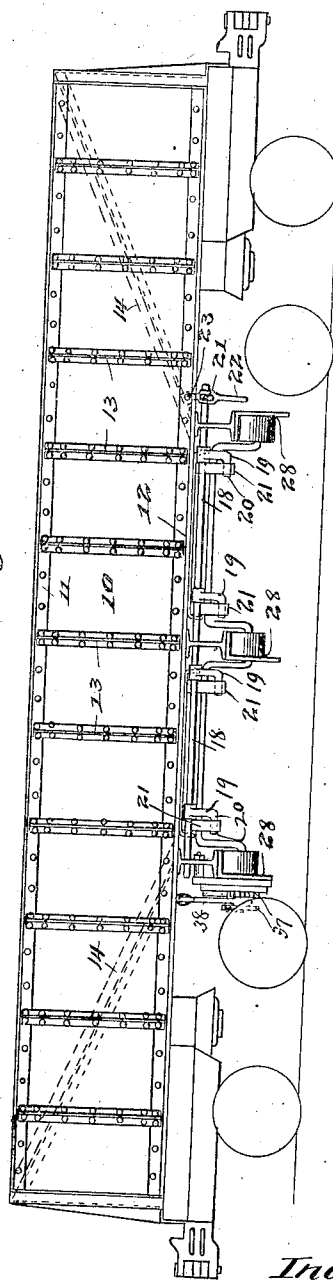
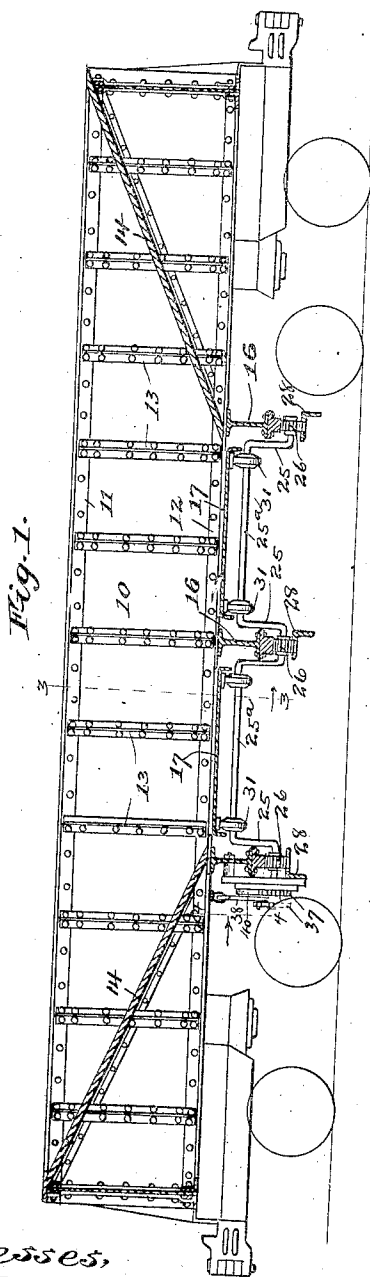


No. 855,838.

PATENTED JUNE 4, 1907.

E. I. DODDS.
CAR CONSTRUCTION.
APPLICATION FILED MAY 8, 1905.

4 SHEETS—SHEET 1.



Witnesses,
V. O. Mann,
J. H. Pond.

Inventor,
Ethan I. Dodds,
By Offield, Fowler & Lathrop
Attys

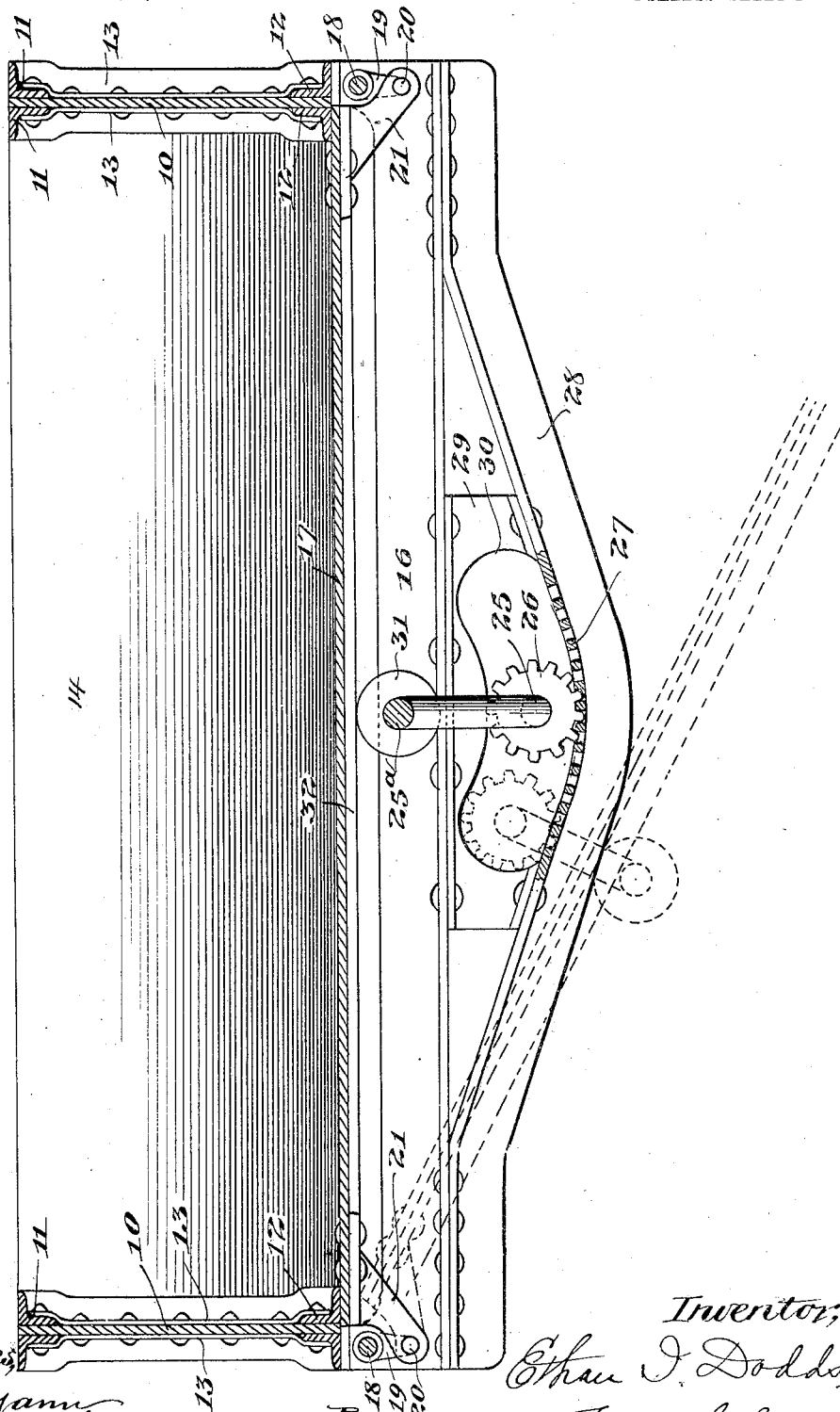
No. 855,838.

PATENTED JUNE 4, 1907.

E. I. DODDS.
CAR CONSTRUCTION.
APPLICATION FILED MAY 8, 1906.

4 SHEETS—SHEET 2.

Fig. 3.



Witnesses:
J. Mann,
O. N. Pond.

Inventor;
Ethan I. Dodds,
By J. Offield, Towler & Smithwick
Attys.

No. 855,838.

PATENTED JUNE 4, 1907.

E. I. DODDS.
CAR CONSTRUCTION.
APPLICATION FILED MAY 8, 1905.

4 SHEETS—SHEET 3.

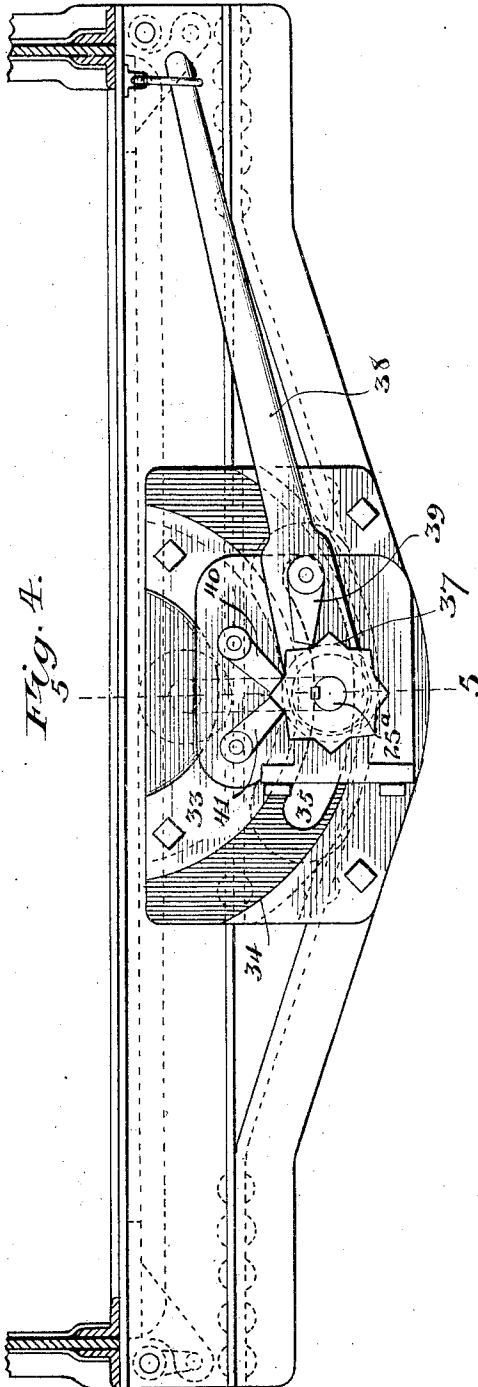


Fig. 4.

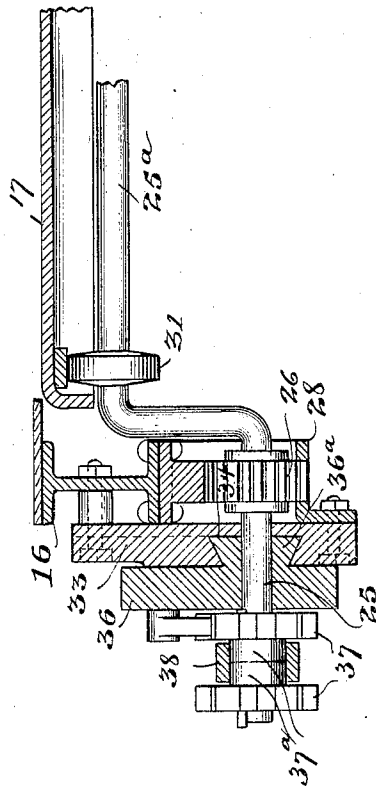


Fig. 5.

Witnesses,
J. M. Mann,
S. N. Ford

Inventor,
Ethan I. Dodds,
By *Offield, Fowler & Smith*
Attys.

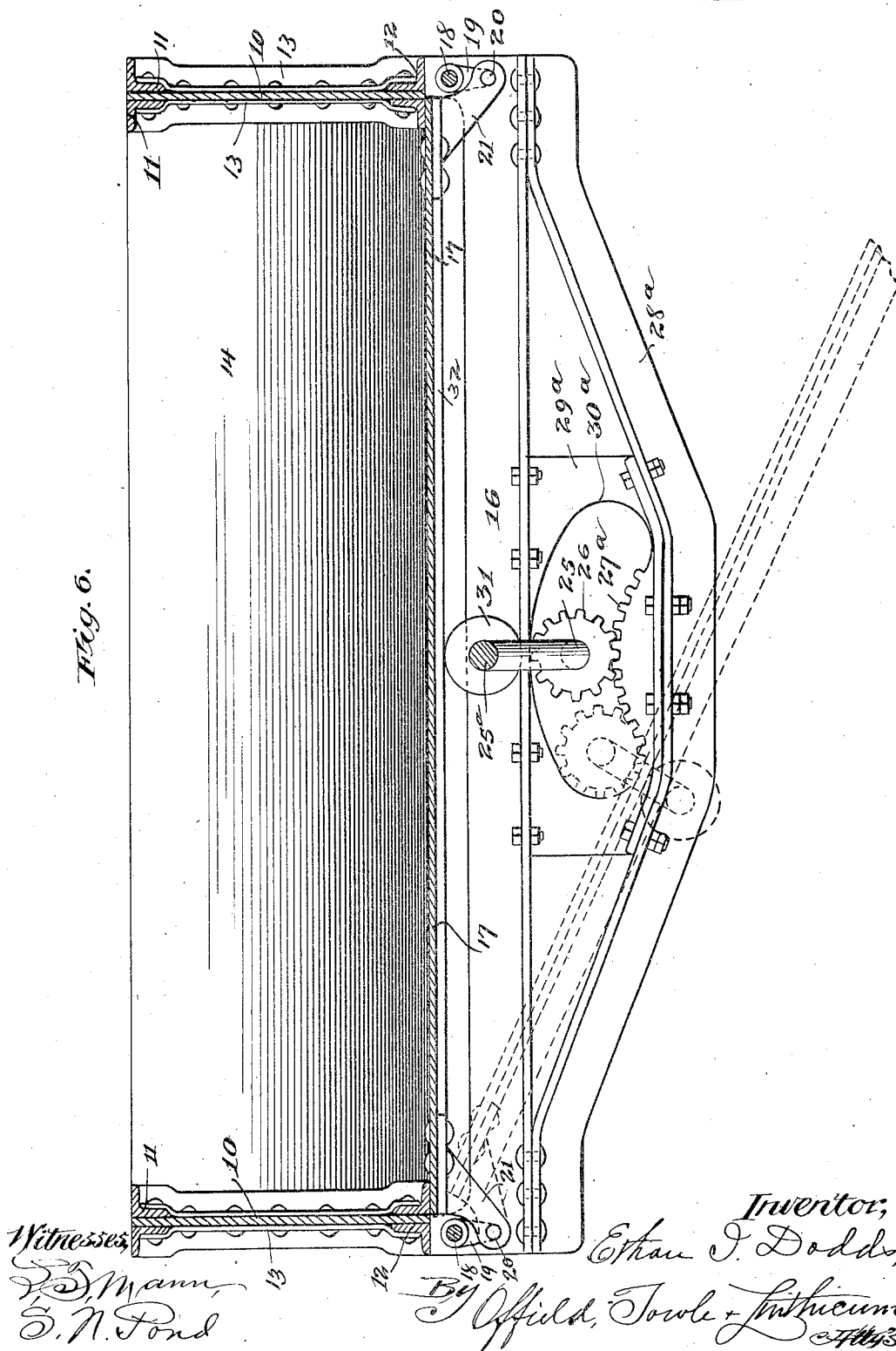
No. 855,838.

PATENTED JUNE 4, 1907.

E. I. DODDS.
CAR CONSTRUCTION.
APPLICATION FILED MAY 8, 1905.

4 SHEETS—SHEET 4.

Fig. 6.



UNITED STATES PATENT OFFICE.

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

CAR CONSTRUCTION.

No. 855,838.

Specification of Letters Patent.

Patented June 4, 1907.

Application filed May 8, 1905. Serial No. 359,377.

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 Car Constructions, of which the following is a specification.

My invention relates to car constructions, more particularly steel cars of the gondola type; and my present improvements pertain in part to a novel construction of car-body wherein the center sills are dispensed with, and the floor is made in the form of one or more drop-bottom sections extending the full width of the car-body; and in part to a novel form and construction of operating mechanism for said drop-bottom floor sections.

In carrying out that part of my invention which relates more particularly to the construction of the car-body, I employ a novel construction of side walls which adapts the latter to assume substantially the function of the longitudinal center sills in resisting shocks or strains; and in carrying out that part of my improvements relating to the dumping floor sections and the mechanism for operating the latter, I employ one or more sections extending the full width of the car-body, which sections are hinged at either or both of their edges lying alongside the side walls of the car, being preferably, and as herein shown, separably hinged at both of said edges, whereby either edge may be freed so as to cause the section to swing from and on the other edge as a hinge. In connection with said drop-bottom floor sections or doors I employ an operating mechanism constructed and operating on the principle of a door-operating mechanism disclosed in an application filed by me on the 24th day of April, 1905, Serial No. 257,150, but constructionally modified to specially adapt the same for operating doors having the full width of the car-body.

My present improvements will be readily understood when considered in connection with the accompanying drawings which illustrate approved mechanical embodiments of the same, and in which—

Figure 1 is a substantially central vertical longitudinal sectional view of a car embodying my improvements; Fig. 2 is a side elevational view of the same; Fig. 3 is a cross-

sectional view on an enlarged scale; Fig. 4 is a front end view, partly broken away and in section, more particularly showing the operating means at the end of the car for the door-operating mechanism; Fig. 5 is a cross-sectional view on the line 5—5 of Fig. 4; and Fig. 6 is an enlarged cross-sectional view through the car, similar to Fig. 3, but showing a slight modification of the stationary supports for the door-operating mechanism.

Referring to the drawings, 10 designates each of a pair of steel plates constituting the principal elements of the side walls of the car-body. Riveted to both sides of the upper and lower edges of said plates are angle irons 11 and 12, respectively, and at intervals there are riveted to said plates, preferably on both sides thereof, vertical reinforcing ribs 13, herein shown as having the form of angles, the ends of which are preferably bent and cut so as to snugly fit the interior angles of the upper and lower longitudinal reinforcing members 11 and 12, all as plainly shown in the cross-sectional view, Fig. 3.

14 designates the inclined end walls of the car-body which, as usual in gondola cars of the steel type, extend from the upper ends of the side walls downwardly and inwardly to points somewhat in rear of the truck frames.

15 may represent the usual body bolsters; and 16 designates a series of transversely extending floor frame members in the form of I-beams which are rigidly secured at their ends to the lower margins of the side walls. Between adjacent I-beams 16, and occupying the floor space between the lower inner ends of the sloping end walls 14 are a series of drop-bottom floor sections or doors 17, herein shown as two in number. These doors, as will be observed by reference to Figs. 3 and 6, are of a width equaling the full width of the car-body between the side walls; and for the purpose of allowing them to drop downwardly in discharging the load, the usual longitudinal center sills are omitted. These doors may be permanently hinged at either longitudinal edge with the opposite edge free to rise and fall, as is common in cars of this class; but in order to adapt a car to discharge the load to either side I prefer to employ a construction wherein the door is separably hinged at both longitudinal edges so that it may open on either side of the car,

such a construction being herein shown. This construction, which in its broad aspects constitutes the subject matter of an application filed by me on the 28th day of April, 1905, Serial No. 257,879, consists of the following. Mounted in and transversely of the ends of the I-beams 16 on each side of the car is a longitudinally slidable rod 18, pendent from which are a series of hinge-arms 19, each having at its lower end a laterally projecting hinge-pintle 20 engaging an aperture in the lower end of a downwardly and outwardly projecting bracket or hinge-arm 21 rigidly secured to the under side of the floor section 17. One end of each of said rods is engaged by an actuating lever 22 (Fig. 1) suitably pivoted to the car-frame at 23 and having a pin and slot connection 24 with the end of said rod 18. By swinging said lever 22 in one direction the rod 18 is moved longitudinally a sufficient distance to retract the pintles 20 from the hinge-arms 21, thus allowing the adjacent edge of the floor section to drop. When said floor section has been restored to horizontal or closed position by the means hereinafter described, the movement of said rod in the opposite direction restores the separable hinge-members to co-operating relation, in which the edge of the door is supported thereby. The last described manner and means of hinging a floor section is disclosed as applied to a door supported between the center sill and a side sill in the application last above referred to.

Referring now to the means for permitting the dropping of the floor sections and more especially restoring them to normally closed position when the car has discharged its load, 25 designates a door-operating shaft disposed longitudinally (and when in door-closing position) centrally of the car-bottom, which shaft has integral offset or cranked portions 25^a disposed between adjacent I-beams, as best shown in Fig. 1, and underlying the hinged doors. The shaft 25 has fast thereon a series of spur gears 26 that rest upon and operate over lugs 27 formed on the upper side of hangers 28 that are securely riveted at their ends to the lower flanges of the I-beams. These hangers, and the racks formed therein, are made concave on their upper surfaces, whereby the spur gears 26 travel in an upwardly inclined direction to either side of the center of the racks when the shaft 25 is operated to allow the doors to open, and conversely, travel downwardly toward the center when the shaft is operated in a direction to close the doors. For the sake of greater rigidity I preferably insert a filling plate 29 centrally between the I-beam 16 and the hanger 28, said plate having an arc-shaped slot 30 of sufficient dimensions to accommodate the travel of the gear 26 therein. The offset portions or cranks 25^a are each provided preferably with one or more rollers

31 that engage the under surfaces of the doors in an anti-friction manner. For the purpose of transversely stiffening the doors, as well as providing a wear strip or track on which the rollers 31 may operate, I preferably provide the under surface of the door with metal strips or bars 32 disposed in the vertical planes of the rollers 31.

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. It will also be observed that by reason of the fact that in opening the doors the gears are caused to travel in an upwardly inclined direction, while in closing the doors said gears are caused to travel in a downwardly inclined direction, the weight of the shaft and parts carried thereby will oppose the too sudden or abrupt falling of the doors in the opening movement, and, conversely, will facilitate to the same extent the closing of the doors. This construction, therefore, is well adapted to cars intended to carry heavy or easily discharged material.

In Fig. 6 I have shown a slight modification that is well adapted to cars designed to carry lighter or more or less sticky material that is not so easily discharged. In this construction, the hanger 28^a carries a rack 27^a that is convex in form, instead of concave, as in Fig. 31 this rack being conveniently formed on the filling member 29^a, constituting the lower edge of the arc-shaped slot 30^a therein. With this construction it will be observed that the gears travel downwardly in the opening of the doors and upwardly in the closing thereof, whereby, in the opening movement, the door-operating shaft practically drops of its down weight and opposes little or no resistance to the opening movement of the doors, thus permitting the latter to drop quickly and suddenly, which operation facilitates the discharge of material of more or less sticky character, or having a relatively high coefficient of friction.

Any suitable or convenient mechanism for operating the shaft 25 may be employed, a simple mechanism for this purpose being shown in Figs. 4 and 5, wherein 33 designates a plate securely bolted to the outer face of the end I-beam 16 and hanger 28, and containing a dovetailed channel 34 curved on the same radius of curvature as the supporting racks 27 of the hangers. The rear wall of said channel also has a correspondingly curved slot 35. On said plate is rotatably mounted

by means of a curved dovetailed tongue 36^a engaging said channel and block 36, on which is journaled the end of the shaft 25. On the overhanging end of said shaft are keyed a pair of twin star wheels 37, which, as shown in Fig. 5, may have inwardly projecting hubs 37^a, on which is loosely mounted an operating lever 38 that carries on either side a pivoted dog 39 engaging the toothed peripheries of the star wheels. Pivotaly mounted on the plate 33 above the inner star wheel 37 are a pair of oppositely disposed and operating detent pawls 40 and 41, the noses of which overlie and engage the teeth of said star wheel, one of said walls preventing the 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. 4, a shaft is securely held against turning and sidewise bodily movement in either direction.

It will be evident that by simply reinforcing the curve of the dovetailed tongue and groove of the last described mechanism, the same will be made applicable to the operation of a door-operating shaft mounted in the manner shown in Fig. 6.

In operation, if the load is to be discharged on the right hand side of the car, as shown in Figs. 3 or 6, the lever 22 is operated to separate the hinge-members on that side of the car, and the pawl 40 or 41 on the opposite side is thrown upwardly or out of the way, and the dog 39 is adjusted to render the lever 28 operative upon the star wheels to turn the shaft in a direction toward the hinged edge of the doors. As soon as the shaft 25 has been turned sufficiently to carry the rollers 31 slightly to one side of the vertical plane of the shaft, the weight of the doors and the load causes said doors to drop, the latter and the door-operating mechanism assuming at the end of the dropping movement the relative positions shown by dotted lines in Figs. 3 and 6, thus discharging the load to one side of the car. Subsequent manipulation of the operating lever 38 in the reverse direction effects the return of the shaft to normal position, in which movement the crank portions swing upwardly and restore the doors to horizontally closed position, after which the separated hinge-members are united by proper operation of the shaft 18. By making the hinged floor sections of the full width of the car-body, the operation of discharging the load is simplified and shortened, as compared with the usual construction employing one or more doors on each side of the car; and by separably hinging the doors on both sides of the car the load can be discharged to either side, as desired.

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 departing from the principle thereof or sacrificing any of its advantages, 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 the combination of a car-body having side walls each provided with longitudinal reinforcing strips on both sides of its upper and lower margins, and vertical reinforcing strips on both sides between said horizontal strips, and a hinged load-discharging floor section co-extensive with the width of the car body, substantially as described.

2. In a railway car the combination of a car-body having side walls, each provided with longitudinal reinforcing strips on both sides of its upper and lower margins, and vertical reinforcing strips on both sides between and secured to said horizontal strips, and a hinged load-discharging floor section co-extensive with the width of the car body, substantially as described.

3. In a railway car the combination of a car-body having side walls each provided with angle irons disposed longitudinally of and secured to both sides of its upper and lower margins, and other angle irons disposed vertically at intervals on both sides between said longitudinal angle irons, and a hinged load-discharging floor section co-extensive with the width of the car body, substantially as described.

4. The combination with a car-body having a hinged load-discharging floor section substantially co-extensive with the width of the car, of 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, substantially as described.

5. The combination with a car-body having a dumping floor section substantially co-extensive with the width of the car, 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, substantially as described.

6. The combination with a car-body having a hinged load-discharging floor section substantially co-extensive with the width of the car, of an operating mechanism therefor comprising a longitudinally extending shaft disposed substantially centrally therebeneath and having one or more offset portions

engaging the under side of said section, and means for turning said shaft, substantially as described.

7. The combination with a car-body having a hinged load-discharging floor section substantially co-extensive with the width of the car, of an operating mechanism therefor comprising a longitudinally extending shaft mounted beneath said floor-section and having one or more offset portions engaging the under side of the latter, gears carried by said shaft, racks disposed transversely of and beneath the car-body engaging and supporting said gears, and means for turning said shaft, substantially as described.

8. The combination with a car-body having a hinged load-discharging floor section, of an operating mechanism therefor comprising a longitudinally extending shaft disposed beneath said floor section and having one or more offset portions engaging the un-

der side of the latter, gears carried by said shaft, curved racks disposed transversely of and beneath said car-body engaging and supporting said gears, and means for turning said shaft, substantially as described.

9. The combination with a car-body having a hinged load-discharging floor section, of an operating mechanism therefor comprising a longitudinally extending shaft disposed beneath said floor section and having one or more offset portions engaging the under side of the latter, gears carried by said shaft, concave racks disposed transversely of and beneath said car-body engaging and supporting said gears, and means for turning said shaft, substantially as described.

ETHAN I. DODDS.

Witnesses:

SAMUEL N. POND,
FREDERICK C. GOODWIN.