No. 656,543. Patented Aug. 21, 1900.

E. H. HARRISON & T. LAWSON.

PNEUMATIC DOOR CHECK.

(Application filed July 7, 1899.)

(No Model.) 2 Sheets—Sheet 1.

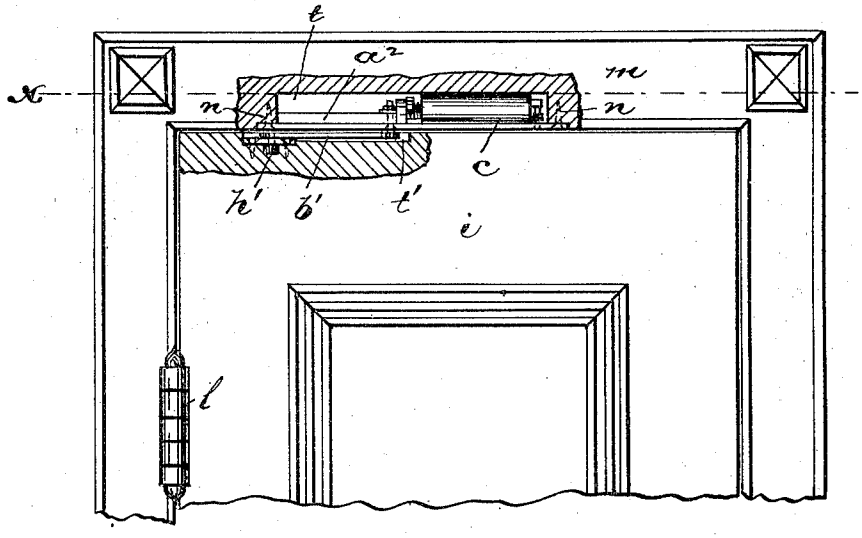


Fig. 1.

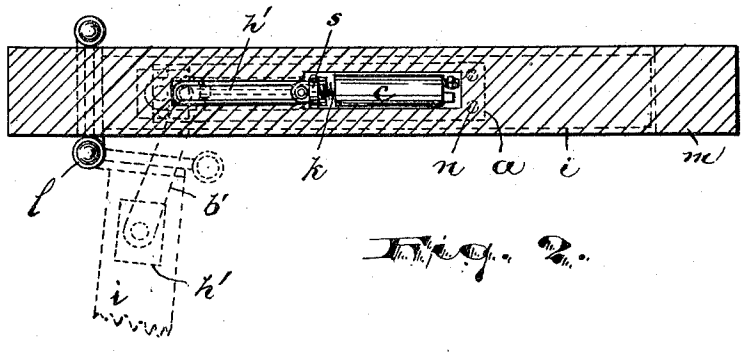


Fig. 2.

WITNESSES:

Alfred R. Krause

Russell M. Everett

INVENTORS

Enos H. Harrison,
Thomas Lawson,

BY

Drake & Co.

ATTORNEYS.

No. 656,543. Patented Aug. 21, 1900.

E. H. HARRISON & T. LAWSON.

PNEUMATIC DOOR CHECK.

(Application filed July 7, 1899.)

(No Model.) 2 Sheets—Sheet 2.

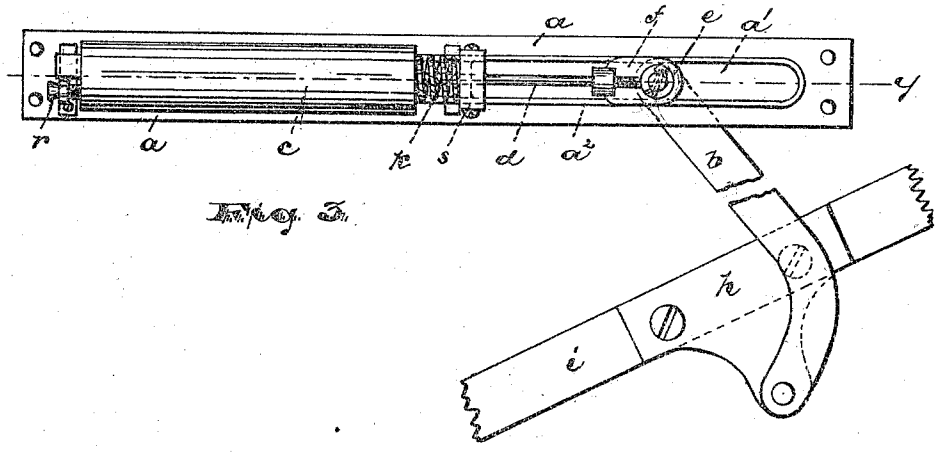


Fig. 2.

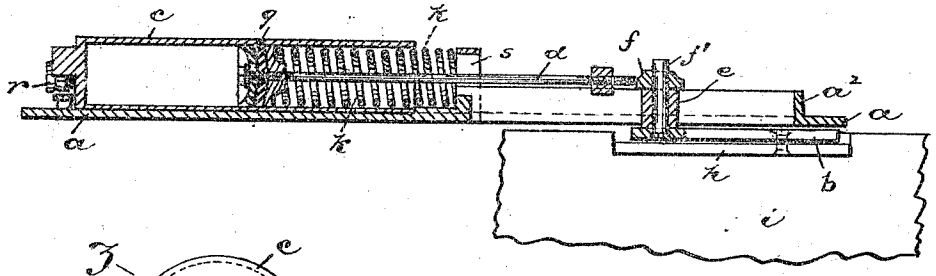


Fig. 4.

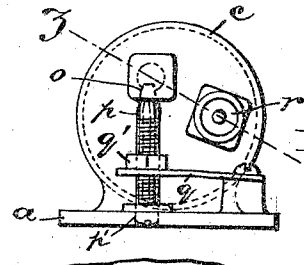


Fig. 3.

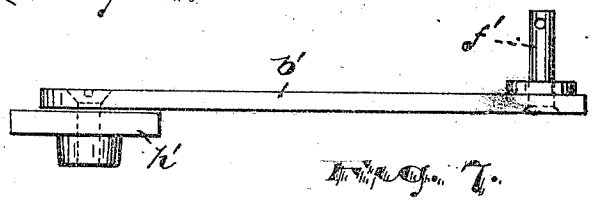


Fig. 7.

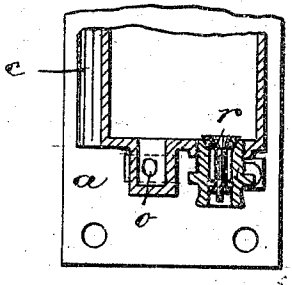


Fig. 6.

WITNESSES:

Alfred R. Krause

Russell M. Everett

INVENTORS:

Thos. H. Harrison,

Thomas Lawson,

BY

Drake & Co.

ATTORNEYS.

UNITED STATES PATENT OFFICE.

ENOS H. HARRISON AND THOMAS LAWSON, OF NEWARK, NEW JERSEY.

PNEUMATIC DOOR-CHECK.

SPECIFICATION forming part of Letters Patent No. 656,543, dated August 21, 1900.

Application filed July 7, 1899. Serial No. 723,110. (No model.)

To all whom it may concern:

Be it known that we, ENOS H. HARRISON and THOMAS LAWSON, citizens of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Pneumatic Door-Checks; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

The objects of this invention are to provide a pneumatic door-check which will be applicable to a double-acting door or a door capable of opening inwardly and outwardly on its hinges, to provide a check which will be less visible to the eye and one that will act as effectually and efficiently in checking the inward movement of the door as in checking its outward movement, to reduce the cost of construction and provide a simple and compact arrangement which will be durable and strong and less liable to get out of order, and to secure other advantages and results, some of which may be referred to hereinafter in connection with the description of the working parts.

The invention consists in the improved pneumatic door-check and in the arrangements and combinations of parts of the same, all substantially as will be hereinafter set forth, and finally embraced in the clauses of the claim.

Referring to the accompanying drawings, in which like letters of reference indicate corresponding parts in each of the several figures—

Figure 1 is a front elevation of the upper part of a door and its frame to which our improved door-check has been applied, the said door and its frame being in partial section to show the operating parts more clearly. Fig. 2 is a sectional view of the door frame and check, taken at line *x*, Fig. 1. Fig. 3 is a plan of the door-check detached from the casing and showing the parts, on an enlarged scale, with a connecting-arm of a type adapted for a single-acting door. Fig. 4 is a section of the same, taken at line *y*, Fig. 3. Fig. 5 is a rear end view of the pneumatic cylinder, showing certain means for adjusting the air-escape valve. Fig. 6 is a sectional detail view at line *z*, Fig. 5. Fig. 7 is a side elevation in detail, showing the connecting-arm as constructed for a double-acting door.

In said drawings, *a* indicates a bed-plate, which is longitudinally slotted, as at *a'*, to receive a connecting-arm *b* and permit the movement of the same longitudinally when operated upon by the piston-rod *d*. The said slot *a'* is located at one end of the bed-plate and extends to a point about at the middle of the said bed-plate, the other end of the said bed-plate being unslotted and on the upper or inward side furnishing a seat or support for a pneumatic cylinder *c*, soldered to said plate or otherwise suitably secured thereto. Also on the upper side of the said plate *a*, around the slot *a'*, is formed an upwardly-projecting flange a^2, the inside face of which coincides with the inside walls of the slot. Said inside walls of the said flange a^2 serve as bearings for a roller *e*, attached to the arm *b*, as will be hereinafter more fully described, and also form at the upper edge a slideway for a sliding plate *f*, which lies in line or approximately in line with the longitudinal axis of the pneumatic cylinder *c*. The said sliding plate *f* is threaded at its end toward said cylinder *c* and is adapted to receive the piston-rod *d*, which extends inwardly into said cylinder, where the said rod is provided with a piston-head *g*, of leather, backed by a metal washer or of any other suitable construction adapted to secure a proper impervious fit in the cylinder. The said sliding plate *f* is provided with or receives the upper end of a stud *f'*, which extends downwardly through the slot *a'* and upon which is arranged the roller *e* above referred to, and at the lower end of said stud is fastened the connecting-arm *b*, which extends to a plate *h*, adapted to be fastened to the top of the door *i*.

It will be understood that the bed-plate *a* is let into the top of the door-casing *m* and fastened by screws *n* in such position that its lower or under face is flush with the surface of the casing. Said plate is disposed directly above the door when in normal position or in the same vertical plane, and the casing *m* is

deeply recessed to receive the parts carried by said bed-plate.

The parts of the check are so arranged and disposed that when the door is opened in one direction or in the other the piston is drawn out of its cylinder and an inflow of air is occasioned through the valve *r* at the end of the said cylinder. Upon releasing the door a suitable spring, arranged at the hinges 1 of the door or upon the piston, as shown in Figs. 3 and 4 and marked *k*, serves to close said door automatically against the body of air contained within the cylinder. Said cylinder is provided at its rear end with a leak-hole *o*, adapted to permit a slow outflow of the confined air, so that the door impelled by the spring gradually and slowly closes as permitted by the air slowly outflowing through said leak-hole. The speed of the outflow is and may be regulated and controlled by a screw *p*, which enters the outflow-opening and tends to close the same, the screw being held in said outflow-opening by a spring *q* and nut *q'*, the spring serving to press the nut and screw arranged therein toward said opening. A perforation *p'* in the bed-plate permits access to said screw through the bed-plate, said screw having its outer end slotted to receive a screw-driver, and thus by turning said screw in one direction or the other in the nut *q'* the tension of the spring *q* is increased or diminished, so that the latter holds the screw into the outpassage opening *o* with greater or less firmness, thus regulating the degree of pressure required to open the outflow-valve.

To permit a free inflow of air to the interior of the cylinder when the piston is drawn outwardly, an inwardly-opening check-valve *r* is provided at the end of the cylinder. This valve may be of any suitable construction to be unseated by the inflowing air and firmly seated by outflowing air to prevent any escape of the compressed air, except through the leak-valve *o*.

To secure compactness and reduce the strain on the door, we prefer to employ a door-closing spring *k* in connection with the pneumatic piston-rod *d*, the spring being arranged between the head of the piston and a bearing *s*, fastened to the bed-plate *a* outside of the said piston. The said spring is coiled around the piston-rod *d* and tends to close the door against the outflowing air, as above indicated. Obviously this spring could be dispensed with and springs employed at the hinges in any usual manner.

It will be seen from the foregoing description of our construction that the bed-plate *a*, with all the parts it supports when applied to a door, lies out of sight in the recess *t* in the door frame or casing, with the lower surface of said bed-plate flush with the surface of the door-frame. The said recess is cut directly above the top of the door when closed or in the door-rabbet, and thus when said door is closed it hides the bed-plate *a* from view. The connecting-arm *b* lies in a recess *t'*, cut in the top of the door, as does also the plate *h*, and thus all the parts are unnoticeable and a very pleasing appearance is secured. When the door is opened, the connecting-arm is the only part brought into prominent view.

Where our improved device is applied to a door opening in only one direction, we prefer to use a connecting-arm *b* and plate *h*, as shown in Fig. 3; but in connection with a double-acting door it becomes necessary to use the slightly-modified form shown more particularly in Figs. 2 and 7, so as to permit a free swing to either side. Furthermore, while we have shown the cylinder *c* and coöperating parts circular in cross-section it will be evident that to enable the same to be fitted into a narrower recess or space, such as would be provided by a thinner door, the said cylinder may be oval and inserted edgewise. Other slight changes and modifications may be made without departing from the spirit and scope of the invention.

Having thus described the invention, what we claim as new is—

1. In a door-check, the combination of a plate adapted to be sunk into a recess in the top of the door-frame directly above the door when in closed position, said plate being longitudinally slotted at one end and having at the opposite longitudinal sides of said slot upwardly-projecting ribs, said ribs forming at their edges slideways for a piston-slide and at their inner faces forming bearing-surfaces for a roller, a valved cylinder secured longitudinally upon the upper surface of the plate at the end opposite the said slot and adapted to lie in the recess in the door-frame, a piston working in said cylinder and having its outer end adjustably connected to a slide arranged on said slideways, a pin pivotally arranged in said slide and extending downward through the slot, a roller arranged on said pin in said slot, and an arm adapted to lie beneath the slotted portion of the plate when the door is closed and having its end next the cylinder pivoted on said pin and its opposite end pivoted to the door, substantially as set forth.

2. In a door-check, the combination of a plate slotted near one end and having a valved cylinder on the unslotted end arranged in line with the slot, a piston working in said cylinder, a slide at the outer end of said piston and reciprocating at the upper side of the slotted portion of the plate, a roller arranged in the slot, an arm beneath the plate and being connected at one end with the door, and a pivotal pin holding the other end of said arm and the said slide at opposite ends of the roller in operative position, substantially as set forth.

3. The improved door-check, comprising a plate longitudinally slotted and flanged on the inner side for a portion of its length and also having at its inner side a valved cylinder longitudinally disposed at the unslotted end of said plate, a piston working at one end in said cylinder and at the opposite end connected to a slide, said slide arranged on the

inner edges of the flanges, a roller arranged between said flanges, an arm serving to connect the slide with the door and a pivotal pin connecting the arm, slide and roller and holding the same in operative position, substantially as set forth.

In testimony that we claim the foregoing we have hereunto set our hands this 20th day of June, 1899.

ENOS H. HARRISON.
THOMAS LAWSON.

Witnesses:
CHARLES H. PELL,
C. B. PITNEY.