

F. DITCHFIELD.

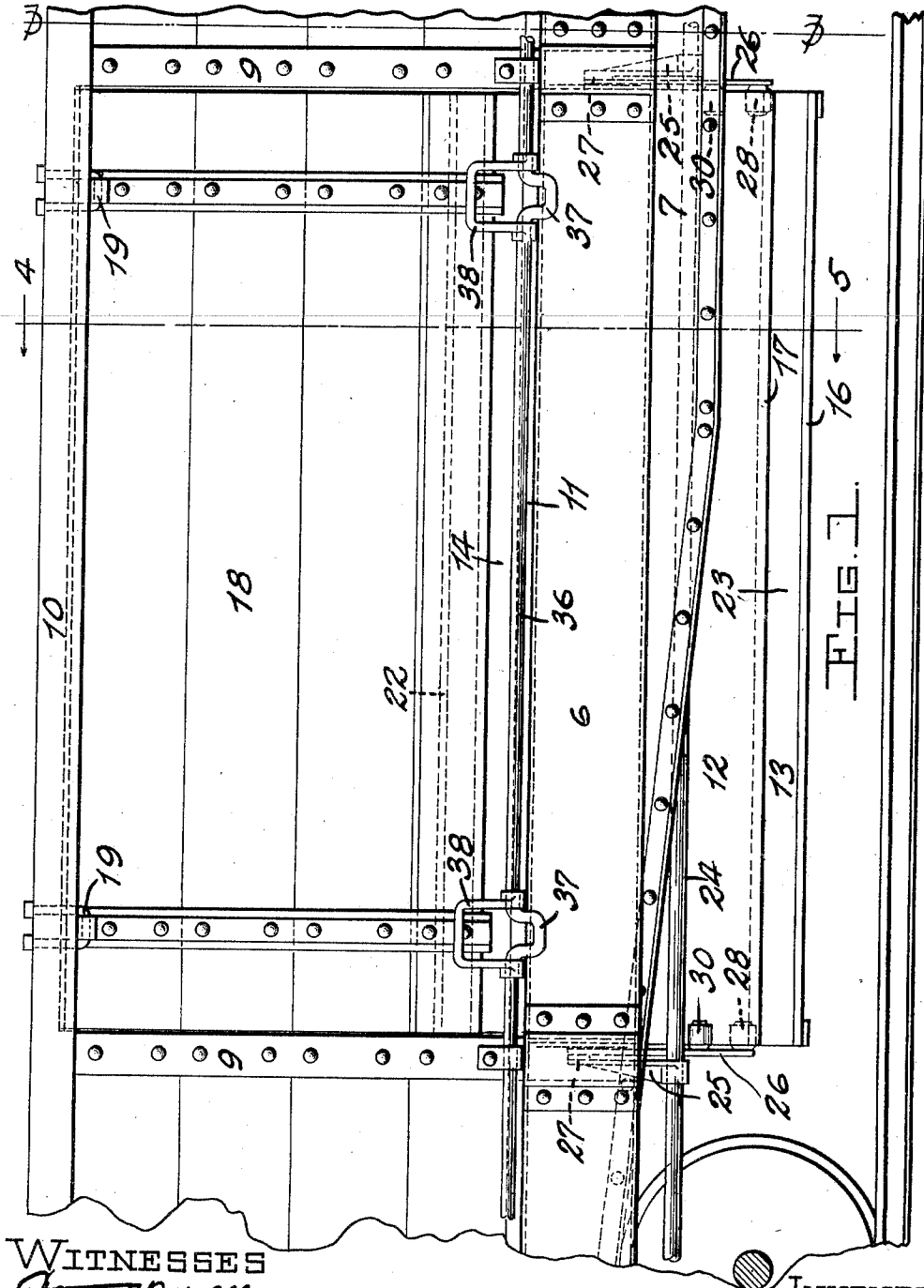
DUMP CAR.

APPLICATION FILED JUNE 3, 1909.

1,009,957.

Patented Nov. 28, 1911.

3 SHEETS—SHEET 1.



WITNESSES

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INVENTOR

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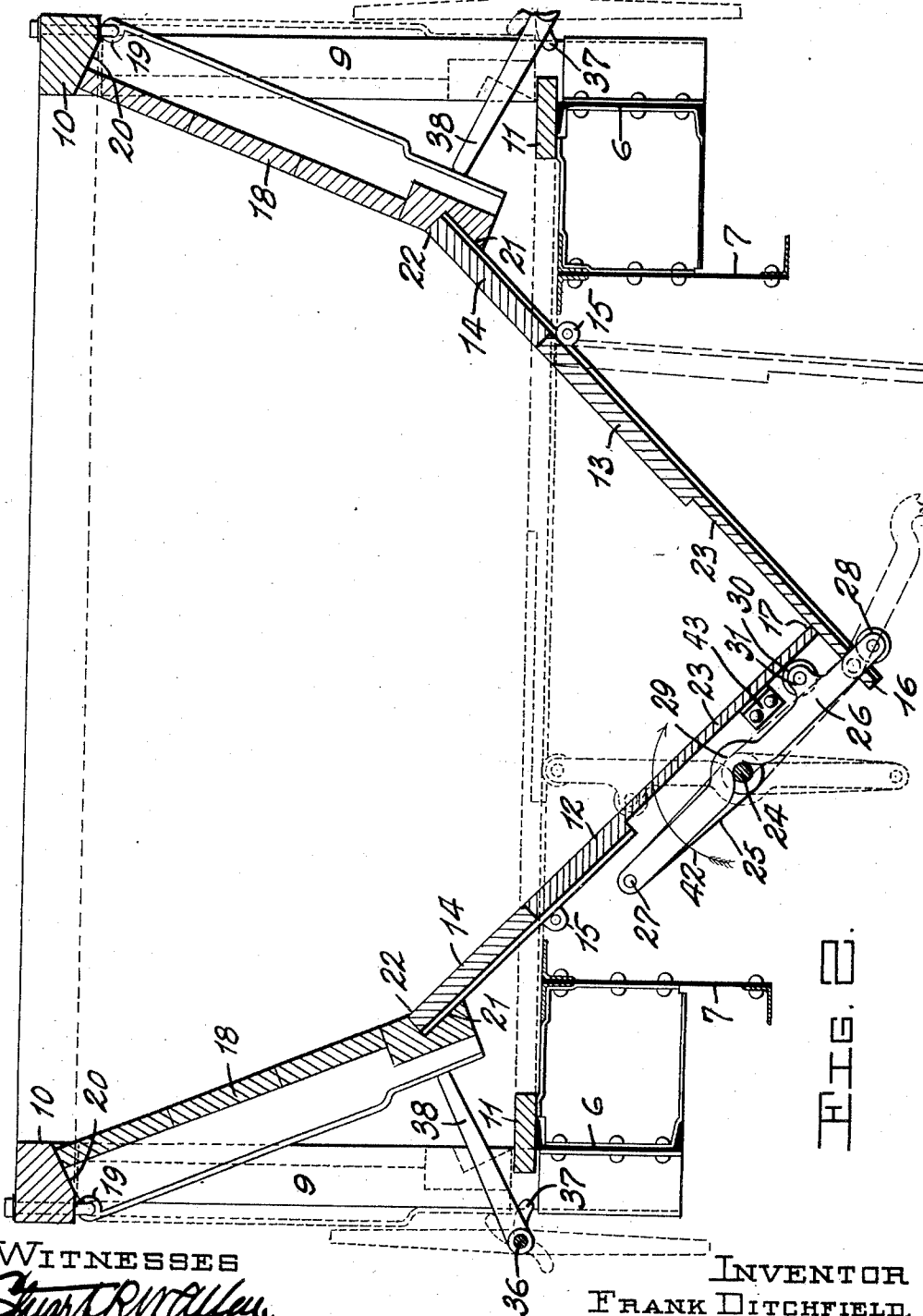


FIG. 2.

WITNESSES

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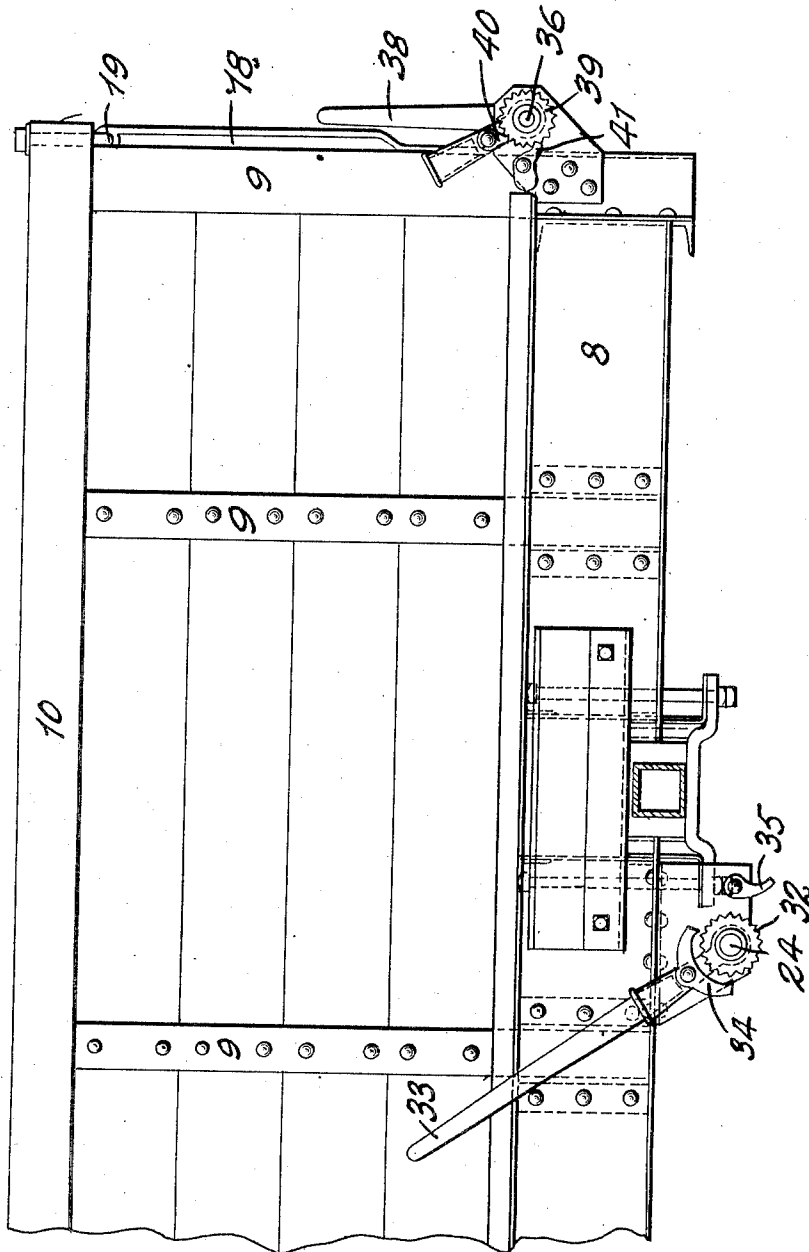


FIG. 3.

WITNESSES

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UNITED STATES PATENT OFFICE.

FRANK DITCHFIELD, OF MONTREAL, QUEBEC, CANADA.

DUMP-CAR.

1,009,957.

Specification of Letters Patent.

Patented Nov. 28, 1911.

Application filed June 3, 1909. Serial No. 499,883.

To all whom it may concern:

Be it known that I, FRANK DITCHFIELD, of the city of Montreal, in the Province of Quebec and Dominion of Canada, have invented certain new and useful Improvements in Dump-Cars, of which the following is a full, clear, and exact description.

This invention relates to that class of cars known as convertible dump cars—that is, a car provided with elements capable of being arranged in one position to form a hopper-bottom dumping car and in another position to form a flat bottom car of the gondola type.

The main object of the invention is to provide a car of simple, economical, and efficient construction that can be used as an ordinary flat-bottom car and loaded and unloaded in the usual manner; that can be quickly converted into a side dumping car and that can further be converted into a hopper-bottom car and unloaded automatically along the central axis thereof, thus combining a structure capable of carrying several different classes of freight.

A further object is to provide a car that can be loaded as a flat-bottom car and unloaded either from the sides or from the hopper bottom as is found most desirable, a result that, to my knowledge, has never been accomplished heretofore.

A still further object is to provide a car in which the elements comprising the floor may be converted into the hopper bottom, thus eliminating the permanent or stationary hopper device heretofore used. This feature of construction I believe to be new in cars of this type.

The invention consists essentially in a car having its sides hinged at the top and capable of being swung either outwardly or inwardly, as desired. The floor comprises longitudinal plates adapted, when overlapped and locked in position, to form a flat or plain floor surface. These plates are hinged in such a manner that when the central overlapping portions are lowered the floor is converted into a hopper under the car and capable of being separated at any angle to discharge the contents centrally between the rails. The underframe of the car is similar to the ordinary underframes of cars of this type.

The invention consists further in the features, combinations and details of construction hereafter described.

In the drawings, in which similar numerals refer to corresponding parts throughout all the figures:—Figure 1 is a partial side elevation of a car constructed according to my invention. Fig. 2 is a vertical transverse sectional view on the line 4—5 of Fig. 1. Fig. 3 is an end elevation of the car.

In the above defined figures 6 designates the side sills and 7 the center sill of a car, which are connected by end sills 8. Pillars 9 are fixed to the side sills and support on their upper extremities a rail 10 which forms the upper edge of the car body. In the dumping portion of the car the floor is formed of a pair of longitudinal jamb plates 11 located on either side of the longitudinal axis of the car and preferably equidistant therefrom, and overlapping doors 12, 13 and 14 hinged at 15 which, when in a horizontal position, occupy the space between the jamb plates 11, as shown in dotted lines in Fig. 2. It will be seen in this figure that the doors are hinged inside the side plates of the center sill. The portions 14 of the doors 12 and 13 outside the hinges 15 are separate from the main portions of the doors though mounted on the same hinges 15. This division of the doors is necessary in order that when they are lowered the portions 14 outside the hinges will not rise and leave a space between themselves and the side doors on which they rest through which a portion of the contents of the car would fall.

The doors are preferably of unequal width in order that when they are lowered to form a hopper under the car, as shown in full lines in Figs. 1 and 2, the inner edge 16 of one door will extend beyond the inner edge 17 of the other door in order that the extending portion of the door may be directly engaged by the operating mechanism without the use of any intermediary parts. The sides of the car adjacent the floor doors are formed of doors 18 hinged at their upper edges at 19 to the rails 10. The lower sides of the rails 10 are beveled at 20 to allow the side doors to be swung inwardly, the lower edges of said doors being recessed at 21 to engage the outer edges 22 of the floor doors 14. When in their vertical position the lower edges of the said doors will form a tight joint with the jamb plates 11. The side plates may also be swung outwardly in order to discharge the contents of the car at the sides thereof. The overlap-

ping portions 23 of the floor doors will be reduced in thickness on opposite sides and suitably strengthened in order that when the doors are in their horizontal overlapping position the floor formed thereby will be of uniform thickness and will present a plain, unobstructed upper surface.

The operating mechanism of the floor doors comprises a shaft 24 located longitudinally of the car under the floor thereof, said shaft having fixed thereto a plurality of levers 25 operating links 26 which connect the levers with the doors. The links 26 are pivoted at one end at 27 to the free extremities of the levers 25 and at the other end are provided with rollers 28 which engage under the edge 16 of the door 13. The links 26 are provided, intermediate their ends, with offset portions 29 which embrace the shaft 24 and make the links practically rigid with the levers when the shaft is revolving in one direction. This offset is on the upper side of each link, that is, on the side of the link adjacent the door 12 when the doors are in their lower position. A roller 30 is mounted on a lug 31 extending from each link between the roller 28 and the offset 29, and on the same side of the link as the offset 29. It will be seen in Fig. 2 of the drawings that by reason of the offset 29, the pivotal center 27 of the link, the pivotal center of the roller 28, and the center of the shaft 24 will lie normally in line so that any stress applied to the roller 28 by the weight of the doors will not tend to rotate the shaft through the medium of the lever 25. The shaft 24 extends to the end of the car and is provided beyond the end sill 8 thereof with an escapement wheel 32. Operating levers 33 are pivoted on the shafts and carry escapement levers 34 adapted to engage the escapement wheels 32 in the well known manner so that when the levers 33 are oscillated the escapement wheels will revolve one tooth at a time. Suitable pawls 35 are provided which may be thrown into engagement with the escapement wheels when it is desired to rotate the same in a reverse direction.

The operating mechanism of the side doors consists of a shaft 36 journaled to the bases of the pillars 9, on each side of the car and extending longitudinally of the car. Cranks 37 having the arms thereof curved as shown in Fig. 2 are formed in the shafts 36 adjacent the ends of the doors. Suitable levers 38 are fixed to the shafts 36 lying at a suitable angle thereto. The shafts 36 may be operated by any suitable means, such as star toothed wheels 39 fixed to the ends thereof and engaged by a lever operated pawl 40 and a fixed locking pawl 41.

The operation of the car varies according to the way in which the doors are arranged. In the drawings I have shown the car in

full lines with the doors arranged to form a hopper car; and in dotted lines to form a flat-bottom gondola car. In the case of the hopper car arrangement when it is desired to dump the car the shaft 24 is rotated in the direction of the arrow 42 Fig. 2. The rotation of the shaft operates the levers 25 to throw the extremities of the links 26 out of line with the shaft so that the weight of the load on the doors actuates the levers through the links to rotate the shaft sufficiently to allow the door 13 to drop as shown in the broken lines in Fig. 2, the door 12 being held against further downward movement by the stops 43 attached to the car frame adjacent the ends of the doors. During this movement the escapement device on the shafts prevents the same from revolving rapidly and allows the discharge of the lading to be regulated to the desired speed. In raising the door 13 to close the hopper the parts move in reverse directions and the movement is continued until the offsets 29 of the links engage the shaft bringing all the pivotal points in line so that the levers 25 are unable to rotate the shaft.

To convert the hopper car into a flat-bottom gondola car the shafts 36 are rotated so that the levers 38 holding the side doors in their inward position are moved to a vertical position and the doors themselves allowed to assume a vertical position in which they are held against outward movement by the cranks 37. The portions 14 of the floor doors outside the hinges are now free to drop. The shaft 24 is rotated in a direction contrary to the arrow 42 and as the links 26 cannot pass the shaft they will move with the levers 25 to which they are attached. When in the closed hopper position the doors 12 and 13 are at an angle of approximately 90° and the links 26 are substantially parallel with the door 12, and the lower edge 17 of the door being supported on the rollers 30 and the lower projecting edge 16 of the door 13 supported on the rollers 28. It will be readily seen that the door 12 will be raised directly by the upward movement of the lower extremities of the links a greater distance than the door 13 as the movement of the link extremity in this case is for a time approximately parallel with the door 13. The door 12 is thus lifted clear of the door 13 and does not again engage it until the upward movement of both doors is equal, at which point the angle between the doors is so great that the door 13 will carry the door 12 with it without any considerable friction or resistance. The movement of the shaft is continued until the doors assume a horizontal position, overlapping each other, and the links and levers, a vertical position, as shown in dotted lines in Fig. 2. The weight of the doors and any load thereon is now transmitted directly

downward through the links to the shaft, the alinement of the pivotal points forming a lock. The escapement device will at all times hold the shaft sufficiently rigid to prevent the vibration of the moving car from destroying this alinement. To empty the car thus converted into a flat-bottom gondola car the shafts 36 are rotated to swing the levers 38 outwardly and downwardly and move the cranks 37 out of engagement with the doors 18 which are thus left free to swing outwardly. The car may now be emptied by shoveling or by means of a plow. To reconvert the flat-bottom gondola car into a hopper-bottom car the shaft 24 is rotated in the direction of the arrow 42 until the doors are lowered into the position shown in full lines and previously described. The small floor doors 14 are slightly raised so that they will engage in the recesses 21 in the lower edge of the side doors 18 and be carried by the side doors until they are in line with and form a continuation of the doors 12 and 13.

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

1. In a car of the class described, the combination with a supporting framework of hinged side doors adapted to swing outwardly and inwardly, floor doors adapted to form a level car floor when in one position, and means for converting said floor doors and side doors into a hopper for the car.

2. In a car of the class described, the combination with a supporting framework of floor doors hinged adjacent the sides of the car, a shaft extending longitudinally of the car under said doors, means operated by said shaft for maintaining said doors in horizontal overlapping relation.

3. In a car of the class described, the combination with a supporting framework of a pair of doors of unequal width, a revoluble shaft extending longitudinally of the car, and means operated by said shaft for lowering said doors into angular relation to form a hopper longitudinally under the car.

4. In a car of the class described, the combination with a supporting framework of a pair of doors of unequal width hinged adjacent the sides of the car, a revoluble shaft extending longitudinally under the car, levers fixed to said shaft, links pivoted to the levers and engaging the free edge of the wider doors to hold said doors in angular relation under the car.

5. In a car of the class described, the combination with a supporting frame work of a pair of doors of unequal width hinged adjacent the sides of the car, a revoluble shaft extending longitudinally under the car, mechanism actuated by the shaft for releasing the doors whereby the contents of the

car will be discharged centrally between the rails, and means for controlling the rotation of said shaft.

6. In a convertible dump car, the combination with a supporting framework of a pair of floor doors of unequal width hinged adjacent the sides of the car, a revoluble shaft extending longitudinally under the car, levers fixed to said shaft, links pivoted to said levers and each provided with an offset portion engaging the shaft whereby the links will move with the levers in one direction, rollers on the free extremities of said links engaging the lower edge of the wider door, and further rollers carried by said links engaging the lower edge of the narrower door whereby when the shaft is rotated the narrower door will be lifted clear of the wider door.

7. In a car of the class described, the combination with a supporting frame work, of hinged side doors, means for actuating said doors to swing outwardly or inwardly, floor doors hinged to the frame work, said floor doors each consisting of two members pivotally mounted on each side of the hinge point, the central floor members being provided with mechanism for lowering same to form a hopper-bottom for the car.

8. A convertible car comprising a supporting frame work, hinged side doors, pivoted outer floor plates adapted to be raised to coöperate with the hinged side doors and pivoted central floor plates, means for maintaining said central floor plates in a horizontal position, and means for converting said central floor plates into a hopper-bottom for the car.

9. A convertible car comprising a supporting frame work, hinged side doors, and hinged floor members, a shaft extending longitudinally under said floor members, mechanism connecting the shaft with said floor members, and means for actuating said mechanism to lower the floor members to form a hopper-bottom for the car.

10. In a car of the class described, the combination with a supporting framework of hinged side doors adapted to swing inwardly and outwardly, floor doors adjustable to an inwardly and downwardly sloping position, said side doors and said floor doors being adapted to form the walls of a hopper when adjusted to a downwardly and inwardly inclined position.

11. In a car of the class described, the combination with a supporting framework of hinged side doors adapted to swing outwardly and inwardly, said side doors when swinging inwardly being adapted to form a part of the walls of a hopper, floor doors adapted to swing from a horizontal to an inclined position, said floor doors when adjusted to an inclined position having a portion thereof extending below and a por-

tion thereof above, the floor level to form a continuation of the walls of a hopper formed by said side doors.

12. In a car of the class described having
5 a supporting framework, hinged side doors adapted to be swung outwardly and inwardly, means for inclining said doors inwardly, floor doors, and means for inclining said floor doors in angular relation below

the car whereby said side doors and floor 10 doors will form the walls of a hopper.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

FRANK DITCHFIELD.

Witnesses:

A. S. ATWOOD,
C. W. TAYLOR.

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