P. J. HARRIGAN.

DUMP CAR.

APPLICATION FILED DEC. 18, 1913.

1,114,350.

Patented Oct. 20, 1914.

3 SHEETS—SHEET 1.

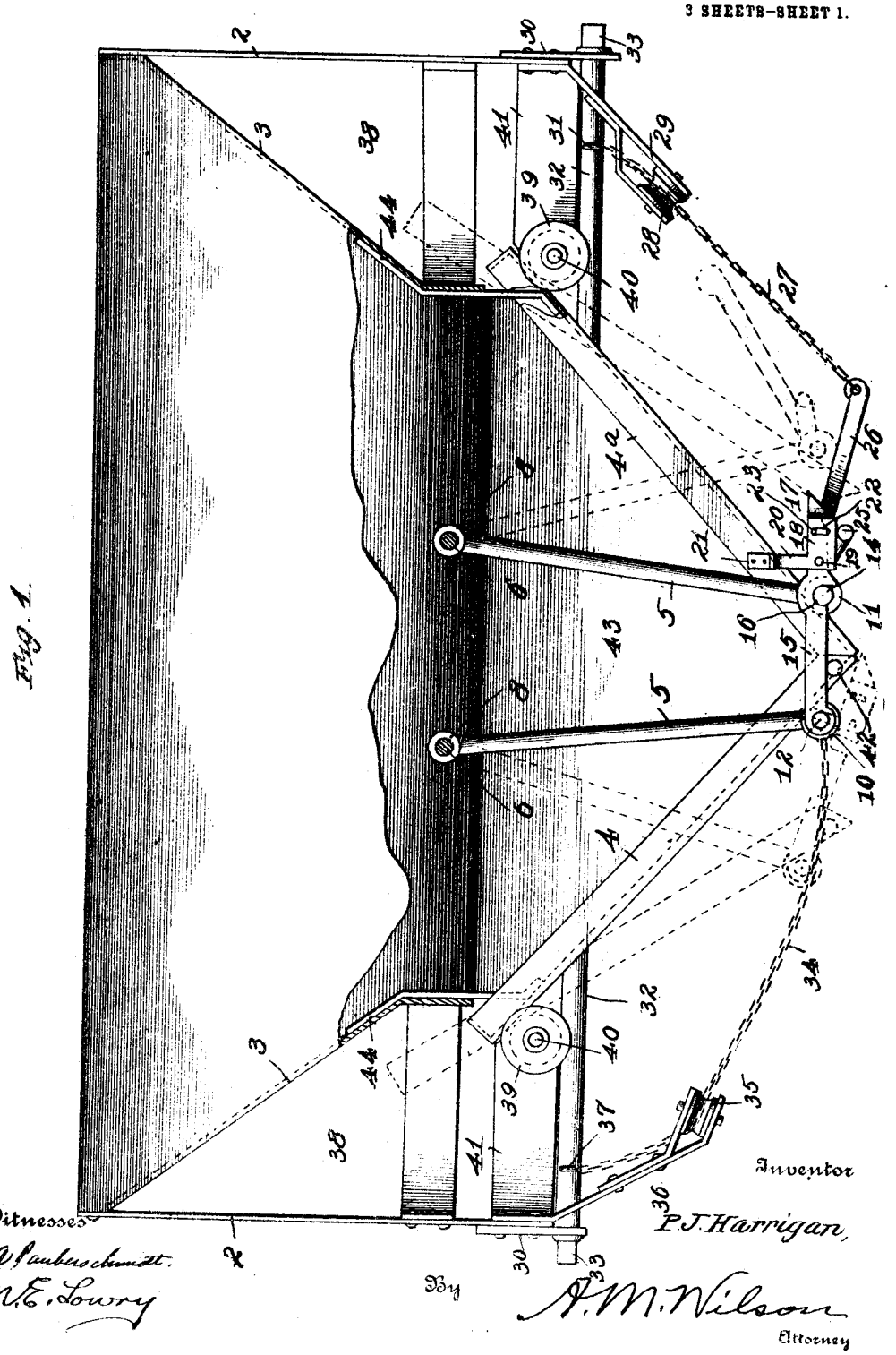


Fig. 1.

Witnesses:
G. A. Paulus Schmidt.
M. E. Lowry

Inventor
P. J. Harrigan,
By
A. M. Wilson
Attorney

P. J. HARRIGAN.

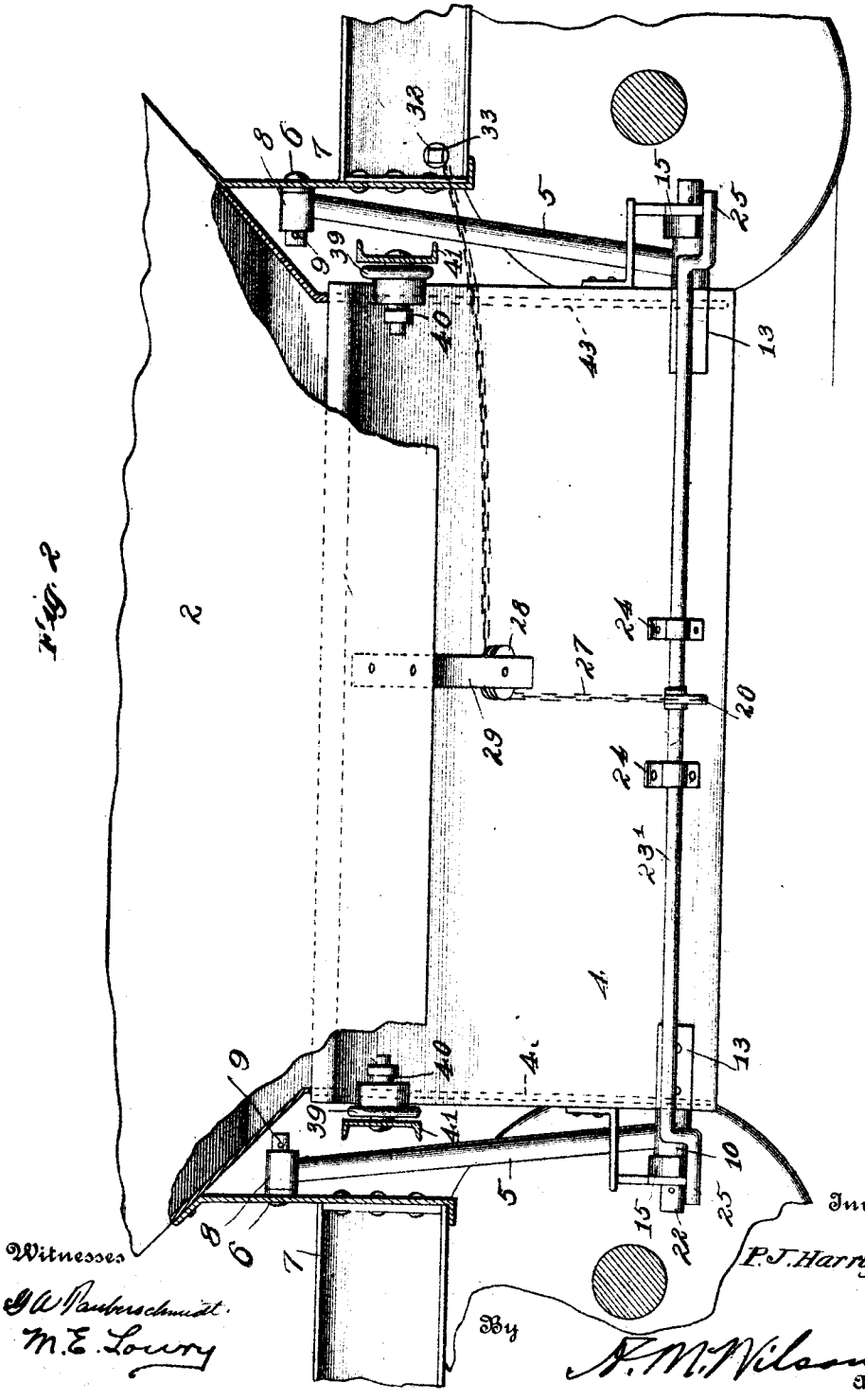
DUMP CAR.

APPLICATION FILED DEC. 18, 1913.

1,114,350.

Patented Oct. 20, 1914.

3 SHEETS—SHEET 2.



P. J. HARRIGAN.

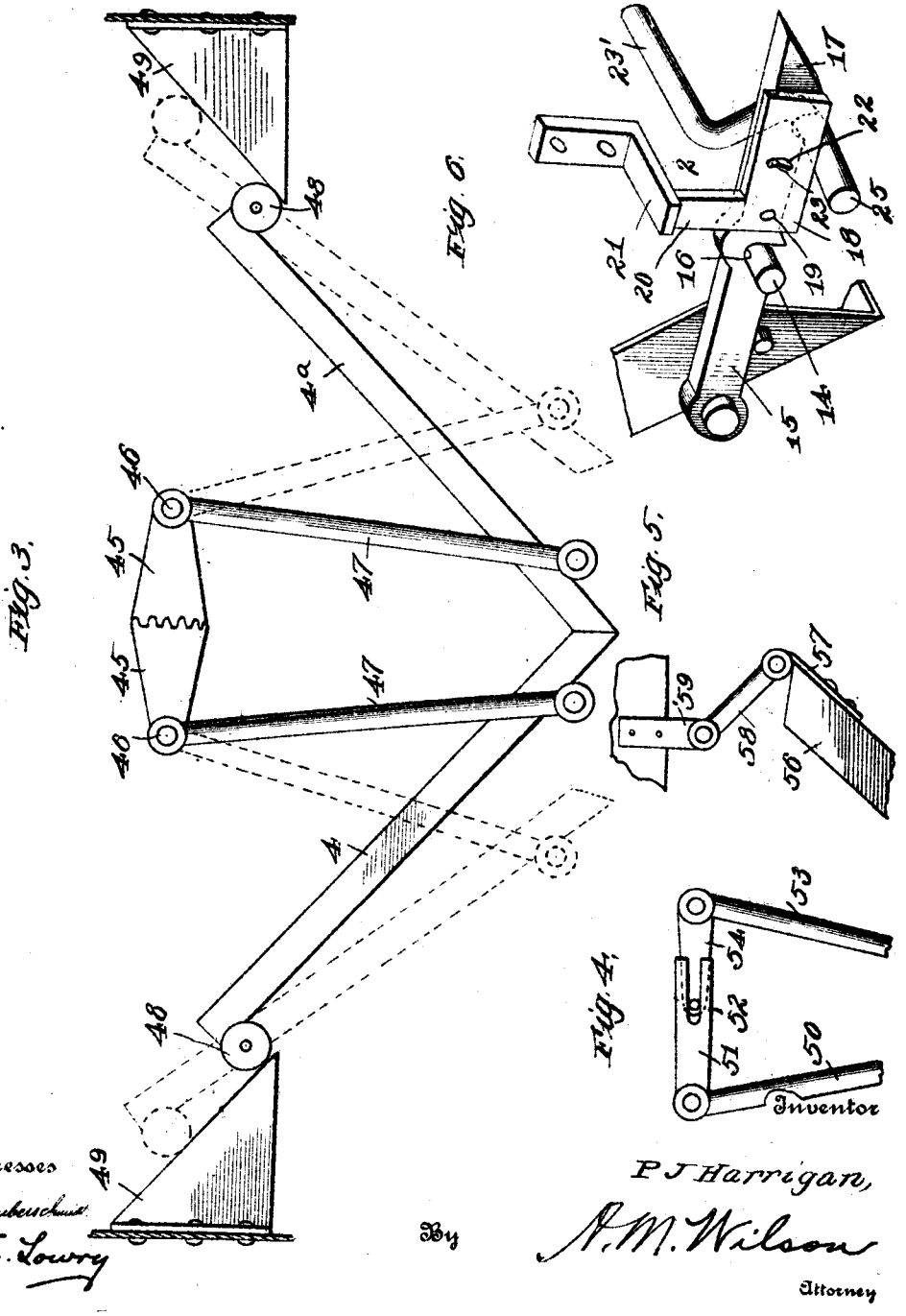
DUMP CAR.

APPLICATION FILED DEC. 18, 1913.

1,114,350.

Patented Oct. 20, 1914.

3 SHEETS-SHEET 3.



UNITED STATES PATENT OFFICE.

PATRICK J. HARRIGAN, OF McKEESPORT, PENNSYLVANIA.

DUMP-CAR.

1,114,350. Specification of Letters Patent. Patented Oct. 20, 1914.

Application filed December 18, 1913. Serial No. 807,467.

To all whom it may concern:

Be it known that I, PATRICK J. HARRIGAN, a citizen of the United States, and residing at McKeesport, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Dump-Cars, of which the following is a specification.

This invention relates to certain new and useful improvements in dump cars, and more particularly to those of the hopper bottom type.

The present invention relates more particularly to certain radical improvements in the door operating mechanism of such cars, whereby to permit the doors to be opened or disposed the full distance of the length between the trucks of a car and reaching between the wheels close to the axles.

The manner of suspending or mounting the doors is such that their lower edges travel in practically a horizontal plane when opening or closing, and thus permits the doors to hang low or close enough to the rails to give track clearance, thus to give the greatest possible internal area for any given height of car.

The doors, as usual, are angularly disposed, that is to say, occupy a double incline forming a hopper shaped container for the load and the means employed to hang or suspend the door balances the weight thereof and reduces friction to a minimum, rendering it possible to operate very long or heavy doors with comparative ease, whether the car be loaded or empty.

The operating means for the doors and the locking mechanism therefore, are directly connected, and are so arranged that the actuating means therefor may be rendered operable to secure a release of the doors and their lateral shifting or swinging by turning the actuating means in either direction, and on either side of a car. By the arrangement employed, the lading tends to open the doors when unlocked or may be aided in opening the doors by the operator giving a slight initial opening movement. The lading while discharging itself from the car exerts a pressure on the doors that operates to hold them opened, and when the car is empty, and the operator releases the means initially employed for opening the doors, the latter will close of themselves, and the locking means employed will automatically come into action to secure the doors against opening while receiving further lading.

With the above general statement of the main features of construction of the invention, the main object will be apparent, which is to provide a dump car having movable doors arranged or supported in such manner as to be readily and easily operated to provide a discharge opening of large area, in order to obtain a rapid discharge of the material from the car, and effectually to prevent the bridging of the material during such discharge.

A further object is, in a ready and practical manner, to dispense with the employment of chains, or stationary door suspending means, such as are generally employed in connection with cars of the character described.

A further object is to provide a dump car having a movable door or doors to form the bottom thereof, and disposed at such angle with relation to the car sides that upon the initial discharge of the lading from the car, the weight of the lading will be directed against the door or doors, thereby to effect a rapid full opening of such closure, the door or doors in their completely open position being still so disposed that their tendency is automatically to return to a closed position as soon as the weight of the lading is relieved therefrom.

With the above and other objects in view, as will appear as the nature of the invention is better understood, the same consists, broadly stated, in a dump car, embodying double inclined doors, swinging supports pivotally connected near the lower ends of the doors, means for maintaining the doors normally in locked position, means for releasing the doors, means for swinging the doors laterally to open position, and means for converting the lateral movement into oblique upward movement, whereby the lower ends of the doors are caused to travel in a substantially horizontal plane, the locking mechanism being of such character that upon return of the doors to closed position, such mechanism will automatically come into play, and will be positively prevented from accidental release, from any jars or vibrations imparted to the car in use.

The invention consists further in the various novel details of construction of a door

operating means for a dump car as will be hereinafter fully described and claimed.

In the accompanying drawings, forming a part of this specification, and in which like characters of reference indicate corresponding parts: Figure 1 is a view in end elevation, partly in section, of a dump car constructed in accordance with the present invention. Fig. 2 is a view in side elevation, partly in section, showing more particularly the means for suspending the bottom portions of the doors from the side sills of the car, and also the means for releasing the door locking mechanism. Fig. 3 is a view in elevation of a modified form of door operating mechanism. Fig. 4 is a view similar to Fig. 3, of another form of door operating mechanism, the doors being omitted. Fig. 5 is a view similar to Fig. 4, of another modified form of door suspending or operating mechanism. Fig. 6 is a perspective detail view displaying, on an enlarged scale, the means for releasing the locking mechanism.

Referring to the drawings, and particularly to Figs. 1, 2, and 6, 1 designates the end sheet of an ordinary metallic dump car, 2 the side sheets, and 3 the hopper sheets, the latter being so arranged as to constitute door casings to receive the upper ends of the doors 4 and 4ª, when the latter are opened, as will hereinafter more fully appear.

The essential feature of the present invention resides in a novel arrangement of mechanism for supporting the doors so as to permit the lower ends thereof to have lateral swinging movement in a substantially horizontal plane, thus to dispense with grooved or slotted guides and rollers, such as are commonly employed or of chains, and further in the novel arrangement of the door locking mechanism and releasing means therefor.

As the various mechanisms employed are the same at each end of the car, and co-act in unison, a description of one will serve for both.

The suspending mechanism consists of two links 5 for each door, that are pivoted upon pintles 6 rigidly secured to the cross sills 7, as clearly shown in Fig. 2, the collars or sleeves 8 carried by the links and engaging the pintles being held from accidental disconnection therefrom by cotter pins or bolts 9. The lower end of each of the links is provided with a sleeve 10 and 11 respectively, the former of which engages the pintle 12 carried by a plate 13 firmly secured to the door 4, adacent to its lower edge, and the latter of which engages a pintle 14 carried by a plate similar to the plate 13 and rigidly secured to the door 4ª adjacent to its lower end. I preferably dispose the pintles 12, 14 somewhat above the lower edges of the doors, in practice usually about six inches above said lower edges. This is done so that in the lower edges of the doors during their opening and closing movements, will travel in a substantially horizontal plane, whereas if the pintles were at the lower edges of the doors, such lower edges would necessarily describe an arc during their opening and closing movements. Though the doors will operate equally well when the links 5 are pivoted to their lower edges, I prefer to eliminate to as great an extent as possible, the arc-movement of their lower edges in opening and closing. Loosely mounted upon each of the pintles 12 is a latch 15 having intermediate of its ends a seat 16 that is designed to engage with the pintle 14, the free end of the latch being provided with a beveled nose 17, as most clearly shown in Fig. 6. Pivoted to the latch adjacent to its outer end is a safety dog comprising a weighted head 18 that is secured by a pivot 19 to the latch, and terminates short of the nose 17, and projects some distance below the under edges of the outer end of the latch. The head carries an upstanding arm 20 that is normally disposed under an L-shaped keeper 21 rigid with the end of the door 4ª. As it is designed that the safety dog shall move through a prescribed arc of a circle, it will be understood that the upper end of the arm 20 will terminate sufficiently short of the keeper to prevent interference with such movement. In order to limit the upward movement of the head 18, it being necessary only that it should move a sufficient distance to permit the arm 20 to clear the keeper 21, the head is provided with a curved slot 22, that is engaged by a pin 23 carried by the latch. As will be obvious, by reference to Fig. 6, when the latch is in locked engagement with the pintle 14, and the arm of the safety dog is under the keeper 21, it will be impossible for the latch to become accidentally released from engagement with the pintle 14 from any jars or vibrations incident to the travel of the car over the road.

To release the latch from engagement with the pintle, when it is desired to open the doors, a crank shaft 23 is employed, clearly shown in Fig. 2, and which is supported in suitable bearings 24 secured adjacent to the lower edge of the door 4ª. At each end of the shaft is a crank 25, and this lies directly under and is normally in engagement with the under edge of the head 18 of the safety dog. Projecting laterally from the crank shaft at a point adjacent to its center is an arm 26, to the outer end of which is secured one end of a chain 27, the other end of which passes around a sheave 28 mounted in a bracket 29 secured to the side sill 30, the upper end of the chain being secured to a staple or keeper 31 carried by a shaft 32

journaled in the side sills 30, the outer ends of the shaft being squared as at 33 to permit the application of a wrench or crank thereto for the purpose of turning the shaft when necessary. Secured to the door 4 adjacent to its lower edge is one end of a second chain 34, the other end of which passes around a sheave 35 mounted in a bracket 36 secured to the side sill 30, the upper end of the chain being secured to a staple or keeper 37 carried by the shaft 32.

As above stated, it is one of the objects of the invention to permit the lower ends of the doors to move in substantially a horizontal plane and to effect this result, it is necessary that the upper ends of the doors should be caused to move in an oblique vertical line, to take up what would otherwise be a curvilinear movement of the lower ends of the doors, and to accomplish this, the upper ends of the doors project into the casings 38, formed in part by the side sheets 2 and by the hopper sheets 3 and are supported by rollers 39 journaled upon bearings 40 carried by the cross sill 41.

It will be obvious, owing to the fact that the latch is loosely mounted upon the pivot 6, that in order to insure automatic action when brought to locking position, some means must be provided whereby to prevent its dropping down, and to preclude this, there is a latch rest 42 employed in the nature of a pin, which projects from the end of the door 4 and upon which the latch rests, as shown in Fig. 1.

In order to close the space at the ends of the doors at their ends, thus to prevent the escape of any material with which the car is loaded, V-shaped plates 43 are employed which are firmly secured as by rivets, to angle extensions 44 rigid with the hopper sheets 3, as indicated in Fig. 1.

Having thus described the parts of the structure shown in Figs. 1, 2, and 6, the manner of their operation in releasing the doors will be given. Assuming that the parts are in the position shown in Fig. 1, which is the load-holding position, and it be desired to release the doors, thus to permit the load to be discharged to the track, a crank or wrench is applied to the squared portion at either end of the shaft 32, and upon the latter being turned, the draft will be first applied to the chain 27, the chain 34 being at this time slack. This will cause the arm 26 to be rocked imparting motion to the crank shaft 23, whereupon the cranks 25 will operate to lift the head 18 of the safety dog, by riding against the lower edge thereof, and upon continued movement being imparted to the shaft 32, the crank will cause the arm 20 of the dog to be moved free from contact with the keeper 21 and upon riding up the nose 17, will lift the latch, and thus release the latter from engagement with the pintle 14. By the time this movement has been accomplished, the chain 34 will have become taut and the two chains will then operate to move the doors laterally, and permit discharge of the lading. As soon as the car is empty, the doors will automatically close, and the nose of the latch will ride upon the pintle 14 and cause the automatic reëngagement of its seat with the pintle.

In the structure shown in Fig. 3, two arms 45 are employed, the opposed ends of which are provided with racks that intermesh, and these arms are mounted upon the pintles 46 that support the links 47, which operate in the manner above described, to impart swinging movement of the doors 4 and 4ª. Of course, it will be understood, that the actuating mechanism for moving the doors will be the same as that described in connection with Figs. 1 and 2, and as such arrangement will be readily understood, detailed illustration thereof is deemed unnecessary. In this form of the invention, the rollers 39 are dispensed with, and in lieu thereof, the upper end of each of the doors has journaled to it, a roller 48 that is designed to travel upon a track 49, which as herein shown is inclined, although it may be of any other desired contour to secure the result designed, namely, to impart an upward movement to the doors 4 and 4ª as the latter open.

In the arrangement shown in Fig. 4, the upper end of one link 50 has rigidly secured to it an arm 51 carrying a fork 52, and the other link 53 carries a rigid arm 54 which has a pin for engaging the forked end 52 of the arm 51.

In the form of the invention shown in Fig. 5, the door 56 has secured to it a bracket 57 to which is connected at one end of the link 58, the other end of which is pivoted to a bracket 59 secured to the car body. It will be understood that in each of the forms of the invention shown in Figs. 3, 4, and 5, that the means shown as connecting the links is utilized to cause one link to impart a movement to the other, thus to minimize the power necessary to actuate the links.

While the form of locking mechanism herein shown has been found thoroughly effective in use, it will be understood that the invention is not to be limited thereto, as other arrangements may be adopted and still be within the scope of the invention.

What I claim as new and desire to secure by Letters Patent of the United States is:—

1. A dump car having inclined doors, swinging supports for the lower portion of the doors, means for maintaining the supports in locked relation relative to the doors to cause the latter to resist any tendency to open from a weight imposed thereon, safety devices co-acting with the locking mecha-

nism to prevent the latter from becoming accidentally unlocked and means for successively releasing the safety devices and the locking mechanism.

2. A dump car having doors suspended for swinging movement at their lower ends, means for converting the lateral movement into an upward movement whereby to cause the lower ends of the doors to travel in an approximately horizontal plane, interlocking devices carried by the doors for locking the swinging means against movement when the doors are in load-receiving position, safety means for preventing accidental release of the locking mechanism and means for successively releasing the safety means and the interlocking devices.

3. A dump car having double inclined doors, swinging links pivotally-connected with the lower ends of the doors, means for supporting the upper ends of the doors for sliding movement, and means carried by one of the links and interlocking with a part of the other link for locking the doors together.

4. A dump car having double inclined doors, swinging links pivotally-connected with the lower ends of the doors, means for supporting the upper ends of the doors for sliding movement, means carried by one of the links and interlocking with a part of the other link for locking the doors together, and a safety device for said locking means to prevent accidental unlocking.

5. A dump car having double inclined doors, swinging links pivotally-connected with the lower ends of the doors, means for supporting the upper ends of the doors for sliding movement, means carried by one of the links and interlocking with a part of the other link for locking the doors together, a safety device for said locking means, and means operating to first release the safety device and then the locking mechanism.

6. A dump car having doors suspended for swinging movement at their lower ends, locking mechanism co-acting with the suspending means to hold the latter against movement when the doors are in load-receiving position, safety means carried by the locking mechanism to prevent accidental release of the latter, and means to first release said safety means, and then the locking mechanism.

7. A dump car having doors suspended for swinging movement at their lower ends, locking mechanism co-acting with the suspending means to hold the latter against movement when the doors are in load-receiving position, a keeper carried by the locking mechanism to prevent accidental release of the latter, and means operating first to release the keeper and then the locking mechanism.

8. A dump car having doors suspended for swinging movement at their lower ends, a gravity actuated locking latch co-acting with the suspending means to hold the latter against movement when the doors are in load-receiving position, a keeper co-acting with the locking mechanism to prevent the accidental release of the latter, and means operating first to release the keeper and then the locking latch.

9. A dump car having doors suspended for swinging movement at their lower ends, a gravity-actuated locking latch co-acting with the suspending means to hold the latter against movement when the doors are in load-receiving position, a gravity-actuated safety dog carried by the latch to prevent accidental release of the latter, and means operating first to release the keeper and then the locking latch.

10. A dump car having double inclined doors, means for pivotally supporting the lower ends of the doors to permit swinging movement, means for supporting the upper ends of the doors for upward sliding movement, interlocking elements carried by the doors for holding the lower ends of the doors in locked relation, safety devices for said interlocking elements, and means for successively releasing said safety devices and interlocking elements.

11. A dump car having double inclined doors, swinging links pivotally-connected with the lower ends of the doors, means for supporting the upper ends of the doors for sliding movement, and gravity-actuated locking means co-acting with the lower ends of the links to retain the same in locked position.

12. A dump car having double inclined doors, swinging links pivotally-connected with the lower ends of the doors, means for supporting the upper ends of the doors for sliding movement, a gravity-actuated latch carried by one of the links and interlocking with a part of the other link, and a gravity-actuated safety dog co-acting with the latch to prevent accidental release of the latter.

13. A dump car embodying double inclined doors, swinging supports pivotally connected near the lower ends of the doors, means for maintaining the doors normally in locked position, means for releasing the doors, means for swinging the doors laterally to open position, and means for converting the lateral movement into oblique upward movement, whereby the lower ends of the doors are caused to travel in a substantially horizontal plane, the locking mechanism being of such character that upon return of the doors to closed position, such mechanism will automatically come into play and will be positively prevented from accidental release from any jars or vibrations imparted to the car in use.

14. A dump car having double inclined

doors suspended by mechanism that permits a swinging pivotal movement of the doors at their lower ends, and a movement in an approximately horizontal plane, and an upward oblique movement at their upper ends, in combination with interlocking devices co-acting with the door-suspending mechanism for locking the doors together, a safety device co-acting with said interlocking devices, and means for successively releasing said safety device and said interlocking devices.

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

PATRICK J. HARRIGAN.

Witnesses:
SAML. P. ROBBINS,
JOSEPH J. HENRY.