

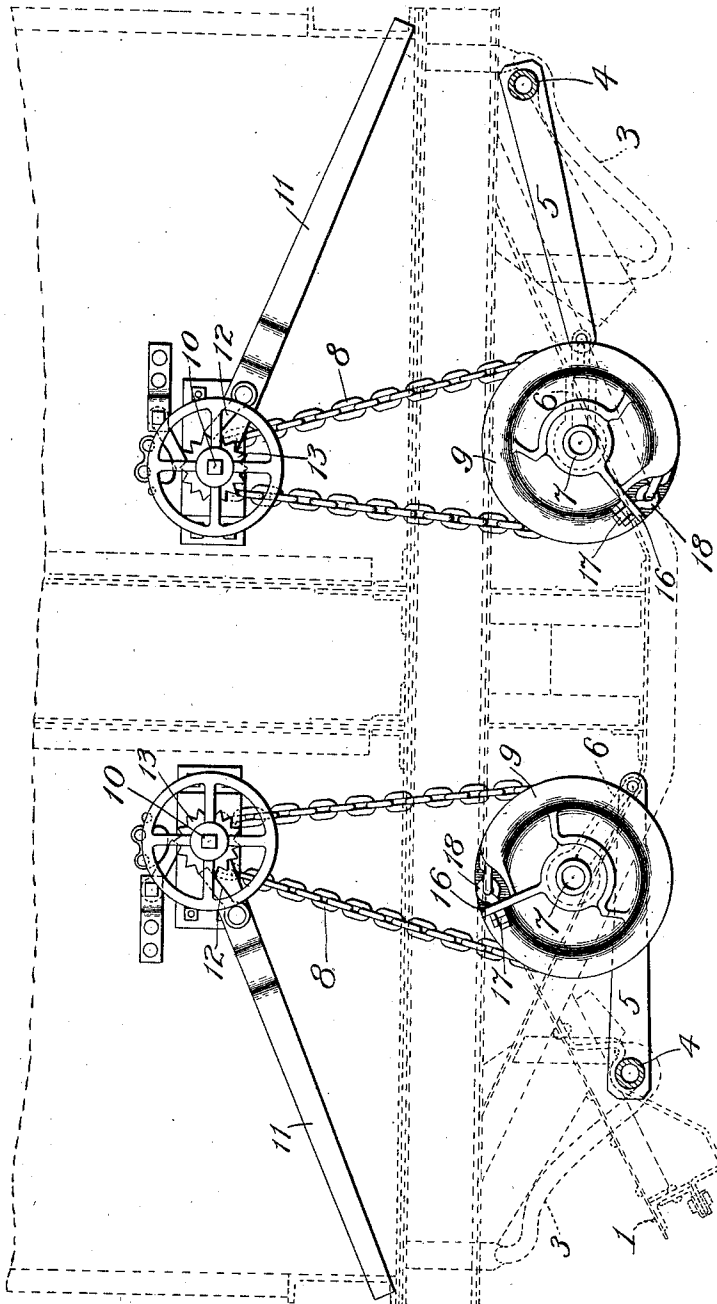
W. H. YOST.
DOOR OPERATING MECHANISM.
APPLICATION FILED OCT. 2, 1907.

1,003,574.

Patented Sept. 19, 1911.

4 SHEETS—SHEET 1.

Fig. 1.



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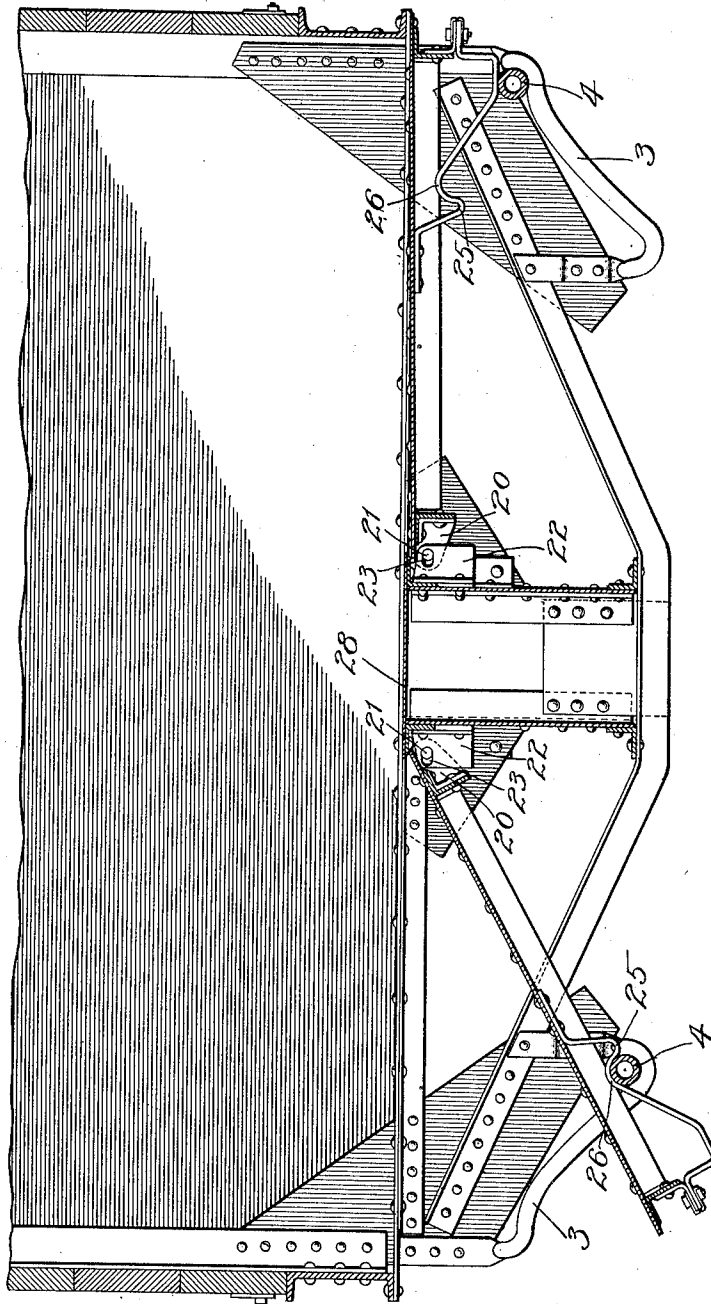
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4 SHEETS—SHEET 2.

Fig. 2.



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4 SHEETS—SHEET 3.

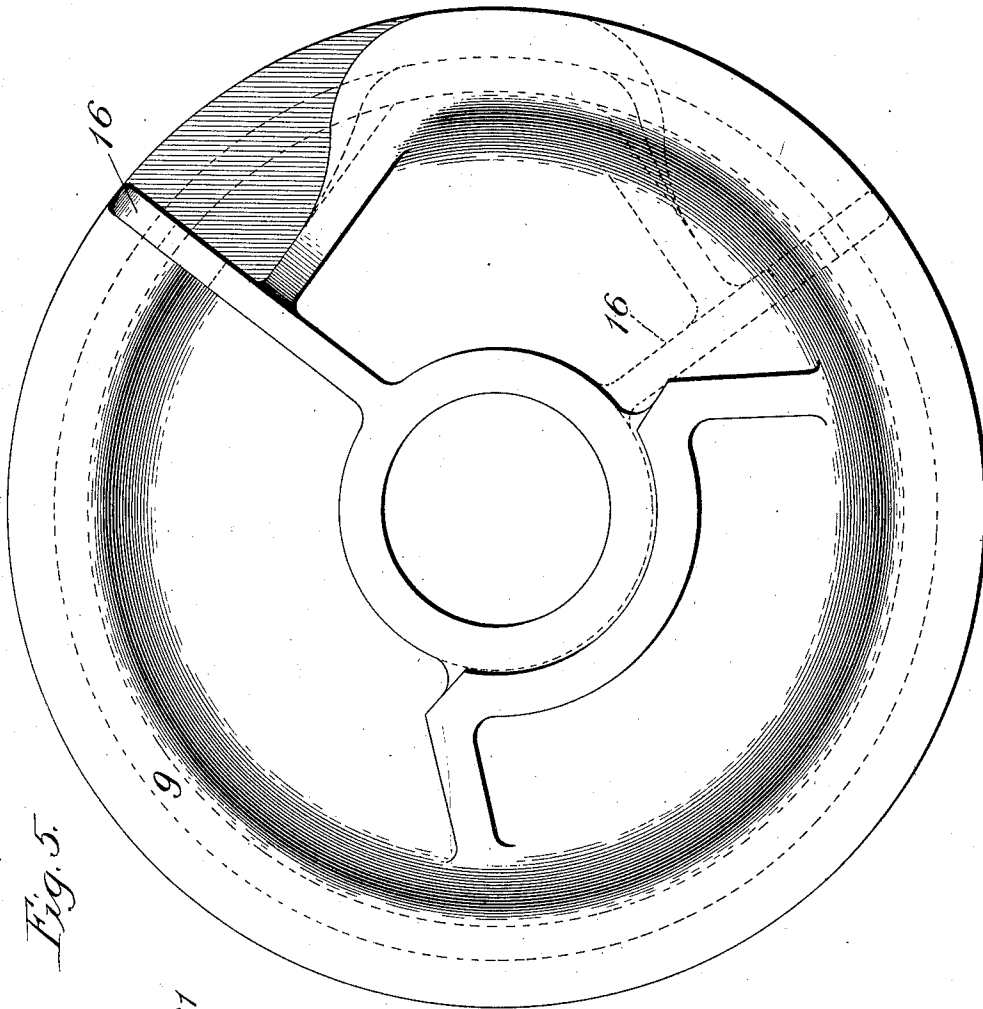


Fig. 5.

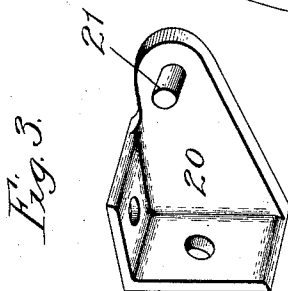


Fig. 3.

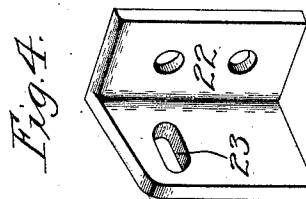


Fig. 4.

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4 SHEETS—SHEET 4.

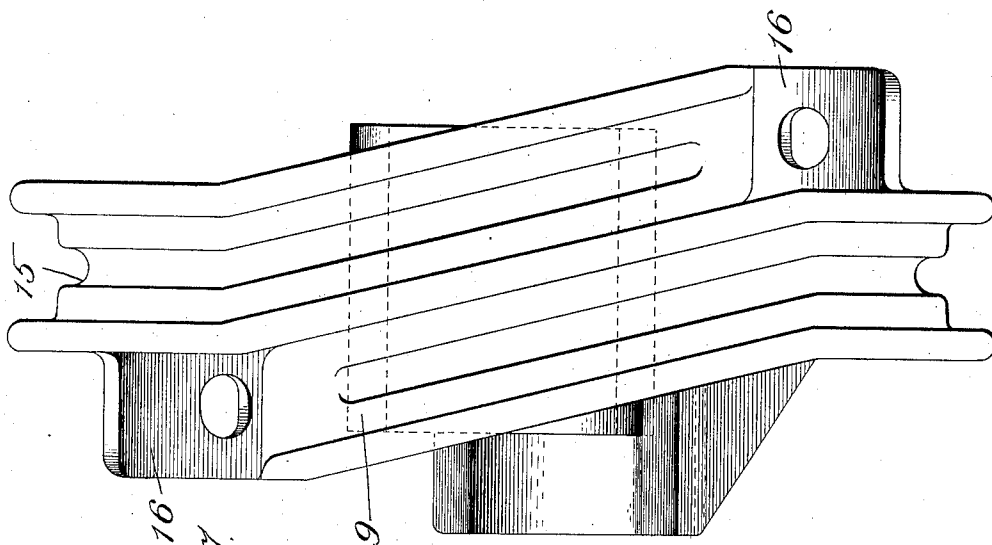


Fig. 7.

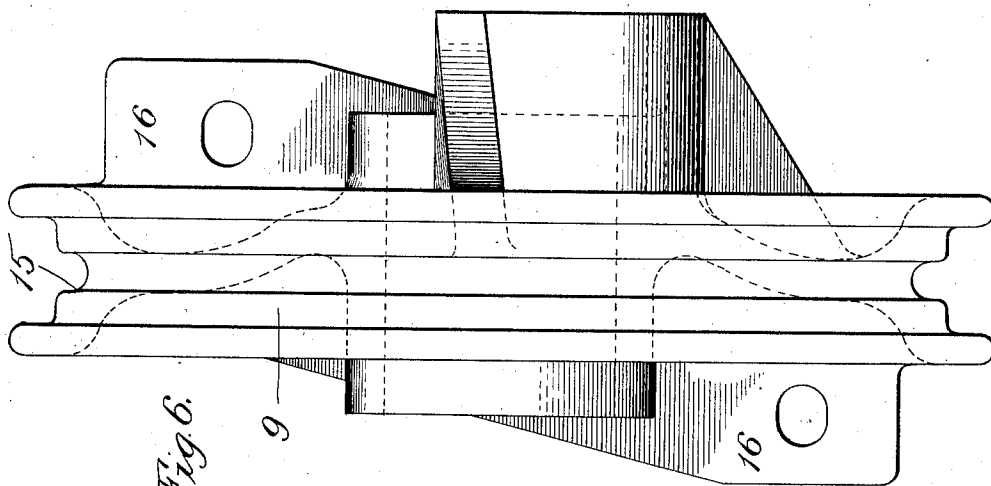


Fig. 6.

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UNITED STATES PATENT OFFICE.

WINFIELD H. YOST, OF MONTREAL, QUEBEC, CANADA, ASSIGNOR TO NATIONAL DUMP CAR COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF MAINE.

DOOR-OPERATING MECHANISM.

1,003,574.

Specification of Letters Patent.

Patented Sept. 19, 1911.

Application filed October 2, 1907. Serial No. 395,581.

To all whom it may concern:

Be it known that I, WINFIELD H. YOST, of the city of Montreal, in the county of Hochelaga, Province of Quebec, Dominion of Canada, have invented certain new and useful Improvements in Door-Operating Mechanism, of which the following is a specification.

The object of my invention is to provide improved means for transmitting power from the power shaft to the operating shaft of the mechanism for opening and closing the doors of dump cars, and more particularly to provide means for preventing the slipping of the power transmitting chain.

A further object of the invention is to provide means for preventing the material transported in the car from falling between the inner hinged edge of the dump door and the adjoining floor plate of the car, this object being accomplished in the present instance by providing means for moving the door bodily toward and beneath the adjoining floor plate when the door falls to open position.

In the drawings—Figure 1 is an end view of a car showing the means for transmitting power from the power shaft to the door operating shaft. Fig. 2 is a cross sectional view of a car showing the mechanism whereby the door when opened is moved bodily beneath the adjacent floor plate. Figs. 3 and 4 are details of the dump door hinge. Fig. 5 is a detail view of the chain sheave upon the door operating shaft. Figs. 6 and 7 are edge views from opposite directions of the chain sheave.

I have illustrated my invention as applied to a car of a type now in general use. In cars of this type the dump doors 1 are hinged at their inner edges to a stationary part of the car and are provided on their under surfaces with inclined tracks 25. Inclined tracks 3 are secured to a stationary part of the car, generally to the car girders. Coacting with these inclined tracks are transversely movable shafts 4, by the outward and inward movement of which the doors are opened and closed. In the structure illustrated, movement is imparted to the shafts 4 by links 5, which extend between said shafts and cranks 6 upon operation illustrated, movement is imparted to the operating shaft 7 by means of power

transmission chains 8 which extend around sheaves 9 upon shaft 7 and also around sheaves upon the power shafts 10. The power shafts 10 are rotated by means of hand levers 11, which are provided with pawls 12 engaging ratchet wheels 13 fixed to the power shafts 10.

In cars constructed as above described, difficulty is experienced in the slipping of the chains upon the sheaves, due to the stretching of the chains and the wear of the parts. I have found it desirable therefore to provide means for preventing such slipping, those means in the present instance consisting in the sheaves 9, which are provided with spiral grooves for the chains and with means for securing the chains to said sheaves in such manner as to permit adjustment of the length thereof. As in prior constructions, the chains 8 pass around circular sheaves upon the shafts 10. The sheaves 9, however, as will be apparent from an inspection of Figs. 5, 6 and 7, are provided with a groove 15, the ends of which are inclined and overlap, the groove being of a length about equal to one and one quarter revolutions. At the ends of the groove are transverse walls 16 integral with the body of the sheave and forming part of webs which extend outwardly from the hub thereof. The walls 16 are provided with perforations 17^a designed to receive eye-bolts by means of which the chain is secured to the sheave. The attachment of the chain to the sheave is shown clearly in Fig. 1 of the drawings. The end link of the chain engages an eye-bolt 18, the screw threaded end of which is passed through the opening in the plate 16 and secured by means of nuts 17. By means of this expedient, the chain may be easily tightened whenever necessary, by screwing up the nuts on the eye-bolts at either or both ends of the chain. It is obvious that other means of securing the chain to the sheave and other means of adjustment might be adopted without departing from the scope of my invention.

In dump cars as ordinarily constructed, difficulty is experienced as a result of the fact that when the doors are opened an aperture is left between the hinged edge of the door and the adjoining floor plate. The material dropping through this space clogs

the hinges and other working parts of the operating door mechanism, causing the deterioration of these parts, and also interfering with the easy action thereof. In order to overcome this difficulty, I have provided means whereby, when the door is lowered, it is moved bodily inward and under the adjoining edge of the floor plate of the car, thus closing the aperture which would otherwise be formed between the edge of the door and the floor plate when the door is opened. In the embodiment of my invention illustrated in the drawings, this object is accomplished by providing an enlarged opening in one of the hinge members, in order that the pivot upon the other hinge member may slide back and forth therein. The hinge member 20 attached to the door may be constructed in any preferable manner and provided with the usual pivot pin 21. The other hinge member 22, secured to a stationary part of the car, is provided with an elongated aperture 23, in which the pivot 21 may rotate and in which it may also move bodily. This arrangement may, of course, be reversed, placing the hinge member having the pivot upon the body of the car structure and the slotted member upon the door. The inclined track 25 upon the door is provided with a depression 26. When the transverse shaft 4 is moved inward it engages the depression 26, as shown at the left of Fig. 2, thus arresting its progress relative to the door. The parts are so arranged that the transverse shaft 4 engages this depression before the shaft 4 reaches the bottom of the track 3. The movement of the shaft 4 after it has engaged the depression 26 imparts a bodily inward movement to the door, causing the pivot 21 to travel to the inner end of the slot 23, thus carrying the inner edge of the door beneath the floor plate 28 and effectually preventing the passage of material between the inner edge of the door and said floor plate. It is obvious that the parts may be so disposed as to cause the inward movement of the door to take place at a different stage of its downward movement. I have found however that the construction illustrated, wherein the door is moved to its inward position just before it has completed its downward movement, gives satisfactory results.

It will be understood that in place of the chain heretofore referred to, other flexible connections may be used between the power shaft and the operating shaft, and that my invention is not restricted to the use of a link chain. In the appended claims, therefore, I have used the term cable, intending to designate thereby any flexible connection, such as a link, a wire cable, or other flexible belt.

My invention is not limited to the particular means illustrated for securing the bodily movement and rotary movement of the door, but includes broadly any suitable means for so mounting the door that it may have a turning movement for the purpose of opening and closing, and a bodily movement for the purpose of effecting the function above described, or any other purpose, such as causing the door to move in a path that will not conflict with other parts of the car.

What I claim is:

1. In a car, a dump door, a power shaft, an operating shaft and connected mechanism for moving the door, cable pulleys on each of said shafts, and a cable embracing said pulleys, both ends of said cable being secured to one of said pulleys.
2. In a car, a dump door, a power shaft, an operating shaft and connected mechanism for moving the door, cable pulleys on each of said shafts, and a cable embracing said pulleys, both ends of said cable being adjustably secured to one of said pulleys.
3. In a car, a dump door, a power shaft, an operating shaft and connected mechanism for moving the door, cable pulleys on each of said shafts, one of said pulleys being provided with a helical groove with overlapping ends, and a cable passing around said pulleys and having its ends adjustably secured to said helically grooved pulley at the ends of the helical groove.
4. In a car, a floor plate, a dump door hinged at one edge to the car structure in such manner that said door has a turning movement and a movement toward and from said floor plate, and means whereby the door when opened is given a movement toward said floor plate.
5. In a car, a floor plate, a dump door hinged adjacent said floor plate in such manner as to be movable toward and from said floor plate, a track fixed to the car structure, and a transversely movable shaft coacting with said track and door, the parts of said track and door coacting with said shaft being so formed that when the shaft is moved to open the door, the door will be moved bodily toward said floor plate.
6. In a car, a floor plate, a dump door hinged adjacent thereto in such manner as to have a turning movement and a bodily movement toward and from said floor plate, a bearing surface provided with a depression on the under side of the door, a bearing surface fixed to the car structure, a transversely movable shaft coacting with said bearing surfaces, said bearing surfaces being so disposed that the door is opened and closed by the transverse movement of said shaft, and the engagement of said shaft with said depression causing said door

to move bodily toward said floor plate in opening and away from said floor plate in closing.

7. In a car, a floor plate, a dump door, 25
a hinge member secured to said door, a
coacting hinge member connected to the
structure of the car, one of said hinge mem-
bers being provided with a slot, and a pivot
pin on the other hinge member, the slot be-
10 ing of such size as to permit bodily move-
ment of the pin therein.

8. In a car, a floor plate, a dump door,
a hinge secured to said floor plate and door,
a pin upon one member of said hinge, the
15 other member being provided with a slot of
such dimensions as to permit bodily move-
ment of said pin therein, an inclined track
secured to said door and provided with
a notch, an inclined track secured to
20 the body of the car, a transversely mov-
able shaft cooperating with said in-
clined tracks, and means for operating said

shaft, the inclined track secured to the
body of the car being so formed that when
said shaft enters the notch in the other in- 25
clined track the door will be moved bodily
inward by the further movement of the
shaft causing the inner edge of said door to
pass beneath the edge of said floor plate.

9. In a car, a door hinged at one edge in 30
such manner that said door may have a
rotary movement and a bodily movement,
a floor member adjacent one edge of said
door, and means for guiding said edge be-
neath said floor member. 35

10. In a car, a pivoted door, a floor mem-
ber, and means permitting the bodily move-
ment of the pivotal center on which said
door is mounted, said means also serving to
guide said door beneath said floor member. 40

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Witnesses:

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