

C. G. HARRINGTON.

DUMPING CAR.

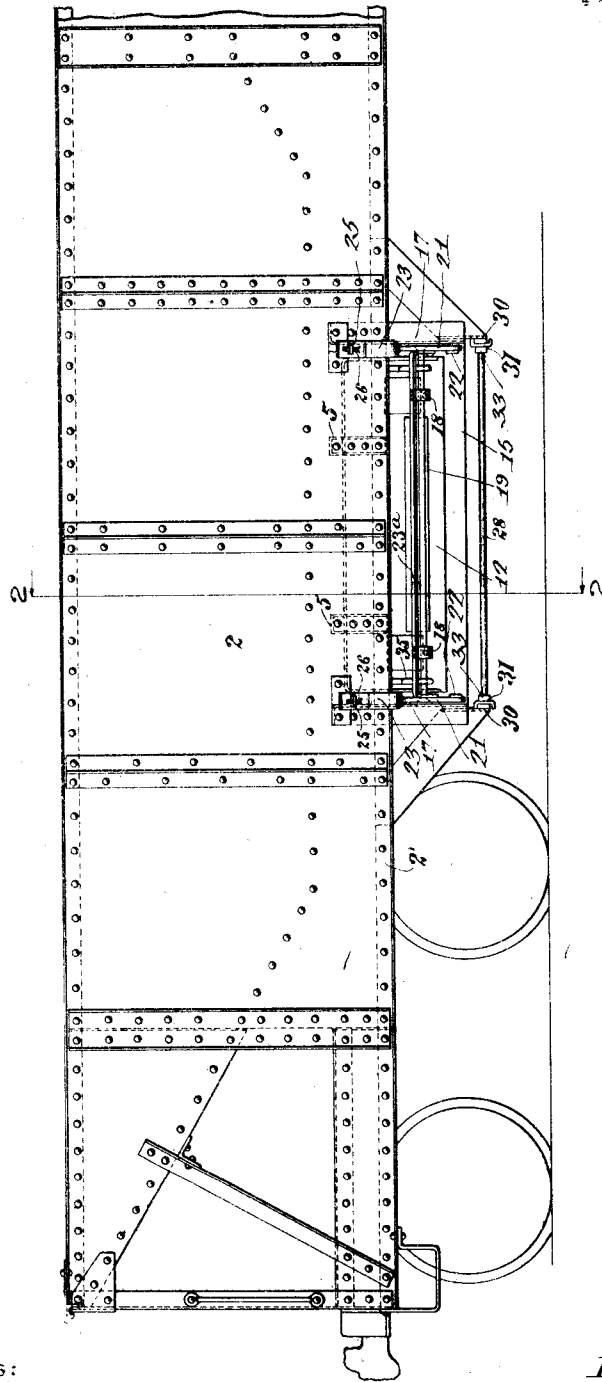
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Patented July 8, 1913.

4 SHEETS-SHEET 1.

1,066,607.

Fig. 1

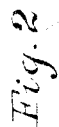


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4 SHEETS—SHEET 2.



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DUMPING CAR.

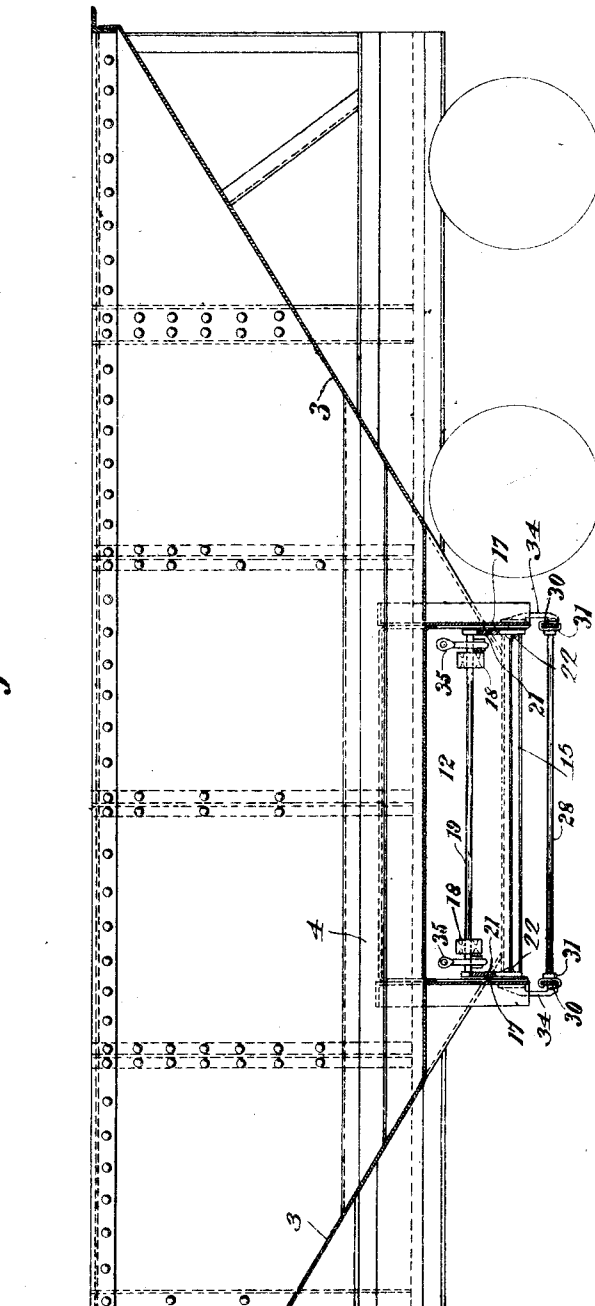
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4 SHEETS—SHEET 3.

Fig. 3.



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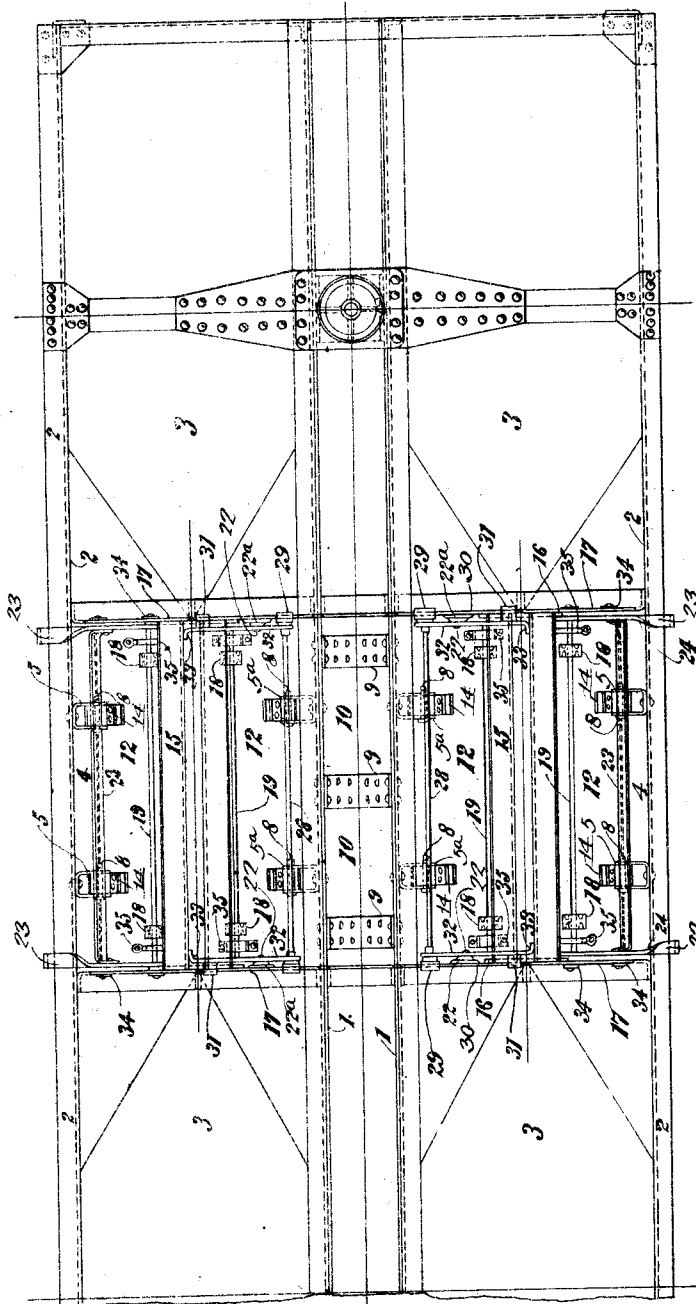
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4 SHEETS—SHEET 4.

Fig. 4.



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DUMPING-CAR.

1,066,607.

Specification of Letters Patent.

Patented July 8, 1913.

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To all whom it may concern:

Be it known that I, CLEMENT G. HARRINGTON, residing at and whose post-office address is St. Louis, Missouri, and being a citizen of the United States, have invented certain new and useful Improvements in Dumping-Cars, 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 view in side elevation of one-half of a car embodying the features of the present invention the undisclosed half being a duplicate of that disclosed. Fig. 2 is a transverse, vertical section taken on the plane indicated by line 2—2 of Fig. 1. Fig. 3 is a longitudinal, vertical, fragmentary section taken on the plane indicated by line 3—3 of Fig. 2, and looking in the direction indicated by the arrow. Fig. 4 is an inverted plan view of one half of the car showing the hoppers with the door operating mechanism therefor. Fig. 5 is a detail hereinafter described. Fig. 6 is a fragmentary detail view showing a portion of the door (12) with a guiding bracket and stop thereon, as hereinafter described.

This invention relates to improvements in steel hopper cars, and particularly to such as are provided with lever actuated dumping valves.

Among the objects in view are simplicity and efficiency of manipulation of the operating parts as well as the effective distribution of strains.

Referring to the drawings by numerals, 1, 1 indicates the longitudinal plates of the center sill, and 2, 2 the side girders, which latter form the sides of the car. The car may be divided into as many hoppers as preferred, but for the purposes of illustration the car is indicated as being provided with four hoppers, two being arranged side by side in each half-length of the car, and each hopper consisting of the respective side or side girder 2, and front and rear inclined

floors 3 and longitudinally extending laterally inclined floors 4, 4.

Each side girder 2 depends below the outer floor 4 of the respective hopper, and intermediate the length of said floor are arranged castings 5—5, spaced apart and each riveted to the side girder 2 and extending to and affording a support for the inclined floor 4. Each casting 5 preferably consists of a hollow casing, made up, as best seen in Fig. 5, of side plates 5' and a connecting cross web 5'' extending along the inner inclined edges of the plates 5', along the upper horizontal edges thereof, and down along the outer edges thereof, the inner lower edges being left disconnected, and the said web 5'' receiving the rivets with which the casting or casing 5 is connected to the side girder 2. Each plate 5' of each casing 5 is formed at its upper inclined edge with a notch 6, producing an ear 7, and these two ears of each casing are perforated for receiving a pintle or hinge-bolt 8. The center plates 1 are connected at their upper edges by cross webs or plates 9—9 extending downwardly between the sill members and united thereto. Upon the webs 9—9 is arranged a V shaped cover plate 10 riveted or otherwise suitably secured to the plates 9 and having its opposite legs extending downwardly across the upper edges of the center sill plates 1—1 and forming the inner inclined floor 4 of the adjacent hopper. The upper edge of each plate 1 is provided an angle bar 11 riveted to the plate 10, said angle having outstanding horizontal flange. Between each of the plates 1 and the contiguous floor 4 are arranged castings or casings 5^a, constructed exactly like the casings 5, and riveted to the plate 1 and extending to and supporting the contiguous floor 4. The floors 4 terminate a considerable distance above the bottom central point of the respective hoppers and the remaining portion of each hopper is completed by a pair of valves or doors 12, one being pivotally carried by the pintles 8 of the casings 5, and inclining, when closed, downwardly and inwardly, to the bottom central point of the hopper, and the other being pivotally carried by the pintles 8 of the casings 5^a and inclining, when closed, downwardly and outwardly to the lower edge of said first door.

Each door 12 underlaps the respective floor 4 and is provided about all of its edges with a downwardly extending flange 13 lying, when the door is closed, within the notches 6, at the upper edges of said doors. A pair of hinge straps 14—14, riveted to the under side of each door, are designed to engage the pintles 8—8 in the casings 5 and 5^a for pivotally sustaining the door in engagement with the pintles, each strap 14 extending between the pair of side plates 5' of the respective casing carrying the given pintle 8. Obviously, as many of the casings 5 and 5^a and hinge straps 14 may be provided as desired, but a pair for each door is usually sufficient. The flange 13, along the lower edge of each door 12, is preferably formed with a downwardly turned bend 13' adapted to snugly fit a correspondingly shaped portion of a pressing 15 extending throughout the length of and centrally beneath the open bottom of each hopper, and terminating at its ends in end flanges 16, 16, riveted to the depending cross plates or bulk heads 17 at the ends of the open bottom of the hopper. The conformity of flange 13 with the transverse angular form of the pressing 15 insures a snug, close fit of the doors 12, providing against springing of the parts or other openings affording opportunity for leakage.

Each door is supported in its closed position by a pair of bell crank levers 20, 21 carrying, at their ends next the doors, shafts 19 on which are supported rollers 18 bearing against the outer or under faces of the doors. Each bell crank is pivotally supported, the pivot comprising preferably a fixed pin as 22 projecting from a suitable bracket 22^a carried by the respective bulk head 17.

The bell crank levers 21—21, carrying rod 19 for the outer door 12, are continued, in the form of flat bars 23, and the outer ends thereof project beyond the side girder 2 and are twisted, as at 24, for presenting their flat faces toward the outer face of the girder. These levers are connected together by a tie rod 23^a. The extensions 23 are bent approximately at the point of the twist 24 for producing an angular portion adapted to extend, when the doors are in closed position, about the horizontal flange of the angle bar 2' of girder 2. The outer ends of the extensions 23 are preferably slotted and adapted for engagement with locking members 25—25 projecting outwardly from the side face of the side girder 2. The locking members extend through the slots and suitable cotter pins 26 retain the levers in raised position. It is to be noted that when the parts are in closed position, the shaft 19 is in that alignment with the pivots 22, commonly known as a dead center, so that the pressure exerted on each of the doors 12 will

be taken up directly by the pivots 22 with no appreciable pressure on the outer portions of the levers 21, such pressure being taken up as a direct longitudinal stress by the short arm 20.

The free arm of each inner lever 21 is pivotally engaged by a depending link 27, said link at its lower end pivotally engaging a slide bar 32, a rod 28 being provided for and connecting the links 27 of the pair of inner levers 21 for each inner door 12. The inner ends of bars 32 are fixed to slides 29 carried on and engaging ways 30, each slide having an upper and a lower flange lapping the upper and lower edges of their respective way 30. A similar slide 31 slidably engages each way 30, and is spaced thereon outwardly from slide 29 and connected with slide 29 by the bar 32, said bar being bent or otherwise constructed at its outer end to form an operating handle or grip 33. When the door is closed the links 27 extend substantially vertically above the rod 28 thus practically locking the connected levers against rotation. Near the outer end of each bar 32, the same is formed with an aperture 32' registering, when the door 12 is closed, with a corresponding opening 30' formed in way 30, through which registering openings is passed a removable key or other suitable locking device 32'' for locking the bar 32 and more effectually retaining the parts in a closed position. Each bar 32 may be of any desired length, and each link 27 is preferably of a length for causing the rod 28 to lie beneath pressing 15 when the inner door 12 is open, as seen at the left end of Fig. 2. Each way 30 is braced and supported by stays and braces 34, 34, extending downwardly from parts of the car body, and each way 30' preferably consists of a flat strip which extends across the entire width of the car, so as to serve as a way for the slide of the inner door 12 of each of the hoppers of the laterally juxtaposed pair. For guiding and for enabling forcible opening of the doors, when frozen or otherwise stuck in closed position, by movement of bars 19, each of said bars extends through and travels transversely within a pair of guiding brackets 35 fixed to the respective door 12. At the lower terminus of movement of each bar 19, the outstanding flange or web of an angle plate 36 is arranged, said angle plate being comprised in the bracket 35, so that the bar is sustained against excess downward movement. Obviously, as many brackets 35 may be provided as desired, but two such brackets spaced apart along the door are usually sufficient for each rod 19.

It is to be observed that each hinge casing 5 has its attached edge comparatively long and lapping and riveted to the vertical flange of the contiguous edge angle 2' of the

respective sill or side girder. The stress of the load is thus distributed from the hinges directly to the sills almost entirely as a downward component and with but a minimum of lateral or bursting strain. Obviously, while the means of attachment for various parts has been herein mentioned as rivets, and while such specific means is preferred, any of the known methods of attachment may be utilized within the spirit and intent of the invention.

The shifting connection between the respective doors and their operating bell crank levers, and the directness of engagement of the levers with the doors, insures ease and certainty of operation. Either door 12 of any hopper may be manipulated independently of the other, whereby the entire load may be discharged near the center of the car, by opening only the inner doors, or approximately one-half of the load may be discharged at each side of the car, by opening only the outer doors, or the load may be discharged directly downwardly by opening all of the doors simultaneously. The simultaneous opening of both doors of one hopper uncovers the openings in the bottom of that hopper, as indicated at the left of Fig. 2, and its load can thus be practically instantly discharged. To close the outer doors, it is only necessary to lift the projecting ends 23 of outer levers 21 into engagement with locking members 25, which lifting movement, causing travel of rollers 18 along the under side of the door, will swing said door closed, and the retaining pins 26 may be positioned for locking the parts closed. To open said door requires only the removal of the pins 26 and the starting of the outer ends of the levers downwardly for moving bar 19 from the line of dead center, whereupon the door will be released and will open by reason of the weight of the sustained load or may be forced open by engagement of the rod 19 with the guides 35. The action of the inner set of levers, for operating the inner door 12, is the same as that just described, except that slide bars 32 are shifted longitudinally in lieu of the swinging movement of the outer ends of the outer levers, the links 27 transmitting movement from slide bars 32 to the inner levers 21.

Having thus described my invention, what I claim is,—

1. In a dumping car, the combination with a car body and a dumping door therefor hinged thereto, of a pivot pin fixed to said car body, and a bell crank lever pivotally carried on said pivot pin having one of its arms extending into direct connection with the door for manipulating the same.

2. In a dumping car, the combination with a car body and a dumping door therefor hinged thereto, of a bell crank lever piv-

otally connected at its angle to the car body and having one arm provided with direct connections with the door, and slidable means for sustaining said lever with the door, connected arm aligned with the pivot of the lever and disposed in the line of stress of the load acting on the door.

3. In a dumping car, the combination with a car body and a dumping door therefor hinged thereto, of a bell crank lever pivotally supported by the car body and having one arm provided with connections with the door, slidable means for disposing said arm in the line of stress of the load acting on the door, and means for locking the lever with said arm in such position.

4. In a dumping car, the combination with a car body and a dumping door therefor hinged thereto, of a bell crank lever pivotally supported by the car body and having one arm provided with connections with the door, the said arm being adapted to be positioned for delivering the stress of the load acting upon the door directly to said pivotal support as a direct longitudinally compressing strain on said arm, and slidable means for locking the other arm of the lever against movement when the first-mentioned arm is so positioned.

5. In a dumping car, the combination with a car body and a dumping door therefor hinged thereto, of a pair of pivotally mounted bell crank levers engaging said door for manipulating the same, and means spaced from the pivots of said levers connecting said levers together.

6. In a dumping car, the combination with a car body and a dumping door therefor hinged thereto, of a pair of bell crank levers pivotally sustained by the car body and connected with said door for manipulating the same, and slidable means for securing said levers in position for locking said door in a closed position.

7. In a dumping car, the combination with a car body and a dumping door therefor hinged thereto, of a bell crank lever pivotally supported beneath the car body adapted to engage said door for manipulating the same and retaining the door in positions controlled by the lever, and slidable means having link connection with said lever for locking said lever in one position.

8. In a dumping car, the combination with a car body and a dumping door therefor hinged thereto, of a bell crank lever pivotally sustained beneath the door, a guiding bracket carried by the door, a rod carried by one arm of the lever and extending through said guiding bracket and having a bearing engaging said door, and an angle plate fixed to the door and having a flange extending in the path of movement of the rod.

9. In a dumping car, the combination

with a car body and a dumping door therefor hinged thereto, of a bell crank lever pivotally sustained beneath the door, a guiding bracket carried by the door, and a rod carried by one arm of the lever and extending through the guiding bracket and having a bearing engaging the door, said guiding bracket comprising an angle plate having a flange extending into the path of movement of the rod.

10. In a dumping car, the combination with a hopper having an open bottom, of a centrally disposed plate extending across beneath said opening and formed transversely angular with the apex of the angle directed upwardly, and doors closing said opening, and each formed with an edge flange bent transversely to conform to the transverse contour of the cross plate and adapted to fit snugly against the same when the doors are closed.

11. In a dumping car, the combination with a hopper having an open bottom, of a centrally disposed plate extending across said opening and formed angular in cross section with the apex of the angle uppermost and having a plurality of transverse angular bends, and doors for closing said opening, each having an edge flange bent transversely to conform to the transverse contour of the cross plate and adapted to fit snugly against the same when closed.

12. In a dumping car, the combination with a car body and a dumping door therefor hinged thereto, of a guide-way extending transversely of the axis of pivotal movement of the door, a slide mounted on said guide-way, a bell crank lever controlling and actuating said door, and connections between the slide and lever for enabling manipulation of the lever by actuation of the slide.

13. In a dumping car, the combination with a car body and a dumping door therefor hinged thereto, of a bell crank lever hinged to swing in the same planes with the door and engaging the door for manipulating the same, a guide-way disposed transversely of the axis of the bell crank lever, and a slide engaging said guide-way and connected with said lever for actuating and controlling the same.

14. In a dumping car, the combination with a car body and a dumping door therefor hinged thereto, of a pair of bell crank levers pivotally sustained independently of the door and engaging the same for actuating and controlling the door, a pair of guide-ways, slides engaging said guide-ways, means connecting the slides together, and means connecting the slides to the bell crank levers for actuating and controlling said levers.

15. In a door operating device, the combination comprising a door, a bell crank lever rockably mounted below said door when in

closed position, a stop for limiting the movement of said lever in one direction, and means engaged by said lever while moving away from said stop adapted for forcing the door open.

16. In a dumping car, the combination with a car body and a dumping door therefor hinged thereto, of a bell crank lever engaging and adapted to actuate and control said door, a link pivoted to said bell crank lever, and a slide pivotally connected to said link for actuating and controlling the lever.

17. In a dumping car, the combination with a car body and a dumping door therefor hinged thereto, of a plurality of bell crank levers carried by the car body, adapted for manipulating said door, means connecting said levers together, and door engaging means carried by said connecting means.

18. In a dumping car, the combination with a car body and a dumping door therefor hinged thereto, of a bell crank lever pivotally supported by the car body and being adapted to be moved into position for transmitting the weight of the door directly to the pivotal support of said lever, and slidable means for sustaining said lever in such position.

19. In a dumping car, the combination with a car body and a dumping door therefor hinged thereto, along one of the sides of said door, a pair of bell crank levers disposed one at each end of said door spaced from the path of movement thereof, means extending between and connecting said levers beneath said door, and door engaging means carried by said connecting means.

20. In a dumping car, the combination with a car body and a dumping door hinged thereto along one edge of said door, a pair of bell crank levers disposed one at each end of the door being spaced from the path of movement thereof, means extending between and connecting said levers beneath said door, door engaging means carried by said connecting means, and slidable means for operating said bell cranks.

21. In a dumping car, the combination with a car body and a dumping door therefor hinged thereto along one side of said door, a pair of bell crank levers disposed one at each end of the door being spaced from the path of movement thereof, means extending between and connecting said levers beneath said door, door engaging means carried by said connecting means, and slidable means having link connections with said bell cranks for operating the same.

22. In a dumping car, the combination with a car body and a dumping door therefor hinged thereto along one side of said door, a pair of bell crank levers for operating said door disposed one at each end of

- the door being spaced from the path of movement thereof, means extending between and connecting said levers beneath said door, and slidable means for operating said bell cranks.
23. In a dumping car, the combination with a car body and a dumping door therefor hinged thereto along one side of said door, a pair of bell crank levers for operating said door disposed one at each end of the door being spaced from the path of movement thereof, means extending between and connecting said levers beneath said door, and guiding brackets carried by the door and extending about said connecting means.
24. In a dumping car the combination with a car body comprising a hopper, of a pair of doors closing said hopper and bell crank levers having fixed fulcrums and engaging said doors for operating said doors.
25. In a dumping car, an underframe, a drop door hinged to said underframe and adapted to swing to a vertical position, a door actuating mechanism including a fixedly pivoted lever, and means forming a positive and sliding connection between one end of the lever and the door.
26. In a dumping car, the combination with a car body and underframe, of a plurality of converging dumping doors forming part of a hopper, a bell crank lever having a fixed fulcrum within the underframe and adapted to actuate one of said doors in either direction.
27. In a dumping car, the combination with a car body, and a plurality of dumping doors forming a hopper in said car body, bulk heads beneath said hopper at opposite ends of said doors, and bell crank mechanism carried by said bulk heads for operating said doors.
28. In a dumping car, the combination with a car body and a plurality of dumping doors forming a hopper in said car body, bulk heads beneath said hopper at opposite ends of said doors, and means carried by said bulk heads for independently operating each of said doors.
29. In a dumping car, the combination with a car body and a plurality of dumping doors forming a hopper in said car body, of independently operable bell crank lever mechanism for operating each of said doors.
30. In a dumping car, the combination with a car body and a plurality of dumping doors forming a hopper in said car body, bulk heads beneath said hopper at opposite ends of said doors, and independently operable bell crank levers carried by said bulk heads for operating each of said doors.
31. In a car door operating device, the combination comprising a door, a guiding bracket carried by the door, a lifting means including an interposed lever positively engaging the bracket to push open said door while one end of said lifting means is rising to a higher plane.
32. In a car door operating device, the combination comprising a door, a positive door actuating means including an interposed bell crank adapted to push open said door while one end of said lifting means is rising to a higher plane.
33. In a car door operating device, the combination comprising door opening means, including a bell crank lever supported independently of a door above the lower edge of the door when in open position and adapted to actuate said door, and a projection on said door adapted to be engaged by said bell crank during movement thereof.
34. In a door operating device, the combination comprising a door, a bell crank lever rockably mounted below said door when in closed position, a stop for limiting the movement of said lever in one direction, and means engaged by said lever while moving away from said stop adapted for forcing the door open.
35. In a car door operating device of the compression type, a pivoted bell crank lever having a stationary fulcrum comprising an actuating arm and a supporting arm integral therewith, said supporting arm adapted to slidably contact with and be connected with the door.
36. In a hopper door operating device, the combination comprising a door and a door opening bell crank lever having a fixed fulcrum and being positively and slidably secured to said door.
37. In a hopper door operating device, the combination comprising a door, a stop on said door, a bell crank lever having an arm adapted to abut one part of said stop to hold said door in locked position and to contact with another part of said stop to open the door.
38. In a car door actuating device, the combination of a hopper bottom, a door, a member slidably mounted beneath said door, and means including a bell crank lever having a fixed fulcrum adapted to actuate said member to open said door.
39. In a car door operating device, the combination of a hopper bottom, a door having a guiding bracket on the underside thereof, a member slidably mounted within said bracket, and means including a bell crank lever having a fixed fulcrum adapted to actuate said member to open said door.
40. In a car, the combination with an underframe, of a door, a member slidably mounted beneath said door, and means including a bell crank lever having a fixed fulcrum within the underframe adapted to actuate said member to open and close said door.

41. In a car door operating device, the combination of a door, a member slidably mounted beneath said door, and means including a bell crank lever having a fixed fulcrum adapted to actuate said member to lock said door in closed position.

42. In a railroad car, a hopper bottom, a door for closing said bottom, and a bell crank lever engaging said door to open the same positively.

43. In a railroad car, a hopper bottom, a door for closing said bottom, and a bell crank lever engaging said door to pull the same into open position.

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

CLEMENT G. HARRINGTON.

Witnesses:

HERBERT W. WOLFF,
OSCAR HOCHBERG.