

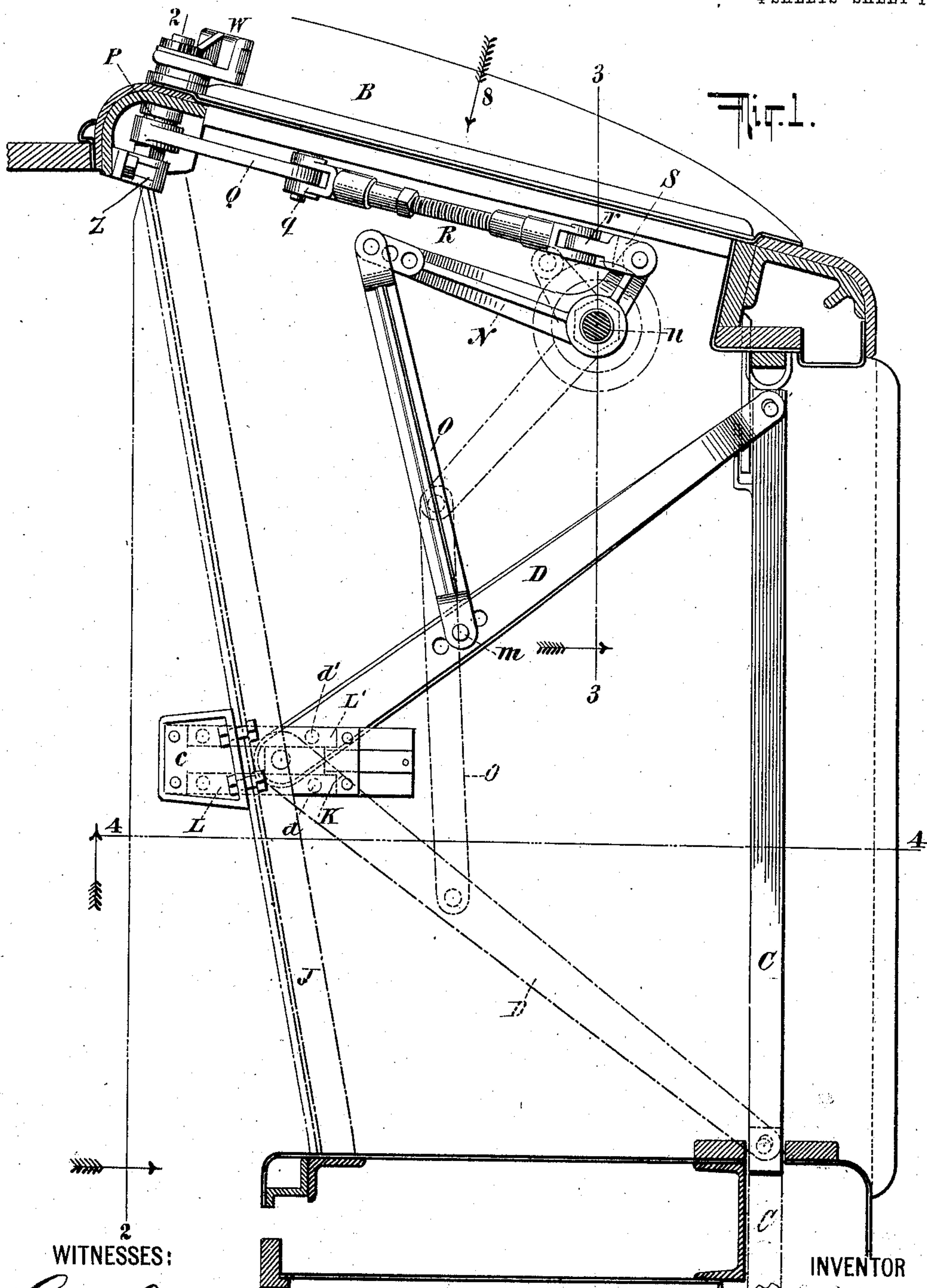
No. 791,184.

PATENTED MAY 30, 1905.

M. COSSEY.
DOOR OPERATING MECHANISM.

APPLICATION FILED NOV. 5, 1904.

4 SHEETS—SHEET 1.



WITNESSES:

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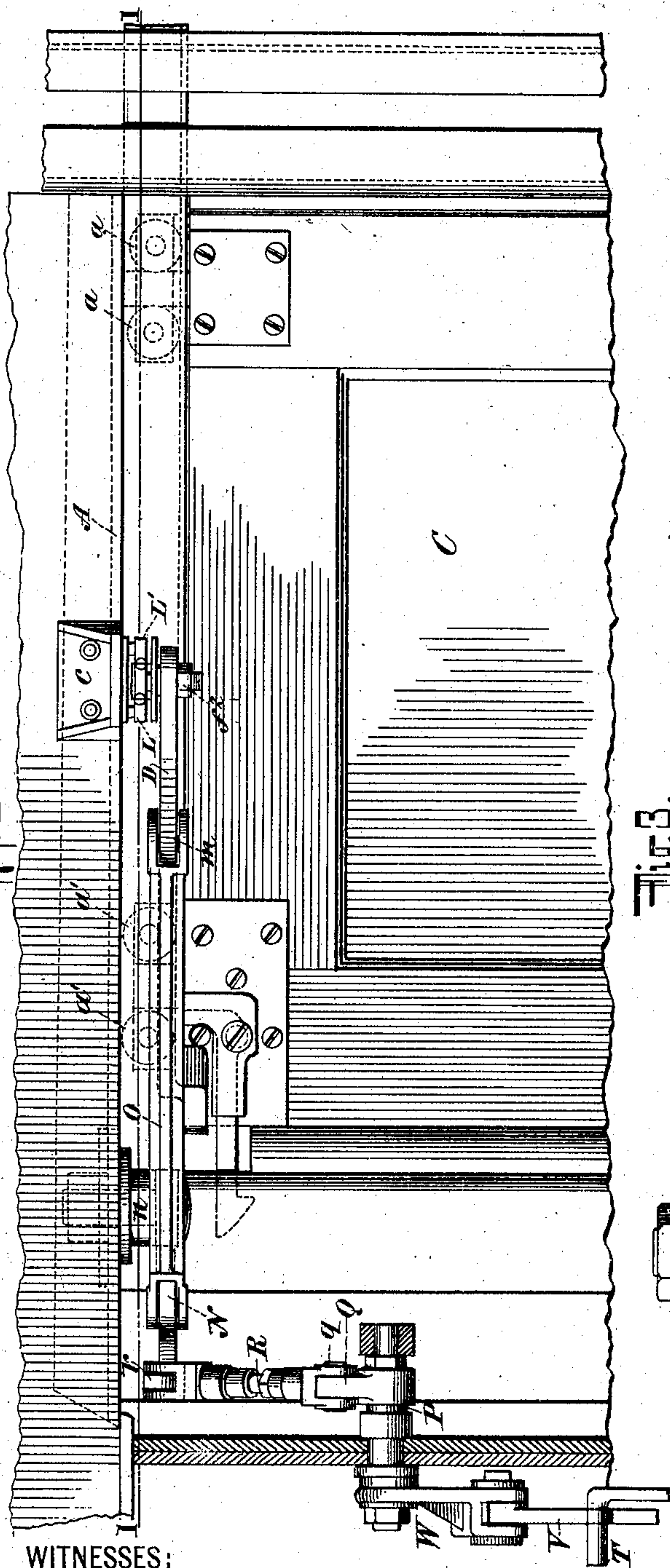
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Fig. 2.

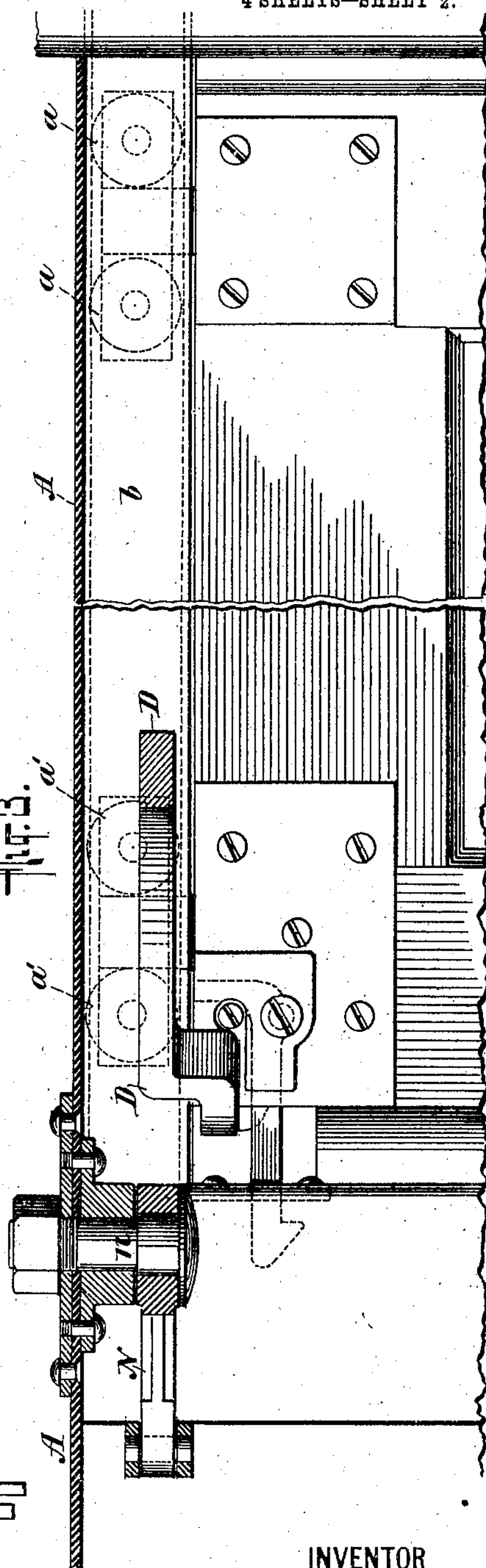


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Fig. 3.



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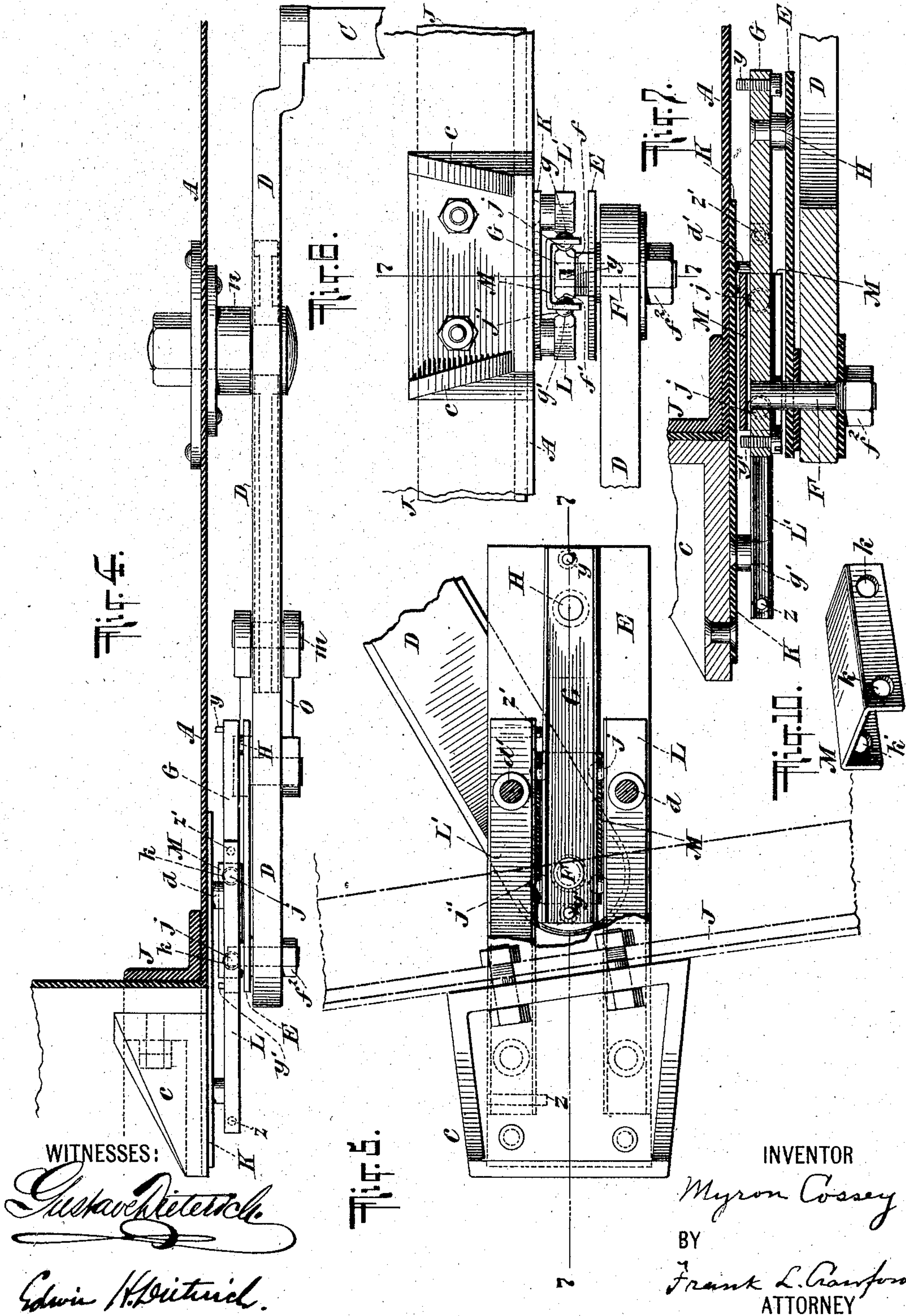
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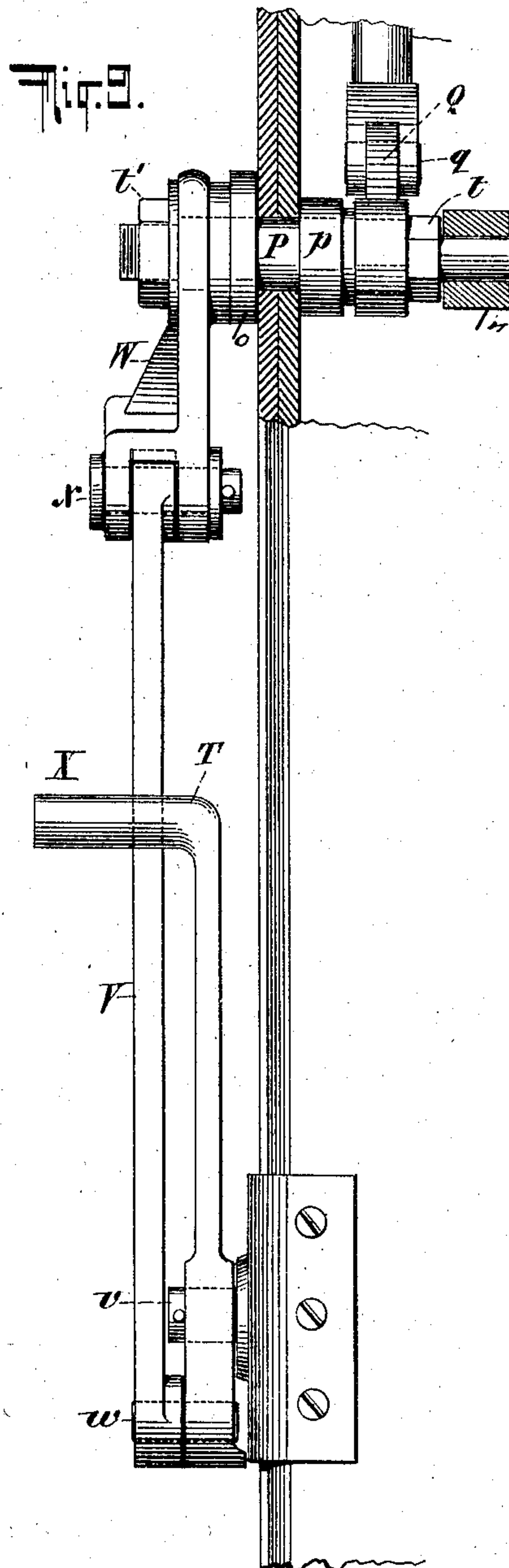
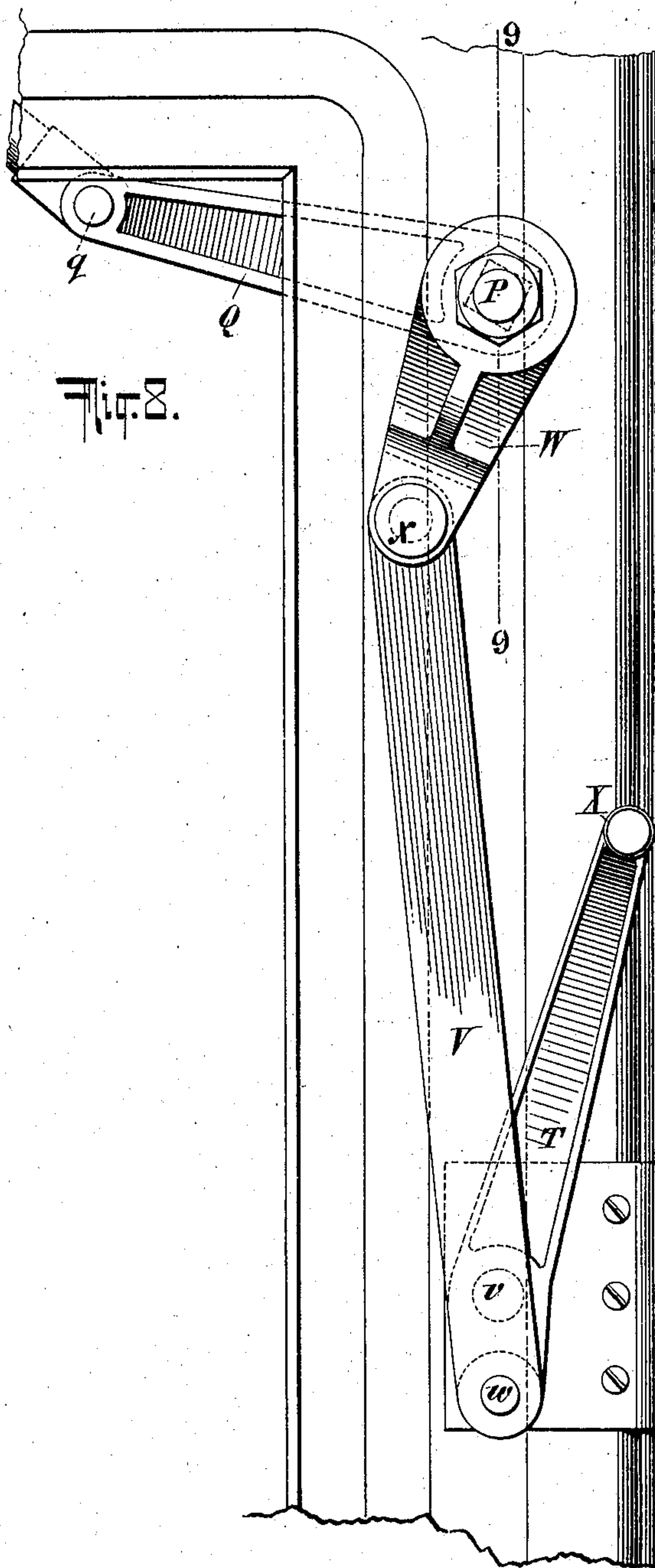
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UNITED STATES PATENT OFFICE.

MYRON COSSEY, OF BROOKLYN, NEW YORK, ASSIGNOR, BY MESNE ASSIGNMENTS, TO WILLIAM R. PITT, OF NEW ROCHELLE, NEW YORK.

DOOR-OPERATING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 791,184, dated May 30, 1905.

Application filed November 5, 1904. Serial No. 231,602.

To all whom it may concern:

Be it known that I, MYRON COSSEY, a citizen of the United States, residing in the borough of Brooklyn, in the county of Kings 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.

The invention herein described relates to improvements in operating mechanism for suspended sliding doors or gates such as those used on car-platforms, where the said mechanism engages the sliding door or gate in approximately the horizontal plane of its line of suspension. In the mechanism heretofore used for operating such sliding doors the door has been directly engaged by a horizontal lever the inner end of which is provided with a long slot by which the lever engages with a pivot attached to the roof of the platform. As the door was opened or closed this horizontal lever moved longitudinally back and forth along the said pivot so far as the length of the slot would permit. When the door was about half opened, the end of the slot nearest to the door would be approximately in contact with the fixed pivot, so that the distance from the pivot to the point where the horizontal lever was attached to the other operating parts of the mechanism, which portion formed one arm of the horizontal lever, became very short. The result was that when the door reached its middle position it would frequently stick and have to be further pushed or closed by hand, because that part of the horizontal lever between its point of attachment with the other operating mechanism and the end of the slot nearest to the door, as above described, did not furnish sufficient leverage to carry the horizontal lever past its dead-center.

The object of my invention is to substitute a movable fulcrum for the fixed pivot referred to, whereby the length of the shorter arm of the horizontal lever will remain uniform; also, to provide antifriction devices whereby the reciprocating longitudinal motion of the horizontal lever is rendered substantially frictionless.

In general terms, my invention comprises operating mechanism for a suspended sliding door or gate, which mechanism engages said door in approximately the horizontal plane passing through its line of suspension, said operating mechanism consisting of a horizontal lever pivotally attached to a movable plate, which plate engages movably by suitable antifriction devices with supports on the roof or hood of the car-platform, so that the horizontal lever has limited longitudinal and free pivotal movement, a series of levers connected at one extremity to said horizontal lever and suitably supported at the other extremity upon the car-body, and suitable means for operating said levers.

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

Figure 1 in the drawings is a horizontal section of a part of a car-body, taken on the plane of the line 1 1 of Fig. 2. Fig. 2 is a vertical longitudinal section on the plane of the line 2 2 of Fig. 1 and looking in the direction of the arrow. Fig. 3 is a similar section on the plane of the line 3 3 in Fig. 1 looking in the direction of the arrow. Fig. 4 is a vertical cross-section on the line 4 4 of Fig. 1 looking in the direction of the arrow. Fig. 5 is a detail enlarged view of the sliding mechanism. Fig. 6 is an end view of the same. Fig. 7 is a longitudinal section of the sliding mechanism, taken on the plane of the line 7 7 of Figs. 5 and 6. Fig. 8 is a detail exterior view of one form of operating-levers looking in the direction of the arrow 8 of Fig. 1. Fig. 9 is a vertical section of the same, taken on the line 9 9 of Fig. 8. Fig. 10 is a detail perspective view of the carrier M.

A is the hood or roof of the car-platform.

B is the outer end of the platform.

C is a sliding door suspended overhead in any suitable or well-known manner. For convenience, we have shown the door supported by the wheels *a a a'*, running on an overhead track *b*, attached to the roof A of the platform; but other suitable means for supporting the sliding door may be employed

without affecting my invention. These wheels are omitted in Fig. 1, so that the remaining parts may be shown with greater clearness.

D is a lever, preferably horizontal, one of whose ends engages pivotally with the sliding door at its outer edge and substantially in the horizontal plane passing through its line of suspension. The other end of the lever D is pivoted to a plate E by a pivot F, which passes through the plate E and into and through a grooved rail G, which rail G is rigidly attached to the plate E by the pivot F and the bolt H. The pivot F serves to bolt the plate E and the rail G together, it being rigidly connected with each of them. The rail G and the plate E form a sliding carriage for the support of the horizontal lever D, which having one end loosely pivoted on the pivot F slides back and forth longitudinally a limited distance with the sliding carriage and moves freely in a pivotal motion about the pivot F, which itself slides back and forth with the carriage formed by the grooved rail G and the plate E.

J is an angle-iron supported from the roof of the platform.

c is a brace for the angle-iron J.

K is a plate rigidly attached to the roof of the platform, extending from which are two fixed rails L L', connected with the plate K by the bolts d d'. The rail G is grooved on each side at f f', and the fixed rails L L' are correspondingly grooved at g g', so that the corresponding grooves in the fixed and movable rails will form channels of circular concavity and of suitable diameter to receive anti-friction-balls j j' and to allow said balls to revolve freely and move back and forth in said channels, thus forming ball-bearings. These balls are guided and kept in place by a U-shaped guide or ball-carrier M, formed of a plate bent over the movable rail G and sliding with it, but detachably and at a lower rate of speed. In the depending members of this guide are circular openings or perforations k k', which at once support the balls and allow them to revolve freely. The motion of the sliding carriage is limited by the stops y y' on the sliding rail G, which take alternately against either end of the ball-carrier M. At the same time the carrier M, which moves back and forth with the sliding carriage, but at a less rate of speed, has its longitudinal movement limited by the stops z z', which project inwardly from the fixed grooved rail L'.

f² is a set-nut holding the end of the lever D in place on the pivot F.

It results from this arrangement of parts that the distance between the pivot F and the pivot m, by which the lever D is attached to the rest of the operating mechanism, is always the same, or, in other words, the length of the shorter arm of the lever D being the distance from the fulcrum F to the point m where the power is applied is uniform, the fulcrum be-

ing movable instead of being fixed, as in the mechanism of similar apparatus heretofore in use. Consequently there is no tendency for the lever D to become set on a dead-center nor for the door to stick when opening and closing. On the contrary, with my improved mechanism just described the door moves with the most absolute certainty and freedom from the full-open position to the full-closed position and the reverse. This action is of course materially assisted by the antifriction devices just described.

N is a bell-crank lever pivoted at n on the roof of the platform.

O is a pitman-lever connecting the longer end of the bell-crank lever N with the horizontal lever D.

P is a rocking shaft suitably mounted in the end of the platform.

p is a shoulder on the rocking shaft.

o is a washer.

To the rocking shaft P is secured a lever Q, having a swivel connection q with the lever R, and the last-named lever has a swivel connection at r with a short lever S, pivoted to the short arm of the bell-crank lever N.

t t' are set-nuts.

One end of the rocking shaft P extends through the bracket Z, by which it is partially supported.

T is a bell-crank hand-lever pivoted at v and having its short arm pivoted at w to a pitman-lever V, which connects the hand-lever with the short lever W, to which the lever V is pivoted at x. The lever W is rigidly attached to the rocking shaft P.

The operation of the mechanism described is as follows: The operator standing on the platform presses the handle X of the hand-lever T. This throws out the short arm of the hand-lever and with it the pitman-lever V, which correspondingly pushes up the lever W. As the handle X descends the rocking shaft P revolves, and the motion is transmitted through the other levers described so as to move the long arm of the bell-crank lever N toward the middle of the platform, carrying with it the lever O, which pushes directly upon the horizontal lever D, which in turn pushes upon the door. As these motions are continued the door slides from the closed position to the open position, the inner end of the lever D moving with the sliding mechanism above described into its extreme position, as shown in dotted lines in Fig. 5. As the door passes the middle point the carriage formed by the sliding rail G and the plate E moves back and forth, carrying with it the end of the horizontal lever D, so that when the door is fully open the carriage and the corresponding end of the lever D are in the position shown in Fig. 7. When it is desired to close the door, the handle X is raised and the motion of all the parts is reversed.

In practice the described apparatus would

be duplicated at the opposite side of the platform and each car-platform would be similarly provided with a set of sliding doors and devices for operating them. The trainman standing in the usual way with his feet on the two abutting platforms can open both sliding doors from the same side at once. The doors slide back into the car, suitable space being provided for that purpose, as shown. The door-operating mechanism is so placed or located in respect to the car, the side passageway, and all moving parts of the car mechanism that its operation does not in any way interfere with the structural arrangement of the car or the operation of its moving parts or the convenience of the passengers. The door is locked in its closed position by pushing the hand-lever T over until the handle X rests against the pitman-lever V.

I have described above a series of levers connecting the horizontal lever D with the rocking shaft P, which by itself forms no part of my invention, but which is suitable to operate the sliding car-door in conjunction with the sliding mechanism and the lever D hereinbefore described. I have also shown and described a compound operating-lever attached to the rocking shaft and serving as a means for turning the rocking shaft, and so actuating the said series of levers; but said compound lever separately considered is also no part of my invention, as other combinations of levers may be employed for connecting the lever D with a suitable support on the car-body and other operating-levers or other suitable means for setting in motion the series of levers connecting the horizontal lever D with the support on the car-body may be employed without affecting my invention.

I do not broadly claim operating mechanism for a suspended sliding door which engages the door in the plane of the line of suspension, which operating mechanism consists of a series of levers connected with a horizontal lever, one end of which engages the door and the other is so attached to the door or roof of the platform as to have limited longitudinal and free pivotal motion, as I am aware that mechanism accomplishing this result is already in use, as is shown particularly in the patent to Gibbs and Pearson, No. 731,676; but

What I do claim, and desire to secure by Letters Patent, is—

1. In the platform of a street or railway car having a suspended sliding door, operating mechanism for said door engaging the same in approximately the horizontal plane of its line of suspension, said operating mechanism consisting of a horizontal lever attached to a movable plate which engages movably by suitable antifriction devices with supports attached to the roof or hood of the platform, so

that said lever has limited longitudinal movement and a free pivotal movement about a movable fulcrum; a series of levers connected at one extremity with said horizontal lever and at the other extremity to a suitable support on the car-body; and suitable mechanism for operating said series of levers substantially as described.

2. In the platform of a street or railway car having a suspended sliding door at one side thereof, operating mechanism for said door engaging the same in approximately the horizontal plane passing through its line of suspension, said operating mechanism consisting of a substantially horizontal lever pivoted on a sliding plate carrying a grooved rail, which rail engages by suitably-supported antifriction-rollers with reciprocally-grooved fixed rails attached to the roof or hood of the platform, so that the horizontal lever has a relatively frictionless longitudinal movement of limited extent and free pivotal movement about a movable pivot; in combination with a series of levers connected at one extremity to said horizontal lever and at the other extremity to a suitable support on the car-body; and suitable means for operating the said series of levers substantially as and for the purposes set forth.

3. In the platform of a street or railway car having a suspended sliding door at one side thereof, operating mechanism for said door engaging the same in approximately the horizontal plane passing through its line of suspension, said operating mechanism consisting of a horizontal lever pivoted on a sliding plate carrying a grooved rail, which grooved rail engages with reciprocally-grooved fixed rails by means of balls supported between the reciprocal grooves by a guide, said guide being loosely supported by the sliding rail and having plates projecting downward between the members of each pair of reciprocal grooves, said plates having perforations through which the balls revolve, and the fixed rails being suitably attached to the roof or hood of the platform, so that the pivoted end of the horizontal lever has a reciprocating longitudinal movement limited in extent and a free pivotal movement about a pivot or fulcrum which moves reciprocally with the sliding plate; in combination with a series of levers connected at one extremity to said horizontal lever and at the other extremity to a suitable rocking shaft supported on the car-body, and a suitable operating-lever connected to said rocking shaft, substantially as and for the purposes set forth.

MYRON COSSEY.

Witnesses:

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