C. ALTER.

DOOR OPERATING DEVICE.

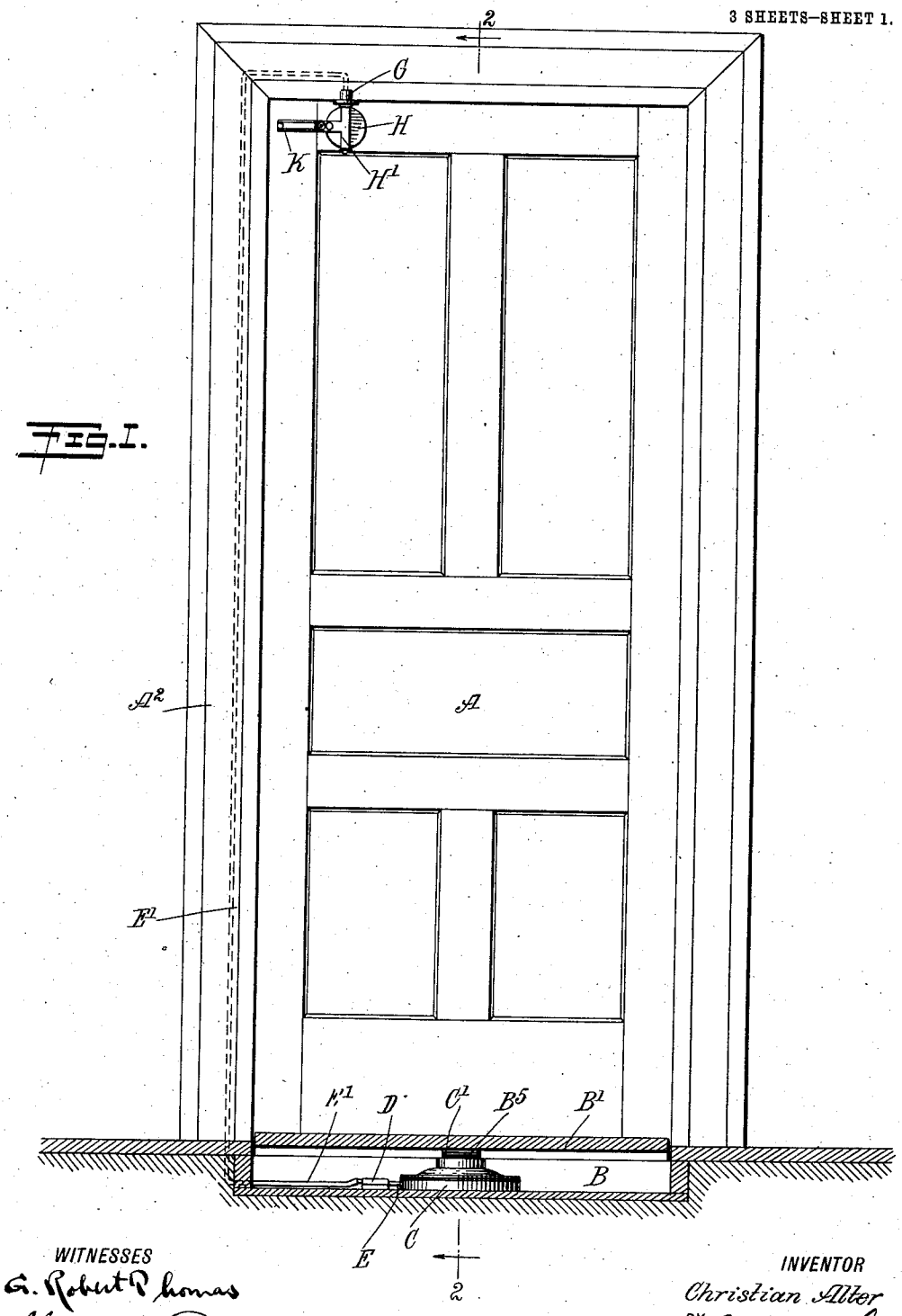
APPLICATION FILED OCT. 11, 1911.

1,027,231.

Patented May 21, 1912.

3 SHEETS—SHEET 1.

Fig. 1.



WITNESSES

G. Robert Thomas

Henry Hoover

INVENTOR

Christian Alter

BY Munn & Co

ATTORNEYS

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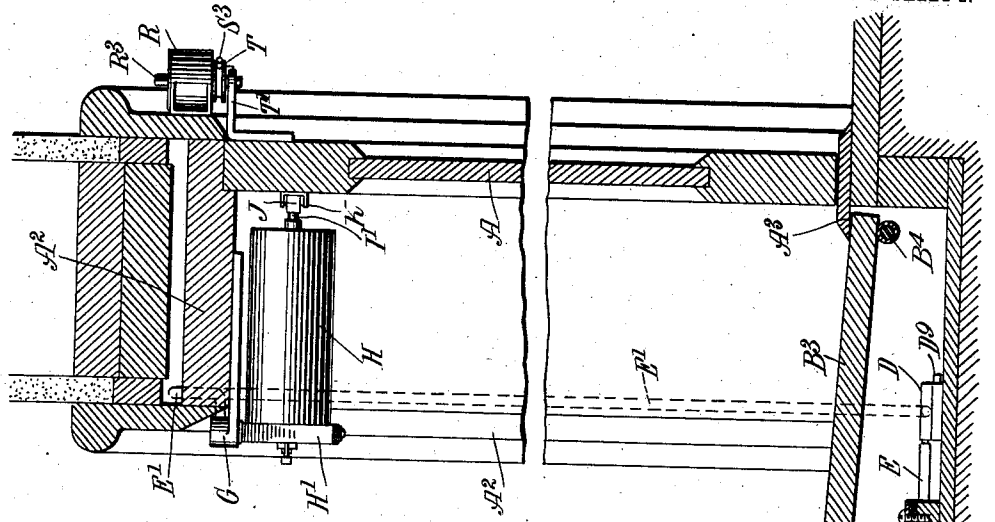

FIG. 4.

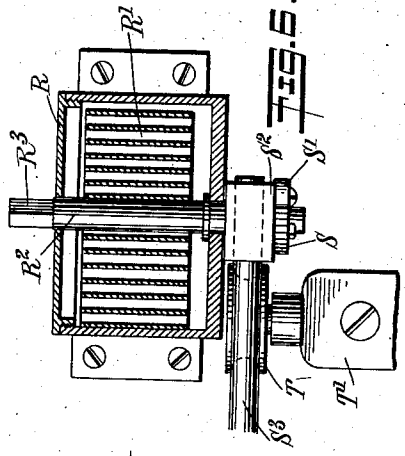

FIG. 5.

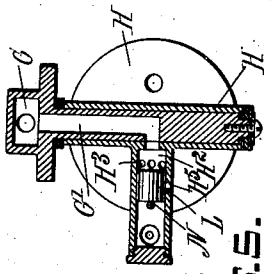

FIG. 6.

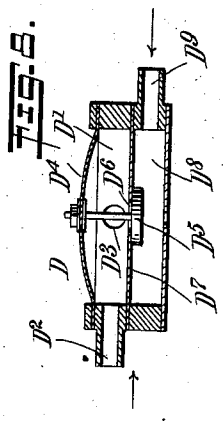

FIG. 8.

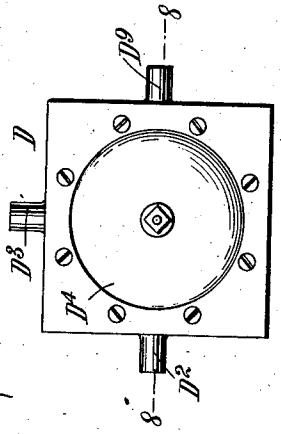

FIG. 7.

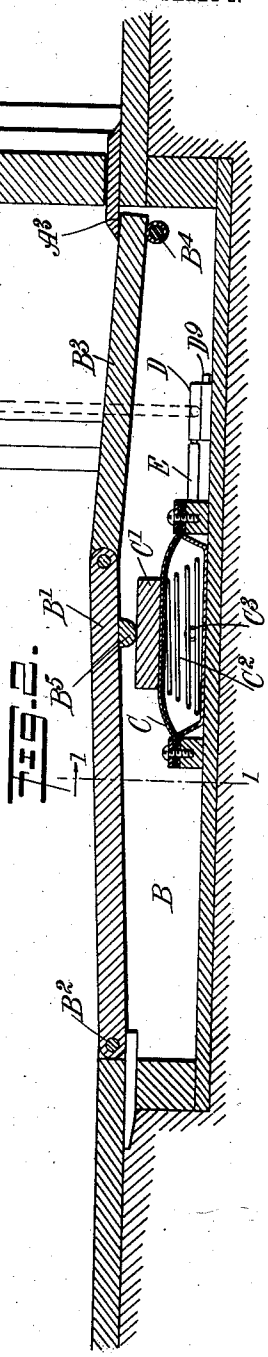

FIG. 2.

WITNESSES

G. Robert Thomas

Percy Hoosteds

INVENTOR

Christian Alter

BY Munn & Co

ATTORNEYS

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3 SHEETS—SHEET 3.

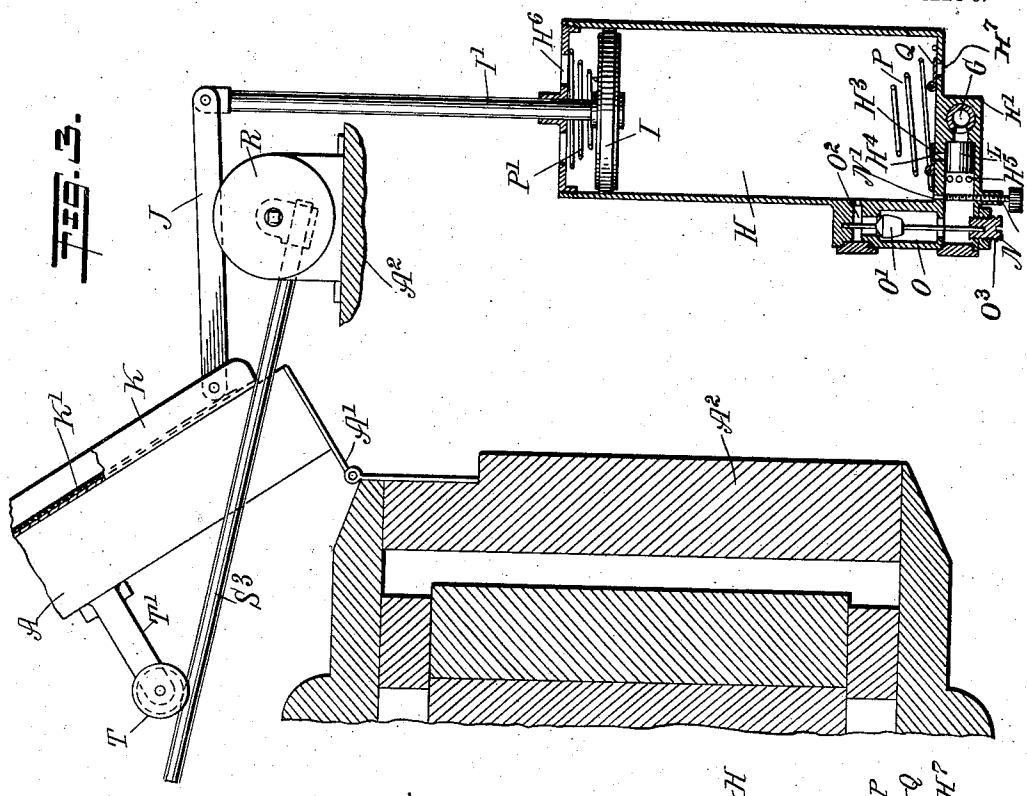

Fig. 3.

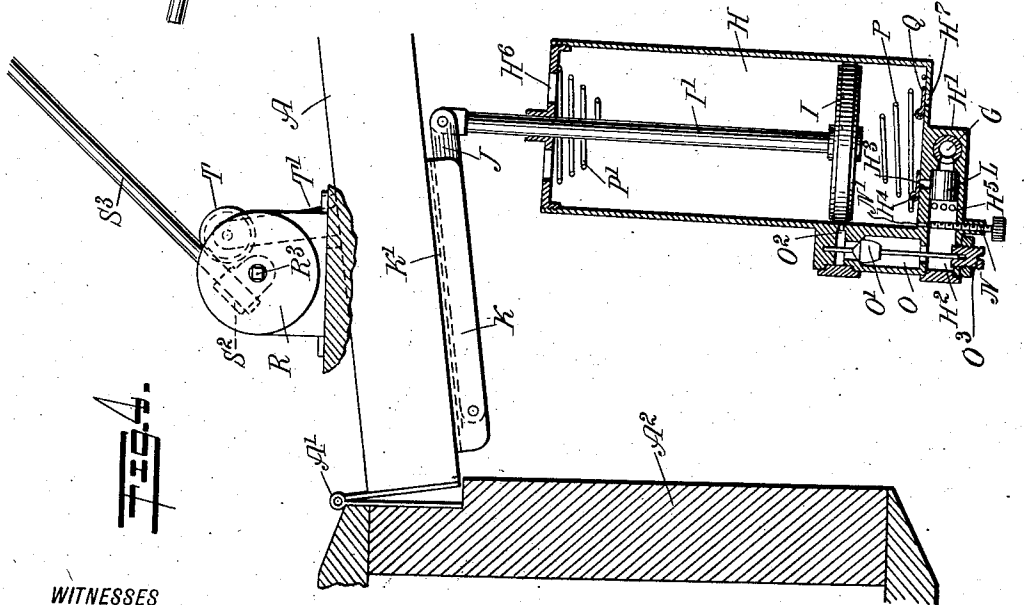

Fig. 4.

WITNESSES

G. Robert Thomas

Percy J. Hoskins

INVENTOR

Christian Alter

BY Munn & Co.

ATTORNEYS

UNITED STATES PATENT OFFICE.

CHRISTIAN ALTER, OF NEW YORK, N. Y.

DOOR-OPERATING DEVICE.

1,027,231. Specification of Letters Patent. Patented May 21, 1912.

Application filed October 11, 1911. Serial No. 654,015.

To all whom it may concern:

Be it known that I, CHRISTIAN ALTER, a citizen of the United States, and a resident of the city of New York, borough of Manhattan, in the county and State of New York, have invented a new and Improved Door-Operating Device, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved door-operating device designed for use on doors of stores and other buildings, and arranged to permit a person carrying bundles or packages or the like, or being otherwise encumbered, to open the door on stepping on a platform in front of the door, the door being held in an open position for a sufficient length of time to allow a person to conveniently pass through the open door-way, and to insure self closing of the door after the person has passed through the door-way.

For the purpose mentioned, use is made of a pneumatic pressure actuating device connected with the door, and a pneumatic pressure producing device connected with the said actuating device to supply the latter with air pressure to open the door.

A practical embodiment of the invention is represented in the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a side elevation of a door in a closed position and provided with the improvement shown partly in section on the line 1—1 of Fig. 2; Fig. 2 is an enlarged transverse section of the same on the line 2—2 of Fig. 1; Fig. 3 is an enlarged sectional plan view of the same; Fig. 4 is a similar view of the same showing the parts in a different position; Fig. 5 is an enlarged sectional side elevation of the pivotal connection of the air pressure actuating device; Fig. 6 is an enlarged cross section of the door closing device; Fig. 7 is a plan view of the controlling valve for the pneumatic; and Fig. 8 is a sectional side elevation of the same on the line 8—8 of Fig. 7.

The door A, on which the door-operating device is shown applied, is connected by hinges A^1 with the door casing A^2, to swing into an open or a closed position. In front of the door A is arranged a well B in the flooring adjacent the door, and in the said well is arranged a pneumatic C adapted to be actuated by a platform B^1 forming a part of the flooring in front of the door, the platform being hinged at B^2 to the adjacent fixed flooring and the free end of the platform B^1 being connected with an auxiliary platform B^3 extending with its free end under the door sill A^3 and supported at the free end on a roller B^4 journaled in the well B. The under side of the platform B^1 is provided near the free end thereof with a lug B^5 engaging the top of the movable member C^1 of the pneumatic C, normally held in an open position by a spring C^2 arranged within the pneumatic. When a person walks toward the door A and steps on the platform B^1 then the weight of the person is sufficient to swing the platform B′ downward thus closing the pneumatic C and forcing the air contained therein out of the pneumatic into a controlling valve D, preferably arranged in the well B. The controlling valve D (see Figs. 7 and 8) is provided with a chamber D^1 having an opening D^2 connected by a hose or pipe E with the opening C^3 leading to the interior of the pneumatic C. The chamber D^1 is also provided with an outlet D^3 and with a diaphragm top D^4 supporting a valve D^5 controlling an opening D^6 arranged in the bottom D^7 of the chamber D^1, the opening D^6 leading to a chamber D^8 provided with an air inlet D^9. The opening D^3 is connected with a hose or a pipe E^1 extending from the well B up into one side of the door casing A^2 to connect with a hollow vertically-disposed pivot G attached to the door casing A^2 and engaged by a bearing H^1 forming part of the rear end of a cylinder H disposed horizontally and mounted to swing on the said pivot G. Within the cylinder H is mounted to reciprocate a piston I having a piston rod I^1 extending through the other end of the cylinder H and having its outer end pivotally connected with one end of a link J pivoted at the other end to one end of a keeper K attached to the door A, preferably at the upper end thereof, as plainly indicated in the drawings. The keeper K is preferably in the form of a channel iron provided on its back with a cushion K^1 for the link J to be seated on, so that when the door closes and the link J swings into the keeper K then the cushion K^1 deadens the noise so that the closing o fthe door is practically rendered noiseless.

The opening or channel G^1 of the pivot G

(see Fig. 5) connects at its lower end with a valve chamber H^2 extending sidewise from the bearing H^1 and forming part thereof, and the valve chamber H^2 is provided with a piston valve L adapted to control ports H^3 leading from the chamber H^2 into the cylinder H, as plainly indicated in Figs. 3 and 4. A flap valve H^4 on the inside of the cylinder normally closes the port H^3 from the inside of the cylinder, and the said valve H^4 is adapted to open inwardly on pressure passing from the chamber H^2 through the port H^3. The piston valve L also controls a port H^5 leading to the atmosphere, and the sliding movement to the left of the piston valve L is limited by a stop N, preferably in the form of a needle valve controlling a bleed hole N^1, connecting the valve chamber H^2 with the interior of the cylinder H. The valve chamber H^2 is in communication with another valve chamber O arranged on one side of the cylinder H and containing a valve O^1 controlling a port O^2 leading to the interior of the cylinder H a distance from the outer end thereof, as plainly indicated in Figs. 3 and 4. The movement of the valve O^1 can be regulated by an adjusting screw O^3 held on the cylinder H and engaging the stem of the valve O^1, so that the piston I on the return stroke up to the port O^2 can travel faster or slower according to the amount of air passing out of the valve O^1 at the time. The forward end of the cylinder H is provided with openings H^6, so that when the piston I moves outward or inward a free outward or inward movement of air can take place in the forward end of the cylinder H. Within the cylinder H at the ends thereof are arranged springs P and P^1, of which the spring P serves to push the piston I a short distance outward upon opening the door by hand, and the spring P^1 serves to start the piston I on the return stroke. The inner end of the cylinder H is further provided with a port H^7 normally closed by a flap valve Q adapted to open inwardly, the said valve Q admitting air to the interior of the cylinder H on opening the door A by hand so that the piston I can slide freely within the cylinder H.

In order to automatically close the door use is made of a self-closing device consisting essentially of a spring barrel R secured to the door casing A^2 and containing a coil spring R^1 fastened at one end to the barrel R and at its other end to a spindle R^2 journaled in the barrel R. On the bottom of the spindle R^2 is secured a ratchet wheel S engaged by a pawl S^1 fulcrumed on the heel S^2 of a rod S^3 engaging a grooved roller T journaled on a bracket T^1 attached to the door A. The heel S^2 is mounted to turn loosely on the spindle R^2. When the door A is swung into an open position the rod S^3 receives a swinging motion thus turning the spindle R^2 by the action of the ratchet S and pawl S^1, thereby placing the spring R^1 under heavy tension, and when the door A has come to a standstill the pressure exerted by the rod S^3 on the roller T causes a return swinging motion of the door A to close the same. The upper end R^3 of the spindle R^2 is preferably made polygonal to permit of turning the spindle R^2 with a view to give more or less tension to the spring R^1 according to the weight of the door A.

The operation is as follows: When the door is closed and the pneumatic C is in open or inflated position by the action of the spring C^2 then a person walking toward the door and stepping on the platform B^1 swings the latter downward to close the pneumatic C, whereby the air contained in the pneumatic is forced through the tube E into the chamber D^1 of the controlling valve D, whereby the diaphragm D^4 is held in an uppermost position so that the valve D^5 closes the port D^6 and consequently the air pressure that passed into the chamber D^1 passes through the opening D^3 and hose E^1 into the hollow pivot G, from which the air passes into the inner end of the valve chamber H^2 and through the now open port H^3 into the cylinder H to force the piston I outward into the position shown in Fig. 3, whereby the piston rod I^1 and link J impart a swinging motion to the door A so as to swing the latter open and thereby allow the person to walk through the open doorway. When this has taken place the door A gradually begins a return swinging movement owing to the pressure exerted by the spring-pressed rod S^3 on the roller T journaled on the bracket T^1 attached to the door A. The piston I now slides backward in the cylinder H and in doing so the valve H^4 closes and air now passes under pressure into the port O^2 and exerts a pressure on the valve O^1 to open the same and to allow the air to pass into the chamber O and from the latter into the left-hand end of the chamber H^2 and out of the same through the ports H^5 now uncovered by the air pressure forcing the piston valve L to the right to close the port H^3 (see Fig. 3). The piston I during its return movement finally closes the port O^2 so that the air is confined in the end of the cylinder H to form an air cushion for the piston I, it being understood that this confined air can gradually leak out through the bleed hole N^1 into the chamber H^2 and out of the same by way of the ports H^5. With the pressure of the spring-pressed rod S^3 still exerted against the door A the piston I is gradually returned to the end of its return stroke, so that the door A is closed gradually without being banged. When a person steps off the platform B^1 the pneumatic C is relieved and the spring C^2 now

moves the movable member C^1 of the said pneumatic upward, thus reducing the pressure in the chamber D^1 and allowing the diaphragm D^4 and valve D^5 to drop so that the port D^6 is opened to allow air to pass by way of the air inlet D^9, chamber D^8, port D^6, chamber D^1 and pipe E into the pneumatic C to insure a quick opening or inflation thereof. When the piston I moves outward in the cylinder H under the impulse of the compressed air, the door A is swung open beyond the travel of the piston I in the cylinder H, and to compensate for such movement of the door without being checked at the time the piston I reaches the end of its stroke the link J swings into open position relative to the keeper K as shown in Fig. 3.

In case a person opens the door A by hand and the piston valve L is in closed position relative to the port H^3 then the flap valve Q opens to allow air to pass through the port H^7 into the end of the cylinder H to permit an easy outward movement of the piston I, which latter offers very little resistance to the opening of the door A by hand.

It is understood that the cylinder H and its piston I act as a door check during the return or closing movement of the door, and by the use of the adjustable valve O^1 the door is allowed to close quicker or slower as previously explained.

It is understood that by the arrangement described a pneumatic pressure producing device furnishes compressed air for an actuating device connected with the door A, and the said pneumatic pressure producing device is actuated by a person stepping on the platform B^1, whereby the weight of the person causes the platform B^1 to swing downward and close the pneumatic C of the said pneumatic pressure producing device.

By arranging the door-actuating device and the door-closing device in the manner described, the door is held open for a time sufficiently long to permit a person to pass through the open doorway, and then the door automatically closes noiselessly and without danger of banging.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. A door opening device, comprising a movable platform, a pneumatic underneath the said platform and adapted to be closed by the same by the weight of a person stepping on the said platform, a cylinder provided with a piston having a piston rod, the said cylinder and piston rod being connected with the door casing and door, a pivot for the said cylinder to swing on and connected with the said pneumatic, and a valved connection between the said cylinder and the said pivot.

2. A door-opening device, comprising a pneumatic, a movable platform engaging the movable member of the said pneumatic for closing the pneumatic on a person stepping on the said platform, a controlling valve connected with the pneumatic, a cylinder, a pivot on the door casing and on which the said cylinder is mounted to swing, the said pivot having an inlet channel connected with the said controlling valve, a valved connection between the said pivot and the said cylinder, and a piston in the said cylinder and connected with the door to be opened.

3. A door-opening device, comprising a pneumatic, a movable platform engaging the movable member of the said pneumatic for closing the pneumatic on a person stepping on the said platform, a pivot on the door casing and having an inlet channel connected with the said pneumatic, a valve chamber on the said cylinder for connecting the said inlet channel with the said cylinder, a piston valve in the said valve chamber for controlling the connection between the said channel and the said cylinder, and a piston in the said cylinder and connected with the door to be opened.

4. A door-opening device, comprising a pneumatic, a movable platform engaging the movable member of the said pneumatic for closing the pneumatic on a person stepping on the said platform, a pivot on the door casing and having an inlet channel connected with the said pneumatic, a valve chamber on the said cylinder for connecting the said inlet channel with the said cylinder, a piston valve in the said valve chamber for controlling the connection between the said channel and the said cylinder, a piston in the said cylinder and connected with the door to be opened, and an air escape valve connecting the said cylinder with the said valve chamber.

5. A door-operating device, comprising a pneumatic adapted to be closed by the weight of a person exerted on the movable member of the pneumatic, a cylinder on the door casing and containing a reciprocating piston having a piston rod, a valved connection between one end of the cylinder and the said pneumatic, a cushioned keeper on the door, and a link pivotally connecting the outer end of the said piston rod with the said keeper at one end thereof, the said link being adapted to be seated on the said cushion.

6. A door-operating device, comprising a cylinder provided with a piston having a piston rod, the said cylinder and piston rod being connected to the door casing and door, a pivot for the said cylinder to swing on and provided with an inlet channel connected with an air pressure supply, a valved connection between the said channel and the

said cylinder, and an escape valve connected with the said cylinder.

7. A door-operating device, comprising a pneumatic, a movable platform engaging the movable member of the said pneumatic for closing the pneumatic on a person stepping onto the said platform, a controlling valve for the said pneumatic and having an air inlet and an air outlet, and a pneumatic door-closing device connected with the air outlet of the said controlling valve and with the door to be opened.

8. A door-operating device, comprising a pneumatic adapted to be closed by the weight of a person exerted on the movable member of the pneumatic, a cylinder on the door casing and containing a reciprocating piston having a piston rod, a valved connection between one end of the cylinder and the said pneumatic, a connection between the said piston rod and the door, and an air inlet valve for the said cylinder to allow air to pass into the cylinder on opening the door by hand.

9. A door-operating device, comprising a cylinder mounted to swing on the door casing on a vertical axis and provided with a piston, a link connecting the said piston with the door, and means for supplying the said cylinder with fluid pressure to actuate the piston with a view to open the door, the said cylinder and the air contained therein under pressure forming a door check for the return movement of the door.

10. A door-operating device comprising a cylinder mounted to swing on the door casing on a vertical axis and provided with a piston, a link connecting the said piston with the door, means for supplying the said cylinder with fluid pressure to actuate the piston with a view to open the door, the said cylinder and the air contained therein under pressure forming a door check for the return movement of the door, and an adjustable valve for regulating the escape of the air from the cylinder during part of the return stroke.

11. A door-operating device, comprising a cylinder mounted to swing on the door casing on a vertical axis and provided with a piston, a link connecting the said piston with the door, means for supplying the said cylinder with fluid pressure to actuate the piston with a view to open the door, the said cylinder and the air contained therein under pressure forming a door check for the return movement of the door, an adjustable valve for regulating the escape of the air from the cylinder during part of the return stroke, and a bleed hole in the cylinder for final escape of the air.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHRISTIAN ALTER.

Witnesses:

THEO. G. HOSTER,

PHILIP D. ROLLAHAUS.