

(No Model.)

J. KEENE.
DOOR CHECK.

No. 479,813.

Patented Aug. 2, 1892.

Fig. 1.

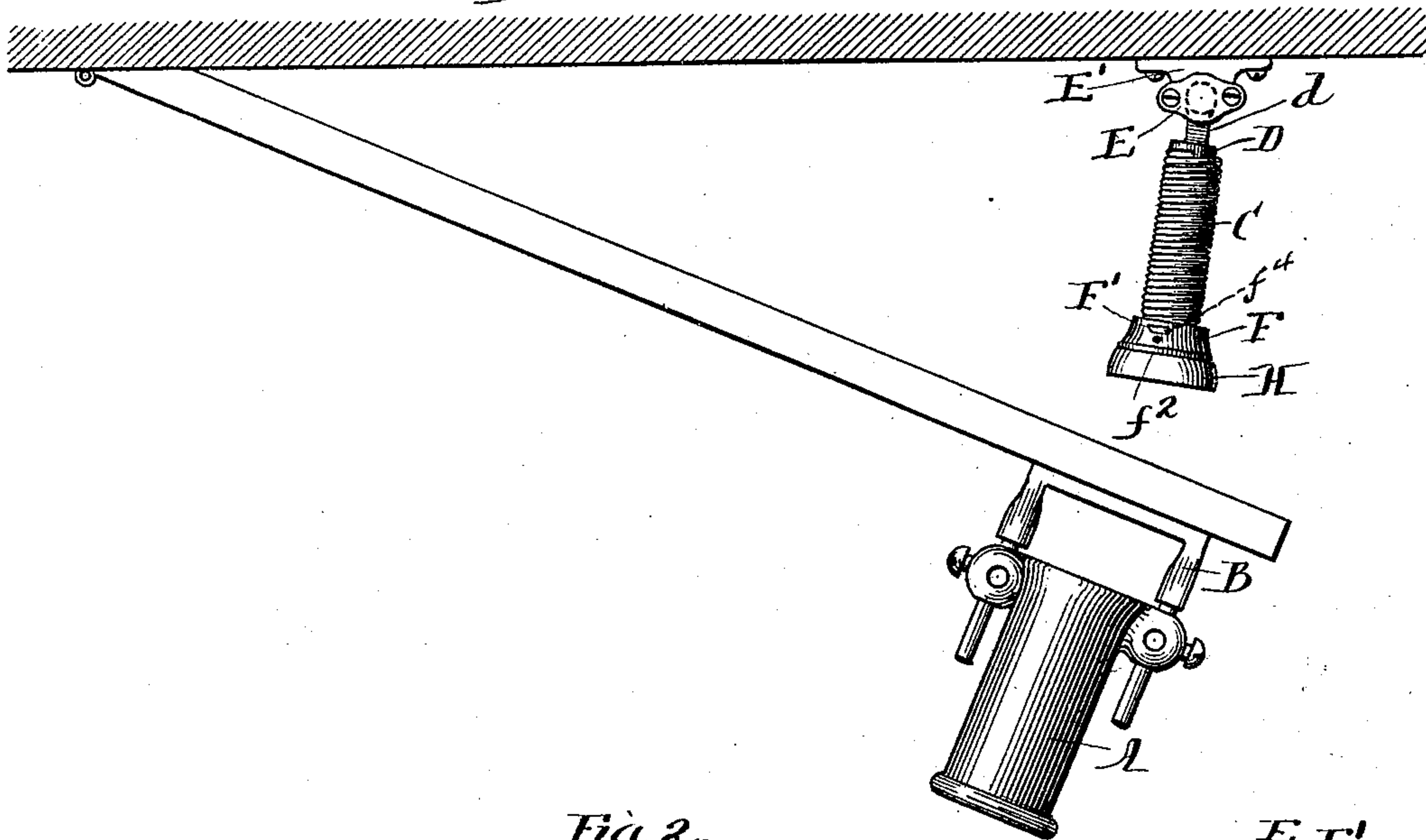


Fig. 2.

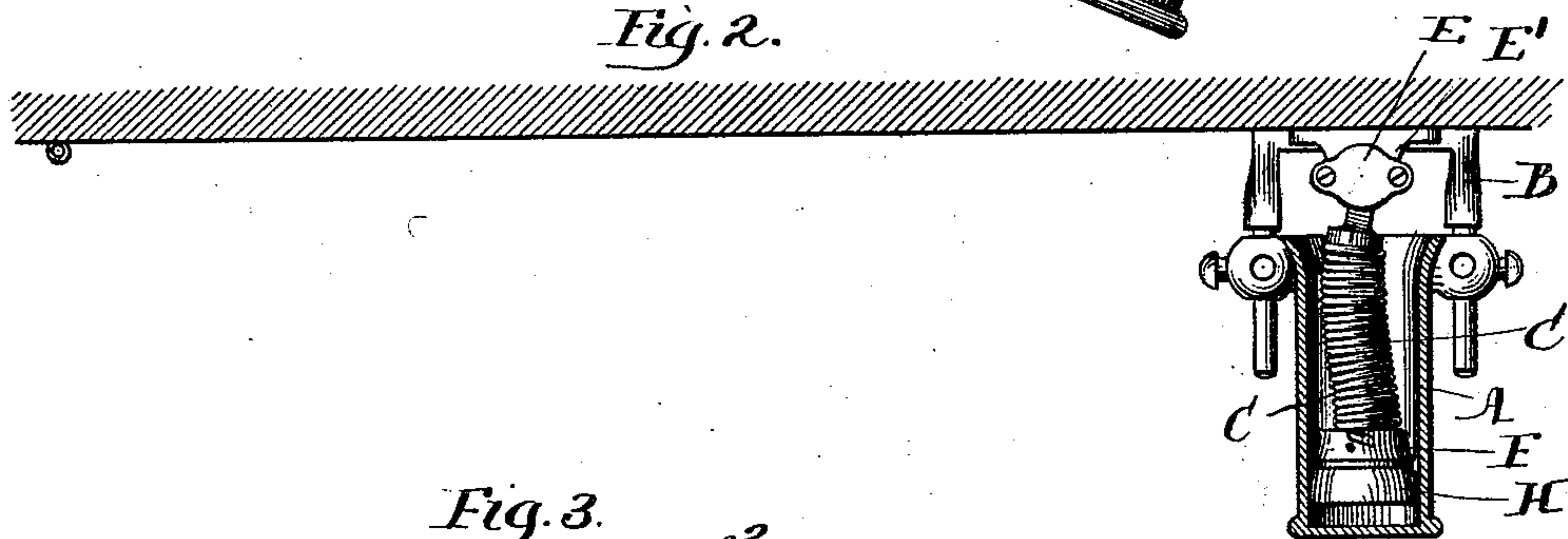


Fig. 3.

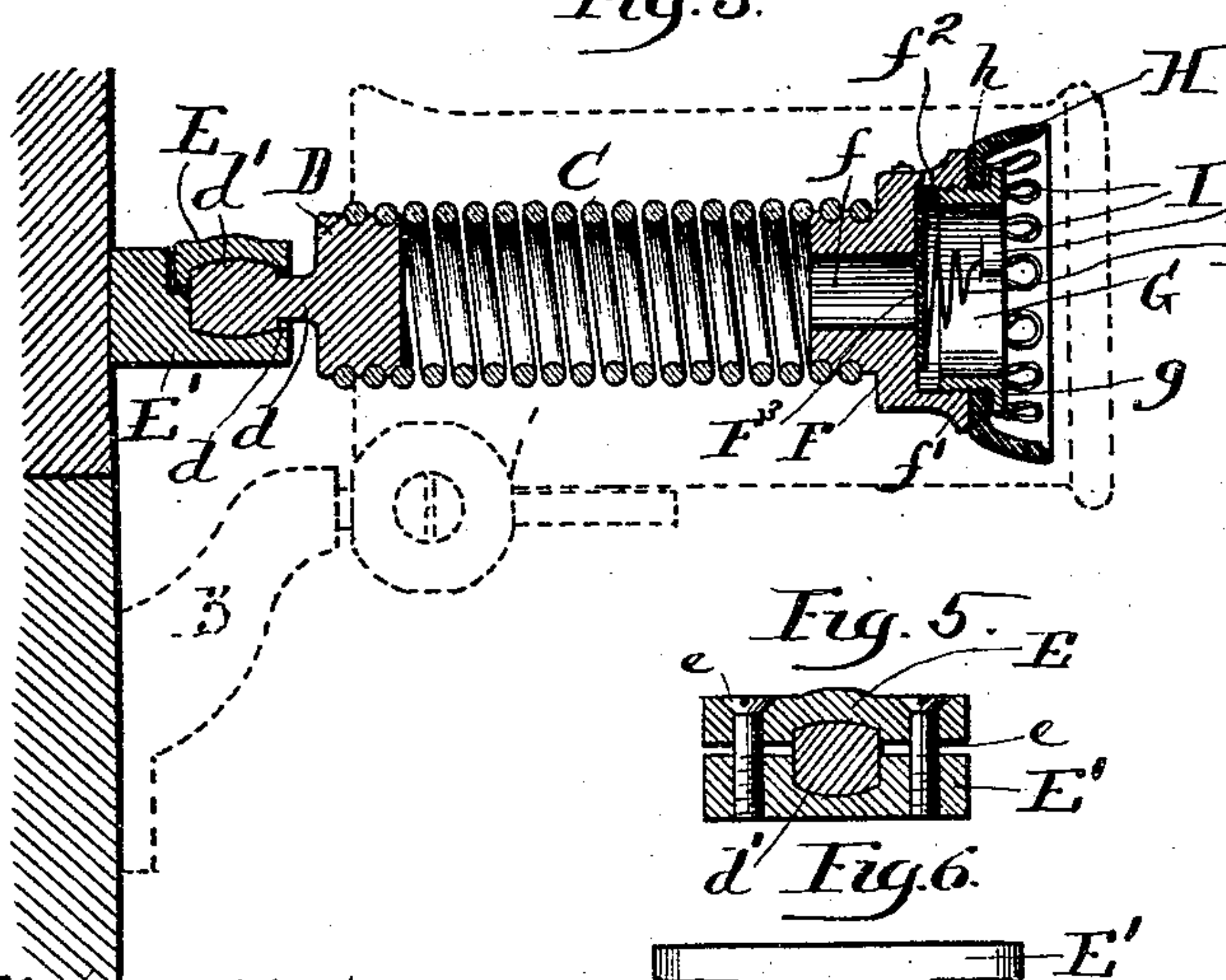


Fig. 4.

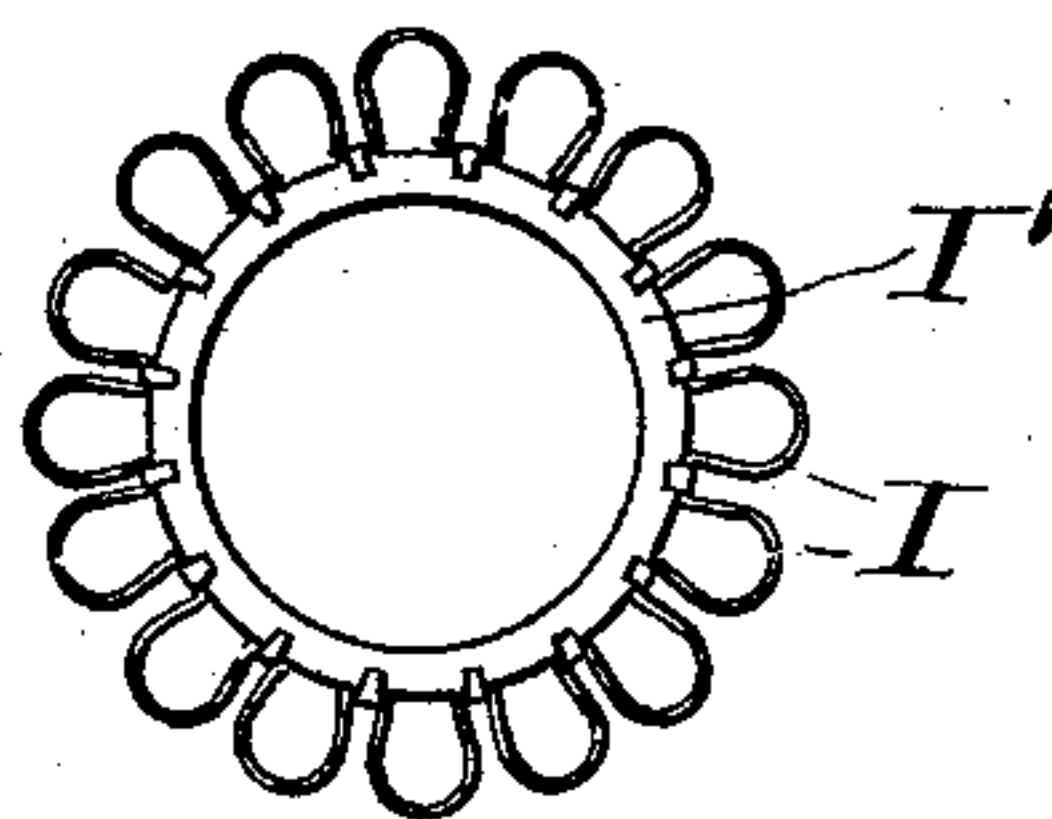
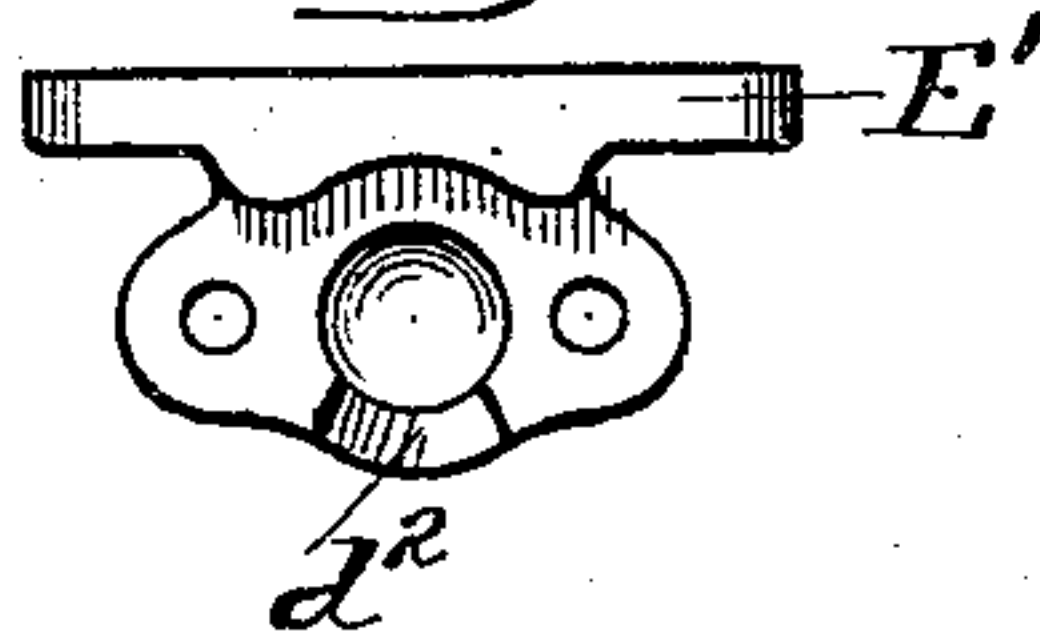


Fig. 5.



Fig. 6.



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UNITED STATES PATENT OFFICE.

JOSEPH KEENE, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE CHICAGO SPRING BUTT COMPANY, OF SAME PLACE.

DOOR-CHECK.

SPECIFICATION forming part of Letters Patent No. 479,813, dated August 2, 1892.

Application filed November 2, 1891. Serial No. 410,630. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH KEENE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Door-Checks, of which I do declare the following to be a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My present invention has relation more particularly to that class of door-checks commonly known as "pneumatic" door-checks, wherein there is employed a cylinder, within which air will be compressed by a piston to resist the violent closing or slamming of the door, an example of this type of door-check being illustrated in Letters Patent No. 454,360, granted to the Chicago Spring Butt Company as my assignee June 16, 1891. In this class of door-checks, and particularly with constructions in which the piston is completely withdrawn from its cylinder in the act of opening the door it is desirable that provision shall be made for permitting the piston to accurately enter the cylinder. If the cylinder be a straight one, as is usually the case, provision must be made to permit the free passage of the piston into the cylinder, notwithstanding the fact that the door which carries the cylinder or the piston, as the case may be, is moving upon the arc of a circle tangential to which the piston extends.

One object of my invention therefore is to provide improved means for so sustaining the piston-head that it can freely travel within the cylinder, and this object I have accomplished by providing the piston-head with a flexible connection or support.

My invention consists in the novel features of construction hereinafter described, illustrated in the accompanying drawings, and particularly defined in the claims at the end of this specification.

Figure 1 is a plan view of a door and lintel having applied thereto a door-check embodying my improvements. Fig. 2 is a view showing the door in closed position and showing the cylinder in horizontal section, the piston being shown in plan. Fig. 3 is a view in cen-

tral vertical section through the piston, the cylinder being shown in dotted lines. Fig. 4 is a detail inverted plan view of the wire spring whereby the piston-packing is forced normally outward. Fig. 5 is a view in vertical transverse section through the ball-and-socket joint which sustains the piston. Fig. 6 is a plan view of the lower socket-plate.

A designates the cylinder of my door-check. In the drawings I have illustrated the same construction of cylinder as is set out in my hereinbefore-mentioned Letters Patent, although it will be readily understood that any suitable construction of cylinder might be employed instead thereof, as my present invention relates to the piston mechanism and not to the cylinder. The cylinder A is a cylinder open at one end, its mouth being bell-shaped or expanded to permit the piston-head to readily enter therein, and the opposite end of the cylinder A may be completely closed or may be provided with a vent, if desired. In the arrangement shown in the drawings the cylinder A is attached by means of a suitable bracket B to the door, the piston in such case being attached to the lintel or casing of the door, although it will be readily understood that the cylinder may be placed upon the lintel and the piston upon the door, if desired.

The body or carrier C of my improved piston is preferably formed of a coiled spring, one end of this spring being furnished with a plug D, the stem d of which is ball-shaped or expanded at its end that fits between the socket-plates E and E', that are held together and against the ball d' by means of screws e . The socket-plate E' is preferably furnished with bracket-arms e^1 or other convenient means whereby it may be attached to the lintel of the door. The front edges of the socket-plate E' are preferably cut away to form the space d^2 , through which the stem d passes, and by means of the socket-plates and their screws, bearing, as they do, upon the ball d' , the stem d can be adjusted to hold the piston-body in any desired position, as will presently more fully appear. The opposite end of the coiled spring C is preferably furnished with the improved construction of

piston-head illustrated in the drawings—that is to say, the outer end of the spring C carries a cap F, preferably perforated, as at f , to provide for the ready admission of air to the cylinder when the piston is to be withdrawn therefrom. This cap F is preferably interiorly screw-threaded to receive a correspondingly-threaded retaining-ring G, between the flange g of which and the flange f' of the cap is clamped the cup-shaped washer or packing H, preferably of leather or rubber, the free edge of which is forced normally outward by the bent metal spring I. This spring I, as more particularly shown in Fig. 4 of the drawings, is made by forming a wire with return-bends, as shown, and then uniting the inner bends of the wire to a base-ring I', that will be clamped between the flange g of the retaining-ring and the inwardly-projecting flange h of the washer H. Preferably the cap F is furnished with a vent-hole f^2 , that is controlled by a valve F', consisting of a plate pivoted, as at f^4 , and adapted to be swung more or less over or entirely away from the opening f^2 . The purpose of this opening f^2 is to allow a slight escape of the air from the cylinder as the piston enters the same, and the function of the valve F' is to increase or diminish the area of the opening, in order to modify the escape of air, and thus determine the force with which the arresting of the door shall occur. Within the recessed portion of the cap F is placed a valve F³, that is held in position to normally cover the opening f of the cap by means of the spring F⁴, this spring preferably bearing against lugs g^2 , projecting inwardly from the ring or washer G. The purpose of this valve F³ is to close the opening f when the piston enters the cylinder, but to allow for the free admission of air as the piston and cylinder are separated in the act of opening the door.

From the foregoing description it will be seen that when the cylinder A has been placed upon the lintel of the door and the socket-plates have been attached to the door in approximately correct position the piston can be readily adjusted to permit its head to accurately enter the mouth of the cylinder as the door is closed. The proper position for the piston can be easily determined by loosening the socket-plates and opening the door until the piston-head is withdrawn from the cylinder, and then by clamping the socket-plates together the piston will be held at the proper point to insure the accurate entrance of its head into the mouth of the cylinder. As the cylinder in its movement toward the piston travels upon the arc of a circle, while the piston is extended in a line tangential to this arc, it is manifest that as soon as the piston-head enters the mouth of the cylinder the spring-body C of the piston will be deflected, so as to permit the piston-head to assume its proper position with respect to the cylinder as the piston-head nears the bottom thereof. (See Fig. 2 of the drawings.) As soon, how-

ever, as the cylinder is withdrawn again by the act of opening the door the spring will cause the piston-head to return to the proper position for again entering the mouth of the cylinder, as seen in Fig. 1 of the drawings.

It will be readily understood that as soon as the piston-head is within the mouth of the cylinder in the act of closing the door a compression of the air within the cylinder will begin, the air so compressed acting as a cushion to prevent the slamming of the door; but as soon as air escapes, as it will through the opening f^2 in the piston-head, the door can gradually and completely close. It is obvious that by moving the valve F³ more or less over the opening f^2 the rapidity with which the air escapes from the cylinder can be determined and the suddenness with which the arrest of the door shall occur can be modified. When the door is to be opened, the valve F³ will be lifted from its seat against the force of its spring F⁴, thereby permitting the free entrance of air through the perforations f of the piston-head F to prevent the bending of the piston-head within the cylinder.

I wish it distinctly understood that features of my invention may be employed without its adoption as an entirety, and the details of construction may be modified within wide limits without departing from the spirit of my invention. Thus, for example, any other suitable form of spring may be employed instead of the coiled spring shown, and, if desired, the coiled spring may be one having its coils more or less open, so that it will not only act as a flexible support for the piston-head, but will also serve in a measure to aid in cushioning the door as it is closed. In other words, I regard the employment of a flexible connection or support for the piston-head as distinguished from the hinged rods commonly used for such purpose as a very important feature of the invention, whether a coiled spring be employed, as shown, or whether this flexible connection be of other convenient shape.

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

1. In a door-check, the combination, with an open-ended cylinder or casing, of a piston-head, said parts being constructed the one for attachment to the door and the other for stationary attachment and so that the two may entirely separate by the withdrawal of the piston-head from the cylinder, and a flexible body or carrier for sustaining the piston-head in manner permitting it to be entirely withdrawn from and to re-enter the open-ended cylinder, substantially as described.

2. In a door-check, the combination, with an open-ended cylinder or casing, of a piston-head, said parts being constructed the one for attachment to the door and the other for stationary attachment and so that the two may entirely separate by the withdrawal of the piston-head from the cylinder, and a flexible

body or carrier for sustaining the piston-head in manner permitting it to be entirely withdrawn from and to re-enter the open-ended cylinder, said flexible body or carrier having
5 one end fixed to the piston-head and having its opposite end rigidly fixed to a bracket for attachment to the door or casing, substantially as described.

3. In a door-check, the combination, with
10 an open-ended cylinder or casing, of a piston-head, said parts being constructed the one for attachment to the door and the other for stationary attachment and so that the two may entirely separate by the withdrawal of the
15 piston-head from the cylinder, and a flexible connection or support for sustaining the piston-head in manner permitting it to be entirely withdrawn from and to re-enter the open-ended cylinder, said connection consisting of a coiled spring, substantially as described.
20

4. In a door-check, the combination, with the open-ended cylinder or casing, of a piston-head, said parts being constructed the one for
25 attachment to the door and the other for sta-

tionary attachment and so that the two may entirely separate by the withdrawal of the piston-head from the cylinder, and an elastic flexible connection or support for sustaining the piston-head in manner permitting it to be
30 entirely withdrawn from and to re-enter the open-ended cylinder, and means for attaching said support to the door or lintel and for adjusting it in different positions, substantially as described.

5. A door-check comprising the combination, with a suitable cylinder and casing, of a piston-head, a suitable flexible support for said piston-head, comprising a coiled spring, a suitable plug or attachment D for the inner
40 end of said coiled spring, said plug having a stem or extension, and suitable clamp-plates for engaging with the head or end of said stem or extension and within which plates the position of said plug can be adjusted,
45 substantially as described.

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