

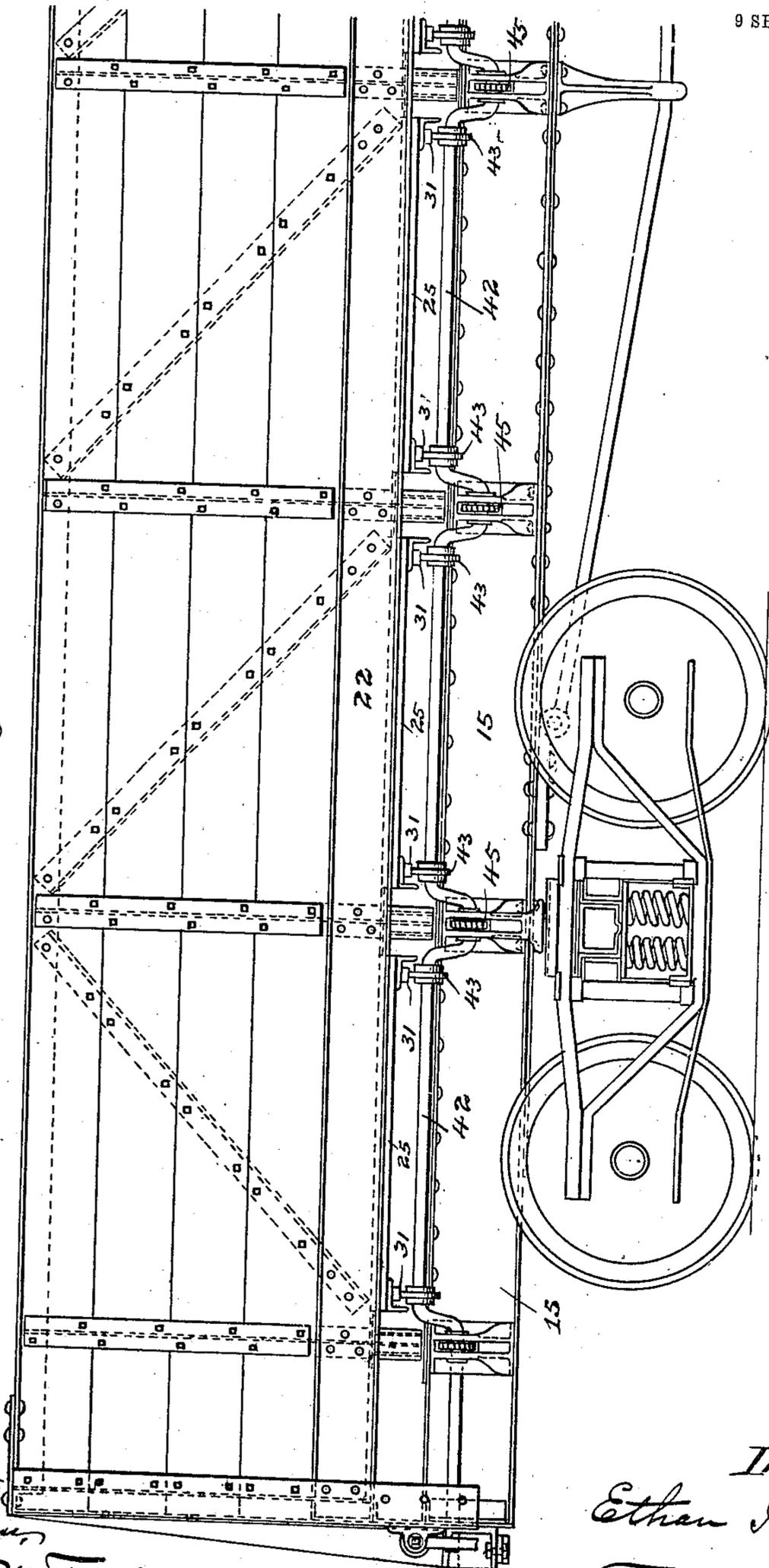
No. 855,840.

PATENTED JUNE 4, 1907.

E. I. DODDS.  
RAILWAY DUMPING CAR.  
APPLICATION FILED MAY 26, 1906.

9 SHEETS—SHEET 1.

Fig. 1.



Witnesses  
J. D. Mann  
Walter M. Fuller

Inventor,  
Ethan J. Dodds

By Alfred Towle & Luthman  
Atty's.

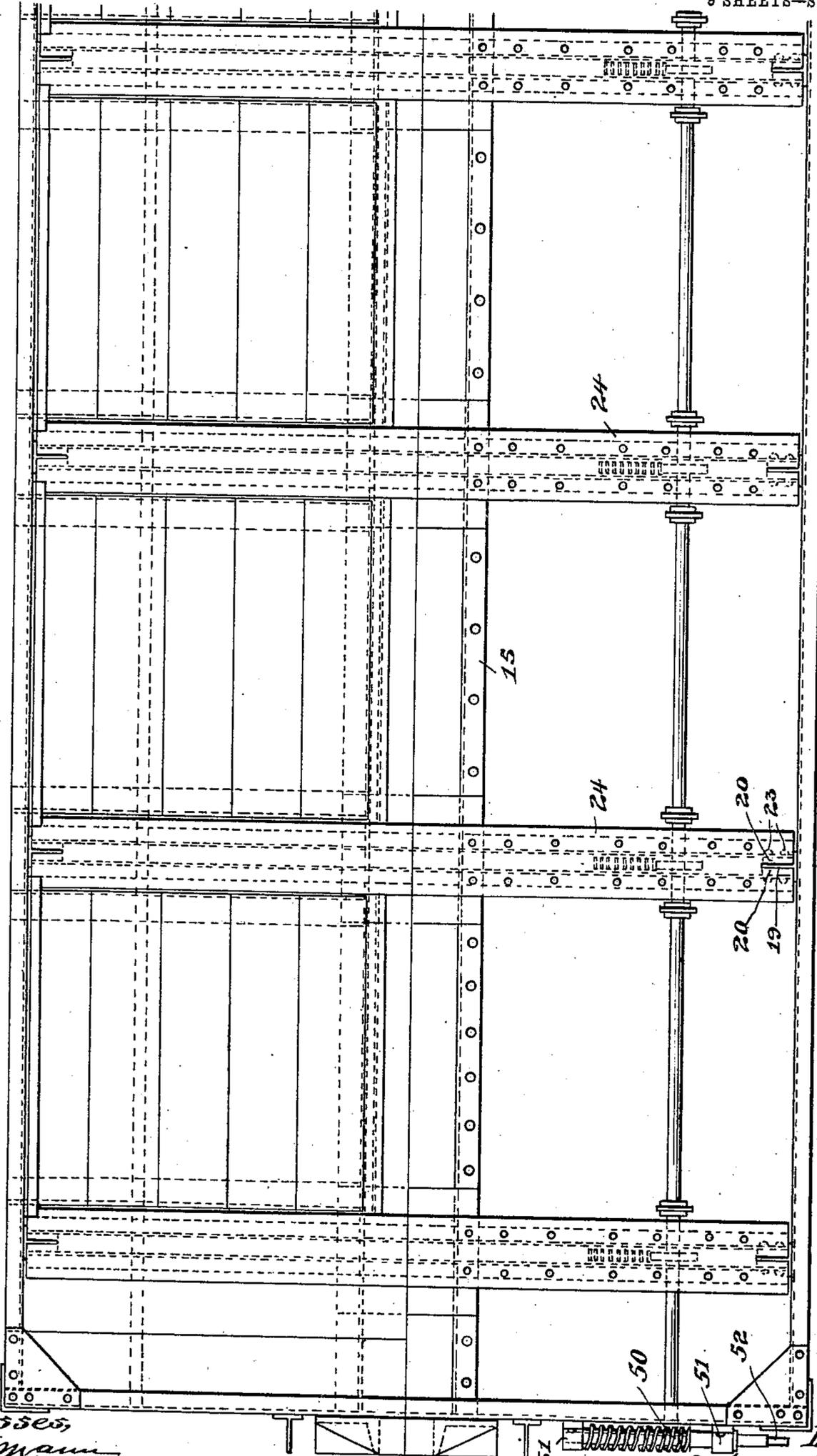
No. 855,840.

PATENTED JUNE 4, 1907.

E. I. DODDS.  
RAILWAY DUMPING CAR.  
APPLICATION FILED MAY 26, 1906.

9 SHEETS—SHEET 2.

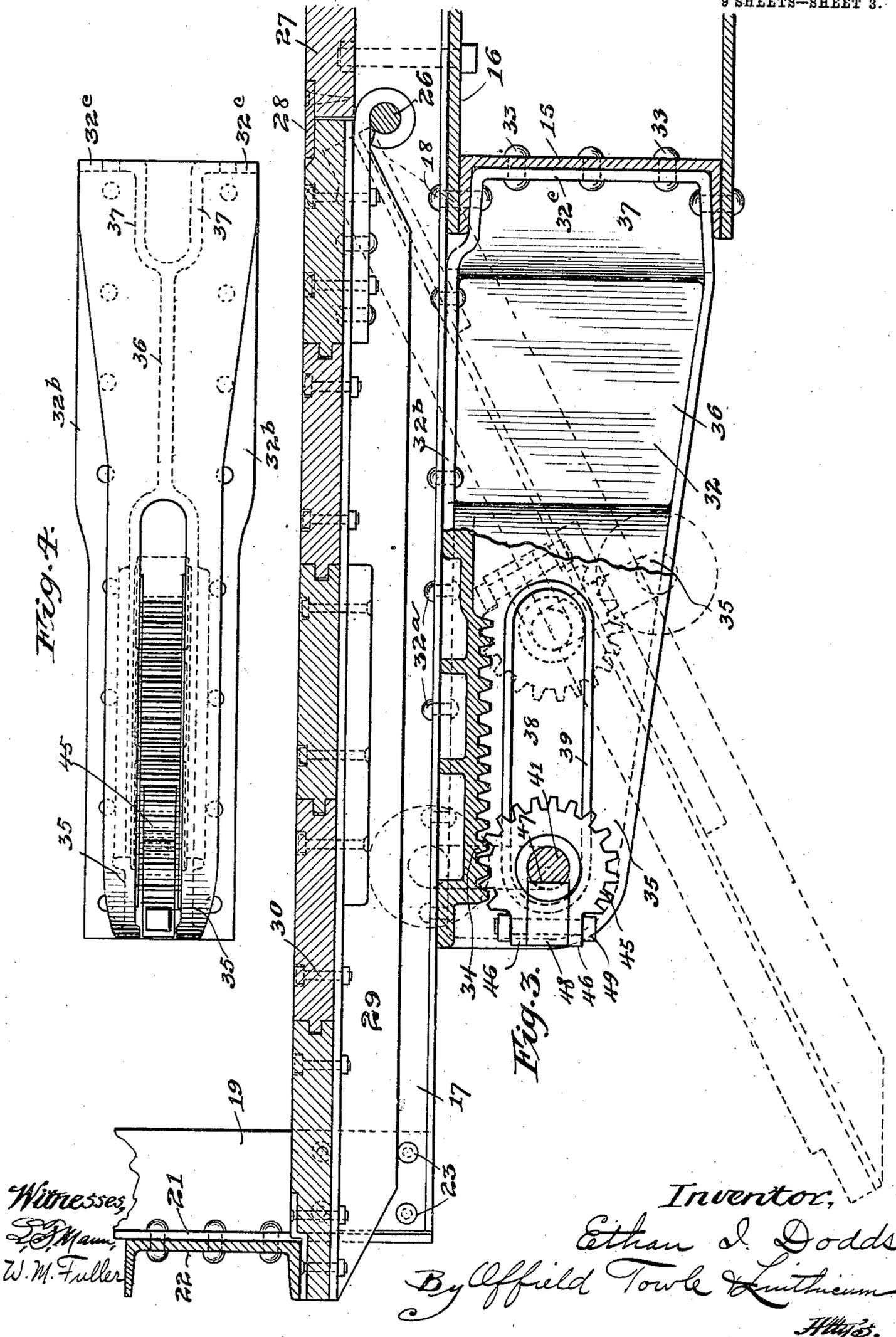
Fig. 2.



Witnesses,  
J. Mann  
Walter M. Fuller

Inventor,  
Ethan J. Dodds  
By Affield Towle & Lenthicum  
Attys

E. I. DODDS.  
RAILWAY DUMPING CAR.  
APPLICATION FILED MAY 26, 1906.

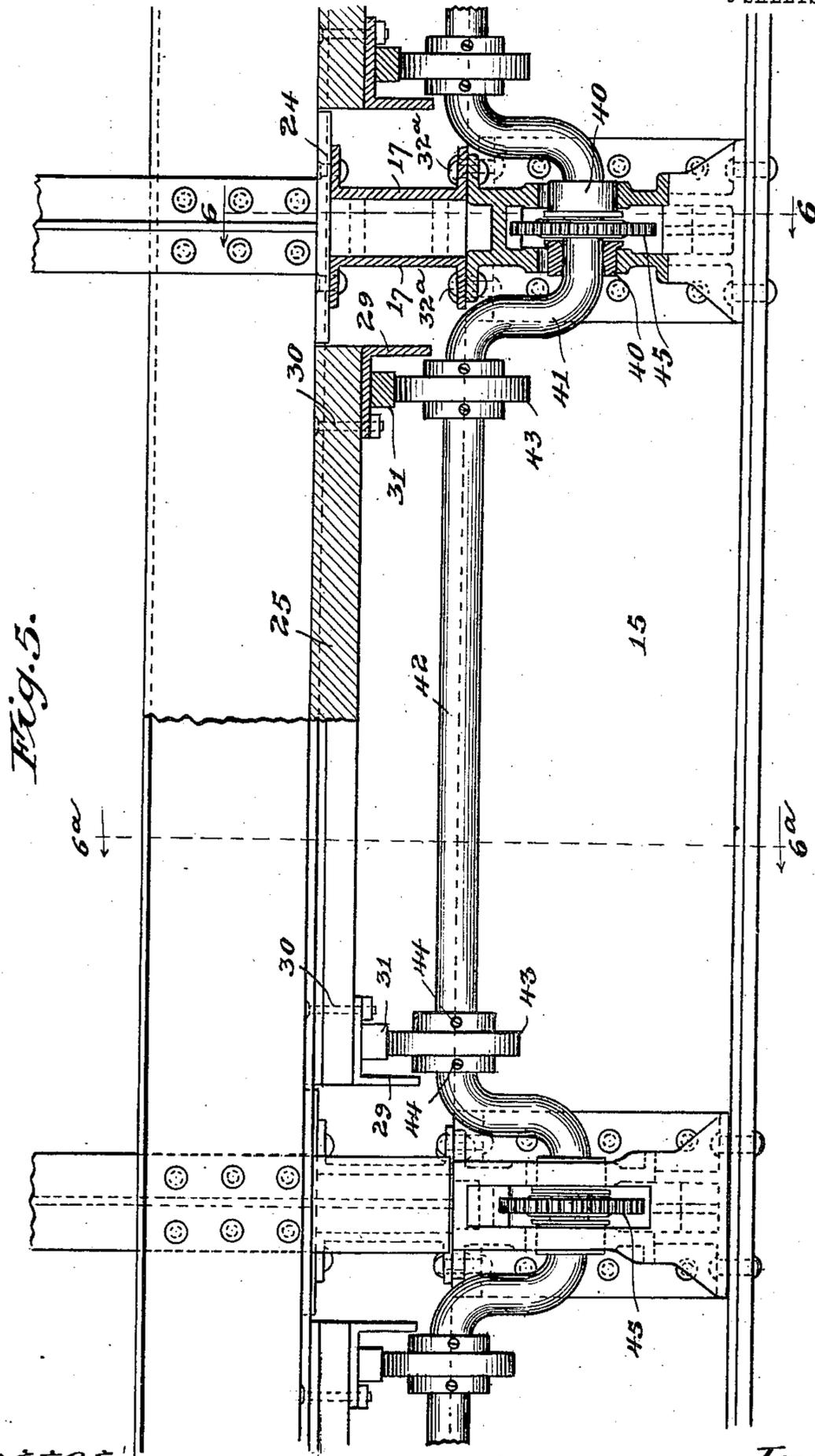


No. 855,840.

PATENTED JUNE 4, 1907.

E. I. DODDS.  
RAILWAY DUMPING CAR.  
APPLICATION FILED MAY 26, 1906.

9 SHEETS—SHEET 4.



Witnesses,  
J. O. Mann,  
Walter M. Fuller

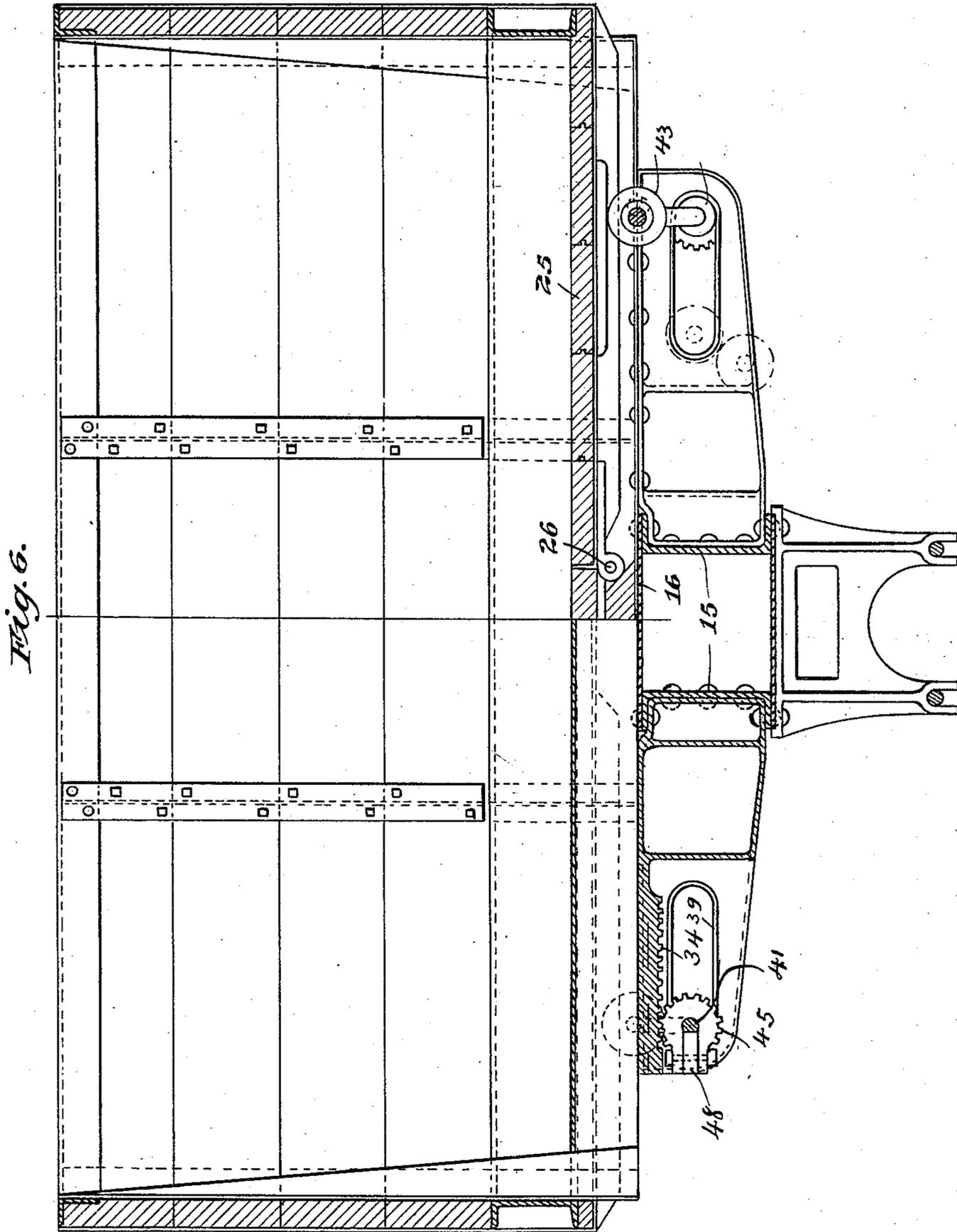
Inventor,  
Ethan J. Dodds  
By Offield Towle & Luthicium  
Attys.

No. 855,840.

PATENTED JUNE 4, 1907.

E. I. DODDS.  
RAILWAY DUMPING CAR.  
APPLICATION FILED MAY 26, 1906.

9 SHEETS—SHEET 5.



Witnesses,  
J. O. Mann,  
Walter M. Fuller

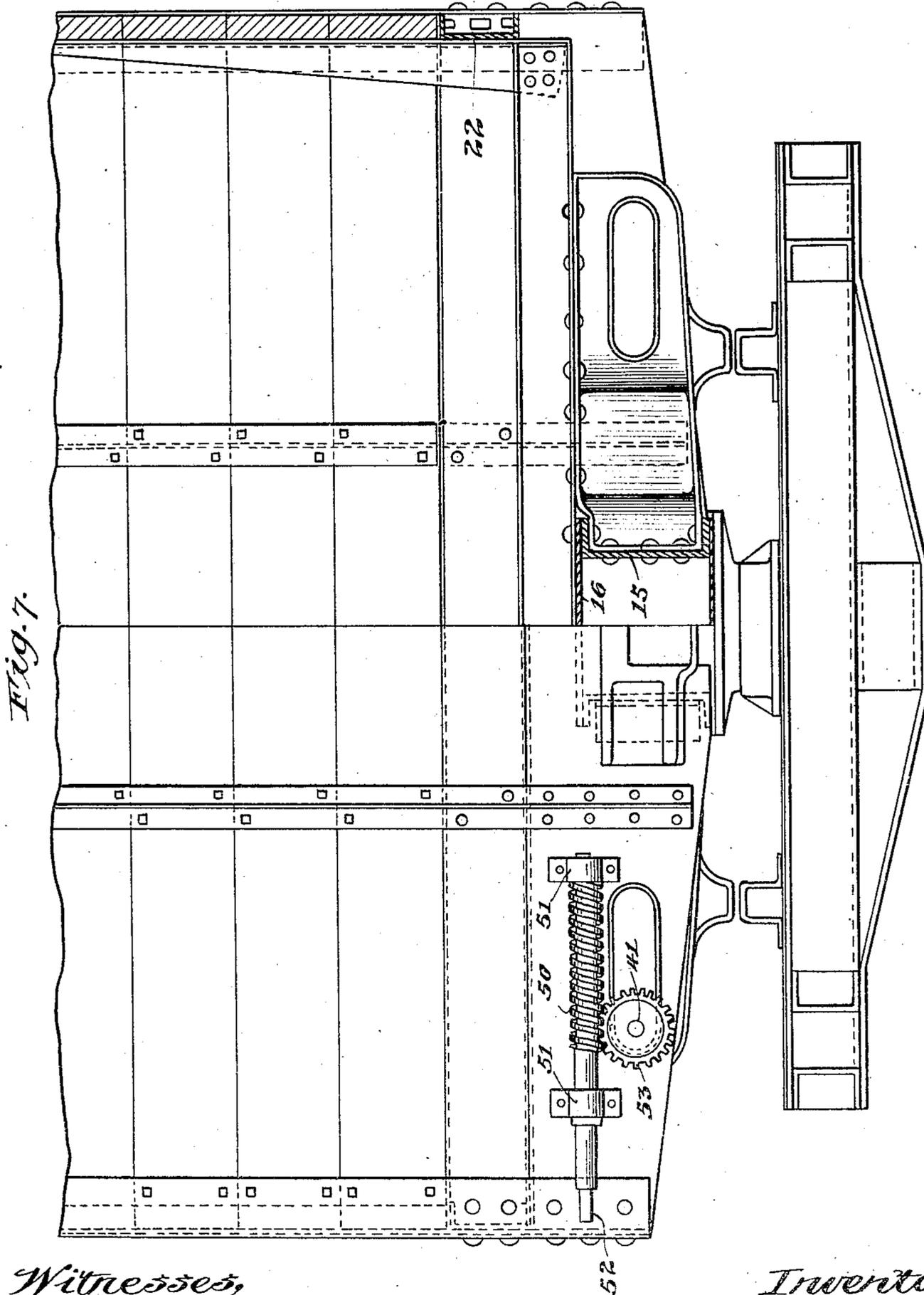
Inventor,  
Ethan I. Dodds  
By *Offield Towle & Linticum*  
Attys.

No. 855,840.

PATENTED JUNE 4, 1907.

E. I. DODDS.  
RAILWAY DUMPING CAR.  
APPLICATION FILED MAY 26, 1906.

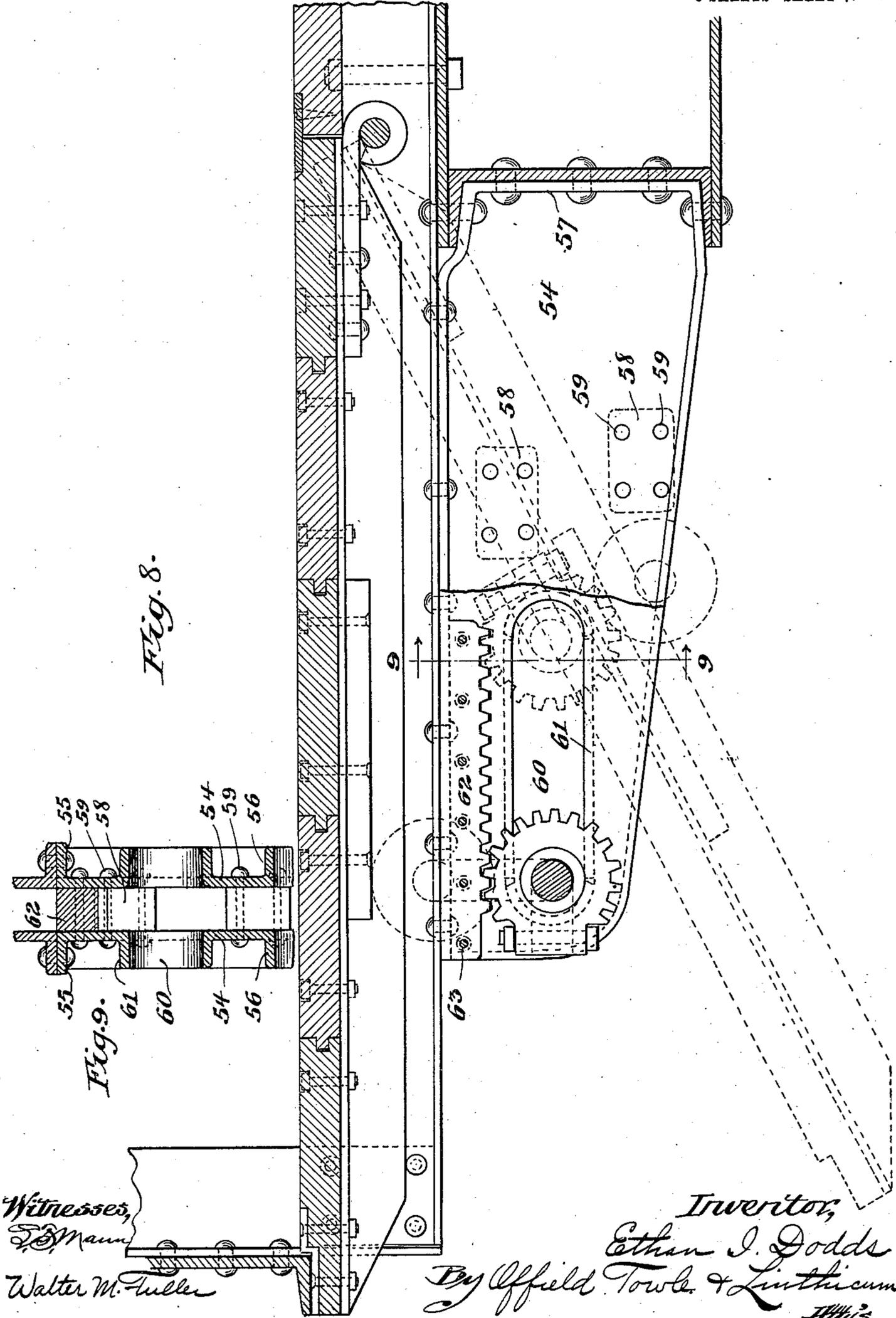
9 SHEETS—SHEET 6.



Witnesses,  
J. M. Mann,  
Walter M. Fuller

Inventor,  
Ethan I. Dodds  
By *Bylfield Towle & Luthicum*  
Attys.

E. I. DODDS.  
RAILWAY DUMPING CAR.  
APPLICATION FILED MAY 26, 1906.



Witnesses,  
*S. J. Mann*  
*Walter M. Fuller*

Inventor,  
*Ethan I. Dodds*  
 By *Offield Towle & Luthicum*  
*Attys.*

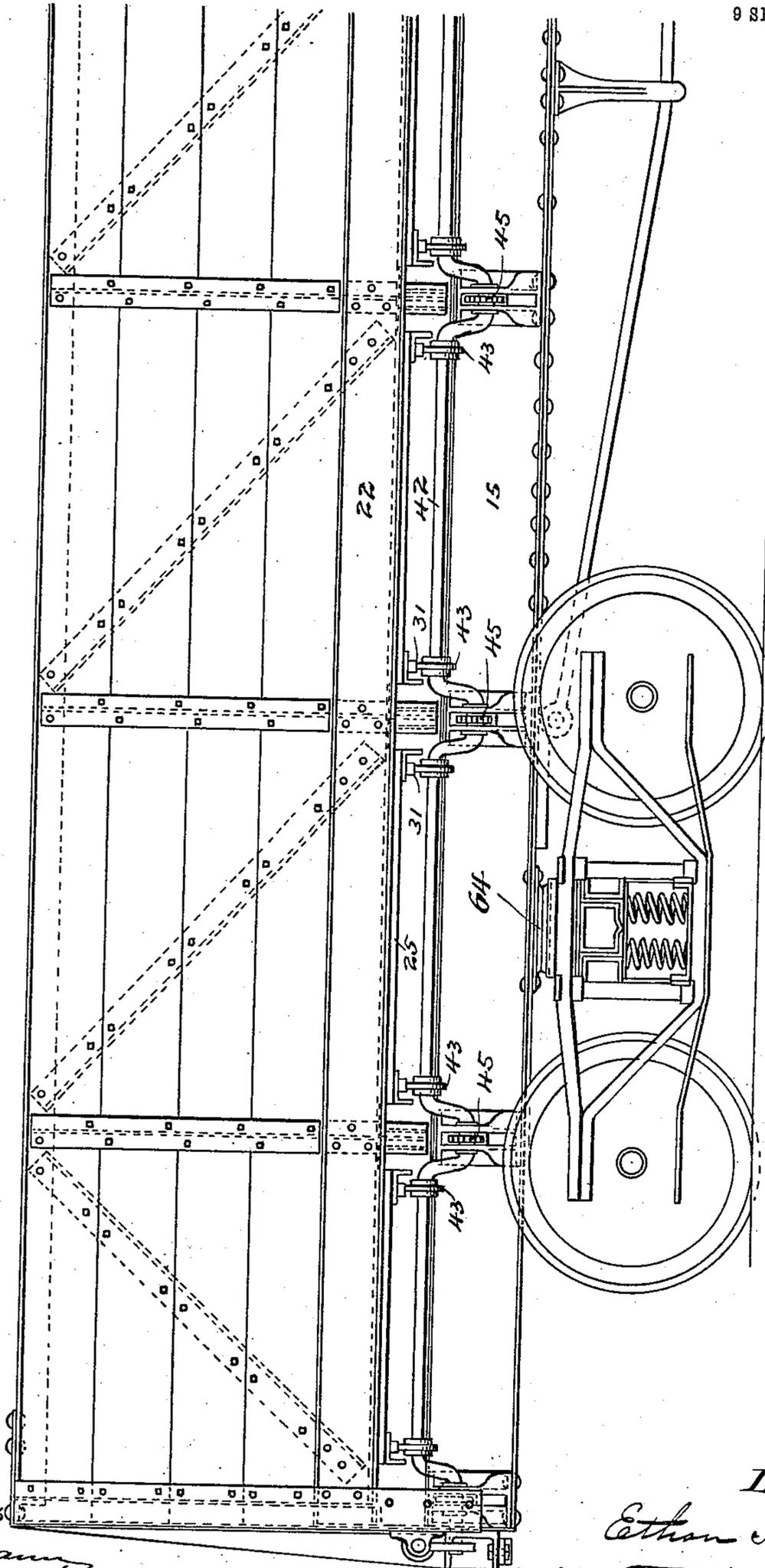
No. 855,840.

PATENTED JUNE 4, 1907.

E. I. DODDS.  
RAILWAY DUMPING CAR.  
APPLICATION FILED MAY 26, 1906.

9 SHEETS—SHEET 8.

Fig. 10.



Witnesses  
F. D. Mann  
Walter M. Fuller

Inventor,  
Ethan J. Dodds  
By *Bylfield Towle & Luthicum*  
Attys.

E. I. DODDS.  
RAILWAY DUMPING CAR.  
APPLICATION FILED MAY 26, 1906.

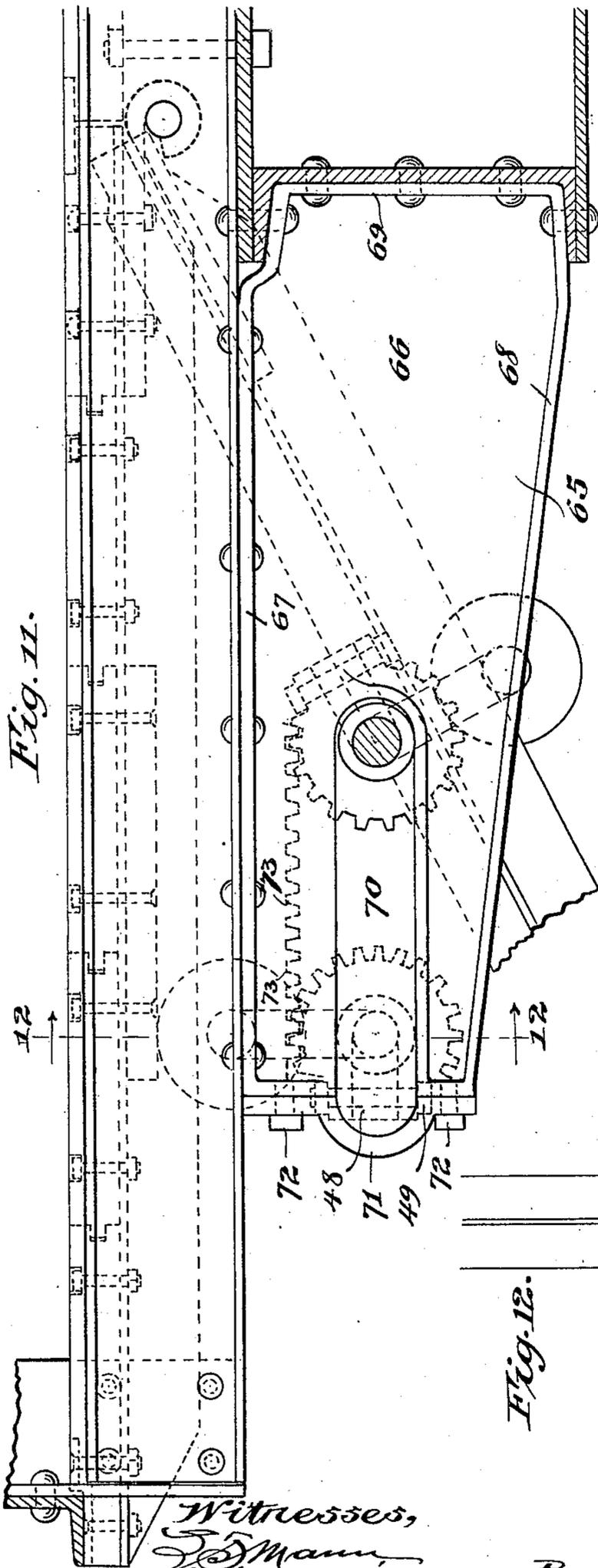


Fig. 11.

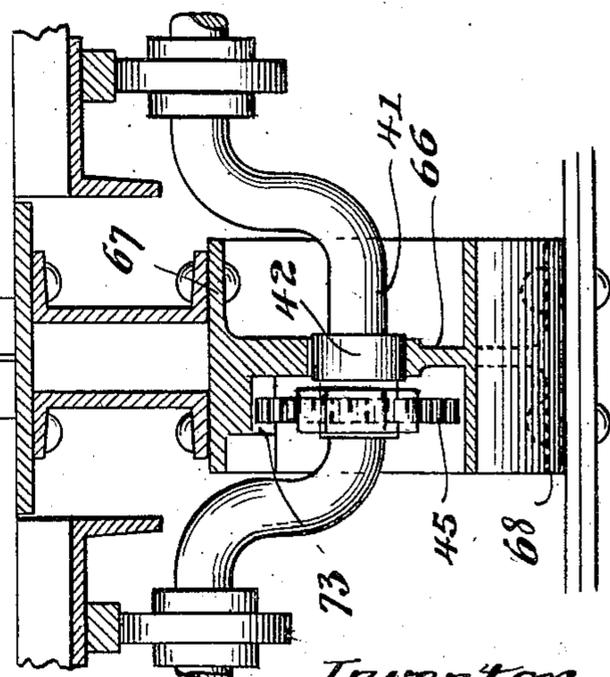


Fig. 12.

Witnesses,  
J. J. Mann  
Walter M. Fuller

Inventor,  
Ethan J. Dodds  
By Alfield Towle & Luthicum  
Atty's.

# UNITED STATES PATENT OFFICE.

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

## RAILWAY DUMPING-CAR.

No. 855,840.

Specification of Letters Patent.

Patented June 4, 1907.

Application filed May 26, 1906. Serial No. 318,955.

*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 Railway Dumping-Cars, of which the following is a specification.

My invention relates to a railway dumping car having hinged floor sections or load discharging doors, and more particularly concerns improvements in the mechanism for lowering or raising or opening or closing these doors. Heretofore there has been employed in this art a shaft adapted to travel transversely of the car beneath the doors to operate the same, the shaft being equipped with pinions co-acting with stationary racks below the shaft, but with these cars there has been a considerable tendency for the coal or other lading to fall and lodge upon these racks thereby interfering with the rolling of the pinions thereon. To overcome this difficulty in my improved construction I have placed the racks above the pinions or gears so that no obstruction can rest thereon, consequently the door operating means acts more freely, with less expenditure of effort, and with more certainty and satisfaction. The shaft which I employ is preferably cranked, the doors resting upon the offset portions so that a wide opening of the doors may be effected, and for the pinions or gears I use split ones which may be applied to and removed from the shaft with facility. Preferably at the end of the car there is provided any suitable means for causing the shaft to turn, and as it thus rotates it is compelled to travel toward or from the side of the car on suitable supports because of the coöperation between the pinions and their racks. This turning of the shaft also raises or lowers the cranked parts of the shaft on which the doors rest so that the closing or opening of the latter is easily effected. To support this shaft and attached parts I provide a number of brackets or beams upon parts of which rollers on the shaft travel and on which the weight of the doors and load rests so that no weight presses upon the gears or racks. In one form of my invention no body bolsters are employed for the car since I have found that they may be readily dispensed with and in such cars, as well as in those of the usual type, that portion of the load over the trucks

is discharged without difficulty and without falling upon the trucks. 55

In the accompanying drawings, which form a part of this specification, I have illustrated several embodiments of my invention wherein: 60

Figure 1 is a side elevation of a part of a car equipped with my improved means for actuating the dumping floor doors; Fig. 2 is a plan view of the same part of the car, one longitudinal half thereof having the dumping doors and a portion of the floor removed; Fig. 3 is an enlarged cross-section of a portion of the car illustrating in detail the means for raising and lowering the dumping doors; Fig. 4 is a view of the under side of one of the members which support the door actuating shaft, shown in Fig. 3; Fig. 5 is an enlarged partial side elevation and partial lengthwise section of a part of the car showing clearly the construction of the details thereof; Fig. 6 is a vertical cross-section of the car, the right hand part being on line 6<sup>a</sup>—6<sup>a</sup> of Fig. 5 and the left hand part on line 6—6 of Fig. 5 on a reduced scale; Fig. 7 is a partial end elevation and partial cross-section of the car illustrating the means for turning the shaft controlling the opening and closing of the dumping doors; Fig. 8 is a fragmentary cross-section of a car equipped with a modified type of door operating mechanism showing the door in open position in dotted lines; Fig. 9 is a cross-section of the construction shown in Fig. 8 on line 9—9; Fig. 10 is a side elevation of a part of a car embodying a modified form of my invention, said car having no body bolsters; Fig. 11 is a cross-section of a part of a car equipped with another modified form of door actuating means; and Fig. 12 is a cross-section of the construction shown in Fig. 11 on the line 12—12 as viewed in the direction indicated by the arrows and illustrates the pinion in elevation. 65 70 75 80 85 90 95

The car shown in Figs. 1 to 7 inclusive has the usual channel center sills 15, spaced apart as is customary, their upper flanges being riveted to a top or cover plate 16 extending substantially the full length of the car. Arranged transversely of the car above these center sills and resting on the top plate 16 are a number of cross bearers or flying transoms and bolsters 17 preferably of channel section, as shown in Fig. 5. These transverse members or beams are fastened to cover plate 16 100 105

by rivets 18 [Fig. 3] and to the top flanges of the center sills by the same rivets, and they are preferably grouped in pairs, as shown in Figs. 2 and 5, and spaced apart sufficiently to accommodate the inwardly extended flanges or ribs 19 of the side stakes together with filler blocks 20. These side stakes are shown on the drawings as T-shaped in cross-section and have their oppositely extended flanges 21 riveted to the web 22 of the adjacent channel side sill. The connection between these side stakes and the cross bearers is preferably by means of rivets 23 passing through the ribs 19 of the stakes and also through the filler blocks 20. Each pair of cross bearers 17 has a top floor plate 24, running preferably the full width of the car, riveted to their upper marginal flanges, which will be apparent from an inspection of Figs. 2 and 5. Between these plates 24 are disposed a plurality of hinged floor sections or doors 25 pivoted or hinged in any convenient manner above the center sills at 26, a central longitudinal plate or board 27 being provided which extends substantially the full length of the car and is equipped on each side with a plate 28 adapted to overlap the inner edges of the dumping doors. Each door has on its lower surface two angle bars 29 extending transversely of the car, and to which the planks or floor boards are bolted or riveted as at 30. The outer edges of these dumping doors in their closed position preferably extend beneath and contact with the bottom flanges of the side sills of the car thereby limiting their upward movement. The under side of each door 25 is also supplied with a pair of tracks or wearing plates 31 on the under side of which travel wheels or rollers mounted on the actuating shaft mentioned and described hereinafter.

Beneath each cross bearer or bolster and on each side of the pair of center sills is a bracket or beam 32 to support the door operating shaft. Each one of these supports or brackets has flanges along its top and bottom edges and also on its inner edge. Its top flanges 32<sup>b</sup> are secured to the bottom flanges of the cross-bearer channels 17 by rivets 32<sup>a</sup>, while its inner end flanges 32<sup>c</sup> are attached to the web of the adjacent center sill by rivets 33. These supports or brackets are preferably cast integral, each having an integral rack 34 near its upper part disposed between the two webs 35 which merge into the single web 36 as they extend toward the center of the car, the latter dividing into a pair of parallel webs 37 adjacent to the center sill. By employing a construction of this character I secure a maximum amount of strength with a minimum amount of metal properly disposed. The parallel webs 35, of the several supports 32, have aligned slots 38 provided with marginal flanges 39 on which travel rollers 40 on a

cranked shaft 41 the offset portions 42 of which are each provided with a pair of split rollers or wheels 43 retained in position on the shaft by collars 44. These rollers 43 are beneath the wearing plates 31 upon which they travel and sustain the door above in open or closed position as the case may be. Between each pair of rollers 40 and disposed within the bracket or beam 32 which supports the shaft is a gear or pinion 45 fixed to the shaft to turn therewith but readily removable therefrom, the teeth of said gear meshing with the downwardly projecting teeth of rack 34, as shown most clearly in Fig. 3. It is to be understood that in order to secure a uniform movement of the shaft I provide one of these pinions and racks between each cross bearer and body bolster. Gear 45 has two lugs or projections 46 integral therewith and spaced apart a distance approximately equal to the diameter of shaft 41, while the central part of the gear has a cylindrical aperture the same diameter as the shaft, said aperture communicating with the space between the ears or lugs 46. Those portions of the shaft supplied with one of these pinions or gears are flattened at 47 (Fig. 3) and against this flat surface presses the square end of a filler block or key 48 adapted to fit between the ears 46 with its inner end abutting against the flat part of the shaft. To retain the parts in position a bolt 49 is passed through holes in the ears 46 and the filler block or key 48 whereby the gear is compelled to rotate with the shaft. It should be noted that in this construction the weight of the doors and the load above them is transmitted to the rollers 43 and through the shaft to the other rollers 40 which rest upon the supports for the shaft. Obviously no part of the load or part of the car itself rests upon the pinions or their racks. Furthermore, it is apparent that no portion of the load can fall upon the racks and remain thereon to impede the travel of the pinions.

At one or both ends of the car I provide a comparatively long worm 50 rotatably mounted in suitable bearings 51 (Fig. 7). The outer end of the shaft bearing the worm 50 has an angular head 52 to which a wrench or crank may be easily applied to turn the worm, the latter meshing with a worm wheel 53 fixed to shaft 41. In the drawings I have shown this latter shaft 41 as extending the whole length of the car, but to those skilled in the art it is obvious that the same may be divided into sections if such a construction is found to be desirable.

The operation of the device is as follows: Let us assume that the car is loaded with any form of lading such, for example, as coal or gravel with the doors in horizontal or closed position and the shaft 41 at the outer ends of slots 38 with the cranked portions 42 at their

highest elevation retaining the doors closed by means of their rollers 43 pressing against the under surface of the bearing plates or tracks 31. In order to drop the doors so that the lading may be discharged a crank or other turning means is applied to the end 52 of the worm shaft and the worm 50 turned so as to rotate the shaft 41 through its worm wheel 53. As shaft 41 revolves it is compelled to travel bodily inwardly toward the center of the car because of the co-operation of gears 45 with their stationary or fixed racks 34. As the shaft thus moves inwardly the rollers 40 rolling on the lower margins of slots 38, the crank portions thereof are lowered thereby permitting the doors to drop to discharge the load. It will be noted that worm 50 is substantially as long as slot 38 so that worm wheel 53 is always in mesh therewith regardless of its position. To elevate the offset portions of the shaft so as to close the floor doors the worm is turned in the reverse direction whereupon the shaft rolls outwardly toward the side of the car and the cranked portions thereof are raised to close the doors.

If it becomes desirable to remove any of the gears 45 from shaft 41 or to remove the shaft itself from the underframe of the car this may be readily accomplished by sliding the rollers 40 [which are curved inside as shown in Fig. 5] lengthwise the shaft away from the supports 32 whereupon the shaft is lowered sufficiently to bring the teeth of the gears out of mesh with their racks, and by removing the bolts 49 and keys or blocks 48 the gears may be slid off from the shaft laterally. By turning the shaft so that its cranked portions pass through the slots 38, the whole shaft may be removed lengthwise from its supports provided the split rollers 43 have been removed. It is to be understood that the turns in the shaft are rounded so that the rollers 40 and collars 44 may be threaded or put on to the shaft from one end.

In Figs. 8 and 9 I have illustrated a modified form of support for the door operating shaft wherein the support consists of two slightly tapered pressed-steel members 54 each of which has a top flange 55 projecting outwardly and a bottom flange 56 similarly disposed. The top flanges of members 54, as shown in the previous instance, are riveted to the lower flange of the cross bearers or flying transoms, and the inner end flanges 57 are similarly riveted to the webs of the channel center sills. These pressed members 54 are properly spaced apart by filler blocks 58 placed between them and fastened to them by rivets 59. Each member 54 has a longitudinal slot 60 with an outwardly extended marginal flange 61 and between the two members 54 is fastened a rack 62 held in place by rivets 63 passing therethrough and through the side members of the support.

The operation of this mechanism is apparent so that further description thereof appears to be unnecessary, the object of this illustration and description being to set forth the manner in which the shaft supports could be made of pressed metal members.

The peculiarity of the modification shown in Fig. 10 lies in the fact that the car has no body bolsters. In other words it has no transverse beams above the central part of the trucks. I have found from computation and by experiment that the car does not require body bolsters, and it becomes an advantage to eliminate them in a car of this class because that portion of the load above the truck can be more easily discharged without falling upon the truck than in cars equipped with body bolsters. In this modification the cross bearers and shaft supports are placed so that none of them come above the central part of the truck. In this type of car the upper center bearing plate 64 is attached directly to the lower flanges of the center sills while the adjacent cross bearers are so disposed that a door is arranged centrally over the truck and when it is dropped it slides the load out sidewise over the truck none of the lading falling thereon.

A still further modification is set forth in Figs. 11 and 12, this type of car having the advantage of being able to remove one or more of the pinions or gears from the shaft without lowering the latter by sliding sidewise the rollers which travel on the supports. In cross-section the shaft support 65 is substantially I-shaped having a central vertical web 66 and top and bottom flanges 67 and 68, while at its inner end it has lateral flanges 69 riveted to the webs of the center sills. The web 66 of this shaft support has a longitudinal slot 70 flanged along its lower margin and open at its outer end except when closed by a removable cap 71 fastened to the end of the support by screws or bolts 72. On the under side of one of the top flanges 67 this support has an integral rack 73 with downwardly projecting teeth as in the other styles of support. Meshing with the teeth of this rack is a gear 45 in all respects like that described in connection with the other types of car. The crank shaft 41 in this instance has a single roller 42 adapted to travel on the lower margin of slot 70 and when it becomes desirable to remove the gear 45 from the shaft and underframe the bolt 49 and the filler block or key 48 are removed so that the gear may be slid lengthwise the shaft sufficiently to disengage its teeth from those of the rack at which time it can be removed from the shaft laterally, as will be apparent on an inspection of the drawing.

While I have illustrated and described in this application several styles of cars and several embodiments of my invention it is to be understood that many other modifications

may be made in the structure without departing from the substance of my invention as outlined in the appended 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 a hinged dumping door, a door operating mechanism comprising the combination of a support, a shaft mounted to move bodily on said support from and toward the hinges of said door to open and close the same, a gear on said shaft, a stationary rack above the axis of said shaft with which the teeth of said gear mesh, and means to turn said shaft to cause it to revolve and travel toward or from the hinges of the door, substantially as described.

2. In a railway car having a hinged dumping door, a door operating mechanism comprising the combination of a support, a shaft mounted to move bodily on said support from and toward the hinge of said door to open and close the same, a gear on said shaft, a rack above said gear with which the teeth of the latter mesh, and means to turn said shaft to cause it to revolve and travel toward or from the hinge of the door, substantially as described.

3. In a railway car having a hinged dumping door, a door operating mechanism comprising the combination of a support, a shaft, one or more rollers on said shaft adapted to travel on said support, said shaft being bodily movable on said support to open and close said door, a gear on said shaft, a rack above said gear with which the teeth of the latter mesh, and means to turn said shaft, substantially as described.

4. In a railway car having a hinged dumping door, a door-operating mechanism comprising the combination of a car underframe having slotted supporting members, a shaft extended through said slots and bodily movable lengthwise said slots to open and close said door, a gear fixed on said shaft, a stationary rack above said gear with which the teeth of said gear mesh, and means to turn said shaft, substantially as described.

5. In a railway car having a hinged dumping door, a door operating mechanism comprising the combination of a car underframe, a cranked shaft mounted on said underframe and adapted to move bodily toward and from the hinge of said door, the offset or cranked portion of said shaft being adapted to engage and open and close said door, a gear on said shaft, a rack mounted on said underframe above said gear, the teeth of said gear and rack co-operating, and means to turn said shaft, substantially as described.

6. In a railway car having a hinged dumping floor door, the combination of a car underframe having a plurality of slotted shaft-supporting members, a shaft extended

through said slots and adapted to move bodily lengthwise said slots, said shaft having a cranked or offset portion to engage the under side of said door and control its opening and closing, rollers on said shaft adapted to travel on the margins of said slots, a gear on said shaft, a rack fixed on said underframe above said gear, the teeth of said gear and rack co-operating, and means to turn said shaft, substantially as described.

7. In a railway car, the combination of a hinged dumping door, a shaft, a support for said shaft permitting bodily movement thereof toward and from the hinge of said door, a stationary rack, a gear mounted on said shaft to turn therewith, the teeth thereof meshing with those of said rack, a worm wheel on said shaft, and a worm to turn said worm wheel and shaft, substantially as described.

8. In a railway car having a hinged load-discharging door, the combination of a cranked shaft, the cranked or offset portion thereof engaging the under surface of said door and sustaining the weight thereof, a support for said shaft permitting bodily movement thereof toward and from the hinges of said door, a gear mounted on said shaft to turn therewith, a stationary rack, the teeth of said gear and rack meshing with each other, a worm wheel fixed to said shaft, and an operating worm meshing with said worm wheel, substantially as described.

9. In a railway car having a hinged load-discharging door, the combination of a cranked shaft, the cranked or offset portion thereof being below and bearing the weight of said door and the load above it, slotted supports for said shaft permitting bodily movement thereof toward and from the hinges of said door, a gear on said shaft rotatable therewith, a stationary rack above said gear, the teeth of said gear and rack meshing together, a worm wheel fixed to said shaft, and a worm rotatably mounted on the car meshing with said worm wheel and adapted to rotate the same during the whole of its bodily movement, substantially as described.

10. In a railway car, the combination of a shaft, a split gear adapted to be fixed to said shaft, said gear having a pair of spaced ears or lugs and a central aperture of substantially the same diameter as the shaft, the space between said lugs also being substantially equal to the diameter of said shaft and communicating with said central aperture whereby said gear may be attached to said shaft without removing the latter from its bearings, a filler block adapted to be placed between said ears or lugs, and a bolt adapted to pass through said lugs and filler block to fasten said gear to said shaft, substantially as described.

11. In a railway car, the combination of a shaft, a split gear adapted to be fixed to said

shaft, said gear having a pair of spaced ears  
or lugs and a central aperture of substan-  
tially the same diameter as said shaft, the  
space between said lugs also being substan-  
tially equal to the diameter of said shaft and  
communicating with said aperture whereby  
said gear may be attached to said shaft with-  
out removing the latter from its bearings, a  
filler block with an inner flat end adapted to  
be placed between said lugs, said shaft being  
flattened at one side for the engagement of  
the flat end of said filler block, and a bolt  
adapted to pass through said ears or lugs and  
filler block to fasten said gear to said shaft,  
substantially as described.

12. A support for a door-operating shaft  
of a railway car, comprising two spaced

slotted members connected together, and a  
rack between said members, substantially as  
described.

13. A cast metal support for a door-oper-  
ating shaft of a railway car having top and  
bottom marginal flanges, two spaced slotted  
webs at one end of said support which merge  
into a single web, as they extend toward the  
opposite end of said support, said single web  
being divided into two other spaced webs at  
the other end of the support, and a rack be-  
tween said spaced slotted webs, substantially  
as described.

ETHAN I. DODDS.

Witnesses:

FREDERICK C. GOODWIN,  
WALTER M. FULLER.