

No. 825,580.

PATENTED JULY 10, 1906.

A. CAMPBELL.
CAR FLOOR DOOR OPERATING MECHANISM.

APPLICATION FILED MAR. 26, 1906.

3 SHEETS—SHEET 1.

Fig. 1.

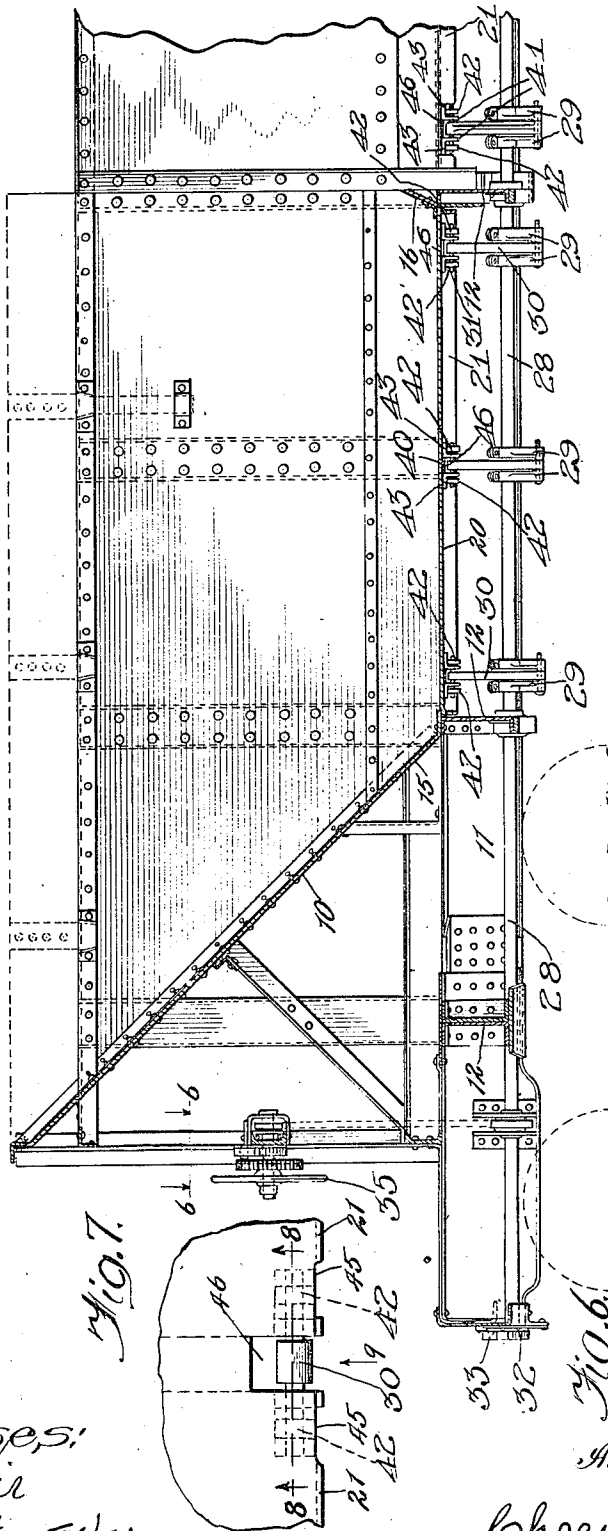


Fig. 7.

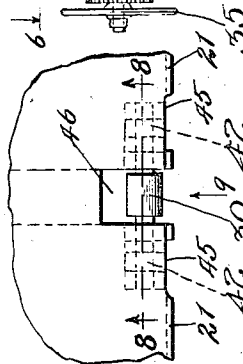
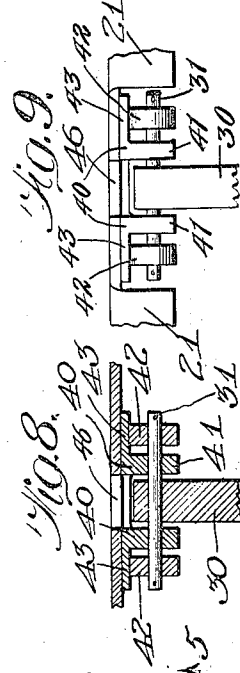
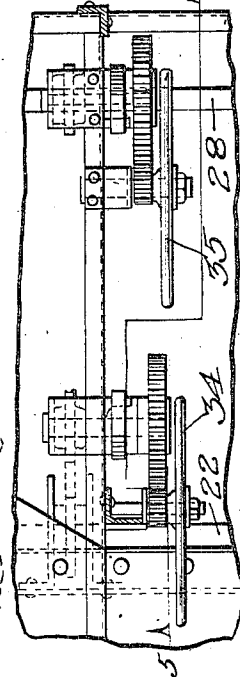


Fig. 6.



Witnesses:
J. B. Weir
Robert H. Weir

Inventor:
Argyle Campbell

By Cheever & Co.
Attys

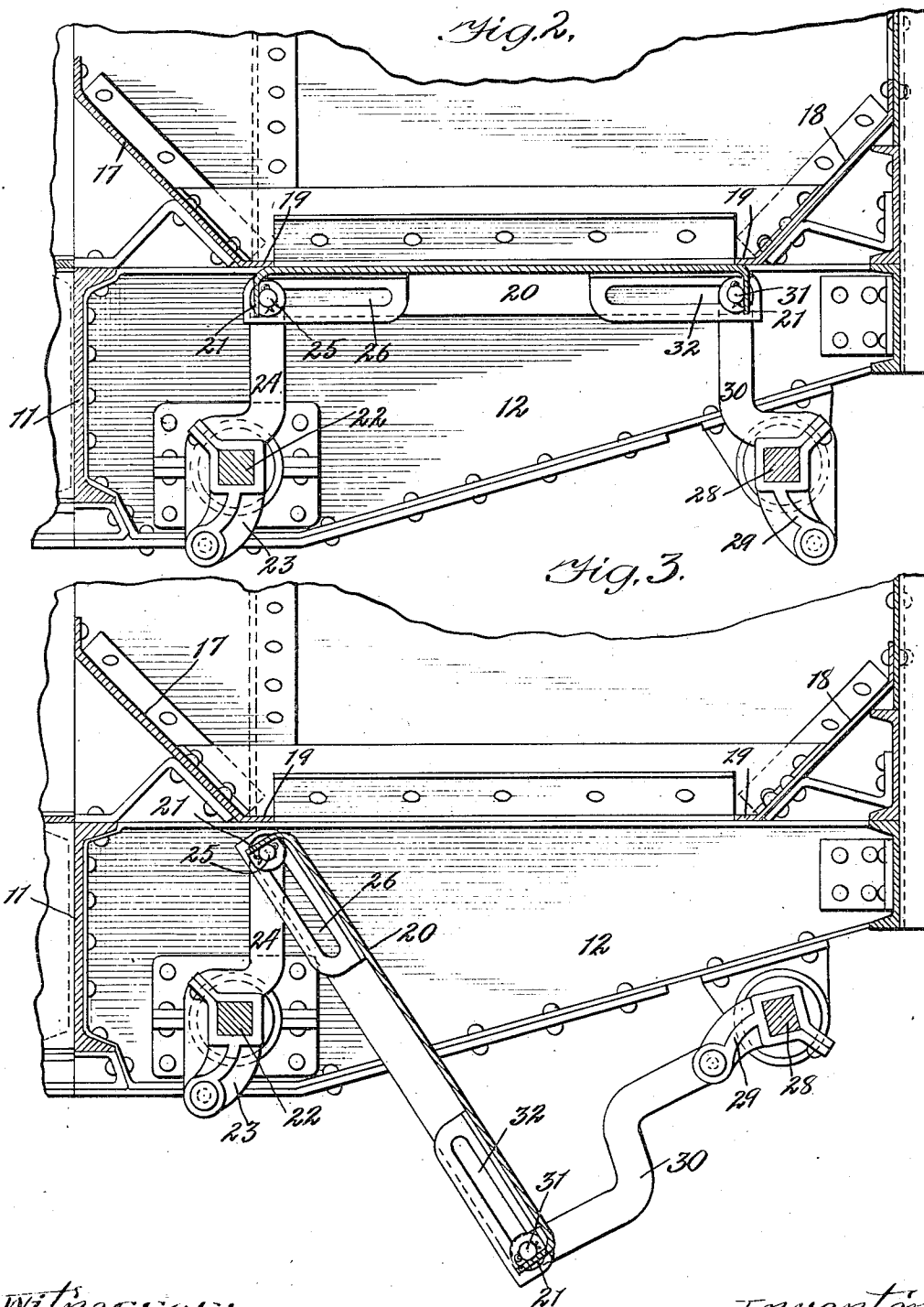
No. 825,580.

PATENTED JULY 10, 1906.

A. CAMPBELL.
CAR FLOOR DOOR OPERATING MECHANISM.

APPLICATION FILED MAR. 26, 1906.

3 SHEETS—SHEET 2.



Witnesses:
J. B. Weir
Robert A. Weir

Inventor:
Angyle Campbell
By Cheever & Co
Attys.

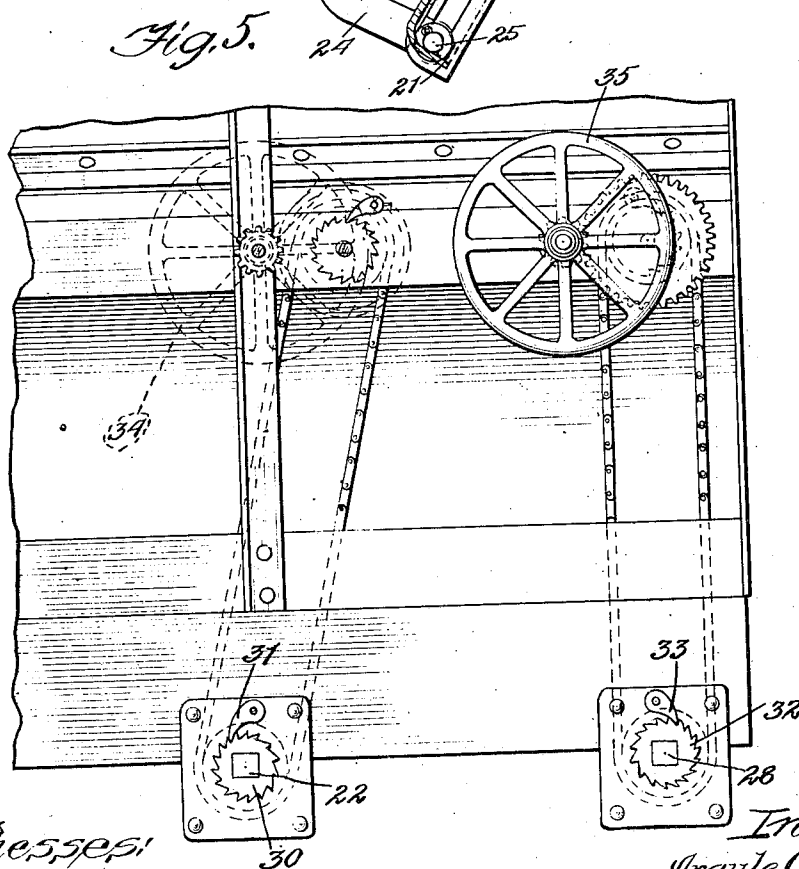
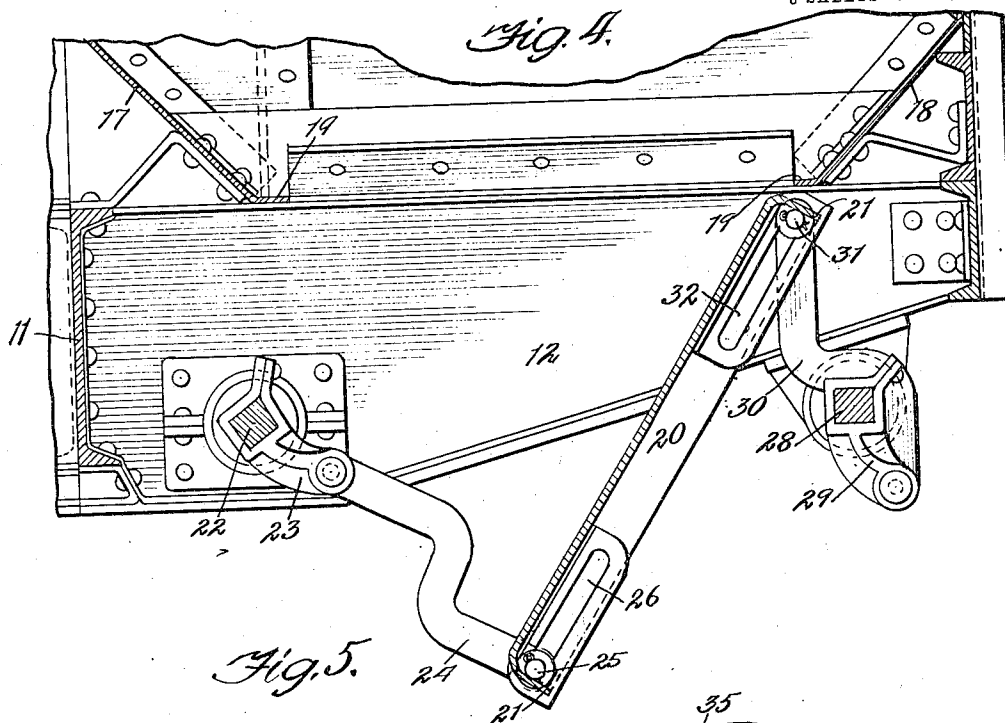
No. 825,580.

PATENTED JULY 10, 1906.

A. CAMPBELL.
CAR FLOOR DOOR OPERATING MECHANISM.

APPLICATION FILED MAR. 26, 1906.

3 SHEETS—SHEET 3.



Witnesses:
J. B. Weir
Robert A. Weir

Inventor:
Argyle Campbell
By Cheever & Cox
Attys.

UNITED STATES PATENT OFFICE.

ARGYLE CAMPBELL, OF CHICAGO, ILLINOIS.

CAR-FLOOR-DOOR-OPERATING MECHANISM.

No. 825,580.

Specification of Letters Patent.

Patented July 10, 1908.

Application filed March 26, 1906. Serial No. 308,048.

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-Floor-Door-Operating Mechanism, of which the following is a specification.

My invention relates to cars having floor-doors capable of being opened to discharge load from the car.

The object of my invention is to provide a floor-door for such a car, preferably a normally level floor-door with an operating mechanism, by means of which it may be opened so as to tilt toward either of two opposite sides of the door, this so that the load may be discharged upon opposite sides of said door, in other words, so that a door located on one side of the center girder of the car may be tilted at the will of the operator either about its side adjacent to the center of the car toward the side to discharge load at the side of the track or about its side adjacent to the side of the car toward the center of the track. My invention consists in mechanism capable of accomplishing the foregoing objects which may be very readily made and installed, which is efficient in operation, and is not readily liable to get out of order.

In the specific embodiment of my invention herein illustrated my invention consists in the use of two crank-shaft mechanisms mounted upon opposite sides of the door, the door having an independent pin-and-slot connection with each of said mechanisms, so that when one mechanism is operated to swing the door the pin of the other mechanism serves as a hinge or pivot on which the door is tilted, and so that when the second crank-shaft mechanism is operated to tilt the door the door is hinged or pivoted upon the first operating mechanism.

More in detail my invention consists in the use of two mechanisms, such as are shown, described, and claimed in United States Letters Patent No. 812,783, on opposite sides of the door, so that either may be operated to open the door and give it a very wide opening while the door remains hinged upon its pin-and-slot connection with the opposite mechanism.

Still more in detail, my invention consists in details of construction which will be here-

inafter more fully described and claimed as the specification proceeds.

Referring to the drawings, Figure 1 is a side view of a portion of the car having my invention applied thereto. Fig. 2 is a sectional end view of one-half of the car, showing the door mechanism of my invention in position with the door closed and forming a part of the floor of the car. Fig. 3 is a view corresponding to Fig. 2 with the door tilted to discharge load at the side of the car. Fig. 4 is the same view as Fig. 3 with the door tilted to discharge load toward the center of the track. Fig. 5 is a partial end view of the car, showing one form of mechanism which may be applied at the ends of the car to operate the device of my invention. This figure is taken on line 5 5 of Fig. 6. Fig. 6 is a detail plan view on line 6 of Fig. 1. Fig. 7 is a plan view of an edge of the door, showing the connection of the operating mechanism thereto. Fig. 8 is a sectional view on line 8 of Fig. 7. Fig. 9 is a side view looking in the direction of arrow 9, Fig. 7.

In the drawings I have shown my device as applied to a car of the hopper type; but this feature is not essential to my invention, as the mechanism may be applied to any other type of car with load-carrying floor-doors. In the particular car here shown the load-carrying hopper 10 is supported upon an underframe consisting of a central girder 11, with a plurality of cross bearers or bolsters 12 extending therefrom crosswise of the car. The particular construction of this underframe is no part of my invention. In the particular car here shown the hopper 10 has four downwardly-inclined directing boards or plates 15, 16, 17, and 18, arranged on four sides of a load-discharging square opening located at one side of the central girder between successive cross bearers or bolsters of the underframe. In the car shown there are several such openings from the hopper 10, located between different sets of cross-bearers and on opposite sides of the central girder; but for convenience only one will be described. This opening is normally closed by a horizontal floor-door 20, fitting up against a longitudinal flange border 19 around the opening, said border being preferably a part of the directing-plates 15 16 17 18, as shown. This door might be used to close any opening of any car without departing from the principle of my invention. This flange-bordered open-

ing and its floor-door is, as shown, preferably of somewhat less width than one-half the car and is located approximately midway of the distance between the central girder and the ends of the cross-bearers connected therewith adjacent to the door.

In order to strengthen the door, I make it with downturned flanges 21. Below the inner edge of the door—i. e., the edge toward the longitudinal center of the car—I mount upon the cross members of the car a longitudinal shaft 22, running preferably the entire length of the car, as shown, and upon said shaft I mount one or more crank-arms 23, with connecting-rods 24, carrying pins 25, adapted to slide backward and forward in slots 26 upon the under side of the door 20 and adjacent to the inner edge thereof, said crank-shaft mechanism being made in substantial accordance with that shown, described, and claimed in my said prior patent No. 812,783. Similarly below the outside edge of the door—that is to say, the edge near the side of the car—I mount upon the cross members of the underframe another shaft 28, running preferably the entire length of the car, as shown, and upon this shaft I mount one or more crank-arms 29, carrying connecting-rods 30, carrying pins 31, adapted to slide backward and forward in a slot or slots 32 in the under side of the outer edge of the door, said crank-shaft mechanism, just described, being also substantially identical with that of my prior patent, No. 812,783. The only difference between the two mechanisms carried by the shafts 22 and 23 is, as shown, that they are what will be for convenience defined as respectively “left” and “right” hand mechanisms. In other words, the shaft 22 is rotated clockwise when seen in Figs. 1, 2, 3, and 4 to open the door, while the shaft 28 is rotated counter-clockwise, when viewed in the same figures, to open the door.

In the preferred embodiment of my invention here shown I have, as best seen in Fig. 1, shown three lever-arms 24 along the central or inner edge of the door, each having one pin 25, supporting that edge of the door, with the result that, as shown, the door has three hinge-supports on which to tilt when it is moved from the position of Fig. 2 to that of Fig. 3 and back again and that it has three points of engagement with the crank-shaft mechanism when shaft 22 is operated to move the door from the position of Fig. 2 to Fig. 4 and back again. Similarly, as shown, I have provided three lever-arms 30, each carrying a pin 31, supporting the outer edge of the door, so that the door has three hinge-supports while it is being tilted from the position of Fig. 2 to the position of Fig. 4 and back again, and the crank-shaft mechanism carried by the crank-shaft 28 has three engagements with said door to move it from the

position of Fig. 2 to the position of Fig. 3 and back again.

In the crank-shaft mechanism shown in my prior patent, No. 812,783, I used a block 23", secured upon the underside of the door carrying the pin-and-slot connection with the operating mechanism, said block 23" extending beyond the edge of the door. In the construction here shown I give the crank-shaft mechanism a very easy motion by providing on the under side of the doors castings 40, having downwardly-turned flanges 41, between which the connecting-rods 24 or 30 are located, the outer ends of the pins 25 or 31, carrying rollers 42, adapted to bear and travel upon the under sides of horizontal flanges 43 of castings 40. As these castings 40 are located below the door, as shown, the flange 21 is cut away in the line 45, as best shown in Fig. 7, and the floor has notches 46 cut in it, adapted to be occupied by the adjacent connecting-rods 25 or 30 when the door is tilted to the positions of Figs. 3 and 4, respectively.

The shaft 22 is provided with a ratchet-wheel 30, normally locked by latch dog or pawl 31, designed to normally hold the inner end of the car-door in the normal position of Fig. 2, while the opposite shaft 28 is provided with a ratchet-wheel 32 and locking-dog 33, designed to normally hold the outer edge of the car-door in the normal position of Fig. 2. These locking mechanisms are right and left hand, so as to lock the respective shafts against the tendency of the load to move them clockwise or counter-clockwise, as heretofore described, when the opposite shaft is rotated. Each of these shafts 22 and 28 are respectively provided with end wheels 34 and 35, the same being connected by suitable chain-and-gearing mechanisms, as shown, to the respective shafts which they are designed to operate. The specific mechanism for operating these shafts is not a part of my invention, and I have merely shown one of the common forms, which may be varied at pleasure.

In the particular car here in question I have shown parts of shafts 22 and 28 as operating two floor-doors, one following the other lengthwise of the car; but a set of such shafts may be used to operate any number of floor-doors lengthwise of the car which it may seem best to use as a part of the car-floor door.

It should be understood that in the full car there is usually and preferably on the opposite side of the central girder another set of floor-doors running lengthwise of the car operated by another set of shafts corresponding to those which I have been describing, which second set is, however, independent of the set heretofore described.

In the operation of the device the operating mechanism is moved until the parts assume and are locked in the position of Figs. 1 and 2, in which position the car is ready for

loading. When a load has been placed upon the car in the hopper 10, it rests upon each floor-door. The operator, if he desires to dump the load at the center of the track, releases the dog 31 and any other locking mechanism controlling the shaft 30 and, taking hold of wheel 34, rotates the shaft 22, with attached parts, to the position of Fig. 4, and thus dumps the load in the desired position, the door swinging on pins 31 of the opposite locking mechanism as a hinge, as heretofore described. When the load has been discharged, the operator rotates wheel 34 in the opposite direction back to normal position of Fig. 2. If, on the other hand, while the car is still loaded the operator desires to dump the load at the side of the track, he does not disturb the locking mechanism of the shaft 30, but does unlock the shaft 28 by moving the dog 33 out of engagement with the ratchet-wheel 32 and unfastening any other mechanism which may be provided with the shaft. He now takes hold of wheel 35 and rotates shaft 28, with attached parts, to the position of Fig. 3, the hinge for the door being formed by the pins 25 of the opposite operating mechanism heretofore described. While the closing of either door is in progress, the locking-dog on its respective operating-shaft clicks over the ratchet-wheel thereon in the ordinary manner, and thus prevents any backward motion of the door contrary to the desire of the operator.

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

1. In a car in combination with a frame and load-retaining car-body a load-carrying floor-door normally closing a load-discharging opening in said body, a crank-shaft mechanism adjacent to two opposite sides of the door each having a pin-and-slot connection with a side of the door so that by operating one of said crank-shaft mechanisms the door may be tilted about the pin of the opposite mechanism as a hinge.

2. In a car in combination with a frame and load-retaining car-body a load-carrying floor-door normally closing a load-discharging opening in the body a crank-shaft mechanism adjacent to two opposite sides of the door each having a pin-and-slot connection with the side of the door to which it is adjacent the whole so arranged that by operating either of said crank-shaft mechanisms the door may be tilted about the pin of the opposite mechanism as a hinge.

3. In a car in combination with a frame and load-retaining car-body a load-carrying floor-door normally closing a load-discharging opening in the body a crank-shaft mechanism adjacent to each of two opposite edges of the door, each crank-shaft mechanism carrying a pin adapted to slide backward and forward in a slot on the under side of the door

the whole so arranged that by operating either crank-shaft mechanism the door is tilted about the pin of the opposite crank mechanism as a hinge to discharge load.

4. In a car in combination with a frame and load-retaining car-body a load-carrying floor-door normally closing a load-discharging opening in said body a crank-shaft mechanism adjacent to each of two opposite edges of the door, each crank-shaft mechanism carrying a pin adapted to slide backward and forward in a slot on the under side of the door, adjacent to its operating mechanism the whole so arranged that operating either crank-shaft mechanism tilts the door about the pin of the opposite crank mechanism as a hinge to discharge load.

5. In a car in combination with a frame and load-retaining car-body a load-carrying floor-door normally closing a load-discharging opening in said body a crank-shaft mechanism adjacent to each of two opposite sides of the door having a pin-and-slot connection with the side of the door to which it is adjacent so that operating one of said crank-shaft mechanism tilts the door on the pin of the opposite mechanism as a hinge and a locking mechanism normally holding each crank-shaft mechanism in load-carrying position while the opposite mechanism is being operated.

6. In a car in combination with a frame and load-retaining car-body a load-carrying floor-door normally closing a load-discharging opening in the body a crank-shaft mechanism mounted on each of two opposite edges of the door, each crank-shaft mechanism carrying a pin adapted to slide backward and forward in a slot on the under side of the door, the whole so arranged that by operating one crank-shaft mechanism the door is tilted about the pin of the opposite crank mechanism as a hinge to discharge load, and a locking mechanism normally holding each crank-shaft mechanism in load-carrying position while the opposite mechanism is being operated.

7. In a car in combination with an underframe consisting of a central girder and cross members, a load-carrying floor-door between a pair of cross members at one side of the central girder occupying less space than the distance between the central girder and the side of the car, a longitudinal shaft mounted upon the underframe at each side of the door one shaft near the central girder and one shaft near the side of the car, a crank mechanism upon each of said shafts having a pin-and-slot connection with each of two opposite edges of the door, means for normally locking each shaft in normal position and means for rotating each shaft the whole so arranged that operating either mechanism tilts the door about the opposite pin as a hinge.

8. In a car in combination with an under-
frame consisting of a central girder and cross
members, a load-carrying floor-door between
a pair of cross members at one side of the
5 central girder occupying less space than the
distance between the central girder and the
side of the car, a longitudinal shaft mounted
upon the underframe at each side of the
door one shaft near the central girder and
10 one shaft near the side of the car, a crank
mechanism upon each of said shafts having a
pin-and-slot connection with the edge of the
door to which it is adjacent, means for nor-
mally locking each shaft in normal position

and means for rotating each shaft the whole 15
so arranged that operating either mechanism
tilts the door about the opposite pin as a
hinge to discharge load at the side of the
door adjacent to the operating-shaft which
is being manipulated. 20

In witness whereof I have hereunto sub-
scribed my name in the presence of two wit-
nesses.

ARGYLE CAMPBELL.

Witnesses:

DWIGHT B. CHEEVER,
CLARA J. CHRISTOFFEL.