(No Model.)

4 Sheets—Sheet 1.

J. S. SHRAWDER.

DOOR CHECK.

No. 539,088. Patented May 14, 1895.

Fig: 1

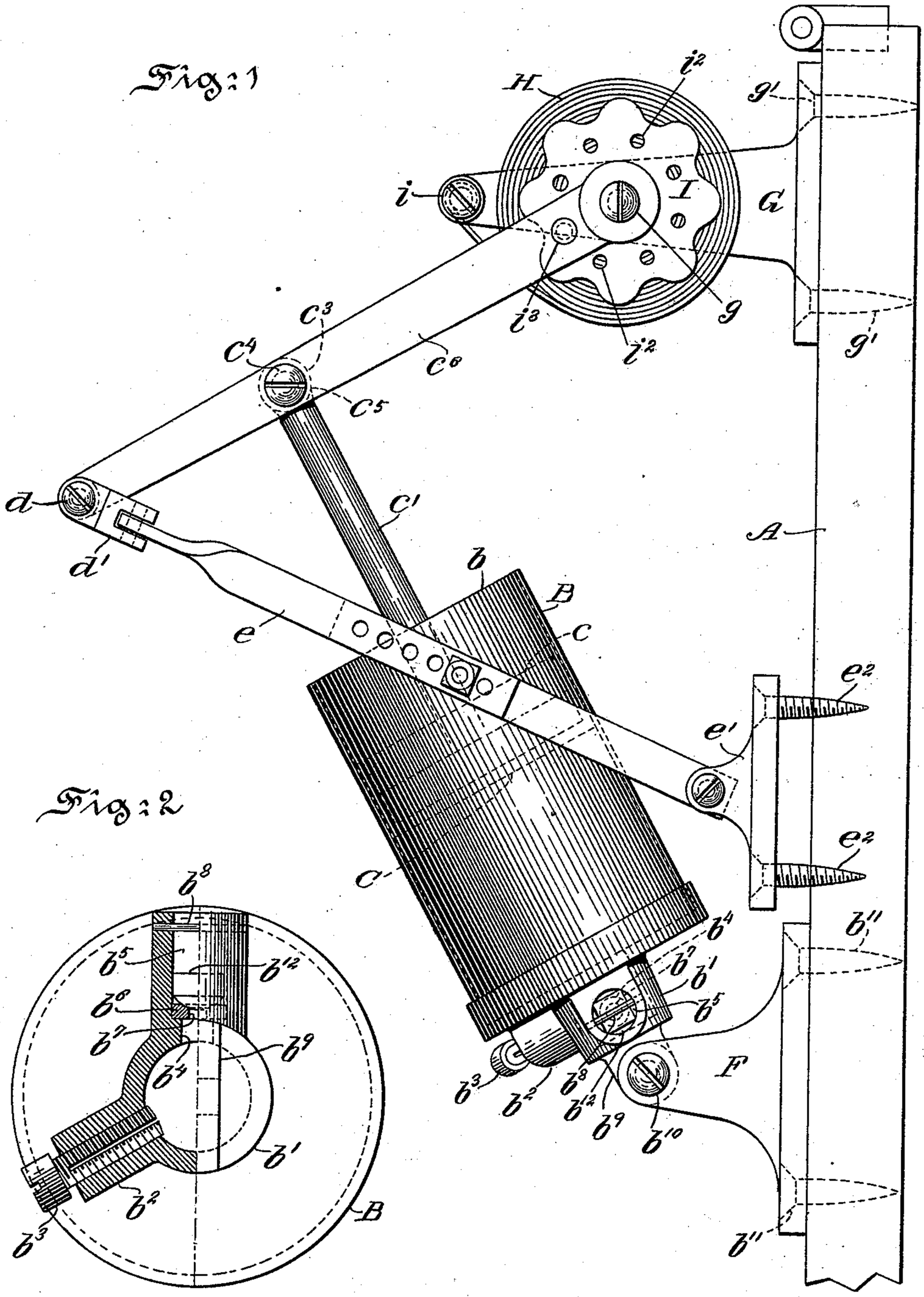

Fig: 2

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(No Model.) 4 Sheets—Sheet 2.

J. S. SHRAWDER.

DOOR CHECK.

No. 539,088. Patented May 14, 1895.

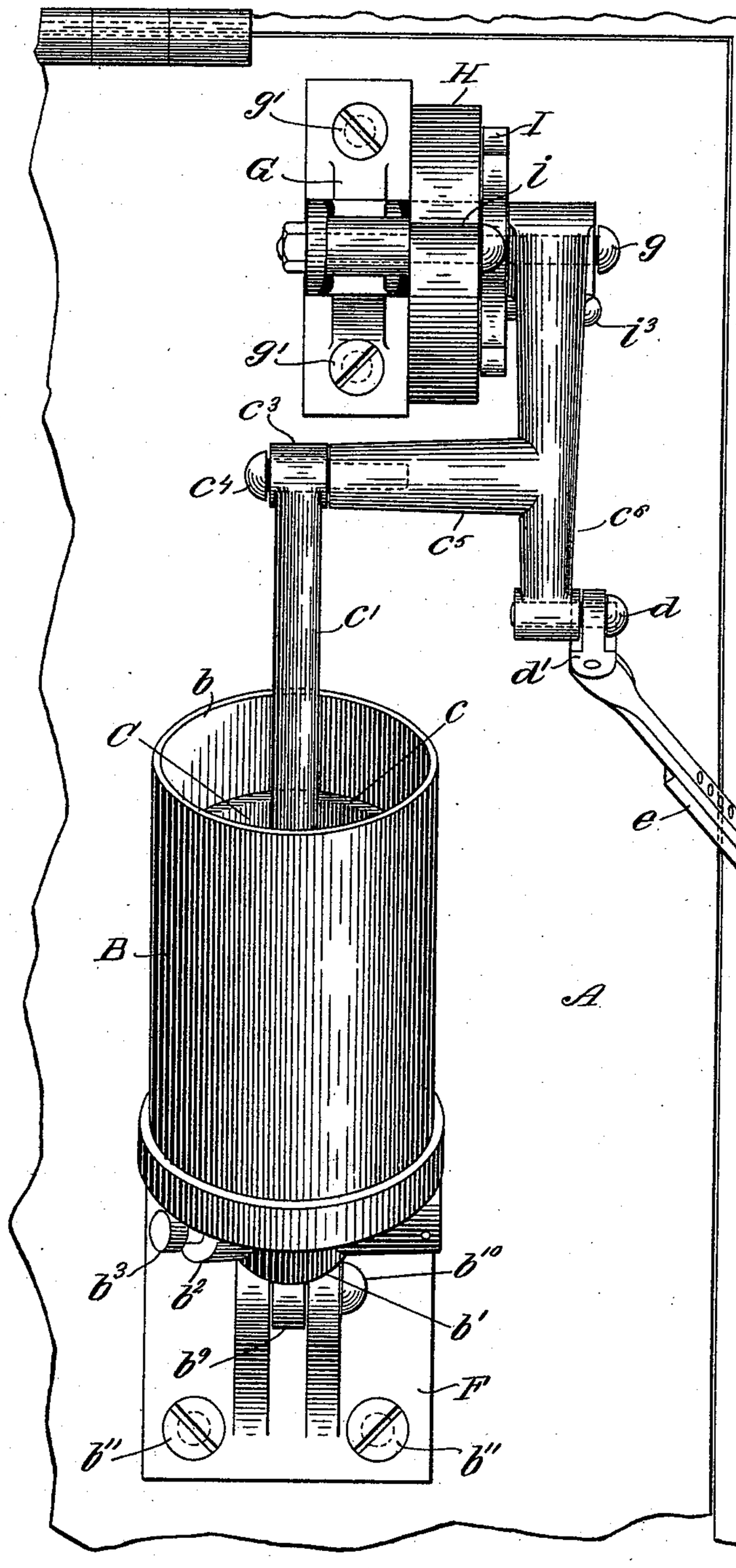

Fig: 3

A'

A

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(No Model.)

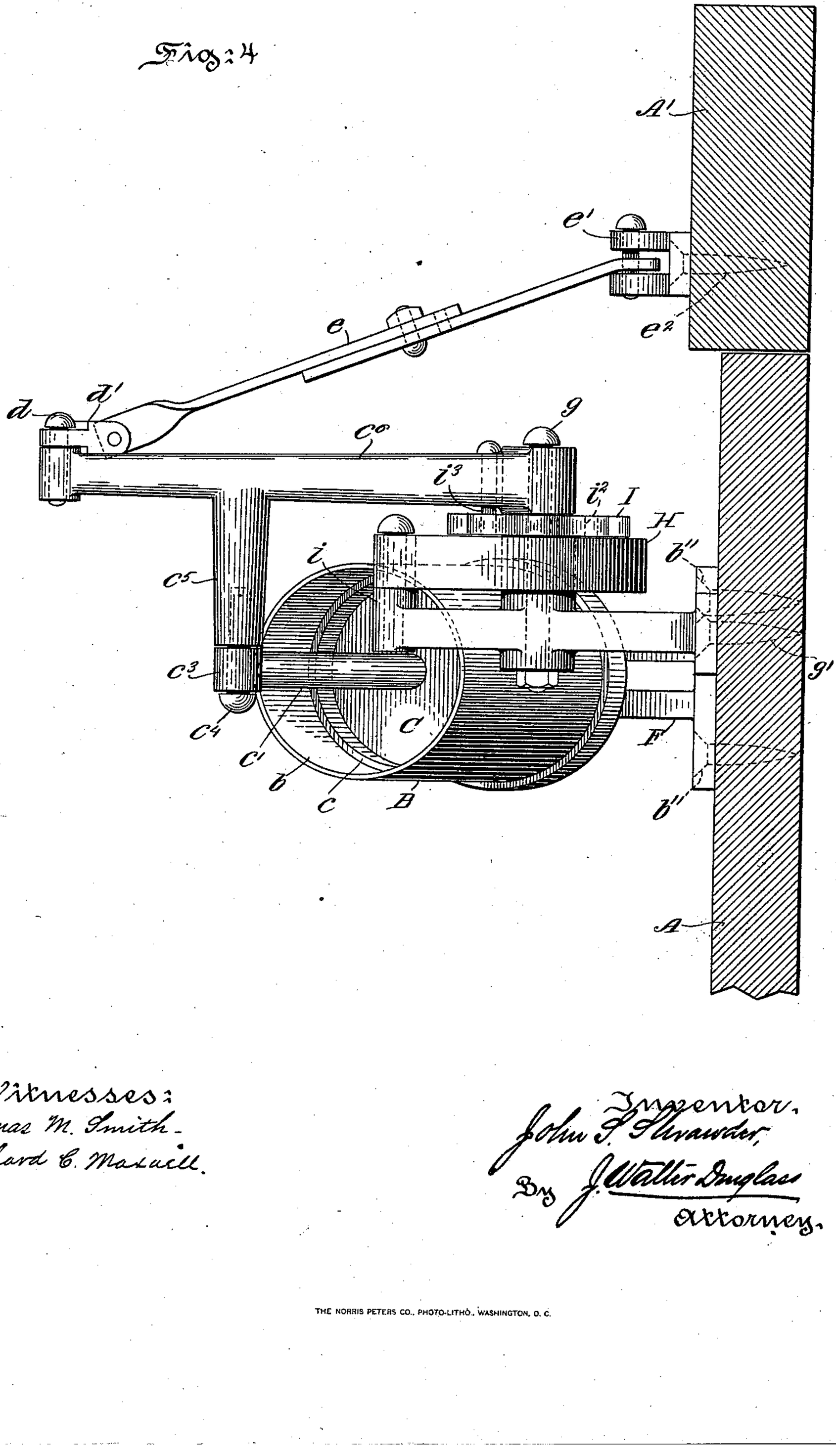
4 Sheets—Sheet 3.

J. S. SHRAWDER.

DOOR CHECK.

No. 539,088. Patented May 14, 1895.

Fig: 4



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(No Model.) 4 Sheets—Sheet 4.

J. S. SHRAWDER.

DOOR CHECK.

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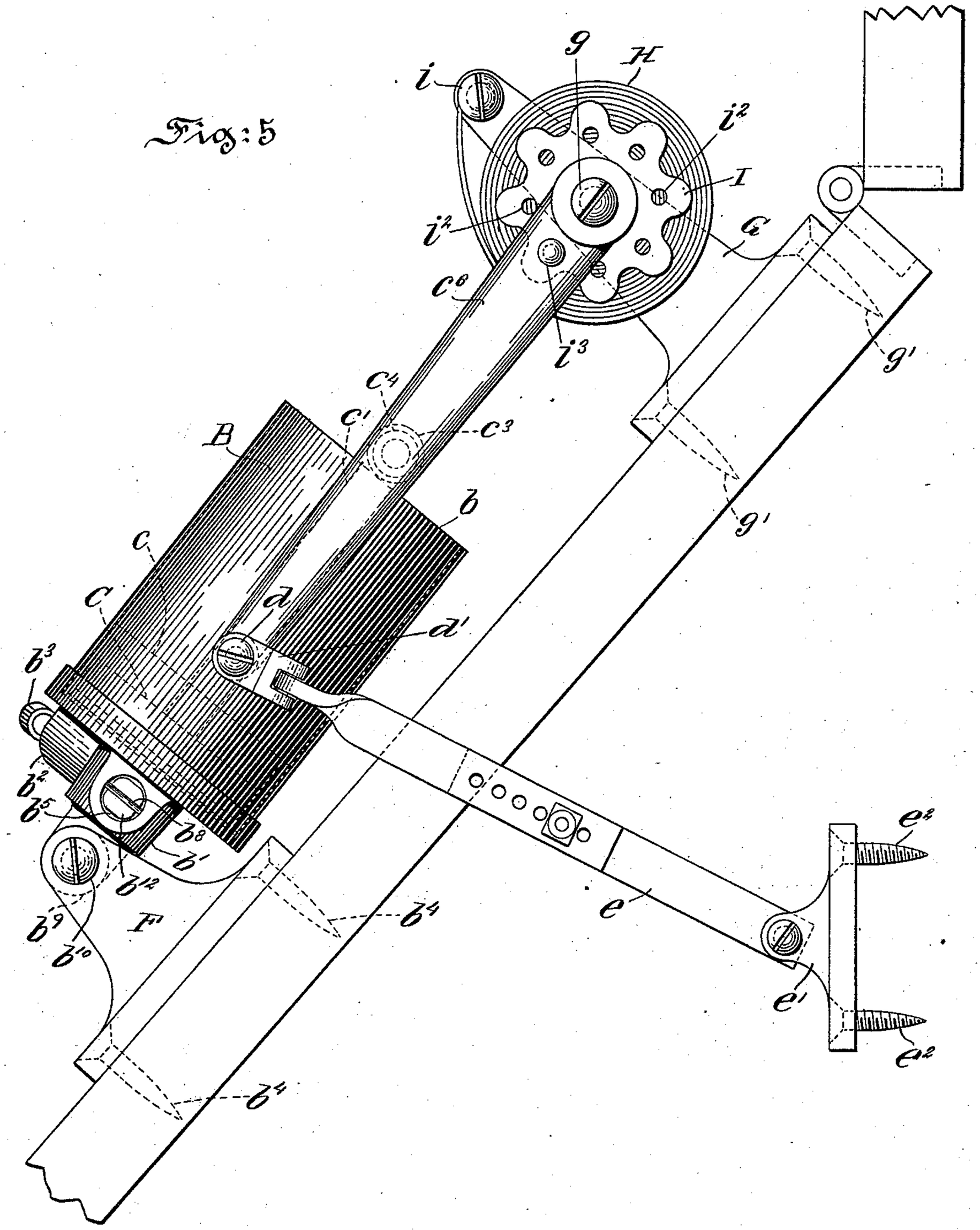
Fig: 5



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UNITED STATES PATENT OFFICE.

JOHN S. SHRAWDER, OF COLLEGEVILLE, PENNSYLVANIA, ASSIGNOR TO THE NATIONAL HARDWARE SPECIALTY COMPANY, OF CAMDEN, NEW JERSEY.

DOOR-CHECK.

SPECIFICATION forming part of Letters Patent No. 539,088, dated May 14, 1895.

Application filed July 23, 1894. Serial No. 518,351. (No model.)

To all whom it may concern:

Be it known that I, JOHN S. SHRAWDER, a citizen of the United States, residing at Collegeville, in the county of Montgomery and State of Pennsylvania, have invented certain new and useful Improvements in Pneumatic Door Checks and Closers, of which the following is a specification.

My invention has relation to a pneumatic door check and closer operating by means of a piston working in a cylinder; and it relates more particularly to the construction and arrangement of such an appliance.

The principal objects of my invention are, first, to provide a pneumatic door check and closer in which the parts are subjected to only a limited pressure or strain, and, second, to provide a pneumatic door check and closer with means and mechanism, whereby atmospheric pressure or weight may be utilized as the means for checking the closing movements of a door actuated thereto by spring door closing mechanism; and to which end it consists in connecting said mechanism with a pneumatic device, comprising a cylinder having an open end and a closed end, a valve chamber connected with the head and opening into the cylinder, check and relief valves therein and a piston and its rod whose normal position, that is, when the door is closed, is near the open end of the cylinder, so that the opening movement of the door will thrust the piston toward the closed end of the cylinder, thus exhausting the air therein through the valved chambers thereof, whereupon in the reverse action of the piston, caused by the closing movement of the door, a partial vacuum will be created in the cylinder behind the piston, while its movement toward its normal position and consequently the movement of the door, will be checked by atmospheric pressure on the outer surface thereof, the force of the spring and expansion of the remaining quantity of air in the cylinder being so regulated as to finally overcome the said pressure and close the door.

The natures and general feature of my present invention will be more fully understood from the following description, taken in connection with the accompanying drawings, forming part hereof, in which—

Figure 1 is a top or plan view of a pneumatic door check and closer embodying the features of my invention in application to a door and the jamb thereof. Fig. 2 is a view, partly in section and partly in elevation, of the head of the cylinder of the said check and closer provided with a valve-chamber and check and relief valves seated or mounted therein. Fig. 3 is a perspective view of the check and closer of my invention, comprising a cylinder having an open and a closed end, with a valve-chamber in the closed end having check and relief valves seated therein, and a piston with its rod, whose normal position, as shown, with the door closed, is near the open end of the cylinder, and also showing the spring door-closing mechanism. Fig. 4 is a similar view showing the normal position of the parts of the check in connection with a door and the jamb of the same, looking at the device from the rear thereof, and also showing the door in a closed position; and Fig. 5 is a similar view of the check and closer of my invention, showing the position of the several parts thereof when the door is open, and such being its position, as illustrated therein.

Referring to the drawings, A is a door hinged to the jamb casing or frame-work A′, thereof.

B, is a cylinder having the head closed, and provided with a cylindrical projection forming a valve chamber b', which is provided with transverse channels or chambers b^2 and b^5, whereof one has a split screw b^3, and whereof the other has a perforated dish-shaped seat b^6, detachably engaged by a plug valve b^{12}, and which is prevented from escaping from the channel or chamber b^5, by means of a cross-pin b^8, inserted through the same. The chamber b', is provided with the channels or chambers b^2 and b^5, and with the split screw b^3 and plug b^{12}, which constitute the check and relief valves of the cylinder B. The cylindrical projection b', of the head of the cylinder B, is provided with an integral lug b^9, in movable connection with a bifurcated bracket or casting F, by means of a pin or pivot b^{10}, and

the said bracket or casting is adapted to be secured to the door A, by means of screws b^{11} or the like. The opposite end b, of the cylinder is open, as clearly shown in the drawings.

C, is the piston of the cylinder B, afforded a range of to and fro movement therein. The piston is provided with a flanged gasket or packing ring c, and a stem c'. At the rear end of the stem c', is provided a bearing c^3, which is engaged by the bolt or pin c^4, of a cross-arm c^5, formed preferably integral with a lever-arm c^6.

It may be here remarked that the connection of the piston stem c', with the lever-arm c^6, is at or beyond the center of the same considered with respect to the length of said arm, as clearly illustrated in Figs. 3 and 4. At the forward end of the lever-arm c^6, by means of a pivot or pin d, and a bifurcated strap d', is movably connected an extensible arm e, which latter is pivotally connected with the forked end of a bracket e', adapted to be secured to the jamb A', of the door by means of screws e^2 or the like. The rear end of the lever-arm c^6, is connected by means of a screw or bolt g, with a bracket G, which is secured to the door A, by means of screws g', as clearly illustrated in Figs. 1, 3 and 4. Coiled around the hub of a ratchet or toothed wheel I, is a leaf spring H, one end of which is secured thereto and the other end to a back-stop or post i, of the bracket G, whereby in the manipulation of the door A, to open it the spring H, will be compressed so that when the energy exerted upon the door in the opening thereof is relieved the latter will be automatically returned to initial or closed position. The tooth or ratchet wheel I, is loosely mounted on the bolt g, extending through the bearing of the lever-arm c^6, and bracket G. Engaging through one of the openings i^2, in said wheel I, is a pin i^3, to permit of the said wheel, which has one extremity of the coiled spring H, connected therewith, being manipulated so as to increase the tension of the spring H, by inserting the pin i^3, through the said lever-arm c^6, and an opening i^2, of the wheel I, after having turned by hand or otherwise the said spring one or more times around to closely compact the leaves to each other.

The mode of operation of the pneumatic door check and closer hereinbefore explained, is as follows:—The door check and closer with its accessories will be in the position shown in Figs. 1, 3 and 4, when the door A, is closed. To open the door A, the piston C, is forced from its position at or near the open end b, of the cylinder B, in the direction of the head or closed end thereof, thus exhausting the air therein through the valve chamber b', by its lifting the plug valve b^{12}, from its perforated seat b^6, in the transverse channel or chamber b^5, of the vslve chamber b', and thereby escaping in such manner from the cylinder B. In the reverse action of the piston C, within the cylinder B, caused by the closing movement of the door, a partial vacuum will be created in the cylinder behind the piston, while the movement toward its normal position is at or near the open end b, of the cylinder B, and consequently the movement of the door A, will be checked by atmospheric pressure on the outer surface of the piston C, and the force of the spring H, and expansion of the remaining quantity of air in the cylinder B, are so regulated as finally to overcome said pressure and to close the door. It may be here remarked that by adjusting the split-screw b^3, in its seat in the valve chamber b', of the cylinder B, the rapidity of the closing of the door under the influence of the forces acting upon and against the device can be regulated to a nicety, as practice has demonstrated.

It will be manifestly obvious that as to minor details, modifications may be made without departing from the spirit of my invention, and hence I do not wish to be understood as limiting myself to the precise construction and arrangement of all the parts as illustrated; but,

Having thus described the nature and objects of my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A pneumatic door check and closer, comprising a cylinder having an open and a closed end, a valve chamber connected with said head and opening into said cylinder and check and relief valves therein, a piston and its rod, the normal position of which when the door is closed is at or near the open end of said cylinder and spring door closing mechanism operatively connected with the said rod and said door and the jamb thereof, substantially as and for the purposes described.

2. A pneumatic door check and closer, comprising a cylinder having an open and a closed end, a valve chamber connected with said head and opening into said cylinder, movable check and detachable relief valves therein, said cylinder adapted to be pivotally attached to a door, a piston and its rod, the normal position of which piston when the door is closed is at or near the open end of said cylinder, a spring controlled lever-arm connected with said rod and an extensible arm connected with said lever-arm and the jamb of the door, substantially as and for the purposes described.

In testimony whereof I have hereunto set my signature in the presence of two subscribing witnesses.

JOHN S. SHRAWDER.

Witnesses:
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