G. I. KING.

CAR DOOR OPERATING DEVICE.

APPLICATION FILED FEB. 2, 1910.

1,067,035.

Patented July 8, 1913.

3 SHEETS—SHEET 1.

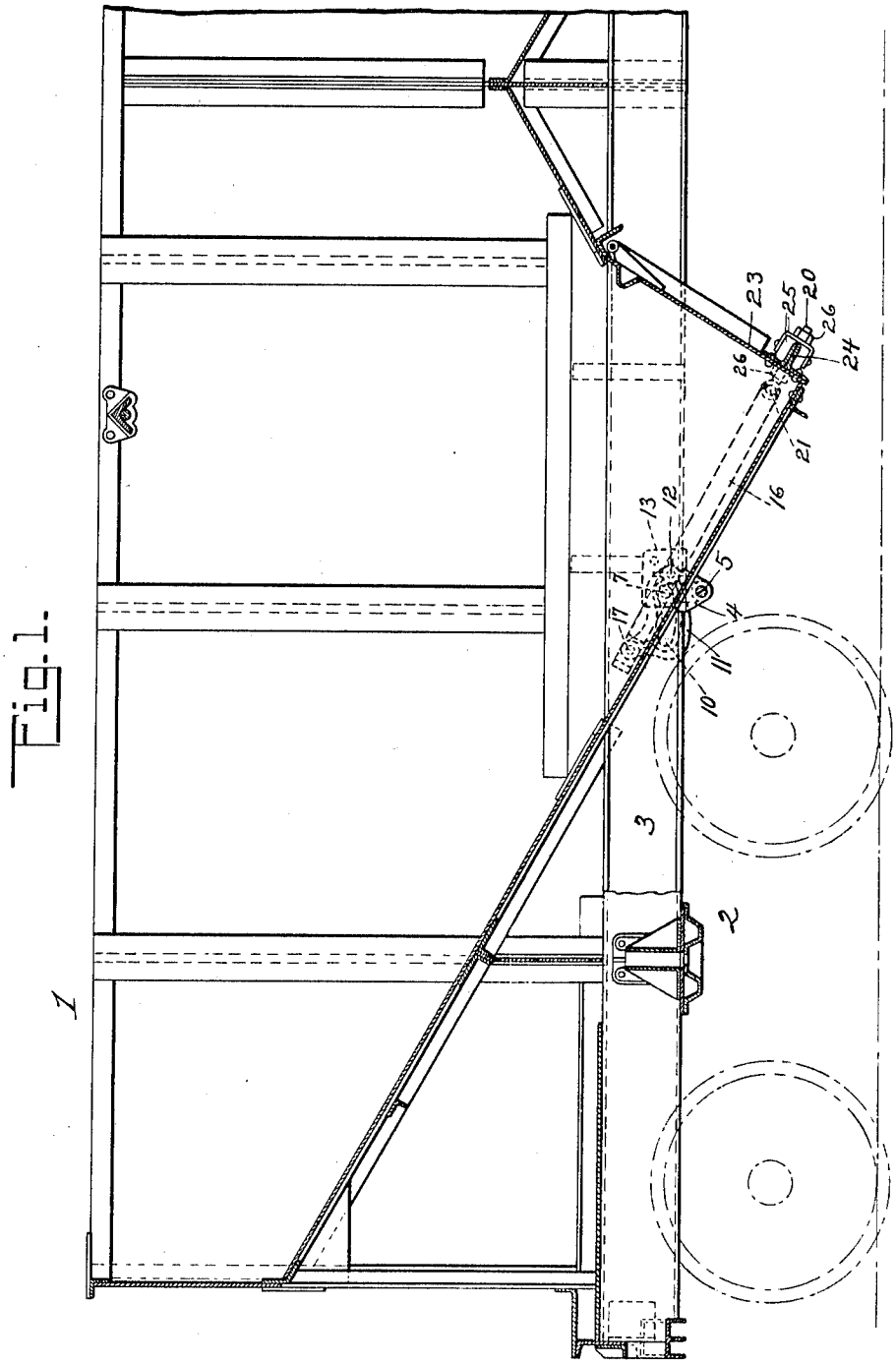


Fig. 1.

Witnesses:

L. Almquist

E. C. Webb

Inventor

George I. King

By his Attorney F. H. Gibbs

COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

G. I. KING.

CAR DOOR OPERATING DEVICE.

APPLICATION FILED FEB. 2, 1910.

1,067,035.

Patented July 8, 1913.

3 SHEETS—SHEET 2.

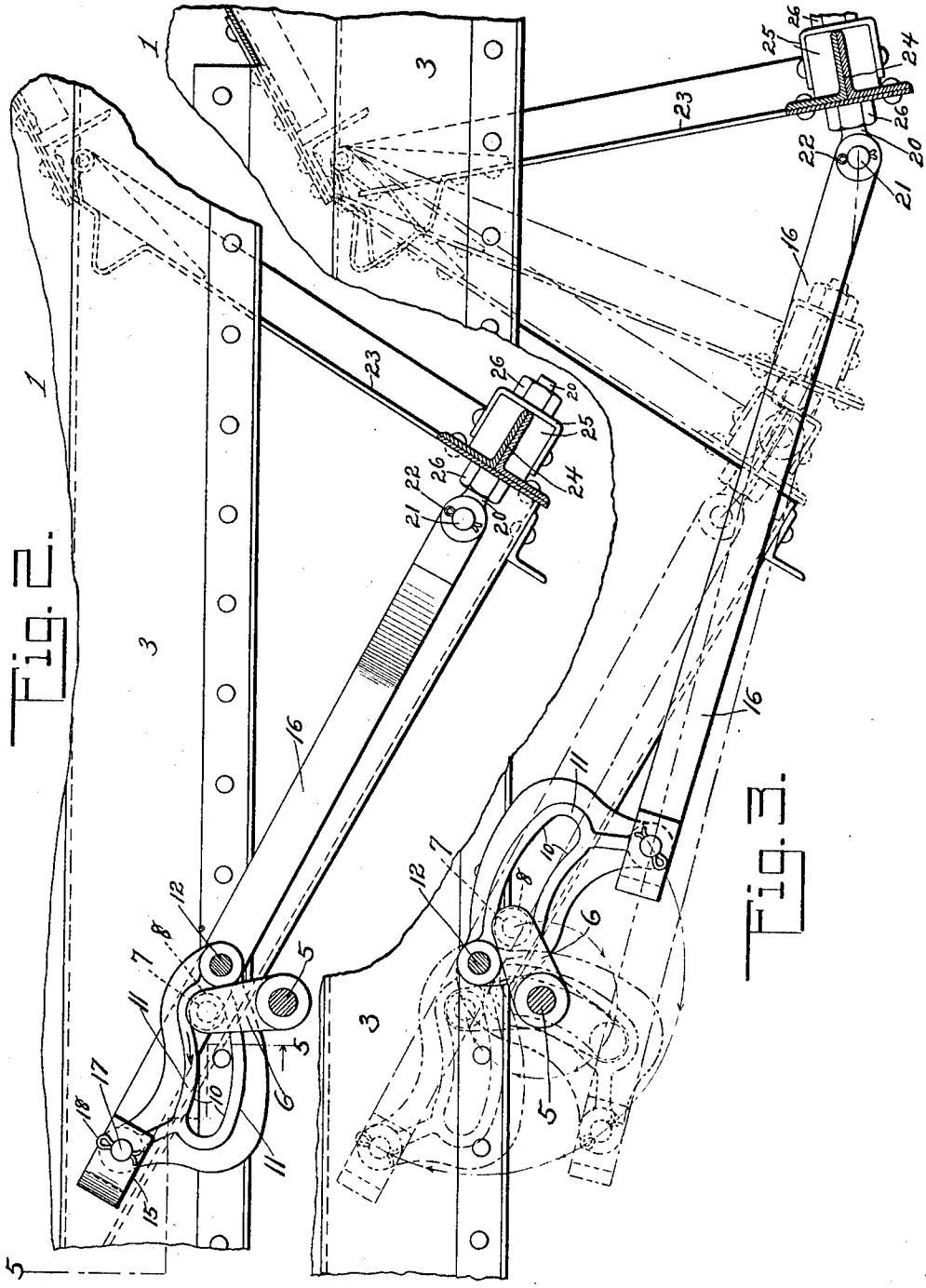


Fig. 2.

Fig. 3.

Witnesses:

L. Almquist

C. C. Webb

Inventor

George I. King

By his Attorney

J. H. Gibbs

COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

G. I. KING.

CAR DOOR OPERATING DEVICE.

APPLICATION FILED FEB. 2, 1910.

1,067,035.

Patented July 8, 1913.

3 SHEETS—SHEET 3.

Fig. 4.

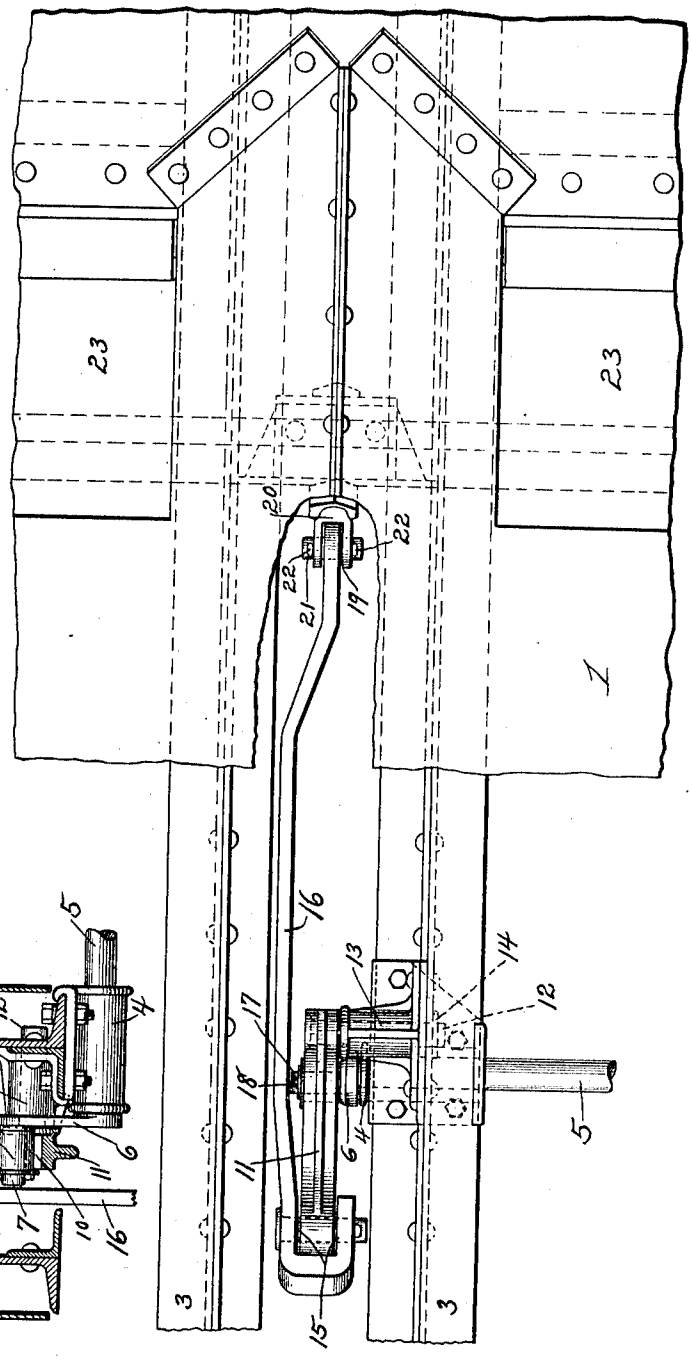
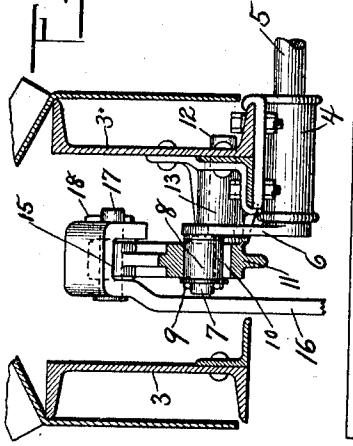


Fig. 5.



Witnesses:

L. Almquist

E. E. Webb

George I King Inventor

By his Attorney F. H. Gibbs

COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

GEORGE I. KING, OF MIDDLETOWN, PENNSYLVANIA, ASSIGNOR TO WILLIAM H. WOODIN, OF NEW YORK, N. Y.

CAR-DOOR-OPERATING DEVICE.

1,067,035. Specification of Letters Patent. Patented July 8, 1913.

Application filed February 2, 1910. Serial No. 541,479.

To all whom it may concern:

Be it known that I, GEORGE I. KING, residing at Middletown, Dauphin county, Pennsylvania, and being a citizen of the United States, have invented certain new and useful Improvements in Car-Door-Operating Devices, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and to use the same, reference being had to the accompanying drawings, which illustrate the preferred form of the invention, though it is to be understood that the invention is not limited to the exact details of construction shown and described, as it is obvious that various modifications thereof will occur to persons skilled in the art.

In said drawings: Figure 1 is a longitudinal section of one-half of a hopper car, the section being taken through the door on the near side of the car, and showing the location of the contrivance in dotted lines, behind the vertical side of the hopper and between the center sills. Fig. 2 is an enlarged section taken between the center sills and showing the device holding the doors in a locked position. Fig. 3 is a section similar to Fig. 2, but showing the contrivance in full lines holding the door opened, and the intermediate and closed positions in broken lines. Fig. 4 is a fragmentary plan view of the car, the bottom being broken away to show a full view of the invention; and Fig. 5 is a transverse section taken on the line 5—5 of Fig. 2.

Referring to the drawings, in which similar reference numerals represent corresponding parts throughout the several views, 1 is a hopper car body supported on an underframe 2 in the usual manner; and to the underside of one of the center sills 3, is securely fastened by bolts or rivets, a bearing 4, in which a shaft 5 is mounted to rotate. Secured to one end of the latter is a crank 6 whose crank-pin 7 is adapted to receive a flanged roller 8 mounted to turn thereon, and which is held in place by a split pin 9 engaging into a hole in the pin 7. The roller 8 is adapted to roll in a slot 10, formed in a link 11. One end of the latter is provided with a pivot 12, which is mounted in a bearing 13, riveted to the center sill 3 and above the bearing 4. The pivot 12 is prevented from moving endwise in its bearing 13 by a split pin 14 engaging in a hole in the outer end of the former. The opposite end of the link 11 is pivotally held in a jaw 15 formed on the upper end of a connecting rod or link 16 by a pin 17 held in place by a split pin 18. The lower end of the link 16 is pivoted in the jaw 19 of an eye-bolt 20 by a pin 21 secured thereto by split pins 22. The adjacent doors 23 are connected at their lower ends by angles 24 and braces 25, to which are fastened the eye-bolts 20 by means of nuts 26.

The operation is as follows: The door being closed and locked as shown in Fig. 2, the shaft 5 is turned by any suitable means, and swings the crank 6 about its center of rotation, causing the roller 8 to roll forward, as shown by the arrow in Fig. 2, in the slot 10, swinging the link 11 to the intermediate position shown in broken lines in Fig. 3, and partly opening the doors. From the intermediate position the crank 6 carries the roller 8 in a reverse direction in the slot 10 and swings the link 11 to the position shown in full lines, in Fig. 3, causing the connecting rod or link 16 to give the doors 23 their full opening, thereby dumping the load. To close the doors, the operation is reversed and the first half of the throw of the crank 6 returns the links 11 and 16 to their intermediate position, bringing the doors 23 almost to a closed position, as shown in dotted lines in Fig. 3. The latter half of the throw of the crank 6 carries the doors 23 the remainder of the way, gradually closing and locking the same, as shown in Fig. 2. In the latter position the doors cannot jar open, owing to the peculiar construction and arrangement of the parts of the mechanism. That is to say, when the door is closed the centers of the pins 21 and 17 are in a straight line with that of the fixed pivot 12, causing the load on the doors to pull directly through the center of the said fixed pivot; and the links 11 and 16 are held in the said position by reason of the former bearing endwise on the crank 6, through the crank pin 7 and roller 8, in the slot 10, bringing the whole weight which tends to unlock the device, in a straight line, through the centers of the crank pin 7 and fixed operating shaft 5, thereby making it

impossible to unlock the mechanism until the said operating shaft and crank are turned to the left, as previously described.

What is claimed as new is:

1. In a hopper car door operating mechanism, a pivotally mounted slotted link, a crank arm provided with means movable in the slot of said link, and a door actuating link connected directly to the first mentioned link and extending longitudinally thereof to a door.

2. In a hopper car door operating mechanism, a pivotally mounted slotted link, a crank arm engaging the slot of said link, and a door actuating link connected to a door and to the first mentioned link.

3. In a hopper car door operating mechanism, a pivotally mounted link, a door actuating link pivoted thereto and to a door, and a crank arm movable longitudinally of said first mentioned link for moving it to and from a position with its pivots in line with the connection of the second mentioned link with the door.

4. In a hopper car door operating mechanism, a pivotally mounted link, a door actuating link pivoted thereto and extending longitudinally thereof to a door, and a crank arm having means movable longitudinally of and adapted for moving the first mentioned link to and from a position with its pivots in line with the connection of the second mentioned link with the door.

5. In a door operating mechanism, a pivotally mounted slotted link, a door actuating link pivoted thereto, and means adapted to travel in said slot for moving the first-mentioned link to and from a position with the pivot of the second-mentioned link at the diametrically opposite side of the pivot of the first-mentioned link from the door to which the second-mentioned link is connected and with said pivots in line with the connection of the second-mentioned link to the door.

6. In a door operating mechanism, a pivotally mounted slotted link, a door actuating link pivoted thereto, and means adapted to travel in said slot for moving the first-mentioned link to and from a position with the pivot of the second-mentioned link at the opposite side of the pivot of the first-mentioned link from that of the door to which the second-mentioned link is connected.

7. In a door operating mechanism, a pivotally mounted slotted link, a door actuating link pivoted thereto, and a crank arm engaging said slot for moving the first-mentioned link to and from a position with the pivot of the second-mentioned link at the opposite side of the pivot of the first mentioned link from that of the door to which the second mentioned link is connected.

8. In a door operating mechanism, a pivotally mounted slotted link, a door actuating link pivoted thereto, and a crank arm engaging said slot for moving the first-mentioned link to and from a position with the pivot of the second mentioned link at the opposite side of the pivot of the first mentioned link from that of the door to which the second mentioned link is connected and with said pivots in line with the connection of the second mentioned link with the door.

9. In a door operating mechanism, a pivotally mounted, slotted link, a door actuating link engaging said first-mentioned link, and a crank arm having a wrist pin engaging the slot of said link and adapted to move therein and swing the link from one side of the pivot to substantially the diametrically opposite side.

10. In a door operating mechanism, a pivotally mounted slotted link, a door actuating link pivotally engaging said first-mentioned link, and a crank arm having a wrist pin engaging the slot of the first-mentioned link, said wrist pin being adapted to swing from one side to substantially the diametrically opposite side of the pivot of the first-mentioned link.

11. In a door operating mechanism, a pivotally mounted, slotted link, a door actuating link pivotally engaging said first-mentioned link, and a crank arm having a wrist pin disposed for moving in the slot of the first-mentioned link while allowing the crank arm to swing its free end from side to side of the pivot of the first-mentioned link.

12. In a hopper car door operating mechanism, a pivotally mounted link, a crank arm adapted to operate the same and disposed for having its free end oscillate past the pivot a drop door, and door actuating means engaging the link.

13. In door operating mechanism for hopper bottom cars, a rotatable shaft mounted in a bearing secured to a center sill, a crank keyed to said shaft and carrying a roller, a link pivotally connected at one end to a suitable bearing mounted on the underframe, said roller being adapted to travel in said link and a connecting rod pivotally connected to the other end of said link.

14. In door operating mechanism for hopper bottom cars, a rotatable shaft mounted in a bearing secured to the underframe, a crank keyed to said shaft and carrying a roller adapted to engage a cam-shaped slot in a link pivotally connected at one end to a projection of said underframe, and a connecting rod pivotally connected at one end to said link and at the other end to the hopper doors.

15. In door operating mechanism for hopper bottom cars, a connecting rod pivotally

connected at one end to the hopper doors and at the other end to a link provided with an elongated slot, a roller adapted to engage said slot and roll forwardly and rearwardly therein thereby swinging said link first in one direction and then in the other and actuating said rod to open and close said doors.

16. In door operating mechanism for hopper bottom cars, a rotatable shaft, a crank keyed to said shaft, a flanged roller mounted on said crank and engaging a cam-shaped slot in a link pivotally connected at one end to the car underframe, and a connecting rod pivoted at one end to said link, and at the other end to the hopper doors.

17. In door operating mechanism for hopper bottom cars, a link mounted at one end upon a fixed pivot, and having its other end pivotally held in a movable jaw formed on the upper end of a connecting rod, the lower end of which is pivotally connected to the hopper doors, and means for swinging said link and actuating said rod such as a roller adapted to engage a slot in said link and roll forwardly and rearwardly therein.

18. In a door operating mechanism for hopper cars, a swinging slotted link, a support for one end of said link, in combination with a connecting rod having an end thereof pivoted to said link adjacent the slot therein and to hopper doors and a crank arm engaging the slot of said link for actuating the same.

19. In a door operating mechanism for hopper cars, a suitably supported slotted link adapted to swing downward past its support, a depending door connecting rod pivoted to said link and means operable in the slot of the link for reversing its position relative to said rod to actuate the same.

20. In door operating mechanism for hopper bottom cars, a link mounted at one end on a fixed pivot and provided with a slot, a roller adapted to engage said slot and roll forwardly and rearwardly therein, and a connecting rod pivoted to the outer end of said link and having its lower end pivotally connected to the hopper doors.

21. In door operating mechanism for hopper bottom cars, a door opening and closing device comprising a rod and a slotted link, said rod being pivotally connected at its lower end to the hopper doors and having its outer end pivoted to the free end of said link, the link being mounted and adapted to swing on a fixed pivot, and an independently mounted crank arm for actuating the link.

22. In door operating mechanism for hopper doors, the combination comprising a connecting rod and a swinging slotted link fixedly pivoted, said rod being pivotally connected at one end to the doors, and at the other to said link, the center of said connecting rod when said doors are closed being in line with that of said fixed pivot, thereby causing the load on the doors to pull directly through said fixed pivot, and a crank arm for actuating said link.

23. In a railway car, a hinged door extending transversely of the car, and a connected door operating mechanism, comprising an oscillating link fixedly pivoted to the car and provided with a slot said link actuated by a roller in said slot.

24. In a railway car, a hinged door extending transversely of the car, and a connected door operating mechanism, comprising an oscillating fixedly pivoted link provided with a slot and actuated by a member adapted to bear in said slot.

25. In a railway car, a hinged door extending transversely of the car, and a connected door operating mechanism, comprising an oscillating link having a fixed fulcrum and provided with a slot in combination with a roller adapted to travel in said slot.

26. In a railway car, a hinged door extending transversely of the car, and a connected door operating mechanism, comprising an oscillating fixedly pivoted link actuated by a roller, adapted to roll in a slot formed in said link.

27. In a railway car, a hinged door extending transversely of the car, and a connected door operating mechanism, comprising an oscillating link pivoted directly to the car and provided with a slot in combination with a roller adapted to travel in said slot, and means for imparting motion to said roller.

28. In a railway car, a hinged door extending transversely of the car, and a connected door operating mechanism, comprising a slotted link, a roller mounted therein and means for imparting motion to said roller to oscillate said link about a fixed fulcrum.

29. In a railway car, a hinged hopper door and a connected door operating mechanism comprising an oscillating link provided with a slot and actuated by a crank shaft cooperating with said slot, and a link actuated by said oscillating link connected with said oscillating link and adapted to extend parallel therewith when said door is closed.

30. In a railway car, a hinged hopper door and a connected door operating mechanism comprising an oscillating link provided with an elongated slot and actuated by a crank shaft engaging said slot, and a link connected to and actuated by said oscillating link and connected directly with a door.

31. In a railway car, a hinged hopper door, and a connected door operating mechanism comprising an oscillating link provided with an elongated slot, an actuating crank shaft having means arranged to travel in said slot, and a single connecting link having one end pivoted to said first men-

tioned link and the other end extending directly to a pivot on said door.

32. In a railroad car, a drop door having a bracket mounted thereon, a door operating mechanism comprising an oscillating slotted link, means engaging the slot to actuate said link, and a link extending from said bracket to said slotted link.

33. In a railroad car, a drop door, a door operating mechanism comprising an oscillating link provided with a cam-shaped slot and actuated by a roller arranged to travel in said slot, and a pivoted link adapted to connect said slotted link with said door.

34. In a railway car, a hinged hopper door, and a connected door operating mechanism comprising an oscillating link provided with a slot and actuated by a crank arm having means arranged to travel in said slot, and a direct single link connection between said first mentioned link and the door.

35. In door operating mechanism, a combination comprising a hinged door, an actuating link connected directly to a pivot on said door and an oscillating link connected to the first mentioned link and provided with a slot and actuated by a crank arm adapted to travel longitudinally of said slot.

36. In door operating mechanism, a combination comprising a hinged door, an actuating link directly connected therewith and an oscillating link connected directly to said first link and provided with an elongated slot and actuated by means arranged to travel longitudinally in said slot.

37. In door operating mechanism, a combination comprising a hinged door, an actuating link directly connected therewith and an oscillating link connected directly to the first link and provided with a cam-shaped slot and actuated by means arranged to travel forwardly and rearwardly in said slot.

38. In a railway car, a hopper door operating mechanism comprising a hinged door, an actuating link connected therewith and an oscillating link connected by direct pivotal connection with said first mentioned link and provided with a slot in combination with means arranged to travel in said slot, and means such as a crank for imparting motion to said means.

39. In a railway car, a hopper door operating mechanism comprising a hinged door, a rotatable shaft, a crank keyed to said shaft, a roller on said crank, a link provided with a slot in which said roller may travel and a rod pivotally connected with said door and slotted link vibrated by the movement of said link.

40. A railway hopper car door operating mechanism, comprising a hinged door, a link provided with a slot, a roller adapted to travel in said slot, means for imparting motion to said roller to oscillate said link, and a rod pivotally connected with said door and slotted link vibrated by the movement of said link.

In witness whereof, I have hereunto set my hand in the presence of two witnesses.

GEORGE I. KING.

Witnesses:
JOHN H. FRANK,
G. A. BAUSMAN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."