E. M. MOLLER.

DOOR OPERATING MECHANISM FOR CARS.

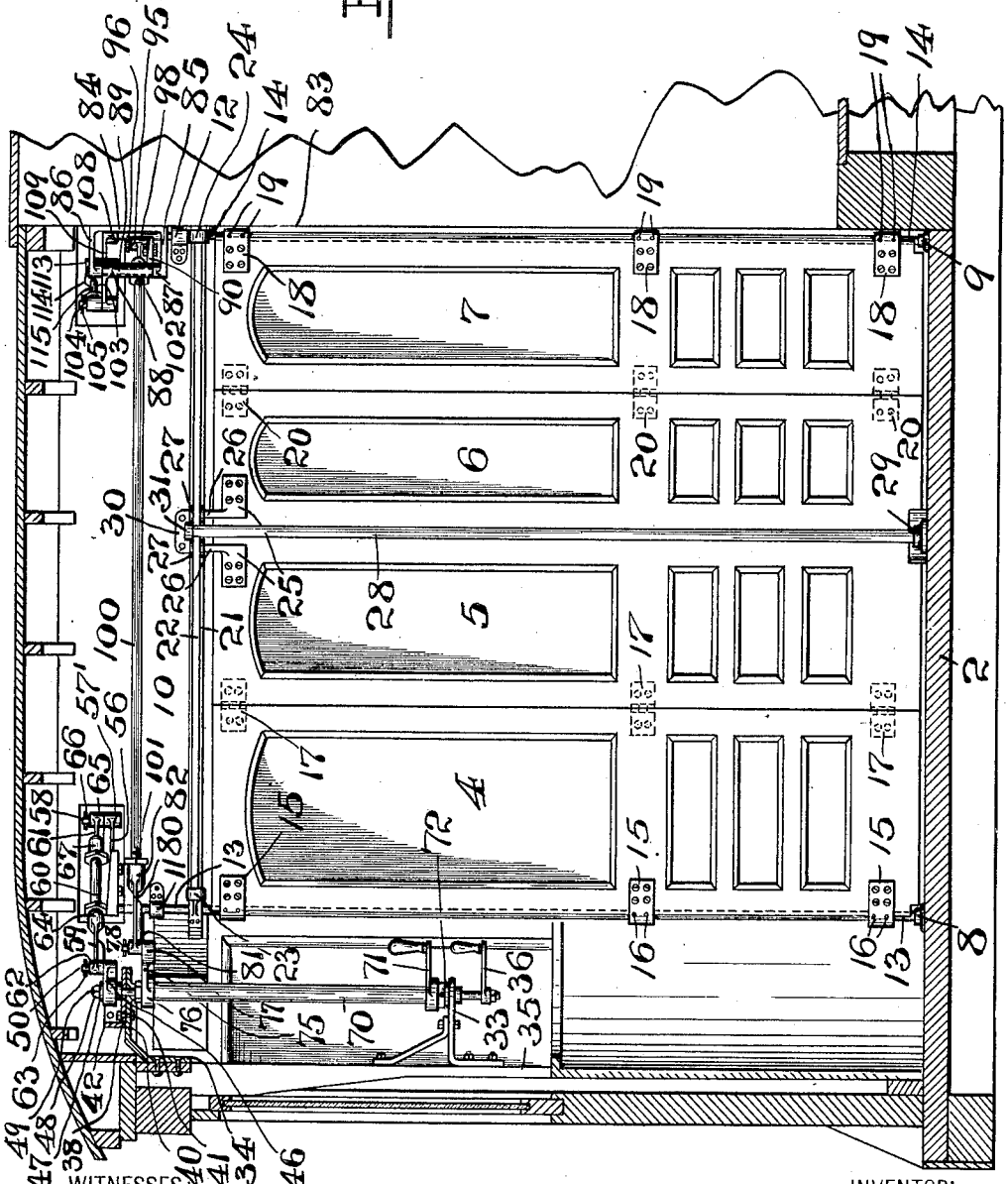
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1,084,222.

Patented Jan. 13, 1914.

2 SHEETS—SHEET 1.

FIG. 1



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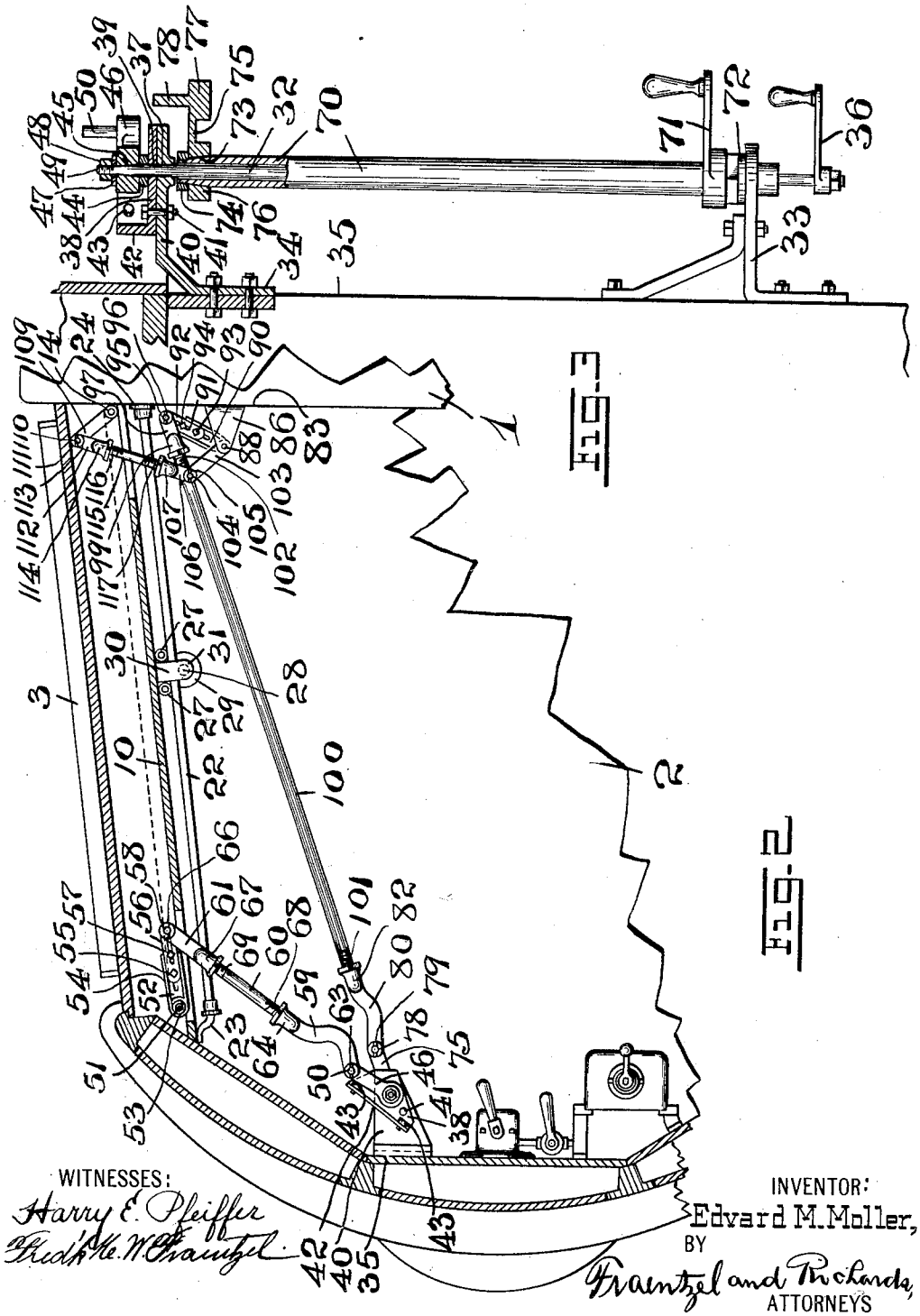
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2 SHEETS—SHEET 2.



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DOOR-OPERATING MECHANISM FOR CARS.

1,084,222. Specification of Letters Patent. Patented Jan. 13, 1914.

Application filed October 30, 1912. Serial No. 728,552.

To all whom it may concern:

Be it known that I, EDVARD M. MOLLER, a citizen of the United States, residing at Jersey City, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Door-Operating Mechanism for Cars; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to characters of reference marked thereon, which form a part of this specification.

The present invention relates, generally, to improvements in railway cars, and this invention has reference, more particularly, to a novel door-operating mechanism for the vestibuled platforms of street-railway cars, being in the nature of improvements in that class of door-operating mechanism set forth in a prior application filed by myself August 31st, 1912, and Number 718,066.

This invention has for its principal object to provide a novel and simply constructed door-operating mechanism for simultaneously or singly operating a pair of double and centrally divided platform doors for cars, each pair of doors being adapted to break in the middle, and both pairs of doors when operated simultaneously or singly moving inwardly and in opposite directions, so that they will stand at right angles (in their folded relation) to the side of the car, or approximately so, and will not be in the way of persons getting on or off the car.

Other objects of the present invention not at this time more particularly enumerated will be clearly understood from the following detailed description of the said invention.

With the various objects of the present invention in view, the invention consists, primarily, in the novel door or gate-closing and opening means for the platforms of railway cars hereinafter set forth; and, the invention consists, furthermore, in the novel arrangements and combinations of the various devices and parts, as well as in the details of the construction of the same, all of which will be more fully described in the following specification, and then finally embodied in the clauses of the claim which are appended to and which form an essential part of this specification.

The invention is clearly illustrated in the accompanying drawings, in which:—

Figure 1 is a diagrammatical vertical longitudinal sectional representation of one end of a railway car and its platform, showing in connection therewith and in elevation, and also in their closed relation to the vestibule-platform, two sectional doors or gates, and one form of mechanism for operating the doors or gates, all illustrating one embodiment of the principles of the present invention; and Fig. 2 is diagrammatical horizontal sectional representation of a portion of the one end of the car and a portion of the platform thereof, said view showing in plan or top view, the said doors or gates in their closed relation, and the mechanism for simultaneously or singly operating said doors. Fig. 3 is a detail view, on an enlarged scale, partly in side elevation and partly in vertical section, of certain portions of the gate or door-operating mechanism for simultaneously or singly operating each pair of gates or doors.

Similar characters of reference are employed in all of the above described views, to indicate corresponding parts.

Referring now to the several figures of the drawings, the reference-character 1 indicates a portion of the body of any usual type of street railway car which is provided at one or both ends with the usual inclosed or vestibule-platform 2 and the usual side-step 3 leading from the platform. The frame-work of the vestibule is provided upon that side of the platform 2 at which the step 3 is located with a large side-opening which, under normal conditions, is closed by the hinged and foldably disposed sections or members 4 and 5, and 6 and 7 of a pair of doors or gates.

As shown in Fig. 1 of the drawings, at suitable points in the flooring of the platform 2 are a pair of socket-like bearing-members 8 and 9, and in vertical alinement with said bearing-members 8 and 9 and suitably secured to the upper portion 10 of the frame-work of the vestibule, above the said large side-opening herein-above mentioned, are a pair of bearing-brackets 11 and 12. Oscillatorily mounted in said bearing-member 8 and the bearing-bracket 11 is a vertical rod 13, and oscillatorily arranged in said

bearing-member 9 and the bearing-bracket 12 is another vertical rod 14, said rod 13 having suitably secured thereto, by means of attaching plates 15, which are fastened to said rod 13 by means of pins 16, the said door-section or member 4. The door-section or member 5 is foldably connected with the said door-section or member 4, by means of suitable hinges, as 17, and as clearly indicated in Fig. 1 of the drawings. In like manner, there is secured to the previously mentioned rod 14, by means of attaching plates 18, which are fastened to said rod 14 by means of pins 19, the previously-mentioned door-section or member 7, said door-section or member 7 being foldably connected with the door-section or member 6 by means of suitable hinges, as 20.

As has been stated, the main purpose of this invention is to simultaneously or singly cause the oscillatory or rotary movements of the vertical rods 13 and 14, whereby each pair of doors or gates may also be simultaneously or singly opened, and to accomplish this, the mechanism for operating the said rods will presently be fully described. In operating the said rods 13 and 14, the door or gate-sections 4 and 7 are moved from their closed positions inwardly upon the platform of the car into their opened positions, and in order that the respective door-sections 4 and 5, and 6 and 7, will break joints, and that the section 5 will fold upon the section 4, and the section 6 will fold upon the section 7, suitable guiding means in the form of two bars 21 and 22 are arranged in front of the portion 10 of the frame-work directly above the side-opening of the platform, the said bars 21 and 22 being suitably secured in place by means of suitable fastening devices or brackets, as 23 and 24. The door-sections or members 5 and 6 have secured thereto, at their upper corners, suitable plates 25, each plate 25 being provided with a stud or post 26, and a guide-roller 27, said post and roller being movably disposed in the guide-space formed between said bars 21 and 22. The action of these rollers 27 is to cause the respective door-sections or members 4 and 5, and 6 and 7 to become folded, when the rods 13 and 14 are rotated so as to bring said door-sections into their open positions with relation to the platform of the car; but, said rollers 27 serving also to cause the several door-sections or members to assume their straightened-out relation, when the said rods 13 and 14 are rotated in the opposite directions.

If desired, in alinement with the vertical closing joint formed by the two door-sections or members 5 and 6, there may be a dividing post, as 28, said post being arranged upon the platform 2, near the side-opening, by having its lower end-portion arranged in a socket 29 and its upper end-portion in a socket-like bearing-portion 31 of a bracket 30 which is secured to and extends inwardly from the portion 10 of the frame-work, substantially as illustrated in Fig. 1 of the drawings.

Having in the foregoing described the general arrangement of the door or gate-sections for closing the exit and entrance-openings thus provided by the dividing post 28, I will now describe one form of mechanism for simultaneously or singly operating all of said door or gate-sections, so as to move them into their open relation, or from their open relation into their closed relation. This door or gate-operating mechanism comprises a suitable shaft or spindle 32 which is rotatably mounted in the bearing-portions of suitable bearing-brackets 33 and 34 which are suitably secured upon the inner front-portion of the vestibule-frame 35. As shown in Fig. 1 of the drawings, the said vertical shaft or spindle 32 is mounted in the upper half of the platform-space, so as to be out of the way, and said shaft or spindle is provided upon its lower end-portion with a suitable crank-lever or arm 36 for turning said shaft or spindle and which is under easy control of the motorman or other operator stationed upon the platform of the car. As shown more particularly in Fig. 3 of the drawings, the upper end-portion of the said vertical shaft or spindle 32 extends through the bearing-portion 37 of the bracket 34 and through a bearing-portion, as 39, of a buffer-plate 38 which rests upon the upper surface of the shelf-like member 40 of the bracket 34, and is suitably secured thereto by means of a bolt 41, or other suitable fastening means. The said plate 38 is provided with an upwardly extending flange-like member, as 42, which is provided with an arrangement of stops 43 of a suitable flexible material, against which certain parts of the mechanism are brought into contact, so as to limit the rotary movement of the shaft or spindle 32 in either direction. Resting upon shelf-like member 40, and mounted upon said shaft or spindle 32 is a collar 44 and secured upon the tapered portion 45 of said shaft or spindle 32 is a crank-arm 46, the parts being rigidly connected by means of a washer 47 and a nut 48 which is firmly screwed down upon the screw-threaded end 49 of said shaft or spindle 32. Upon its opposite end-portion the said crank-arm 46 is provided with an upwardly extending cylindrical stud or pin 50.

Suitably mounted upon the upper tapered end-portion 51 of the door or gate-carrying rod 13 which extends above the bearing 11 is the bearing-hub 53 of a laterally extending plate 52, said plate being provided with guide-flanges 54. Slidably and adjustably mounted upon the said plate 52, between the guide-flanges thereof, and adapted to be

secured in its adjusted position to said plate, by means of bolts, as 55 and 57, in the manner of my said former application, Serial Number 718,066, is a plate-like member or plate 56. Upon its free end-portion, the said member or element 56 is made with a hub-like enlargement, as 57′, which is provided with an upwardly extending cylindrical stud or pin 58. Pivotally arranged between and connected with the previously-mentioned cylindrical stud or pin 50 and the said cylindrical stud or pin 58 is a suitable adjustable connecting rod, said rod comprising three members 59, 60 and 61. The member 59 is formed upon its one end with a perforated hub 62 by means of which it is pivotally arranged upon the pin or stud 50, being secured upon said pin or stud 50 by means of a pin 63, or other suitable fastening means. Upon its other end-portion, the said member 59 is made with an internally screw-threaded socket-like portion 64. The member 61 is formed upon its one end with a perforated hub 65 by means of which it is pivotally arranged upon said pin or stud 58, being secured upon said pin or stud 58 by means of a pin 66, or other suitable fastening means. Upon its other end-portion, the said member 61 is also made with an internally screw-threaded socket-like portion 67. The member 60, herein-above mentioned, is in the form of a connecting rod and is provided with the right and left-hand screw-threaded end-portions 68 and 69 which are screwed into the respective and correspondingly internally screw-threaded socket-like portions 64 and 67 of the respective members 59 and 61. Thus it will be evident, that after the various parts of this mechanism have been properly adjusted and secured in their assembled relations, by turning the vertical shaft or spindle 32 in either direction, the door or gate-carrying rod 13 is also correspondingly rotated, and the door or gate-sections 4 and 5 are brought into their opened or closed relations, as will be clearly evident.

Referring now more particularly to Figs. 1 and 3 of the drawings, it will be seen, that there is concentrically and rotatably arranged upon said previously-mentioned vertical shaft or spindle 32, a long sleeve-like member or tubular shaft, as 70, upon the lower end-portion of which is suitably secured the hub 72 of a crank-arm 71, for turning said member 70 independently of the turning movement of the shaft or spindle 32 when the latter is operated by the crank-arm 36. The upper end-portion of said sleeve-like member or tubular shaft 70 is preferably tapered, as at 73, and suitably secured upon said tapered portion by means of a nut 74, or in any other suitable manner, is the hub 76 of another crank-arm 75, all arranged and locked in such a manner by the nut 74, that the crank-arm 75 will turn with the said sleeve-like member or tubular shaft 70, as will be clearly evident. Upon its opposite end, the said crank-arm 75 is made with a hub-like enlargement, as 77, which is provided with a cylindrical stud or pin 78. Pivotally mounted upon said stud or pin 78, and against accidental displacement therefrom by a pin 79 is a perforated hub 81 of a plate-like member or rod 80, said rod or plate-like member 80 being provided upon its opposite end-portion with an internally screw-threaded socket-like part or member 82. Suitably secured to a portion 83 of the car-body is a plate 84 from which extends a pair of bearing-arms 85 and 86 provided at their free end-portions with bearings, as 87. Mounted in said bearings 87 are the ends of a short stem or rod 88, indicated in dotted outline in Fig. 1 of the drawings, said rod 88 being fixed in place against displacement from said bearings by means of any suitable fastening means. Rotatably arranged upon said rod 88, between the said two bearings 87 is a sleeve 89 with which is suitably connected and from which extends laterally a plate 90, similar in construction to the previously-mentioned plate 52, and provided with suitable guide-flanges 91. Adjustably arranged between the guide-flanges 91 of said plate 90 is a plate-like member or element 92, said member or element 92 being adjustably secured to said plate 90, in the manner set forth in my said former application, Serial Number 718066, by an arrangement of bolts 93 and 94. The opposite end-portion of said adjusting plate-like element or member 92 is provided with an upwardly extending cylindrical bolt or pin 95 with which is pivotally connected against accidental displacement therefrom by means of a pin 96, the perforated hub 98 of a rod or plate-like member 97. Upon its opposite end-portion, the said rod or plate-like member 97 is provided with an internally screw-threaded socket-like portion 99. The reference-character 100 indicates a long connecting rod which is provided with the right and left-hand screw-threaded end-portions 101 and 102 which are screwed into the respective and correspondingly internally screw-threaded socket-like portions 82 and 99 of the plate-like members or rods 80 and 97. Suitably connected with and extending laterally from the upper portion of said sleeve 89 is another crank-arm 103, said arm being provided upon its free end-portion with a cylindrical stud or pin 104. Pivotally connected with said stud or pin 104, and against accidental displacement therefrom by a pin 105, is a member 106 which is provided upon its opposite free end-portion with an internally screw-threaded socket-like portion 107.

The door or gate-carrying rod 14 has suit-

ably secured upon its upper end-portion, by means of a suitable fastening means, the hub-like portion 108 of a crank-arm 109, said arm 109 being provided upon its other end with an upwardly extending cylindrical stud or pin 110. Pivotally connected with said stud or pin 110, against displacement therefrom by a pin 111, is the hub-like portion 113 of a member 112 which is provided upon its opposite free end-portion with an internally screw-threaded socket-like member 114. Connecting the said screw-threaded socket-like portions 107 and 114 is a connecting rod 115 which is provided with the right and left-hand screw-threaded end-portions 116 and 117 which are adapted to be screwed into the respective and correspondingly internally screw-threaded socket-like portions 107 and 114 of the respective members 106 and 112.

From the foregoing description of these last-mentioned parts, it will be clearly evident, that after these various parts of this mechanism have been properly adjusted and secured in their assembled relations, by turning the tubular shaft or member 70 in either direction, the door or gate-carrying rod 14 is also correspondingly rotated, and the door or gate-sections 7 and 6 are brought into their opened or closed relation, and, it will be further understood, that by the turning operation of the said vertical shaft or spindle 32, the other door or gate-operating mechanisms and devices are actuated, so that the door-sections or gates 4 and 5 are brought into their opened or closed positions at the same time, or by operating both crank-arms 36 and 71 at the same time, all the gate or door-sections may be worked simultaneously. It will also be seen, that all the several parts of the mechanism and devices are placed in the upper portion of the vestibuled platform, out of the way of the persons passing onto or from the platform, but are still within easy reach of the workman, so that any part of the mechanism can readily be repaired, when necessary. Furthermore, there being no parts of the mechanism beneath the platform of the car, where they are subjected to dirt and wet, and flying particles of dust and stones, the mechanism is not likely to get out of order, or difficult to operate on account of the bearings and joints located beneath the car becoming quickly clogged with dirt and dust.

I am aware that changes may be made in the general arrangements and combinations of the several devices and parts, as well as in the details of the construction of the said parts, without departing from the scope of the present invention as set forth in the foregoing specification, and as defined in the clauses of the claim which are appended to said specification. Hence, I do not limit my present invention to the exact arrangements and combinations of the several devices and parts as described in the said specification, nor do I confine myself to the exact details of the construction of the said parts, illustrated in the accompanying drawings.

I claim:—

1. In a car, the combination with a pair of doors comprising foldable door-sections, of a door-operating mechanism for singly or simultaneously operating said doors, consisting of brackets secured to and within the vestibule of the car a vertical shaft rotatably mounted in said brackets, a tube-like member rotatably mounted upon said shaft, a door-operating means, consisting of a crank-arm affixed to said vertical shaft, a pair of adjustably connected plate-like members connected with one pair of the door-sections, a connecting rod between said crank-arm and said adjustably connected plate-like members, another crank-arm affixed to said tubular member, a bracket secured to the car body, a second pair of adjustably connected plate-like members pivotally connected with said last-mentioned bracket, a connecting rod between said last-mentioned crank-arm and adjustably connected plate-like members, a third crank-arm connected with one of said last-mentioned plate-like members, another crank-arm connected with the other pair of door-sections, and a connecting rod between the said two last-mentioned crank-arms, substantially as and for the purposes set forth.

2. In a car, the combination with a pair of doors comprising foldable door-sections, of a door-operating mechanism for singly or simultaneously operating said doors, consisting of a pair of rotatable vertical door-supporting rods which carry said foldable door-sections, brackets secured to and within the vestibule of the car, a vertical shaft rotatably mounted in said brackets, a tube-like member rotatably mounted upon said shaft, and a door-operating means, consisting of a crank-arm affixed to said vertical shaft, a pair of adjustably connected plate-like members connected with one of said door-supporting rods, and a connecting operating means between said plate-like members and said crank-arm, another crank-arm affixed to said tubular member, a bracket secured to the car-body, a second pair of adjustably connected plate-like members pivotally connected with said last-mentioned bracket, a connecting rod between said last-mentioned crank-arm and adjustably connected plate-like members, a third crank-arm connected with one of said last-mentioned plate-like members, another crank-arm mounted upon the other door-supporting rod, and a connecting rod be-

tween the said two last-mentioned crank-arms, substantially as and for the purposes set forth.

3. The herein described mechanism for operating a pair of foldable door or gate sections for the platforms of cars, comprising a pair of bearing-brackets secured to the frame-work of the vestibule, a vertical shaft mounted in said bracket, a crank-lever connected with said shaft, a buffer-plate upon one of said brackets, a crank-arm affixed to said vertical shaft, said crank-arm being adapted to be moved into arresting engagement with said buffer-plate, a pair of adjustably connected plate-like members connected with one pair of door-sections, a connecting rod between said crank-arm and said adjustably connected plate-like members, a tubular member rotatably mounted upon said shaft, a second crank-arm affixed to said tubular member, a bracket secured to the car-body, a second pair of adjustably connected plate-like members pivotally connected with said last-mentioned bracket, a connecting rod between said last-mentioned crank-arm and adjustably connected plate-like members, a third crank-arm connected with one of said last-mentioned plate-like members, another crank-arm connected with the other pair of door or gate-sections, and a connecting rod between said two last-mentioned crank-arms.

4. The herein described mechanism for operating a pair of foldable door or gate-sections for the platforms of cars, comprising a pair of bearing-brackets secured to the frame-work of the vestibule, a vertical shaft mounted in said brackets, a crank-lever connected with said shaft, a buffer-plate upon one of said brackets, a crank-arm affixed to said vertical shaft, said crank-arm being adapted to be moved into arresting engagement with said buffer-plate, a pair of adjustably connected plate-like members connected with one pair of door-sections, a connecting-rod between said crank-arm and said adjustably connected plate-like members, said connecting rod consisting of two members, said members being respectively provided with right and left internally screw-threaded sockets, and a rod-like member having right and left screw-threaded end-portions screwed into said sockets, a tubular member rotatably mounted upon said vertical shaft, a second crank-arm affixed to said tubular member, a bracket secured to the car-body, a second pair of adjustably connected plate-like members pivotally connected with said last-mentioned bracket, a connecting rod between said last-mentioned crank-arm and adjustably connected plate-like members, said connecting rod consisting of two members, said members being respectively provided with right and left internally screw-threaded sockets, and a rod-like member having right and left screw-threaded end-portions screwed into said sockets, a third crank-arm connected with one of said last-mentioned plate-like members, another crank-arm connected with the other pair of door or gate-sections, and a connecting rod between said two last-mentioned crank-arms, said connecting rod consisting of two members, said members being respectively provided with right and left internally screw-threaded sockets, and a rod-like member having right and left screw-threaded end-portions screwed into said sockets, substantially as and for the purposes set forth.

In testimony, that I claim the invention set forth above I have hereunto set my hand this 28th day of October, 1912.

EDVARD M. MOLLER.

Witnesses:
FREDK. C. FRAENTZEL,
FREDK. H. W. FRAENTZEL.

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