(No Model.) 2 Sheets—Sheet 1.

W. GILFILLAN.

DOOR CHECK.

No. 470,188. Patented Mar. 8, 1892.

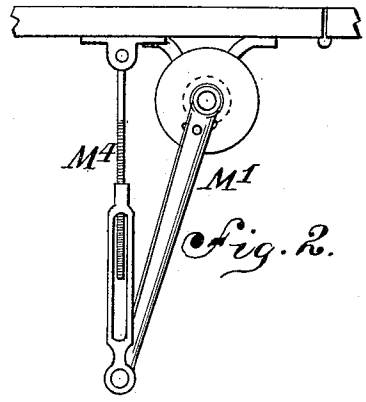

Fig. 2.

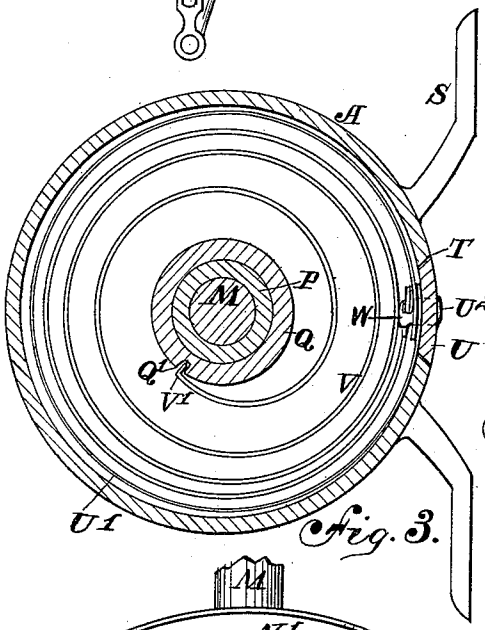

Fig. 3.

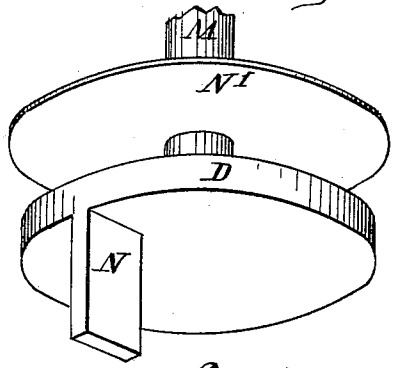

Fig. 5.

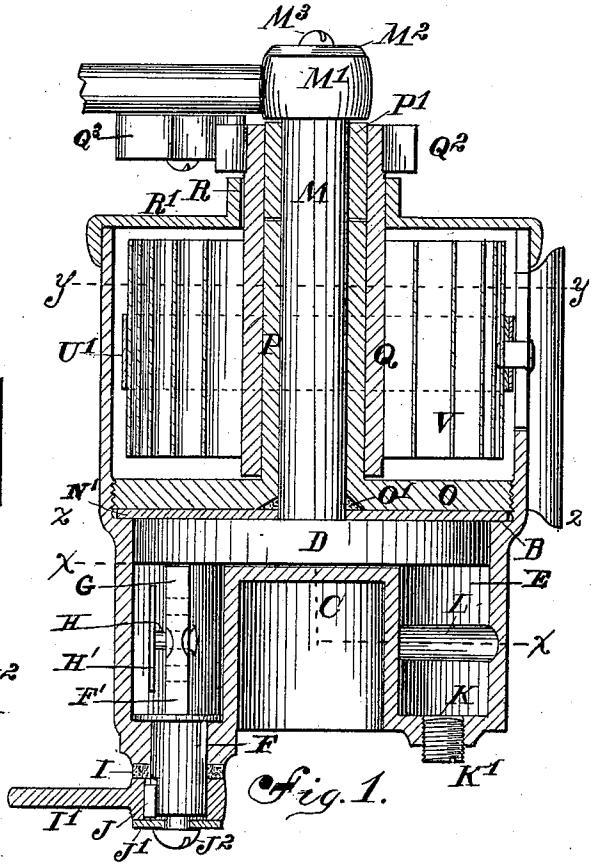

Fig. 1.

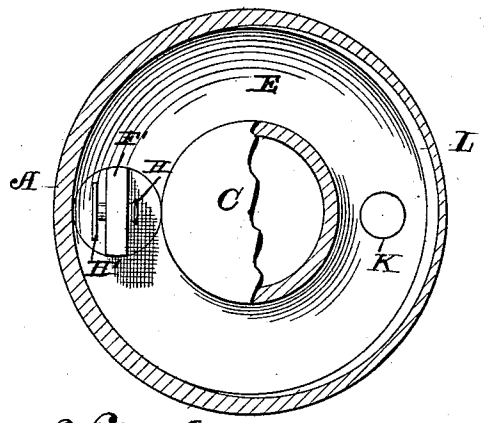

Fig. 4.

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(No Model.) 2 Sheets—Sheet 2.

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DOOR CHECK.

No. 470,188. Patented Mar. 8, 1892.

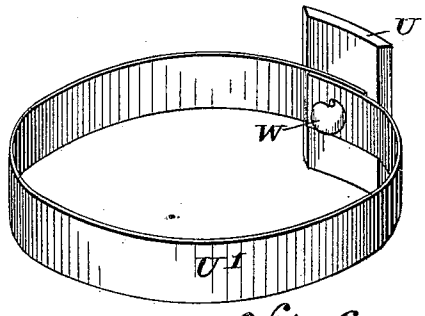

Fig. 6.

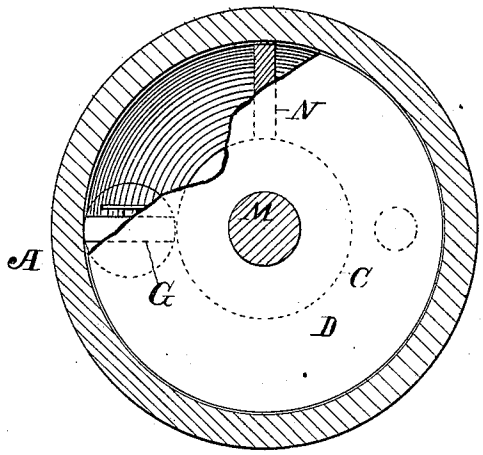

Fig. 7.

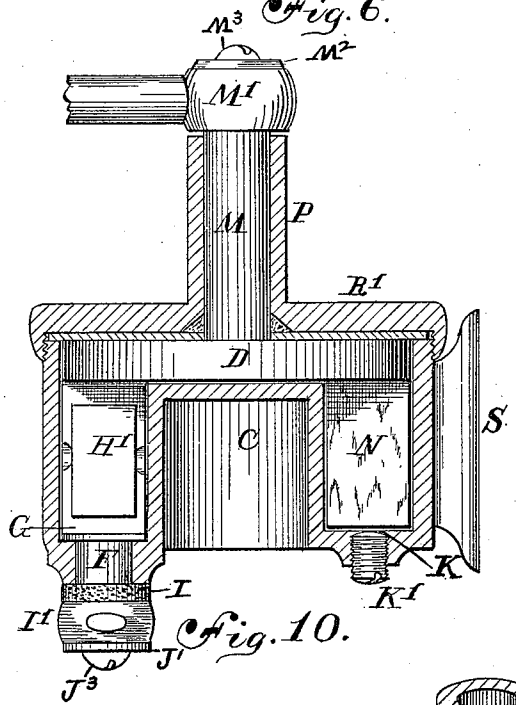

Fig. 10.

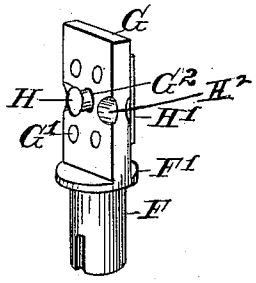

Fig. 9.

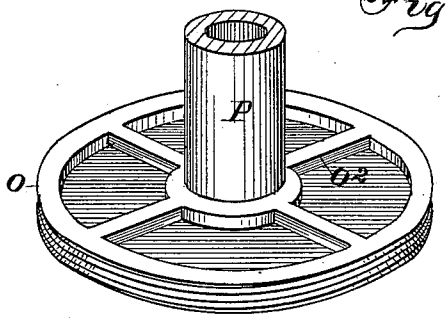

Fig. 8.

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UNITED STATES PATENT OFFICE.

WILLIAM GILFILLAN, OF BROOKLYN, NEW YORK.

DOOR-CHECK.

SPECIFICATION forming part of Letters Patent No. 470,188, dated March 8, 1892.

Application filed October 1, 1891. Serial No. 407,398. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM GILFILLAN, a citizen of the United States, and a resident of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Door-Checks, of which the following is a specification.

The object of my invention is to provide a fluid door-check of such construction that the spindle may be located wholly outside of the liquid-chamber and the liquid prevented from leaking into the spring-chamber.

A further object is to so dispose the spring within its casing that its tension will be graduated to give it such elasticity and freedom of action that it will offer but slight resistance to the opening of the door and yet will afford ample power to close it.

A further object is to provide a readily-reversible spring to enable it to be quickly adjusted for use on right or left hand doors.

A further object is to provide a cylinder cast in a single piece and comprising a spring and a liquid-chamber, and thereby secure a strong and reliable structure and one which will prevent any leakage of the liquid.

A further object is to provide a fluid door-check with an annular liquid-chamber and a reversible plug-valve located in said chamber to regulate and control the flow of the liquid in either direction in said chamber.

A further object is to provide a fluid door-check with certain other features of improvement, which will be hereinafter set forth.

With these ends in view my invention consists in certain features of construction and combinations of parts, as will be hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a vertical section of one construction of door-check embodying the invention. Fig. 2 is a plan view of the door-check applied to a door and casing. Fig. 3 is a transverse section through line *y y*, Fig. 1. Fig. 4 is a transverse section through line *x x* of Fig. 1. Fig. 5 is a view in perspective of the rotary disk. Fig. 6 is a view in perspective of the spring-retaining band. Fig. 7 is a transverse section through line *z*, Fig. 1, showing a portion of the rotary disk cut away. Fig. 8 is a view in perspective of the rotary partition-disk and stem or spindle thereto. Fig. 9 is a view in perspective of the reversible venting-plug, and Fig. 10 is a vertical section of a modification in which the spring is dispensed with.

A represents the shell or casing, preferably cast in a single piece and provided with a ledge B. The bottom of the casing is formed with a circular dome C, which forms the inner wall of an annular chamber E, the outer walls of which are formed by the casing. The top of the dome is finished to form a smooth flat bearing for the rotary disk D. A hole K is formed in the bottom or through any other portion of the annular liquid-chamber to allow the latter to be filled with liquid, and a screw-plug K′ serves to close such filling-hole. Disk D is attached to or suitably connected with the spindle or stem M, so as to be actuated thereby. A locking-plate O is provided with screw-threads on its circumference, which engage screw-threads formed on the inner wall of the casing above the ledge B. A packing-ring O′ is interposed between the disk and plate O. By tightly screwing the locking-plate O against the disk D the latter is forced snugly against its seat on the drum, whereby the liquid in the chamber is prevented from being forced over the top of the dome, while the circumference of the disk snugly fits against the outer wall of the annular chamber and prevents the liquid from flowing or leaking into the spring-chamber. As a further precaution against leakage a packing-ring N′ may be interposed between the disk and locking-plate, the outer edge of the packing-ring being firmly clamped between the locking-plate and ledge B.

From the foregoing it will be observed that the rotary disk constitutes a closed top or cover for the annular liquid-chamber.

G represents a reversible plug formed with a cylindrical shank F and elongated flattened valve-body F′, which latter is of proper width to fit snugly between the walls of the annular liquid-chamber. Holes G′ are formed through the body F′, and over them is placed the valve H′, which is kept in position by the shank H, which passes through the valve-body and permits of a sufficient range of movement to the valve to allow it to freely open and close the openings G′. The side edges of the valve-body are formed with inclined grooves H^2, which extend from one side nearly but not quite to

the opposite side, so that when the valve-body is set radially to the shaft no liquid can escape through either one of the grooves H^2, but when slightly turned the liquid is allowed to flow through one of such grooves. The cylindrical shank F is inserted through a hole in the bottom of the liquid-chamber, and upon its projecting end is secured a key or handle I′. A packing-ring I is interposed between the key and wall of the casing to prevent any leakage around the shank F. The key is fastened in place by means of a pin J, washer J′, and screw J^2. By means of the key the plug may be adjusted so as to regulate the size of the liquid-passages between the sides of the plug and the walls of the annular chamber and thereby vary the resistance of the check, and also by reversing the position of the key or handle the position of the plug is reversed, and thereby adapting the check for use on either right or left hand doors. In Fig. 1 the plug is adjusted so as to allow of the free passage of the liquid around the annular chamber, while in the position represented in Fig. 7 the plug cuts off the passage of liquid in one direction. If adjusted to any intermediate position, the flow of liquid past the plug will depend on the angle of adjustment.

To the under side of the disk is secured a radial wing or blade N, the sides of which snugly fit against the inner and outer walls of the annular chamber, while its lower end fits and snugly engages the lower and stationary wall of the chamber. It is obvious that this wing may be cast integral with the disk or be made separately and secured thereto. The depending wing or blade N, carried by the disk, travels backwardly and forwardly within the annular liquid-chamber. When moved in one direction, due to opening the door, the liquid offers but little or no resistance to such movement, because it freely escapes through the openings in the plug, the liquid being forced in a direction to open the valve. When the wing is moved in the opposite direction, due to closing the door, it forces the liquid in a direction to close the valve, whereby the liquid being confined between the plug and wing serves as a resisting medium to the movement of the latter. This resistance may be regulated and controlled by adjusting the plug and regulating the flow of liquid through the passages formed between its sides and the walls of the annular chamber. It will be observed that the walls of the annular chamber adjacent to the plug serve as the casing for the latter and insure an exceedingly simple and efficient construction and arrangement of parts for regulating the resistance of the check. The outer wall of the annular chamber has milled or otherwise formed therein a groove L, which is deepest at its central portion, from which its cross-sectional area gradually diminishes to its opposite ends. This groove allows of the escape of fluid past the wing N and automatically regulates the speed at which the door will move in closing. When the door is wide open and commences to close, the spring is at its greatest tension and hence exerts its greatest force. During the first movement of the door in closing the resistance of the liquid to the movement of wing N is but slightly lessened by the escape of liquid through the shallow passage formed in the end of groove L. As the door continues to close the tension of the spring gradually diminishes, and the resistance of the liquid is also gradually diminished by reason of the greater cross-section of the groove L permitting a larger quantity of liquid to escape past the wing N, and hence the door is caused to close quite rapidly and at a comparative uniform rate of speed until it has nearly closed, when the wing N will have moved to a position when the groove L will permit little or no fluid to escape through it, with the result that the movement of the door will be gradually checked until it will move so slowly as to prevent its slamming when closing.

M represents a spindle or stem, the lower end of which is connected or made integral with disk D. The spindle extends upwardly through the spring-chamber and has an arm M′ attached to its upper end by means of a washer M^2 and screw M^3. The arm M′ has pivotally connected therewith an adjustable link M^4, which has a bracket pivoted to its free end, by which it is secured to the door-casing. Locking-plate O is constructed with an upwardly-projecting sleeve P, within which the spindle M is journaled. The lower end of the spindle has its bearing in a hole in the locking-plate, the hole being countersunk, as shown at O′, for the reception of packing. The upper surface of the locking-plate is furnished with radial ribs O^2 to enable it to be tightly screwed against its seat. The upper end of the spindle is encircled by a short collar or sleeve P′, upon which is seated the hub of the arm M′. Around the sleeves P P′ is placed the barrel Q, to which is secured the inner end of the spring V, a groove Q′ being formed in the barrel for this purpose. To the upper end of the barrel is secured a ratchet-wheel Q^2, with which engages a double pawl Q^3, which is pivoted to the under side of the arm M′. The barrel fits loosely within the projecting tubular bearing R on the cap R′ and, as stated, has a bearing on the sleeves P P′. Hence this extended bearing of the spring-barrel prevents it from binding and insures great freedom of action to the spring.

The upper edge of the casing is formed with a slot, the side edges of which are preferably made beveled, as shown at T. Within this slot is removably secured a block U, which is fastened to a spring-retaining band U′ by means of a rivet U^2 or in any other desired manner. This band encircles the spring V, the inner end of which is formed with a right-angled band, which, as has been stated, is attached to the barrel, while its outer end is

provided with an eye by which it is attached to the hook W on the inner end of the rivet U^2. By means of this construction the spring is always securely retained within its retaining-band and may be readily secured in the casing either side up to adapt it for use on either a right or left hand check.

The coiled spring has its outer convolutions wound closely together, so that they are nearly concentric with each other, while its inner coils are more sharply curved. The object of coiling the spring in this manner is to prevent it from offering an undue initial resistance to the free opening of the door. When the door is first swung from its closed position, the outer and longer coils are first affected and offer so little resistance that the presence of the check on the door is hardly noticeable. However, the complete movement of the door in opening will result in contracting the outer and inner coils to such an extent that the spring will have ample power stored in it to close the door.

Fig. 10 illustrates a modified form of check in which the spring is dispensed with. This construction of check is adapted for use on doors provided with a separate spring for closing. The ears S are in this instance formed on the casing of the liquid-chambers, while the screw-threaded cap R′ serves the purpose of the locking-plate to retain the disk D in place.

It is evident that changes in the construction and relative arrangement of the several parts might be made without avoiding my invention, and hence I would have it understood that I do not restrict myself to the particular construction and 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 casing for a door-check formed in a single piece and comprising a spring-chamber and an annular liquid-chamber, the latter being constructed with a dome forming the inner wall of the annular liquid-chamber, substantially as set forth.

2. In a door-check, the combination, with an annular liquid-chamber, of a rotary disk forming the top of said chamber, and a wing or blade attached to the disk and extending into the annular liquid-chamber, substantially as set forth.

3. In a door-check, the combination, with an annular liquid-chamber and a wing or blade adapted to move in said chamber, of a reversible plug-valve fitted to engage the inner and outer walls of said annular chamber, substantially as set forth.

4. In a door-check, a reversible plug-valve having grooves (one or more) formed in its side edges, substantially as set forth.

5. In a door-check, the combination, with an annular liquid-chamber and a plug provided with a valve located in said chamber, of a rotary disk having a wing or blade constructed to operate within the annular chamber, substantially as set forth.

6. In a door-check, the combination, with an annular liquid-chamber, a plug located therein, and a blade adapted to move within the annular chamber, of a venting-groove formed in one of the parts within the chamber and adapted to govern and control the speed of the door in closing, substantially as set forth.

7. In a door-check, the combination, with an annular liquid-chamber, a rotary disk closing the top of said chamber, and a wing or blade attached to the disk and extending into the annular chamber, of a locking-plate for retaining the rotary disk in place, substantially as set forth.

8. In a door-check, a spring provided with a retaining-band, substantially as set forth.

9. In a door-check, the combination, with the casing, of a spring provided with a retaining-band adapted to be reversibly secured to the casing, substantially as set forth.

10. In a door-check, a spring provided with a retaining-band, the outer coils of the spring being closely wound, while the inner coils are quite widely separated, substantially as set forth.

11. A door-check comprising an annular liquid-chamber, a rotary disk provided with a wing or blade which extends into said chamber, a spindle for transmitting the power of a spring to the rotary disk, a locking-plate for retaining the rotary disk in place, and an adjustable venting-plug located in the annular chamber, substantially as set forth.

12. In a door-check, a casing constructed with a dome forming the inner wall of an annular liquid-chamber, said dome having a flat seat on its top, which serves as a bearing for a rotary disk, substantially as set forth.

Signed at New York, in the county of New York and State of New York, this 10th day of January, A. D. 1891.

WILLIAM GILFILLAN.

Witnesses:
J. S. ZERBE,
I. S. ELKINS.