

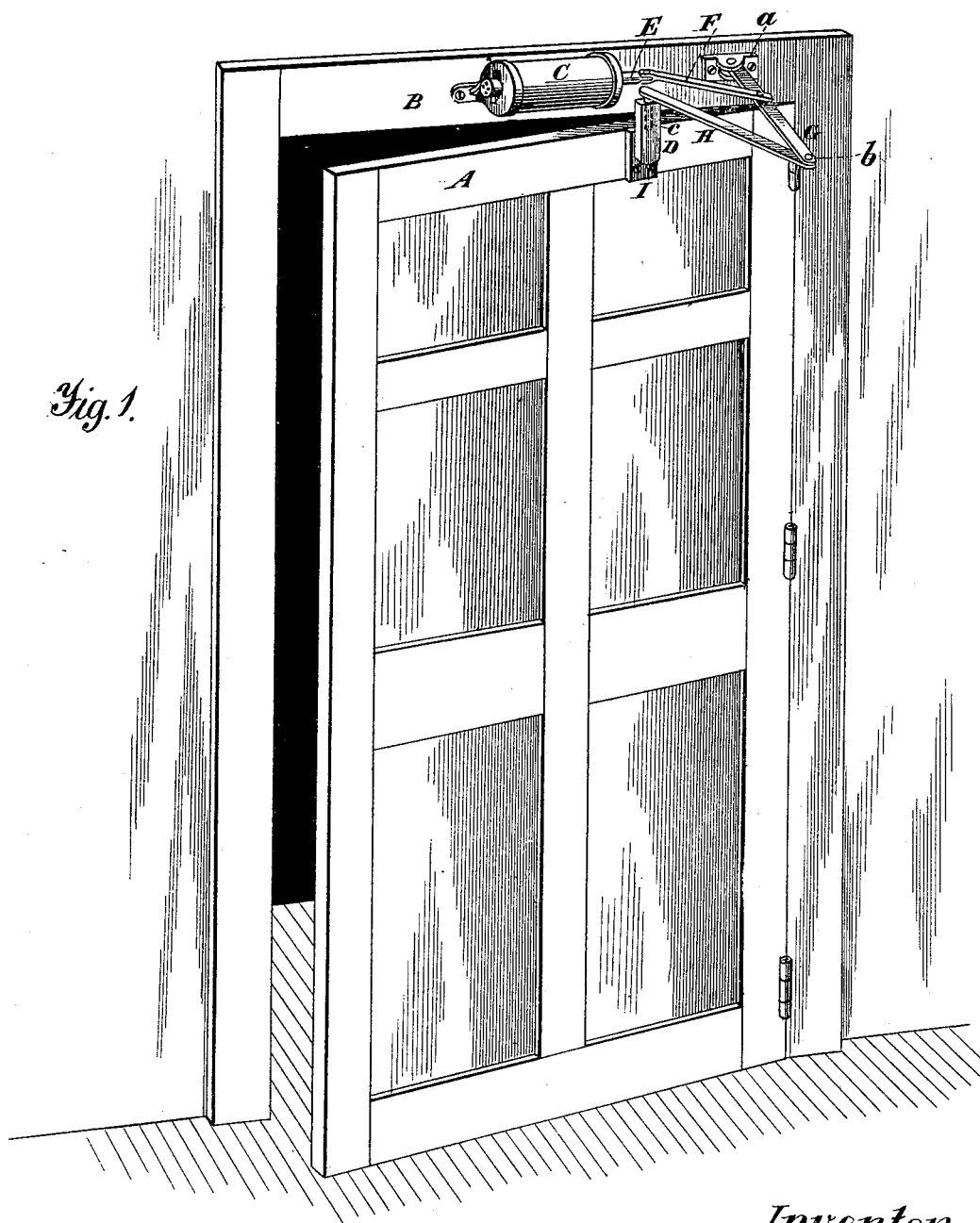
(No Model.)

2 Sheets—Sheet 1.

G. R. ELLIOTT.
PNEUMATIC DOOR CHECK.

No. 266,795.

Patented Oct. 31, 1882.



Witnesses.
A. Ruppert.
Wm H. Bates

Inventor:
Gilbert R. Elliott
per C. E. Duffy
att'y

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Fig. 2.

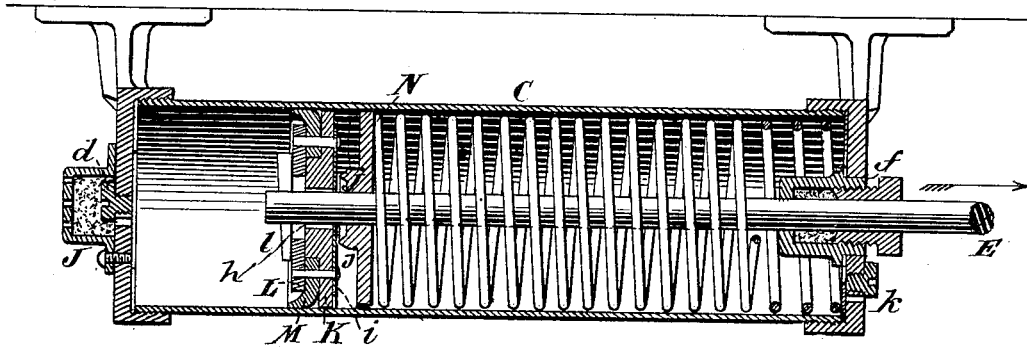


Fig. 4.

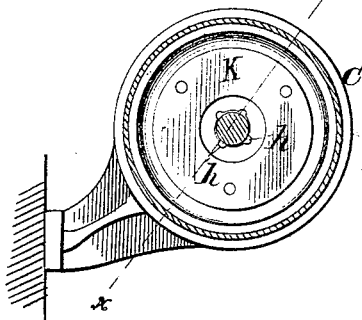


Fig. 3.

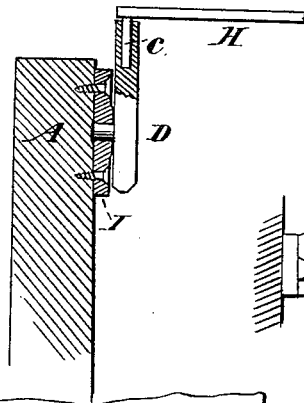
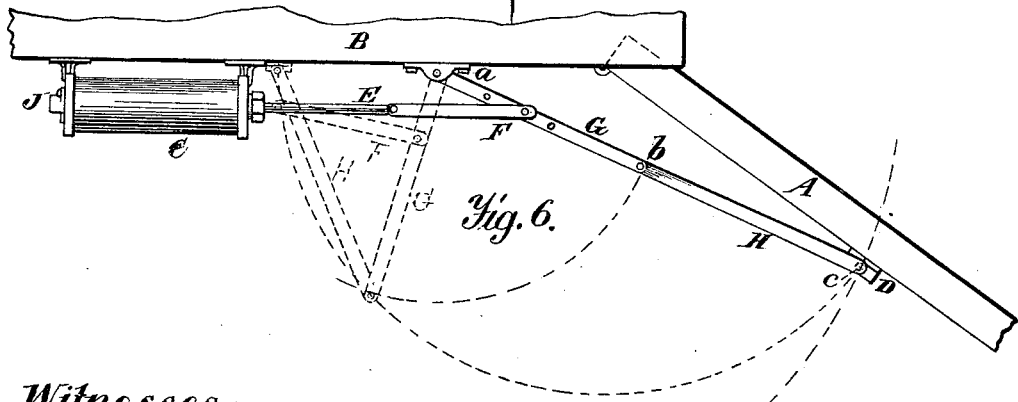
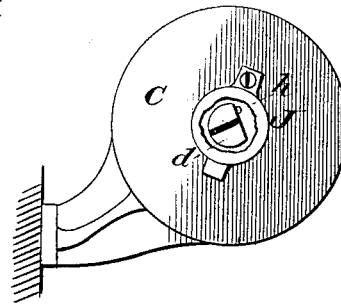


Fig. 5.



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UNITED STATES PATENT OFFICE.

GILBERT R. ELLIOTT, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE
ELLIOTT PNEUMATIC DOOR CHECK COMPANY, OF SAME PLACE.

PNEUMATIC DOOR-CHECK.

SPECIFICATION forming part of Letters Patent No. 266,795, dated October 31, 1882.

Application filed September 5, 1882. (No model.)

To all whom it may concern:

Be it known that I, GILBERT R. ELLIOTT, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Door-Checks; and I do hereby declare that the following is a full, clear, and exact description of the invention, which 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 the letters of reference marked thereon, which form part of this specification.

This invention relates to that class of inventions known as "pneumatic door-checks."

The object of the invention is to shut or close a door, and at the same time prevent the slamming thereof, and also to retain the door in an open position when desired.

The present invention is an improvement upon an allowed application now in the United States Patent Office, (serial No. 64,329;) and it consists in combining in one cylinder a double cushioning force, whereby the impelling force of the spring is neutralized before the door reaches the contact-point of the sill or jamb, and thereby the slamming of the door is prevented.

It further consists in means for retaining the door in an open position against the tension of the spring by the arrangement of the links, levers, and piston-rod in combination with the cylinder.

It further consists in means for retaining the working-cylinder and piston-rod in a true line, notwithstanding the settling or sagging of the door or door-frames or building; and it finally consists in the combination, with the cylinder, of a door-check and vent-valve of a muffling device, whereby the disagreeable sissing noise, caused by the induction and eduction of air, is obviated.

For a more complete understanding of my improved door-check, I will refer to the accompanying drawings, which form a part of this specification.

Figure 1 is a perspective view of an ordinary door, partly open, with my door-check in position. Fig. 2 is a longitudinal central section

on, line *x x* of Fig. 4 through the cylinder, clearly illustrating all the working parts. Fig. 3 shows a portion of a door, to which is attached a detail of my improvement, and which forms one of the important features of my invention. Fig. 4 is a transverse sectional view of the cylinder, a face view of the piston-head, which shows small apertures around the piston-rod for the escape of air from one side of the piston-head to the other. Fig. 5 is an end view of the cylinder, showing the air-controlling valve. Fig. 6 represents a top plan view of the door and door-check, and also the various parts, showing the door open and the position of the links when closed, the latter being in dotted lines. The position now occupied by the door, as shown in this figure, will be automatically retained when desired to have the door stand open, and the parts will strike the segment shown by the dotted lines.

The same letters denote like parts in all the figures.

A is the door, and B the jambs. C is the cylinder; D, the door fastening or pivot. E is the piston-rod, and F the connecting-link. G is a link, pivoted to a bracket, *a*, located on the jamb of the door, and connects to a link, H, by a knuckle or other suitable joint, *b*. This link or arm H also connects to a swiveling-socket, D, on the door, the arm H having a pintle, *c*, which fits in said socket D. The socket D is pivoted in the piece I, (see Fig. 3,) which is fastened to the door A and arranged to adjust itself to any angle of the door, either open or closed or while swinging. All these parts co-operate with each other, in combination with the cylinder and mechanism therein, to close the door and prevent it from slamming.

Upon one end of the cylinder I locate what I term a "muffler," J, arranged to move laterally over the valve or valves. This muffler is perforated on its exterior surface, and also communicates with the interior of the cylinder by means of a valve, *d*. This muffler is filled with sponge or some loose fibrous material, and its object is to break the sissing noise of the escaping air from the cylinder by breaking its volume into infinitesimal jets, thus destroying

its velocity, and consequently its noise. It is obvious that air passes into the cylinder through the muffler as well as out. On the other end of the cylinder C is located a stuffing-box, *f*, and having a gland, *g*, through which the piston-rod works. The spring in the cylinder fits over the stuffing-box. It is not therefore in the way. The stuffing-box is made longer than common for the purpose of making it act as a guide for the piston-rod, and thus prevent it from shunting.

I will now proceed to describe the internal parts of the cylinder and their operation.

K represents the piston-head, which is formed of the disk-follower L and packing M. This piston-head (usually rigidly fixed) loosely fits the piston-rod, and has around its bore surrounding the piston-rod small apertures, *h*, for permitting air to pass through between the rod and the bore of the piston-head. Upon the face of the piston-head is a disk, *i*, of leather or other flexible material, which forms a valve-seat. Rigidly fixed to the piston-rod is another piston-head, N, against which the spring works, and on its opposite side is formed a valve or annular projection, *j*, beveled to a knife-edge. This valve-seat *j* is designed to fit up against the flexible disk *i* on the piston-head K. On the end of the piston-rod is an adjusting device—in this instance a pin, *l*—which is tapering in form; but a set-screw or lock-nut or other equivalent device may be used. The piston-head K is adapted to have sliding motion between the piston N and the pin *l* for the purpose of allowing the flexible disk *i* on its face to close against the valve *j*; the object being as follows: When the spring is drawn up the air is expelled from that portion of the cylinder which contains the spring, so that when the door is being shut and the spring expanding with great force, a partial vacuum is formed in the spring portion of the cylinder, and thereby retards the motion of the piston in displacing the air from the piston end of the cylinder, and thus assists the air to cushion the door against the rapid action of the spring.

Heretofore when the spring has been drawn up the air from the outside was drawn in by the piston, which rendered the opening of the door very difficult, because the air also had to be expelled from behind the piston through small vents.

With this device, when the spring is drawn up, the air displaced passes through the apertures *h*, between the bore of the piston-head and its rod, as well as through the end valve, *k*. To prevent a perfect vacuum, and entirely prevent the door from closing, I adjust the small valve *k* to admit any desired quantity of air that may be found desirable. The openings of apertures *h* of the valve *j* may be readily adjusted by lessening the space between the two piston-heads by driving in the tapering pin, or, if a nut be used, by screwing it up. This is done according to the size of the door and the

power of resistance. The valves *d* and *k* are eccentric in their action, so that the valve-openings may be regulated and controlled as occasion may require.

The leverage of the apparatus may be varied by changing the pivotal points of levers F and G.

The apparatus may be secured to the door and door-frame by any approved means; but brackets such as described and shown are preferred. In the present instance the cylinder is secured to the door-frame just over the door, and the duplex pivotal bracket is secured to the door proper, so that very little of the apparatus is exposed to view.

Heretofore the cylinder has been placed at right angles to the door, and stood out prominently, which looks very cumbersome and very unsightly. The appearance of mine is neat, the parts are simple in construction, readily put together, and effective in operation.

Having described my invention, and the best means at present known to me for carrying the same into effect, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, in a pneumatic door-check, of a cylinder provided with a double piston-head, said heads having a valve and valve-seat, whereby the vacuum on one side of the heads is utilized with the air on the other side of the piston-heads for forming a combined cushioning and holding-back medium, as described.

2. The combination, in pneumatic door-checks, of a cylinder inclosing operating mechanism, with a muffling device secured thereto to prevent the noise arising either from induction or eduction of the air when rapidly entering or escaping from the cylinder, as shown and described.

3. The combination, in a pneumatic door-check, of the cylinder, double piston-heads provided with a valve and valve-seat, as described, and the operating-spring with a muffling device, substantially as described.

4. The combination, in a pneumatic door-check, of the cylinder, a piston, a spring, the air-controlling valves, whereby the pressure of air within the cylinder is regulated by its admission and escape, with the noiseless muffling device, arranged to move laterally over the valve or valves, and adapted to muffle the air on its induction and eduction, substantially as shown and described.

5. The combination, in a pneumatic door-check, consisting of a piston-rod, tight and loose piston-heads or disks, one of said piston-heads having a valve and the other a valve-seat, the loose piston being adapted to approach and recede from the tight piston-head, and adjustable thereto, whereby, when the piston-heads are moving in one direction, two forces are made to retard the motion in the opposite direction, the pressure in the cylinder is equalized, substantially as set forth.

6. The combination, in a door-check, of the cylinder, the piston-rod E, link F, and links G and H, the latter having a pintle adapted to revolve in a pivoted socket, said socket also
5 being adapted to adjust itself to any irregularities of the settling of the door-frame or sagging of the door, in the manner shown and set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

GILBERT R. ELLIOTT.

Witnesses:

MINTER P. KEY,
B. F. MORSELL.