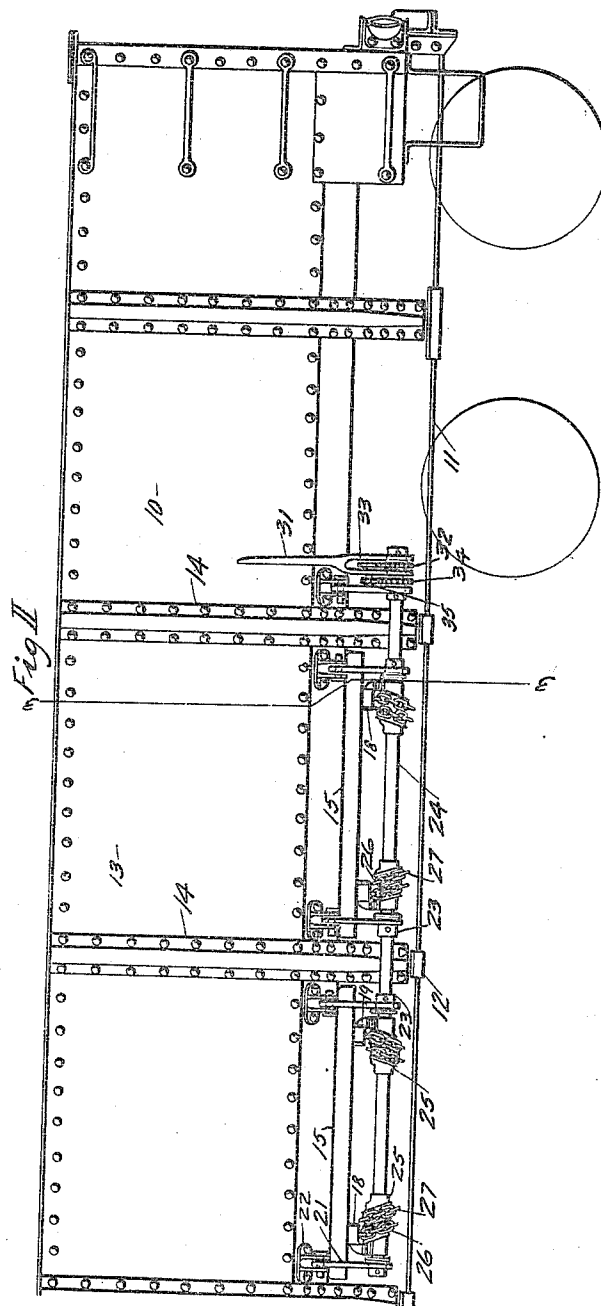
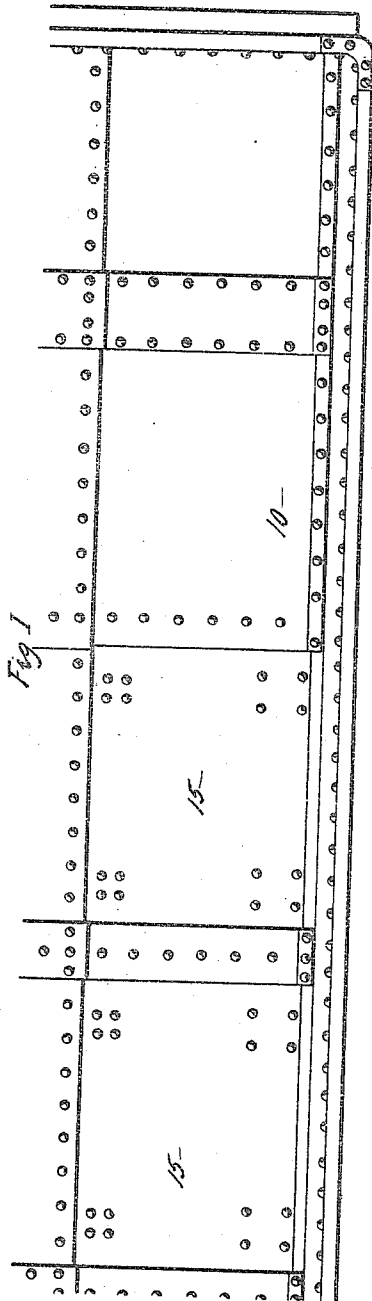


A. CAMPBELL.
DOOR MECHANISM FOR DUMP CARS.
APPLICATION FILED JULY 31, 1911.

1,051,487.

Patented Jan. 28, 1913.

2 SHEETS-SHEET 1.



WITNESSES:
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Paul Abrams

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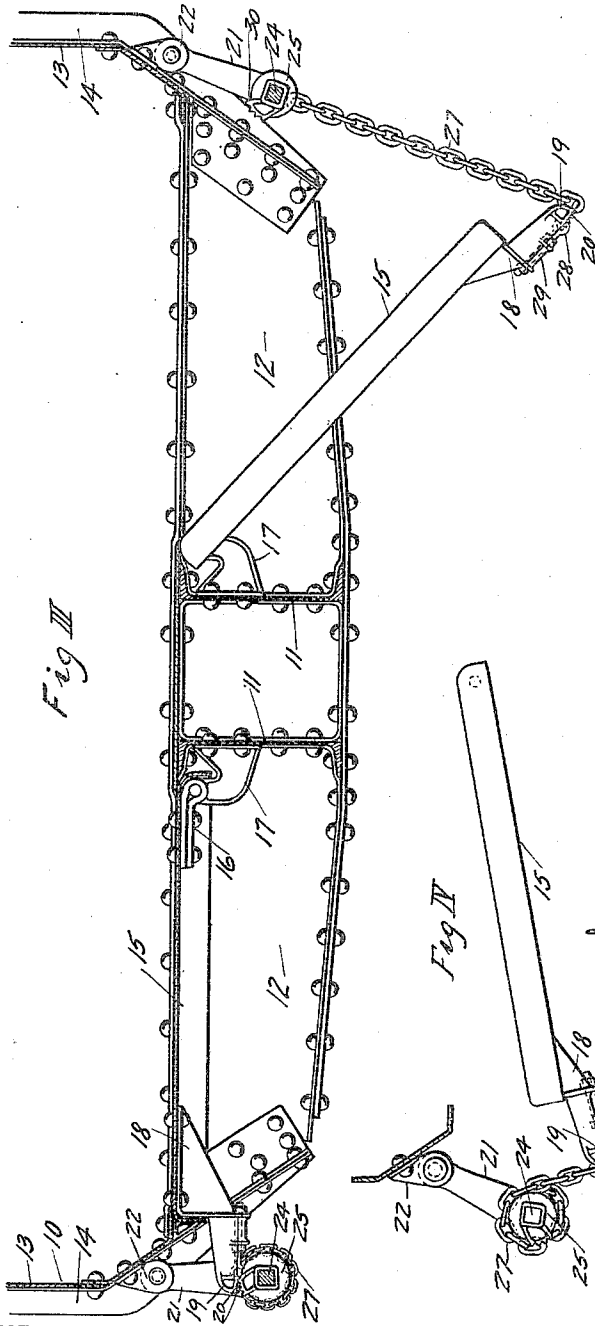


Fig III

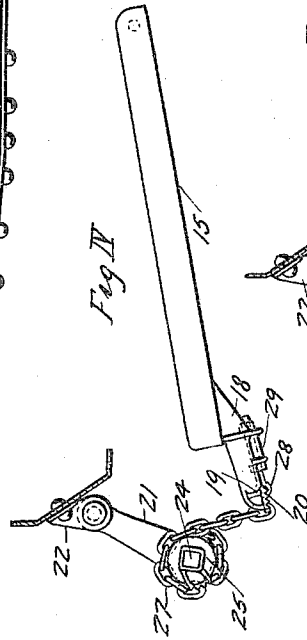


Fig IV

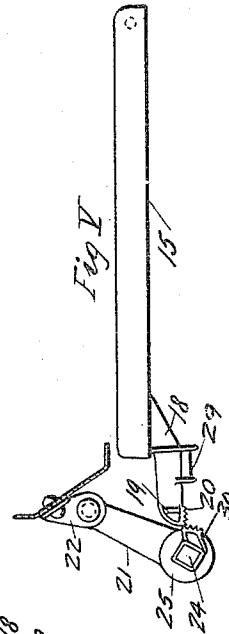


Fig V

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UNITED STATES PATENT OFFICE.

ARGYLE CAMPBELL, OF CHICAGO, ILLINOIS, ASSIGNOR TO ENTERPRISE RAILWAY EQUIPMENT COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

DOOR MECHANISM FOR DUMP-CARS.

1,051,487.

Specification of Letters Patent.

Patented Jan. 28, 1913.

Continuation of application Serial No. 574,069, dated July 27, 1910. This application filed July 31, 1911.
Serial No. 641,612.

To all whom it may concern:

Be it known that I, ARGYLE CAMPBELL, a citizen of the United States, residing in Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Door Mechanism for Dump-Cars, of which the following is a specification.

This invention relates to improvements in door operating mechanism for dump or drop bottom cars and is a continuation of my co-pending application, Serial No. 574,069, filed July 27, 1910.

The object of this invention is to provide a simple and effective mechanism whereby the doors may be opened or closed with comparative ease, wherein the friction is reduced as much as possible, and a structure whereby the doors are safely and securely locked when in closed position.

My invention consists in combination with a car body and hinged drop bottom doors, of a shaft supported in links pivoted to the car body, and a flexible chain or connection connecting the outer or free end of the bottom door to a winding drum on the shaft, and mechanism for operating the shaft.

The structure furthermore includes inter-engaging pieces on the swinging shaft and the free end of the car door so arranged that when the door is closed, these pieces engage and the shaft is automatically swung under the door and the weight on the door is thus held and sustained by means of the shaft through the links pivoted to the car body.

My invention consists in the novel construction of parts and devices and in the novel combinations of parts and devices herein shown and described, and more particularly specified in the claims.

In the drawings forming a part of this specification, Figure 1 is a plan view of a quarter section of the drop bottom car. Fig. 2 is a side elevation of a car showing my operating mechanism for the doors applied thereto. Fig. 3 is a partial cross section, taken on the line 3—3 of Fig. 2, showing the door on the left hand side of the car in a closed position, and the door on the right hand side in its open or lowermost position. Fig. 4 is a view showing the position assumed by the operating mechanism when the door is ap-

proximately half closed. Fig. 5 is a detail view, showing the operating mechanism, with the chain omitted, in the position assumed when the door is in its nearly closed position.

In the drawings, 10 represents the car body mounted on an underframe comprising center sills 11 and diaphragms 12. The sides 13 of the car body are provided with the side stakes 14, as is usual in this type of car. The bottoms 15 of the cars are pivoted at their inner ends, by means of hinges 16, to hinge brackets 17 riveted to the body of the car and the center sills. The outer ends of each of the doors are provided with projecting heads 18 riveted thereto, each head having an outstanding lug 19 which is provided on its under face with a gear or rack face 20. Pivoted to the sides of the car body at points above the gear or rack portions 20 of the brackets 18 are links 21. These links are pivoted in brackets 22 rigidly fixed to the car body, and are provided at their free ends with shaft bearings 23. Mounted in these shaft bearings is an operating shaft 24 which may be extended so as to operate either one or more of the drop bottom doors of a car. In this connection it will of course be apparent that the operating mechanism used in connection with each door, that is, the drum, the flexible connection and the members 18 on the doors will have to be duplicated for each door, but that the same shaft may be used throughout. Each of these swinging links 21 is supported adjacent to each projecting bracket 19 of the car doors and on the shaft, to one side of the link journals, is rigidly fixed to the shaft a winding drum 25, preferably provided with a spiral groove 26, on which is adapted to be wound the flexible connection or chain 27. This chain is attached at one end to the winding drum and passes over the same on its inner side and is connected by an end bolt 28 to the bracket 19 on the car door. Each of these bolts 28 is preferably provided with a nut 28 threaded thereon so that the same may be adjusted in the bolt lug 29 on the bracket 19. This provision is made so that the chain may be taken up or slacked in order that the engaging portions on the shaft and the projecting bracket or head 19 of the car door will properly engage. At one end of

each winding drum is provided a gear portion 30 which may be either an entire gear or a segmental portion thereof, that shown in the drawing being a segmental piece.

5 The shaft 24 is operated by any ordinary ratchet mechanism, and as shown in the drawings, this consists of an operating handle 31 mounted on the shaft 24 and between the bifurcations of the inner end of the handle is attached to the shaft a ratchet wheel 32, and the handle 31 is also provided with a pawl 33. Also mounted on the shaft is a ratchet wheel 34, engaged by a pawl 35, which serves to retain the shaft

10 in any of its intermediate positions.

As clearly shown in Fig. 4, each flexible connection or chain 27 is tangential to its corresponding winding drum and also passes over the extreme outer end of the corresponding extension 19 on the doors, and it will be evident that all the winding drums are always to one side of the intervening portions of the flexible connections and the ends of the doors to the other side of said connections, thus allowing clearance for the drums and the rack gear 20 on the doors until the gears 30 on the swinging shaft engage the racks 20 of the doors and is rolled thereunder by a continued winding up of the operating shaft. The winding up of the shaft is continued until each drum assumes a position under the corresponding cooperating projection 19 on the car bottom door directly under the pivot point of the links

20 21. It will thus be seen that by this construction, the door is automatically locked in position, since the weight of the door and of any load which may be thereon serves to prevent the winding drum having the gear 30 thereon from unrolling. To let down the door, the shaft is rotated in the reverse direction, and in the beginning of this operation the shaft is rolled outwardly for a short distance, due to the meshing of the gears 30 and 20, until the shaft has assumed a position just beyond the outer portion of the extension 19 on the door, when a continued rotation of the operating shaft 24 will unwind the flexible connection 27 and allow

25 the door to be lowered. It will of course be obvious that a single winding drum and a single projection on the car door and connecting mechanism might also be used instead of two sets of mechanisms for each door without changing or varying the operation or scope of my invention. It will also be noted that by pivoting the links at their upper ends to the car body at points above the level of the doors, when the latter

30 are in closed position, and in a vertical plane which passes outside of the free edges of the hinged doors, that no additional means, such as locks or latches, are required to hold the shaft clear of the door or extensions on

35 the door during the winding operation since

the shaft automatically clears the doors due to the fact that it swings freely in the manner of a pendulum and will always assume a position tangential to the portions of the flexible connections between the shaft and the doors.

Various changes and modifications may be made in the details of construction without departing from the spirit of the invention, and all such changes and modifications are contemplated as fall within the scope of the claims appended hereto.

I claim:—

1. In a dump car, the combination with hinged doors having supporting bars projecting beyond the free edges thereof and provided with toothed heads, of a swinging operating shaft suspended from pivot points above and provided with winding drums and with gears adapted to engage said toothed heads of the supporting bars on the doors, flexible connections between said operating shaft and said doors, said gears on said operating shaft and said toothed heads being brought to engaging position by said flexible connections, substantially as specified.

2. In a dump car, the combination with the floor, upright sides and transverse diaphragms of the car, of doors hinged at their inner longitudinal edges and provided with supporting bars projecting beyond their outer edges, said supporting bars having toothed heads, a swinging operating shaft furnished with winding drums and with gears adapted to engage the toothed heads of said supporting bars, flexible connections between said operating shafts and said doors, said gears on said operating shaft and said toothed heads being brought to engaging position by said flexible connections, suspension links for supporting said swinging operating shaft, substantially as specified.

3. In a dump car, the combination with the floor, upright sides and transverse diaphragms of the car, of doors hinged at their inner longitudinal edges and provided with supporting bars projecting beyond their outer edges, said supporting bars having toothed heads, a swinging operating shaft furnished with winding drums and with gears adapted to engage the toothed heads of said supporting bars, flexible connections between said operating shaft and said doors, said gears on said operating shaft and said toothed heads being brought to engaging position by said flexible connections, suspension links for supporting said swinging operating shaft from a fixed point attached to the body of the car directly above the operating shaft when the doors are closed, substantially as specified.

4. In a dump car, the combination with hinged doors having supporting bars projecting beyond the front edge thereof and

furnished with toothed heads, of a swinging operating shaft furnished with gears adapted to engage the toothed heads of said supporting bars to cause the swinging
 5 operating shaft to travel around and under said supporting bars as the doors are raised by the operating shaft, flexible connections between said operating shaft and said doors, said gears on said operating shaft and said
 10 toothed heads being brought to engaging position by said flexible connections, substantially as specified.

5. In a dump car, the combination with hinged doors having supporting bars projecting beyond the front edge thereof and
 15 furnished with toothed heads, of a swinging operating shaft furnished with gears adapted to engage the toothed heads of said supporting bars to cause the swinging oper-
 20 ating shaft to travel around and under said supporting bars as the doors are raised by the operating shaft, and chains connecting the operating shaft and doors, substan-
 tially as specified.

25 6. In a dump car, the combination with hinged doors having supporting bars projecting beyond the front edge thereof and furnished with toothed heads, of a swinging
 30 operating shaft furnished with gears adapted to engage the toothed heads of said supporting bars to cause the swinging oper-
 ating shaft to travel around and under said supporting bars as the doors are raised by the operating shaft, and chains connect-
 35 ing the operating shaft and doors, said operating shaft having winding drums furnished with spiral grooves, substantially as specified.

7. In a drop bottom car, the combination
 40 of a suspended swinging rotating shaft supported from above, a toothed gear on said swinging shaft which engages with a cor-
 responding toothed piece attached to the car door, said toothed pieces having flexible con-
 45 nections from one to the other so as to cause them to engage when the car door is nearly in a closed position, substantially as speci-
 fied.

8. In a drop bottom car, the combination
 50 of a suspended swinging rotating shaft, means for moving said shaft from one position to another, attachments on said door engaging with similar attachments on said
 shaft, said door attachment resting on said
 55 shaft attachment when in a closed position, substantially as specified.

9. The combination in a car, of a plu-
 60 rality of car doors, a swinging operating shaft connected to the car body by a plu-
 rality of swinging supports, winding drums and gear pieces on said shaft, flexible con-
 nections therefrom to gear pieces on the
 doors, said operating shaft gear pieces and
 65 door gear pieces engaging when brought to-
 gether by the flexible connections, said door

gear pieces resting upon and supported by said operating shaft gear pieces when the doors are closed, substantially as specified.

10. The combination of a car having drop
 bottoms or doors, having engaging portions
 70 thereon links pivoted to the car body, shaft bearings mounted in the free ends of the links, a swinging operating shaft supported
 in said bearings, said shaft having winding
 75 drums and engaging portions thereon, flexible connections therefrom to the door engaging portions and means for rotating
 said shaft to open or close the doors, sub-
 stantially as specified.

11. In a drop bottom car, the combination
 80 with a depending swinging shaft having a gear thereon, of a gear piece on the car door adapted to engage the shaft gear, a
 flexible connection between the car door and
 shaft for operating the door, and shaft ro-
 85 tating means, the shaft being adapted to swing under the car door when the latter is closed to automatically lock same, substan-
 tially as specified.

12. In a car having a bottom door pivoted
 90 thereto at its inner end, the combination with an operating shaft rotatably supported in a plurality of links pivoted to the car
 body above the level of the car door, means
 for rotating the shaft and a flexible con-
 95 nection between the shaft and the car doors adapted to be wound on the shaft, said shaft
 having a gear adapted to engage a corre-
 sponding gear on the car door, and to roll
 thereunder to a point in a vertical line be-
 100 low the link pivots to support and retain the car door closed, substantially as specified.

13. In a dump car, of the class described, the combination of a car body having a car
 105 door and a door operating mechanism suspended from above and arranged to support the car door by supporting links pivotally
 attached to the car, an operating shaft rest-
 ing in said links and flexible connections from
 said operating shaft to said car door, said
 110 flexible connections being the means to elevate the door and at the same time preventing the said operating shaft from swinging
 to a restful position until said doors are in a
 plane above said operating shaft when said
 115 shaft may swing to its restful and locked position beneath the car door, substantially as specified.

14. In a dump car, of the class described, the combination of a car body having a car
 120 door and a door operating mechanism composed of a swinging operating shaft, pieces thereon for flexible connections to wind
 around, said flexible connections being at-
 125 tached to the car door or to a rigid connection attached to the car door, means for act-
 uating said swinging shaft, said swinging
 shaft arranged to be in position beneath the
 car door when the door is closed and in a po-
 130 sition adjacent to the front edge of the car

door and out of the line of travel of said car door during its movement from an open to a closed position, substantially as specified.

- 5 15. In a dump car, of the class described, the combination of a car body having a car door and a door operating mechanism, links pivotally attached to the car body and supporting a swinging operating shaft journaled in said links, flexible connections from
10 said operating shaft to said door, said flexible connections being the means of elevating the door, also a preventative from the shaft taking a restful position until the doors
15 have been raised to a position in a plane above said swinging shaft and the weight of said door and load thereon is carried by said pivot links suspended from the car body, substantially as specified.
- 20 16. A dump car comprising, in combination: a car provided with dump doors; and operating mechanism for said doors including a shaft, swinging links in which the shaft is rotatably mounted, and flexible connections from the shaft to the doors, said
25 links being pivoted at points in a vertical plane which passes outside of the free edges of the doors when the latter are in closed position, substantially as specified.
- 30 17. A dump car comprising, in combination:

a car provided with dump doors; and operating mechanism for said doors including a shaft, swinging links in which the shaft is rotatably mounted, said links being pivoted at points above the level of the
35 doors when the latter are in closed position, and flexible connections between the shaft and the door, substantially as specified.

18. A dump car of the class described having dump doors, each door being provided
40 with a member extended beyond the free edge of the door, and operating mechanism for opening and closing said doors including a winding shaft, pivotally mounted members in which the shafts are journaled, and
45 flexible connections between the shaft and the extended members on the doors, the shaft, flexible connections and shaft supporting members being so arranged that the shaft will automatically assume a position to
50 clear the extended door members while the flexible connections are being wound on the shaft to close the doors and will then roll under said extended members and sustain the doors, substantially as specified.

ARGYLE CAMPBELL.

Witnesses:

PEARL ABRAMS,
H. M. MUNDAY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."