

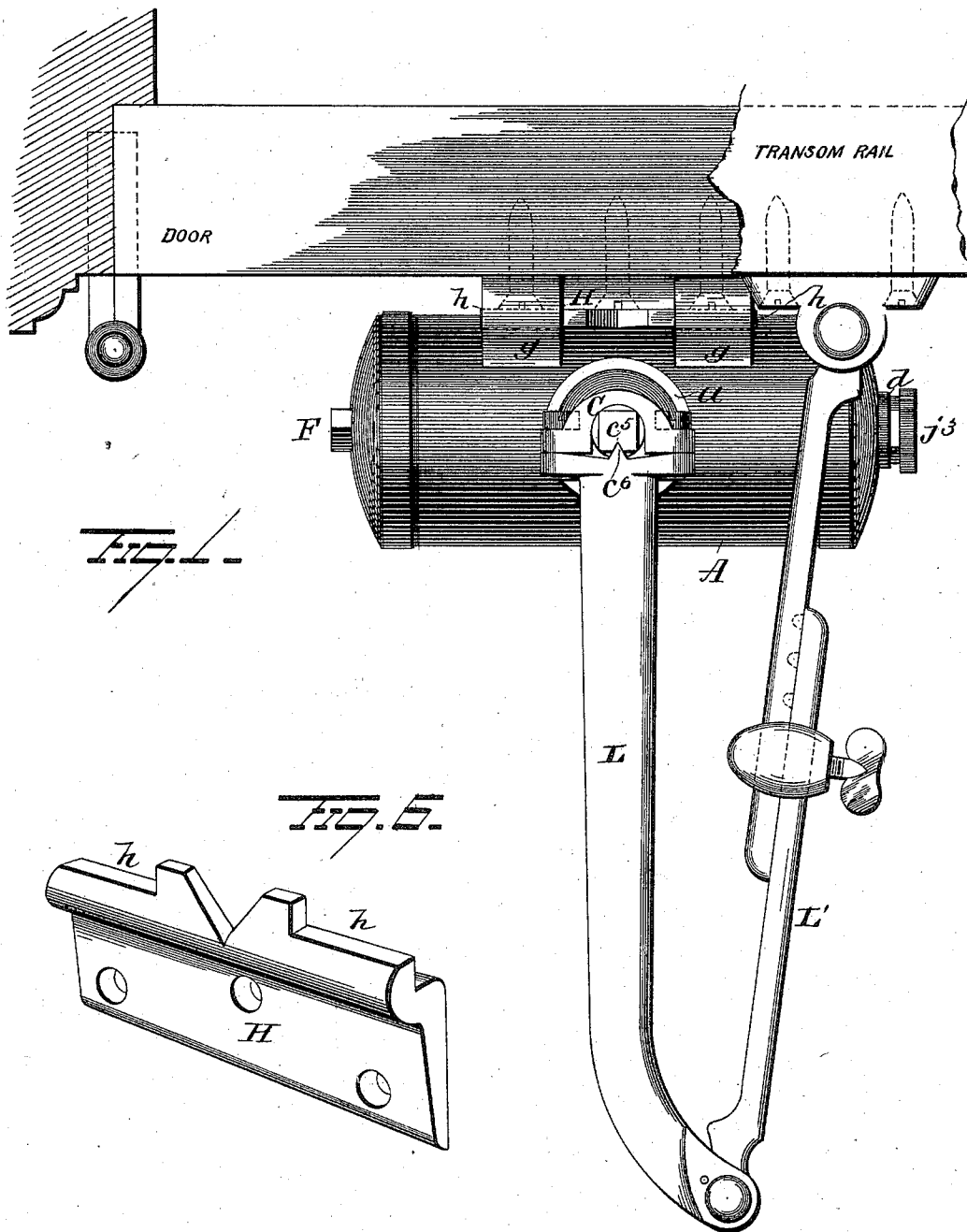
(No Model.)

3 Sheets—Sheet 1.

W. GILFILLAN.
LIQUID DOOR CHECK.

No. 577,917.

Patented Mar. 2, 1897.



Witnesses

E. Nottingham
G. F. Downing.

Inventor

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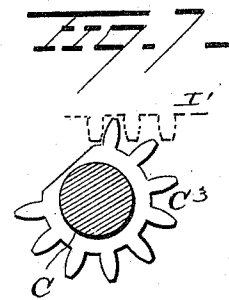
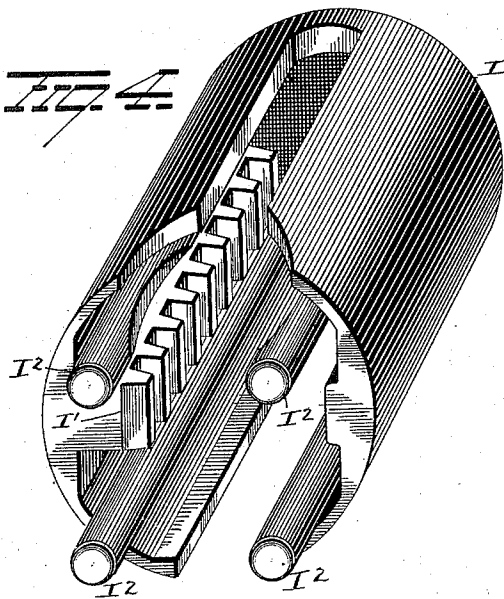
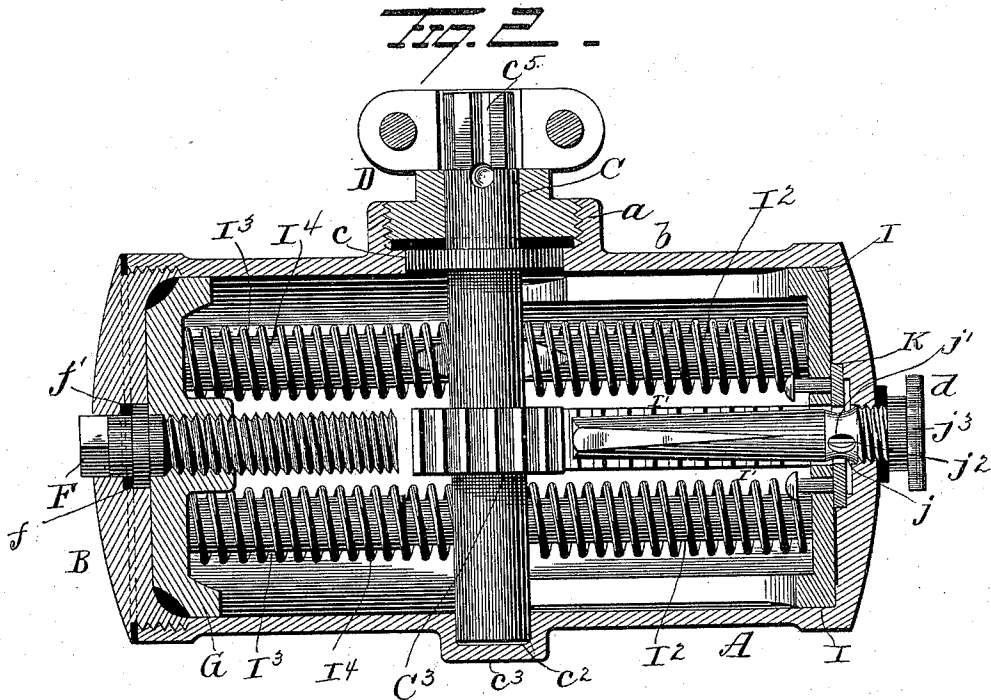
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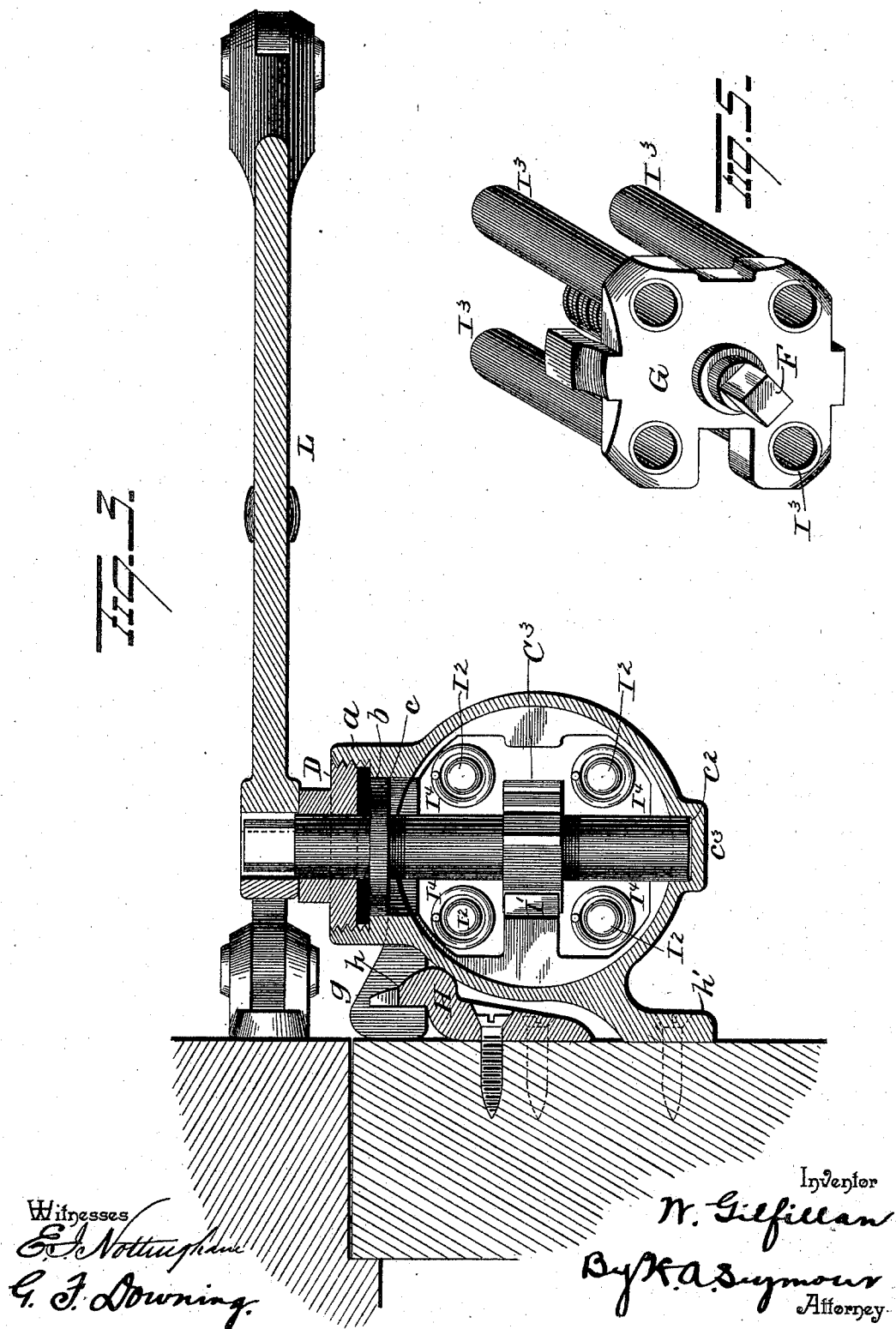
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UNITED STATES PATENT OFFICE.

WILLIAM GILFILLAN, OF NEW YORK, N. Y.

LIQUID DOOR-CHECK.

SPECIFICATION forming part of Letters Patent No. 577,917, dated March 2, 1897.

Application filed October 15, 1896. Serial No. 608,986. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM GILFILLAN, a resident of New York, in the county of New York and State of New York, have invented certain 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 make and use the same.

My invention relates to an improvement in liquid door-checks.

In the liquid door-checks now in use the piston is actuated in one direction by a clock or coiled spring. The use of these springs is objectionable in that in order to possess the requisite strength they must be of considerable size and weight, and hence are expensive to make. Again, they are liable to break and require considerable power to operate them, owing to the gradually-increasing surface-friction as the spring is compressed while opening the door. Again, the door-checks employing this form of spring are necessarily provided with a casing or box at right angles to the liquid casing to contain the spring, thus adding considerably to the size of the apparatus as well as to the weight and cost of manufacture.

The objects of my invention are to provide a check operated by a spring or springs which expand and contract in the direction of the movement of the piston; to provide the spring or springs with an adjusting device whereby the spring or springs can be adjusted to the tension required for closing the door; to the construction and arrangement of parts whereby leakage is absolutely prevented; to provide improved means for securing the check to a door or door-jamb, and to other improvements in the details which contribute especially to the simplicity and durability of the mechanism.

With these ends in view my invention consists in the parts and combinations of parts and to details of construction, which will be hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a view in elevation of my improved check. Fig. 2 is a view in longitudinal central section of same. Fig. 3 is a transverse sec-

tional view looking toward the head of the plunger or piston. Fig. 4 is a perspective view of the plunger, looking toward the open end thereof. Fig. 5 is a view of the tension-disk, screw, and tubes. Fig. 6 is a view of the fastening-plate, and Fig. 7 is a view of the pinion and a section of the rack-bar.

A represents a cylindrical casing provided with an integral head at one end and screw-threaded at its other end for the attachment of the removable head B. This cylinder is provided centrally on its upper side with a nipple *a*, internally threaded and provided below the threads with a flange *b*, on which can be seated a washer and against the edge of which rests the collar *c* on the spindle C, the spindle and washer being held in place by the screw-cap or gland D, which latter is provided with an angular boss thereon for engagement with a wrench and with a central opening for the passage of the spindle.

The integral head is provided centrally with a small threaded opening for the attachment of the gland *d*, carrying the vent-tube E, while the removable head B of the cylinder is provided with a centrally-located opening for the passage of the head of the screw F, on which the tension-disk G is mounted.

The rear face of the cylinder is provided with two bosses *g*, separated a suitable distance and provided with undercut lower faces adapted to receive the flange *h* of the locking or fastening plate H. This plate H is provided with screw-holes for its attachment to a door or jamb, and its upper edge is offset outwardly, forming the upwardly-projecting flange *h*, which latter, as before stated, is adapted to enter the recesses in the lower faces of the bosses *g* and support the casing in position while the screws are passed through the lower flanges *h'*, integral with the casing A. Heretofore in placing a door-check in position it has been necessary for the workman to support the check, which weighs several pounds, with one hand while he inserts the screws with the other. Owing to the fact that the casing has to be placed a predetermined distance from the hinge edge of the door, it is sometimes a difficult matter to make the necessary measurements accurately, place the casing in position, and then secure it by screws. With this improvement, however, it

is simply necessary to first mark off the distance the center of spindle is to be from hinge edge of door and then secure the plate H in position with the bottom of the V-shaped slot therein on the mark previously made. As the base or bottom of the V-shaped slot is in a line with the center of the spindle, it follows that when the check is applied to the fastening-plate H it will be in its proper position. The check is then applied, and as its weight is supported by the fastening-plate both hands of the workman are free to be used in locking the casing in position, which is done, as before stated, by passing screws through the flange integral with the casing.

I is an elongated cylindrical piston open at one end and closed at the other and cut away on its top and bottom, as shown, to permit its open end to straddle the spindle as the piston is moved toward the springs, as in opening the door. It is provided interiorly with a rack-bar I', extending from the inner face of the head of the piston to the open end of the latter, and is also provided on its inner face with a series (four in the present instance) of rods or lugs I², which project beyond the rear or open end of the piston and are adapted to register with and enter the tubes I³, carried on the tension-disk G. While I have shown the rods extending beyond the open end of the piston and shown the disk G with tubes adapted to receive the rods when the piston is moved toward the tubes, as in opening the door, I do not limit myself to such an arrangement, as the tubes and rods might be dispensed with altogether, or the rods could be shortened up considerably, so as to form simply supports for the ends of the spiral spring I⁴, while rods or lugs could be substituted for the tubes for supporting the springs at their outer ends. I prefer, however, the construction disclosed, as by such construction the springs are supported against lateral deflection throughout their entire length, and hence never come in contact with or obstruct the free movement of any of the movable parts. The disk G is mounted on the screw F, which latter is provided with a shoulder f, adapted to rest against a shoulder f', formed on the removable head of the casing, a gasket or washer being interposed between the two sections to form a tight joint and prevent leakage of the liquid. The end of this screw F passes through the removable head B of the cylinder and is provided with an angular end for turning same. By turning the screw in one direction the disk is moved toward the piston and the springs I⁴ thereby compressed and the tension increased. By moving the disk in the opposite direction the springs are permitted to elongate and thus decrease the tension. By means of the movable disk the springs can be given tension just sufficient to close the door.

Located centrally in and at right angles to the cylinder is the spindle C, the lower end of which is seated in the recess c², formed in

the lower face of the cylinder, the cylinder being enlarged externally at this point by the boss c³ for the purpose of the recess.

The spindle is provided with the mutilated pinion C³, which latter engages the rack I' and moves the piston I against the action of the springs I⁴ in opening the door, and is moved by the rack I' while the springs I⁴ are forcing the piston to its normal position. The upper end of the spindle is made angular for the attachment of the arms L L', ordinarily employed, the arm L being loosely connected at its outer end to the extensible sectional arm L', which in turn is attached at its free end to the door or jamb, as the case may be.

To indicate the proper position of the arm L on the spindle C, and to prevent the possibility of mistake in assembling the parts, I provide the angular end of the spindle C with a slot c⁵ and the yoke of arm L with a projection c⁶ to enter the slot, and hence in assembling the parts it is necessary, in order to place the yoke on the spindle, to enter the projection c⁶ within the slot, which insures the proper relative position of arm and spindle.

Secured to the integral head of the cylinder is the vent-tube E. This tube is provided at a point adjacent to the head of the cylinder with a peripheral groove j and with an opening j', and located within the tube is a cut-off valve j², actuated by the thumb-wheel j³, located outside the cylinder. By turning the valve to close more or less of the opening the liquid between the head of the cylinder and the piston is permitted to escape slower or faster through the opening into the tube and through the tube to the cylinder in front of the piston. The peripheral groove is for the purpose of permitting the fluid to pass rapidly from behind the piston to the front thereof just as the door comes to a close, thus permitting the springs to exert their full power for latching the door.

The peripheral groove j may, if desired, be omitted and the door allowed to come gradually to the latching-point without the releasing action before described.

The tube E passes through an opening in the piston-head and is preferably tapered or grooved throughout its length, so as to permit the fluid to move rapidly and escape from behind the piston as the door starts to close, gradually checking the flow, until, as before stated, the door reaches a nearly-closed position and then rapidly releasing the confined fluid, so that the door can close suddenly with force sufficient to latch the door.

Instead of making the tube tapering or instead of grooving the tube, it may be cylindrical throughout its length, thus resulting in a substantially uniform checking action of the liquid throughout the closing of the door.

Surrounding the opening in the head of the piston is the valve K. This valve is simply a disk having an opening just large enough for the passage of the vent-tube and is provided with two rivets which pass loosely

through the head of the piston, thus permitting the valve to move a slight distance toward and away from the valve-head. The opening in the piston-head is somewhat larger than the tube, while the opening in valve is of practically the same diameter as the large end of the vent-tube. Thus it will be seen that as the piston is moved in the direction of the springs to compress them, as in opening the door, the fluid to the front of the piston opens the valve carried by the piston and surrounding the vent-tube and flows freely back behind the piston. As soon however as the door is released and the springs permitted to exert their pressure on the piston the valve is closed by the pressure of the fluid thereagainst and the closing action of the door checked. As the tube is tapered or grooved from its free end rearward, it will be seen that the closing movement of the door is gradually retarded until, as before stated, the door is nearly closed, when the circumferential groove at the base of the vent-tube permits of the sudden escape of the confined liquid and allows the door to close with a force sufficient to latch the same. This closing movement, permitted by the tapered or grooved vent-tube, can be accelerated to a greater or less degree by the valve within the vent-tube. By opening the valve to its limit the door closes at its greatest possible speed, and by closing the valve the speed is reduced. By this arrangement the closing speed of the door can be regulated as desired.

While I have disclosed a tube and a valved piston for the passage of the liquid from one side of the piston to the other, I do not confine myself to the employment of the improvements herein claimed with a check having a valved piston, but consider myself at liberty to use them with any other construction of parts designed to permit the escape of the liquid from the front of the piston.

The check-case can be attached to the door or door-jamb, and connected to the door or door-jamb, by arms L L', as disclosed in my former patents, and in either case as the door is opened the spindle is turned, thereby compressing the springs, and when the door is released the piston action on the spindle causes the door to assume its normal position. The free end of the spindle terminates above the top of the case, and as there is no pressure on the fluid in front of the piston there is no tendency whatever to leakage around the spindle. The springs I⁴ are ordinary spiral springs made of round spring wire, and by so arranging them that they are compressed and expand in the direction of the movement of the piston they can be located directly in the piston-chamber, thus avoiding the necessity of a separate spring-chamber.

It is evident that numerous slight changes might be made in the details of construction and general 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 limit myself to the precise details shown; 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 cylinder closed at one end and provided with a removable cap at its other end, a piston located in said cylinder, means whereby the liquid may escape from in front of the piston, a spring supported at one end by a bearing carried by the removable cap and bearing at its other end against the piston and a spindle connected to the piston.

2. A door-check comprising in its construction a cylinder closed at one end and provided with a removable cap at its other end, a piston located in said cylinder and provided with a valve, a spring supported at one end by a bearing carried by the removable cap and bearing at its other end against the piston and a spindle connected to the piston.

3. A door-check comprising in its construction, a cylinder closed at one end and provided with a removable cap at its other end, a piston located in said cylinder means whereby the liquid may escape from in front of the piston, a plurality of springs supported at one end by a bearing carried by the removable cap and bearing at their other ends against the piston, and a spindle connected with the piston.

4. A door-check comprising in its construction a liquid-chamber closed at one end and provided with a removable cap at its other end, a piston located in said cylinder, means whereby the liquid may escape from in front of the piston, a plurality of spiral springs supported at one end by a bearing carried by the removable cap, and bearing at their outer end against the piston, means for simultaneously adjusting the tension of the several springs, and a spindle connected with the piston.

5. A door-check comprising in its construction a liquid-chamber closed at one end and provided with a removable cap at its other end, a piston within said cylinder, means whereby the liquid may escape from in front of the piston, a plurality of springs bearing at one end against the piston, a disk supporting the other end of the springs, a screw carried by the removable cap and passing through the disk, and a spindle connected with the piston.

6. A door-check comprising a liquid-chamber, a piston therein, a series of rods on the piston an adjustable disk carrying a series of tubes, spiral springs each mounted on a rod at one end and a tube at the other end and a spindle connected with the piston.

7. A door-check comprising a closed liquid-casing an elongated slotted piston therein, a rack carried by and within the slotted piston,

springs for moving the piston in one direction and a spindle mounted in the closed casing and carrying a pinion engaging the rack on the piston.

- 5 8. A liquid door-check comprising a casing having a seat in its lower face and an opening in its upper face, an elongated slotted piston within said casing, a rack-bar secured to and within the piston, a spindle resting at
10 its lower end in the seat in the casing and provided with a flange closing the opening in the upper face of the casing, a cap and washer for locking the spindle in position and a pinion on the spindle meshing with the rack-
15 bar on the piston.

9. The combination with a plate having lips and screw-holes, of a casing having pro-

jections adapted to take over the lips on the plate and also provided with a lug or boss having screw-holes, substantially as set forth. 20

10. The combination with a plate having lips, a centrally-located notch and screw-holes, of a casing having projections adapted to take over the lips on the plate at opposite sides of the notch and also provided with a lug or boss 25 having screw-holes.

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

WILLIAM GILFILLAN.

Witnesses:

H. M. SKINNER,
J. S. OSWALD.