

May 20, 1958

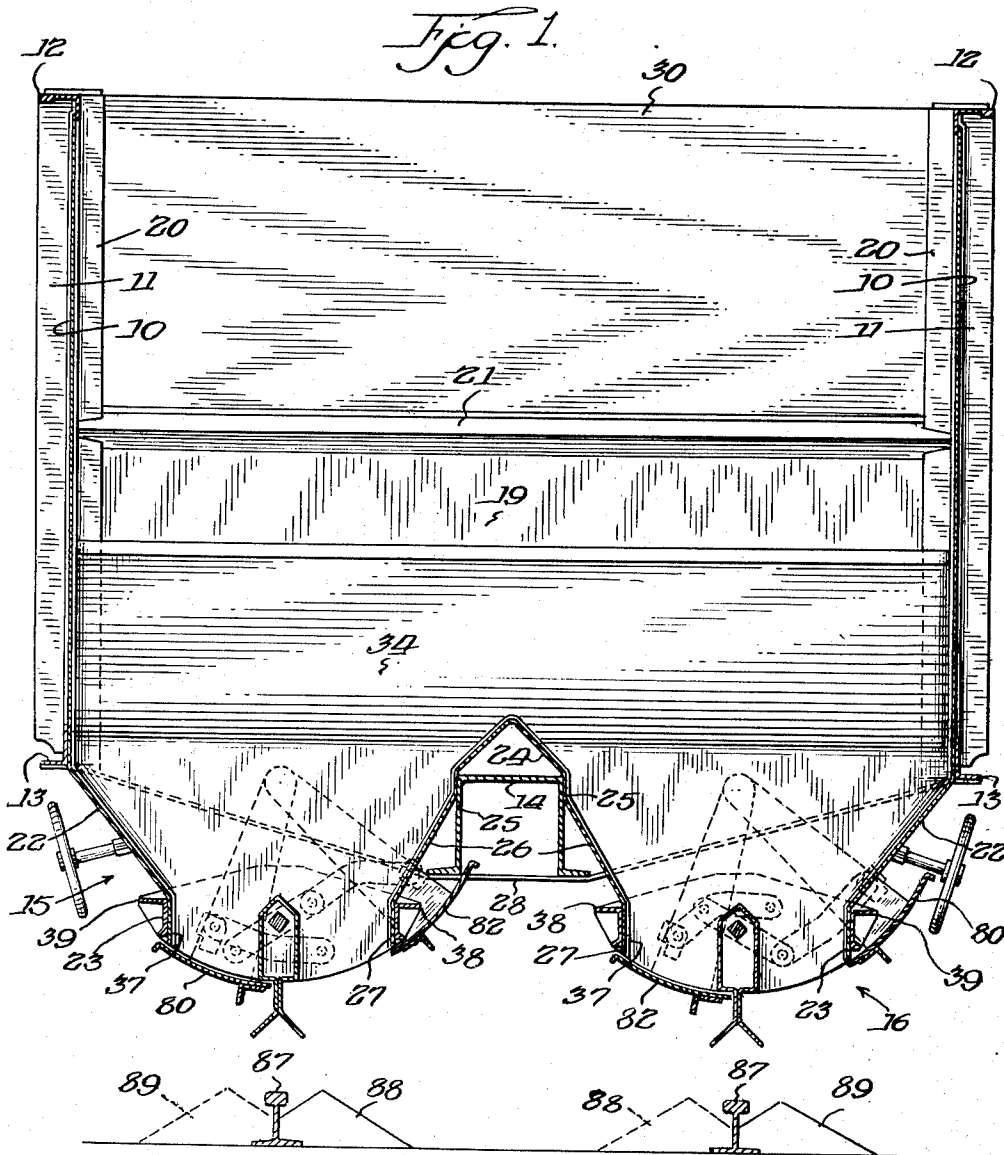
C. B. FAVERTY

2,835,208

BALLAST CAR DOOR OPERATING MECHANISM

Filed Jan. 21, 1954

2 Sheets-Sheet 1



Inventor.
Clyde B. Favery.

By. Wayne Morris Russell.
Atty.

May 20, 1958

C. B. FAVERTY

2,835,208

BALLAST CAR DOOR OPERATING MECHANISM

Filed Jan. 21, 1954

2 Sheets-Sheet 2

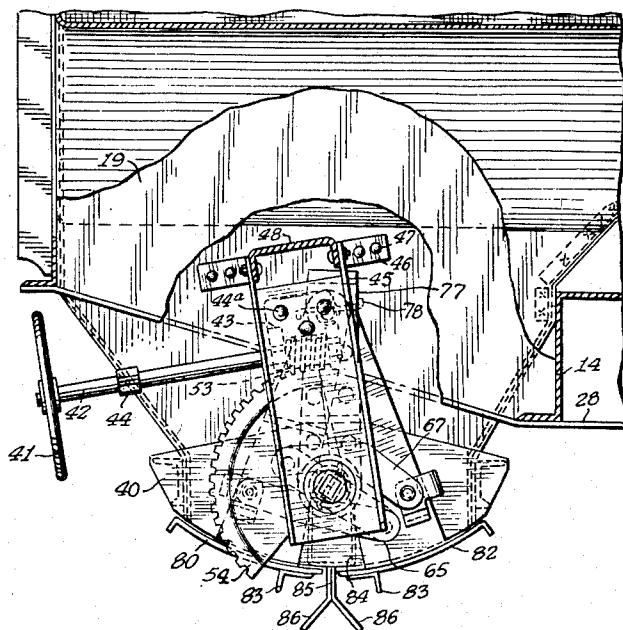


Fig. 2.

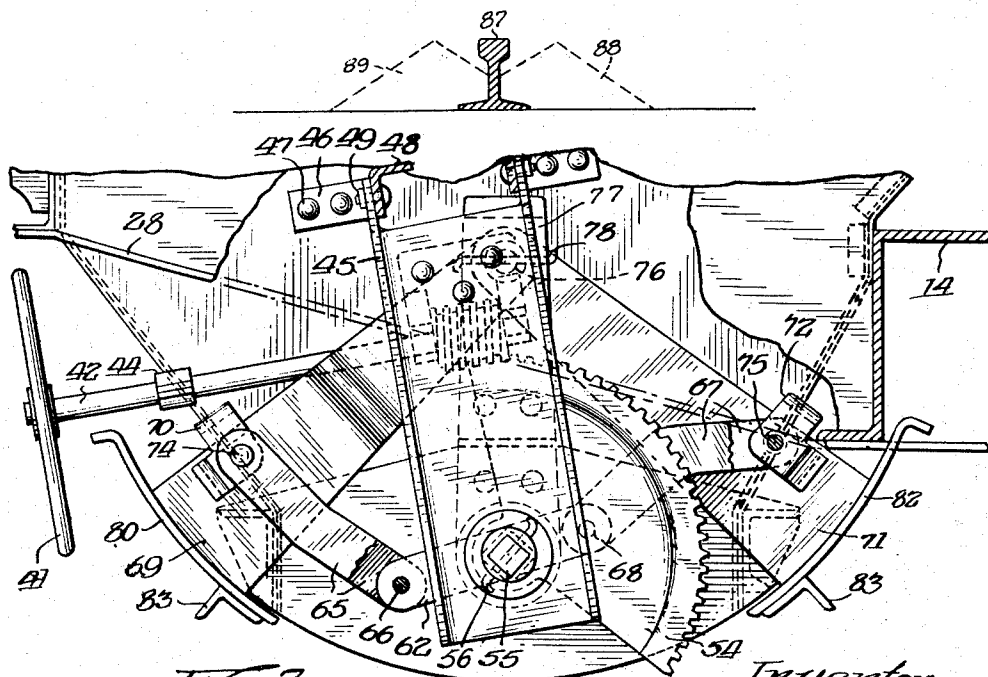


Fig. 3.

Inventor.
Clyde B. Faverty.
By
Wayne Morris Russell.
Att'y.

1

2,835,208

BALLAST CAR DOOR OPERATING MECHANISM

Clyde B. Faverty, Evanston, Ill., assignor to Pullman-Standard Car Manufacturing Company, Chicago, Ill., a corporation of Delaware

Application January 21, 1954, Serial No. 405,273

9 Claims. (Cl. 105-251)

This invention relates to an improvement in ballast discharging cars.

The principal object of this invention is to provide an improved operating mechanism for opening and closing the ballast car hopper doors.

Another object of this invention is to provide with a ballast discharging car having longitudinally disposed hoppers a simplified and rugged hopper door operating mechanism.

A further object of this invention is to provide a novel hopper door operating mechanism whereby ballast may be discharged on one side of the rail or on the other side of the rail or simultaneously on both sides of the rail.

And yet another object of this invention is to provide hopper door controls by which definite and accurate control of the amount of ballast to be discharged while the car is moving may be easily attained.

And still another object of this invention is to locate the hoppers and door openings for properly spreading the ballast.

And yet a further object of this invention is to provide a novel operating mechanism whereby the hopper doors are opened in a direction so as to attain the most efficient ballast spread.

The aforementioned and other objects of the invention may be ascertained by reference to the accompanying drawings wherein—

Fig. 1 is a vertical transverse sectional view taken through the center of a front set of parallel hoppers and depicting the longitudinal shell structure of the car;

Fig. 2 is a fragmentary elevational view showing the hopper doors closed; and

Fig. 3 is a fragmentary sectional view similar to Fig. 1 but showing the hopper doors open.

For purposes of disclosure, one specific embodiment of this invention has been illustrated and will hereinafter be described, however it is to be noted that various modifications and alterations may be effected without varying the spirit and the scope of the objects of this invention as defined in the appended claims.

Of primary importance to the proper maintenance of a railway track is the correct placement of ballast material which is located between the rail ties and the track subgrade. The usual procedure for distributing ballast is to have a car filled with ballast pulled over the track area where ballast is needed, while an operator walks along the car and manipulates the hopper bottom opening. As there are instances where a certain amount of ballast is needed either inside or outside a rail, and where the quantity varies, of the utmost importance to the proper distribution is an efficient correlation of the speed of the car and the ease of controlling the amount of opening of the hopper door. To a better solution of the problem with respect to the control mechanism for operating the hopper door is one principal object of this invention.

After the ballast has been spread by the hopper or ballast car, the next step is one of tamping the ballast

2

into place where it will affect the most efficient use. Needless to say, if the ballast has been spread haphazardly or without regard to tamping placement, much time, effort and expense will be involved in moving the ballast to the proper location. To a better solution of this latter problem is another principal object of this invention.

The invention is embodied in a specially built ballast car having longitudinal and transversely sloping floor sheets to facilitate the free flow of ballast to the hoppers.

Four hoppers are provided near the center of the car, the hoppers comprising a forward transversely parallel set and a rear transversely parallel set, each hopper in the forward set being on the same longitudinal axis as the hopper behind it in the rear set. Each hopper has an inner and an outer door, the inner door discharging ballast inside the rail while the outer door discharges ballast outside the rail. A control mechanism using the worm pinion and gear segment principle is provided with each hopper whereby either curved door may be rotated away from the bottom center of the hopper or both may be simultaneously rotated.

Referring now to the drawings, a ballast discharge car is depicted having side sheets 10, side posts 11, side plates 12, side sills 13, and a center sill 14. The end structures of the car are not illustrated as they are not deemed relevant to the invention. Near the center of the car and on either side of the center sill are hoppers 15 and 16, in a transversely parallel set and which are disposed in front of a similar pair of hoppers not shown which are also transversely parallel. Hoppers 15 and 16 have the same longitudinal axis, as the rear hoppers. To aid in directing the flow of ballast to the hoppers, a center plate 19 is provided which runs transversely between two inner center posts 20-20. Stiffening is provided across the top of the center plate by two angle irons 21-21.

The longitudinal shell structure of the car and a hopper is comprised of the side sheets 10, side slope sheets 22-22 which slope inwardly from the side sheets to form the outer sides of a hopper and which have depending portions 23-23. Over the center sill 14 and between the hoppers in each set extends a ballast separating sheet 24 having its apex above the center sill. The sheet 24 has vertical portions 25-25 securing it to the center sill from which angularly depending sheets 26-26 extend inwardly to form the inner side of a hopper section in conjunction with the depending portions 27-27. The depending portions 27-27 and 23-23 are longitudinally parallel and in the same horizontal plane thereby forming the bottom sides of a hopper. Between the two sets of hoppers is a bracing plate 28 which is secured to the bottom of the center plate 19 thereby forming a type of I beam structure.

Longitudinally sloping floor sheets 30-30 slope from the ends of the car to the hoppers where the hopper end sheets are secured to the floor sheets. Center crossridge sheets 34-34 are secured at their top to the center plate 19 and slope downwardly to the hopper ends opposite where the floor sheets 30 are secured. The crossridge sheets are secured to the hopper end sheets opposed to those to which the end floor sheets are secured. Closing flanges 37 are provided between the hopper end sheets and the side slope sheets 22 and separating sheet 24.

Each hopper is comprised, other than the aforementioned sheet structure, of inner and outer bulb irons 38-38 and 39-39 which are secured longitudinally to the depending portions 27-27 and 23-23 respectively. The irons 38 and 39 are also secured at their ends to hopper end plate panels 40.

Each hopper control mechanism is comprised of a wheel 41 which operates a shaft 42 which further operates a worm pinion apparatus 43. The shaft 42 is held

in place by a plate 44 which is secured to the outside of the side slope sheet 22. The pinion apparatus is secured, such as by rivets 44a, to a wheel support 45. The support has flanges 46 which are secured against the center plate by means such as rivets 47. A U-shaped plate 48 extends between the wheel support 45 and the hopper end sheets, being secured to the support by means such as bolt and nut units 49 and to the end sheets by means of brackets.

The worm pinion 53 is in mesh with a gear segment 54 which is mounted on and drives a shaft 55 being held secure by a pin 56. As the remaining mechanism parts are duplicated at each end of each hopper, only one end will be described to avoid confusion.

A link 62, which is rotated by the shaft 55, is attached at one end to an outer bifurcated door arm 65 by means of a pin 66, and at the other end to an inner bifurcated door arm 67 by means of a pin 68. The outer bifurcated door arm 65 is movably attached to an outer door hanger 69 by means of a clip 70 at the end of the arm opposite the link pin 66. The inner bifurcated door arm 67 is movably attached to an inner door hanger 71 by means of a clip 72. The clips 70 and 72 are secured to the hangers 69 and 71 as by welds. The clips 70 and 72 are rotatably attached to the arms 65 and 67 by means of clip pins 74 and 75 respectively. The hangers 69 and 71 are pivoted adjacent the tops thereof by a pivot pin 76 which is secured to a hanger support 77 by means of a cotter pin 78. The hanger support 77 is secured to the hopper end sheet and the end plate panel 40 by means such as rivets, also providing support for the shaft 55.

Both outer door arms 65 are secured, as by welding, to a curved outer door 80 for reciprocating the door, and both inner door arms 67 are secured, as by welding to a curved inner door 82 for reciprocating that door. The doors 80 and 82 are longitudinally disposed and transversely curved so that upon reciprocation a longitudinally disposed opening in the hopper occurs. L-shaped beams 83—83 are secured adjacent the inner side of each door for stiffening purposes. A shaft cover sheet 84 is provided between the hopper end sheets, which covers the shaft 55 and also serves as a center abutment plate 85 by being joined at the point where the doors 80 and 82 meet. Angular extensions 86—86 of the sheet 84 serve as deflector shields for the proper deflection of the ballast upon discharge. It is to be noted that the doors 80 and 82 extend longitudinally beyond the operating linkage adjacent each hopper end thereby protecting the linkage from foreign articles which may be thrown upward from the track.

Upon being placed in operation, the novel and structurally rugged hopper door operating mechanism operates the doors by a turn of the wheel 41. The wheel revolves the worm pinion 53 which in turn moves the gear segment 54. Direct drive from the segment to the shaft 55 is transmitted through the shaft to the link 62 which is rotated also in a direct ratio to the segment rotation. The link in turn, through its arm pins 66 and 68 force the arms 65 and 67 respectively outward, thereby forcing the hangers 69 and 71 by means of the clips 70 and 72 to pivot on their pivot pin 76 and reciprocate the doors away from the abutment plate 85. Due to a direct drive being transmitted from the gear segment to the door, the amount of opening is effectively and accurately controlled by the operator at the wheel 41. It is to be noted that the shafts 55 of hoppers 15 and 17 are on the same longitudinal axis, as are the shafts 55 of hoppers 16 and 18.

Scientific road maintenance surveys have disclosed the ideal location for the ballast material, after tamping, to be adjacent the inside and outside of each rail 87 (Figs. 1 and 2). So as to spread the ballast in that location in order to eliminate the necessity of costly manual spreading for tamping purposes, the reciprocation of the doors and the placement of the door openings in conjunction

with the deflector shields were so designed to allow for the proper accumulation of ballast, as indicated by ballast piles 88—88 and 89—89. And as there are instances also where ballast is required only in certain locations, the operating mechanism was also designed to permit either door to open. By pulling the outer door link pin 66 at each end of the hopper, the outer door linkage becomes inoperative as the rotation of the link 62 will not actuate the outer door arm 69. By pulling the inner door link pins 68, the inner door linkage also becomes inoperative in a similar manner.

Thus it may be seen that a simplified operating control mechanism has been disclosed which accurately allows for the discharge of ballast either inside or outside of the rail or on both sides and in the most ideal location for efficient tamping purposes.

What is claimed is:

1. In a ballast car adapted to run on rails and having a center sill and ballast discharge hoppers upon opposite sides of said sill, a pair of longitudinally disposed rotary door members underlying each hopper and transversely reciprocable to provide a ballast discharge opening directly above each rail, and mechanism for opening and closing said door members in such a manner to direct ballast to either side of said rail or simultaneously to both sides thereof, said mechanism having a longitudinal axis located above said door members and directly over said rail.

2. In a ballast car adapted to run on rails and having a center sill and ballast discharge hoppers upon opposite sides of said sill, a pair of longitudinally disposed rotary door members at the bottom of each hopper pivotally suspended from a single longitudinal axis and moving by sliding actions in opposing transverse directions thereby providing a ballast discharge opening beginning directly above each rail, and mechanism for operating said doors to discharge ballast to either side or both sides of said rails including a rotatable link operatively connected to both of said doors for simultaneous operation thereof and operatively connected to one of the doors for selective operation thereof.

3. In a ballast car adapted to run on rails and having a center sill and ballast discharge hoppers upon opposite sides of said sill, a pair of longitudinally disposed reciprocable door members at the bottom of each hopper thereby providing a pair of discharge openings, abutment means separating said doors and being located directly over each rail, said door members being pivotally suspended from a single longitudinal axis located above said abutment means and moving by sliding actions in opposing directions transverse to the flow of ballast through the discharge openings and engaging against said abutment means to close said openings, and mechanism for operating said doors including a rotatable link operatively connected to both of said doors for discharging ballast to both sides of a rail and operatively connected to one of said doors for discharging ballast to a selected side of a rail.

4. In a ballast car adapted to run on rails and having a center sill and ballast discharge hoppers upon opposite sides of said sill, a pair of longitudinally disposed rotary door members at the bottom of each hopper being separated by an abutment element and thereby providing a pair of discharge openings, said door members being pivotally suspended from a single longitudinal axis above said element and moving by sliding actions in opposing directions transverse to the flow of ballast through the discharge openings and engaging beneath said element to close said openings, mechanism for operating said doors simultaneously or selectively to discharge ballast to either side or both sides of said rails including an operating link and an associated arm at each end thereof operatively connected with respective doors for simultaneous operation of both doors, and means for disconnecting said link from either of said arms for selective operation of either door.

5. In a ballast car adapted to run on rails and having

5

a center sill and ballast discharge hoppers upon opposite sides of said sill, a pair of longitudinally disposed rotary doors at the bottom of each hopper thereby providing ballast discharge openings, said doors being separated by an abutment element, mechanism for controlling the movement of said doors comprising a manually operable member, differential means operated by said member, torque transmitting means rotatably connected to said differential means, link means fixedly connected to said torque transmitting means, and pendulum means secured to each end of each door and pivoting about a longitudinal axis above said abutment element, said link means adaptable to be secured to said pendulum means for selectively or simultaneously operating said doors.

6. In a ballast car adapted to run on rails and having a center sill and ballast discharge hoppers upon opposite sides of said sill, a pair of longitudinally disposed rotary doors at the bottom of each hopper thereby providing ballast discharge openings, said doors being separated by an abutment element, mechanism for controlling the door comprising manually operated differential means, link means rotatably connected to said differential means, and arm means pivotally connected to the car above said element and operatively connected to said doors, said link means having ends each of which is adaptable to be connected to said arm means for selectively or simultaneously operating said doors.

7. In a ballast car adapted to run on rails and having a center sill and at least one ballast discharge hopper, a pair of longitudinally disposed rotary doors at the bottom of each hopper thereby providing ballast discharge openings, and mechanism for controlling said doors comprising manually operated differential means, torque transmitting means rotatably connected to said differential means, an operating link fixedly connected to said transmitting means, and an associated arm at each end thereof pivotally connected to said car above the bottom of the hopper and operatively connected with respective doors for simultaneous operation of both doors, and means for disconnecting said link from either of said arms for selective operation of either door.

8. In a ballast car adapted to run on rails and having a center sill and ballast discharge hoppers upon opposite sides of said sill, a pair of longitudinally disposed rotary doors at the bottom of each hopper thereby providing ballast discharge openings, said doors being separated by an abutment element, mechanism for operating

6

said doors simultaneously or selectively to discharge ballast to either side or both sides of said rails comprising a manually operable wheel member, a pinion member rotated by said wheel member, a gear segment driver at right angles by said pinion member, a shaft member fixedly connected to said segment member and extending longitudinally through the center of a hopper, a pair of link members secured one at each end of a hopper, a pair of arms rotatably secured one at each end of each link, and a hanger secured at one end adjacent each end of each door, said hangers being pivotally connected about a single longitudinal axis in the same vertical plane as said shaft member, each arm being pivoted to its respective hanger, and means for disconnecting each of said link members from either of said associated arms for selective operation of either door.

9. In a ballast car adapted to run on rails and having a center sill and ballast discharge hoppers upon opposite sides of said sill, a pair of longitudinally disposed doors at the bottom of each of said hoppers, an abutment member between said doors and having deflection shields therebelow, said abutment member having a first longitudinal axis, mechanism for operating said doors including torque transmitting means along a second longitudinal axis above said first longitudinal axis, said torque transmitting means operatively connected to pendulum means pivoting about a third longitudinal axis above said second longitudinal axis, said pendulum means operable to slide said doors in opposing transverse directions to said longitudinal axes to permit the flow of ballast through a resulting discharge opening, said ballast being directed by said deflection shields to spread immediately adjacent a rail, said first, second and third longitudinal axes being in the same vertical plane.

References Cited in the file of this patent

UNITED STATES PATENTS

1,174,677	Campbell	Mar. 7, 1916
1,209,809	Campbell	Dec. 26, 1916
1,609,297	Hart	Dec. 7, 1926
1,800,832	Hindahl	Apr. 14, 1931

FOREIGN PATENTS

392,921	France	Dec. 9, 1908
567,132	France	Feb. 25, 1924
54,780	France	Jan. 12, 1950
(1st addition to 907,911)		