No. 855,837. PATENTED JUNE 4, 1907.

E. I. DODDS.

DOOR OPERATING MECHANISM FOR GONDOLA CARS.

APPLICATION FILED APR. 28, 1905.

4 SHEETS—SHEET 1.

Fig. 1.

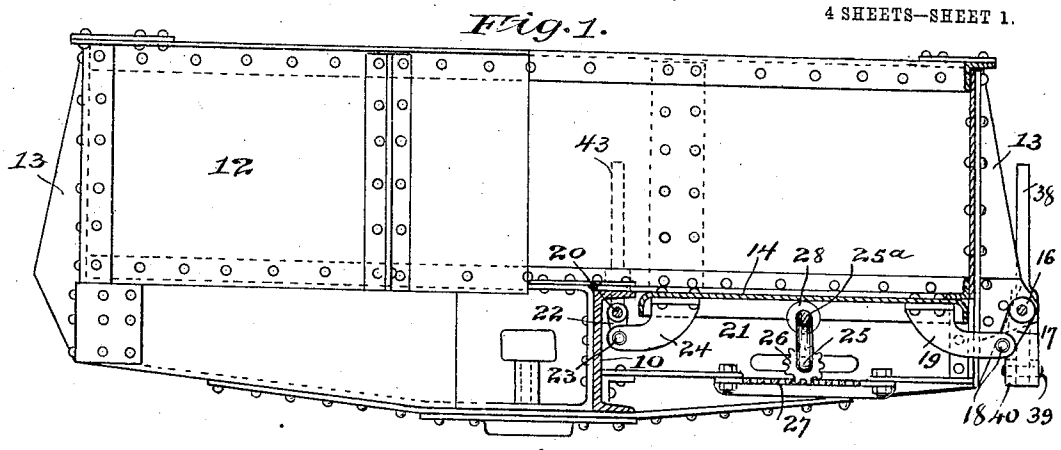


Fig. 2.

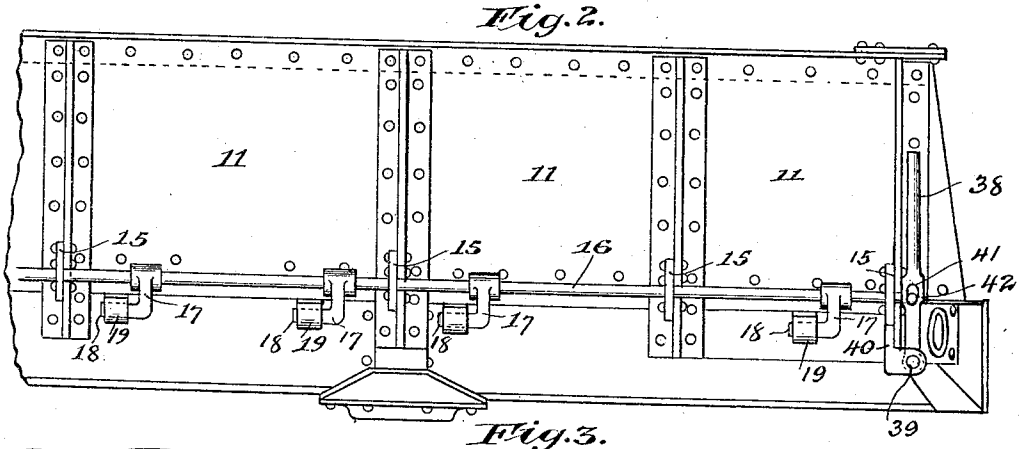
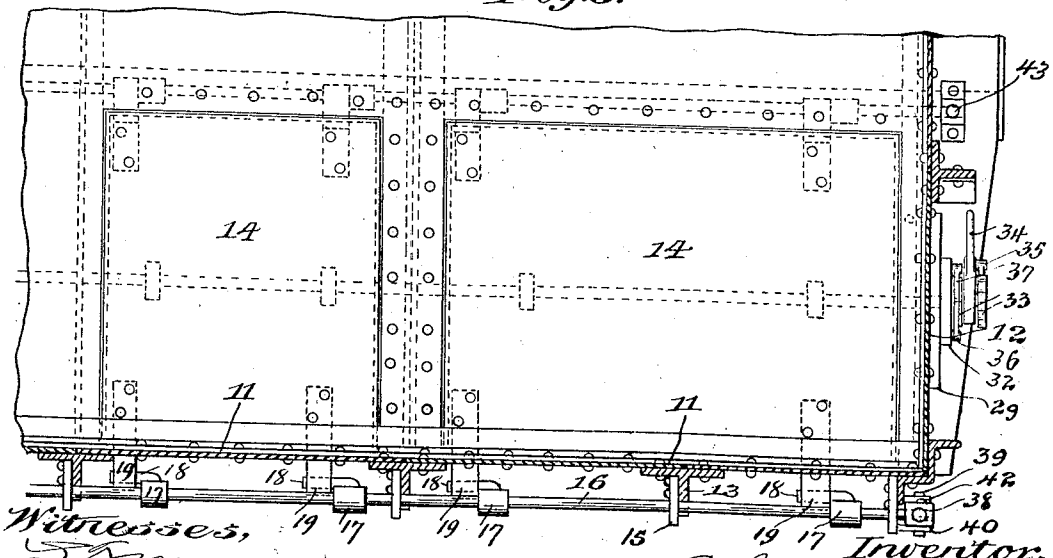


Fig. 3.



Witnesses,
F. D. Mann
S. N. Pond

Inventor,
Ethan I. Dodds,
By Offield, Towle & Linthicum
Attys.

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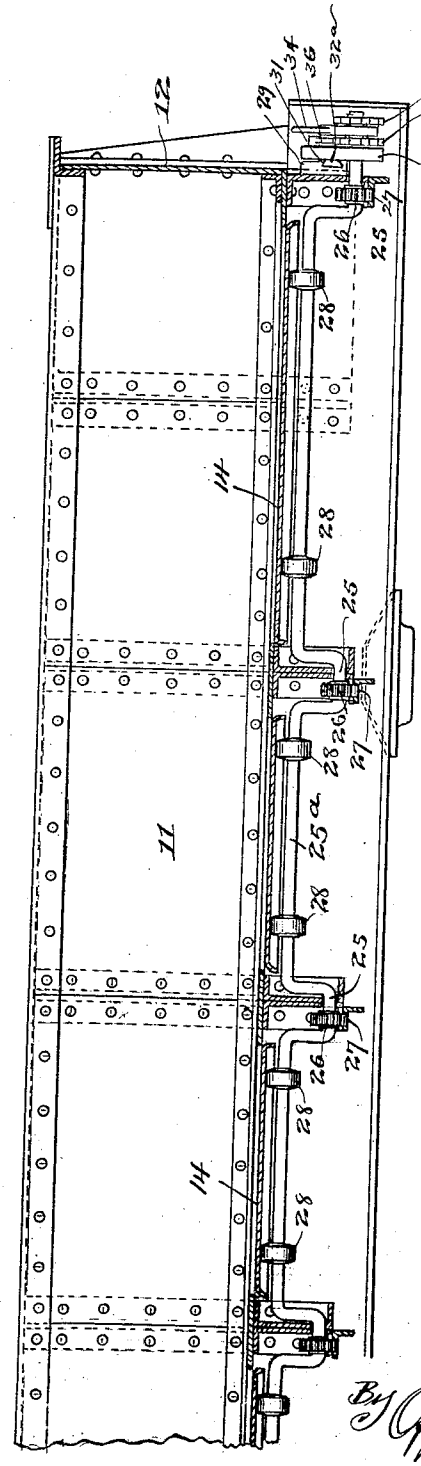
Fig. 4.



Witnesses,
F. S. Mann,
S. N. Todd.

Inventor,
Ethan I. Dodds,
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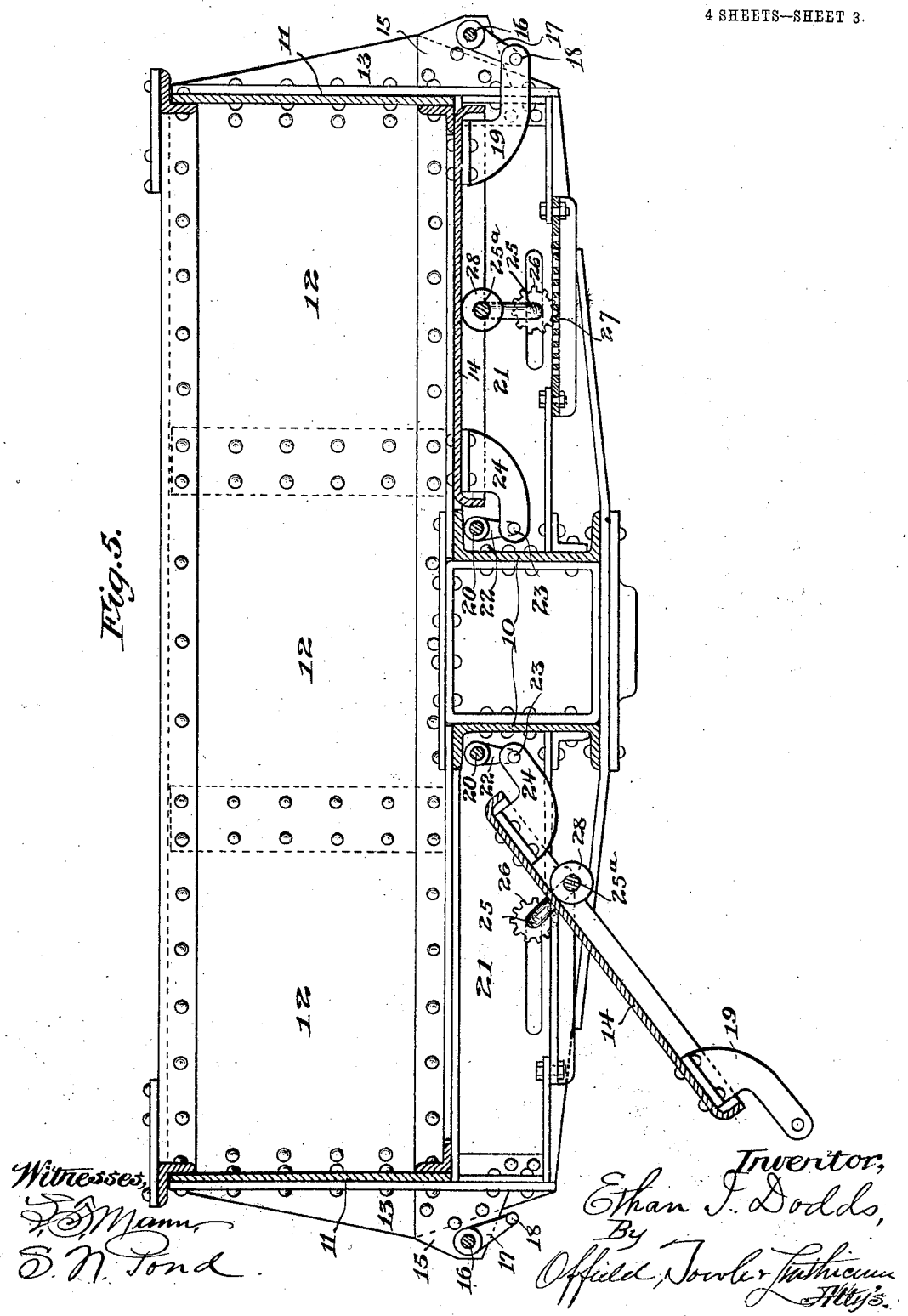
4 SHEETS—SHEET 3.

Fig. 5.



Witnesses,
F. D. Mann.
S. N. Pond.

Inventor,
Ethan I. Dodds,
By Offield, Towler & Lothrop
Attys.

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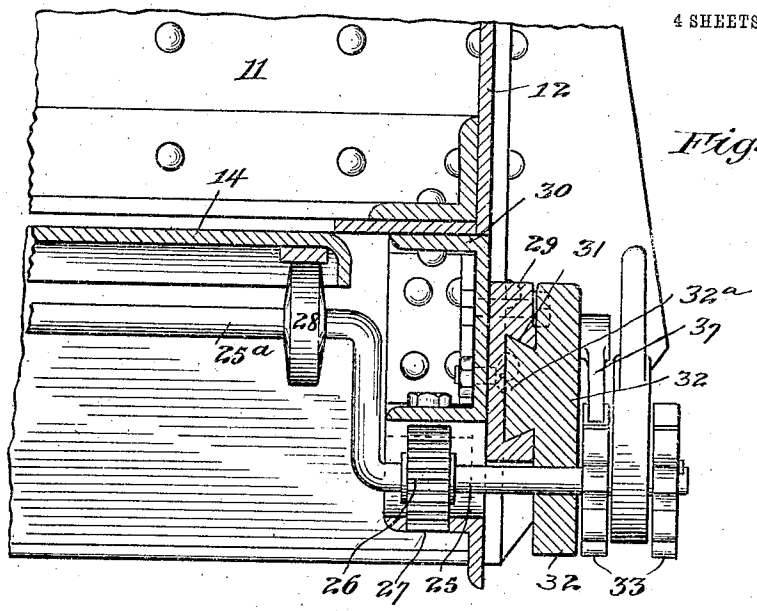


Fig. 6.

Fig. 7.

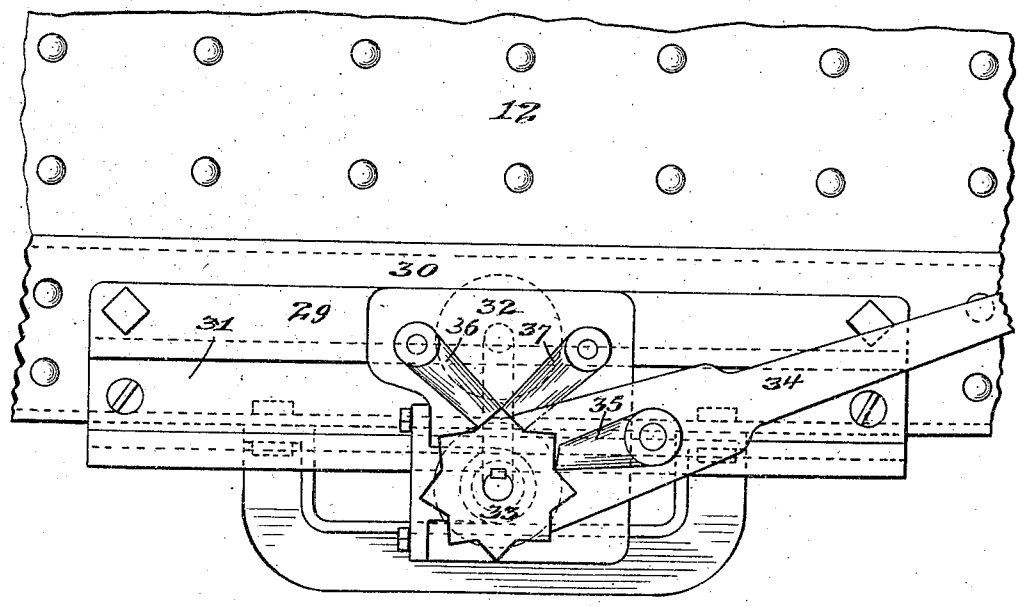
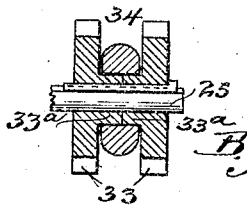


Fig. 8.



Witnesses,
F. D. Mann,
S. N. Pond.

Inventor,
Ethan I. Dodds,
By Offield, Towler & Linthicum
Attys.

UNITED STATES PATENT OFFICE.

ETHAN I. DODDS, OF PULLMAN, ILLINOIS, ASSIGNOR TO THE PULLMAN COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

DOOR-OPERATING MECHANISM FOR GONDOLA CARS.

No. 855,837. Specification of Letters Patent. Patented June 4, 1907.

Application filed April 28, 1905. Serial No. 257,879.

To all whom it may concern:

Be it known that I, ETHAN I. DODDS, a citizen of the United States, residing at Pullman, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Door-Operating Mechanisms for Gondola Cars, of which the following is a specification.

My invention relates to metal car constructions, more particularly cars of that type wherein the bottoms are constituted by a series of floor sections in the form of hinged doors that may be dropped by means of door-operating mechanism to discharge the load beneath or to the sides of the car and subsequently raised to and held in normally closed position.

In an application heretofore filed by me on the 24th day of April, 1905, Serial No. 257,150, I have disclosed as the subject matter thereof a door-operating mechanism characterized by the provision of a shaft extending longitudinally of each side of a car and provided with offset or cranked portions engaging the under sides of the doors, said shaft being so mounted and operated as to move bodily laterally in a direction transversely of the car-body or inwardly and outwardly of the door, thereby securing a longer and more effective arc of travel to the door-engaging parts. In said application, however, the operating mechanism is shown as applied to doors permanently hinged alongside the center sills of the car and opening outwardly of the sides of the latter.

My present invention is based on the same fundamental principle of operation as disclosed in the aforesaid application, but embodies an extended application of this principle to a mechanism adapted to co-operate with doors hinged along both the center sills and side sills and adapted to be swung on either hinge so as to open either inwardly or outwardly of the transverse dimension of the car-body; the general objects of the invention being to provide a car capable of discharging its load either directly beneath the car-body or outwardly of the sides thereof, and to provide a simple and easily manipulated mechanism for operating the hinged doors of such a car.

In the accompanying drawings I have illustrated a preferred mechanical embodiment of my invention as applied to a steel gondola car, and referring thereto,—

Figure 1 is an end elevational view of a car-body embodying my invention, with one side thereof in cross-section showing the door-operating mechanism; Fig. 2 is a side elevational view of a portion of the car-body; Fig. 3 is a top plan view of Fig. 2 with the side and end walls in horizontal section; Fig. 4 is a side elevational view of the door-operating parts, with the car-body in longitudinal vertical section; Fig. 5 is an enlarged cross-sectional view showing one of the doors open and the other closed; Fig. 6 is an enlarged detail view in longitudinal section through the shaft-operating mechanisms at the end of the car; Fig. 7 is a detail front elevational view of the shaft-operating mechanism shown in Fig. 6; and Fig. 8 is a sectional detail illustrating the manner and means of mounting the actuating lever and star wheels on the door-operating shaft.

Referring to the drawings, 10 may designate the twin center sills which, in cars of this type, usually accommodate the drawbar and coupler.

11 designates the side-plates and 12 the end-plates of the car-body.

13 designates the side stakes, herein shown as provided with outwardly projecting stiffening webs of increasing width from the top to the plane of the floor of the car to afford a maximum resistance to said strains at the points of greatest bending moment.

14 designates each of a series of doors constituting drop-bottom sections of the car floor. These doors are hinged along both their inner and outer longitudinal edges in the following manner and by the following means. Riveted to the lower ends of the side stakes 13 are bracket plates 15 which support shafts 16 so mounted therein as to be capable of a limited longitudinal play in their bearings effected by means hereinafter described. Fast on these shafts are depending arms 17 provided with laterally extending pintles 18, on which latter are hinged the outer ends of bracket arms 19 rigidly bolted to the outer marginal portions of the doors 14. By this mechanism the doors are supported with capacity for a swinging movement on their outer margins as hinges. A similar mechanism is employed for support-

ing the inner margins of the doors with the same capacity for a swinging movement on their inner margins as hinges, consisting of shafts 20 mounted in the transverse frame members of the car-body, indicated at 21 and commonly termed "flying transoms", said shafts 20 being located preferably just outside the center sills 10. Fast on shafts 20 are depending arms 22 having laterally projecting pintles 23, on which are hinged the inner ends of bracket arms 24 securely riveted to the doors 14 on their inner margins. The shafts 20, like the shafts 16, are provided with suitable mechanism hereinafter described for effecting a sufficient longitudinal movement thereof to disconnect the hinged arms 22 and 24, when desired.

Disposed longitudinally of and beneath each side of the car bottom is a door-operating shaft 25 which has integral offset or cranked portions 25ª disposed between adjacent "flying transoms" and underlying the hinged doors. Each shaft has fast thereon a series of spur gears 26 that rest upon and operate over racks 27 herein shown as bolted to the lower margin of the "flying transoms." The offset portions or cranks 25ª of the shaft are each provided preferably with one or more rollers 28 that engage the under surfaces of the doors in an anti-friction manner.

From the foregoing it will be seen that when the shaft 25 is given a turning movement, the shaft will not only rotate about its own axis, but, by reason of the gear and rack mechanism on which it is mounted, will be caused to travel bodily and laterally inwardly and outwardly of the sides of the car-body, this resulting in giving to the roller supports of the doors a long wide arc of travel, permitting a wide opening of the doors, as well as affording a mechanically advantageous means for operating the latter. Any suitable and convenient mechanism for operating said shafts may be employed, a simple mechanism for this purpose herein shown consisting of the following. Referring more particularly to Figs. 6, 7 and 8, 29 designates a bar securely bolted to the outer face of the transverse end sill 30 and containing a dove-tailed channel 31. On said bar is slidably mounted by means of a dove-tailed tongue 32ª engaging said channel a block 32 in which is journaled the end of the shaft 25. On the overhanging end of said shaft are keyed a pair of twin star wheels 33, which, as shown in Fig. 8, may have inwardly projecting hubs 33ª, on which is loosely mounted an operating lever 34 that carries on either side a pivoted dog 35 engaging the toothed peripheries of the star wheels. Pivotally mounted on the block 32 above the inner star wheel 33 are a pair of oppositely disposed and operating detent pawls 36 and 37, the noses of which overlie and engage the teeth of said star wheel, one of said pawls preventing rotation of the star wheels and shaft in one direction, and the other preventing such rotation in the opposite direction. When both engage the star wheel in the manner shown in Fig. 7, the shaft is securely held against turning and sidewise bodily movement in either direction.

For the purpose of effecting sufficient longitudinal movement of the outer hinge shafts 16 to effect the hinging and unhinging of the doors along their outer edges, I have shown a lever 38 pivoted at its lower end at 39 to a bracket 40 suspended from one of the bracket plates 15, said lever having a vertical slot 41 engaging a cross-pin 42 carried by the end of the shaft 16. By manipulating the lever 38 the shaft 16 may be shifted so as to carry the pintles or hinge-pins 18 into and out of engagement with the bracket arms 19, as desired. A similar lever 43 (Fig. 3) is herein shown for similarly actuating the inner longitudinally movable hinge shaft 20.

In operation, assuming that the doors are closed, and that it is desired to discharge the load outwardly of the sides of the car, the levers 38 are actuated to release the hinged arms 19 from their supporting pintles 18, and, by means of the lever 34 the shafts 25 are turned in a direction to cause them to travel bodily inwardly of the car, the inner detent pawl being turned out of the way for this purpose, and the actuating dogs 35 being thrown into proper engagement with the star wheel to start the travel of the shaft after which the weight of the load is sufficient to complete the movement of the shaft; the relative positions of the parts at the completion of the bending movement being shown at the left in Fig. 5. An opposite movement imparted to the shaft by lever 34 and the dogs 35 effects the return of the parts to normal position, the proper detent pawl being thrown into action to hold the shaft against return movement as the door-engaging cranks are gradually swung up by successive actuations of the lever 34. In case it is desired to discharge the load beneath the car, and consequently to swing the doors on their outer margins as hinges, the inner levers 43 are actuated, separating the hinged arms 24 from their supporting pintles 23; whereupon, by actuating the shafts 25 in a direction outwardly of the sides of the car in the manner already described a wide swinging movement is imparted to the inner margins of the doors. When the doors are returned to normal or horizontal position, whether swung on their inner or outer margins, an inward movement of the hinge rods 16 or 20, as the case may be, re-establishes the previously disconnected hinge connections and insures the support of the doors at both margins as well as through the intermediate support afforded by the shafts 25.

It being evident that minor changes in the details of construction and relative arrangement of parts might be made in the above-described mechanism without variance from the principle thereof, or loss of the advantages secured thereby, I do not limit the invention to the particular structure and mechanism disclosed, except to the extent indicated in specific claims:

This patent is intended to embrace only so much of the disclosure made herein as is covered by the claims.

I claim:

1. In a railway car having center sills, the combination of one or more dumping doors on each side of said center sills, and separable hinge mechanisms supporting each of said doors at both of its longitudinal edges, whereby the hinge mechanism on either edge of any of said doors may be separated and permit the door to open turning on the unseparated hinge mechanism at its opposite edge, substantially as described.

2. In a railway car having center sills, the combination of one or more dumping doors on each side of said center sills, separable hinge mechanisms supporting each of said doors at both of its longitudinal edges, whereby the hinge mechanism on either edge of any of said doors may be separated and permit the door to open turning on the unseparated hinge mechanism at its opposite edge, and means to control the movements of said doors, substantially as described.

3. In a railway car having center sills, the combination of one or more dumping doors on each side of said center sills, separable hinge mechanisms supporting each of said doors at both of its longitudinal edges, whereby the hinge mechanism on either edge of any of said doors may be separated and permit the door to open turning on the unseparated hinge mechanism at its opposite edge, and means to close said doors, substantially as described.

4. In a railway car having center sills, the combination of one or more dumping doors on each side of said center sills, separable hinge mechanisms supporting each of said doors at both of its longitudinal edges, whereby the hinge mechanism on either edge of any of said doors may be separated and permit the door to open turning on the unseparated hinge mechanism at its opposite edge, and means to close said doors when opened in either direction, substantially as described.

5. In a railway car having center sills, the combination of one or more dumping doors on each side of said center sills, separable hinge mechanisms supporting each of said doors at both of its longitudinal edges, whereby the hinge mechanism on either edge of any of said doors may be separated and permit the door to open turning on the unseparated hinge mechanism at its opposite edge, and means to control the opening of said doors when the hinge mechanisms at either edge are separated, such means being adapted to close said doors when opened in either direction, substantially as described.

6. In a railway car having center sills, the combination of one or more dumping doors on each side of said center sills, separable hinge mechanisms supporting each of said doors at both of its longitudinal edges, whereby the hinge mechanism on either edge of any of said doors may be separated and permit the door to open turning on the unseparated hinge mechanism at its opposite edge, and door-operating means each including a rotatable cranked or offset shaft, substantially as described.

7. In a railway car having center sills, the combination of one or more dumping doors on each side of said center sills, separable hinge mechanisms supporting each of said doors at both of its longitudinal edges, whereby the hinge mechanism on either edge of any of said doors may be separated and permit the door to open turning on the unseparated hinge mechanism at its opposite edge, and door-operating means each including a rotatable cranked or offset shaft, said doors resting upon and supported by the cranked or offset portions of said shafts, substantially as described.

8. In a railway car having center sills, the combination of one or more dumping doors on each side of said center sills, separable hinge mechanisms supporting each of said doors at both of its longitudinal edges, whereby the hinge mechanism on either edge of any of said doors may be separated and permit the door to open turning on the unseparated hinge mechanism at its opposite edge, and door-operating means each including a rotatable cranked or offset shaft, said doors resting upon and supported by the cranked or offset portions of said shafts, the cranked or offset portions of said shafts being in vertical planes when the doors are in closed position, substantially as described.

9. In a railway car having center sills and a flat or flush bottom, the combination of one or more dumping doors on opposite sides of said sills, said doors forming parts of said flat or flush bottom, and separable hinge mechanisms supporting each of said doors at both of its longitudinal edges, whereby the hinge mechanism on either edge of any of said doors may be separated and permit the door to open turning on the unseparated hinge mechanism at its opposite edge, substantially as described.

10. In a railway car having center sills and a flat or flush bottom, the combination of one or more dumping doors on opposite sides of said sills, said doors forming parts of said flat or flush bottom, separable hinge mechanisms

supporting each of said doors at both of its longitudinal edges, whereby the hinge mechanism on either edge of any of said doors may be separated and permit the door to open turning on the unseparated hinge mechanism at its opposite edge, and door-operating means, substantially as described.

11. In a railway car, the combination of one or more dumping doors disposed on each side of the longitudinal center of the car, and separable hinge mechanisms supporting each of said doors at both of its longitudinal edges, whereby the hinge mechanism on either edge of any of said doors may be separated and permit the door to open turning on the unseparated hinge mechanism at its opposite edge, substantially as described.

12. In a railway car, the combination of a car-body having a substantially flush and horizontal bottom, two sets of dumping floor doors arranged in two longitudinal series and forming portions of said bottom, and means supporting said doors permitting either longitudinal edge of each to be dropped, substantially as described.

13. In a railway car, the combination of a car-body having a substantially flush and horizontal bottom, one or more dumping floor doors on each side of the longitudinal center of the car forming portions of said bottom, and means supporting said doors permitting either longitudinal edge of each to be dropped, substantially as described.

14. In a railway car, the combination of a car-body having a substantially flush and horizontal bottom, one or more dumping floor doors on each side of the longitudinal center of the car forming portions of said bottom, and separable hinge mechanisms supporting each of said doors at both of its longitudinal edges, whereby the hinge mechanism on either edge of any of said doors may be separated to permit the door to turn on the unseparable hinge mechanism at its opposite edge, substantially as described.

15. In a railway car, the combination of a car-body having a dumping floor door, separable hinge mechanisms supporting said door at opposite edges, whereby the hinge mechanism at either edge may be separated and permit the door to open turning on the unseparated hinge mechanism at its opposite edge, and a door-operating means including a shaft bodily movable toward and from the hinge edges of said door, substantially as described.

16. In a railway car, the combination of a car-body having a dumping floor door, separable hinge mechanisms supporting said door at opposite edges, whereby the hinge mechanism at either edge may be separated and permit the door to open turning on the unseparated hinge mechanism at its opposite edge, a shaft upon which said door rests, said shaft being bodily movable toward and from the hinge edges of said door, and means to bodily move said shaft, substantially as described.

17. The combination with a car-body having a dumping floor section, of separable hinge mechanisms supporting said floor section on both of its longitudinal edges whereby either edge may be dropped, and a longitudinally extending shaft mounted beneath said floor section and bodily movable laterally of the car, said shaft having one or more offset portions engaging the under side of said floor section, and means for turning said shaft, substantially as described.

18. The combination with a car-body having a dumping floor section, of separable hinge mechanisms supporting said floor section on both of its longitudinal edges whereby either edge may be dropped, and a longitudinally extending shaft mounted beneath said floor section, said shaft having one or more offset portions engaging the under side of said floor section, and means for turning said shaft and causing the same to move bodily to and from either side of its normal central position wherein said floor section is closed whereby to open and close said floor section when the latter is swung from either hinge mechanism, substantially as described.

19. The combination with a car-body having a plurality of dumping floor sections on either side of the car, of separable hinge mechanisms supporting said floor sections on both their inner and outer longitudinal edges whereby either edge may be dropped, and a longitudinally extending shaft mounted beneath the series of floor sections on each side of the car, each of said shafts having an eccentric member engaging the under side of each floor section, and means for imparting a combined rotary and bodily lateral movement to said shaft on either side of its normal central position wherein said floor sections are closed, substantially as described.

20. In a railway car having center sills and sides, the combination of a dumping floor section comprising one or more doors on each side of said center sills, and separable hinge mechanisms supporting said doors on both of their longitudinal edges adjacent to said center sills and said sides whereby either edge of the doors may be dropped, substantially as described.

21. In a railway car having center sills and sides, the combination of a dumping floor section comprising one or more doors on each side of said center sills, separable hinge mechanisms supporting said doors on both of their longitudinal edges adjacent to said center sills and said sides whereby either side of the door may be dropped, and actuating means for said doors, substantially as described.

22. In a railway car having center sills and sides, the combination of a dumping floor

section comprising one or more doors on each side of said center sills, separable hinge mechanisms supporting said doors on both of their longitudinal edges adjacent to said center sills and said sides whereby either side of the door may be dropped, and actuating means serving to operate said doors when opening in either direction, substantially as described.

23. The combination with a car body having a door hinged at its opposite longitudinal edges, means for locking the hinged edegs of the door in the closed position, means for releasing the locking devices to allow the door to open at either edge, a crank shaft journaled at the opposite ends of the door, its crank being arranged to act on the door to close the latter when swung in either direction and forming a supporting stirrup for the door when open, substantially as described.

ETHAN I. DODDS.

Witnesses:
SAMUEL N. POND,
FREDERICK C. GOODWIN.