shifting the door.

18. The combination, with a car-body having a doorway, of a door therefor; a track supported on said body; a pair of hangers mounted on said track; a brace connecting said hangers and provided with a pair of stop-faces; crank mechanism connecting each of said hangers with said door and embodying a bell-crank; a pair of connecting-rods secured to said bell-cranks; an actuator connected to said connecting-rods; a device shift-

able on said brace intermediate said stop-faces for supporting said actuator in position, and effective as compensating or equalizing means for the crank mechanisms; and means for locking said actuator in position.

19. The combination, with a car-body having a doorway, of a door therefor; a track supported on said body; a pair of hangers mounted on said track; a brace connecting said hangers and provided with a pair of stop-faces; crank mechanism connecting each of said hangers with said door and embodying a bell-crank; a pair of connecting-rods secured to said bell-cranks; an actuator connected to said connecting-rods; a device shiftable on said brace intermediate said stop-faces for supporting said actuator in position, and effective as compensating or equalizing means for the crank mechanisms; and means for locking said actuator in position, said means comprising a swinging lever and a keeper.

20. The combination, with a car-body having a doorway and a door, of a plurality of supporting means for the door; means for shifting the door; and a compensator or equalizer located outside of the edge of the door and effective to prevent straining and breakage of the mechanism.

21. The combination, with a car-body having a doorway and a door, of a plurality of means for supporting said door on said body; a rock-shaft actuator projecting toward the top and bottom of the door; and a sliding compensator or equalizer and effective to prevent straining and breakage of the mechanism.

22. The combination, with a car-body having a doorway and a door movable laterally relatively to such doorway, of mechanism for supporting the door on such body for movement upwardly and outwardly; an actuator for effecting such movement; and means for maintaining the door part way open, thereby to leave a space intermediate the jamb and the edge of the door, said means comprising an aperture and a projection adapted to fit therein, one carried by the body at the under side of the door at a predetermined distance from the jamb, and the other by the lower edge of the door, the projection entering the aperture when the door is moved laterally the distance between such jamb and the device carried by said body and lowered from its raised position, whereby a space is formed intermediate the jamb and the door for the admission of air into the car without entirely opening the door.

23. The combination, with a car-body having a doorway and a door, of a track supported on said body; a pair of hangers mounted on said track, each of said hangers having a stop cooperating with stops carried on the door for limiting the upward movement thereof; a brace or track supported by said hangers and having a pair of stops; crank mechanism connecting each of said hangers with said door; a device shiftable on said track or

brace and limited in its movement by the stops carried by said brace and acting as a compensator or equalizer to prevent straining or breakage of the mechanism; an actuator connected with said device; and connectors connecting said device with said crank mechanism.

24. The combination, with a car-body having a doorway, of a door therefor; a track on said body; a pair of hangers mounted on said track; crank mechanism connecting each of said hangers with said door and embodying a bell-crank; a brace connecting each of said hangers and having a pair of stop-faces; a pair of connectors secured to said bell-cranks; an actuator for shifting said connectors; a device mounted on said brace for supporting said actuator and adapted to act as compensating or equalizing means for the crank mechanism; means for locking said actuator in its adjusted position; means for supporting the bottom of the door; and means for guiding the bottom of said door on its movement away from the doorway.

25. The combination, with a car-body having a doorway, of a door therefor; a track mounted on said body; a pair of hangers mounted on said track and connected by a brace having a pair of stop-faces; crank mechanism connecting each of said hangers with said door and embodying a bell-crank; a pair of connecting-rods pivoted to said bell-cranks; an actuator for shifting said connecting-rods; a device shiftable on said brace and track for supporting said actuator and effective as compensating or equalizing means for the crank mechanisms; a swinging lever for locking said actuator in position; means for supporting the bottom of the door; means for guiding the bottom of the door during its movement away from the doorway, and comprising a bar secured to the car-body and a flexible device secured to said door and shiftable on said bar.

26. The combination with a car-body having a doorway and a door; of a track secured to said body; means shiftable on said track for supporting said door; a track located free of the door; a pair of connectors connected to said supporting means and to a device mounted on said last-named track; and means for shifting said connectors.

27. The combination with a car-body having a doorway and a door, of a track secured to said body; carriers mounted on said track and embodying crank mechanism connected to said door; a brace or track secured to said carriers; a bell-crank connected to each said crank mechanism; connectors pivoted to said bell-cranks and having their inner ends secured to a device located on said brace; and means for shifting said connectors.

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