

(No Model.)

3 Sheets—Sheet 1

C. O. CASE.
DOOR CHECK OR CLOSER.

No. 528,853.

Patented Nov. 6, 1894.

FIG. 1.

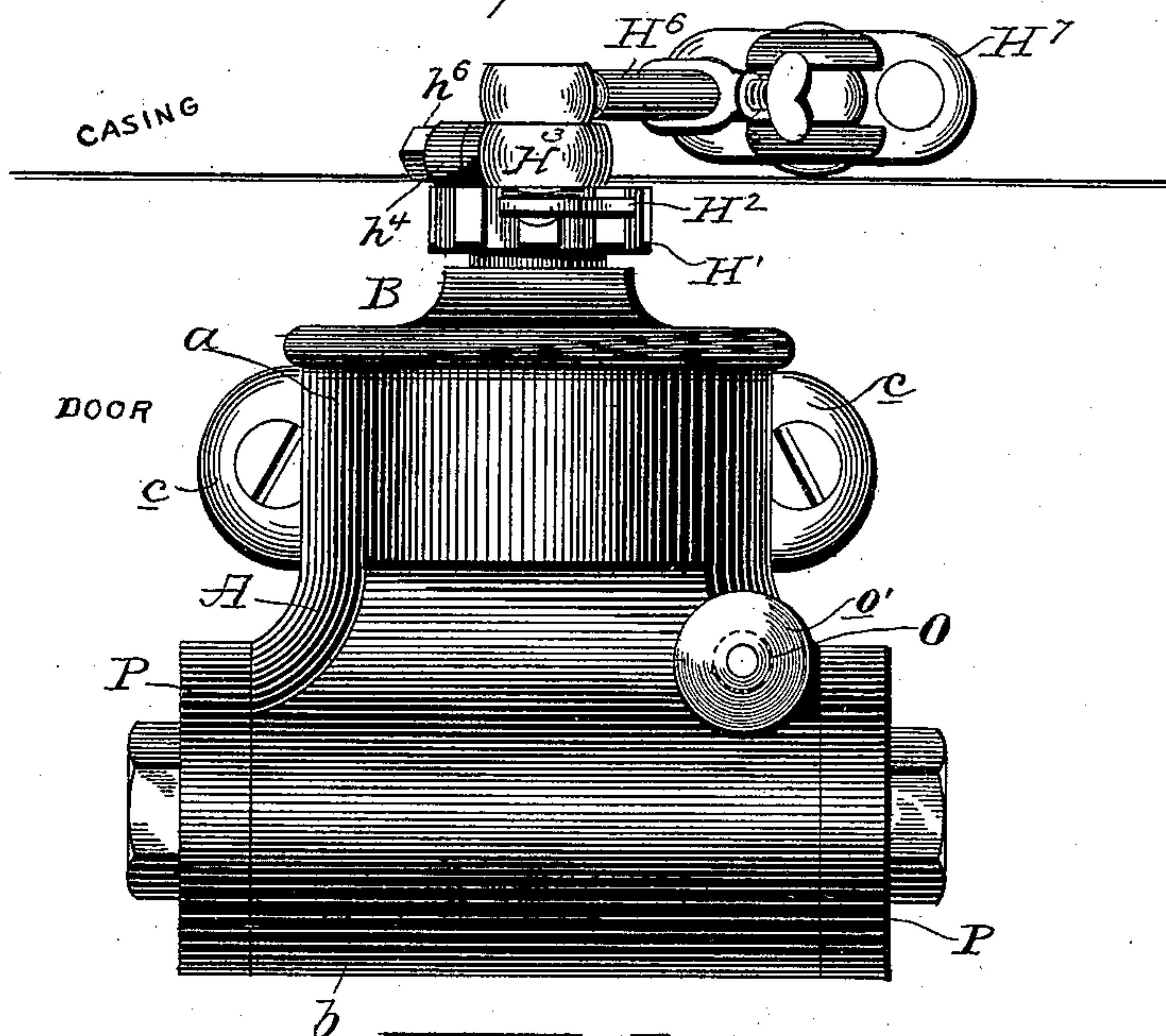
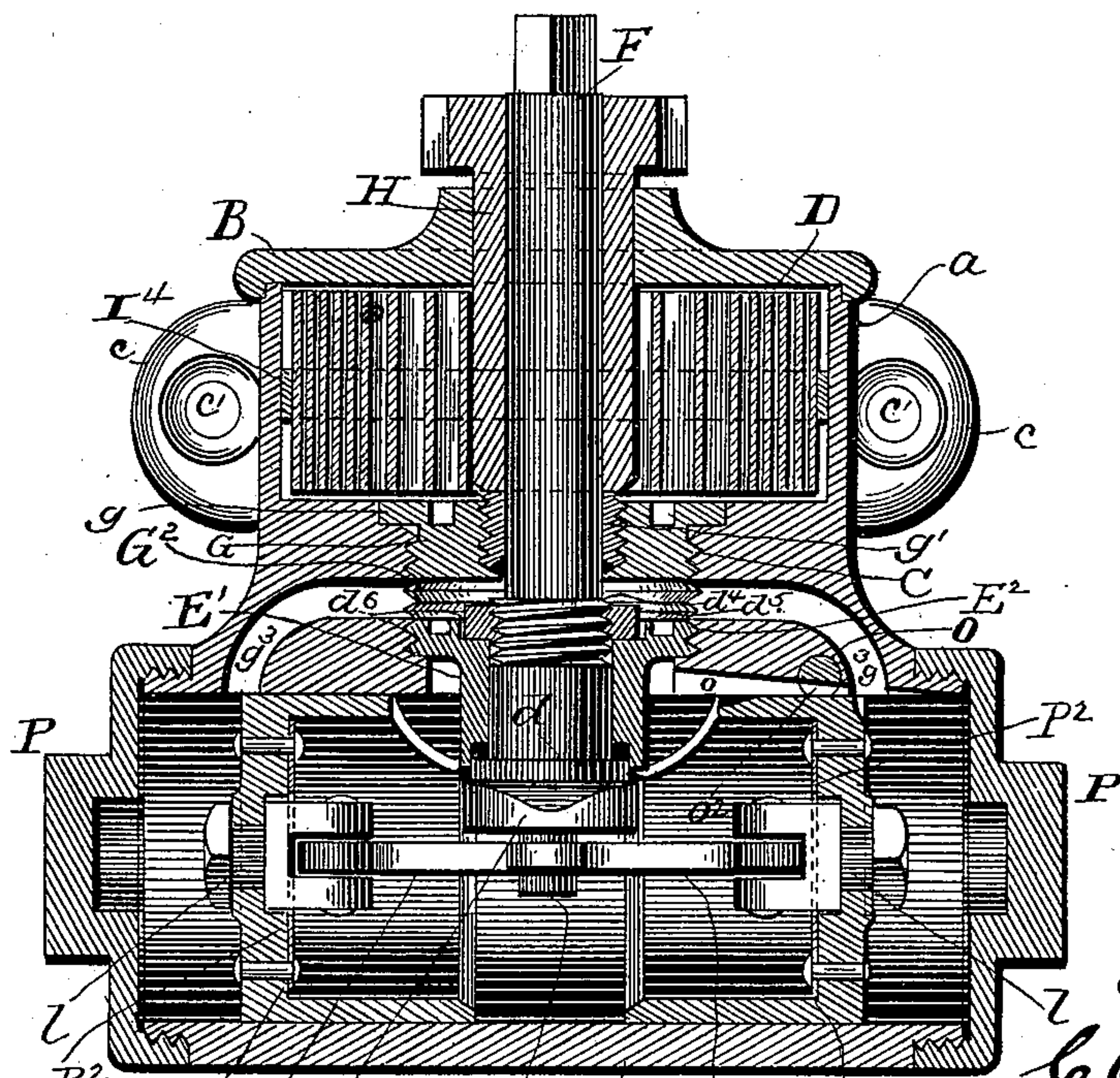


FIG. 2.



Witnesses

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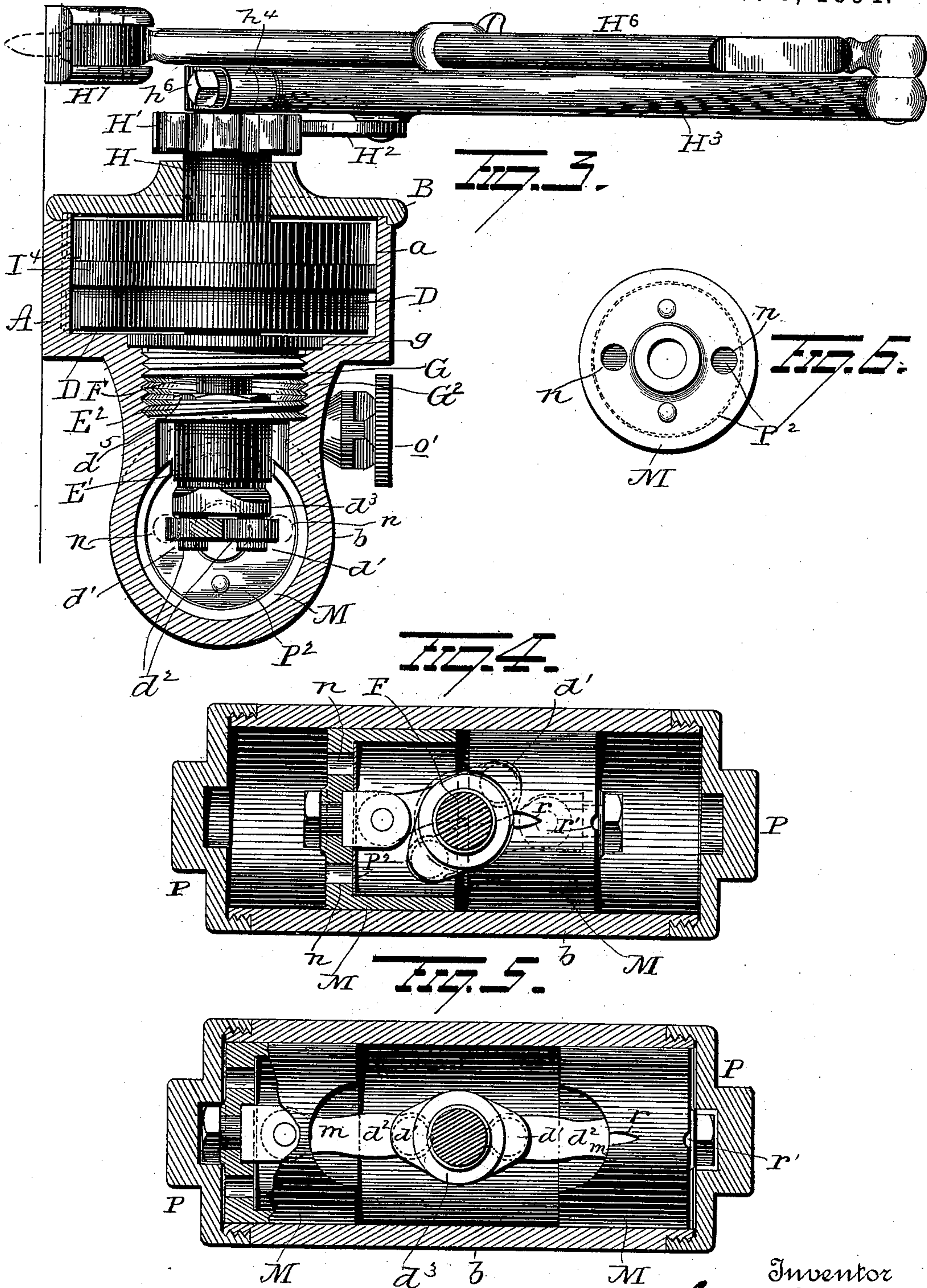
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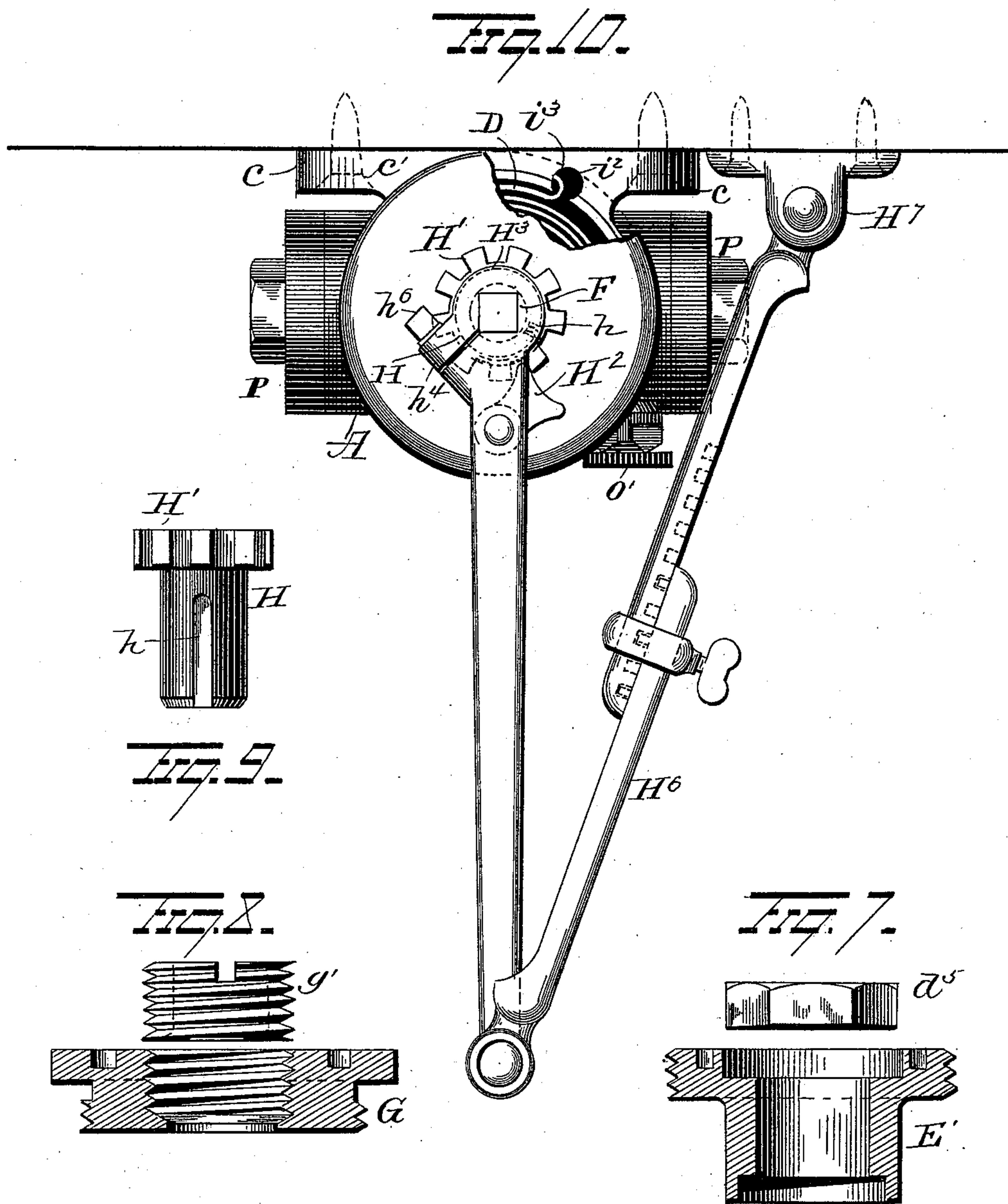
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UNITED STATES PATENT OFFICE.

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

DOOR CHECK OR CLOSER.

SPECIFICATION forming part of Letters Patent No. 528,853, dated November 6, 1894.

Application filed August 18, 1894. Serial No. 520,721. (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 new and useful Improvements in Door Checks or Closers; 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 apper-
10 tains to make and use the same.

My invention relates to an improvement in liquid door checks, and it consists in certain features of construction and combinations of parts as will be hereinafter described and
15 pointed out in the claims.

In the accompanying drawings:—Figure 1 is a view in elevation of my improved check. Fig. 2 is a vertical sectional view of same. Fig. 3 is a view in vertical section at right an-
20 gles to Fig. 2. Figs. 4 and 5 are views in horizontal section through the liquid chamber. Fig. 6 is an end view of one of the pistons. Fig. 7 is a view of the screw cap. Fig. 8 is a view of the packing sleeve. Fig. 9 is a view
25 of the spring sleeve, and Fig. 10 is a plan view partly in section showing the improvement applied to a door.

A represents the casing cast in a single piece, the upper portion or vertical cylindrical section *a* of which constitutes the spring
30 chamber, while the lower or horizontal cylindrical section *b* constitutes the liquid chamber. This casing A is provided with the integral brackets *c* which are provided with
35 holes *c'* for the insertion of screws by which the device may be held in place. The vertical cylinder or spring chamber *a* is constructed with an open end which is closed by the cap B, which may simply rest on the cylinder or
40 be secured thereto in any desired manner.

The spring chamber and liquid chamber are separated by a partition C, the upper face of which is finished to form a flat seat for the spring D. This partition is provided cen-
45 trally with an opening designed to receive the packing through which the spindle F passes. This spindle F is simply a cylindrical rod provided on its lower end with a head *d*³ carrying two wrist pins *d'* each of which operates
50 a piston through the intervention of a link *d*². Located above the head *d*³, and preferably in-

tegral with the same, and also with the spindle, is the shoulder *d* cylindrical in shape and preferably provided with a flat upper face. This shoulder rests within a cylindrical recess
55 in the sleeve E', which constitutes a part of the packing, a packing ring being interposed between the upper face of the shoulder *d* and the adjacent face of the sleeve E'. This sleeve
60 is, in the present instance, somewhat smaller in diameter than the diameter of the opening in the partition C, so as to permit the parts to be easily and quickly assembled, and is provided at its upper end with a rim or flange
65 E², screw threaded on its outer edge for engagement with screw threads formed in the partition C. The sleeve E' is provided centrally with an opening for the passage of the
70 spindle F, the said opening making a close fit with the spindle at a point just above the head *d*³, the spindle being slightly increased in diameter at this point. The upper portion
of this enlarged portion of the spindle is screw threaded as at *d*⁴ to engage the nut *d*⁵
75 which latter when in position rests within a recess *d*⁶ formed in the top of the sleeve E'. This nut resting on the sleeve and attached to the spindle forms a support for the spindle
and holds the latter in proper position, with the wrist pins approximately in the horizontal
80 center of the liquid chamber.

G is a screw cap provided with threads for engaging the threads formed in the partition C, and with a plain rim or flange adapted to
85 snugly fit within the recess *g* formed in the top face of the partition adjacent to the opening. This cap G is provided with a cylindrical recess opening centrally from the top and
screw threaded to receive the screw threaded gland *g'*, which latter has a bore designed to
90 snugly fit the spindle F. Suitable packing is placed within the recess below the gland *g'* to prevent the liquid from passing upwardly around the spindle. The top of the sleeve and
the lower face of the screw cap, are, when in
95 proper position separated as shown in Figs. 2 and 3, thus leaving a chamber G². Opening into this chamber are two ports *g*³, one of which leads from chamber G² to a point near
one end of the cylinder *b*, while the other port
100 *g*³ leads from chamber G² to a point near the opposite end of cylinder *b*. Thus it will be

seen, that should any of the liquid employed in the check, leak past the sleeve E' into chamber G², it would be free to pass from thence back into the cylinder or liquid chamber b, as there is practically no pressure on the liquid in the liquid chamber b between the piston and the heads of the cylinder.

Located within the spring chamber a is the barrel or sleeve H which latter embraces the spindle F, and is provided with a groove h to receive the bent inner end of the spring I. To the upper end of the sleeve H is secured a ratchet wheel H' designed to engage a double pawl H² pivoted to the under side of arm H³. This sleeve fits loosely within the projecting tubular bearing in the cap B, and as it bears throughout its length on the spindle it is prevented from binding thus insuring freedom of action of the spring.

The cylindrical section or spring cylinder a of the casing A is formed with a slot i² the edges of which are beveled as shown, to receive the curved outer end i³ of the spring I. The spring is provided with a retaining band I⁴, which limits its expansion and by means of the curved or hooked ends thereof and the groove in sleeve H and the slot i² having beveled edges, the spring may be removed or placed in the casing either side up to adapt it for use on either a right or left hand check.

Heretofore the arm H³ has been secured to the spindle by drilling and tapping the end of the latter to receive a screw which holds a washer over the arm. With such a construction the spindle is so weakened that it frequently breaks under the strain, and when not broken, the constant usage to which the parts are subjected causes the screw to become loosened, thus rendering the connection loose and unreliable. To overcome these objections, I cast the arm H³ with a projecting lug h⁴ which latter is drilled and tapped, to receive the screw h⁶. This lug is then sawed through leaving a kerf which is sufficient to permit the angular bearing on the end of the arm to be compressed around and thus locked to the angular end of the spindle.

To the outer end of arm H³ is pivotally secured the extensible link H⁶ carrying the bracket H⁷ which latter is designed to be fastened to the door, casing or jamb as the case may be.

The downwardly projecting wrist pins on the head of the spindle are located approximately in the horizontal center of the liquid chamber, and on each is mounted a link d². To the outer end of each link is pivotally attached a screw l which latter passes through a cylindrical piston M and engages a nut. The two cylindrical pistons are located on opposite sides of the axis of the spindle and as the latter is turned in opening or closing a door, the pistons are moved simultaneously in opposite directions away from or toward each other as the case may be.

The liquid cylinder or chamber is closed at its opposite ends by the screw caps P, suit-

able gaskets being interposed to prevent leakage at the ends.

Each piston is cut away on top as shown at m to permit its inner end to straddle the head of the spindle when the pistons are in their innermost positions, and each piston head is provided with a series of holes n covered on their inner faces by the release valve P².

From the foregoing it will be seen that when the pistons are moved outwardly or toward the ends of the liquid cylinder, the liquid pressing against the valves P² bends them inwardly, thus permitting the liquid to pass freely through the piston heads and into the space between the pistons. When however the pistons are moved toward each other, as they are while the door is closing, the pressure of the liquid forces the valves against the faces of the pistons and prevents the escape of the liquid through these holes. The liquid between the two pistons constitutes then the checking medium and the rapidity with which the door moves in closing is dependent on the rapidity of the discharge of the liquid from between the pistons. In opening the door, the spring is compressed and the pistons moved outwardly toward the ends of the cylinder, the liquid between the pistons and ends of the cylinder passing freely through the holes in the pistons. When the door is released, the spring then exerts its tension to close the door, and the liquid thus confined between the pistons operates as the checking medium. When the door is in the act of closing, the liquid between the two pistons is under pressure while the liquid between the piston heads and heads of the cylinder is practically free from pressure. This bringing the liquid under pressure directly under the spindle tends to force the spindle upward bringing it against its shoulder heretofore described and the harder the pressure, is the tighter the spindle fits against its bearing suitably packed and the tendency to leakage about the spindle upward into the spring chamber is practically entirely overcome. In practice this method of operation has been found to prevent leakage. If, however, any of the checking liquid should leak upward about the spindle it is received into the chamber G², before described, which as before stated is in communication by ports or passages with the ends of the liquid cylinder. The pressure being thus relieved the liquid flows back into the liquid cylinder. By this arrangement of parts there is no pressure of the liquid against the screw cap. Hence the tendency to leak upwardly into the spring chamber is entirely overcome.

In order to permit the liquid which enters the space between the pistons while the door is being opened, to escape while the spring is closing the door, I have provided the cylinder with a groove o which latter extends from the opening in the partition C to a point beyond the throw of the piston. Extending transversely the cylinder, is the rotary valve O which latter crosses the groove o. This valve

projects at one end beyond the casing and is provided with a thumb wheel o' by means of which it can be turned for the purpose of regulating the discharge, and is also provided with a transverse groove o^2 in line of and adapted to register with the groove o in the cylinder. When the valve is turned so that the groove therein is in line with the groove in the cylinder, the discharge outlet is then open to its full capacity and the door will close rapidly. When however the valve is turned so as to partly close the groove o the door will close more slowly, the movement of the door in closing being dependent on the position of the valve.

The piston at the end of the cylinder in which the checking valve is placed, is provided on its upper side at its inner edge with a tapering groove r which latter rests under and in line with groove o in the cylinder. The larger end of this groove is at the inner end of the piston, and as the pistons move inwardly while checking the door, it will be seen that as the door starts to close the liquid is released freely thus permitting the door to move rapidly. As the pistons move inward however, the groove gradually decreasing in size, moves under the valve thus gradually cutting off the escape and consequently gradually retarding the closing movement of the door. The effect of this gradual decrease in speed is to lessen the shock in closing of the door when the pistons come against the full resistance of the checking medium. By means of the tapering groove, the door meets the full checking resistance provided by the adjustment of the valve in the groove of the cylinder gradually. Consequently there is no rebound or shock, but the door moves smoothly and gradually to the latching point.

The casing is attached to the door or door frame, and the bracket to the door frame or door, in the usual manner, and as the door is opened the spring is compressed and the pistons separated, the separation of the pistons forcing the liquid between the pistons. The liquid thus forced between the pistons is the checking medium, and the movement of the door in closing is controlled by the escape of the liquid from between the cylinders. The piston having the groove in its top face is also provided with a groove r' in its outer face, which is designed to permit of the more rapid and sudden discharge of the liquid confined between the pistons just at the point of latching the door. The parts are so arranged that this groove in the rear face of the piston passes the passage or groove in the valve at that time, and suddenly releasing an increased volume of the liquid permits the door to be closed with sufficient speed and force to latch the door. This same effect of releasing an increased volume of liquid at the moment of latching may be secured by omitting the last named groove in the piston and arranging the parts so that the throw of the piston will bring the inner end thereof beyond the valve

at the latching point. When the door is closing as only one side of the liquid cylinder is provided with the groove and valve for providing for, and regulating, the escape of the liquid the surplus of liquid after passing to the end of the cylinder outside of the piston is free to flow through the ports or passages g^3 and chamber G.

By the construction and arrangement of parts as above described all liability of leakage into the spring chamber while the liquid is under compression between the pistons is avoided, and by employing two pistons moving toward the center in closing, I get double the length of movement in compressing the liquid and at the same time avoid all side thrust or pressure on the spindle bearings together with obtaining great simplicity, strength and durability of the parts.

As it is obvious that many changes in the construction and relative arrangement of parts might be resorted to without departing from the spirit and scope of my invention I would have it understood that I do not restrict the invention to the particular construction herein 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 in its construction a spring chamber, a liquid chamber closed at its ends, a spring, a spindle, two pistons connected to the spindle and means for permitting the free passage of the liquid from the ends of the liquid chamber to the space between the pistons, and means for permitting the escape of the liquid from between the pistons.

2. A door check comprising a spring chamber and its spring, a liquid chamber closed at its ends, two pistons in said liquid chamber, each piston having a valved port, and a spindle located at right angles to the line of movement of the pistons and connected to said pistons.

3. A door check comprising a spring chamber and its spring, a spindle, a liquid chamber closed at its ends, two pistons connected to the spindle, means for permitting the free passage of the liquid from the ends of the liquid chamber to the space between the pistons, and a valved groove or port for regulating and controlling the escape of liquid from between the pistons.

4. A door check comprising a spring chamber and its spring, a liquid chamber closed at its ends, a spindle, two pistons connected to the spindle, means for permitting the free passage of liquid from the ends of the cylinder to the space between the pistons and a groove in the cylinder for the escape of the liquid from between the pistons, the piston adjacent to the groove in the cylinder having a groove registering with the groove in the cylinder, substantially as set forth.

5. A door check comprising a spring chamber and its spring, a closed liquid chamber, a

spindle, two pistons connected with the spindle, one of said pistons having a groove therein, and a valved groove in the cylinder for regulating the escape of liquid from between the pistons, the said valved groove registering with the groove in the piston and means for permitting the passage of the liquid from the ends of the cylinder to the space between the pistons.

6. A door check comprising a spring chamber and its spring, a closed liquid chamber having a valved groove or port, a spindle, and two pistons located in the liquid chamber and connected to the spindle, one of said pistons having a tapering groove registering with the valved groove or port in the cylinder, and on its outer face with a tapering groove also registering with said valved groove or port.

7. A door check comprising a spring chamber and its spring, a liquid chamber, a spindle passing into the liquid chamber, packing for the spindle, a supplemental chamber above the packing and communicating with the liquid chamber near one end of the latter, and a piston connected to the spindle, substantially as set forth.

8. A door check comprising a liquid chamber, a spindle passing into the liquid chamber and adapted to actuate a piston, a packing sleeve through which the spindle passes, the said packing sleeve being secured in the wall of the liquid chamber, and a nut secured to the spindle and resting on the sleeve, substantially as set forth.

9. A door check comprising a liquid chamber, a spindle passing into the liquid chamber and adapted to actuate two pistons, a packing sleeve through which the spindle passes, the said packing sleeve being secured in the wall of the liquid chamber, a screw cap secured above the packing sleeve, a chamber between

said cap and sleeve, and ports in the casing connecting the said chamber with the liquid chamber near the outer ends of the latter.

10. A door check comprising a liquid chamber, a packing sleeve secured in the wall of the liquid chamber, a screw cap secured above the packing sleeve, a gland in the cap, a spindle passing through the gland, cap and sleeve, and adapted to actuate a piston, and a nut secured to the spindle and resting on the sleeve.

11. A door check comprising in its construction a liquid chamber closed at its ends, a spindle, two pistons connected to the spindle, and a valve for regulating the escape of the liquid from between the cylinders.

12. A door check comprising in its construction a closed liquid chamber, a spindle, two valved pistons connected to the spindle, and a valve for regulating the escape of the liquid from between the pistons.

13. A door check comprising a closed main liquid chamber, a supplemental liquid chamber, ports connecting the latter with the main liquid chamber, a spindle passing through the supplemental chamber and terminating in the main liquid chamber, and two pistons connected with the spindle, substantially as set forth.

14. A door check comprising a liquid chamber, a packing, a spindle passing through the packing and provided with a shoulder the latter resting against the packing, and a piston connected to the spindle.

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

CROMWELL O. CASE.

Witnesses:

C. A. BLAIR,
G. E. ROOT.