

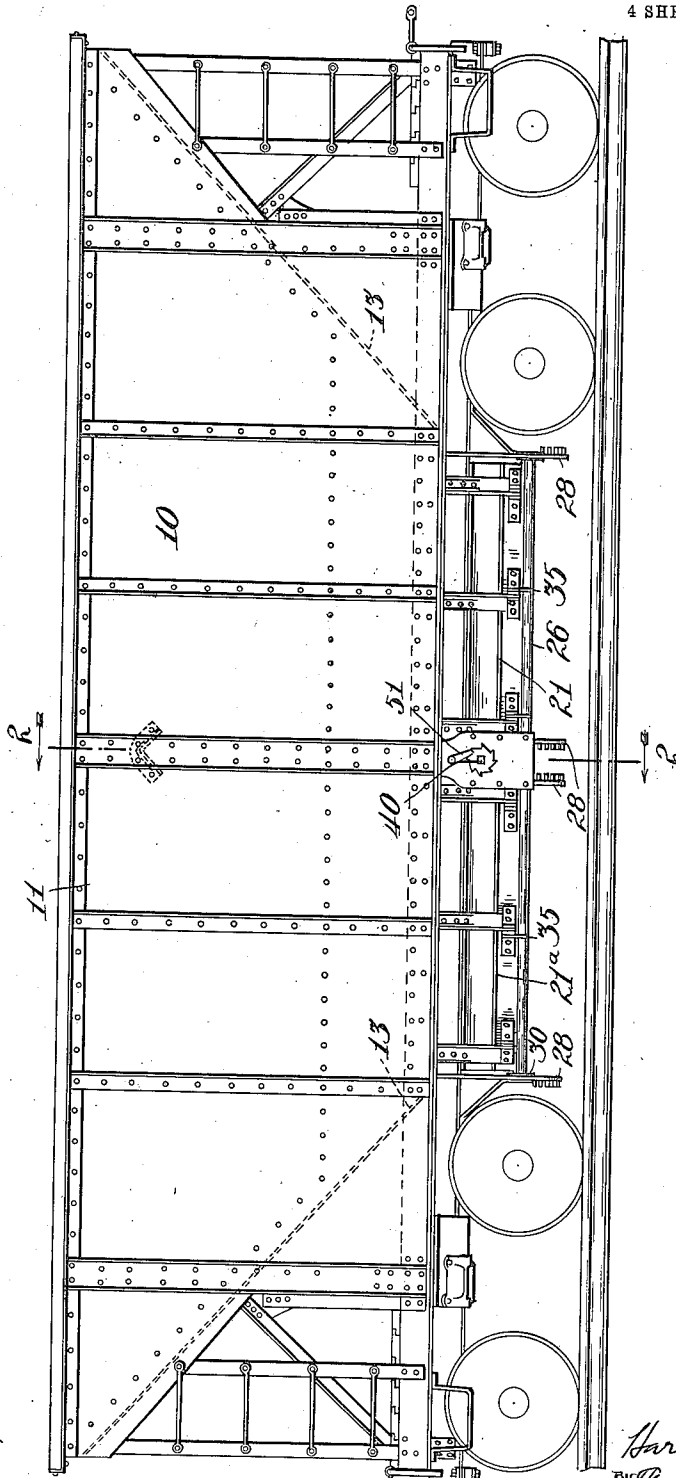
H. S. HART & F. SEABERG.
 OPERATING MECHANISM.
 APPLICATION FILED FEB. 23, 1910.

1,122,918.

Patented Dec. 29, 1914.

4 SHEETS—SHEET 1.

Fig. 1.



Witnesses
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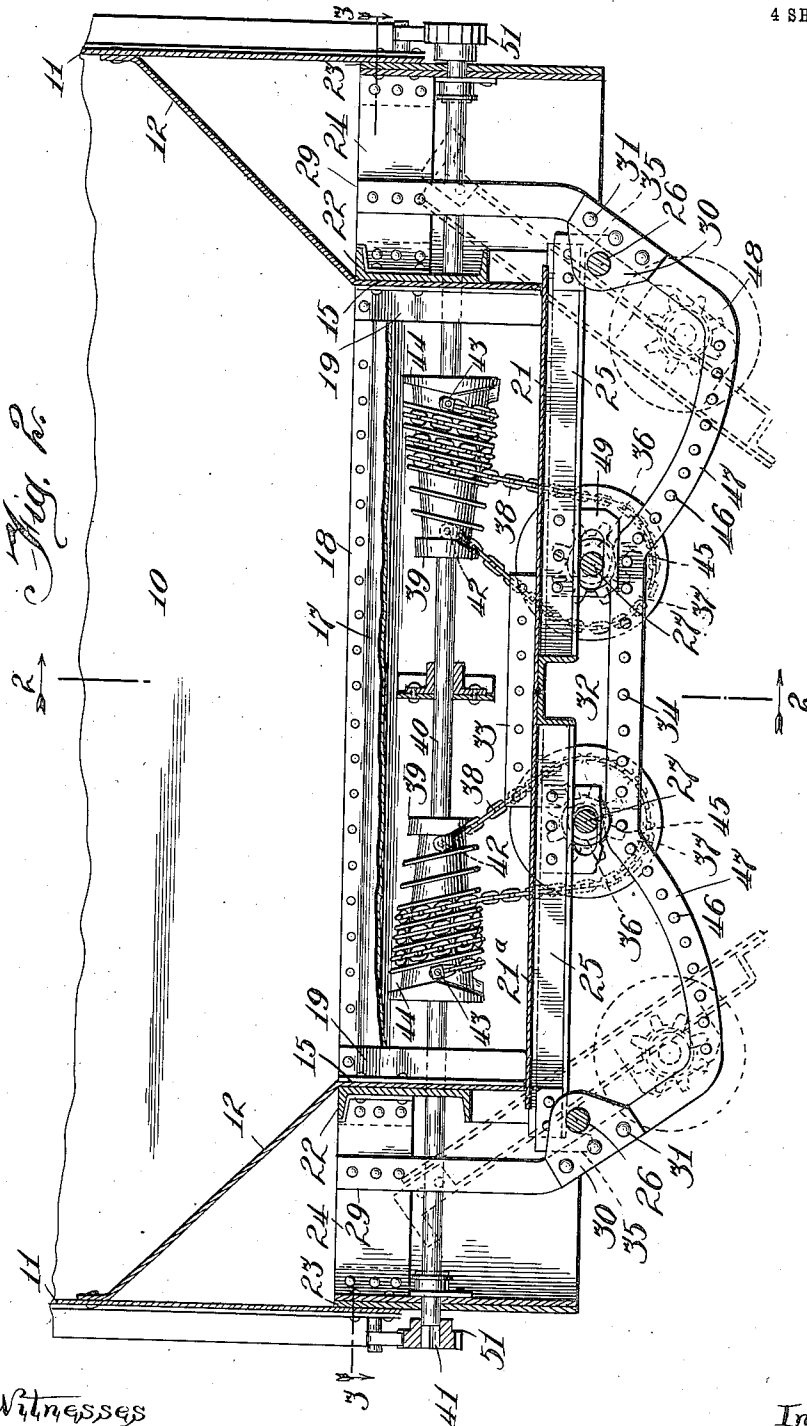
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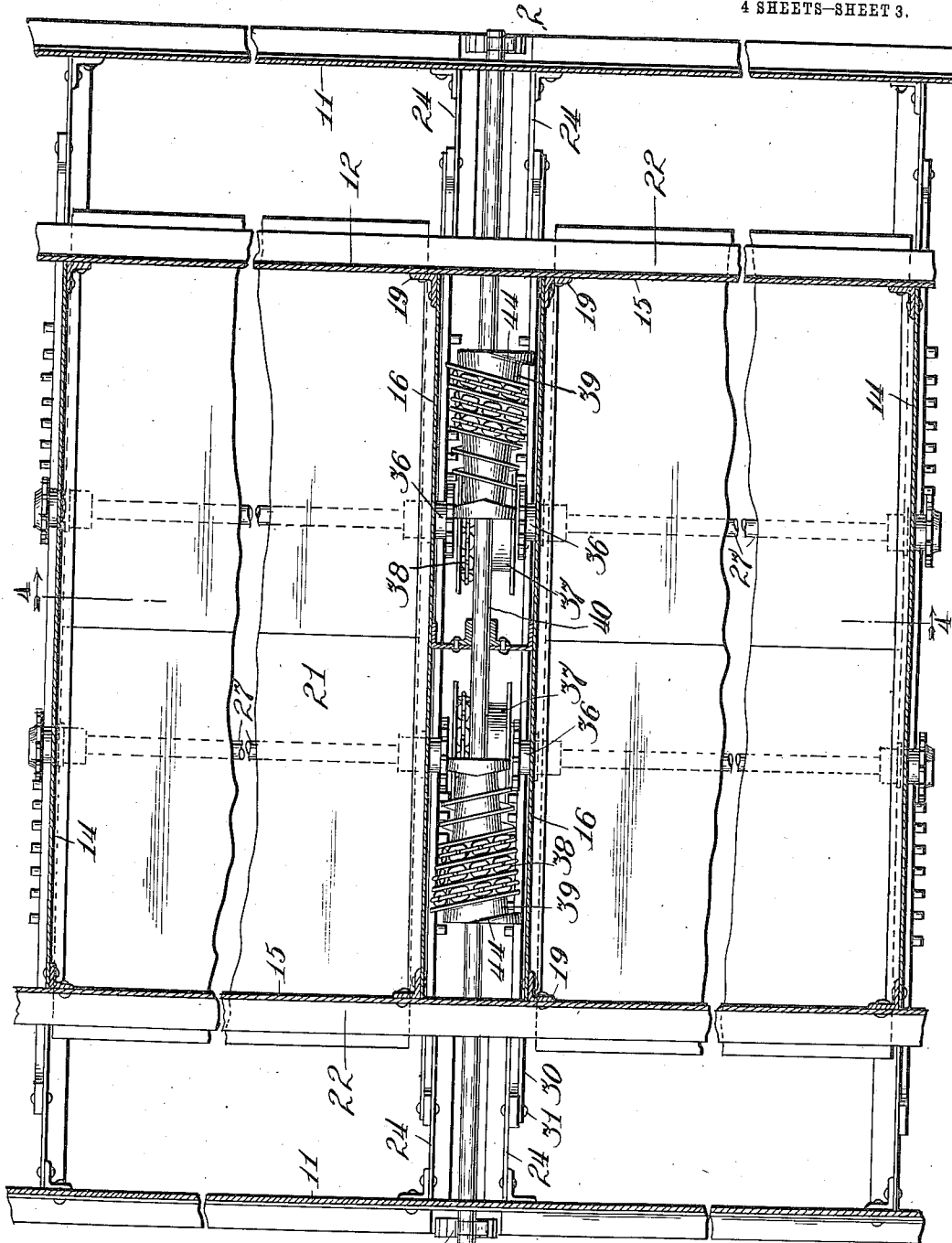
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4 SHEETS—SHEET 3.



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Fig. 3.

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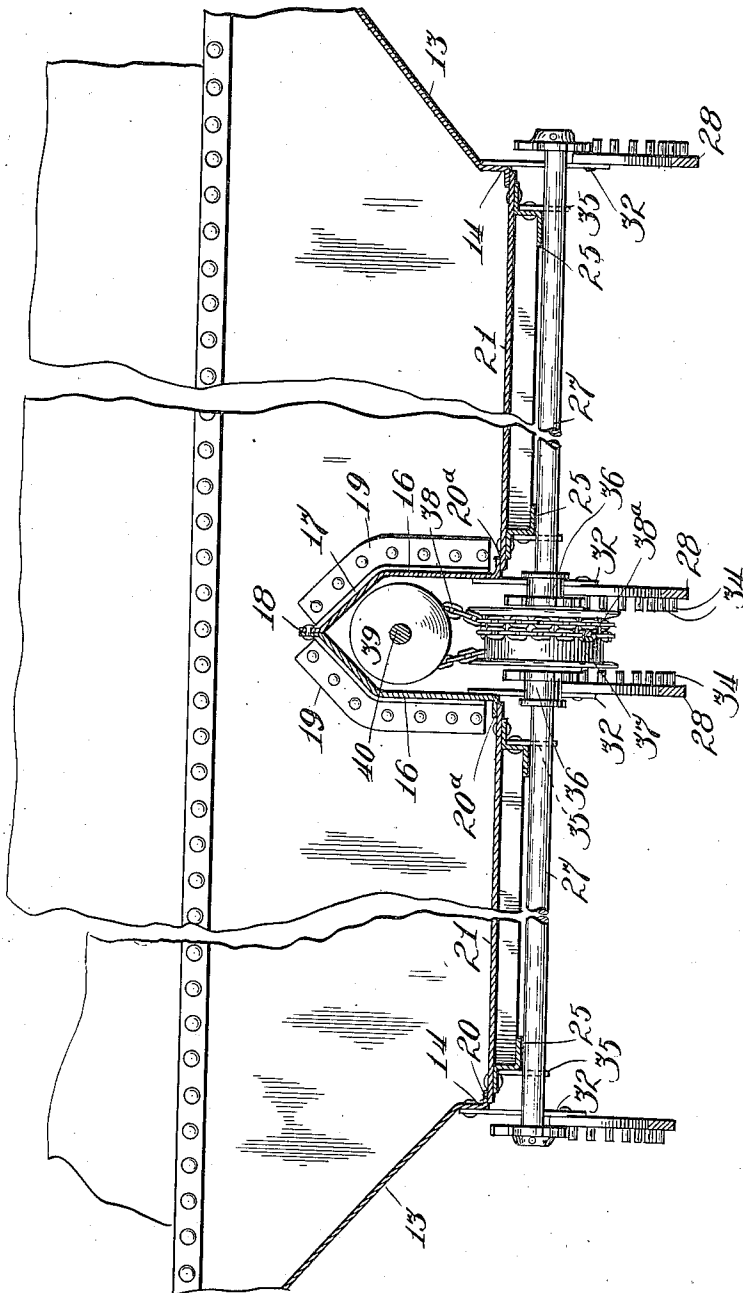
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4 SHEETS-SHEET 4.

Fig. 4.



Witnesses

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UNITED STATES PATENT OFFICE.

HARRY S. HART AND FREDERICK SEABERG, OF CHICAGO, ILLINOIS, ASSIGNORS TO
NATIONAL DUMP CAR COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF MAINE.

OPERATING MECHANISM.

1,122,918.

Specification of Letters Patent.

Patented Dec. 29, 1914.

Application filed February 23, 1910. Serial No. 545,474.

To all whom it may concern:

Be it known that we, HARRY S. HART and FREDERICK SEABERG, citizens of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Operating Mechanism, of which the following is a specification.

Our invention relates to dump cars in which the bottom of a car is divided into sections which are adapted to be moved to an open position when it is desired to dump the load from the car.

Our invention has been designed with particular reference to the form of cars known as hopper cars, in which the end walls slope downwardly to a discharge opening at the center of the car, where the hinged floor sections or dump doors are located.

The object of our invention is to improve the mechanism for operating the dump doors. While particularly designed for hopper cars our invention is applicable to other forms of dump cars.

The objects and advantages of our improvements will become more fully apparent in the following specification and claims, taken in connection with the accompanying drawings, in which—

Figure 1 is a side view of the car with our improvements applied thereto. Fig. 2 is a cross section of the lower portion of the car, taken substantially on the line 2—2 of Fig. 1 and showing the greater part of our improvements. Fig. 3 is a horizontal section of the car, taken substantially along the line 3—3 of Fig. 2 and showing the greater part of our improvements in plan or top view. Fig. 4 is a longitudinal section of the lower portion of the car, taken substantially along the line 4—4 of Fig. 3.

Similar reference numerals designate the same parts in different views.

In the drawings the body 10 of the car has a form known as a hopper car body and is provided with vertical side walls 11 and sloping end walls 13. The sloping plates 12 are attached at their upper edges to the vertical side walls 11 and terminate in their lower portions in vertical walls 15, which latter serve as vertical side walls of a rectangular discharge opening in the bottom of the car. The sloping end walls 13 also termi-

nate in vertical portions 14, which, in a similar manner to the walls 15, serve as end walls for the said rectangular central discharge opening.

The rectangular central discharge opening is preferably given a form in which its longer dimensions are parallel to the longitudinal dimensions of the car. The rectangular discharge opening is divided into two sections by transverse walls 16, made of steel plates, which have sloping and converging upper portions 17 terminating in flanges 18, which are riveted together. These plates 16 are riveted at their ends to the vertical walls 15 of the central discharge opening. The plates 16, because of the particular form given to them, provide a convenient housing or cover for the principal parts of the dump door operating mechanism, which comprises chiefly the subject of our invention. This housing, as will be seen in the drawings—particularly in Figs 2 and 4—does not extend upwardly further than the vertical side walls 15 of the central discharge opening. It will be seen that the main body of the car is free of partitions. The housing referred to is confined wholly to the portion of the car which is immediately adjacent the discharge opening, and divides the said discharge opening into two parts. The plates 16 are secured at their ends to the side walls 15 by the angle bars 19 and suitable rivets.

The extreme lower edges of the walls 14 at the bottom of the sloping end plates 13 are provided with inwardly turned horizontal flanges 20. The lower edges of the plates 16 are also provided with similar inwardly turned horizontal flanges 20^a. These flanges 20 and 20^a serve as abutments against which the edges of the door 21 bear when closed. The side walls 15 terminate at their lower edges at a level with the bottoms of the flanges 20 and 20^a, and the doors 21 also bear upon said lower edges when closed.

The car frame includes longitudinal channel bars 22, against which the vertical side walls 15 of the discharge opening or chute are secured. The car frame also includes longitudinally disposed angle bars 23, which are secured to the side walls 11 at their lower edges. Between the channel bars 22 and the angle bars 23 are placed struts or stays 24,

which are secured at their ends to the channel bars 22 and angle bars 23. These struts or stays 24 are convenient for the attachment of the tracks 29, which will be described later.

The dump doors 21 are provided with Z-bars 25 secured to their lower faces, which serve as stiffening ribs for said doors. The lowermost flanges of the said Z-bars also provide bearing surfaces by which the dump door is supported upon the movable door-supporting shaft 27 and the fixed door-supporting shaft or bar 26. It will be seen that when the doors are in a closed position—and such a condition is shown in the drawings in full lines—they are supported at their outer edges by the fixed bar 26 and near their inner edges by the movable door-supporting shaft 27.

The movable door-supporting shaft 27 rests upon track bars 28, of which there are two for each door. These track bars 28, however, extend transversely of the car for a distance extending entirely beneath and beyond the discharge opening and are fixed to the car frame at their ends 29. The ends 29 are riveted to the struts or stays 24. It will be seen that there are two doors 21 and 21^a which are supported by two track bars 28. The doors 21 and 21^a are arranged in pairs, having their meeting edges lying in the central vertical plane of the car and their opposite or outer edges disposed beneath the side walls 15 of the central discharge opening or chute. One pair of doors thereof serve to close the bottom of one-half, or one of the divisions of the central discharge openings. It will be understood that the divisions above referred to extend from the plates 16 to the vertical portions 14 of the end walls 13.

The fixed door-supporting shaft 26 is held in position by the bearing 30, which is riveted to the track bar 28 by the rivets 31. The bearing 30 may be made of a piece of steel plate. The middle portions of the track bars 28 may be supported from the plates 16 of the car frame by the plates 32, which are riveted at 33 to the said plates 16 and at 34 to the said track bars 28. The shafts 27, 27 are held by parts rigidly attached to the car frame and no tendency to slide from their normal position exists.

The dump doors 21 and 21^a are provided with downwardly projecting hooks or lugs 35, which are riveted to the webs of the Z-bars 25 and serve to limit the inward movement of said doors. The inward movement of the said dump doors is limited by contact of the said hooks or lugs 35 with the fixed supporting bar 26. The said downwardly projecting hooks or lugs 35, taken in connection with the fixed supporting bar 26, serve in a great measure as a hinge for the dump doors 21 and 21^a, though they

leave the said fixed supporting bar when the downward movement of the dump door begins. The movable door-supporting shaft 27 is provided with sleeves 36, forming part of a gear 45 described later, said sleeves bearing upon the track bars 28. The movable door-supporting shaft 27 is provided with a drum or barrel 37, by which rotary movement is imparted to said shaft by the flexible member or chain 38. This flexible member or chain is attached at its ends to a spiral conical sheave 39, which is adapted to wind up one end portion of said chain and to unwind the other end portion of said chain when it is rotated. The sheave 39 is fixed to and mounted upon an operating shaft 40, arranged transversely of the car and provided with suitable bearings in the car frame.

The operating shaft 40 is preferably placed a suitable distance above the movable door-supporting shafts 27. This operating shaft is extended a sufficient distance beyond the outer wall of the car body upon each side, to permit the attachment of an operating crank or other driving means. In the drawings we have shown the ends squared at 41 to receive the hub of an ordinary hand crank.

One end of the flexible chain or member 38 is attached to the sheave 39 in the bottom of a spherical groove 44 on said sheave, by a pin 42. The other end of said chain 38 is fixed to the larger end of said conical sheave by the pin 43, in a similar manner. It will be seen that when the shaft 40 is rotated, one end of the chain 38 will be wound upon one end of the conical sheave 39, while the other end of the chain is unwound from the other end of the conical sheave. When thus operated it will be seen that the intermediate portion of the chain 38 which is not wound upon the sheave 39 will have a variable length. This is due to the fact that one end of the chain is taken up more rapidly or more slowly than the other by the conical sheave 39.

The chain 38 is given two or more turns about the drum 37 and should be held against slipping on said drum by a pin 38^a, which may be passed through a link. If preferred, two separate chains leading from a pin 38^a to the pins 42 and 43 may be used. The advantage of the variation in length of the intermediate portion of the chain 38 will soon become apparent.

Upon the movable door-supporting shafts 27 are fixed toothed wheels or gear pinions 45, which mesh with pins or teeth 46 upon the track bars 28. These track bars are provided with a downwardly and outwardly curved portion 47, which permits a downward movement of the door-supporting shaft 27 when it is moved along said track. It will be seen that when the operating

shaft 40 is rotated, a rotary motion will be imparted to the door-supporting shaft 27, and, because of the gear above described, an outward movement of said shaft will
 5 take place. At the same time a downward movement will occur, and this downward movement will be permitted and accommodated by the increase in length of the intermediate portion of the chain 38. The
 10 downwardly and outwardly curved portion 47 of the track is given such degree of curvature as will accommodate the increase of length of the intermediate portion of the chain 38.

15 The downward and outward movement is limited by the sharp curve or bend 48 in the track 28, and the track bar at this point is extended upwardly, being finally riveted at 29 to the frame of the car.

20 The dump doors 21, 21^a are provided with a downwardly projecting bearing 49 for the supporting shafts 27, and the aperture 50 in this bearing is elongated or given a slotted form to permit an initial movement
 25 of the shaft 27 before the door itself is moved from its normal position. This initial movement is sufficient to permit the shaft 27 to leave the horizontal portion of the bar 28 and to begin the downward
 30 movement upon the curved portion 47. It will be seen that while the shaft 27 is resting upon the horizontal portion of the track bar 28 it has no tendency to move from that position. It may, however, be easily moved
 35 by the operator from its normal position to the curved part of the track without moving the heavily weighted door 21. After the shaft 27 has reached the curved part 47 of the track, the load resting upon the door
 40 assists in opening it.

The downwardly and outwardly curved portion 47 of the track bar is given such a curvature as will cause the movable door-supporting shaft 27 to approach in a measure the fixed shaft 26. The bearing 49 will
 45 cause the shaft 27 to transmit its movement to the door and give it an outward and upward movement upon the fixed shaft 26. This outward and upward movement is accompanied by an angular movement of the
 50 door. This particular movement results in a wide opening of the doors and causes them to assume positions which have a steep slope and at the same time effects the opening of
 55 the doors with a minimum downward movement thereof. This latter feature renders it possible to carry the central hopper down close to the track. This is clearly shown by the dotted line position of the doors in
 60 Fig. 2.

The shaft 40 may be provided at each of its outer ends with a ratchet device 51 for starting the shaft and which is operated by the usual hand crank or lever as is common
 65 in dump car mechanism.

The operation of our improved dump door-operating mechanism has been largely referred to in the foregoing description. In using this mechanism the operator may place a crank upon the squared end 41 of
 70 the operating shaft 40 and give the said shaft a rotary movement in such direction as will cause the end of the chain which is attached to the pin 41 to wind upon the
 75 smaller end of the conical sheave 39. This rotary movement will cause that portion of the chain which is wound upon the larger end of the sheave 39 to unwind. The chain 38 will therefore impart a rotary motion to the drum or barrel 37, and hence the door-supporting shaft will be rotated. The rotation of the shaft 27 will be in such a
 80 direction as to cause it to move outwardly upon the track bar 28. This will be effected by means of the engagement of the gear teeth 45 with the gear teeth or pins 46. The outward movement of the shaft 27 will continue until the outer end of the slot 50 in the bearing 49 is met with
 85 by said shaft 27. This outward movement will be sufficient to cause the shaft 27 to leave the horizontal portion of the track bar 28. A continued rotary movement of the operating shaft 40 will, by the above means, cause a continued rotary motion of the shaft 27 to take place, and the said shaft will move upon the downwardly and outwardly curved part 47 of the track. The shaft 27 will cause the door 21 to move
 90 outwardly. The weight of the load upon the door 21 will cause it to move downwardly. These combined forces will cause the weight of the door and the load upon it to be carried by the curved portion 47 of the track. The increased length of the intermediate portion of the chain 38 will permit this downward movement. This downward and outward movement will continue until the shaft 27 reaches the bend 48 in the track bar, when the movement will be
 95 arrested.

During the above described operation, the outer portion of the door will slide upon the fixed supporting bar 26, and because of the relative position of the parts the outermost edge of the door will rise to a position between the frame bars 22 and 23.
 115

To close the doors, the operator gives an opposite rotary movement to the shaft 40. The conical spiral sheave 39 will cause one
 120 end of the chain 38 to be wound up more rapidly than the other, thereby causing the intermediate portion to decrease in length and to lift or assist in lifting the door-supporting shaft 27. A rotary motion will also be imparted to the shaft 27 and, by means of the gear above described, it will be caused to travel upwardly and inwardly on the curved part of said track. The movement is continued until the door-supporting
 125
 130

shafts 27 rest upon the horizontal portion of the track 28 and until the meeting edges of the doors have come in contact.

With our improved form of door-operating mechanism, as above described, both doors can be operated from either side of the car. By our improved construction also the advantages of bodily sliding and shaft-supported doors that can be simultaneously operated from either side of the door are attained.

The advantages of bodily sliding doors that can be thus operated are very great, as by this means a wide opening of the discharge opening can be quickly effected in the minimum space between the car body and the track. By this means a car of greater capacity can be produced by utilizing a great part of the space immediately above the track.

With our improved construction we are enabled to attain the advantages of shaft-supported doors which are rigidly and efficiently held by parts which are directly attached to the car frame, and in which no tendency exists to displace the doors because of the great weight of the load.

While we have described more or less precisely the details of construction, we do not wish to be understood as limiting ourselves thereto, as we contemplate changes in form and proportion of parts and the substitution of equivalents, as circumstances may suggest or render expedient, without departing from the spirit of our invention.

We claim:—

1. In a dump car, a spiral sheave suitably supported in the frame of the car and adapted to be rotated, a movable door-supporting shaft, a flexible member adapted to wind upon said sheave at one of its end portions while unwinding therefrom at the other of its end portions, and means fixed to said door-supporting shaft and engaged by the intermediate portion of said flexible member, whereby said shaft may be operated.

2. In a dump car, a spiral sheave suitably supported in the frame of the car and adapted to be rotated, a movable door-supporting shaft, a flexible member adapted to wind upon said sheave at one of its end portions while unwinding therefrom at the other of its end portions, and a drum fixed to said shaft and adapted to engage the intermediate portion of said flexible member, whereby said shaft may be operated.

3. In a dump car, a spiral sheave suitably supported in the frame of the car and adapted to be rotated, a movable door-supporting shaft, a flexible member adapted to wind upon said sheave at one of its end portions while unwinding therefrom at the other of its end portions, a drum fixed to said shaft and adapted to engage the inter-

mediate portion of said flexible member, whereby said shaft may be operated, and means whereby the rotation of said shaft will cause a bodily movement of said shaft.

4. In a dump car, a spiral sheave suitably supported in the frame of the car and adapted to be rotated, a movable door-supporting shaft, a flexible member adapted to wind upon said sheave at one of its end portions while unwinding therefrom at the other of its end portions, a drum fixed to said shaft and adapted to engage the intermediate portion of said flexible member, whereby said shaft may be operated, a track for supporting and guiding said shaft, and means whereby the rotation of said shaft will cause a bodily movement of said shaft along said track.

5. In a dump car, an operating shaft, a flexible member adapted to wind at one of its end portions around said shaft while unwinding at its other end portion from said shaft, and a movable door-supporting shaft angularly disposed to said operating shaft and about which the intermediate portion of said flexible member is wound and to which it imparts motion, said movable door-supporting shaft being adapted to move bodily in a general direction parallel to said operating shaft while said flexible member is being wound or unwound from said operating shaft.

6. In a dump car, a door supporting shaft, an operating shaft, a sheave thereon having portions of different diameters, one of said portions being adapted to receive and wind one of the end portions of a flexible member while the other end portion of said flexible member is unwinding from the other portion of said sheave, whereby the intermediate portion of said member will have a variable length, a flexible member adapted to wind upon said sheave as described, and means whereby said intermediate portion of said flexible member may operate said movable door-supporting shaft.

7. In a dump car, an operating shaft, a sheave thereon having portions of different diameters, one of said portions being adapted to receive and wind one of the end portions of a flexible member while the other end portion of said flexible member is unwinding from the other portion of said sheave, whereby the intermediate portion of said member will have a variable length, a flexible member adapted to wind upon said sheave as described, a movable door-supporting shaft adapted to be engaged by said intermediate portion of said flexible member and to be rotated thereby, a track adapted to support and guide said door-supporting shaft, and means by which rotation of said door-supporting shaft will cause it to move upon said track.

8. In a dump car, an operating shaft, a

sheave thereon having portions of different diameters, one of said portions being adapted to receive and wind one of the end portions of a flexible member while the other end portion of said flexible member is unwinding from the other portion of said sheave, whereby the intermediate portion of said member will have a variable length, a flexible member adapted to wind upon said sheave as described, a movable door-supporting shaft adapted to be engaged by said intermediate portion of said flexible member and to be rotated thereby, a track adapted to support and guide said door-supporting shaft and having a curved portion receding from said sheave, whereby the intermediate portion of said flexible member is kept taut and said door-supporting shaft is guided in a direction which permits the door to open, and means by which the rotation of said door-supporting shaft will cause it to move upon said track.

9. In a dump car, a sheave having parts of different diameters, one of said parts being adapted to receive and wind up one portion of a flexible member while another portion of said flexible member is unwinding from the other part of said sheave, whereby the intermediate portion of said member will have a variable length, a flexible member adapted to wind upon said sheave as described, and means engaged by said flexible member for operating a dump door.

10. In a dump car, a conical sheave, a flexible member adapted to wind upon one portion of said sheave while it is unwinding from another portion, and means engaged by said flexible member for operating a dump door.

11. In a dump car, a sheave, a flexible member adapted to wind upon one portion of said sheave while it is unwinding from another portion, and a door supporting shaft engaged by said flexible member for operating a dump door.

12. In a dump car, a conical sheave having a spiral groove, a flexible member adapted to wind upon one portion of said sheave while it is unwinding from another portion, and means engaged by said flexible member for operating a dump door.

13. In a dump car, a conical sheave having a spiral groove, a flexible member adapted to wind upon one portion of said sheave while it is unwinding from another portion, said flexible member being attached at its ends to said sheave, and means engaged by said flexible member for operating a dump door.

14. In a dump car, a conical sheave having a spiral groove, a flexible member having its end portions adapted to wind upon different portions of said sheave, whereby the intermediate unwound portion will vary

in length as the sheave is rotated, and means engaged by said intermediate portion of said member for operating a dump door.

15. In a dump car, a bodily movable dump door, a fixed support adjacent and approximately parallel to one side of said door, said door being mounted to freely slide on said support, and a bodily movable supporting and operating bar located adjacent the opposite side of said door.

16. In a dump car, a bodily movable dump door, a fixed support adjacent and approximately parallel to one side of said door, said door being mounted to freely slide on said support, and a bodily movable supporting and operating bar adjacent the opposite side of said door, said movable supporting bar being arranged to effect movement of said door upon said fixed support.

17. In a dump car, a bodily movable dump door, a fixed supporting member located adjacent and approximately parallel to one side of said door, said door being mounted to freely slide on said member, and a bodily movable supporting and operating bar located adjacent the opposite side of said door, said movable supporting bar being arranged to effect movement of said door upon its fixed support.

18. In a dump car, a bodily movable dump door, a fixed support adjacent one edge of said door on which said door is free to slide, a movable supporting bar adjacent the opposite edge of said door and having a bearing attached to said door, said bearing being adapted to permit a limited sliding movement of said bar without moving said door and said movable supporting bar being adapted to cause a movement of said door upon its fixed support when moved beyond the limits of said bearing.

19. In a dump car, a bodily and angularly movable dump door, a movable supporting and operating shaft for said door, and means operable from either side of the car for moving said shaft, said means comprising a shaft operatively connected to said operating shaft.

20. In a dump car, a bodily and angularly movable dump door, a movable supporting and operating shaft for said door, and a fixed supporting shaft for said door, said shafts being approximately parallel.

21. In a dump car, a bodily movable dump door, a bodily movable supporting and operating shaft for said door, and a fixed supporting bar upon which said door is slidably mounted, said shaft and bar being located transversely to the direction of travel of said door.

22. In a dump car, a bodily movable dump door, a bodily movable operating shaft to which said door is pivoted, and a fixed support upon which said door is

adapted to slide, said shaft and support being approximately parallel.

23. In a dump car, a bodily movable dump door, a movable operating shaft to which said door is pivoted, a fixed support upon which said door is adapted to slide, and means for causing said movable shaft to actuate said door, said means being operable from either side of said car.

24. In a dump car, a bodily movable dump door, a movable support to which said door is pivoted, a fixed support upon which said door is adapted to slide, means for causing said movable support to actuate said door, and a track for said movable support.

25. In a dump car, a bodily movable dump door, a movable support to which said door is pivoted, a fixed support upon which said door is adapted to slide, means for causing said movable support to actuate said door, and a track for said movable support, said track having a direction which leads away from the plane of the door when said door is in its closed position, whereby said door is given an angular movement about said fixed support.

26. In a dump car, a dump door having a combined sliding and angular movement, and a fixed supporting shaft upon which said door slides and which is disposed transversely with respect to said sliding movement.

27. In a dump car, a dump door having a combined sliding and angular movement, and a fixed supporting shaft upon which said door slides and about which it has said angular movement.

28. In a dump car, a spiral sheave, a flexible member wound thereon having an unwound portion separated from the sheave between the wound portions, and a door supporting shaft engaged by said separated portion for operating a dump door.

29. In a dump car, a spiral sheave, a flexible member adapted to wind at different portions of its length upon said sheave with an unwound portion between, and a door supporting shaft engaged by said unwound portion for operating the dump door.

30. In a dump car, a conical sheave, a flexible member adapted to wind at different portions of its length upon said sheave with an unwound portion between, and means engaged by said unwound portion for operating a door-supporting member in directions approaching and receding from said sheave.

31. A car having a bottom comprising doors, said doors having a bodily sliding movement in opening, shafts pivotally attached to said doors for supporting said doors in their closed positions, and means

for displacing said shafts to permit the doors to open.

32. A car having a bottom comprising doors, said doors having a bodily sliding movement in opening, shafts pivotally attached to said doors for supporting said doors in their closed positions, and means for displacing said shafts to permit the doors to open, said means being adapted to be operated from either side of the car.

33. A car having a bottom comprising doors, said doors having a bodily sliding movement in opening and being oppositely disposed with respect to the center line of the car, shafts pivotally attached to said doors for supporting said doors in their closed positions, and means for simultaneously displacing said shafts to permit the doors to open, said means being adapted to be operated from either side of the car.

34. A car having a bottom comprising doors, said doors having a bodily sliding movement in opening, shafts pivotally attached to said doors for supporting said doors in their closed positions, and means for simultaneously displacing said shafts to permit the doors to open, said means being adapted to be operated from either side of the car.

35. A car having a bottom comprising doors, said doors having a bodily sliding and angular movement in opening, shafts pivotally attached to said doors for supporting said doors in their closed positions, and means for simultaneously displacing said shafts to permit the doors to open, said means being adapted to be operated from either side of the car.

36. A car having a bottom comprising doors, said doors having a bodily sliding and angular movement in opening and being arranged in series oppositely disposed with respect to the center line of the car, shafts pivotally attached to said doors for supporting said doors in their closed positions, and means for simultaneously displacing said shafts to permit the doors to open, said means being adapted to be operated from either side of the car.

37. A car having a bottom comprising doors, said doors having a bodily sliding and angular movement in opening and being arranged in series oppositely disposed with respect to the center line of the car bottom, movable shafts near the edges of said doors for supporting said doors in their closed positions, and fixed supports for said doors near their outer edges and about which said doors have said sliding and angular movement.

38. A car having a bottom comprising doors, said doors having adjacent edges when in their closed positions, shafts pivotally attached to said doors for supporting

said adjacent edges in their closed positions, a track bar for supporting and guiding said shafts, and means for attaching that part of the track which is adjacent the supporting positions of the shafts to the car frame.

39. A car having a bottom comprising doors, said doors having adjacent edges when in their closed positions, shafts pivotally attached to said doors for supporting said adjacent edges in their closed positions, a track bar for supporting and guiding said shafts, and a frame member in the bottom of the car to which that part of the track adjacent the supporting positions of the shafts is firmly fixed.

40. A car having a bottom comprising doors, a shaft for supporting said doors in their closed positions, a track bar for supporting and guiding said shaft, a frame member in the bottom of the car to which that part of the track adjacent the supporting position of said shaft in which the doors are closed is firmly fixed, and a fixed support for the outer edge of said door attached to said track.

41. A car having a bottom comprising doors, a shaft for supporting said doors in their closed positions, a track bar for supporting and guiding said shaft, said track being attached firmly to the car frame at a point immediately adjacent the supporting position of said shaft in which the doors are closed, and a fixed support for the outer edge of said door attached to said track.

42. A car having a bottom comprising doors, said doors having adjacent edges when in their closed positions, shafts for supporting said adjacent edges in their closed positions, a track bar for supporting and guiding said shafts, said track being attached firmly to the car frame at a point immediately adjacent the supporting positions of said shafts, said track having a downwardly and outwardly inclined portion leading from the supporting portion, and an end portion fixed to said car frame.

43. In a dump car, a door, a fixed shaft upon which said door is slidably and rotatably supported adjacent one edge, a movable supporting member engaging said door adjacent its opposite edge, the movement of said supporting member permitting said door to rotate upon said fixed shaft and causing said door to slide bodily upon said shaft.

44. In a dump car, a movable door supporting shaft, a fixed support for a door, and a bodily movable dump door having a limited movable engagement with said door supporting shaft, said movable shaft being adapted to move said door over said fixed support.

45. In a dump car, a movable door supporting shaft, a fixed support for a door, a bodily movable dump door having a limited movable engagement with said movable shaft, means having a limited engagement with said shaft for supporting said shaft in a position which holds said door closed, the extent of said engagement being less than that of the movable engagement of said door with said shaft, and means for displacing said shaft to permit the door to open.

46. In a dump car, the combination with a bodily movable dump door, of a movable door supporting member engaging such door to have limited transverse bodily movement relatively thereto, for the purpose set forth.

47. In a dump car, in combination, a bodily movable door, a rolling member connected to the door to cause the latter to move bodily therewith, means for rotating such member, and means whereby rotation of the member imparts rolling motion thereto.

48. In a dump car, the combination with a pair of bodily movable doors adapted to close toward one another, of a pair of sheaves, means operatively connecting the sheaves to respective doors, including a pair of flexible members adapted to wind upon the sheaves, and an operating shaft upon which said sheaves are both mounted, such shaft having its axis parallel to a plane extending vertically of the doors in the direction of movement thereof.

49. In a dump car, the combination with a pair of bodily movable doors, of a pair of sheaves, flexible members operatively connected to the doors and to the sheaves, and means for operating such sheaves in unison.

In testimony whereof, we have subscribed our names.

HARRY S. HART.
FREDERICK SEABERG.

Witnesses:

M. E. STOUTENBURGH,
W. J. RYAN.