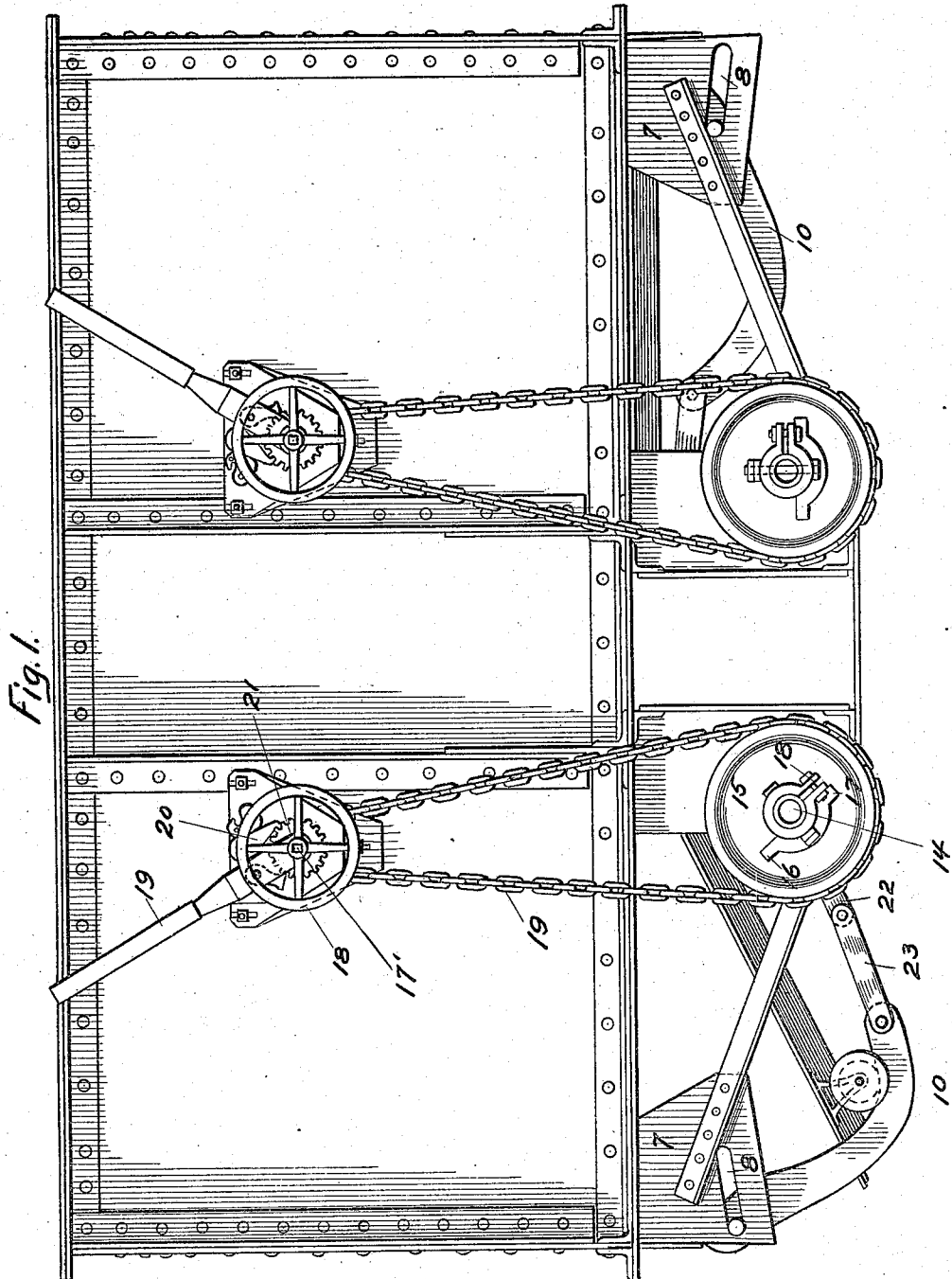


R. M. ZIMMERMAN.
DOOR OPERATING MECHANISM.
APPLICATION FILED MAY 29, 1908.

942,234.

Patented Dec. 7, 1909.
3 SHEETS—SHEET 1.



Witnesses:
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Edythe M. Anderson.

Inventor:
Robert Montague Zimmerman
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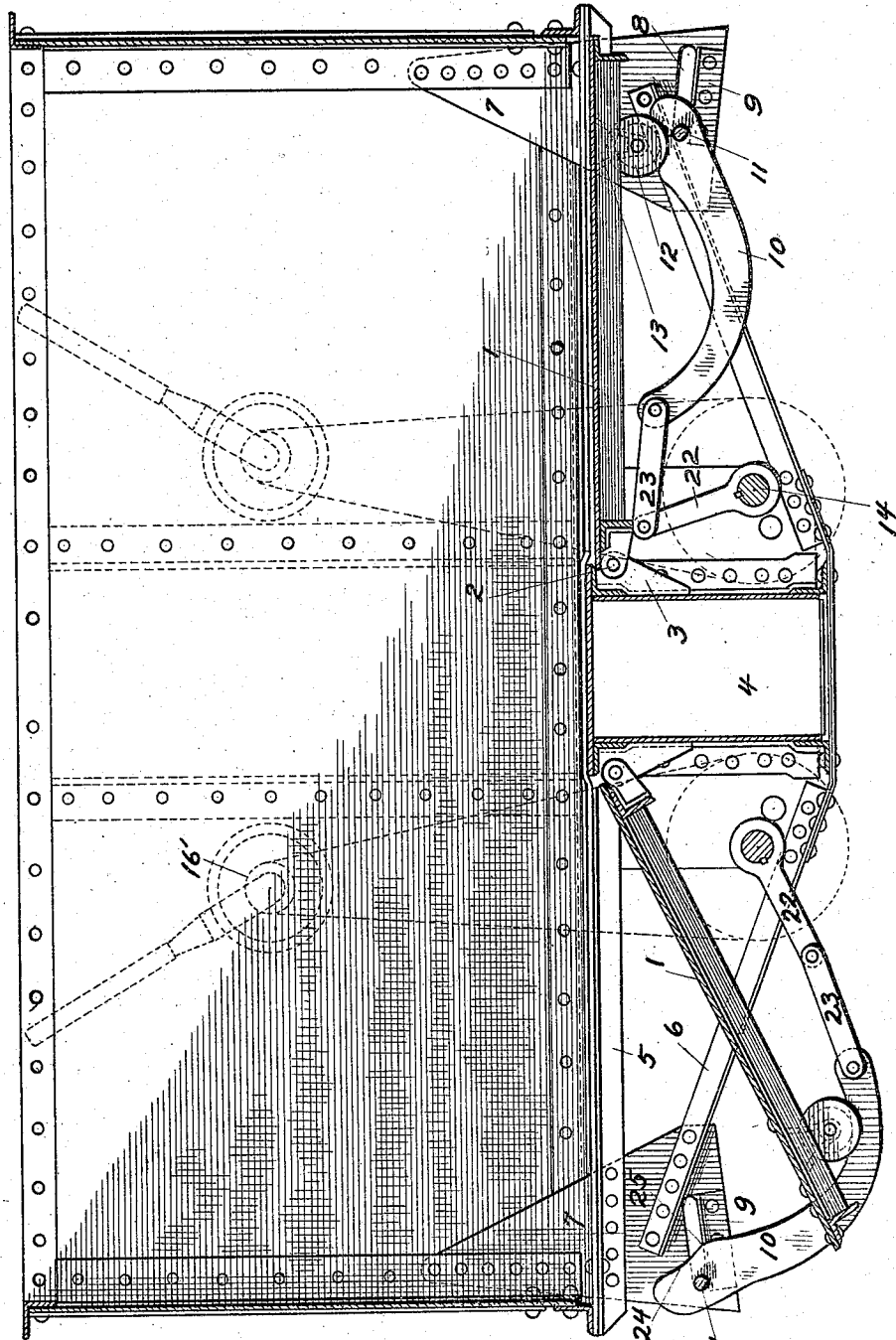
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3 SHEETS—SHEET 2.

Fig. 2.



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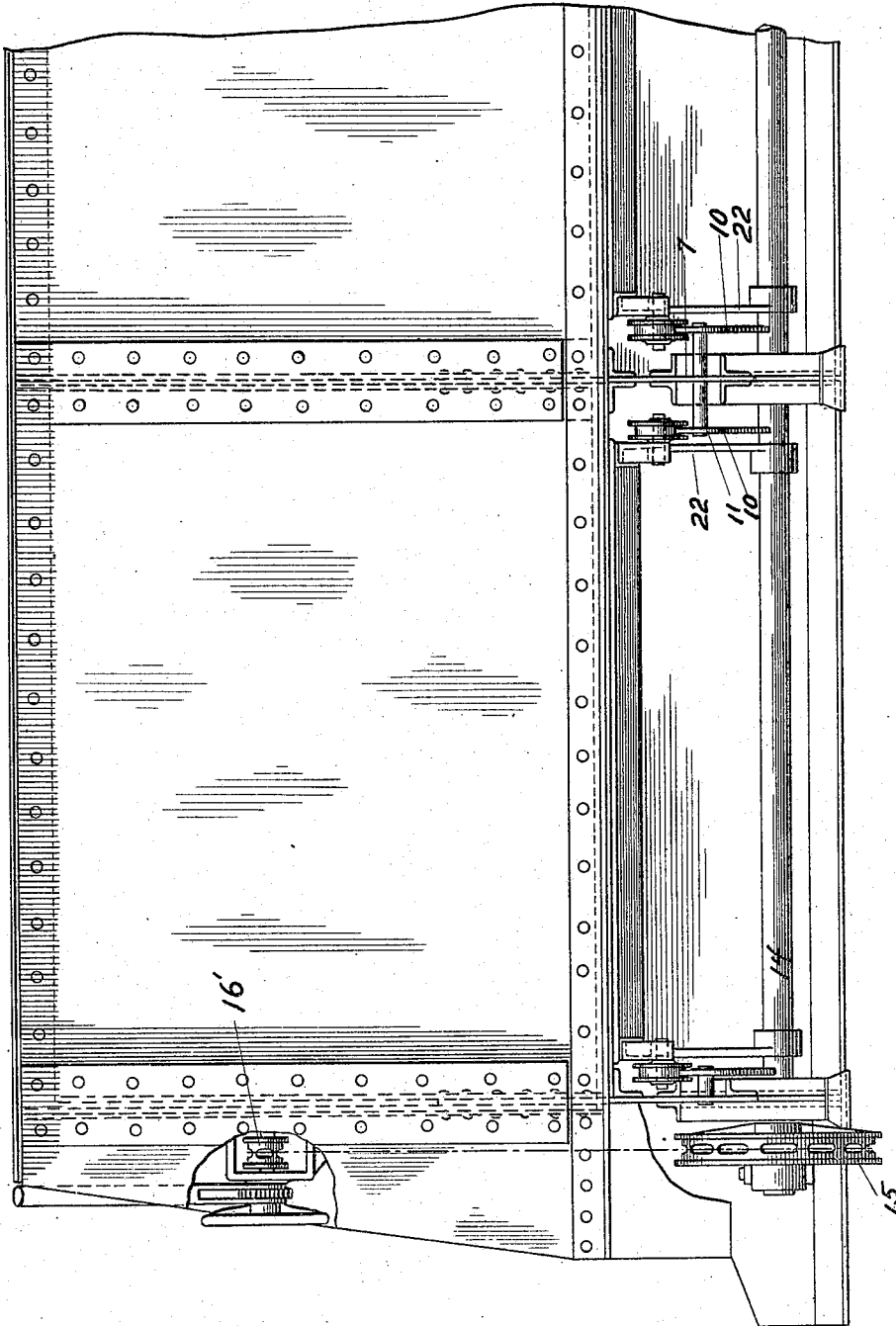
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3 SHEETS—SHEET 3.

Fig. 3.



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UNITED STATES PATENT OFFICE.

ROBERT MONTAGUE ZIMMERMAN, OF MONTREAL, QUEBEC, CANADA, ASSIGNOR TO
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MAINE.

DOOR-OPERATING MECHANISM.

942,234.

Specification of Letters Patent.

Patented Dec. 7, 1909.

Application filed May 29, 1908. Serial No. 435,657.

To all whom it may concern:

Be it known that I, ROBERT MONTAGUE ZIMMERMAN, a citizen of the United States, residing at Montreal, in the county of Hochelaga, Province of Quebec, 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 operating drop doors of dump cars, my improved means being of such a character as to avoid the necessity of employing chains. The number of moving parts is comparatively few and positive means are provided for locking the doors in closed position, and sustaining the weight of the doors and load without subjecting the operating mechanism to strain.

In the drawings—Figure 1 is an end view of a car equipped with my invention. Fig. 2 is a transverse sectional view showing one of the doors closed and the other opened, and Fig. 3 is a side view of the end portion of a car.

The invention is illustrated as being applied to a steel gondola car of ordinary construction. The dump doors 1 are hinged at 2 to brackets 3, secured to the center sill 4. The compression member 5 of the transverse girder is connected to the tension member 6 by means of a gusset plate 7 secured at its upper end to the side stake and at its lower end to said compression and tension members. The gusset plate 7 extends beneath the tension member 6 and is provided adjacent its lower edge with a slot 8, the lower edge of which inclines upward toward the center of the car. For the purpose of strengthening the gusset plates, angles 9 are secured thereto at the lower edges of the slots 8. The doors are operated by means of levers 10, these levers at their outer ends being provided with trunnions 11 engaging the slots 8. The doors engage the levers 10, in the present instance rollers 12 being mounted in brackets 13 upon the under side thereof. While in some instances the use of rollers might be dispensed with, I have preferred to embody them in the example of my invention herein illustrated, as their use

reduces the friction between the levers and doors.

The engagement of the trunnions 11 of the levers 10 with the slots 8 in the gussets 7 permits the levers to have both a pivotal and a bodily movement. It will be apparent that upon raising and lowering the levers 10 the doors 1 will be moved to the positions shown at the left and right of Fig. 2 of the drawings. For the purpose of imparting the pivotal and bodily movements referred to, I provide an operating shaft 14 to which power may be applied in any preferred manner. In Fig. 1 of the drawings I have shown operating mechanism for the power shaft of a type now in common use. In this type of mechanism the operating shaft is provided with a sprocket wheel 15 loosely mounted thereon and having shoulders 16 and 17 adapted to co-act with a shoulder 18 mounted upon the shaft. A sprocket chain embraces the wheel 15 and a coöperating sprocket wheel 16' mounted upon a stub shaft 17' projecting from the end of the car. Power is applied to the stub shaft 17' through either a hand wheel 18 or a lever 19 provided with a pawl. The sprocket wheel 16' and co-acting mechanism may be locked in position by means of a pawl 20 engaging a ratchet wheel 21 secured to the stub shaft 17'.

Secured to the operating shaft 14 is a crank arm 22 connected at its outer end by a link 23 with the inner end of the door operating lever 10. In the mechanism illustrated, the operating shaft 14 is designed to move through about 130 degrees, thus carrying the crank 22 from its downward position illustrated at the left-hand of Fig. 2 to its upper position as illustrated at the right-hand. In passing from its lower to its upper position the crank arm, through the connecting link 23, raises the lever 10 from the position shown at the left to that shown at the right of Fig. 2. The upper surface of the lever 10 is so formed that the desired amount of movement will be communicated to the door during each part of the movement of the lever. Near their outer pivoted ends the levers 10 are provided with depressions 24 sep-

arated from the main body of the lever by projections 25. When in closed position the rolls 12 upon the doors rest in the depressions 24, thus insuring against accidental opening of the doors. The depressions 24 of the levers 10 are brought into position beneath the rolls 12 by means of the bodily movement of the levers 10, accomplished during the latter part of the movement of the crank arms 22 during the closing of the doors. As clearly shown in Fig. 2 of the drawings, the relation of the crank arms 22 to the operating shaft and to the levers 10 is such that the latter part of the movement of the cranks in closing the door is in practically a horizontal line, and it is the inward movement of the cranks in this direction which serves to draw the levers 10 from the outer ends of the slots 8 to the inner ends thereof, thus drawing the depressed portions 24 of the levers beneath the rolls 12. The reverse movement takes place upon opening the doors.

The pivotal mounting of the levers 10 in the intermediate portion of the car is most conveniently accomplished, as clearly shown in Fig. 3, wherein the pivot pin 11 is illustrated as passing through the slot in the gusset plate and supporting one of the levers 10 at each end. By this means a single pivot pin serves to support two levers, and the weight of a door at each end of the pivot pin serves to balance the same and to secure a free action thereof.

While I have illustrated one specific form of the levers 10, it is obvious that the practice of my invention is not dependent upon the particular form of lever shown. For instance, the depression 24 instead of being formed as illustrated might consist merely in a flat surface designed to lie in a horizontal plane when the door is in closed position. Furthermore, other means of imparting pivotal and bodily movement to the levers 10 might be adopted without departing from the principle of my invention, and the levers 10 might be otherwise mounted in such manner as to permit the desired raising and lowering, and movement toward and from the center of the car. I do not consider the pin and slot illustrated for that purpose in this application to be an indispensable accompaniment of my invention, for it is obvious that various arrangements of links and other elements might be employed for the purpose of permitting the levers 10 to move in the desired directions.

What I claim is:

1. In a dump car, a hinged door, a lever extending transversely of the door and mounted adjacent the free edge thereof and having a pivotal and bodily movement, said lever contacting with part of said door and

the upper surface of said lever having a curved contour whereby movement of the lever exerts both a lifting and a camming action upon the door, and means for raising and lowering said lever.

2. In a dump car, a hinged door, a lever extending transversely of said door and pivoted adjacent the free edge thereof, said lever contacting with a part of said door and being provided adjacent its pivoted end with a depression, and means for raising and lowering said lever, the parts being so proportioned that when the lever is raised the contacting part of the door will lie in said depression.

3. In a dump car, a hinged door, a lever mounted in the fixed part of the car frame adjacent the free edge of said door and contacting therewith, said lever having a pivotal and a bodily movement, and means for imparting such movement to said lever.

4. In a dump car, a hinged door, a lever mounted in a fixed part of the car frame adjacent the free edge of said door, said lever having a pivotal and a bodily movement with reference to said fixed part, a projection upon said door cooperating with said lever, and means for imparting pivotal and bodily movement to said lever.

5. In a dump car, a hinged door, a lever mounted in a fixed part of the car frame adjacent the free edge of said door and having a pivotal and bodily movement with reference to said fixed part, said lever being provided near its outer end with a depression, a projection on said door engaging said lever, and means for imparting pivotal and bodily movement to said lever, the parts being so disposed that the bodily movement of said lever causes said projection to enter said depression.

6. In a dump car, a hinged door, a slotted plate secured to the car frame adjacent the free edge of said door, a lever extending transversely of the door and provided at its outer end with a trunnion engaging said slot, a projection upon said door engaging said lever, and means for imparting pivotal and bodily movement to said lever.

7. In a dump car, a hinged door, a lever pivoted adjacent the free edge of said door, a projection upon said door engaging said lever, a power shaft, a crank arm upon said power shaft and operatively engaging the inner end of said lever, and means for rotating said power shaft.

8. In a dump car, a hinged door, a lever mounted upon a fixed part of the car adjacent the free edge of said door, said lever having a pivotal and bodily movement with reference to said fixed part, a power shaft, a crank upon said power shaft, a connection between said crank and the inner end of

said lever, and means for rotating said power shaft.

9. In a dump car, a cross girder provided adjacent its outer end with a slot, hinged
5 doors on either side of said cross girder, a trunnion extending through the slot in said cross girder, a lever on each side of said girder, each lever engaging said trunnion, a projection on each of said doors engaging

one of said levers, and means for imparting 10 pivotal and bodily movement to said levers.

In testimony whereof, I have subscribed my name.

ROBERT MONTAGUE ZIMMERMAN.

Witnesses:

O. W. MEISSNER,
GEO. B. DOREY.