

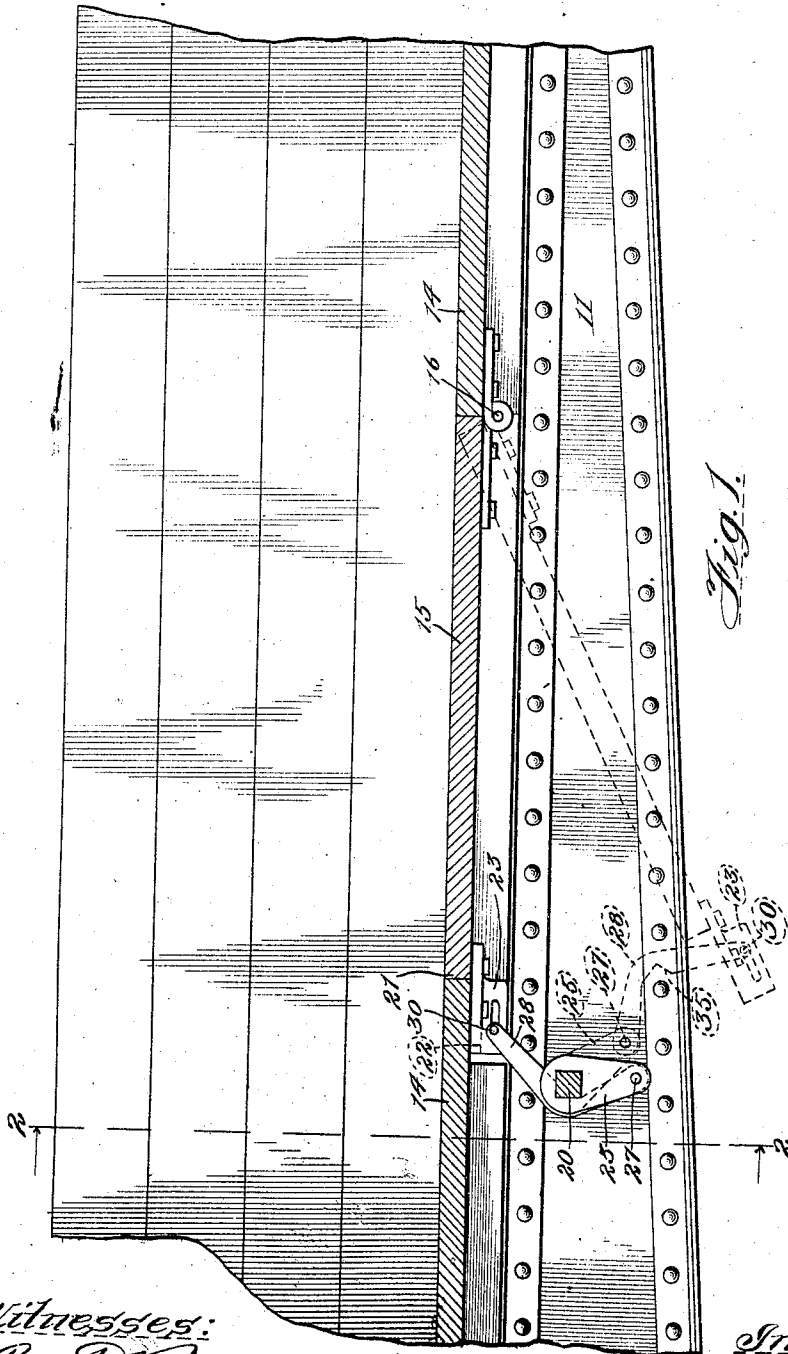
No. 812,783.

PATENTED FEB. 13, 1906.

A. CAMPBELL.
CAR DOOR OPERATING MECHANISM.

APPLICATION FILED DEC. 2, 1905.

3 SHEETS—SHEET 1.



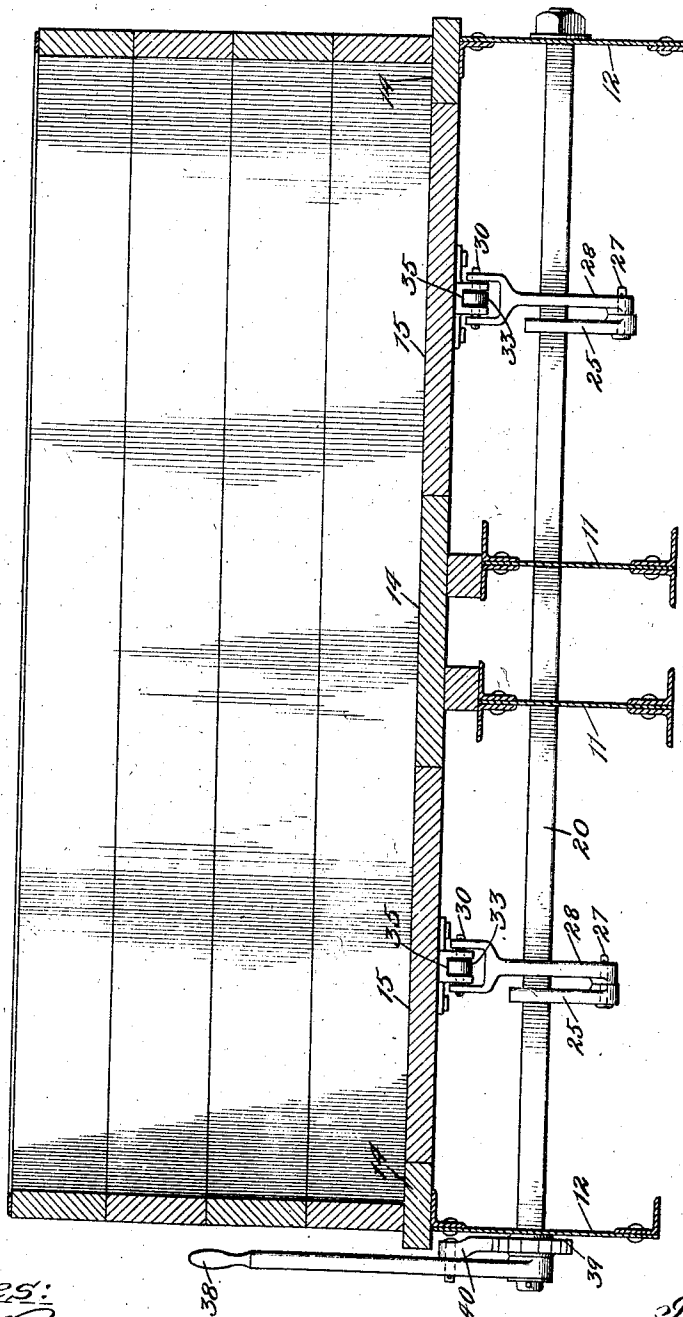
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3 SHEETS—SHEET 2.

Fig. 2.



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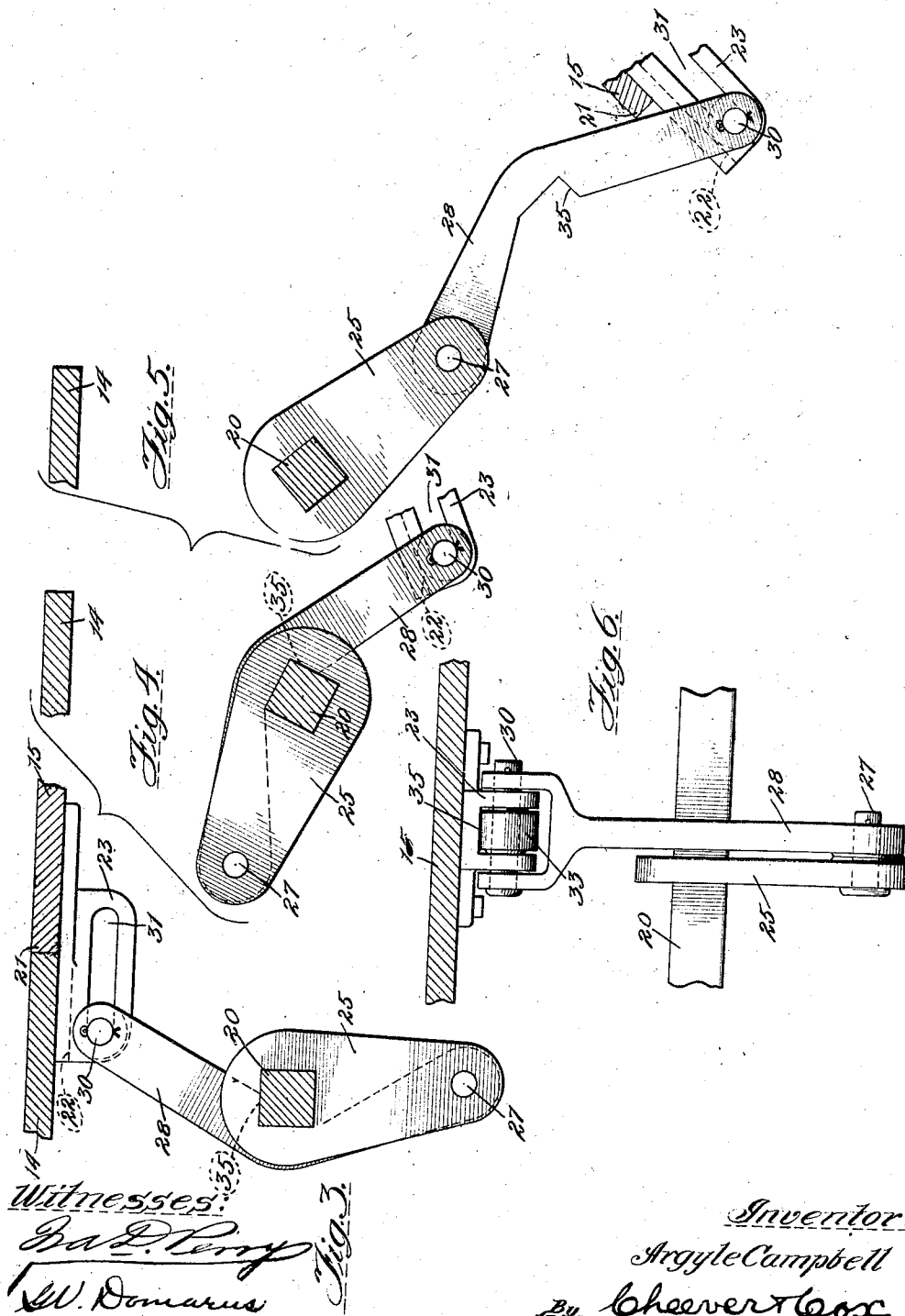
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3 SHEETS—SHEET 3.



UNITED STATES PATENT OFFICE.

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

CAR-DOOR-OPERATING MECHANISM.

No. 812,783.

Specification of Letters Patent.

Patented Feb. 13, 1906.

Application filed December 2, 1905. Serial No. 290,006.

To all whom it may concern:

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

My invention relates to car-door-operating mechanism, and particularly to such doors when placed in the floor or other lower portion of the car, so that they may be opened to dump load from the car.

The object of my invention is to provide such a mechanism which can be very easily and cheaply made and installed, which is efficient in operation, and not readily liable to get out of order.

My invention broadly consists in the use of a shaft or equivalent mechanism carrying a crank-arm connected to the door to be operated by a connecting-rod, there being a flexible connection somewhere in the mechanism, so that by rotating the shaft between two different positions the door may be opened and closed and when in the latter position held in that position without any very great, if any, strain upon special locking mechanism provided to hold the device in such a position.

The invention further consists in more specific details, which will be hereinafter more fully described and claimed as the specification proceeds.

Figure 1 is a partial side view, partly in section, of a car having the specific embodiment of my invention applied thereto. Fig. 2 is a sectional end view on line 2 of Fig. 1, showing the parts illustrated in Fig. 1 when the floor-door is closed. Figs. 3, 4, and 5 are detail views of the operating mechanism, showing, respectively, the parts in the positions which they assume when the door is closed, partly open, and fully open. Fig. 6 is a corresponding detail end view of Fig. 1.

I have illustrated the device of my invention as applied to a car in which the floor-doors are hinged crosswise of the car and swung downward, so that the load is dumped at or near the transverse center of the car; but my invention is just as applicable to a car in which the floor door or doors are pivoted on or parallel to the longitudinal center line of the car and a door or doors swung

down to dump the load either at the side of the car or near the longitudinal center line of the car without departure from the principles of my invention.

In Fig. 1 the numeral 11 indicates plates, channel-irons, I-beams, or built-up sections, forming the central girder of a car, and the numeral 12 indicates suitable corresponding side sills of a car, the same being intersected at suitable intervals by cross-bearers or bolsters (not shown) to form the ordinary underframe of a car. Over this underframe is placed a floor 14, having in it at suitable spaces registering with the spaces in the underframe floor-doors 15. In the particular instance here shown these doors 15 are hinged at 16 to the floor of the car and are adapted to swing from the full-line position of Fig. 1 to the dotted-line position of that figure, so that when in the latter position they discharge the load upon them toward the transverse center line of the car.

Journaled transversely of the car in suitable bearings in the underframe, with its axis parallel to the axis of the hinge 16 of the door or doors, is a shaft 20. This shaft is, as shown, mounted in such a position that it is below the plane of the floor of the car and the floor-doors when they are in normal or full-line position of Fig. 1. It is also mounted to one side of the front edge 21 of the door proper and the front edge 22 of the casting 23, secured to the front edge of the door, as herein-after described, so that the door 15, with the casting 23 upon it, can swing backward and forward between the full-line and dotted-line positions of Fig. 1 without striking the shaft. This shaft should, however, be mounted as near as it conveniently can to the arc of travel of the edge 22 of the casting 23.

Rigidly mounted upon the shaft 20 is a crank-arm 25 for each door to be operated by the device. In the particular instance shown in the drawings where two doors are operated there are two such cranks, and if more doors were operated by the shaft a correspondingly increased number of crank-arms would be used. Pivotaly connected to the outer end of each crank-arm on a pin or pivot 27 is a connecting-rod 28, somewhat longer and preferably about twice as long as the crank-arm 25. This connecting-rod 28 is preferably made in angular form, as shown, so that when

in the normal positions of Figs. 1, 3, and 6 the pivot 27, heretofore described, will lie in approximately the same vertical line as a pin or pivot 30 at the opposite end of the connecting-rod 27, so that the weight upon this

crank-pin 30 causes very little leverage about the center of the shaft 20, tending to rotate the crank-arm 25 about the center of the shaft.

The crank-pin 30, heretofore described, enters and is adapted to travel in an elongated slot 31 in the casting 23, heretofore described, secured to the under side of the floor-door. This crank-pin 30 may be simply a journaled

roller adapted to travel backward and forward in the slot 31, the roller bearing on the normally horizontal sides of the slot 31, as is apparently the case in Fig. 1, or it may carry an independent antifriction-roller 33, adapted to travel backward and forward along the base 35 of the casting 23 or other suitable track, as shown in Fig. 2.

On the end of the shaft 20 I provide a suitable hand-lever 38, a ratchet-wheel 39, and a pawl or pawls 40, of any of the ordinary types of construction, so that the shaft 20 may be moved by the handle between its different positions, as will be hereinafter described, and locked in any desired position by means of the pawl mechanism.

In the operation of the device the parts are normally in the full-line position of Fig. 1 and the positions of Figs. 2, 3, and 6, with the floor-door in closed position. The operator, desiring to dump the load upon a particular floor-door or floor-doors controlled by one shaft 20, takes hold of the handle 38, and after releasing the pawl or pawls 40 from the ratchet-wheel 39 rotates the shaft and attached parts in a clockwise direction when seen as in Fig. 3, with the result that the pin 30 is moved to the right in that figure toward the position of Fig. 4. As this takes place this pin 30 moves along the slot 31 to the right and the load upon the floor-door or the weight of the door itself greatly assists the operator in moving the parts to the position of Fig. 4. If this much of an opening is sufficient for the desired discharge of load, the motion may be stopped at this point; but if a further opening is desired the rotation of the shaft 20 is continued until the parts assume the position of Fig. 5, with the result that the door is given a wide opening because the crank-arm and the connecting-rod are in substantially a straight line, as shown, thereby insuring automatic dumping of even a very sticky load. When the dumping has been completed, the operator takes hold of the handle and rotates the shaft in the opposite direction, first, to the position of Fig. 4, and finally to the position of Fig. 3, in which position the door or doors are closed, and then re-inserts the pawl or pawls 40, thereby locking the device in normal position.

It should be noted that the connecting-rod 28 passes around the shaft 20 on the side away from the hinge of the door when the door is closed, with the result that the shaft forms a fulcrum for the connecting-rod to bear against while moving from the position of Fig. 3 to that of Fig. 4 and back again, so that the upper end of the connecting-rod carrying the pin 30 acts as a lever to positively move the door. This feature is assisted by the fact that a notch 35 is cut in the connecting-rod and there it engages the shaft when the parts are in normal position.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In mechanism of the class described, in combination with a suitable supporting-frame; a hinged car-door to be moved between closed and open positions; a shaft pivotally mounted adjacent to, but clear of, the line of travel of the front edge of the door; a crank-arm on said shaft and a connecting-rod of greater length than the crank-arm connected at one end to the crank-arm and at the other end to the door; and a pin or roller carried by one of the members of the mechanism sliding in a slot in an adjacent member of the mechanism, whereby the shaft may be rotated between two different positions to open and close the door, as described.

2. In mechanism of the class described, in combination with a suitable supporting-frame; a hinged car-door to be moved between closed and open positions; a shaft pivotally mounted adjacent to, but clear of, the line of travel of the front edge of the door; a crank-arm on said shaft and a connecting-rod of greater length than the crank-arm connected at one end to the crank-arm and at the other end to the door; a pin or roller carried by one of the members of the mechanism sliding in a slot in an adjacent member of the mechanism, whereby the shaft may be rotated between two different positions to open and close the door; means for rotating said shaft; and means for locking the same in closed position.

3. In mechanism of the class described, in combination with suitable supporting mechanism, and a hinged car-door to be opened and closed; a shaft mounted approximately parallel to the axis of the hinge of the door adjacent to, and clear of, the swinging front edge of the door; a crank-arm upon said shaft; a connecting-rod pivotally connected at one end to said crank-arm, and a pin-and-slot connection between the opposite end of the crank-arm and the door, whereby the shaft may be rotated between two different positions to open and close the door.

4. In mechanism of the class described, in combination with suitable supporting mechanism, and a hinged car-door to be opened and closed; a shaft mounted approximately

parallel to the axis of the hinge of the door, adjacent to and clear of the swinging front edge of the door; a crank-arm upon said shaft; a connecting-rod pivotally connected at one end to said crank-arm; a pin-and-slot connection between the opposite end of the crank-arm and the door, whereby the shaft may be rotated between two different positions to open and close the door; and mechanism for operating the shaft and for locking the shaft with the door in closed position.

5. In mechanism of the class described, in combination with a suitable supporting-frame and a hinged door to be opened and closed; a shaft parallel to the axis of the hinge of the door mounted clear of but adjacent to the path of travel of the front edge of the door and in a line approximately perpendicular to the plane of the door when the door is closed; a crank-arm on said shaft normally extending away from the door, a connecting-rod having one end pivotally mounted on said crank-arm, extending toward the door past the shaft on its side away from the hinge of the door, and a pin-and-slot connection between the second end of the connecting-rod and the door.

6. In mechanism of the class described, in combination with a suitable supporting-frame and a hinged door to be opened and closed; a shaft parallel to the axis of the hinge of the door, mounted clear of but adjacent to the path of travel of the front edge of the door; mechanism for rotating the shaft and for locking it in desired position; a crank-arm on said shaft normally extending away from the door; a connecting-rod having one end pivotally mounted on said crank-arm, extending toward the door past the shaft on its side away from the hinge of the door to a point in which its second end of the connecting-rod is in approximately the same plane perpendicular to the door as the crank-pin on its lower end, and a pin-and-slot connection between the second end of the connecting-rod and the door, whereby as said shaft is rotated said door is opened and closed, as described.

7. In a car, in combination with the under-frame and a normally level pivoted floor-door, adapted to be opened and closed to discharge the load, a shaft mounted below the floor of the car adjacent to the path of travel of the edge of the floor-door for rotating said

shaft; means for locking said shaft in a desired position; a normally downwardly-extending crank-arm on said shaft; and a connecting-rod of greater length than said crank-arm pivotally mounted at one end upon said crank-arm, extending toward the door on the side of the shaft away from the hinge of the door, and having its opposite end pivotally connected to the door, there being a slidable connection between two adjacent members of the mechanism whereby rotating the shaft between two different positions opens and closes the door, as described.

8. In a car, in combination with a suitable underframe, and a car-floor having doors therein adapted to swing down to discharge load; a shaft journaled below the floor of the car adjacent to the swinging edge of the door; a crank-arm normally depending from said shaft; a connecting-rod of greater length than the crank-arm pivotally connected to the crank-arm, extending past the shaft on the side away from the hinge of the door toward the door to a position in which the upper end of the crank-arm and the pivot on its lower end are normally in approximately a vertical line; a pin upon the upper end of said crank-arm adapted to travel in slot upon the floor-door; and mechanism for rotating said shaft and for locking it in the desired position.

9. In mechanism of the class described, in combination with a suitable supporting-frame and a door to be opened and closed; a crank-arm pivoted adjacent to the path of travel of the edge of the door; means for rotating said crank-arm and for securing it in desired position; a connecting-rod pivotally connected to the crank-arm and connected by pin-and-slot connection to the door, the whole being so arranged that by rotating the shaft to one position the door may be closed, and that by rotating the shaft to another position the door swings past the pivot of the crank-arm and is given a wide opening due to the connecting-rod and crank-arm being in approximately a straight line, as described.

In witness whereof I have hereunto subscribed my name in the presence of two witnesses.

ARGYLE CAMPBELL.

Witnesses:

CAROLYN RAFTEY,
DWIGHT B. CHEEVER.