

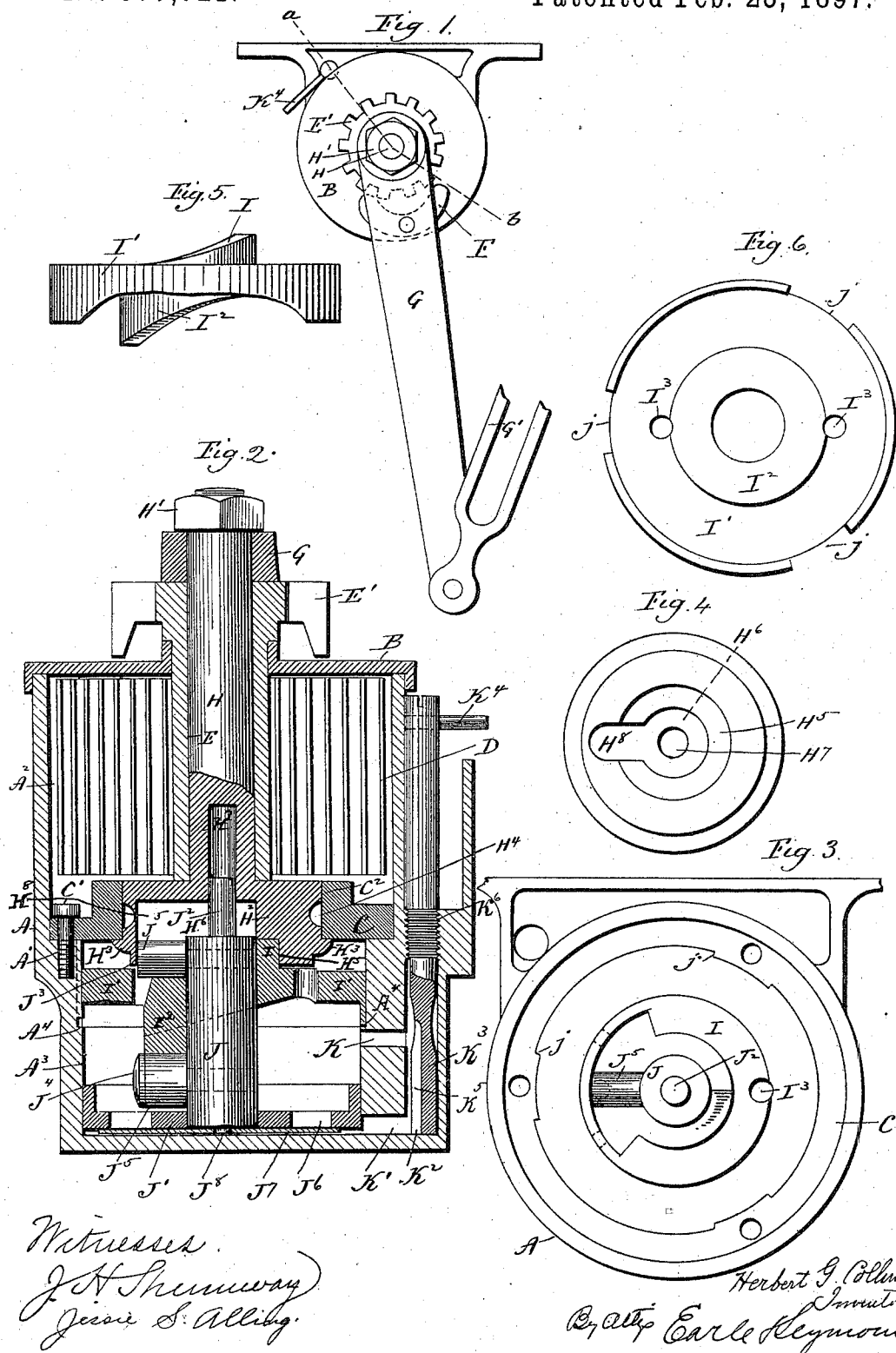
(No Model.)

2 Sheets—Sheet 1.

H. G. COLLINS.
LIQUID DOOR CHECK.

No. 577,721.

Patented Feb. 23, 1897.



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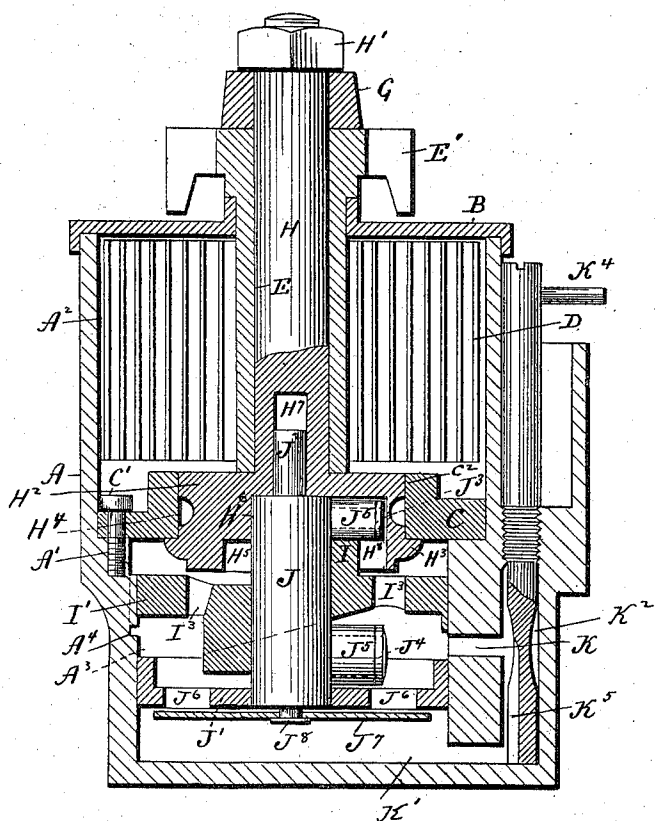
2 Sheets—Sheet 2.

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Fig. 2^a



Witnesses,
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William D. Kellogg

Herbert G. Collins,
Inventor.
By atty Earle Seymour

UNITED STATES PATENT OFFICE.

HERBERT G. COLLINS, OF NEW HAVEN, CONNECTICUT, ASSIGNOR TO THE
SARGENT & COMPANY, OF SAME PLACE.

LIQUID DOOR-CHECK.

SPECIFICATION forming part of Letters Patent No. 577,721, dated February 23, 1897.

Application filed February 25, 1896. Serial No. 580,709. (No model.)

To all whom it may concern:

Be it known that I, HERBERT G. COLLINS, of New Haven, in the county of New Haven and State of Connecticut, have invented a new
5 Improvement in Liquid Door-Checks; and I do hereby declare the following, when taken in connection with the accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description
10 of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a plan view of a door-check containing my invention; Fig. 2, a view thereof
15 in vertical section on the line *a b* of Fig. 1; Fig. 2^a, a similar view, but showing the parts of the check in the positions which they have when the door is open; Fig. 3, a plan view of the check, the parts of the check being removed down to the cam-head; Fig. 4, a reverse plan view of the spindle-head; Fig. 5,
20 a view in side elevation of the cam-head; Fig. 6, a detached reverse plan view thereof.

My invention relates to an improvement in
25 fluid door-checks, the object being to produce a simple and effective device constructed with particular reference to the use of few and strong parts, not liable to breakage or derangement.

30 With these ends in view my invention consists in a fluid door-check having certain details of construction and combinations of parts, as will be hereinafter described, and pointed out in the claims.

35 In carrying out my invention, as herein shown, I employ a case or cylinder A, having its bottom cast integral with it and furnished with a removable flanged cap or cover B. Within the case I locate an annular diaphragm
40 C, resting upon an annular shoulder A', formed within the case, the diaphragm being secured in place by means of screws C'. The said diaphragm virtually divides the case into a spring-chamber A² and a fluid-chamber A³,
45 the said spring-chamber containing a coiled spring D, the outer end of which is connected with the case in the usual manner, while its inner end is connected, also in the usual manner, with a rotary sleeve E, extending down-
50 ward to the bottom of the said chamber and provided at its outer end, which extends up-

ward through the cap B, with an integral ratchet-wheel E', the teeth of which are engaged by a pawl F, pivoted upon the under face of the inner end of the member G of the
55 two-part operating-lever, comprising also a member G'. The said two-part operating-lever may be of any approved construction. The inner end of the member G of the said lever is connected with the outer end of the
60 spindle H, upon which it is held by means of the nut H', which bears upon the inner end of the lever, as shown in Fig. 2. The said spindle H extends downward through the sleeve E and is rotatable independently there-
65 of for adjusting the tension of the spring. It is constructed at its lower end with a circular chambered head H², the exterior periphery of which fits within the central opening C² of the diaphragm C. An outwardly-projecting
70 flange H³, formed upon the lower portion of the head, engages with the lower face of the diaphragm and holds the head and shaft against being moved outwardly. If desired,
75 the head may have a circumferential packing-groove H⁴, as shown in Fig. 2, although this is not imperative. As shown in the said figure, the sleeve E impinges against the outer face of the head. The lower face of the head
80 is constructed with a centrally-arranged annular recess H⁵, which I shall henceforth speak of as a "cam-recess," because it is provided for the reception of the lifting-cam I, formed upon the upper face of the disk-shaped
85 cam-head I'.

Leading out of the top of the recess H⁵ is a recess H⁶, which I shall henceforth call the
"stem-recess," because it is adapted to receive and give clearance to the upwardly-extending vertically-movable stem J of the plunger J'.
90 Leading out of the center of the top of the stem-recess H⁶ is a counterbore H⁷, which receives and affords a clearance for the bearing J³, formed at the upper end of the said stem. The recesses H⁵ and H⁶ are inter-
95 secting by a radially-arranged coupling-slot H⁸, provided for the reception and vertical movement of a lifting and coupling pin J³, mounted in the upper portion of the stem J and coacting with the lifting-cam I, before
100 mentioned. So far as the coupling function of the pin J³ is concerned, it connects the stem

J and spindle H, so that the rotation of the latter is transmitted to the former with the effect of rotating the plunger in one direction or the other; but the said pin only couples the spindle and stem together for rotation, the stem being left free to be moved longitudinally independent of the spindle. This movement of the stem is necessary to permit the plunger to reciprocate in the fluid-chamber A³. The said cam-head I' is fixed against rotation within the liquid-chamber, its periphery being thereto constructed with three notches j, which are taken into by vertical ribs extending into the chamber and formed integral with the case, which is also constructed with a shoulder A⁴, limiting the downward movement of the head. The said cam-head is held in engagement with the shoulder A⁴ by the engagement with its upper face of the lower face of the spindle-head. Upon its lower face the said cam-head is constructed with a doubly-beveled cam I², located in direct opposition to the doubly-beveled lifting-cam I, formed upon the upper face of the head, as clearly shown in Fig. 5. The said cam I², I shall henceforth call the "depressing-cam," because its function is to depress the plunger J'. Two ports I³ I³, formed in the head, permit the fluid to circulate above and below the same. The depressing-cam I² co-acts with a depressing-pin J⁴, mounted in the plunger-stem J at a point below the cam-head I', and, as herein shown, furnished with an antifriction-roll J⁵. These pins J³ and J⁴ are located one above the other, as will be observed by reference to Fig. 2. The plunger J', which is located in the lower portion of the liquid-chamber A³, is adapted in diameter to clear the walls thereof, so as to be free to move up and down and rotate. It is formed with ports or passages J⁶ for the free passage of the liquid downward through it as the plunger is lifted in opening the door, and provided with a large plate-valve J⁷, covering all of the passages J⁶ and suspended from the center of the plunger by means of a pin J⁸, long enough only to give the valve very limited vertical movement for opening and closing the ports J⁶. The controlled passage of the liquid from a point below to a point above the plunger is provided for by means of two ports K and K', located one above the other in the lower portion of the case and intersecting at their outer ends the long vertical passage K², which receives the stem-valve K³. The said valve-stem K³ projects at its upper end above the case and is furnished with an operating-pin K⁴ and threaded, as at K⁶, about midway of its length. The lower end of this valve is constructed with a longitudinal slot K⁵, affording communication between the ports K and K' and means for regulating the flow of the liquid. When the slot is in full alinement with the ports, the flow of the liquid will be the freest, but when virtually reduced in size by being turned into only partial alinement with the ports the flow of the

liquid will be restrained. I do not, however, limit myself to any particular kind of valve for controlling the flow of liquid as described. 70

Having now described the construction of my improved door-check, I will proceed to set forth its mode of operation.

Normally, that is, when the door with which the device is connected is closed, the plunger J' will be located in the bottom of the liquid-chamber, as shown in Fig. 2, with the liquid above it. Now when the door is opened the sleeve E' will be rotated for winding up the spring D, and the spindle H, and hence its head H², will also be rotated, the rotation of the latter being communicated through the lifting and coupling pin J³ to the plunger-stem J and hence to the plunger J'. Just as soon as the rotation of the spindle begins to move the lifting and coupling pin J³ the same is caused to ride up upon the lifting-cam I, whereby the plunger-stem and plunger are lifted in the liquid-chamber, allowing the plate-valve J' to open and clear the ports J⁶, through which the liquid finds a free passage into the lower portion of the liquid-chamber at a point below the plunger. It will be understood that this lifting action of the plunger takes place slowly, so that it is not fully lifted until at about the time the door is open. Now when the door begins to swing back under the effort of the spring A² to uncoil, the depressing-pin J⁴ will begin to ride up the depressing-cam I², so as to immediately begin to move the plunger-stem and plunger downward. At the beginning of this movement the liquid below the plunger is compressed, with the effect of closing the plate-valve, after which the transference of the liquid from a point below the plunger to a point above the same must be through the port K' and the passage K² and the port K, and as this passage is a small one the transference of the liquid will be slow. The downward movement of the plunger is therefore restrained and controlled in exact accordance with the rapidity with which the liquid is allowed to flow through the port K', the passage K², and the port K, and that will depend upon the position of the stem-valve K³. The downward movement of the plunger and hence the closing of the door will therefore be controlled by the slow passage of the liquid from a point below the plunger to a point above the same. It will be understood that on account of the arrangement of the lifting and depressing cams in opposition to each other the depressing-pin clears the depressing-cam at the time the lifting and coupling pin is coacting with the lifting-cam, and vice versa. These cams are made double, so as to adapt the check to be converted for right and left hand doors. 125

It is apparent that in carrying out my invention some changes from the construction herein shown and described may be made, and I would therefore have it understood that I do not limit myself to the exact construction herein shown, but hold myself at liberty 130

to make such changes and alterations as fairly fall within the spirit and scope of my invention.

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

1. In a liquid door-check, the combination with the case thereof, of a spindle, a vertically-movable and rotary plunger provided
10 with a stem coupled for rotation with the spindle, a lifting-pin located at the upper end of the stem, a depressing-pin located at the lower end thereof, and a non-rotatable cam-head interposed between the two pins, and
15 provided upon its upper face with a lifting-cam to coact with the lifting-pin and upon its lower face with a depressing-cam to coact with the depressing-pin.

2. In a liquid door-check, the combination
20 with the case thereof, of a spindle located therein and provided at its lower end with a circular, chambered head, an annular diaphragm located within the case and forming a bearing for the said head, a vertically-mov-
25 able and rotatable plunger located within the lower portion of the said case, and provided with a stem which is coupled with the head for rotation therewith, a lifting-pin connected with the upper end of the stem, a depressing-
30 pin located at the lower end of the stem, and a non-rotatable cam-head interposed between the two pins, and provided upon its upper face with a lifting-cam to coact with the lifting-pin and upon its lower face with a de-
35 pressing-cam to coact with the depressing-pin.

3. In a liquid door-check, the combination with the case thereof, of a spindle mounted therein and provided at its lower end with a circular chambered head, an annular dia-
40 phragm located within the case and forming a bearing for the said head, a vertically-movable and rotatable plunger located within the lower portion of the case and provided with

a stem, the upper end of which enters the said chambered head which affords a bearing for
45 it, a lifting-pin connected with the upper end of the stem and entering a clearance-slot formed in the said head, a depressing-pin lo-
cated at the lower end of the stem, and a non-rotatable cam-head interposed between the
50 two pins and provided upon its upper face with a lifting-cam to coact with the lifting-pin and upon its lower face with a depressing-cam to coact with the depressing-pin, sub-
stantially as described.

4. In a liquid door-check, the combination with a case, of a diaphragm located therein and dividing it into a spring-chamber and a liquid-chamber, a spindle located in the case,
60 and provided at its lower end with a circular head having bearing in the diaphragm, and constructed with a cam-recess, a stem-recess, and a coupling-slot, a vertically-movable and rotary plunger located in the lower portion
65 of the liquid-chamber, a plunger-stem rigidly connected at its lower end with the plunger, and extending upward into the stem-recess, a combined lifting and coupling pin mounted in the upper end of the stem, and extending
70 into the coupling-slot aforesaid, a depressing-pin mounted in the lower end of the stem, and a cam-head located between the said chambered head and plunger, and provided upon its upper face with a lifting-cam enter-
75 ing the cam-recess in the head, and coacting with the lifting and coupling pin, and upon its lower face with a depressing-cam, which coacts with the depressing-pin.

In testimony whereof I have signed this specification in the presence of two subscrib-
80 ing witnesses.

HERBERT G. COLLINS.

Witnesses:

HARRY W. MESBURNE,
WILLIAM S. COOKE.