

(No Model.)

2 Sheets—Sheet 1.

J. KEENE.  
DOOR CHECK.

No. 454,360.

Patented June 16, 1891.

Fig. 1.

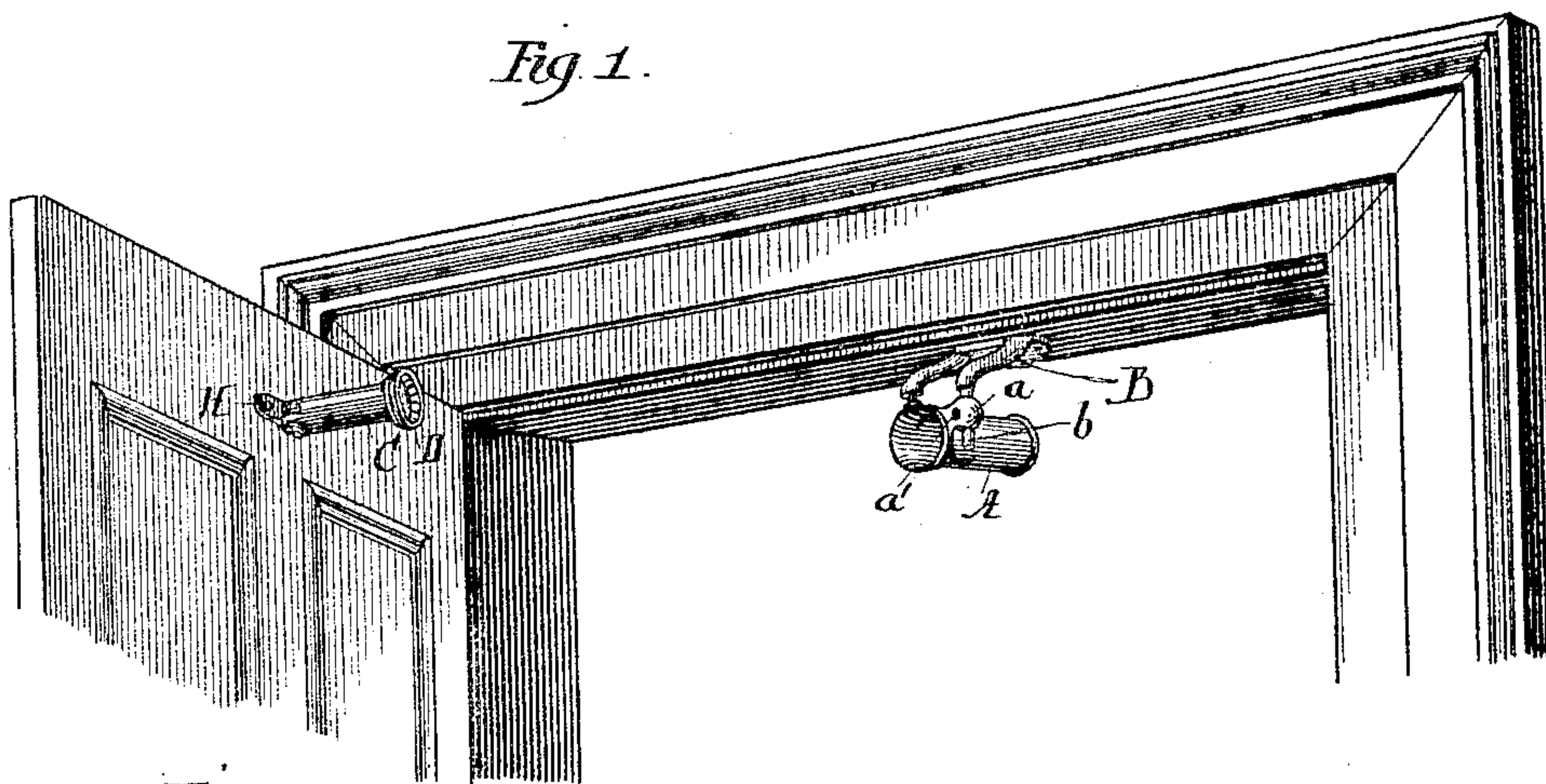


Fig. 2.

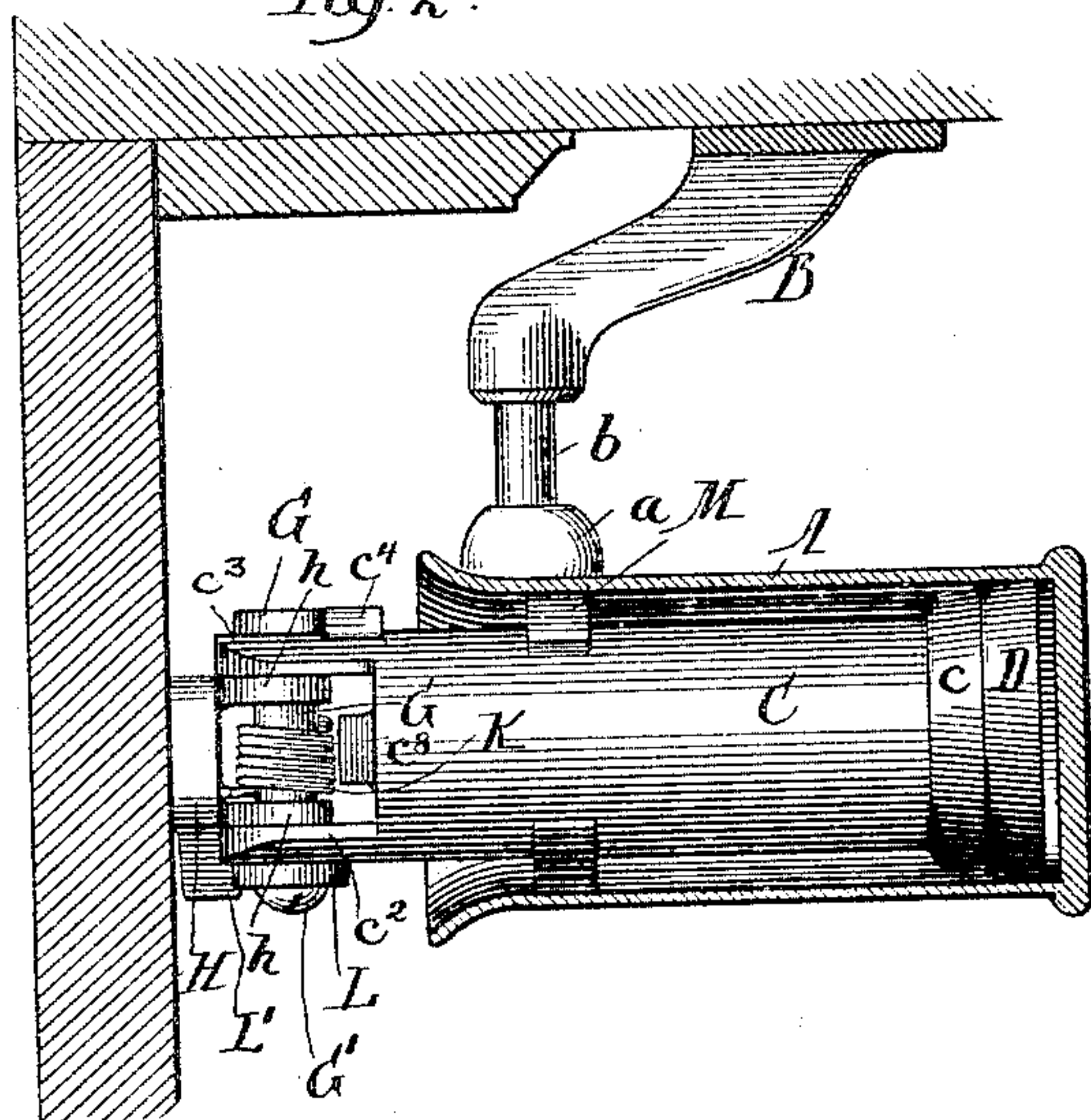


Fig. 3.

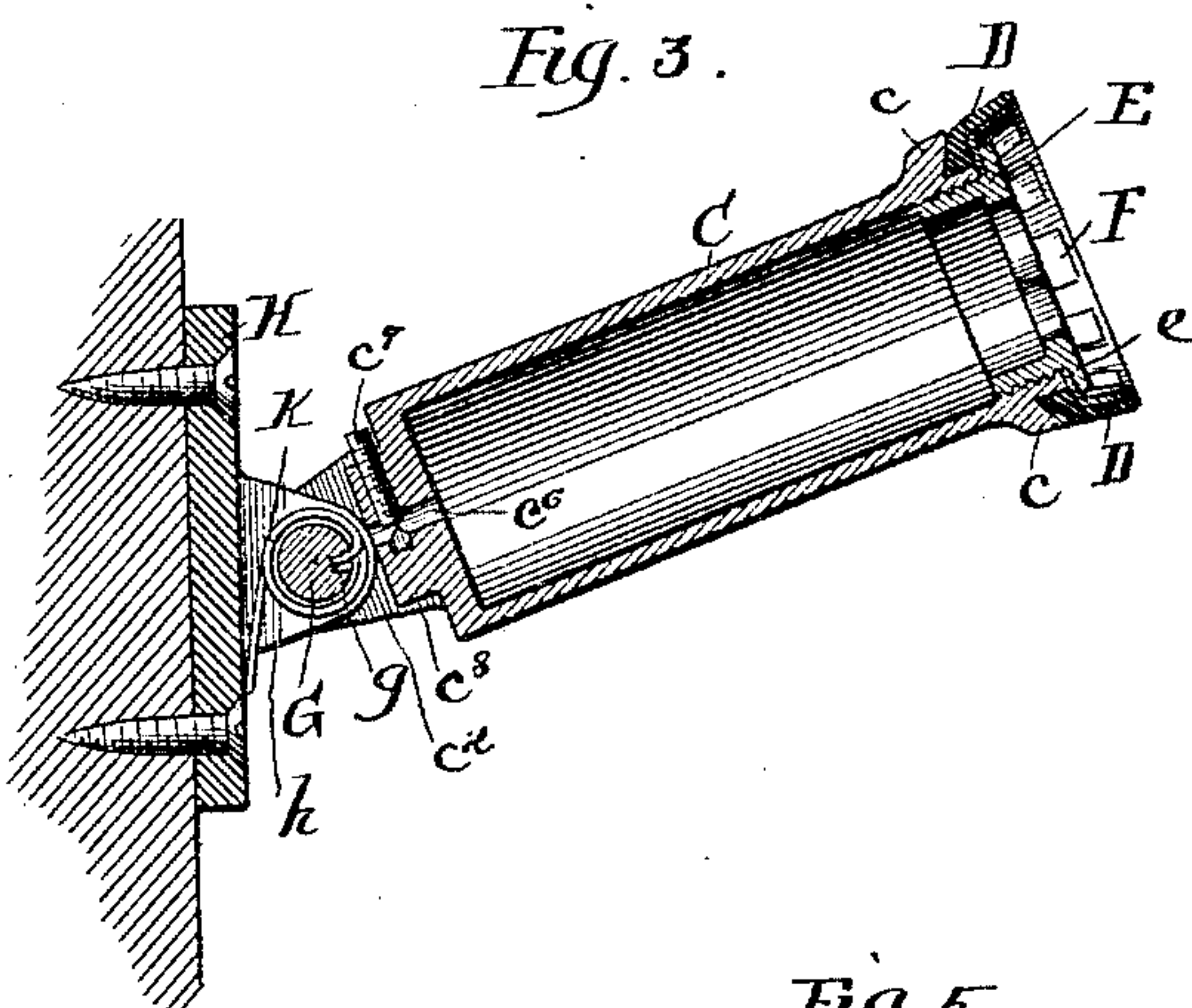


Fig. 4.

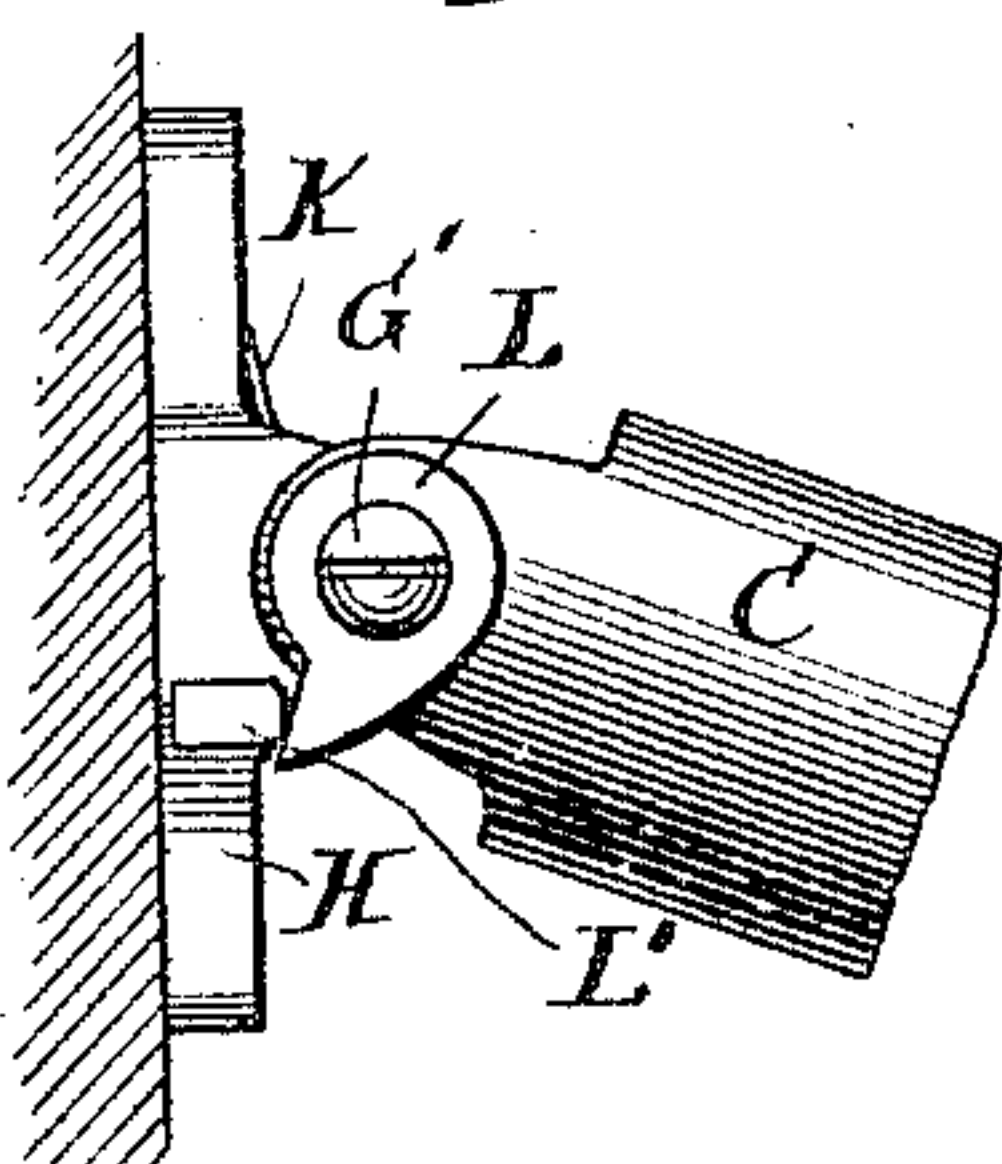


Fig. 6.

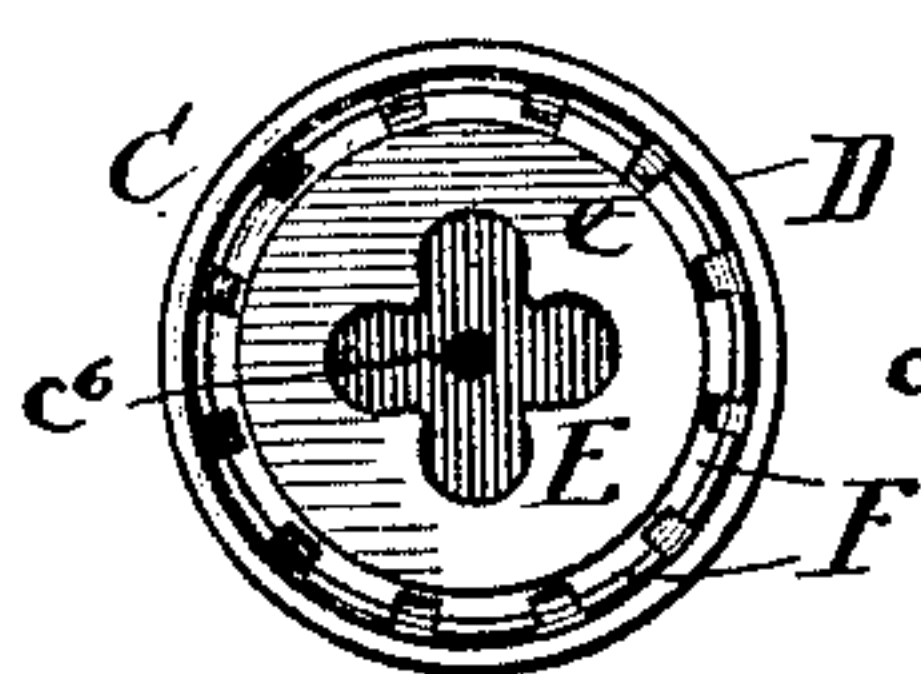


Fig. 7.

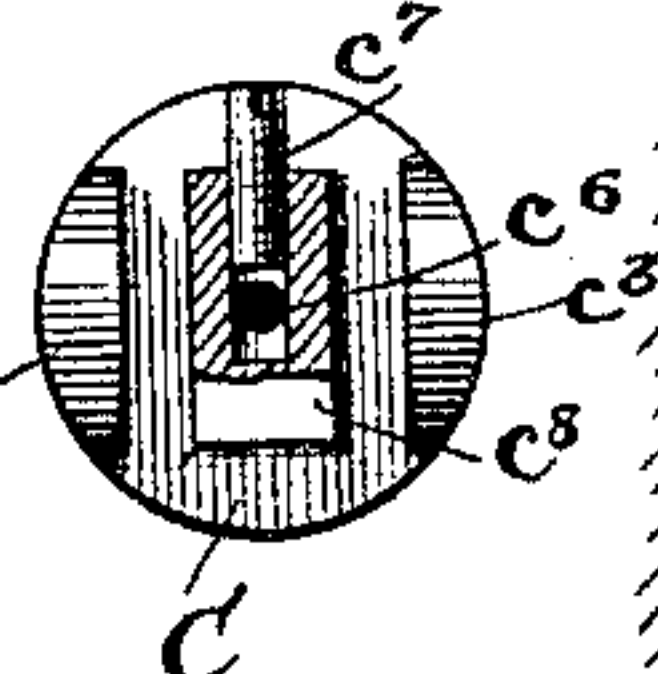


Fig. 5.

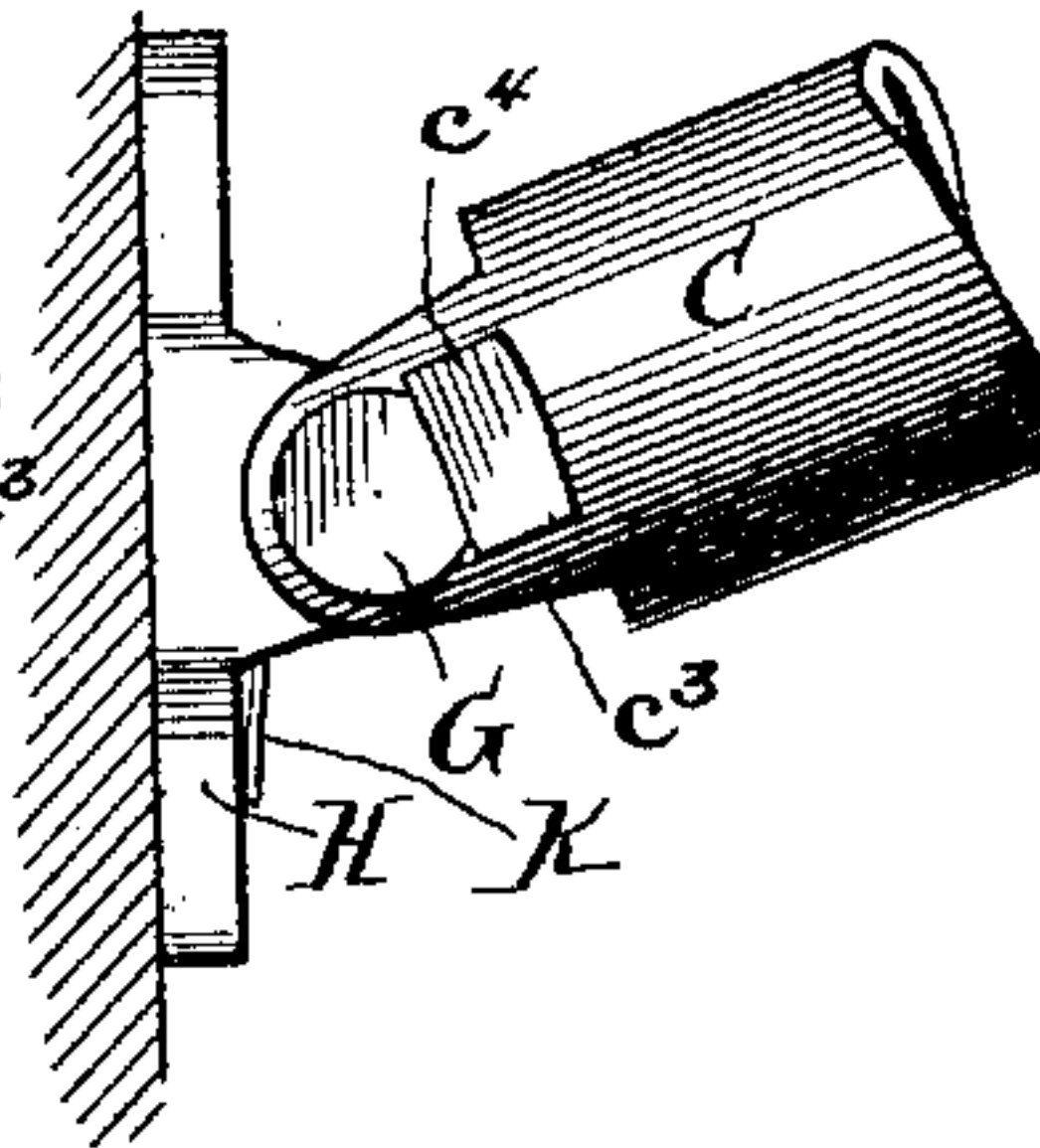
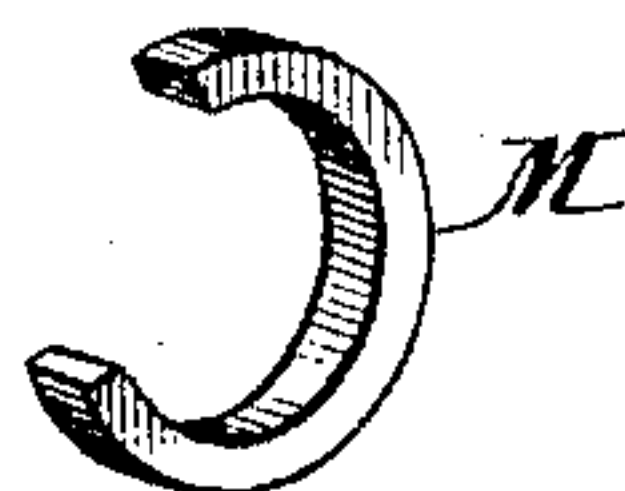


Fig. 8.



Witnesses:

Fred Gerlach  
Louis V. Le Moyne

Inventor:

Joseph Keene  
By *Paul H. Fisher*  
Attorneys



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Fig. 9.

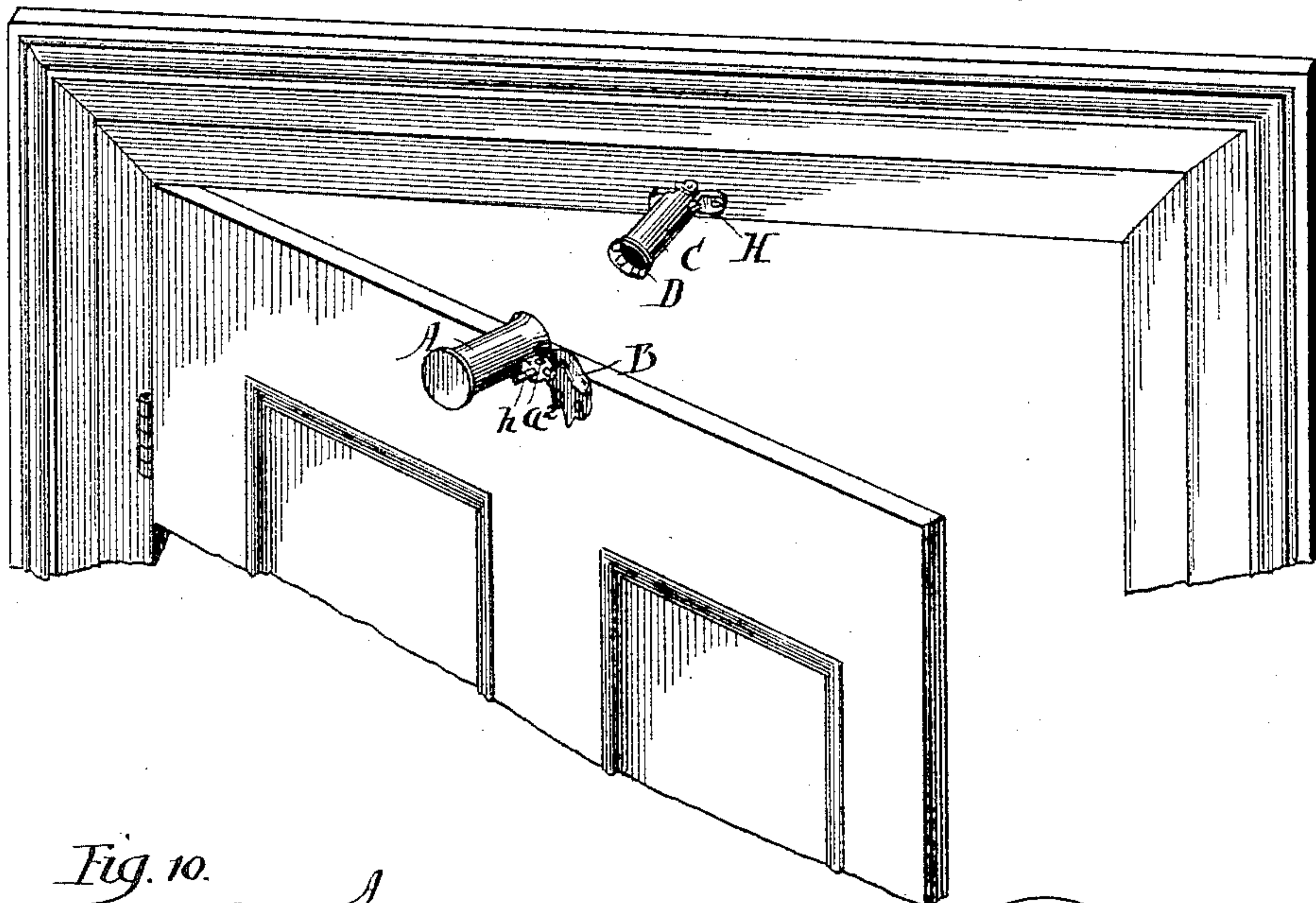


Fig. 10.

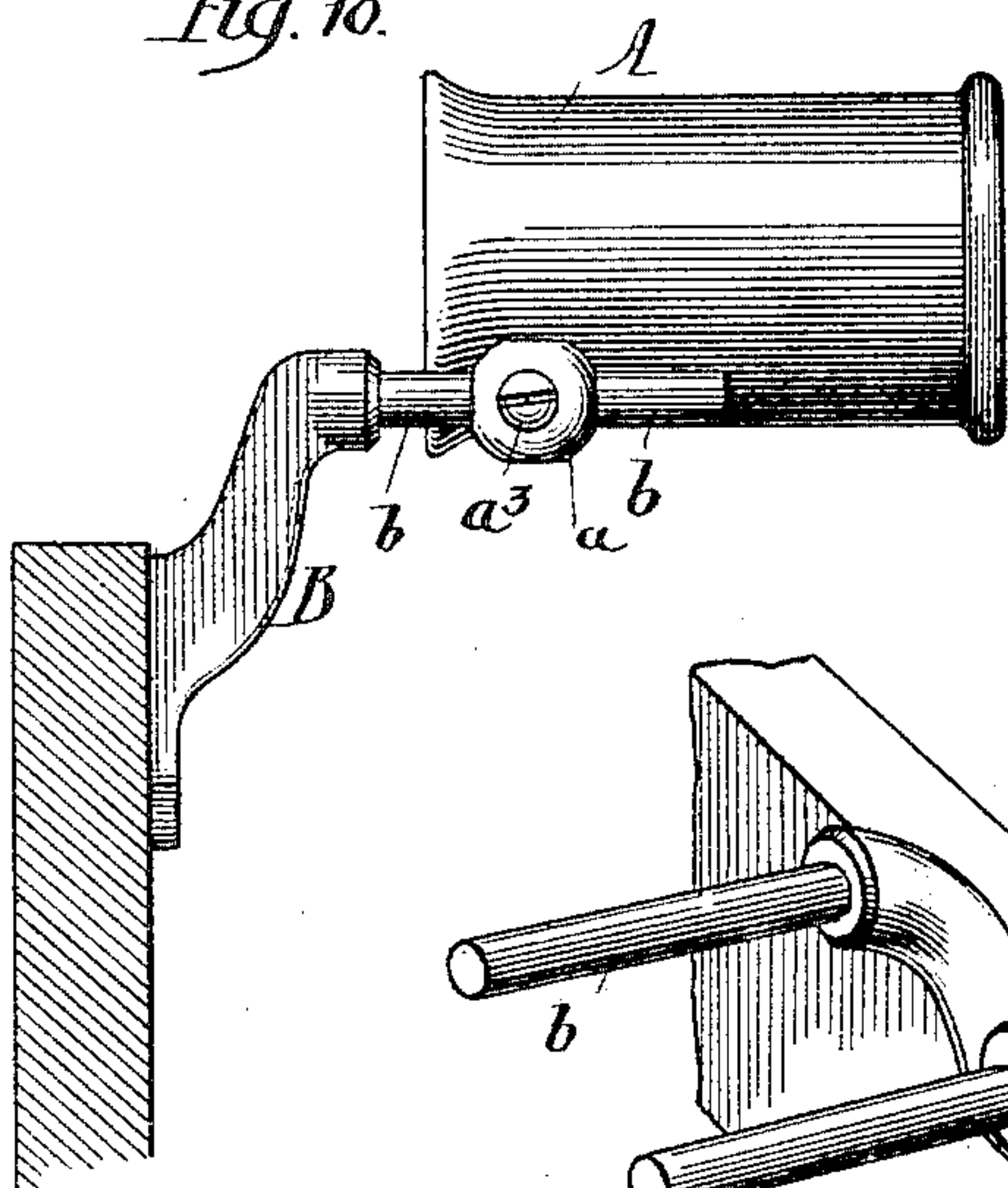


Fig. 12.

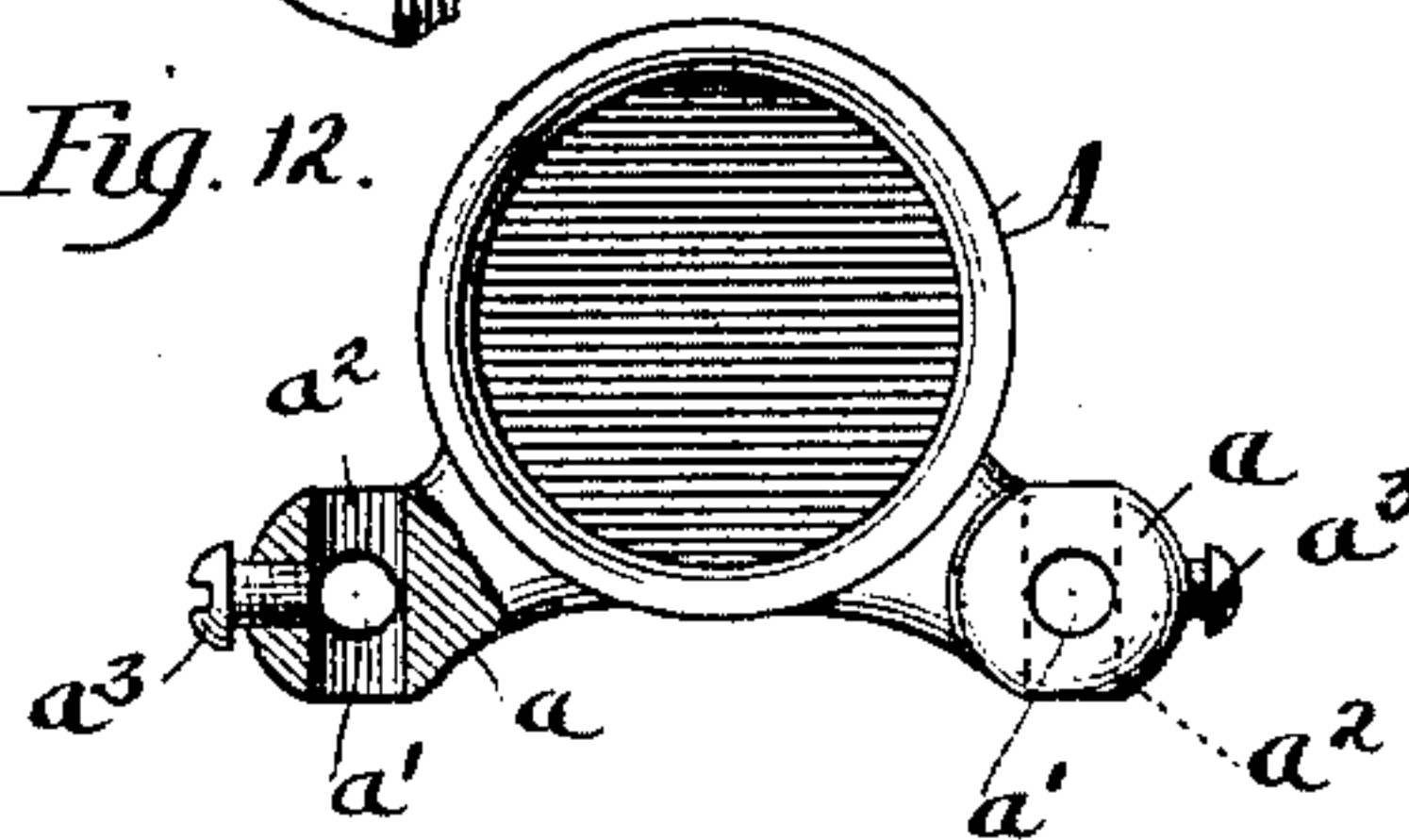
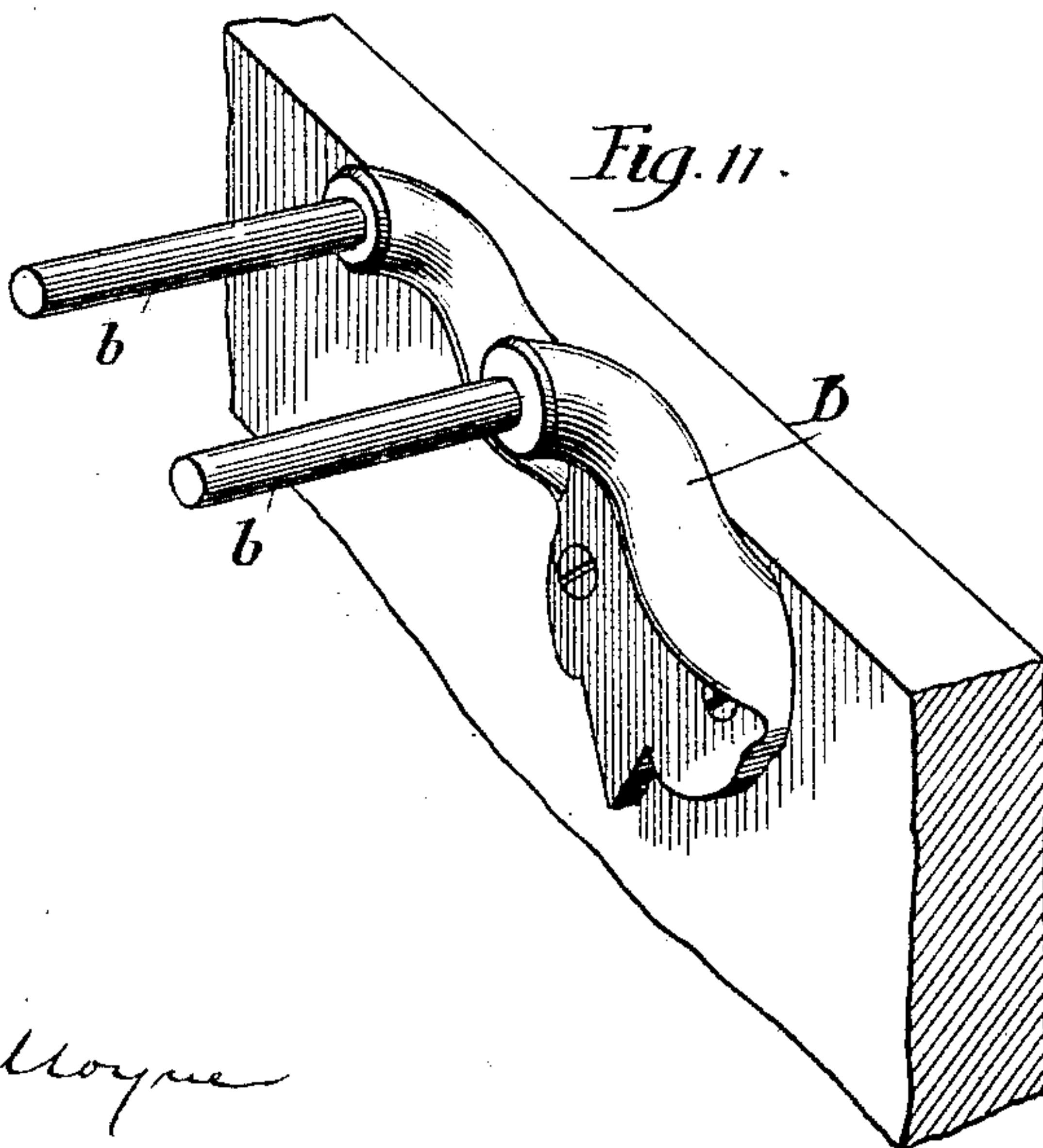


Fig. 11.



Witnesses:

Fred Gorlach  
Louis V. LeMayne

Inventor:

Joseph Keene  
By *Wm. F. Fisher*  
Attorneys.



# 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. 454,360, dated June 16, 1891.

Application filed December 3, 1890. Serial No. 373,443. (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.

This 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.

Figure 1 is a perspective view of the upper portion of a door-frame and door having my improved door-check applied thereto. Fig. 2 is a view in vertical section through the door and its lintel, and through the cylinder of the improved door-check, parts of the door-check being shown in side elevation. Fig. 3 is a detail view in longitudinal section through the piston of the door-check. Fig. 4 is a fractional view from one side, showing the rear end of the piston and its connections; and Fig. 5 is a view similar to Fig. 4, but taken from the opposite side of the piston. Fig. 6 is a front end view of the piston. Fig. 7 is a view of the rear end of the piston, parts being shown in section. Fig. 8 is a detail perspective view of the adjustment-ring. Fig. 9 is a view similar to Fig. 1, but showing the piston and cylinder in different positions. Fig. 10 is a view in vertical section through the door, showing the cylinder and its bracket attached thereto and in side elevation. Fig. 11 is a view in perspective of the bracket for sustaining the cylinder. Fig. 12 is a front view of the cylinder, parts being shown in section for better illustration.

In the construction of that class of pneumatic door-checks to which my invention more particularly relates it is very desirable that the body of air to be compressed shall be of such size as to successfully resist the violent slamming or closing of the door. For this reason it is customary to make the cylinders of considerable length, and it is custom-

ary also to employ a small piston-rod provided at its end with a piston of suitable size to work within the cylinder.

One of the objects of my present invention is to avoid the necessity for making the cylinder of such size as to be unsightly and clumsy in order to enable it to hold the proper volume of air to be compressed, and this object I have accomplished by forming the piston as a hollow piston, so that a portion of the volume of air to be compressed shall be within the piston. In other words, the piston, being hollow, will co-operate with the cylinder in affording a large reservoir wherein the air may be momentarily compressed, while at the same time the piston shall perform as well its function in compressing the air.

My invention also consists in improved means for sustaining the piston and its details of construction. In this class of devices it is desirable that some means shall be provided whereby the cylinder can be held either upon the door-face or upon the lintel of the door-frame, and with devices of this character heretofore employed it is customary to provide the cylinder with two brackets, one of which is suited for attaching the cylinder to the door-face, and the other of which is adapted for sustaining the cylinder upon the lintel.

A further object of my invention is to so construct the cylinder and its bracket that the same bracket will serve to sustain the cylinder either upon the door-face or upon the lintel. This object I have accomplished by providing the cylinder with an extension and with a bracket adapted to be connected to the cylinder in either of two positions, so that the attachment of the cylinder to the door-face or lintel can be readily effected.

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

The cylinder A of my improved door-check is preferably a cylinder open at one end, as shown, and having its opposite end closed. Upon opposite sides of this cylinder are formed suitable lugs or extensions *a*, whereby the



cylinder is connected to a bracket B, that serves to attach the cylinder in position upon the door or the lintel.

While my invention is designed to cover, broadly, the feature of a cylinder provided with means whereby it may be connected in two positions to its supporting-bracket, I prefer to carry out this invention by the construction illustrated in the accompanying drawings—that is to say, the lugs or extensions  $a$  (if two of such lugs or extensions be used) are provided with perforations  $a'$  and  $a''$ , these perforations extending at right angles to each other, as more particularly shown in Fig. 12 of the drawings. Each of the perforations  $a'$  and  $a''$  are of size adapted to admit the arm  $b$  (one or more) of the bracket B, and through the sides of the lug  $a$  pass the set-screws  $a^3$ , whereby the adjustment of the cylinder upon the bracket B can be effected and whereby the cylinder can be firmly secured upon the bracket. If a sustaining-bracket B having only a single arm is to be employed, then this arm will preferably be made square, and the holes through the lugs  $a$  of the cylinder will be made correspondingly square to better guard against the turning of the cylinder upon the arm. It is obvious, however, that any other suitable means may be employed for connecting the lug  $a$  of the cylinder to the arm  $b$  without departing from the spirit of my invention so long as provision is made whereby the cylinder can be attached to the arm of the bracket in either of two positions.

By reference to Figs. 1 and 2 of the drawings it will be seen that the arms  $b$  of the bracket B, when in the perforations  $a''$ , that extend at right angles to the body of the cylinder, will hold the cylinder in proper position beneath the lintel of the door-frame, and by reference to Figs. 9 and 10 it will be seen that when the arms  $b$  of the bracket B are in the perforations  $a'$ , that extend in the plane of the length of the cylinder, the cylinder may be conveniently held upon the face of the door.

My improved piston C is formed hollow, as shown, and at its free end is furnished with a packing-ring D, preferably of leather or other suitable flexible material. This packing-ring has its lower portion seated against the annular flange or rim  $c$  of the piston and is held in place by means of a cap E, that is screw-threaded (see Fig. 3) to engage with the correspondingly screw-threaded end of the piston. The peripheral flange  $e$  of the cap E serves to hold in place also the spring-plate F, the outwardly-bent arms of which bear upon the washer D and serve to hold it normally extended. The cap E is an open cap, (see Fig. 5,) the openings being preferably of suitable shape to permit the cap to be readily screwed to its seat, and to permit also the free access of air to the interior of the piston C. The inner end of the piston C is provided with the arms  $c^2$  and  $c^3$ , through which passes

a suitable pivot-bolt G, that passes also through the arms  $h$  of the piston-bracket H. Upon this pivot-bolt G is mounted a coiled spring K, one end of which is held by the slot  $g$  (see Fig. 3) of the pivot-bolt G, while its opposite end bears against the face of the bracket H. The pivot-bolt G has its head flattened upon one side (see Fig. 5) to bear against a lug  $c^4$ , fixed to the rear portion of the piston C, and the engagement of the lug  $c^4$  with the head of the pivot-bolt G insures that the bolt shall move in unison with the piston, and vice versa. Hence it is plain that as the coiled spring K turns the bolt G it will serve to swing the piston C as the bolt G is so turned. Upon the opposite end of the bolt G is fastened an adjustable stop or arm L, this arm being held in any desired position with respect to the bolt by means of a set-screw  $G'$ , that clamps the arm firmly to the end of the bolt, the bolt G being threaded to receive the set-screw  $G'$ . The stop-arm L is adapted to contact with a suitable shoulder or projection  $L'$  upon the bracket H. The purpose of this stop-arm L is to limit the extent of movement of the piston C under the influence of the coiled spring K, and it is obvious that by setting the stop-arm L by means of the set-screw  $G'$  the piston C will be allowed to swing to a greater or less extent, in order to enable its free end to be properly brought coincident with the mouth of the cylinder A when the door is closed. The piston C is furnished, preferably, at its rear end with a suitable vent-hole  $c^6$ , that can be more or less obstructed by a screw-valve  $c^7$ , as seen more particularly in Figs. 3 and 7 of the drawings, the screw-valve  $c^7$  passing partially through a lug  $c^8$ , formed at the rear end of the piston.

From the foregoing description the operation of my improved door-check will be seen to be as follows: When the door is open, as seen in Figs. 1 and 9, the piston C will be completely withdrawn from the cylinder A. If now the door be released, so that it can be closed by the usual spring mechanism, it will be found that immediately before the closing of the door the piston C will enter the cylinder A and will compress the volume of air within the cylinder and the piston, thereby forming a cushion of air that serves to momentarily check the movement of the door. As the vent  $c^6$  in the piston C permits the escape of the air both from the piston and the cylinder, it is plain that as soon as the pressure upon the air within the cylinder and the piston is relieved the door can be completely closed. When the door is to be opened, the ready withdrawal of the piston C from the cylinder A is permitted, as a free vent for the air within the cylinder and piston is allowed by the hole  $c^6$  and by the collapsing or contraction of the packing ring or washer D.

In order to set the cylinder A and piston C in proper position with respect to each other—that is to say, in such position that the



piston C shall at all times properly enter the mouth of the cylinder A—I provide a ring M, of lead or other suitable material, which when placed about the outer portion of the piston C will hold it in proper concentric position with respect to the cylinder A, and when the cylinder and piston are thus set with respect to each other their respective brackets will be permanently fixed to the door and door-frame.

I do not wish the invention to be understood as restricted to the precise details of construction above set out, as these may be varied widely by the skilled mechanic.

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 a cylinder, of a hollow piston, said piston having its free end provided with an unobstructed opening of large area, whereby the body of air within the piston shall form a part of the air-cushion for retarding the movement of the door as the latter is closed, substantially as described.

2. In a door-check, the combination, with a cylinder, of a hollow piston provided at its free end with a packing-ring and a cap for retaining said ring in place, said cap being formed with an opening of large area, whereby a free access of air is permitted, the piston being provided at its inner end with a vent, substantially as described.

3. In a door-check, the combination, with a cylinder, of the hollow piston having an annular flange *c* around its periphery at its free end and having the interior of its free end screw-threaded, a washer D, and a cap or clamp E, having an opening therein to freely admit air to the piston, said clamp being formed with a screw-threaded portion and with a peripheral extension projecting be-

yond the cylinder to hold the washer in place, substantially as described.

4. In a door-check, the combination, with the cylinder, of a suitable piston, a bracket for said piston, a pivot-bolt G for connecting said piston and bracket, a coiled torsion-spring upon said bolt and between the arms of said bracket, said spring having one end connected to said bolt and having its opposite end bearing against the bracket, and a stop plate or arm adjustably mounted upon said bolt for limiting the extent of movement of the piston, substantially as described.

5. In a door-check, the combination, with the cylinder, of a bracket provided with an arm for sustaining said cylinder, and means—such, for example, as a lug shaped to engage said arm in two positions—whereby said bracket may be attached to the cylinder with its arm extending either in the direction of the length of the cylinder or transversely thereto, substantially as described.

6. In a door-check, the combination, with the cylinder, of a bracket for sustaining said cylinder, said cylinder being provided with a lug or extension and said bracket being provided with an arm, said arm being adjustable to said cylinder either in line therewith or at right angles thereto, and a screw for uniting said cylinder and said bracket-arm, substantially as described.

7. In a door-check, the combination, with a cylinder having a lug provided with two perforations, of a bracket having an arm adapted to enter either of said perforations to sustain the cylinder in different positions, substantially as described.

JOSEPH KEENE.

Witnesses:

J. B. CARPENTER,  
GEO. P. FISHER, Jr.