No. 791,164. PATENTED MAY 30, 1905.

W. R. & R. PITT.

DOOR OPERATING MECHANISM.

APPLICATION FILED DEC. 30, 1904

2 SHEETS—SHEET 1.

Fig. 1.

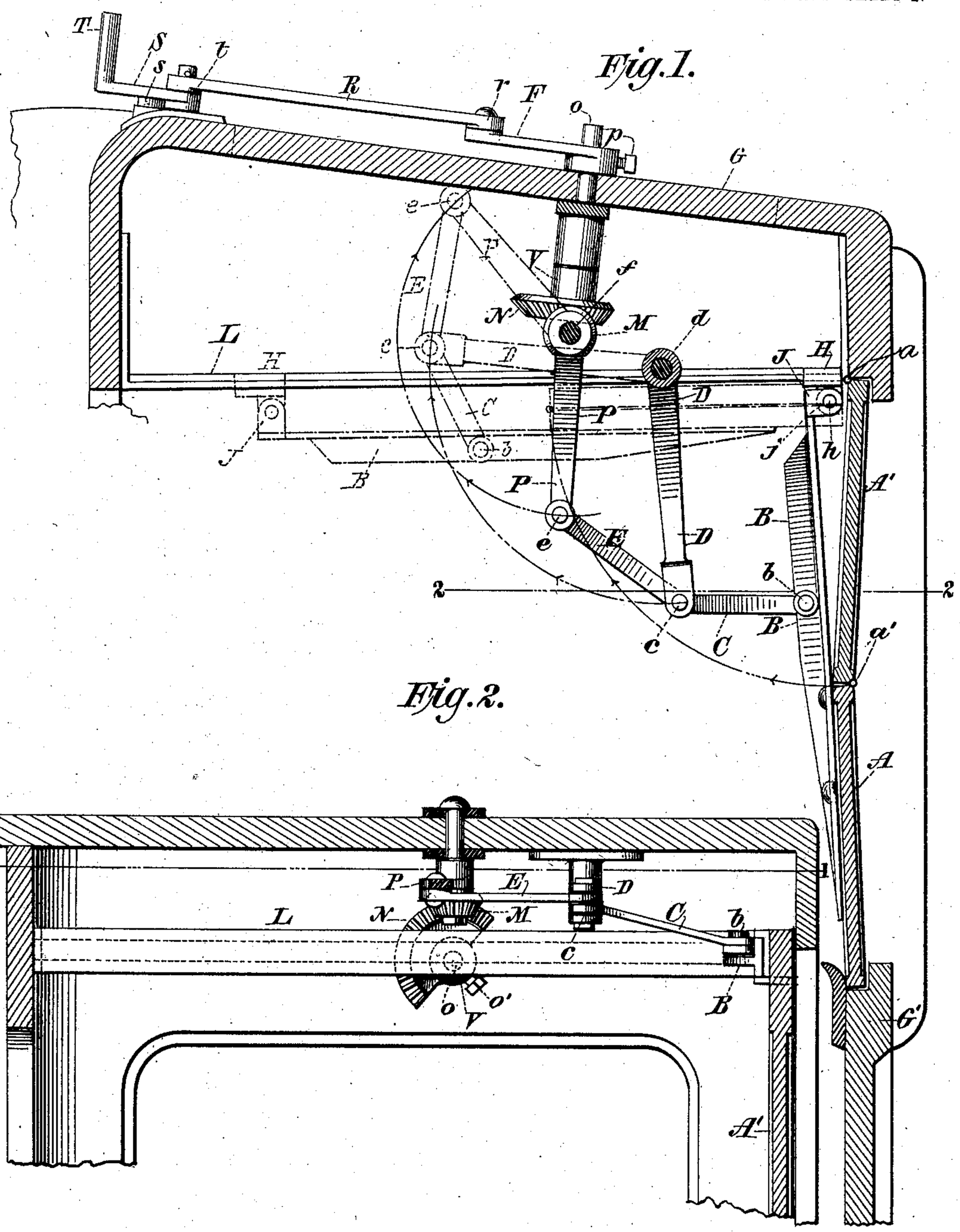

Fig. 2.

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2 SHEETS—SHEET 2.

Fig. 3.

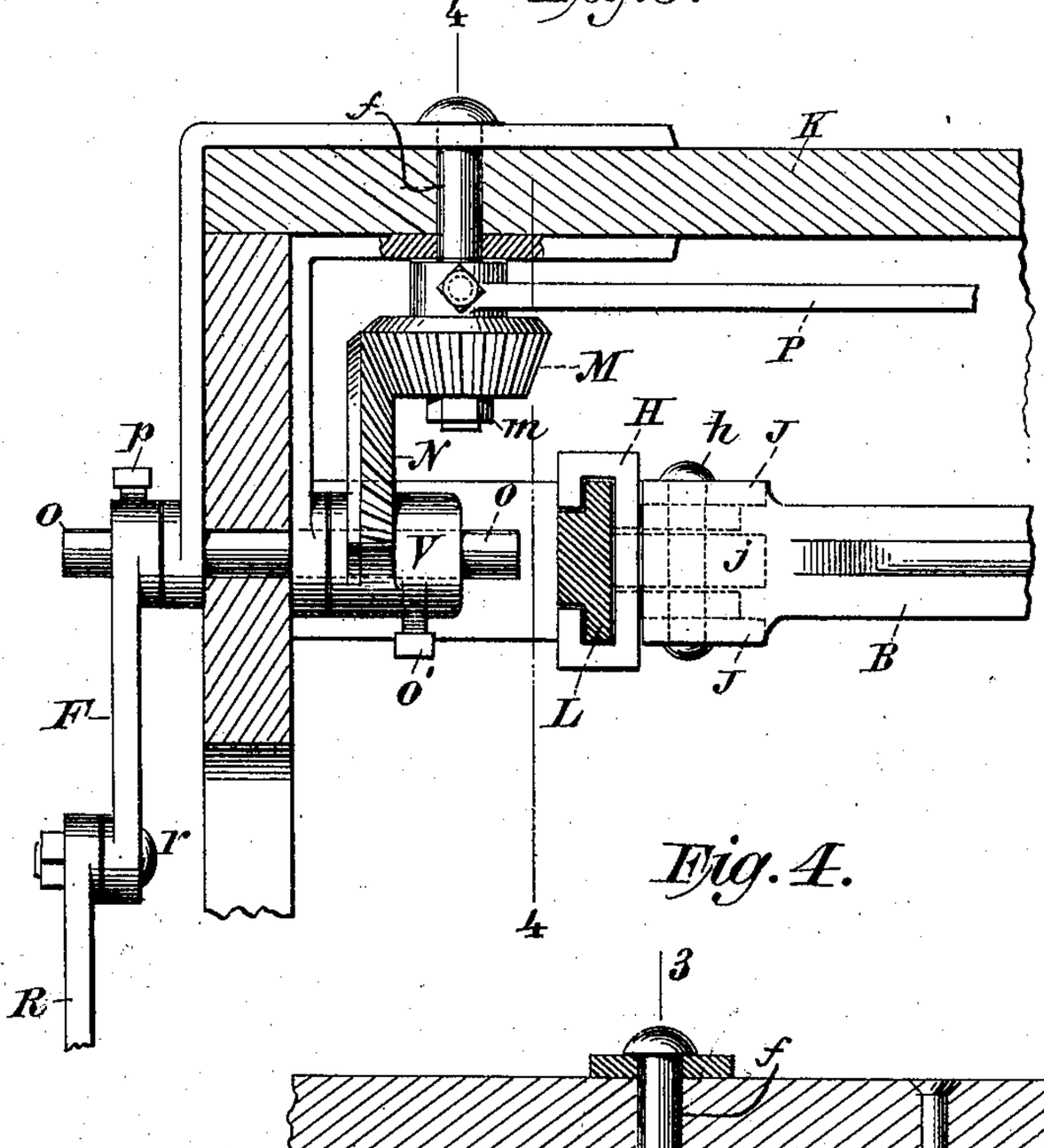

Fig. 4.

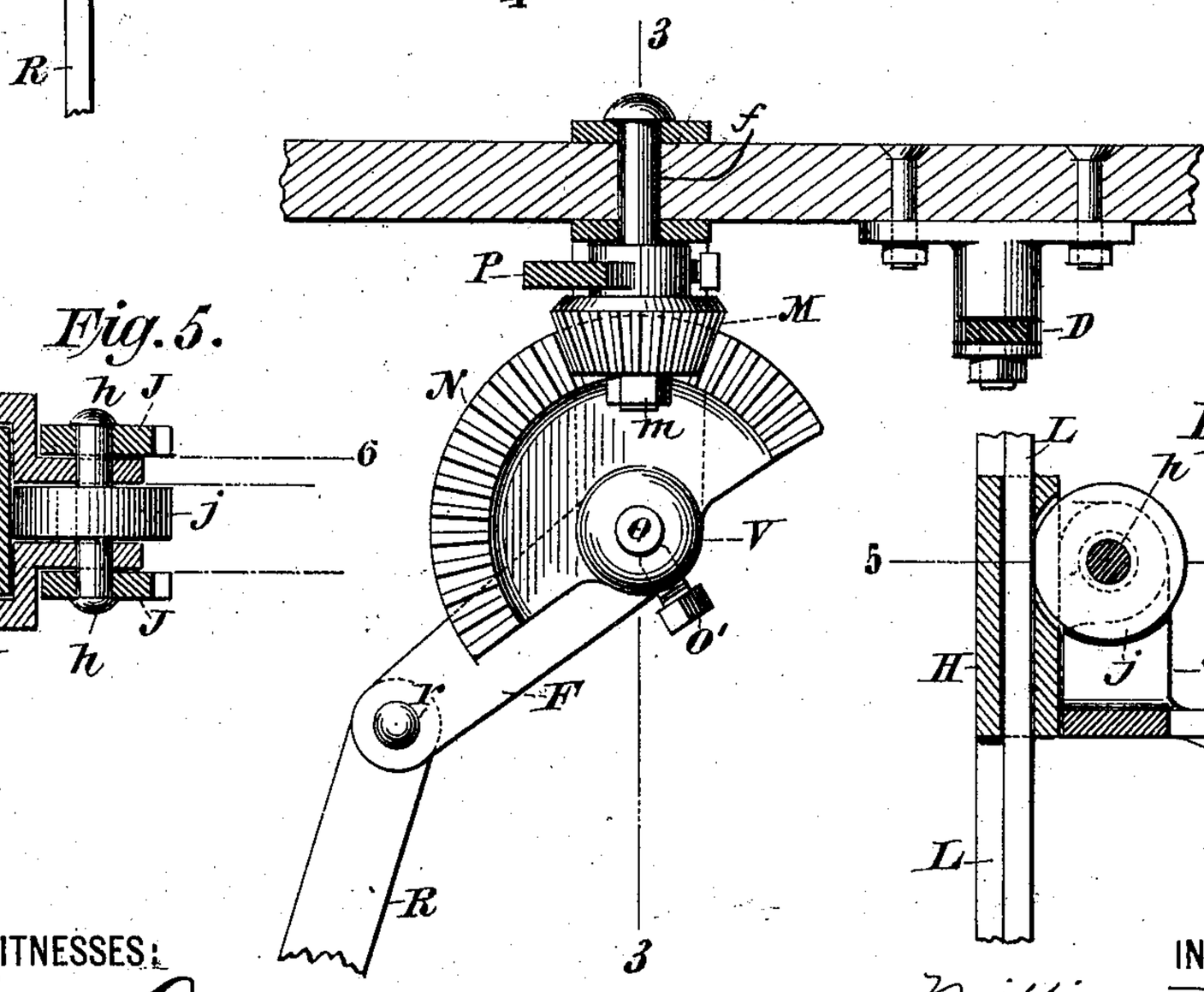

Fig. 5.

Fig. 6.

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UNITED STATES PATENT OFFICE.

WILLIAM R. PITT AND RAFFORD PITT, OF NEW ROCHELLE, NEW YORK, ASSIGNORS TO THE PITT CAR GATE COMPANY, A CORPORATION OF NEW JERSEY.

DOOR-OPERATING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 791,164, dated May 30, 1905.

Application filed December 30, 1904. Serial No. 238,894.

To all whom it may concern:

Be it known that we, WILLIAM R. PITT and RAFFORD PITT, citizens of the United States, and residents of New Rochelle, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Door-Operating Mechanism, of which the following is a full, clear, and exact specification.

Our invention relates to improvements in mechanism for opening and closing the class of doors which are supported at one vertical edge on hinges or other pivotal supports and which are divided vertically into leaves or portions, the said leaves or portions being hinged together and adapted to fold one upon another.

The object of our invention is to furnish a simple mechanism for opening and closing such doors whereby the door itself may occupy the least space as it opens and closes and the operation of the door may be attended with the least possible friction and without danger of any of the parts of the mechanism becoming jammed and refusing to move.

In general terms our invention comprises the combination, with a door divided vertically into leaves or portions which are suitably hinged together and are adapted to fold one upon another, of operating mechanism for said door, consisting of an approximately horizontal bar rigidly attached to the outer leaf of said door and having its heel end pivotally connected to a slide adapted to move on a suitably-supported fixed track, said slide and track, a series of levers connected at one extremity to said horizontal bar and at the other extremity to a suitably-supported vertical rocking shaft, a suitably-supported horizontal rocking shaft having cog connection with said vertical rocking shaft, and suitable operating mechanism connecting with said horizontal rocking shaft.

Our invention may be applied to doors of the class described wherever used, yet it is particularly adapted to be used with such folding doors when the same are installed in street or railway car vestibules.

Our invention is shown in the accompanying drawings, in which similar letters refer to similar parts.

Figure 1 is a horizontal section of a portion of a car-body, taken on the plane of the line 1 1 of Fig. 2. Fig. 2 is a vertical section of the same, taken on the plane of the line 2 2 of Fig. 1. Fig. 3 is an enlarged detail section of the operating-gear, taken on the line 3 3 of Fig. 4. Fig. 4 is an enlarged detail section of the operating-gear, taken on the line 4 4 of Fig. 3. Fig. 5 is an enlarged detail section of a part of the horizontal hinged bar B, taken on the line 5 5 of Fig. 6. Fig. 6 is a detail horizontal section of the horizontal bar B, taken on the line 6 6 of Fig. 5.

We have shown our invention as applied to a door arranged to close the entrance to an exit side of a car-platform, such as is in common use where a passage-way between successive cars of a train is provided for by means of an opening through the central portion of the dashboard. We have shown our invention in connection with a door divided into two leaves or portions substantially equal in width, and this is the preferred form in which we use such doors with our said invention. Doors having a greater number of leaves or folding portions could be employed with our invention without changing its essential operation.

In the drawings, A A′ are two leaves or folding portions of the door, being hinged to each other at *a′* and the inner portion of the door A′ being hinged at *a* to a suitable post or other support in the car-body.

B is a bar, preferably of metal and most conveniently made horizontal, the outer end of which is riveted to the leaf or portion A of the door, its heel end having pivotal connection at *h* with a slide H, adapted to move reciprocally on a fixed track L, supported on the car-body. The pivotal connection between the bar B and the slide H is preferably made by the double flange J, projecting out at right angles from the bar B and connected with the slide H by the pivot *h*. Centrally supported on this pivot *h* is an antifriction-roller *j* of such suitable diameter that when

the slide H is moved along the track L the antifriction-roller will press lightly against the track L and the end of the bar B will be in free contact with the roller.

Supported on the roof of the car-body is a rocking shaft *f*, which bears a horizontal cog-wheel M, which is held rigidly in place upon the rocking shaft *f* by the nut *m* and turns with the rocking shaft.

o is a horizontal rocking shaft supported on the side of the car-platform and projecting through the same.

N is a segment of a cog-wheel carried on a sleeve V, supported by shaft *o*, said sleeve being held in place by a set-screw *o'*. The cog-wheel M and the cog-segment N are cut conically and engage with each other at right angles, so as to convert the vertical motion of the rocking shaft O into the horizontal motion of the rocking shaft *f*.

C is a lever pivoted at *b* to the horizontal bar B.

P is a lever rigidly connected with the rocking shaft *f* and turning with it.

E is a pitman or link having pivotal connection with the levers C and P.

D is a link or arm pivoted at the junction of the levers C and pitman E, the three meeting in a common joint at *c*. The other end of the arm or link D is supported by the pivot *d*, secured to the roof of the platform.

S is a bell-crank lever pivoted to the side of the car-body at *s* and having a handle T. To the small arm of the lever S at *t* is pivoted a pitman-lever R, which at its other extremity is pivoted at *r* to an operating-arm F, rigidly connected with the horizontal rocking shaft *o* by the screw *p*.

The operation of our invention is as follows: Assuming that the door is closed and that it is desired to open the same, the handle T is pressed down. This raises the shorter arm of the angular lever S, and with it the pitman R, which in turn pushes up the operating-arm F. This revolves the rocking shaft *o*, through which the motion is transmitted to the series of levers P, E, and C and by them to the bar B and the door. As the cog-wheel M revolves the levers and the horizontal bar B, carrying with it the door, move into the positions shown in dotted lines in Fig. 1. The slide H and the pivotal connection, already described, between it and the bar B make the passage of the bar B sufficiently smooth and free from friction and at the same time compel the bar B to follow a predetermined path. The two leaves of the door fold upon themselves as the door B moves to its extreme open position. When the door is to be closed, the reverse action of all the parts takes place, beginning with the raising up of the hand-lever T.

Having described our invention, what we claim, and desire to secure by Letters Patent, is—

1. The combination with a door divided vertically into leaves or portions which are suitably hinged together and are adapted to fold one upon the other; of operating mechanism for said door consisting of a bar attached to the outer leaf of said door, a series of levers connected at one extremity to said bar and at the other extremity to a suitably-supported vertical rocking shaft, a suitably-supported horizontal rocking shaft, having cog engagement with said vertical rocking shaft, and suitable operating mechanism connected with said horizontal rocking shaft, substantially as described.

2. The combination with a door divided vertically into leaves or portions which are suitably hinged together and are adapted to fold one upon the other; of operating mechanism for said door, consisting of an approximately horizontal bar rigidly attached to the outer leaf of said door and having its heel end pivotally connected to a slide adapted to move on a suitably-supported fixed track; the said slide and track; a series of levers connected at one extremity to said horizontal bar and at the other extremity to a suitably-supported vertical rocking shaft; a suitably-supported horizontal rocking shaft having cog connection with said vertical rocking shaft, and suitable operating mechanism connected with said horizontal rocking shaft, substantially as described.

3. In the vestibule of a street or railway car, the combination with a door hinged at one edge to the car-body and divided vertically into leaves or portions which are suitably hinged together and are adapted to fold one upon the other; of operating mechanism for said door consisting of a horizontal bar rigidly attached at its outer end to the outer leaf of said door, and having its heel end pivotally connected with a slide adapted to move on a fixed track; the said slide and the fixed track suitably supported on the car-body; a series of straight levers pivotally joined to each other and connected pivotally at one extremity to said horizontal bar and rigidly at the other extremity to a vertical rocking shaft supported on the roof of the platform; a bar or link pivoted at one end to the under side of the platform-roof and at the other end having pivotal connection with two of said series of levers and meeting in a common joint with their overlapping ends; a horizontal rocking shaft supported at the side of the car-platform; cog-wheels on said vertical and horizontal rocking shafts adapted to engage with each other; and suitable operating mechanism connected with said horizontal rocking shaft, substantially as described.

4. In the vestibule of a street or railway car, the combination with a door hinged at one edge to the car-body and divided vertically into leaves or portions which are suitably hinged together and are adapted to fold

one upon the other, of operating mechanism for said door consisting of a horizontal bar rigidly attached at its outer end to the outer leaf of said door, and having its heel end pivotally connected with a slide adapted to move on a fixed track; the said slide and the fixed track suitably supported on the car-body; an antifriction-roller supported between said slide and the heel end of said horizontal bar; a series of three levers, one being pivoted to said horizontal bar and one rigidly connected to a vertical rocking shaft supported on the roof of the platform and these two levers being pivotally connected by a link or pitman; a bar or link working at one end on a pivot secured to the under side of the platform-roof and at the other end having pivotal connection with the lever pivoted to the horizontal bar and with the said pitman at their common joint; a horizontal rocking shaft supported in the side of the car-platform; cog-wheels on said vertical and horizontal rocking shafts adapted to engage with each other and to transmit motion from the operating-lever; and a compound operating-lever on the outer end of the car-platform, consisting of an angular hand-lever, a pitman-lever having pivotal connection with the short arm of said hand-lever, and an operating-lever pivoted at one end of the pitman-lever and at the other end rigidly connected with the horizontal rocking shaft, substantially as described.

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