

J. F. STREIB.
 CAR DOOR OPERATING MECHANISM.
 APPLICATION FILED OCT. 5, 1906.

930,434.

Patented Aug. 10, 1909.
 3 SHEETS—SHEET 1.

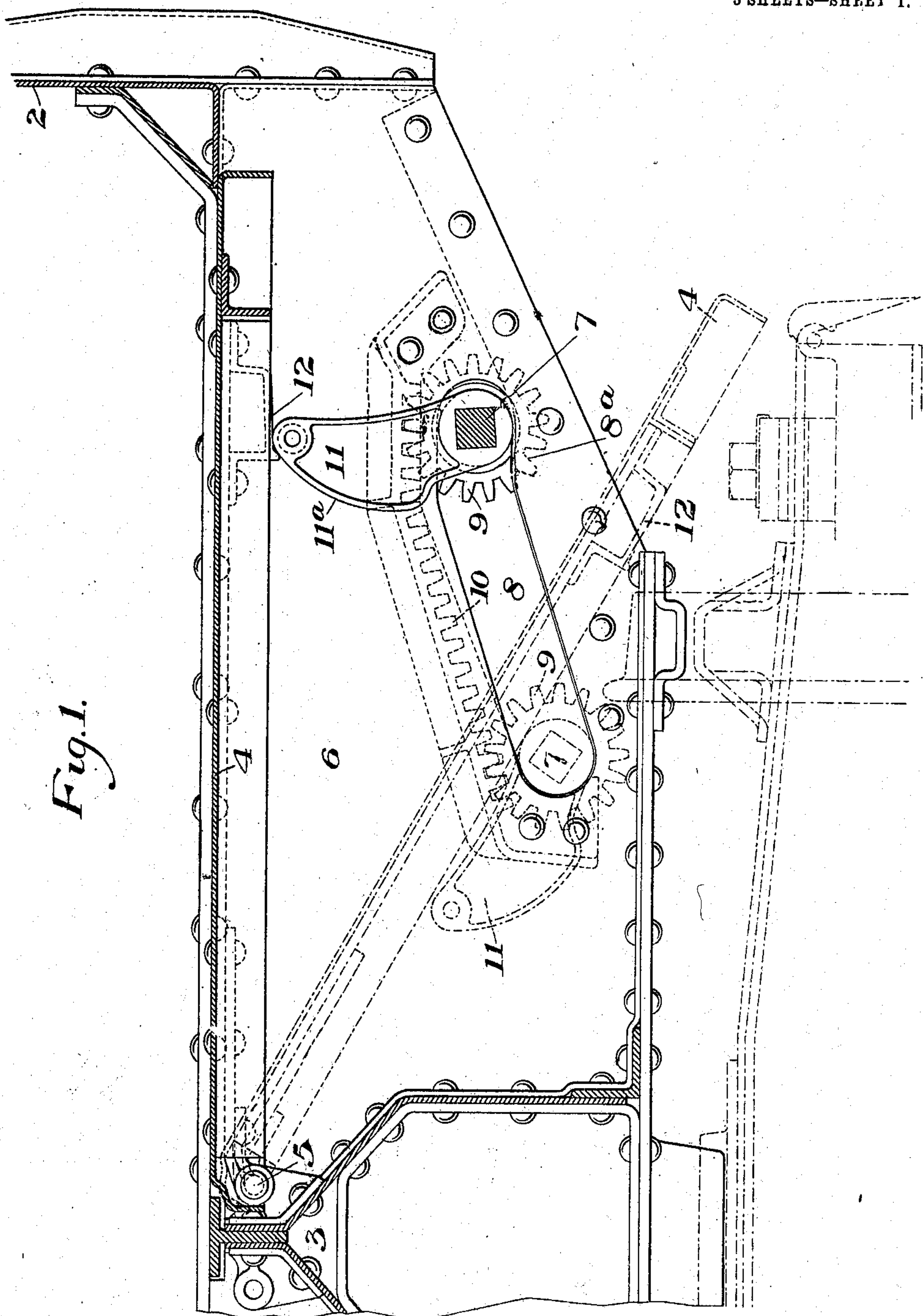


Fig. 1.

WITNESSES

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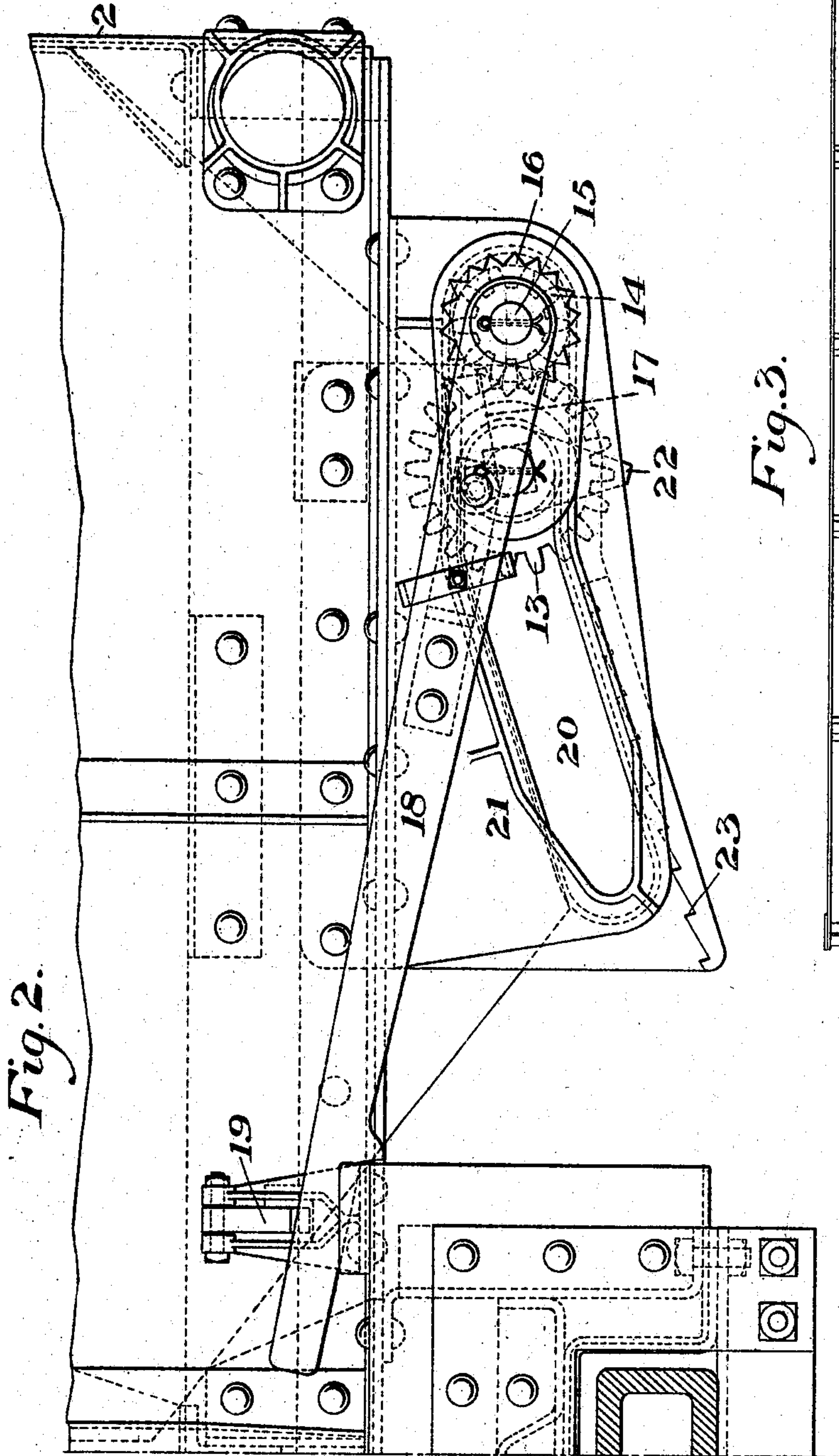


Fig. 2.

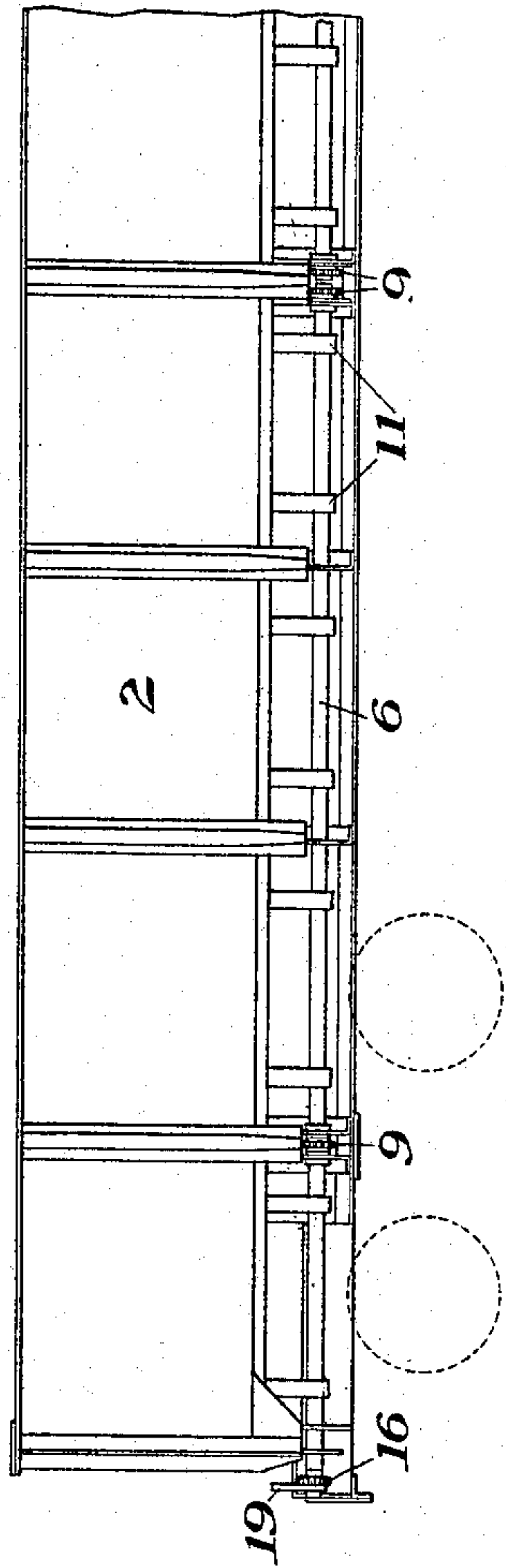


Fig. 3.

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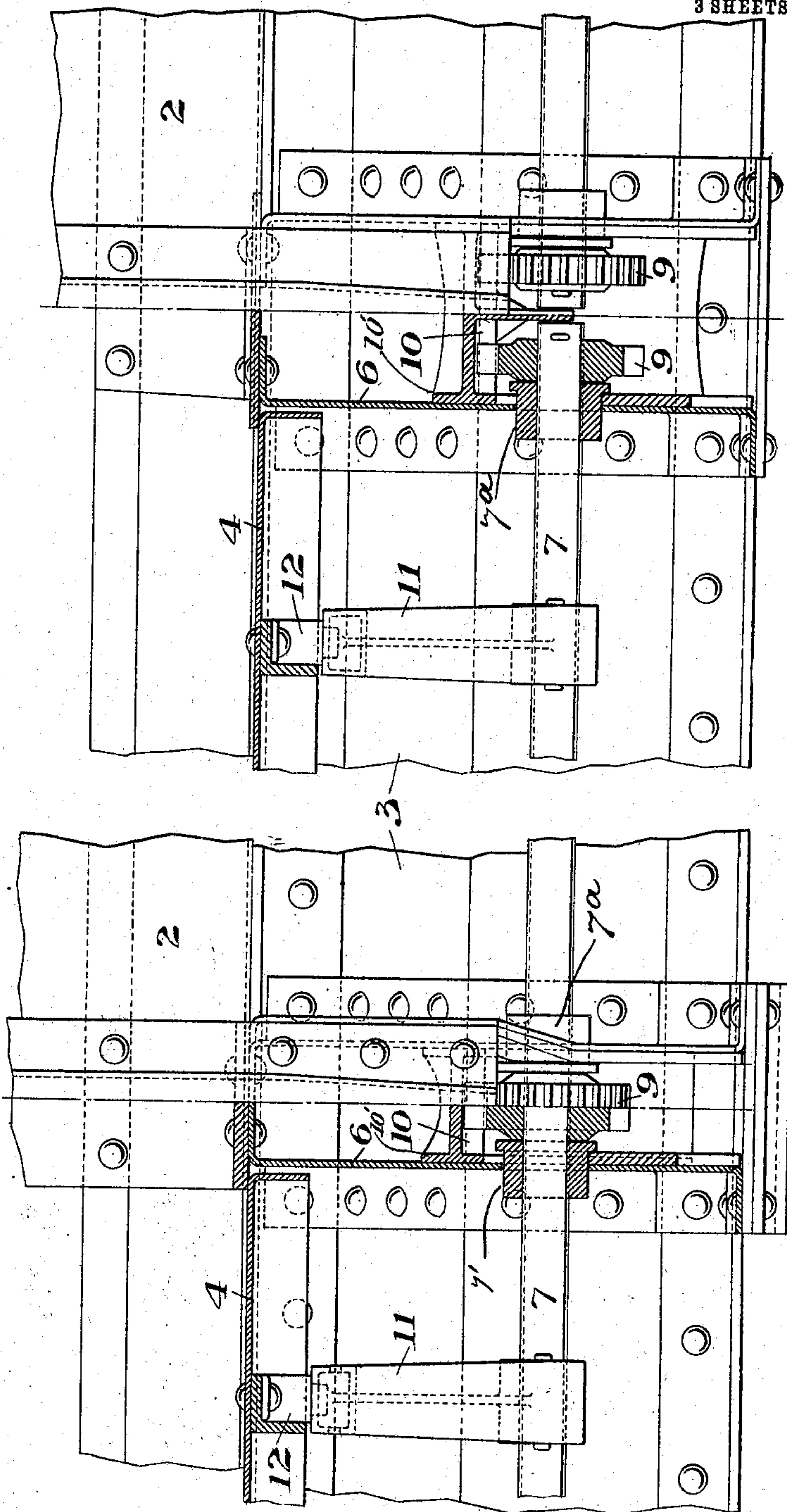
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3 SHEETS—SHEET 3.

Fig. 4.



WITNESSES

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UNITED STATES PATENT OFFICE.

JOHN F. STREIB, OF AVALON, PENNSYLVANIA, ASSIGNOR TO PRESSED STEEL CAR COMPANY,
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CAR-DOOR-OPERATING MECHANISM.

No. 930,434.

Specification of Letters Patent.

Patented Aug. 10, 1909.

Application filed October 5, 1906. Serial No. 337,529.

To all whom it may concern:

Be it known that I, JOHN F. STREIB, of Avalon, Allegheny county, Pennsylvania, have invented a new and useful Car-Door-Operating Mechanism, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a transverse sectional view of a portion of a car showing my invention applied thereto; Fig. 2 is an end view of the car showing one arrangement of operating mechanism for the creeping shaft; Fig. 3 is a side view of a portion of the car; and Fig. 4 is a sectional elevation, partly broken away, showing the details of the invention as applied to the car.

My invention has relation to car door operating mechanism, and is more particularly applicable to flat bottom cars having a series of downwardly opening doors.

The object of my invention is to provide door operating mechanism of this character which will dispense with the use of the chains ordinarily employed for opening and closing the doors, and which will substitute therefor an operating shaft which is movable bodily underneath the doors and which carries a series of arms which support the doors in their closed positions and during the operation of opening and closing the same.

A further object is to provide mechanism of this character which shall be simple and positive in its operation, and which can be readily applied to cars of various types.

With these objects in view my invention consists in the novel construction, combination and arrangement of parts, all substantially as hereinafter described and pointed out in the appended claims.

In the accompanying drawings, the numeral 2 designates the side of the car, 3 the center sill and 4 one of a series of downwardly-opening doors which are hinged at 5 to the center sill 3.

6 designates deep, hollow, transverse members or diaphragms which in connection with the center and end sill form the under-framing of the car.

7 designates the door-operating shaft which is arranged to control the operation of a series of the doors 4. I preferably employ four of these shafts, two at each end portion of the car, extending from the center of the

car to the ends thereof, as shown in Fig. 3, and one shaft being arranged at each side of the car.

Each shaft extends through elongated slots 8 which are formed in the diaphragm or transoms 6, said slots having the form shown in Fig. 1, being downwardly inclined for the major portion of their lengths with a short horizontally-extending portion 8^a at the upper end. Each shaft 7 is provided with flanged wheels or anti-friction rollers 7^a on which it travels through slots 8. Each shaft 7 carries at its inner end portion and also at its intermediate portion a pinion 9 whose teeth are arranged to engage the teeth of racks 10 which are rigidly secured to the diaphragms or transoms 6. These racks are carried by brackets 10', which together with the pinions 9, are arranged and inclosed within the hollow transverse members or diaphragms 6. The shafts 7 are carried on rollers 7' which travel in the slots 8 in said transverse members or diaphragms. Racks 10 are inverted so that their teeth project downwardly obviating the tendency of the teeth to become clogged with dust, dirt, lading, or other foreign matter. This arrangement of the rack is superior also because there is more room above the elongated slots 8 for the location of said rack than beneath it where the space is taken up largely by other parts. Rack 10 in this position further acts as a central strut or stiffener extending between the two diaphragms or plates 6 of the cross-bearer. Each shaft carries a series of upwardly-extending arms 11, which, when the doors are in closed positions engage wear plates 12 on the under sides of doors in the manner shown in Fig. 1. Two of these arms are preferably provided for each door.

Each of the arms is formed with a convex edge 11^a which is adapted to slide on the under sides of the doors when the latter are opened or closed in the manner hereinafter more fully described.

Any suitable means, such as a crank or lever, may be employed for rotating the shaft 7. I have, however, illustrated lever and ratchet means for this purpose which form the subject matter of the copending application of Charles A. Lindstrom and myself, Serial No. 337,530, filed October 5, 1906, Patent No. 847,956, dated March 19, 1907. This mechanism consists of a gear

wheel 13 secured to the outer end portion of the shaft 7 and which is engaged by the teeth of a pinion 14 mounted on a stub shaft 15. The pinion 14 is actuated by means of a ratchet wheel 16 on the shaft 15 engaged by a pawl 17 pivoted to a lever 18 which is fulcrumed on the end of the stub shaft 15. This lever 18 is normally held in the position shown in Fig. 2 by means of a latch device 19. The end portion of the shaft 7 together with the stub shaft 15 are arranged to slide in a slot 20 in a bracket 21, the slot 20 being of corresponding form to the slots in the racks 10 and diaphragm 6.

To open the doors, the lever 18 is disengaged from the latch 19 and is moved upwardly through the arc of a circle, and then moved toward the latch 19 thereby rotating the pinion 14 and the gear wheel 13. This causes the shaft 7 to rotate carrying the cam arm 11 toward the free edge of the door 4 and away from the shoe 12 and causing the shaft 7 to move downwardly in the slots to the position shown in dotted lines in Fig. 1, the pinions 9 working in the racks 10. At the commencement of this movement the rounded upper edges of the cam arms 11 slide on the shoes 12 until the arms 11 point substantially at the free edges of the doors after which, the arms and the doors traveling in the same direction about their respective axes, a relative rolling movement between the doors and arms takes place and the latter are gradually lowered to the dotted position shown in Fig. 1, further movement of the actuating lever throws the arms 11 into the dotted position shown in said figure. The rack 10, the slot 8 and the shaft 7 with its pinion 9 are so arranged that when the doors are in their closed position the arms 11 are supporting the doors near the free edges. One advantage of the use of a cam arm in a mechanism of this character, instead of a roller or disk, is that a much greater drop to the door is permitted as the arm moves out of the way of the door's descent and lies substantially parallel to the door allowing the latter to drop to close proximity to the shaft, whereas in the case of a disk this would be impossible, as the door would be held away from the shaft to an extent equal to the radius of the disk.

To close the doors the lever is moved into reverse direction causing the arms 11 to engage and lift the doors to their closed positions, the shaft 7 moving backwardly and upwardly in the slots.

22 designates a pawl which is loosely sleeved on the end of the shaft 7 and which is designed to engage any one of a series of teeth 23 on the bracket 21 for the purpose of preventing the door operating shaft from slipping back while the same is being moved toward its closed position, and also for holding the doors in partially closed positions.

As above stated, the particular means herein shown for actuating the shaft forms no part of the present invention, and any suitable actuating means may be employed.

The mechanism described forms simple and positive means for effecting the opening and closing of the doors, whereby chains and other objectionable connections which are in the path of the discharge of the lading, and which are likely to become broken, are dispensed with.

Various changes may be made in the details of construction and arrangement of parts without departing from the spirit and scope of my invention, since

What I claim is:—

1. In a dump car, a drop door, a movable shaft for opening or closing said door, means limiting the movement of said shaft in the door-closing direction and means between the door and shaft, when the door is closed, tending to force said shaft toward said limiting means.

2. In a dump car, a drop door, a rotatable shaft, means for allowing a limited rotation of said shaft, and door-engaging means rigidly mounted on said shaft in a position, when the door is closed, to exert a leverage opposed to said limiting means.

3. In a dump car, a drop door, a shaft movable bodily through rotation to operate said door, means allowing a limited rotation of said shaft in one direction, and a door-engaging member rigidly mounted on said shaft in a position, when the door is closed, to exert on said shaft a leverage opposed to said limiting means.

4. In a dump car, a drop door, a movable shaft for opening or closing said door, means limiting the movement of said shaft in the door-closing direction and means between the door and shaft, when the door is closed, adapted to exert a leverage on said shaft opposed to said limiting means to prevent rotation of said shaft and thus produce a lock.

5. In a dump car, a drop door, a movable shaft for opening or closing said door, means on one side of the vertical center of said shaft for limiting the movement of said shaft in the door-closing direction, and means between the door and the shaft, when the door is closed, movable to a position beyond the vertical center of said shaft to the side of said shaft opposite the location of said limiting means to exert a leverage on said shaft opposed to said limiting means and thereby form a lock.

6. In a car door operating mechanism, a bodily traveling shaft and a suitable guide-way for said shaft formed in the car under-frame in combination with a toothed rack located above said shaft, a toothed rack located below said shaft, a gear carried by said shaft in mesh with said upper rack and a

loosely mounted pawl carried by said shaft for engagement with said lower rack.

7. The combination with a car underframe having deep, hollow transverse members or diaphragms, a door-operating shaft extending below a series of the doors to be operated and movable transversely and downwardly beneath the same, slots in the said members or diaphragms, pinions on the shaft, and racks engaged by the pinions, said racks and pinions being inclosed within the said members or diaphragms; substantially as described.

8. The combination with a car having a series of downwardly and inwardly opening doors, and an underframe having deep, hollow transverse members between which the doors are hinged, and which are formed with inclined slots in their side walls, of a door-operating shaft mounted underneath

each set of doors to move in said slots, racks secured to the underframe adjacent to some of the slots, pinions on the shafts engaging the racks, said racks and pinions being inclosed by the transverse members, door-engaging arms on the shaft, and means for actuating the shaft; substantially as described.

9. In a dump car, a drop door, a rotatable shaft and a cam arm on said shaft movable toward the free edge of said door to open same and in the opposite direction to close same.

In testimony whereof, I have hereunto set my hand.

JOHN F. STREIB.

Witnesses:

K. L. ROBINSON,
H. B. FISHER.