

H. ROWNTREE.
 COMBINED DOOR AND STEP OPERATING MECHANISM.
 APPLICATION FILED JULY 1, 1910.

976,926.

Patented Nov. 29, 1910.

2 SHEETS—SHEET 1.

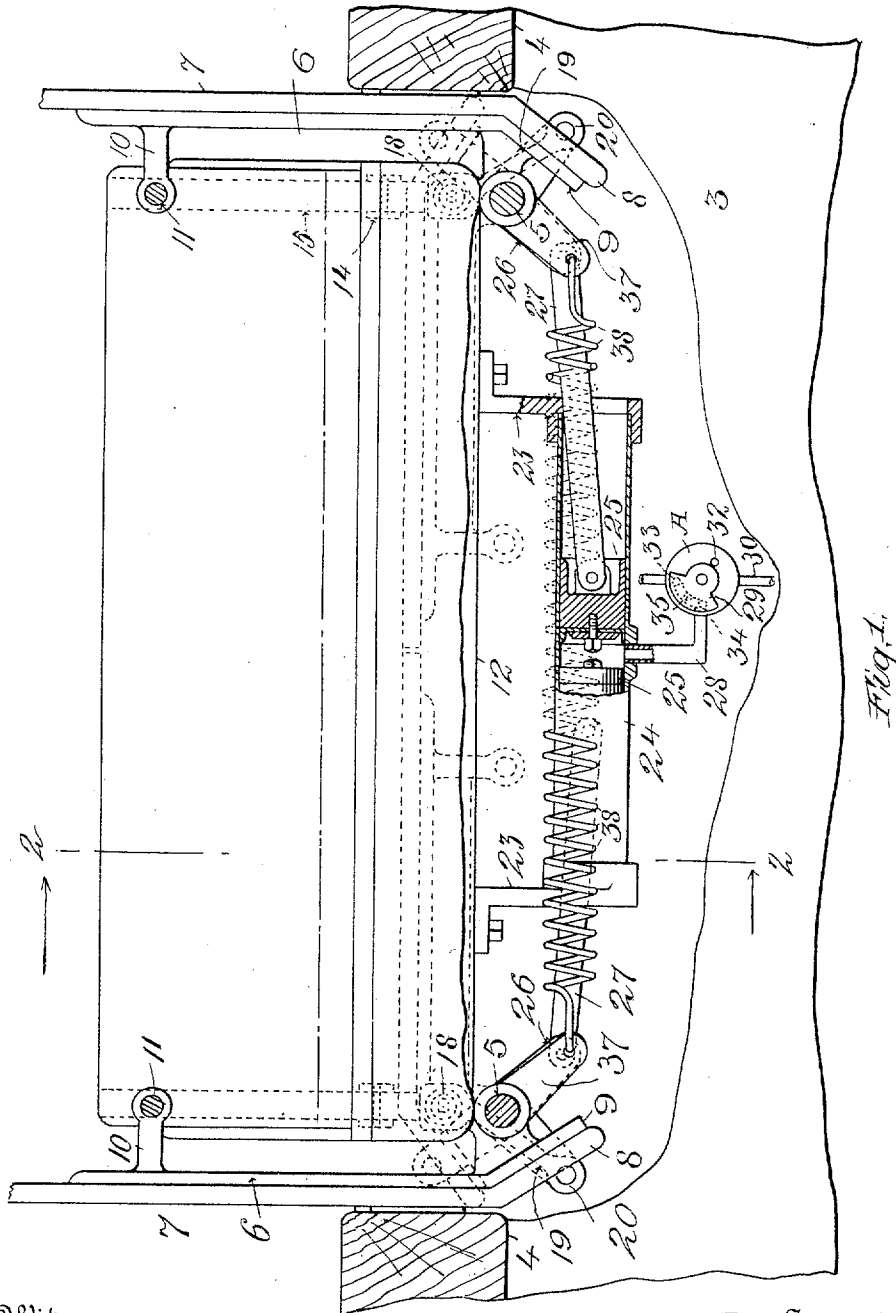


Fig. 1.

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 By my Attorney
 Samuel C. Darley

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2 SHEETS—SHEET 2.

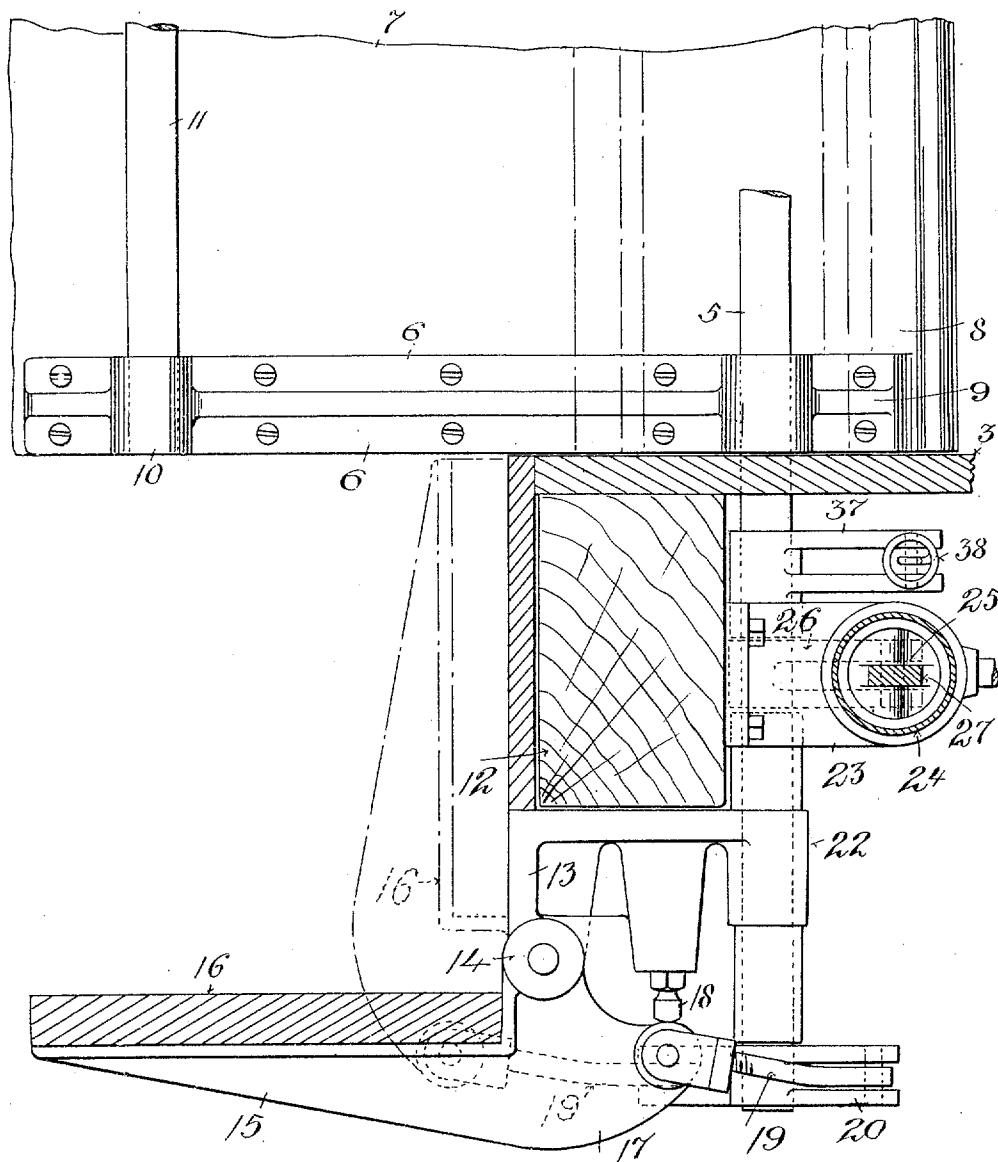


Fig. 2.

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UNITED STATES PATENT OFFICE.

HAROLD ROWNTREE, OF CHICAGO, ILLINOIS, ASSIGNOR TO NATIONAL PNEUMATIC COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF WEST VIRGINIA.

COMBINED DOOR AND STEP OPERATING MECHANISM.

976,926.

Specification of Letters Patent.

Patented Nov. 29, 1910.

Original application filed April 3, 1909, Serial No. 487,667. Divided and this application filed July 1, 1910. Serial No. 569,842.

To all whom it may concern:

Be it known that I, HAROLD ROWNTREE, a citizen of the United States, residing at Chicago, county of Cook, and State of Illinois, have made a certain new and useful Invention in Combined Door and Step Operating Mechanism, of which the following is a specification.

This invention relates to combined door and step operating mechanism.

The object of the invention is to provide a mechanism, power actuated, for coincidentally operating doors and steps, and particularly double hinged doors, and which is simple and efficient.

Other objects of the invention will appear more fully hereinafter.

The invention consists substantially in the construction, combination, location and relative arrangement of parts, all as will be more fully hereinafter set forth, as shown in the accompanying drawings, and finally pointed out in the appended claims.

In the accompanying drawings,—Figure 1 is a view in top plan of a construction of door and associated step and power actuated devices for operating the same, embodying the principles of my invention, parts being in horizontal section. Fig. 2 is a view in vertical section on the line 2, 2, Fig. 1, looking in the direction of the arrows.

The subject matter herein shown and claimed is divided from my application Serial No. 487,667, filed April 3, 1909.

In the practical application of my invention I have shown the same as applied to a street car.

The same part is designated by the same reference wherever it occurs.

In the drawing reference sign 3 designates the floor of a car, 4 are jambs, posts or other parts arranged to form a doorway space, or entry between them. At the sides of this doorway and adjacent the jambs or posts 4, are vertically extending shafts 5, suitably journaled to rock in bearings provided therefor. Castings 6, are carried by the shafts 5, to rock or swing therewith. The doors 7 are secured to the castings 6, and supported thereby. The shafts 5, are somewhat removed from the adjacent jambs or posts 4, so that the doors, when open, will lie close against the faces of the jambs. In order to close the space between the shafts and their

adjacent jambs when the doors are closed; 55 each door is provided on the edge thereof which is closest to the jamb, with an auxiliary narrow panel 8, which, as indicated in dotted lines in Fig. 1, forms a closure for the space referred to when the door is closed. 60 The narrow panels 8 are carried by the extensions 9, of the castings 6. The castings, at or adjacent their outer or free ends are provided with extensions 10, in which are carried vertical rods 11, designed to form 65 hand grabs to aid passengers entering or leaving the car, where my invention is applied to street cars, to ascend to or descend from the floor of the car. The vertical rock shafts 5 may also serve the same purpose. 70

To the underside of the floor supporting beam 12, or other suitable or convenient part, is secured a casting 13, which may be arranged to form one of the bearings 22, in which the shaft 5 is journaled. Upon a 75 pivot pin 14, carried by said casting 13, is pivotally mounted a bracket 15, arranged to form a support for a step 16. Of course it will be understood that a similar support is provided, if desired, at each end of the 80 step so as to afford an efficient and substantial support therefor. Each bracket 15 is provided with an extension 17, beyond the axis of its supporting pivot pin 14, and which extension coöperates with an adjustable stop or limit pin 18, mounted in the casting 13, to form an abutment for the step when in position for use, as clearly shown in Fig. 2. Pivotaly connected at one end 85 to the extension 17, of each bracket 15, is a link 19, the other end of said link being pivotally connected to a crank arm 20, mounted on the adjacent shaft 5, whereby, when the shaft is rocked to open or close the door the step is coöperatingly moved into or out 95 of position for use as the case may be. Since a casting 15, is provided for each end of the step, and each casting is connected to its adjacent shaft 5, it follows that the associated doors, shafts and step must all move 100 in unison.

Suitably supported by brackets 23, or otherwise, mounted on the inner face of the beam 12, or other convenient part, is a power cylinder 24. This cylinder is open 105 at both ends and has two oppositely faced pistons 25, therein. The shafts 5, are provided with crank arms 26, which are respec-

tively connected by links 27, or otherwise, to the pistons 25, whereby when said pistons are moved the shafts 5, are rocked. The piston rods or links 27, extend through the open ends of the cylinder for connection to the pistons. A valve device, indicated generally by reference sign A, Fig. 1, controls the supply and exhaust of operating medium to and from the cylinder. In the form shown a pressure supply connection 28, extends from the valve or control device A, to a point midway the length of the cylinder 24, and between the pistons 25. The valve or control device comprises a valve 29, having an operating handle 30, and is adapted to operate over a seat surface 31, having the pressure supply port 32, the exhaust port 33, and the cylinder supply connection port 34. The under face of the valve 29 is provided with a channel or recess indicated in dotted lines at 35, whereby the ports 33, and 34, may be brought into communication with each other whenever desired. This control device is represented somewhat diagrammatically as the structure thereof in its details forms no part of the present invention, and hence any suitable or convenient form of control device may be employed.

Where the control device is manipulated so as to admit pressure medium to the cylinder 24, at a point between the pistons 25, said pistons are forced apart thereby coincidentally rocking the shafts 5, and hence swinging the doors closed, the doors being held in their closed positions by the force of the pressure medium and when the pressure medium is opened to exhaust from the cylinder the doors are free to move to open position. In order to insure the movement of the doors to open position when the pressure is exhausted from the cylinder 24, I provide each shaft 5, with a crank arm 37, arranged to project in opposite directions, and I connect these crank arms by means of a strong spiral or other spring 38, the tension of which is constantly exerted in a direction to hold the doors open. The operation of the doors to their closed position by the pressure medium acting on the pistons 25, is against the tension of spring 38.

Coincidentally with the movements of the doors the actuation of the step 16 is also accomplished through the connections above described.

A combined door and step operating mechanism, such as above described is simple, inexpensive, cheap and substantial, and can be easily and quickly installed. It is obvious that the control device A, may be located at any convenient point.

By reason of the fact that the pressure medium holds the doors and steps in their closed position it will be observed that I avoid the necessity of providing positive

locking mechanism for the doors or steps when in this position. This is a desirable feature in street car constructions for the reason that while the doors are held closed with sufficient degree of pressure to prevent the same from being opened by passengers leaning thereagainst, still, by applying concentrated force the doors may be opened in case of panic, accident or other cause, or in case the conductor should be forced to leave his station, thereby enabling the passengers to release themselves.

I do not claim herein the door operating mechanism *per se* as the same forms the subject-matter of my application Serial No. 487,667, filed April 3, 1909, of which the present application is a division. It will also be seen that in a construction of door operating mechanism such as above described means for cushioning the door movements are not required.

Having now set forth the object and nature of my invention, and a construction embodying the principles thereof, and having described such construction, its purpose, function and mode of operation, what I claim as new and useful and of my own invention, and desire to secure by Letters Patent is:—

1. The combination with swinging doors, of a cylinder, pistons operating therein and respectively connected to the doors to operate the same, means for yieldingly opposing the movements of the pistons, a step, intermediate connections between the pistons and step for securing coincident movement of the doors and step, and means for controlling the supply and exhaust of operating medium to and from the cylinder.

2. The combination with a door and step, of power mechanism for moving the door in one direction, a spring for moving the door in the other direction and connections for moving the step coincidentally with the door movements.

3. The combination with a door and step, of a rock shaft, connections between said shaft and the door and step respectively, pressure operated mechanism for rocking the shaft in one direction and means for yieldingly opposing such rocking movement.

4. The combination with door jambs, swinging doors for controlling the entry between said jambs, a movable step, intermediate connections between the door and step to secure coincident movement, a cylinder having oppositely faced pistons respectively connected to the doors on opposite sides of the entry, and means for controlling the supply and exhaust of operating medium to and from the cylinder at a point intermediate the pistons.

5. The combination with swinging doors, of a rock shaft carrying each door, a step, connections between each shaft and said

step, a pressure operated means for rocking said shafts coincidently, and means for controlling said power mechanism.

6. The combination with rocking shafts
5 arranged on opposite sides of a doorway, doors respectively carried by said shafts, swinging brackets having connection with said shaft, a step supported at its ends upon said brackets, stop devices for limiting the
10 rocking movements of said brackets, and

power operated mechanism for rocking said shafts.

In testimony whereof I have hereunto set my hand in the presence of the subscribing witnesses, on this 9th day of June A. D., 15 1910.

HAROLD ROWNTREE.

Witnesses:

EDMUND R. DODGE,
MAE W. CLINTON.