

No. 632,697.

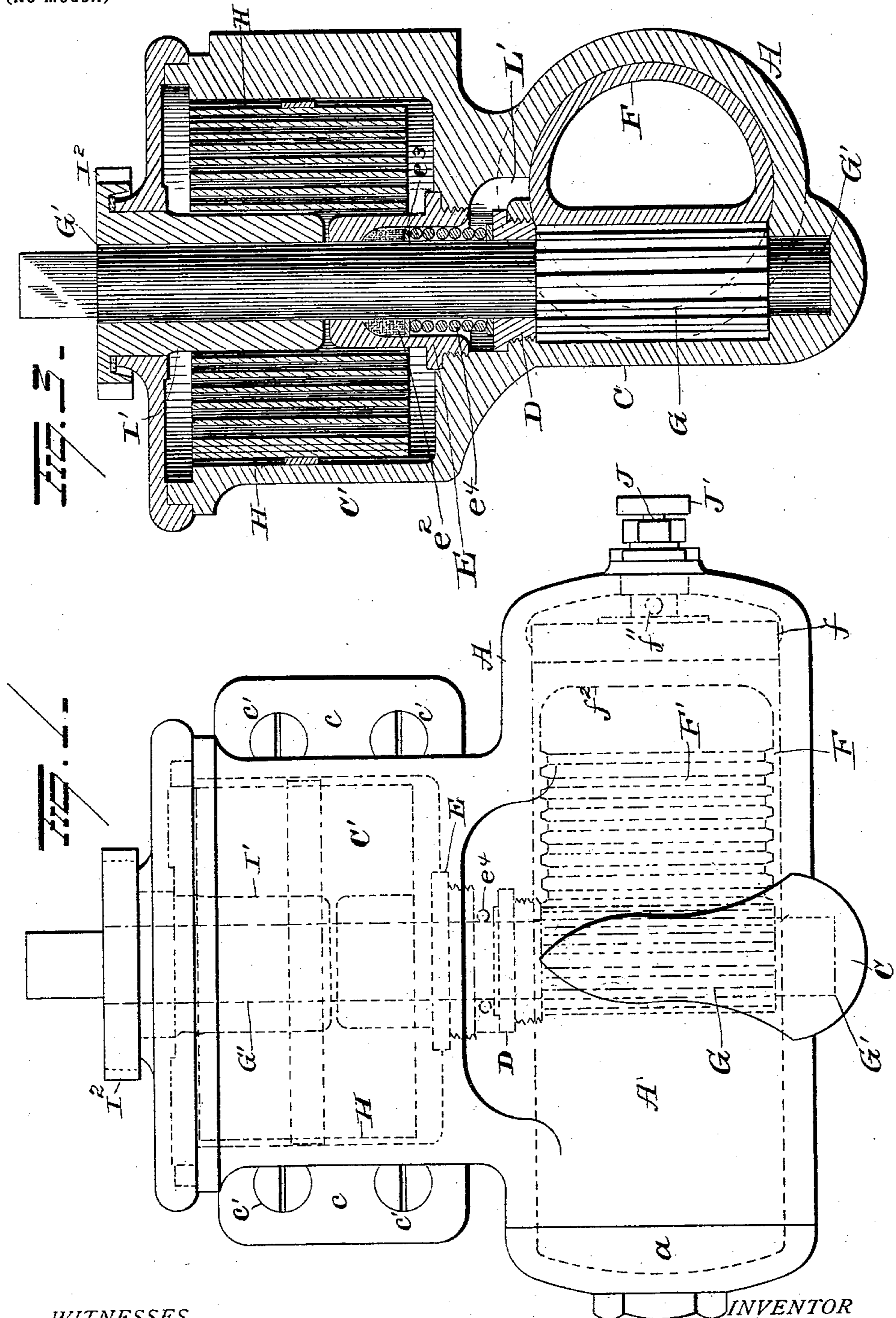
Patented Sept. 12, 1899.

C. O. CASE.  
LIQUID DOOR CHECK.

(Application filed Jan. 25, 1899.)

(No Model.)

2 Sheets—Sheet 1.



WITNESSES  
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INVENTOR  
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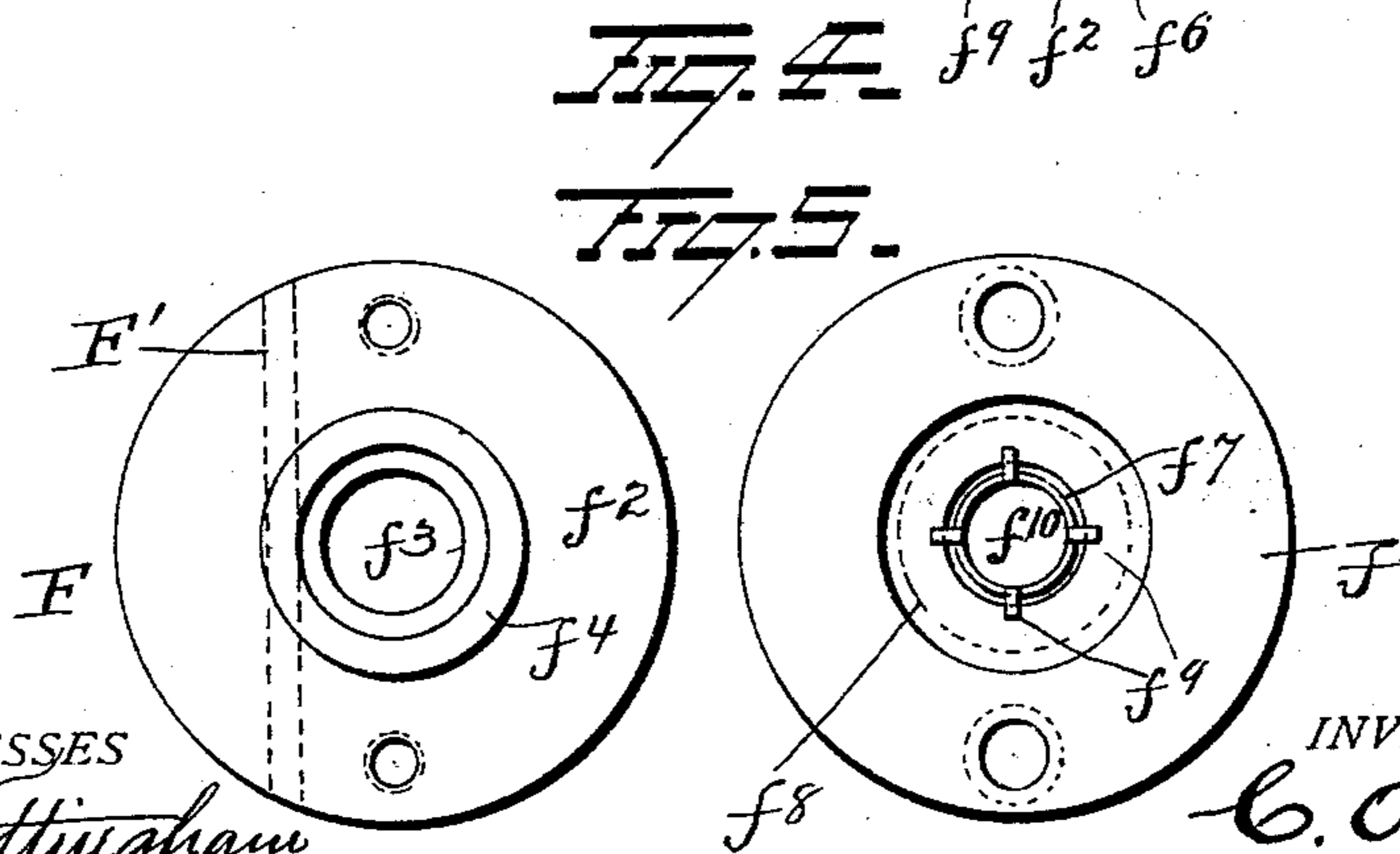
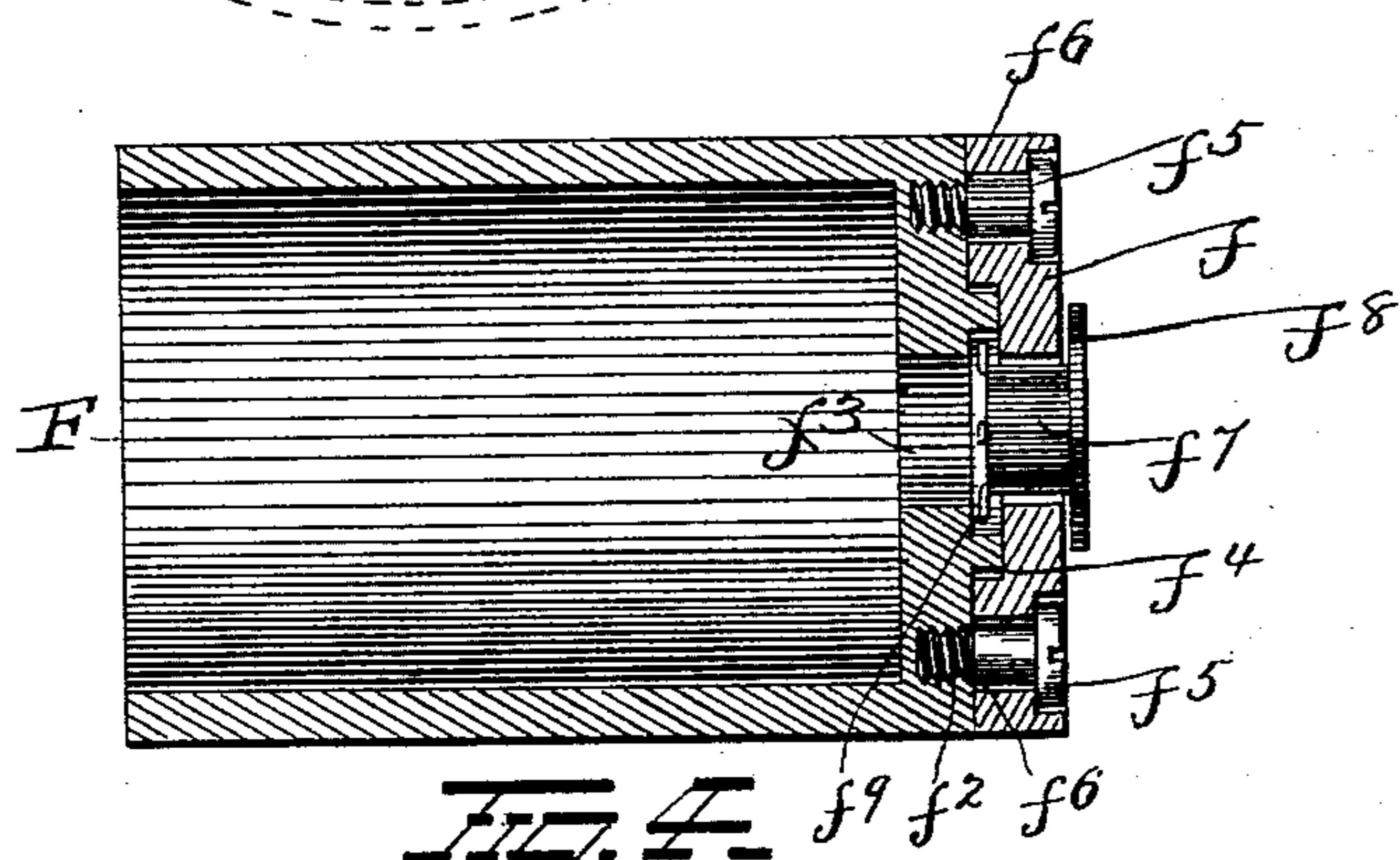
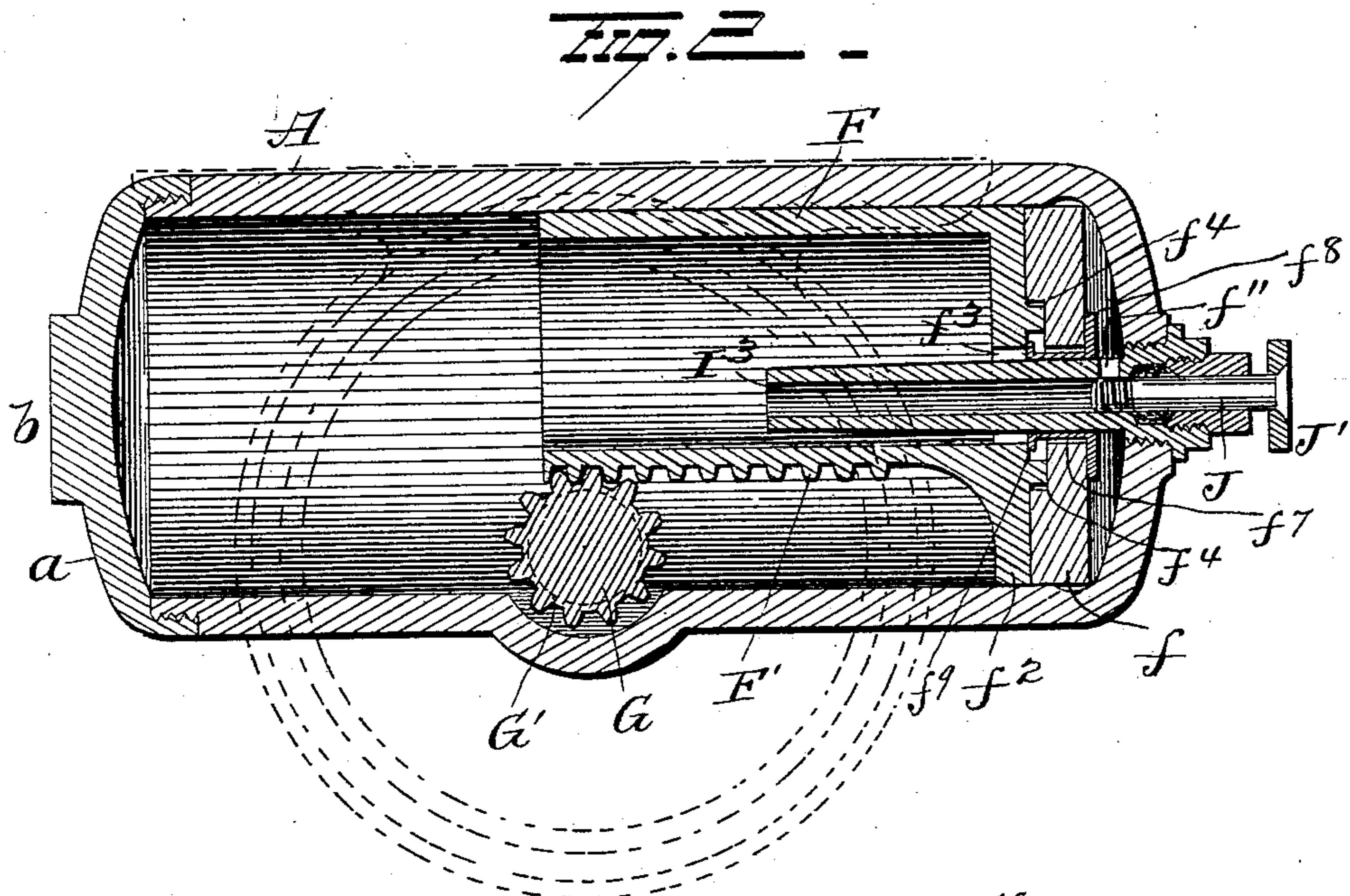
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# UNITED STATES PATENT OFFICE.

CROMWELL O. CASE, OF NEW BRITAIN, CONNECTICUT, ASSIGNOR TO THE  
P. & F. CORBIN, OF SAME PLACE.

## LIQUID DOOR-CHECK.

SPECIFICATION forming part of Letters Patent No. 632,697, dated September 12, 1899.

Application filed January 25, 1899. Serial No. 703,377. (No model.)

*To all whom it may concern:*

Be it known that I, CROMWELL O. CASE, of New Britain, in the county of Hartford and State of Connecticut, have invented certain  
5 new and useful Improvements in Liquid Door-Checks; and I 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  
10 make and use the same.

My invention relates to an improvement in liquid door-checks, and more particularly to an improvement in the door-check disclosed in my application, Serial No. 687,585, filed by  
15 me April 23, 1898.

In the door-check disclosed in my pending application before referred to the spring is located eccentrically to the head of the plunger, and the pinion engaging the rack of the  
20 plunger is located in rear of the edge of the plunger-head farthest removed from the spring. With this construction the plunger has an elongated bearing on the side farthest removed from the rack and a limited bearing  
25 at the edge of the head overhanging the rack, and the tendency is for the edge of the plunger-head overhanging the rack or projecting beyond the body of the plunger to wear more rapidly than the other portions of the plun-  
30 ger, and hence cause leakage around the plunger.

The object of my present invention is to overcome this tendency to uneven wear in the plunger-head; and my invention consists  
35 in a plunger provided with a head loose on the plunger, so as to enable the plunger to have a sliding movement on the head, and thus permit the latter to follow the movements of the cylinder, and thus escape undue  
40 pressure and consequent wear on any part of its periphery.

My invention further consists in the parts and combinations of parts, as will be more fully described, and pointed out in the  
45 claims.

In the accompanying drawings, Figure 1 is a view in elevation of my improved check. Fig. 2 is a longitudinal sectional view of same through the plunger-cylinder. Fig. 3 is a  
50 view in transverse section. Fig. 4 is a sec-

tional view of the plunger; and Fig. 5 is a view of the plunger and head, the latter being detached.

A represents a cylindrical casing having one end integral and closed at its outer end  
55 by a tightly-fitting screw-threaded cap *a*, having an angular boss *b* cast thereon for engagement of a wrench used in securing the cap in place. This cylindrical casing A is provided with a smaller integral cylinder C  
60 at right angles to the main cylinder A, the two cylinders being partly merged together, with their chambers in open and direct communication with each other, as clearly shown in Fig. 2, and also with a cylinder C' above  
65 and with its center slightly to one side of center of cylinder A and directly in line with the axis of cylinder C.

The smaller cylinder C is closed at its bottom and is provided at its top by the threaded  
70 sleeve D and gland E, while cylinder C' is provided with integral brackets *c*, having screw-holes *c'* therein for the passage of screws, by which the apparatus is secured in place  
75 to the door or door-frame.

The plunger F is located within the cylinder A and is provided with an eccentric bore, the thickened side of the plunger caused by locating the bore eccentrically being cut away  
80 in rear of the head to form a rack F', which latter extends from a point just in rear of the head *f* of the piston or plunger back to its rear end. The rack-bar F' engages the pinion G, located in the cylinder C, and as the cylinder is connected to a door and the plunger  
85 connected by suitable devices to the door-frame it follows that the pinion-spindle operates to compress the spring in opening the door.

The cylinder C' is slotted on its inner face  
90 to receive the outer bent end of the spring H', while the inner end of said spring is secured to the barrel or sleeve I', which latter is keyed or otherwise secured to the shaft or spindle G', which, as before stated, carries the pinion G.  
95 The cylinder C' is closed at its upper end by the cap or cover, having an opening therein for the passage of the sleeve I', which latter is provided at a point above the top or cover with a ratchet-wheel I<sup>2</sup>, adapted to be engaged  
100

by a pawl pivoted to the cap or cover of the cylinder.

All that portion of the piston or plunger, excepting the portion cut away to form the rack-bar, closely fits within the cylinder A, and as the portion of the cylinder diametrically opposite the rack-bar has an elongated bearing against the cylinder, while the portion thereof in advance of the rack-bar and adjacent to the head has but a limited bearing, and as the tendency of the spring and pinion is to crowd this limited bearing against the cylinder it follows that this restricted bearing wears more rapidly than the elongated bearing on the opposite side of the plunger, and the object of my invention, as before stated, is to prevent leakage occasioned by such wear on the plunger, and the principal feature of my present invention is a loose head  $f$ , secured to the body of the plunger and adapted to follow the movements of the cylinder and slide on the end of the body of the plunger, and thus avoid the leakage incidental to wear on the body of the plunger.

The end  $f^2$  of the plunger is as large as the head  $f$  and is provided with a central opening  $f^3$ , surrounded by an outwardly-projecting flange  $f^4$ . The outer face of the end  $f^2$  of the plunger and the outer surfaces of the flanges  $f^4$  are ground, and the corresponding or inner face of the head is also ground to form practically a sealed joint, the head being also recessed to receive the flange  $f^4$ . The end  $f^2$  of the plunger is provided with two (or more) threaded holes for the reception of the screws  $f^5$ , which latter secure the head  $f$  in position against the end  $f^2$  of the plunger. These screws  $f^5$  are provided with shoulders  $f^6$ , which abut against the outer face of the end  $f^2$  and limit the penetration of the screws, while the portion of the screws between the shoulders  $f^6$  and the heads are plain.

The head  $f$  is provided with plain holes corresponding to the threaded holes in the end  $f^2$ , but of a size greater than the thickness of the screws, so that when the head is in position on the end  $f^2$  of the plunger, the latter has a sliding movement on the head, and hence the latter is free to rest easily in the cylinder and is not subjected to any extra wear occasioned by any pressure tending to force the end  $f^2$  of the plunger unevenly against the sides of the cylinder. This head  $f$  snugly fits within the bore of the cylinder and is provided centrally with an aperture, in which is loosely mounted the collar  $f^7$ , carrying the disk  $f^8$ . The disk and collar are integral, and the latter is provided on its inner end with lugs or spurs  $f^9$ , adapted to overlap the inner face of the head and hold the collar and disk in position. The collar is smaller than the aperture in the head, so as to permit the liquid to pass out between them as the head is moving in a direction to compress the spring, and the disk  $f^8$  of the collar is provided with a ground inner face resting in contact with the ground

outer face of the head, so as to form practically a liquid-proof joint when the faces are in contact. The disk is provided centrally with an opening  $f^{10}$ , corresponding with the collar for the passage of the tube I. This tube is secured in the closed end of the cylinder, and it may be tapering, or, if cylindrical, it may be provided with one or more beveled surfaces. The rear end of this tube  $I^3$  or the part thereof adjacent to the head of the cylinder snugly fits and practically closes the aperture  $f^{10}$  in the disk; but as the head of the plunger moves away from the fixed end of the tube a space or spaces gradually increasing in size are formed between the tube and wall of the aperture in the disk for the passage of the liquid from one side of the plunger to the other, and when the plunger is moving in the opposite direction the space or spaces are gradually reduced in size and finally closed. This tube is also provided near its fixed end and at a point in front of the head of the plunger with an opening  $f^{11}$ , which latter can be wholly or partly closed by the screw-valve J, mounted in the tube, and provided at its outer end with a thumb-wheel J' by which it is turned.

The upper end of the pinion-spindle G' is secured to a jointed arm, which latter is secured to a door, casing, or jamb in the usual manner and is supported at a point above the pinion by the sleeve D and above the sleeve D by the gland E. The sleeve D is screwed into place within the smaller cylinder and rests with its lower face in contact with the pinion and prevents to a large extent the liquid from passing upwardly. The gland E is dome-shaped and extends well up into the spring-chamber within the lower edge of the spring. This gland is screwed into the base of cylinder C' or into the top of cylinder C and is adapted at its upper end to closely embrace the spindle G'. This gland is counterbored to receive the leather packing  $e^2$ , and the latter is held in place by the washer  $e^3$  and spring  $e^4$ , the latter resting against the top of the sleeve and the lower face of the washer. When the gland is screwed home, the spring  $e^4$  forces the leather packing well up into the counterbore of the gland and solidly around the spindle, and as the packing is held in place by a spring it follows that all wear on the packing is taken up at once. A space is left between the sleeve and gland, and any liquid that may be forced around or through the sleeve gravitates back through the port L' into cylinder A. Hence it will be seen that the liquid under compression never comes in contact with the gland.

The cylinder A is filled or partly filled with a liquid, and Fig. 2 represents the positions of the parts when the door is closed. By now opening the door the spindle is turned, thus moving the plunger rearwardly and compressing the spring, and the liquid in rear of the plunger bearing against the disk  $f^8$  forces the

latter away from the head, thus permitting the liquid to escape through the plunger to the other end of the cylinder, a portion of the liquid also passing through the aperture around the valve-tube. As soon, however, as the door is released the spring tends to turn the spindle in the opposite direction. This movement tends to force the plunger back, and the pressure of the liquid against the disk  $f^8$  and head  $f$  forces them solidly to their seats, thus necessitating the escape of the liquid through and around the tube. At the beginning of the closing movement of the door the small or reduced end of the tapered or beveled tube and the opening through the tube allows of the comparatively free passage of the liquid; but as the door nears its closed position the size of the opening is gradually reduced, thus reducing the speed of the door and gently bringing the latter to its closed position.

It is evident that many slight changes and alterations might be resorted to in the relative arrangement of parts herein shown and described without departing from the spirit and scope of my invention. Hence I would have it understood that I do not wish to confine myself to the exact arrangement of parts shown and described; but,

Having fully described my invention, what

I claim as new, and desire to secure by Letters Patent, is—

1. A door-check comprising a cylinder, a spring-actuated plunger, a pinion engaging teeth on the plunger, a head loose on the plunger and a valved tube carried by the cylinder and passing through an aperture in the sliding head. 35

2. A door-check comprising a cylinder, a spring-actuated plunger, a pinion engaging teeth on the plunger, a sliding head loose on the plunger and having an aperture therein, a collar located within said aperture and carrying a disk having a central opening and a valved tube carried by the cylinder and passing through the opening in the disk. 40 45

3. A door-check comprising a main cylinder, a plunger therein, a smaller cylinder for a pinion and a spring cylinder or casing, of a pinion in the pinion-cylinder engaging rack-teeth on the plunger, a spring in the spring-cylinder connected to the spindle of the pinion and a head loosely mounted on the plunger. 50

In testimony whereof I have signed this specification in the presence of two subscribing witnesses. 55

CROMWELL O. CASE.

Witnesses:

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C. A. BLAIR.