

J. PEARSON.

DUMP CAR.

APPLICATION FILED DEC. 21, 1908.

Patented Nov. 16, 1909.

3 SHEETS—SHEET 1.

940,187.

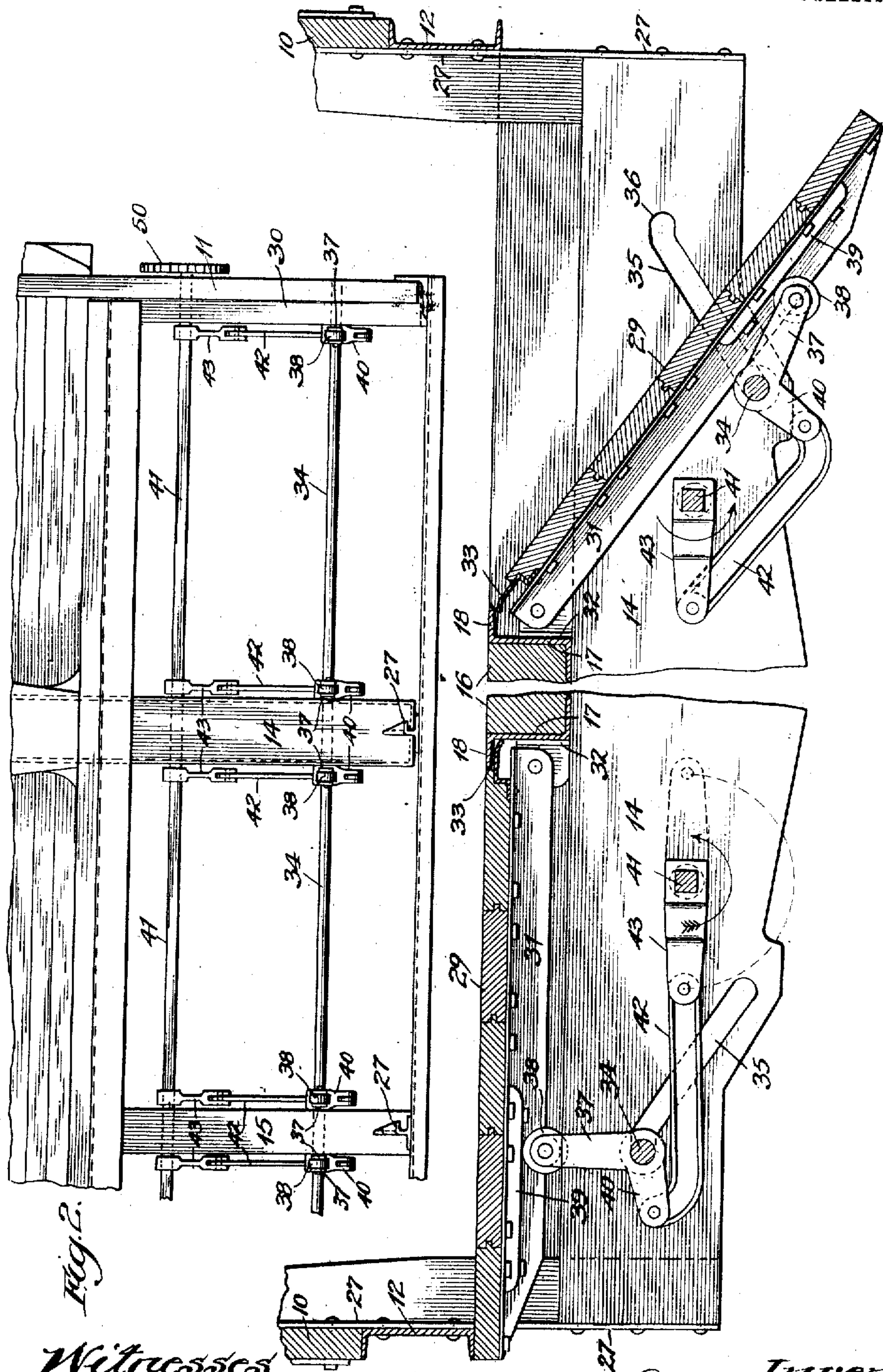


Fig. 2.

Fig. 1.

Witnesses  
Harry R. L. White  
Ray White.

Inventor  
John Pearson  
By Coburn & M. Roberts  
his Atty's





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3 SHEETS—SHEET 3.

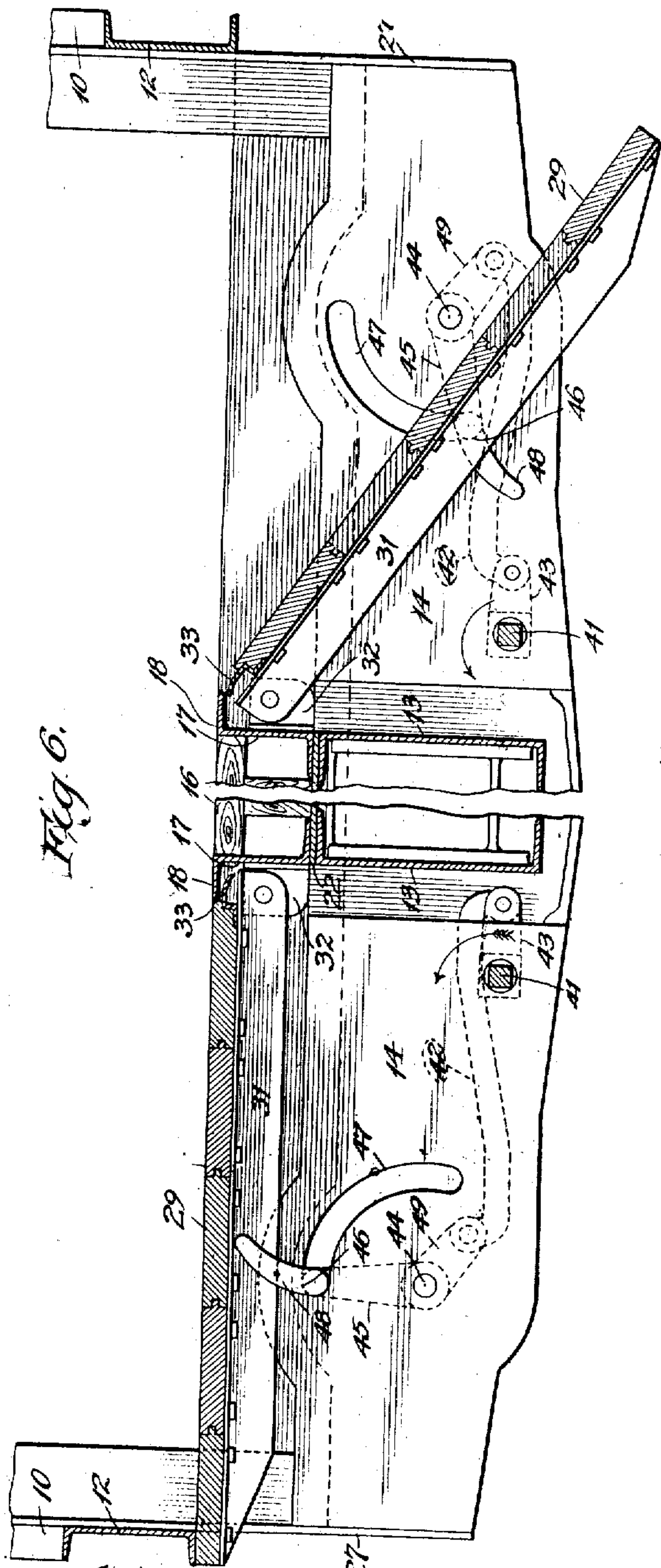


Fig. 6.

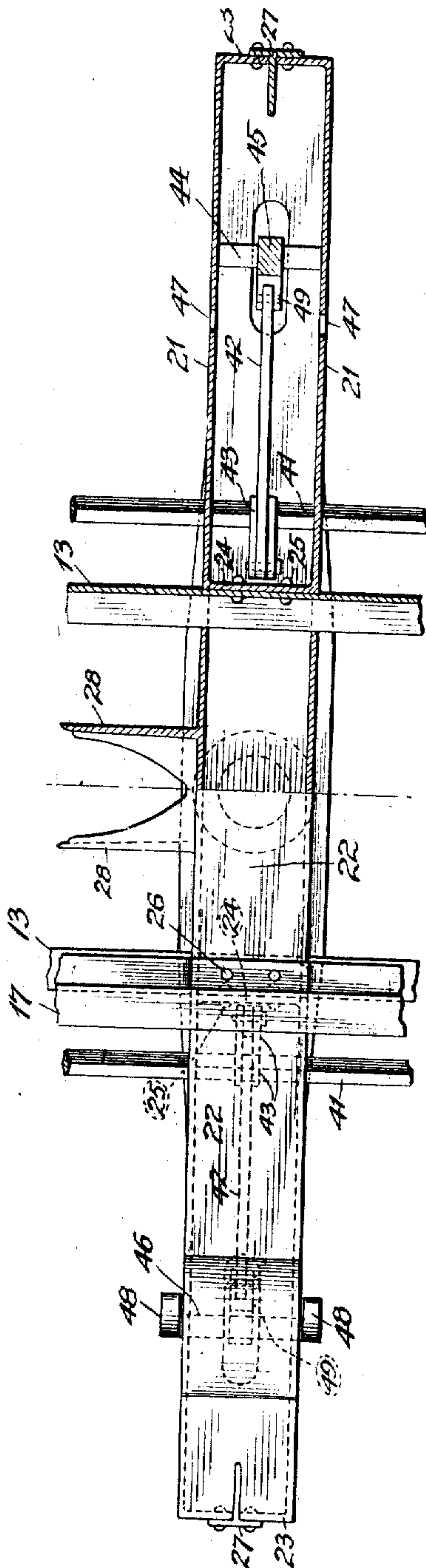


Fig. 7.

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# UNITED STATES PATENT OFFICE

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## DUMP-CAR.

940,187.

Specification of Letters Patent.

Patented Nov. 16, 1909.

Application filed December 21, 1906. Serial No. 348,861.

*To all whom it may concern:*

Be it known that I, JOHN PEARSON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Dump-Cars, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention relates to dump-cars and particularly to that class having drop-bottoms composed of a series of swinging sections or doors which form the bottom of the car when in their closed position.

15 The principal object of the invention is to provide new and improved mechanism for opening and closing the drop-bottom portions or doors, and new and improved mechanism to operate the opening and closing means.

20 Another object of the invention is to provide certain improvements in the frame of the car, and also particularly to provide means for making a closed joint between the doors or drop-portions and the longitudinal portion of the car-body with which the doors cooperate.

30 To these ends my invention consists in the constructions, arrangements and combinations of the several parts all as will be hereinafter described and pointed out in the claims.

In the accompanying drawings—Figure 1 is a cross-sectional elevation of one type of car as it appears when constructed in accordance with my improvements; Fig. 2 is a plan view of the bottom of the car shown in Fig. 1 with the doors on one side removed to show the mechanism beneath; Fig. 3 is a view in end elevation of a car showing means for operating the mechanism to open and close the doors, the right side of this view showing the position of the parts for opening the doors and the left side showing the position of the parts for closing the doors; Fig. 4 is a detail view showing the operating mechanism in position for shifting the parts from position to close the doors to position to open them and vice versa; Fig. 5 is a detail view showing one of the needle or transverse deck-beams in side elevation and other parts in section; Fig. 6 is a view similar to Fig. 1 and show-

ing a different form of means to open and close the doors; and Fig. 7 is a view partly in plan and partly in section of one of the bolsters and certain of the associated parts.

In constructing a car in accordance with my invention I provide the usual side and end walls 10 and 11, the sides being provided with side-sills 12, preferably in the form of channel irons or bars. The supporting frame-work consists of longitudinal sills 13, centrally disposed at each side of the longitudinal center of the car and extending substantially from end to end thereof, and bolsters 14 and transverse deck-beams or needle-beams 15 in the usual positions. The center sills support a stationary central longitudinal portion 16 of the car bottom, which may, if desired, be provided with a hood or cover (not shown) having oppositely inclined sides to provide an apex portion. The sides of the stationary portion 16 are provided with longitudinally extending angle irons 17, which are supported by the sills 13, and in the preferred form are provided with outwardly extending webs or ledges 18 at their tops. For this purpose the angle irons may be constructed of Z-shaped bars, although any suitable form may be employed which may provide outwardly extending webs or ledges for a purpose to be hereinafter described.

The needle-beams are preferably of cast metal, and extend across from side to side of the car as shown in Fig. 5. Their end-portions are substantially rectangular in outline, being cut-away at the lower outer corner, and provided with suitable flanges 15<sup>a</sup> by which they are riveted to the sills 13 and the angle-irons 17. The end-portions are united by a cross-web 19 which lies between the sills 13 and the irons 17, the latter being suitably deflected to pass upwardly over the webs 19, and the parts being secured together by rivets as at 20. The cross-webs extend across beneath the central part 16, and with the end-portions form integral cross-bearers or deck-beams. The bolsters 14 also extend across the width of the car, and preferably are composed of opposite side plates 21 suitably spaced apart and a top plate 22 and end plates 23 of suitable contour such for example as illustrated in Fig. 7, and preferably integral in a



single casting. The bolsters are cut-away at their centers to receive the longitudinal sills 13, and are provided with cross-flanges 24 which are riveted to the sills as at 25.

5 The top plate 22 extends between the sills 13 and angle irons 17, as shown in Fig. 6, and these parts are suitably connected by rivets as at 26. The ends of the bolsters, and also the needle-beams if desired, are provided  
10 with brackets 27 preferably in the form of T-irons, which extend upwardly and carry the side-sills 12 and the timbers of the sides 10, all bolted or riveted thereto. The bolsters are provided with the usual flanges  
15 28 to which the draft-device is secured, the sills 13 being suitably spaced apart so that the draft-device may be arranged between them in the center line of the car, as shown in Fig. 7.

20 The drop-bottom consists of a plurality of swinging sections or doors 29, which in the form shown in the drawings are pivotally secured at their rear edges to the central stationary portion of the bottom at each  
25 side. As is clearly shown in Fig. 2, a swinging section or door is located between adjacent transverse beams or bolsters and between the bolsters and the end-sills 30. Each door is provided with suitable side  
30 plates 31 preferably extending the full depth of the door and pivotally secured to the central stationary portion by means of brackets 32 suitably bolted or otherwise fastened to the angle irons 17.

35 Each of the swinging sections or doors is provided at its rear or inner edge with means to cooperate with the webs or ledges 18 to make a tight joint therewith in all positions of the door. This tight joint may be  
40 provided by any suitable means and for this purpose I have shown the doors or swinging sections occupied with inwardly projecting flanges 33 which take under the webs 18. It will be understood upon reference to  
45 Fig. 1 that when the doors are closed their upper faces come substantially flush with the upper faces of the webs, and the flanges 33 extend inwardly beyond the inner line of the door portions so as to project into the  
50 space below the webs. The flanges 33 and the webs 18 are of sufficient width to allow the door to swing down without breaking the joint between them, this being clearly illustrated in Figs. 1 and 6 wherein the  
55 parts are shown in their respective positions when the doors are raised and lowered. These flanges may be provided by any suitable means and for this purpose I preferably use Z-bars, which are riveted to the  
60 side plates 31 which preferably are in the form of angle-irons, the floor of the doors overlying part of the flanges 33 so as to come flush with the flanges 18 when the doors are closed.

65 The swinging sections or doors may be

raised or lowered by a variety of means without departing from my present invention, and I show two different forms of opening and closing mechanism.

In the form shown in Fig. 1 I provide a 70 rod 34 upon each side of the central portion and adapted to slide in slots 35 in the bolsters, needle-beams and end-sills. The outer ends of the slots are horizontally disposed as shown at 36, these portions being 75 of sufficient extent to form seats to receive and support the rods when in position therein; the slots extend inwardly and downwardly from the seats 36 to form inclined runs or ways for the rods. Upon each side 80 the rod may be integral or sectional, and it is provided with a plurality of bell-crank levers, preferably two, for each swinging section or door. The bell-crank levers are rigidly or loosely secured to the associated 85 rod or section of rod, and may oscillate the rod or merely turn on it as a pivot according to the construction employed. The long arms 37 of the bell-crank levers are in sliding engagement with the under faces of their 90 associated swinging sections or doors, preferably being provided with anti-friction rollers 38 rotatably mounted therein and engaging suitable tracks or wear-plates 39 on the outer faces of the doors. The short arms 95 40 of the bell-crank levers are suitably connected to an operating shaft 41, it being understood that one such shaft may be provided for each longitudinal series of doors on each side of the car or for a half of such 100 series. The connection between the short arms of the bell-crank levers and the operating shaft is preferably in the form of a toggle joint composed of the links 42 and 43 connected at their free ends to the bell-crank 105 and shaft, respectively, the ends of the links 42 connected to the arms 40 being upturned as shown in Fig. 1.

The other form of means to open and close the doors is illustrated in Figs. 6 and 110 7 in connection with one of the bolsters. When this form is employed the bolsters, cross-beams and end-sills are provided in such form that bell-crank levers may be pivoted or journaled between their opposite 115 sides, as at 44. The long arms 45 of the bell-crank levers carry cross-heads 46, each of which extends outwardly through slots 47 in the opposite plates or sides of the bolster or cross-beam and inner face of the 120 end-sills. The slots are struck upon the arc of a circle of which the pivot 44 is the center and extend rearwardly and downwardly as shown in Fig. 6, their upper ends forming seats for the cross-heads. Each cross-head is 125 provided at its ends with upwardly projecting lugs or wings 48 which engage the sides of the doors. The short arms 49 are connected to the operating shafts 41 by links 42 and 43, as heretofore described. 130



Each operating shaft 41 extends through an end of the car where it is provided with a ratchet wheel 50 rigidly mounted thereon and held against accidental displacement by a dog 51 suitably pivoted upon the end of the car body and adapted to be thrown out of engagement with the ratchet wheel when its stop or detent 52 is raised. A link 53 is loosely mounted on the operating shaft 41, and a pawl 54 is carried by a link 55 which is pivotally connected at its ends with the link 53 and a handle 56 pivoted at 57 on the end of the car body, as clearly shown in Fig. 3. By this construction the shaft 41 may be reversely operated to raise and lower the doors. In Fig. 4 it is obvious that when the handle 56 is sufficiently lowered to allow the pawl 54 to engage the teeth of the ratchet wheel 50, the latter may be rotated in the direction of the feathered arrow by the operation of raising and lowering the handle, each down thrust thereof turning the ratchet wheel the distance of one or more of its teeth. To reverse the direction of movement of the shaft 41 the handle is raised until the pawl is drawn out of engagement with the teeth of the ratchet wheel, as shown in Fig. 4, when the pawl is moved backward by hand and the handle lowered until the parts occupy positions substantially as shown at the left side of Fig. 3. In this position it is apparent that if the handle be raised and lowered alternately the ratchet wheel will be rotated with every down thrust in the direction of the featherless arrow and the shaft 41 turned accordingly. It is apparent that when the parts are reversed from the position shown at the left side of Fig. 3 to that of Fig. 4, the pawl 54 will swing by gravity to the position of Fig. 4 when the handle is raised. The pawl at the right side of Fig. 3 may likewise be reversed to oppositely rotate the shaft to raise and lower the doors.

Referring to the form of mechanism shown in Fig. 1, the links 42 and 43 hold the associated rod 34 in the seat 36 formed by the horizontal portion of the slot 35, the outer ends of the links 42 being upwardly curved as shown so that their ends are substantially in the horizontal plane of the rod beyond the seat and lock the rod in the seat when the shaft 41 is held from rotation, as by the dog 51. This holds the long arms 37 of the bell-crank levers in substantially vertical position, and by this arrangement the weight of the doors and the material carried thereby is borne upon the bolsters and deck-beams, the parts of the operating mechanism, except the upright arms of the bell-cranks, being thereby relieved of all weight or strain when the car is loaded. In this position of the parts the free ends of the long arms of the bell-crank levers are in the same vertical plane as the associated rods, so that the weight of the door and its load is sus-

tained at points substantially upon a dead center with the rods; it is therefore apparent that if the point of contact between the bell-cranks and the associated door be shifted from the dead center the weight of the door and its load will cause the rod to be displaced from its seat and to travel down the inclined slot 35 and allow the door to drop. In order to move the bell-cranks sufficiently to throw the long arm off the dead center the dog is released and the shaft 41 is rotated in the direction of the feathered arrow in Fig. 1, which may be accomplished by raising or lowering the handle at the right of Fig. 3 or in Fig. 4, respectively. While the means for giving an initial motion to the bell-cranks may be of any suitable construction, I preferably employ the means illustrated. When the parts of the operating mechanism are in the position substantially as shown at the right hand side of Fig. 3 or in Fig. 4 it is obvious that if the handle is operated the ratchet wheel will be moved in the direction of the feathered arrow the distance of one or more teeth and the operating shaft 41 to which the ratchet wheel is rigidly secured will be turned in the same direction accordingly. This movement of the shaft turns the link 43 downward through the path of the dotted line and thereby pulls the vertical arm of the bell-crank lever off the dead center of the associated rod 34, when the weight of the door and its load will cause the shaft to travel down the inclined portion of the slot 35 to allow the doors to open, the parts taking the position shown at the right side of Fig. 1.

When the load has been dumped and it is desired to return the doors to their closed position, the handle 56 is raised to the position shown in Fig. 4, and the pawl is turned by hand to drop to the position shown at the left side of Fig. 3 when the handle is lowered, and the dog 51 is moved into engagement with the teeth of the ratchet and held in position by means of the detent 52. The parts having assumed the position shown at the right side of Fig. 1 and the left side of Fig. 3, it is apparent that if the handle 56 is thrust down the ratchet wheel and shaft will be turned in the direction of the featherless arrow, and with successive raising and lowering or pumping of the handle 56 the linkage between the shaft and bell-cranks will be moved to push the rods with the door up the inclined portions of the slots 35 until they reach their seats 36. When the rods are seated the continued turning of the shaft 41 rotates the bell-crank levers upon the rods and the long arms 37 bearing upon the wear plates 39 restore the doors to original position, as shown at the left hand side of Fig. 1.

To operate the means shown at the right side of Fig. 3 to close the doors the handle is raised to a position similar to that shown in



Fig. 4 and the pawl is turned by hand to drop in the opposite direction so that the shaft is oppositely moved when the handle is successively lowered, the dog preventing the shaft from turning backward.

In the other form of means to open and close the doors illustrated in Figs. 6 and 7, the rotation of the shaft 41 in the direction of the feathered arrow rocks the cross-heads out of the line of their pivots or off the dead center, and the weight of the doors and load causes the cross-heads to move in the slots from the closed position shown in full lines at the left side to the open or dump-position shown in dotted lines at the right side of Fig. 6; and the reverse rotation of the shaft in the direction of the featherless arrow rotates the bell-cranks to raise the door, the continued rotation of the bell-cranks after the cross-heads seat in the outer ends of the slots causing the wings 48 to close the doors.

While the doors are shown as outwardly discharging it is obvious that the same device may be employed with inwardly opening doors. In other words the invention is capable of embodiment in dump cars in which the doors are hinged to either the center or side sills to dump outwardly or inwardly as desired.

While the levers to open and close the doors are shown in the form of bell-cranks, it is obvious that they may be in other form; for example, the long arms or links 37 or 45 may be employed alone as levers, and may be operated by any suitable means.

In the form shown in Fig. 1 it is obvious that the links 37 may pivot upon the rods 34 or upon the doors as centers, and that in either case when moved they will be thrown out of alinement with the line of the weight or load, or off the dead center, so that the doors may open.

Having described my invention what I claim as new and desire to secure by Letters Patent of the United States, is—

1. In a car, central longitudinal sills, central angle-irons above the sills, and deck-beams having end-portions and a connecting web between the sills and irons.

2. In a car, central longitudinal sills, central angle-irons above the sills, and deck-beams having end-portions connected by a cross-web, the end portions having flanges secured to the sills and the web located between the sills and angle-irons and secured thereto.

3. In a dump-car, a frame having cross-supports provided with inclined slots, a rod in the slots, a series of dump-doors on the frame, bell-crank levers pivoted on the rods each having an arm engaging a door in the line of the dead center of the lever pivots when the doors are closed, and means to move the levers.

4. In a dump-car, a frame having cross-supports provided with inclined slots, a rod in the slots, a series of dump-doors on the frame, bell-crank-levers pivoted on the rods each having an arm supporting a door and arranged in the line of the weight or load therefor, and means to operate the levers to open and close the doors.

5. In a dump-car, a frame having cross-supports provided with inclined slots, a rod in the slots, a series of dump-doors on the frame, a shaft, bell-crank levers on the rods each having an arm supporting a door, links connecting the shaft and the free arm of the bell-cranks, and means to operate the shaft.

6. In a dump-car, a frame having cross-supports provided with inclined slots having horizontal end-seats, a rod in the slots and normally resting in their seats, dump-doors pivoted on the frame, bell-crank levers on the rod, one arm of the levers supporting a door and other arm extending in the line of the end-seats, a shaft held against rotation in one direction, links connecting the shaft and bell-cranks, and means to operate the shaft in the opposite direction.

7. In a dump-car, a frame having cross-supports provided with inclined slots having horizontal end-seats, a rod in the slots and normally resting in the seats, dump-doors pivoted on the frame, bell-crank levers on the rod each having an arm engaging a door, a shaft, a catch to hold the shaft against rotation in one direction, links connecting the shaft and free arm of the bell-cranks, and means to operate the shaft in the opposite direction.

8. In a dump-car, a frame having cross-supports provided with inclined slots having horizontal end-seats, a rod in the slots and normally resting in the seats, dump-doors pivoted on the frame, bell-crank levers on the rod each having an arm engaging a door, a shaft, a catch to hold the shaft against rotation in one direction, links connecting the shaft and free arm of the bell-cranks, and means to operate the shaft when the catch is released.

9. In a dump-car, a frame, a series of dump-doors on the frame, a rock-shaft, connections between the shaft and the doors to open and close the latter, a ratchet wheel on the shaft, an operating handle, link connections between the handle and shaft, and a reversible pawl on the link connections to move the wheel in either direction.

10. In a dump-car, a frame, a series of dump-doors pivoted on the frame, a rock-shaft having a ratchet-wheel, connections between the shaft and doors to open and close the latter, a handle pivoted on the frame, a pivoted link, and a link pivotally connecting the pivoted link and handle and having a pawl to engage the wheel.

11. In a dump-car, a frame, a series of



5 dump-doors pivoted on the frame, a series of levers mounted on the frame and engaging the doors, a rock-shaft having a ratchet-wheel, connections between the shaft and  
5 levers, an operating handle pivoted on the frame, link connections between the operating handle and the shaft, and a reversible pawl on the link connections.

10 12. In a dump-car, a frame, a series of dump-doors pivoted on the frame, a series of bell-crank levers to raise and lower the doors, a rod having sliding support upon the frame and carrying the levers, a rock-shaft having a ratchet wheel, a dog for the ratchet  
15 wheel, connections between the shaft and levers, a link pivoted at one end on the shaft, a handle pivoted on the frame, a link pivotally connected to the handle and free end of

the first link, and a reversible pawl on the second link engaging the ratchet wheel. 20

13. In a dump-car, a frame, a series of dump-doors pivoted on the frame, a series of levers mounted on the frame and engaging the doors, a rock-shaft, connections between the shaft and levers, a ratchet wheel on the  
25 shaft, an operating handle, link connections between the shaft and the handle, and a reversible pawl on one of the links to move the wheel in either direction.

In testimony whereof I affix my signature 30  
in presence of two witnesses.

JOHN PEARSON.

Witnesses:

ELIZABETH MOLITOR,  
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