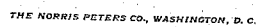


965,770.

Patented July 26, 1910.

3 SHEETS—SHEET 1.

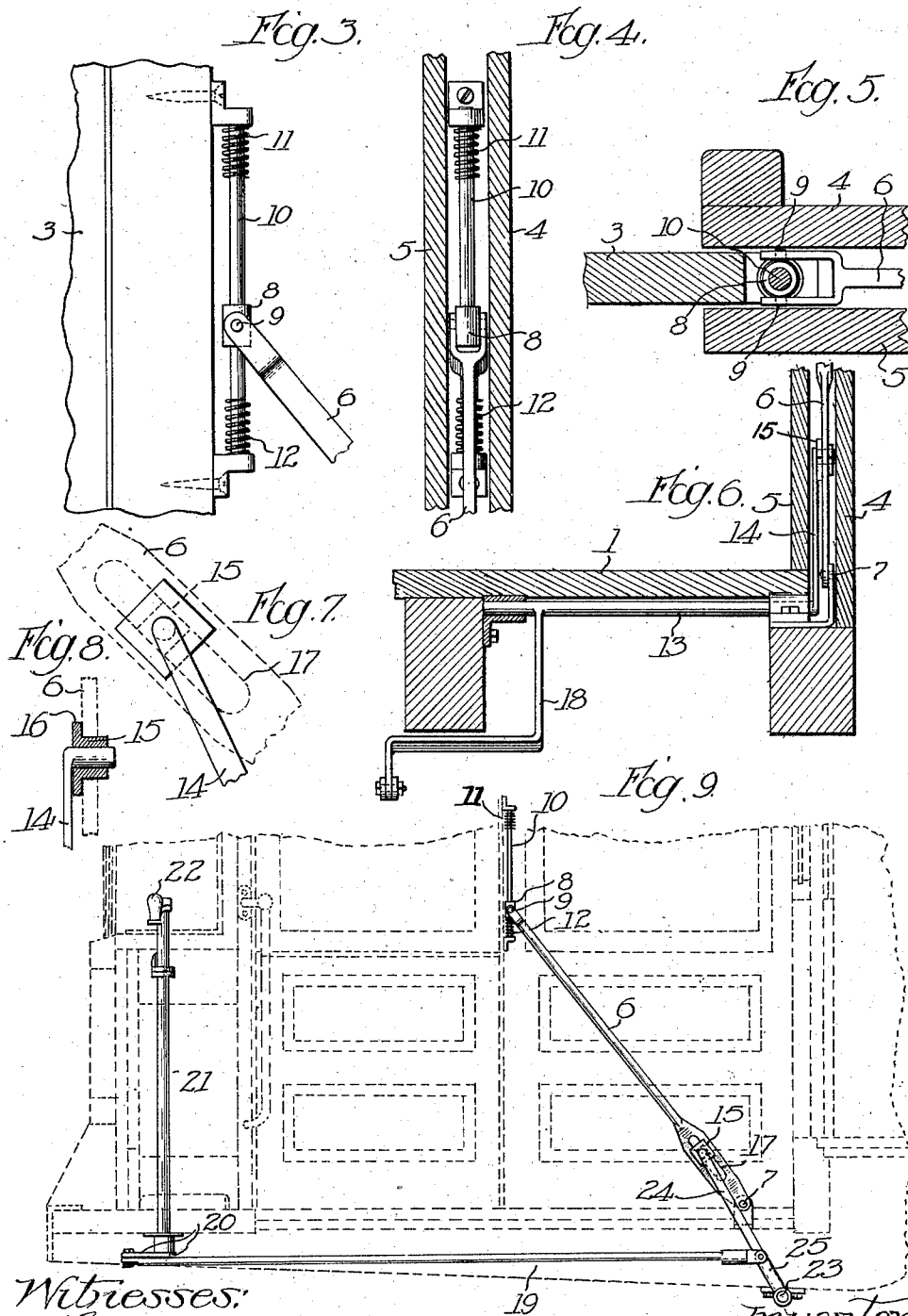


G. W. VOIGT.
MECHANISM FOR OPENING AND CLOSING CAR DOORS.
APPLICATION FILED OCT. 30, 1909.

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3 SHEETS—SHEET 2.



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3 SHEETS—SHEET 3.

Fig. 10

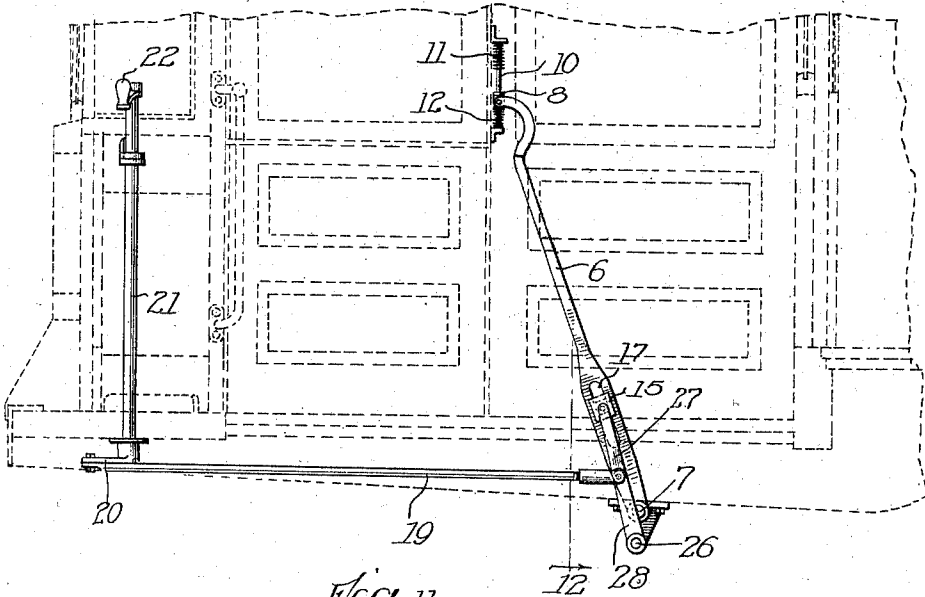


Fig. 11.

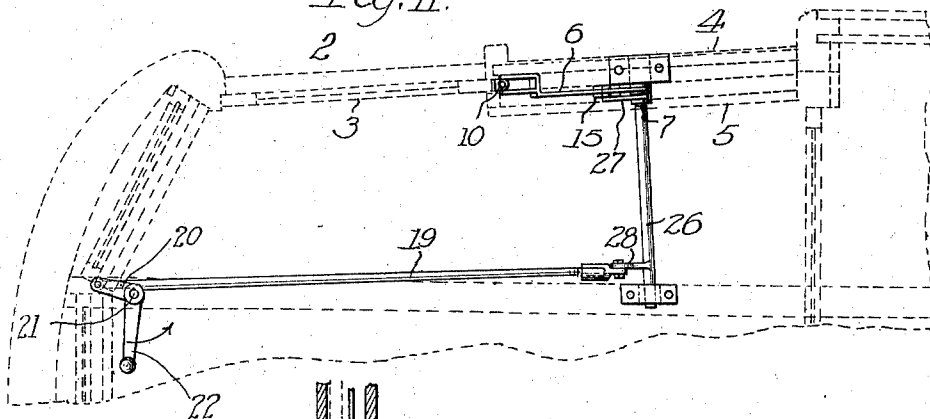
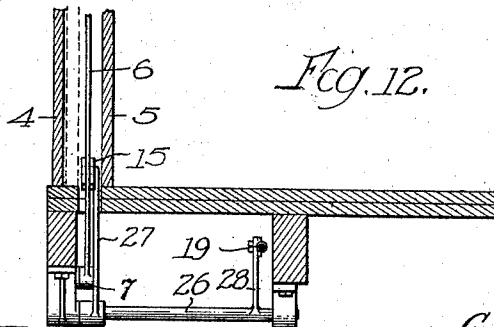


Fig. 12.



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UNITED STATES PATENT OFFICE.

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MECHANISM FOR OPENING AND CLOSING CAR-DOORS.

965,770.

Specification of Letters Patent.

Patented July 26, 1910.

Application filed October 30, 1909. Serial No. 525,415.

To all whom it may concern:

Be it known that I, GEORGE W. VOIGT, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Mechanisms for Opening and Closing Car-Doors, of which the following is a specification.

This invention relates especially to means for opening and closing the exit doors of railway cars that are arranged for the payment of fares as the passengers enter, the objects of the invention being to provide simple, inexpensive door-operating means which may be attached to cars not originally provided with door-operating means without making extensive changes in the construction of the car; which shall be arranged for convenient operation by the motorman; and which is strong and not liable to derangement by reason of rough usage.

In the accompanying drawings, Figure 1 is an elevation of the front end or inclosed platform of a car equipped with door-operating mechanism embodying my invention. Fig. 1^a illustrates a stop device for limiting movement of the actuating staff of the door-operating mechanism. Fig. 2 is a top plan view of said door-operating mechanism. Figs. 3, 4 and 5 are details of the connection between the operating mechanism and the door. Fig. 6 is a fragmental sectional view illustrating a portion of the door-operating mechanism. Figs. 7 and 8 are detail views of the connection between the operating shaft and the lever attached to the door. Fig. 9 is a view similar to that of Fig. 1, but illustrating a modified construction. Fig. 10 is a similar view illustrating a further modification or alternate construction. Fig. 11 is a top plan view of the mechanism shown in Fig. 10. Fig. 12 is a sectional view taken in the plane of dotted line 12 of Fig. 10.

In Fig. 1 the platform of the car is indicated at 1, said platform being inclosed or vestibuled in the usual manner, and having an exit doorway 2. (See Fig. 2.) A slidably supported door 3, which is shown in Figs. 1 and 2 as being in closed position, is arranged to slide into the space between the panels 4 and 5 forming a part of the inclosing wall. The means for sliding the door into and out of said space so as to open and close the doorway 2 comprises a lever 6 pivotally supported at 7 upon a suitable stationary bearing structure and located be-

hind the door and between the panels 4 and 5. The lever 6 is forked or bifurcated at its upper end. A sleeve or collar 8 is arranged to swing upon pivots 9 in the forked upper end of the lever 6, said sleeve being slidable upon a rod 10 secured in a vertical position on the inner or rear edge of the door 3. It will be seen that as the lever 6 is swung upon its pivot, the door 3 will be slid into open or closed position. Suitable means may be provided for cushioning the opening and closing movements of the door. I have herein shown coiled springs 11 and 12 surrounding the rod 10 and fixed in position to be engaged by the ends of the sleeve 8, said sleeve impinging upon and compressing the spring 11 as the door nears the end of its opening movement, and impinging upon and compressing the spring 12 as the door approaches its closed position. The buffer action of the spring 12 is sufficient to check or retard the movement of the door and thus prevent injury to a passenger by reason of slamming.

Supported adjacent to the pivot of the lever 6 and extending transversely of the car is a rock shaft 13 having a crank arm 14 fixed thereon and extending upwardly within the space between the panels 4 and 5. Upon the upper end of the arm 14 is pivoted a square block 15 having a retaining flange 16, said block being slidable within an elongated opening 17 in the lever 6. Said block is preferably made square as shown, in order that, when two opposite edges have become worn, the block may be removed from the slot, turned to present the two other edges in position for service, and replaced. Fixed upon the rock shaft 13 is a downwardly extending crank arm 18 which is connected by means of a link 19 with a crank arm 20 upon the lower end of an operating staff or vertical rock shaft 21. On the upper end of said rock shaft is a handle or crank arm 22 by means of which the staff may be rocked by the motorman to open and close the door. The link 19 extends beneath the floor of the car, as shown in Fig. 1.

The swinging movement of the handle 22 may be limited in one direction by suitable means, such as a collar 21^a fixed on the staff 21 and provided with a lug 21^b adapted to engage a stationary stop portion 21^c.

For operating the door I use a vertical rock shaft or staff, as shown, because by means of it the length of movement of the

operating element (the crank 22) is reduced as much as possible, thereby preventing interference with passengers standing upon the platform; because with a staff there is no objectionable slot or opening in the floor; and because with an oscillatory element, such as the crank arm 20, no special means for locking the door in closed position is necessary, a locking action being obtained by swinging said crank arm 20 slightly over center. Wear and other causes may make it necessary to alter the length of the link 19 in order to preserve such locking action. I, therefore, may provide suitable means for adjusting the length of the link 19, as, for example, by using a socket 19^a having a screw-thread connection with the body of the link.

In some cases it may be desirable to locate the link 19 in a higher plane than that shown in Fig. 1, in order to prevent interference with fenders, hand brakes, rheostats, or the like placed beneath the platform. In such cases, the construction shown in Fig. 9 may be employed. The rock shaft 23 is represented in Fig. 9 as being located adjacent to the lower edge of one of the beams of the platform and at some distance below the pivot 7 for the door-operating lever. The upwardly extending crank arm 24 upon the shaft 23 engages said door-operating lever in the same manner as has already been described in connection with Figs. 1 and 2. Upon or adjacent to the inner end of the rock shaft 23 is an upwardly extending crank arm 25 which is connected by means of the link 19 with the crank arm 20 upon the lower end of the operating staff 21.

When the platform is too short to render practicable the mounting of the lever 6 behind the door, it may be desirable to place the lever at the side of the path of movement of the door and arrange the door to travel past said lever when going into open position. Such a construction is shown in Figs. 10, 11 and 12. Therein the lever 6 is shown as pivoted at 7 so as to extend upwardly within the space between the panels 4 and 5 and at one side of the path of movement of the door. To permit of so locating the lever 6, it may be necessary to move the panel 5 a slight distance to provide increased space between the two panels. The rock shaft 26 is located adjacent to the pivot 7 and sufficiently far below the platform to provide space for an upwardly-extending lever of sufficient length to afford the requisite leverage or movement. The crank arm upon the shaft 26 which engages the lever 6 is indicated at 27, while the upwardly-extending

crank arm to which the link 19 is attached is designated by 28.

It will be understood that in the various forms of mechanisms herein shown the door may be easily and conveniently moved by the motorman by operating the handle 22. In the form shown in Figs. 1 and 9 no alterations are necessary in applying the mechanism to the car, except, possibly, to form an opening in the floor between the panels 4 and 5 through which the crank arm 14 or 24 may extend, and to provide an opening in the platform through which the staff 21 passes. The only additional change necessary in installing the form of mechanism shown in Fig. 10 is to space the panel 5 inwardly to a slight extent.

By placing the crank shaft below the axis of the door-operating lever 6, and providing a crank arm on said shaft to engage the lever, it is possible to operate the door with a relatively short movement of the handle 22 and yet have sufficient leverage to permit of easy operation.

It will be noted that the shaft 13 or 23 or 26 is not positively connected to the door-operating lever 6, hence there is sufficient freedom of movement between said parts to prevent the lever 6 from binding or working hard.

I claim as my invention:

1. In a car platform door-operator, the combination of a slidably mounted door, a lever pivoted at its lower end and extending upwardly and operatively attached to the rear edge of said door, a rock shaft whose axis is below the fulcrum of said lever, a crank arm on said shaft having a sliding connection with said lever for swinging the latter, and means operatively connected to said shaft for rocking the latter.

2. In a car platform door-operator, the combination of a slidably mounted door, a lever pivoted at its lower end and extending upwardly and operatively attached to the rear edge of said door, a rock shaft whose axis is below the fulcrum of said lever, a crank arm on said shaft operatively connected with said lever for swinging the latter, an upwardly extending crank arm on said shaft, an operating staff, a crank arm on the lower end of said staff, and a link connecting said crank arm with the upwardly extending crank arm on said rock shaft.

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