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F. SEABERG.

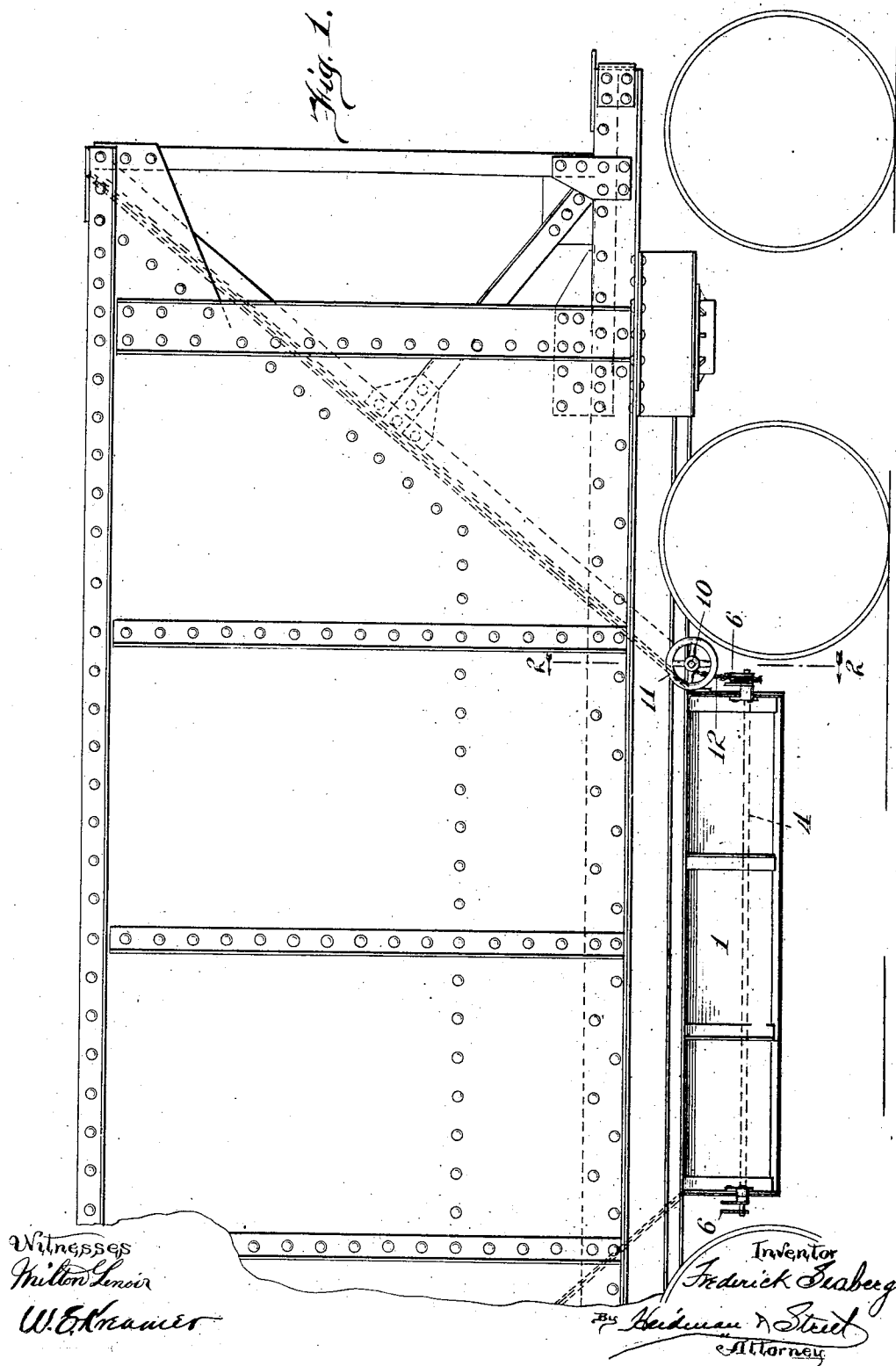
DOOR OPERATING MECHANISM FOR RAILWAY CARS.

APPLICATION FILED APR. 1, 1910.

1,044,265.

Patented Nov. 12, 1912.

2 SHEETS—SHEET 1.

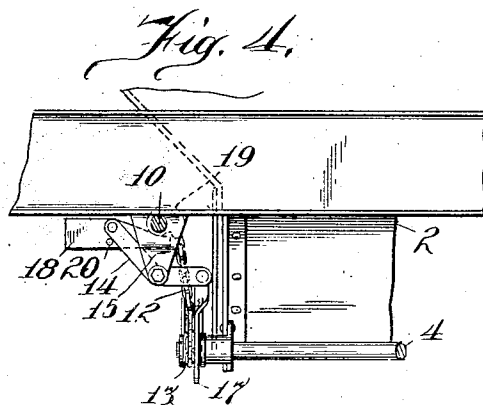
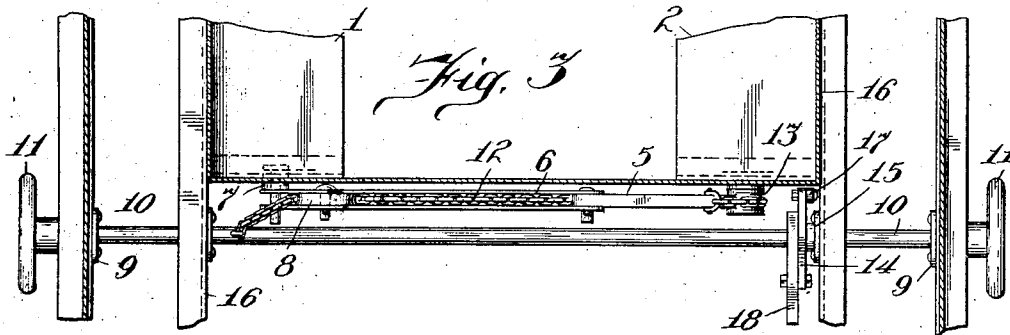
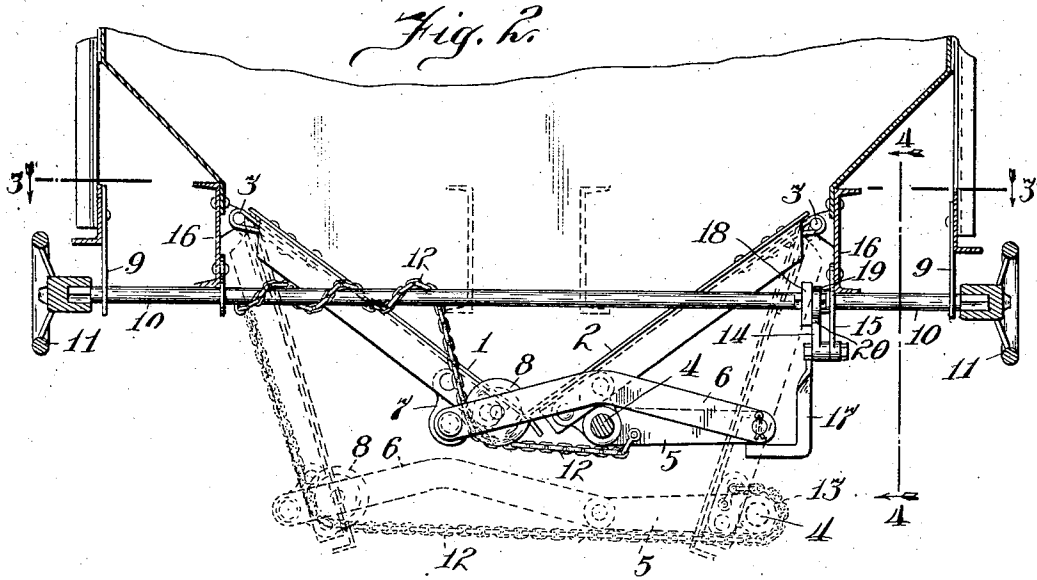


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UNITED STATES PATENT OFFICE.

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DOOR-OPERATING MECHANISM FOR RAILWAY-CARS.

1,044,265.

Specification of Letters Patent.

Patented Nov. 12, 1912.

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To all whom it may concern:

Be it known that I, FREDERICK SEABERG, a citizen of the United States, and resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Door-Operating Mechanism for Railway-Cars, of which the following is a description, reference being had to the accompanying drawings, which form a part of my specification.

My invention relates to door operating mechanism that is more especially adapted for use in connection with the hopper-bottom type of cars, wherein the doors form a part of the hopper and open through the action of gravity; and the object is to provide a simple and efficient mechanism that will simultaneously operate the doors at both sides of the longitudinal center of the car, and automatically lock the doors in closed position, as will more fully appear from the following detailed description of the accompanying drawings.

In the drawings:—Figure 1 is a side elevation of a portion of a dump car provided with my improved door operating mechanism; the doors being shown closed. Fig. 2 is a cross sectional view taken on line 2—2 of Fig. 1. Fig. 3 is a cross sectional view taken on line 3—3 of Fig. 2, looking down, with the doors shown dropped or open. Fig. 4 is a detail view of a portion of the operating mechanism, whereby the locking or holding portion of the door operating mechanism is actuated when in the locking position.

My invention is shown in Fig. 1 applied to that class of dump cars which are provided with a dumping-hopper bottom arranged longitudinally of the car of which the dumping doors form a part: the doors when closed forming a V-shaped hopper bottom in cross section. The doors extend longitudinally of the car between the trucks and constitute what may be termed two swinging dumping sections 1 and 2 at opposite sides of the longitudinal center of the car. The doors 1 and 2 are suitably pivoted at 3, to the frame or longitudinal sills of the car in a well known manner. Rotatably mounted in suitable lugs on the door 2, for example, is a shaft 4, which extends longitudinally of the door, or doors, to the other end of the dumping section, and is there provided with, if desired, similar mechanism to

that now to be described. The shaft 4 is provided at its end with the link or arm 5, which is secured to the shaft so as to rotate or move therewith. Pivotally secured to the free or outer end of the link or arm 5 is a connecting link or bar 6. The other end of this link 6 is pivotally secured to door 1, or preferably to a lug or bracket 7 secured on the outer or under side of the door, as clearly shown in Fig. 2. The connecting bar or link 6 is preferably composed of two members spread apart, as seen in Fig. 3, or it may be bifurcated and has a sheave 8 mounted between the bifurcations, preferably at a point near the pivotal connection of the bar with the door 1. With the arm or link 5 secured between the bifurcations of link 6, as shown in Fig. 3, it is of course necessary to bow the connecting bar or link 6 at or near its center as shown, so as to permit the axes of the respective pivotal points to occupy substantially the same horizontal plane as indicated in Fig. 2. The arm or link 5 is so secured on shaft 4, that it will extend out in a horizontal direction when the doors are completely closed; and by having the arm or link 5 pivoted between the bifurcations of link 6, it is apparent that the end of the connecting bar 6 cannot drop below the horizontal plane or "dead center" of the pivotal points. With the links in the position shown in Fig. 2, that is, with their ends in the same horizontal plane, or at a "dead center" as it were, the doors will be securely locked in closed position.

Suitably mounted in the plates or brackets 9 and extending transversely of the car at the end of the dumping sections, is a rotatable shaft 10, whose outer ends may be provided with any suitable operating device, as for example the hand wheels 11. Secured to said shaft 10, and to be wound about it, is the flexible connection or chain 12. This chain 12 takes beneath sheave 8 mounted on connecting bar 6, and is secured at its other end to the link or arm 5, see Fig. 2. In order to provide a suitable bearing for the chain 12 and maintain it in place, the end of arm 5 where it is secured to shaft 4 may be provided with a groove as at 13, or any other suitable method may be employed to receive and maintain the chain against lateral displacement.

From the description heretofore given, it is evident that when the doors are open,

a rotation of shaft 10 in the proper direction will wind chain 12 up on it. As the other end of the chain is secured to arm or link 5, passing around the point of connection between arm 5 and shaft 4 and then leading beneath sheave 8, the pull of the chain will lift arm or link 5 upward from the position shown in dotted lines in Fig. 2, thereby throwing the links off dead center. The winding up of chain 12 will draw the pivotal connection between links 5 and 6 up above the horizontal plane occupied by the shaft 4 and the pivotal point between link 6 and door 1 and thereby permit the doors to be brought upward to a closed position. It is apparent from this construction, that after the doors have been brought to a closed position, with the respective pivotal points thrown into the same horizontal plane as illustrated in Fig. 2, the mechanism carried by the doors will lock them in place independently of the operating shaft and chain 12, so that any slack in the chain will not release the doors. It is therefore necessary to employ mechanism whereby the pivotal points of the locking mechanism will be moved out of the same horizontal plane or off "dead center", when it is desired to open the doors. I have devised a tripping or actuating mechanism, more clearly shown in Figs. 2 and 4, which comprises a bell crank lever 14 pivoted to a suspended bracket 15 secured beneath the longitudinal sill 16. One end of lever 14 is pivoted to arm 17, whose lower end is curved or bent to take beneath the point of connection between links 5 and 6 when in locking position, as clearly shown in Fig. 2. Secured to the other end of the bell crank lever 14, is a gravity controlled pawl 18, which is normally maintained in the horizontal position shown in Fig. 4; as, for example, by the pin 20.

Mounted on shaft 10 is a cam 19, which is so constructed as to abut against the end of pawl 18, as indicated in Fig. 4, when the shaft 10 is rotated in the direction that will unwind the chain 12. Cam 19 abutting against the end of the pawl 18 will rock bell crank lever 14 about its pivotal connection with bracket 15 and thereby lift arm or member 17 upward; this upward movement of the arm 17 will throw the locking or holding members or mechanism, located on the doors, off "dead center" and permit the doors to drop into the position shown in dotted lines in Fig. 2. When the shaft is rotated in the other or winding direction, the cam 19 merely rides over the ends of pawl 18, which is free to oscillate.

From the construction illustrated and described, it will be seen that a locking mechanism is provided independent of the operating means, and that the locking mechanism is carried by the doors.

I have shown and described what I believe to be the simplest construction; but the same may be varied in certain details without departing from the spirit of my invention, and I do not wish to be understood as limiting myself to the exact construction shown.

What I claim, is:—

1. A car having downwardly opening doors adapted to swing toward or away from each other to close or open respectively, an operating shaft mounted on the car frame, means mounted on the oppositely disposed doors and independent of the car-frame whereby the doors are locked in closed position independently of the shaft, and a connection between the shaft and said means whereby the latter are actuated and the doors operated.
2. A car provided with hopper-doors, an operating shaft, means carried by the doors for holding the doors locked in closed position independently of the operating shaft, a connection between the operating shaft and the means whereby the doors are drawn together and the means moved into locking position, and a connection between the operating shaft and the means whereby the latter is released from locking position.
3. A car having a hopper provided with oppositely swinging doors whose free ends are arranged to take against each other when the doors are closed, a link connected to each door, said links being connected to each other and so arranged that the point of connection between the links will be in substantially the same horizontal plane as the points of connection between the doors and links when the doors are in closed position, thereby locking said doors, and means adapted to be brought into engagement with the links to move the same out of locking position.
4. Operating mechanism for the doors of a hopper car whose free ends abut against each other when they are in closed position, comprising a rotatable shaft, means connected to oppositely disposed doors and so arranged that a portion of said means will move to one side of the point of connection between said means and one of the doors and into substantially the same horizontal plane as the point of connection between the means and the doors, thereby locking the doors in closed position, and a yielding connection between said shaft and means for drawing the latter into said locking position.
5. Operating mechanism for the doors of a hopper car, consisting of a rotatable shaft, means pivotally secured to and carried by the oppositely disposed doors, independent of the shaft, and provided with an intermediate yielding point adapted to occupy substantially the same horizontal plane as the

pivotal connections between said means and the doors whereby the relative positions of the doors are maintained independently of said shaft, means intermediate of said shaft and said first mentioned means whereby the intermediate yielding point in the first mentioned means is moved into locking position, and mechanism intermediate of the first mentioned means and the shaft whereby said intermediate yielding point is moved into unlocking position.

6. Operating mechanism for the doors of a hopper car comprising a rotatable member extending transversely of the car, means pivotally secured to oppositely disposed doors whereby the latter are maintained in closed position, a flexible connection between the member and said means whereby the doors are drawn to closed position and the means thrown into locking position, and mechanism intermediate of the member and said means whereby the latter is thrown out of locking position.

7. Operating mechanism for the doors of a hopper car adapted to swing toward or away from each other to close or open, respectively, comprising means carried by and connecting oppositely disposed doors, said means being so arranged that when a portion thereof is moved to one side of the abutting or free ends of the door the latter will be locked in closed position, a rotatable shaft, and a yielding connection between said means and the shaft whereby the means are actuated and the doors brought into closed position.

8. Operating mechanism for the downwardly swinging and oppositely disposed doors of a car, comprising mechanism pivotally secured to oppositely swinging doors, independent of the frame of the car arranged to swing to one side of the longitudinal center of the car when the doors are being closed whereby the doors are locked and the pulling tendency of the doors exerted on each other through said mechanism, and a rotatable shaft having operative relation with said mechanism whereby the position of the latter is controlled and the doors operated.

9. Operating mechanism for the downwardly swinging doors of a hopper car, comprising a pivoted member secured to each door, the members of oppositely disposed doors being connected together and so arranged that the point of connection between said members will be moved to one side of the pivotal point on the doors and in substantially the same horizontal plane whereby the doors are held in closed position independently of the car-frame, and means operatively connected with said members to control the position of said members and the doors.

in its floor swinging in opposite directions, members pivotally secured to the doors and to each other, the pivotal connection between the members being arranged to move away from the longitudinal center of the car to lock the doors in position independently of the car-frame, and mechanism mounted on the car-frame and engaging with said members to control their positions.

11. A car having gravity opening doors swinging in opposite directions, means pivotally secured to oppositely disposed doors, a point in said means intermediate of the ends being adapted to swing transversely of the car to either side of the pivotal connection of said means with one of the doors, the doors being held in closed position by said means when said intermediate point is swung transversely away from the longitudinal car center, and rotatable mechanism having operative connection with said means whereby the position of said intermediate point is controlled.

12. Operating mechanism for the oppositely disposed doors of a dump car, comprising means carried by the oppositely disposed doors and independent of the car frame, said means being provided with an intermediate pivotal point arranged to move upwardly and swing either intermediate of or to one side of the vertical planes occupied by the free ends of said doors and thereby either unlock or lock the doors respectively.

13. Operating mechanism for the hopper doors of a dump car, comprising means carried by the oppositely swinging doors and having an intermediate yielding point, and being so arranged that the intermediate yielding point may be swung toward or away from the longitudinal center of the car to open and close the doors respectively, the relation between the doors and said means being such that when the intermediate yielding point is swung away from the longitudinal center of the car, the doors will be locked in closed position by said means, a rotatable member having a yielding connection with said means whereby the doors are brought to closed position, and mechanism intermediate of said member and said means whereby the latter are moved out of locking position.

14. Mechanism for operating the gravity opening doors of a dump car comprising means carried by oppositely swinging doors whereby they are pivotally linked together, said means being adapted to lock the doors in closed position when the means are moved in one direction whereby the relation between the means and the doors is such that pressure will be exerted by each of the doors on said means in opposite directions, a member having a yielding connection with the doors and said means and adapted to lift the doors to closed position and move said

10. A car having gravity opening doors

means into locking position, said means being adapted to lock the doors independently of said member, and mechanism intermediate of the member and said means whereby the latter is moved out of its locking position.

15. Mechanism for operating downwardly-opening doors of a dump car adapted to swing toward and away from each other to close and open, respectively, comprising means carried by oppositely disposed doors, said means being adapted to lock the doors when in one position, a rotatable member mounted on the car frame and adapted to draw the doors upward and move said means into closed position when rotated in one direction, and mechanism intermediate of said member and the means adapted to contact with the means when the member is rotated in the other direction whereby the means is moved upward from its locking position and the doors allowed to drop.

16. Mechanism for operating the gravity opening doors of a dump car comprising members pivoted to oppositely swinging doors and to each other, said members being adapted to lock the doors when the pivotal connection between the members is moved to one side of the pivotal connection between one of the doors and one of said members and into the same horizontal plane therewith, a rotatable shaft mounted in the car-frame and operatively connected with the doors and said members whereby the doors are lifted into closed position and the members moved toward their locking position and means, intermediate of said shaft and the pivotal connection between the members when said connection is in locking position, adapted to move the connection out of said horizontal plane to unlock the doors and permit them to drop.

17. Mechanism for operating the oppositely disposed gravity opening doors of a dump car comprising means pivotally mounted on the oppositely disposed doors whereby the latter are locked in closed position when said means are in a substantially horizontal plane, an operating shaft flexibly connected with said means whereby the doors are drawn upward and a portion of said means moved about the pivotal point on one of the doors into locking position, and mechanism intermediate of the shaft and said means whereby the latter are forced out of the locking position.

18. A car provided with gravity opening doors, an operating shaft flexibly connected with said doors whereby the latter are drawn upward to closed position, means carried by the doors whereby the latter are held in closed position independently of the shaft and frame of the car, and mechanism pivotally mounted on the car-frame and in

proximity to the shaft and said means, when the latter is in locking position, and adapted to be oscillated when the shaft is moved in one direction and thereby move said means out of locking position.

19. A car provided with gravity opening doors, a rotatable shaft mounted in the car-frame, members linked to oppositely disposed doors and to each other and adapted to hold the doors in closed position independently of the shaft and frame of the car, a flexible connection between the shaft and said members whereby the doors are drawn upward when the shaft is rotated in one direction, and mechanism intermediate of the shaft and said members adapted to engage with the latter when they are in holding position and move the members upward from their holding position when the shaft is rotated in the other direction.

20. A car provided with hopper-doors, an operating shaft mounted in the car-frame and flexibly connected with the doors, members carried by oppositely disposed doors and pivoted to each other, whereby the doors are locked in closed position independently of the shaft and frame of the car, means pivotally mounted on the car-frame and adapted to engage with the members when the latter are in locking position, and mechanism intermediate of said means and the shaft whereby the means is actuated and the members moved out of locking position.

21. Operating mechanism for hopper-doors of a dump car comprising links connected to oppositely disposed doors and to each other whereby the doors are locked when the links are moved toward one side of the vertical plane occupied by the free ends of the doors when the latter are closed, a shaft mounted in the car-frame and flexibly connected with said links whereby the latter are moved into their locking position while the doors are drawn upward, a member pivotally mounted on the car-frame and arranged to move the links from their locking position, and means intermediate of the shaft and said member whereby the latter is actuated when the shaft is rotated in one direction.

22. A car provided with downwardly opening doors arranged to swing toward and away from each other to close and open, respectively, link mechanism carried by the oppositely disposed doors whereby the position of the latter may be controlled, said link mechanism being so related to the doors when the latter are in closed position, that a pulling tendency will be exerted by the doors on each other through said mechanism, means carried by the car-frame and operatively connected with the link-mechanism whereby the connections between the links and the doors may be brought into substantially the same horizontal plane and

thereby lock the doors in closed position, and means adapted to engage with said link mechanism to move the link-connections out of said plane and allow the doors to open.

23. Operating mechanism for the oppositely swinging doors of a dump car, comprising links carried by the doors whereby they are connected together, said links being adapted to move into dead centers to lock the doors, an operating shaft yieldingly connected with one of said links, whereby the doors are drawn together and the links moved into locking position, and mechanism intermediate of the shaft and the links whereby the latter are moved from locking position.

24. The combination with oppositely moving doors for closing the opening in a hopper car, of door-operating mechanism including a pair of jack knife levers connected to both of the doors for locking them in their closed position, and means including a lever adapted to engage against the connected ends of the jack knife levers for initially moving said jack knife levers from their locked position prior to the initial opening movement of the doors.

25. In a car door operating mechanism, the combination of a pivoted door, a rock arm mounted on the free edge thereof, means for rocking said arm, a link connected to the outer end of said arm, and a companion door to which the opposite end of said link is connected.

26. In a car door operating mechanism,

the combination of a pivoted door, a rock arm mounted near the free edge of said door, and means for operating said rock arm, a link connected to the outer end of said rock arm and a companion door to which the opposite end of said link is connected, and means for operating the outer end of said rock arm to initially move the doors to their open position.

27. In a car door operating mechanism, the combination of two companion doors movable in opposite directions, a rock arm mounted upon one of said doors, a link pivotally connected to the other of said doors and to said rock arm and means for moving said rock arm to a position where the pivotal point of connection of the link thereto is past the line of centers of the axis of movement of said rock arm, and the pivotal connection of the link to the companion door.

28. In a car door operating mechanism, the combination of two companion doors movable in opposite directions, a rock arm mounted on one of said doors, a link connecting the outer end of said arm with the companion door, means for moving said parts to a position where the doors are closed and locked, and means for simultaneously releasing said doors and initially moving them toward an open position.

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