(No Model.) 2 Sheets—Sheet 1.

W. GILFILLAN.

DOOR CHECK.

No. 462,638. Patented Nov. 3, 1891.

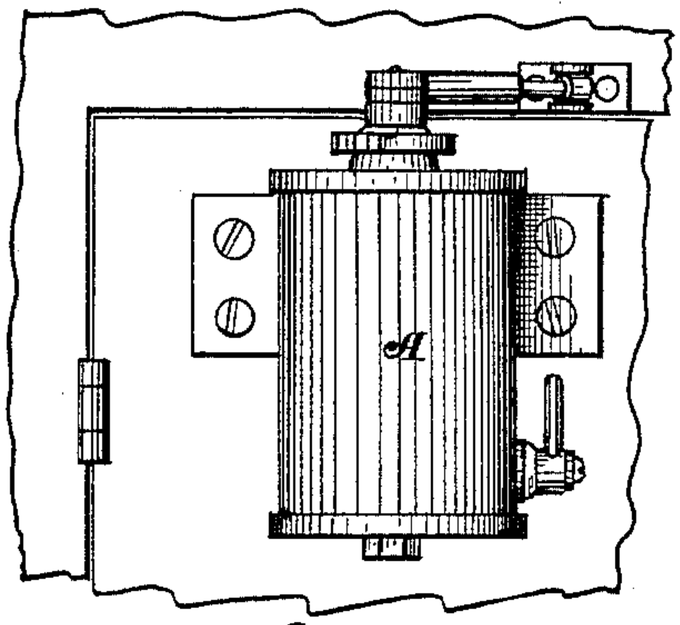

Fig. 1.

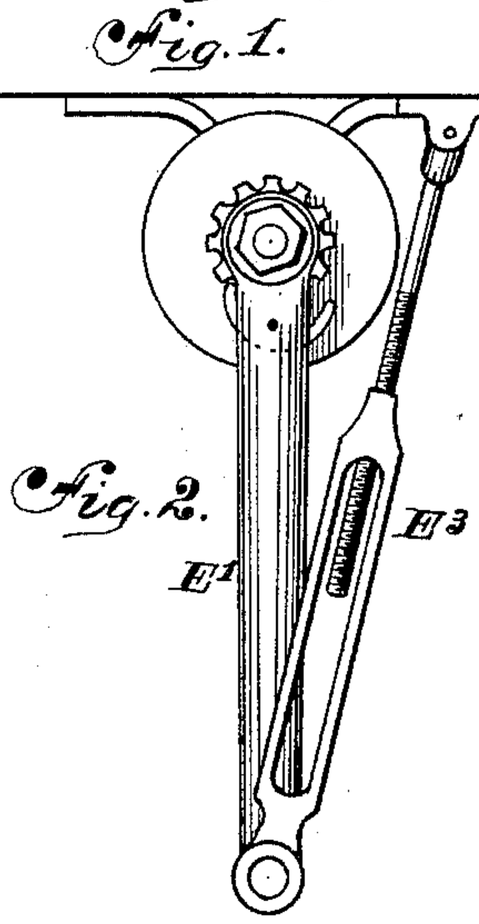

Fig. 2.

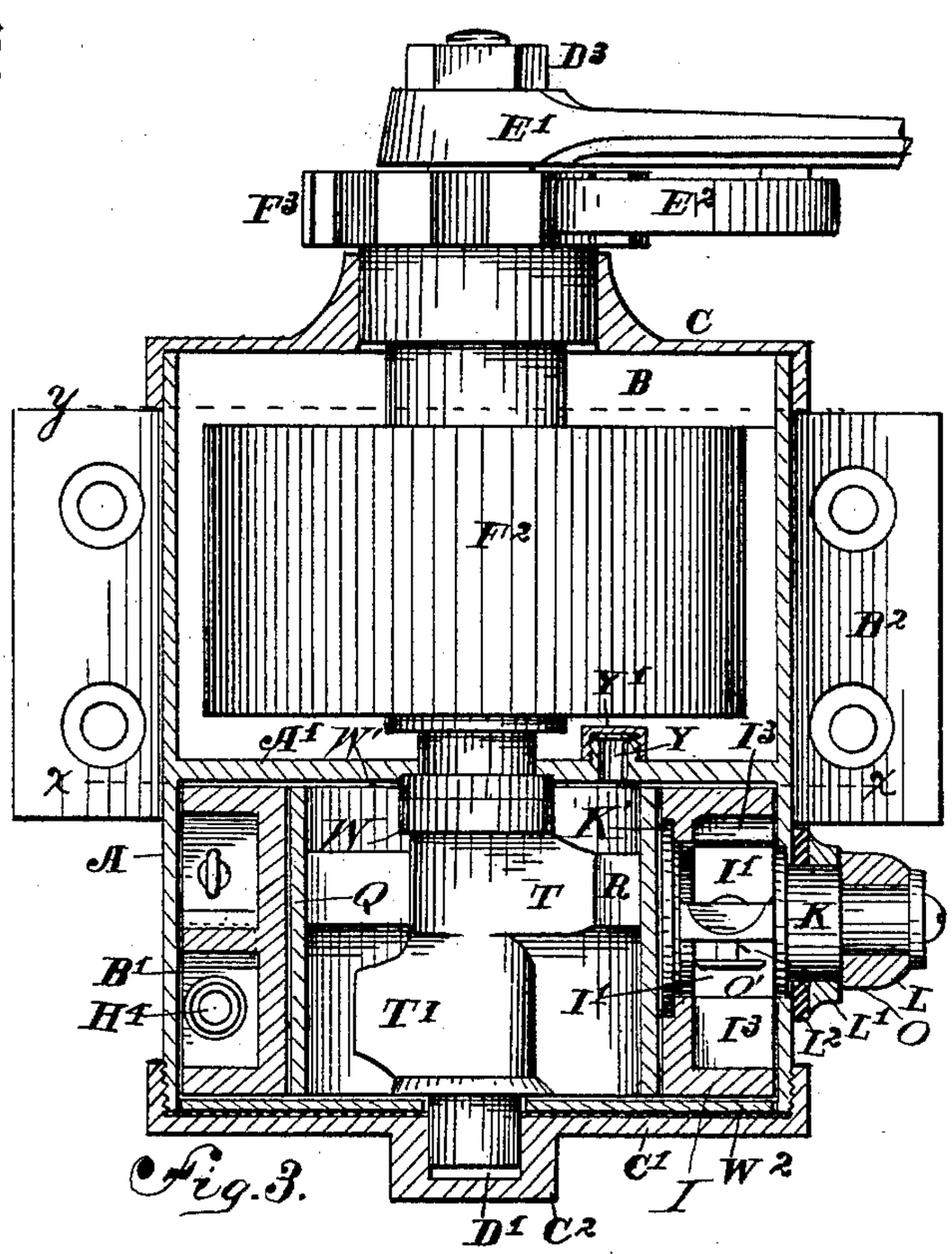

Fig. 3.

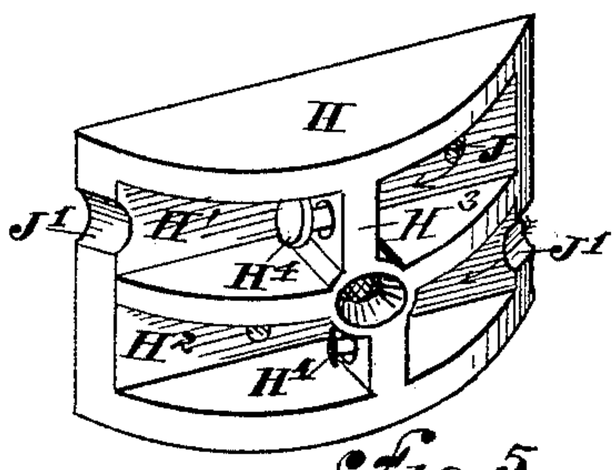

Fig. 5.

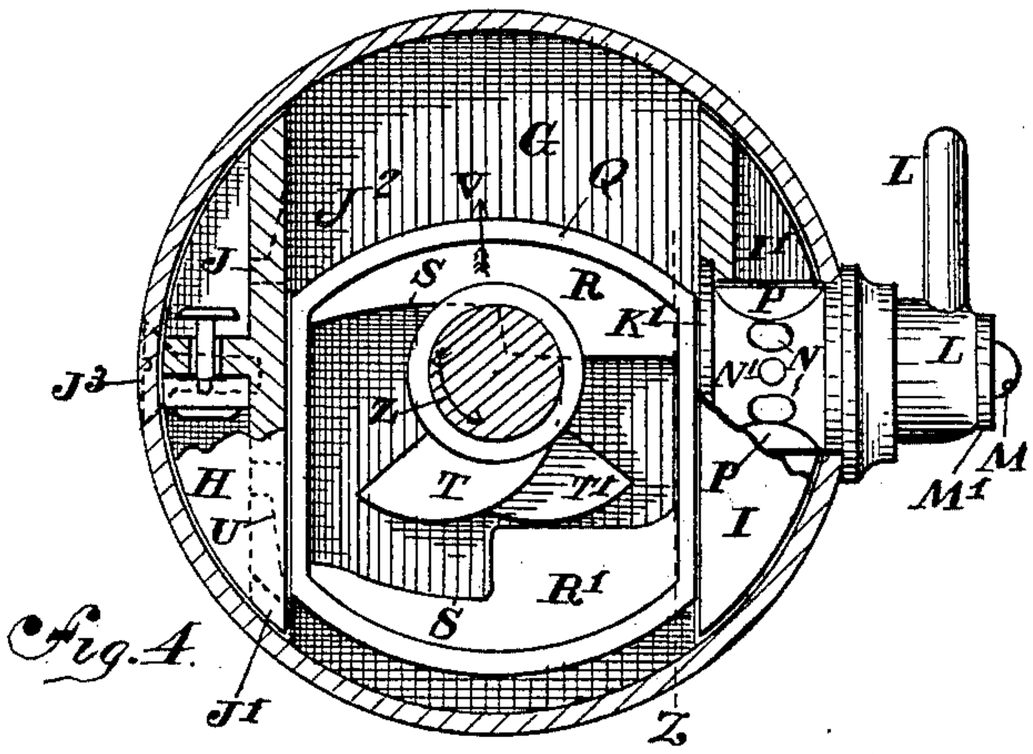

Fig. 4.

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S. Warren

Inventor:

Wm Gilfillan

By Dyrenforth & Dyrenforth

Attorneys

(No Model.) 2 Sheets—Sheet 2

W. GILFILLAN.

DOOR CHECK.

No. 462,638. Patented Nov. 3, 1891.

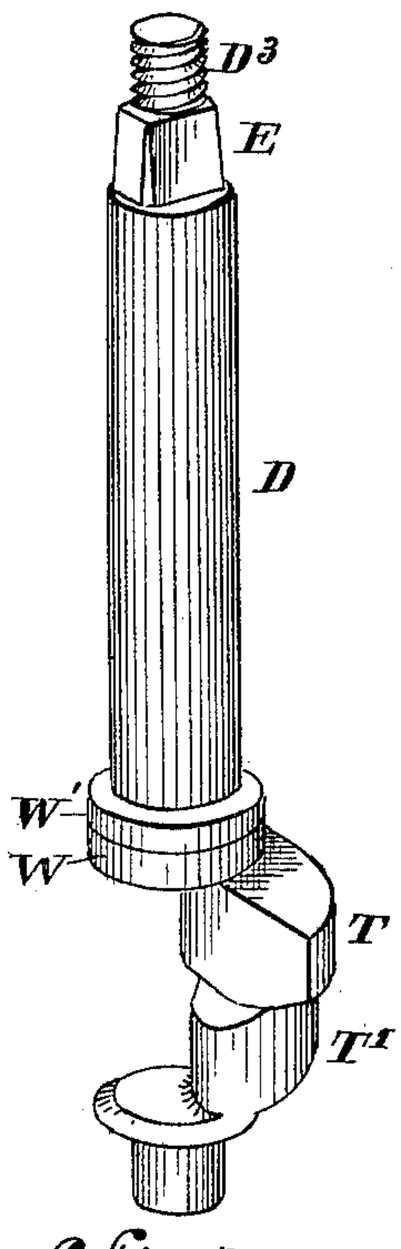

Fig. 7.

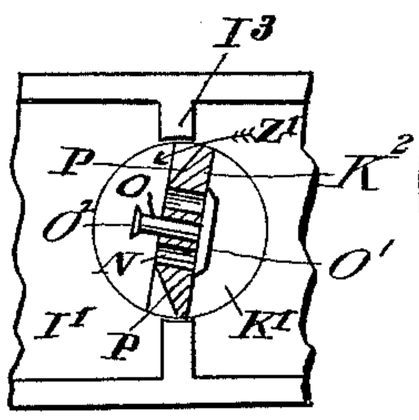

Fig. 15.

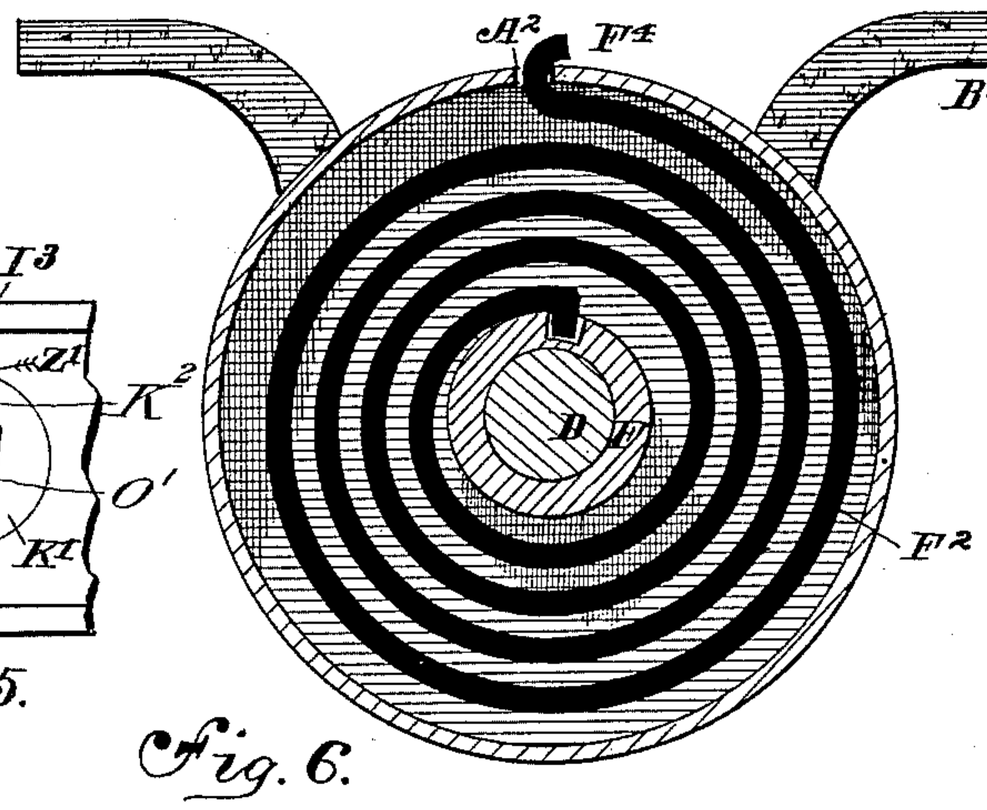

Fig. 6.

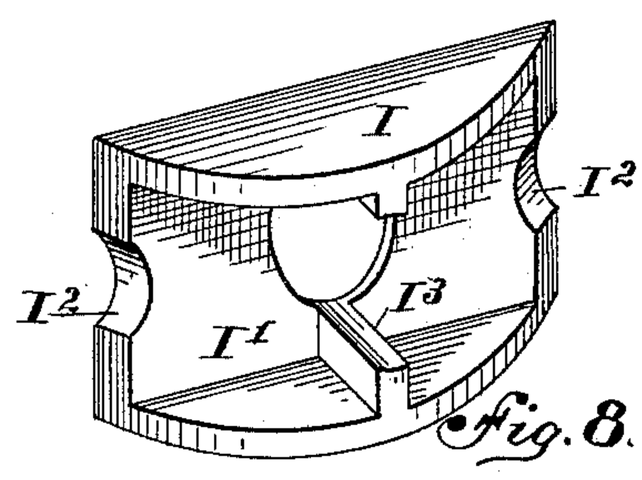

Fig. 8.

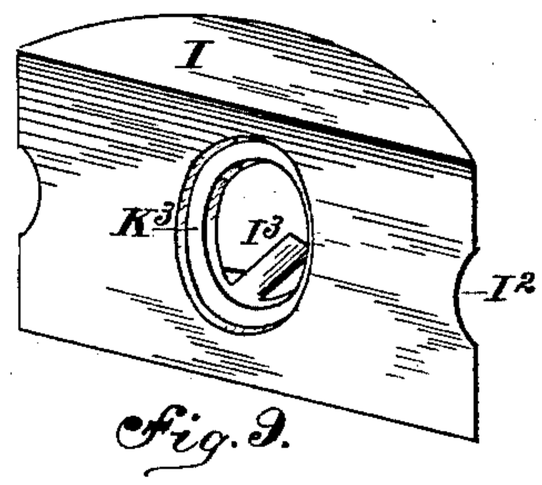

Fig. 9.

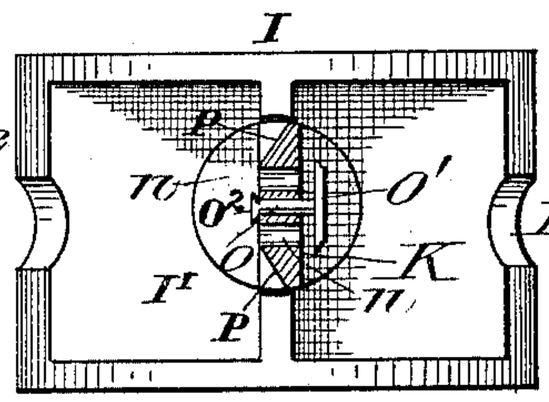

Fig. 10.

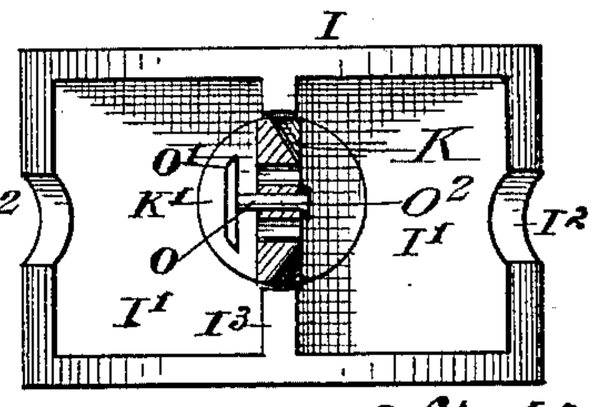

Fig. 11.

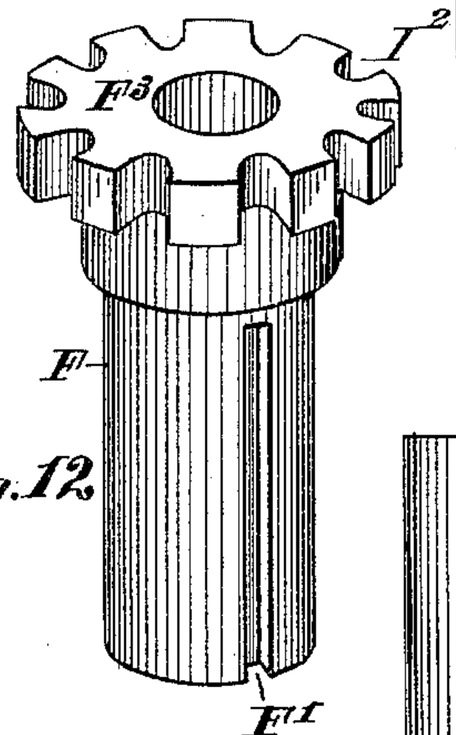

Fig. 12.

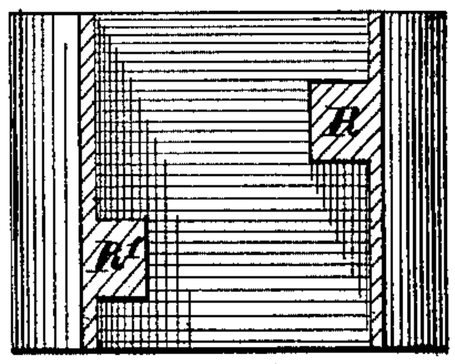

Fig. 14.

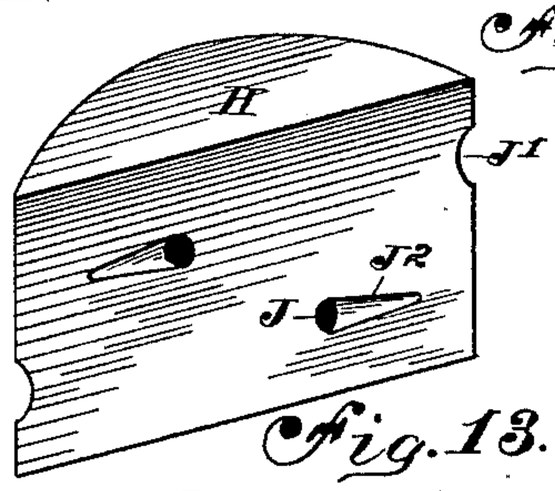

Fig. 13.

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J. J. Chael
S. Marvin

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By D. G. Fish
Attorney

UNITED STATES PATENT OFFICE.

WILLIAM GILFILLAN, OF BROOKLYN, NEW YORK.

DOOR-CHECK.

SPECIFICATION forming part of Letters Patent No. 462,638, dated November 3, 1891.

Application filed November 19, 1890. Serial No. 371,911. (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 construct a cheap, simple, and efficient door-check so arranged that it can be reversed and placed on left or right hand doors, is easily and quickly adjusted to suit any weight of door, and also to provide a means whereby each door-check is adapted to be regulated for the amount of usage to which it is applied. Through years of practice in constructing door-checks of this class and experimenting with the various forms of door-checks I have found that in all cases where liquids of any character are employed in a containing-case it is extremely difficult to so construct the device that the liquid will not be forced through the joints. I have tried numerous forms of packing to accomplish this, and with the result that wherever I have succeeded in making absolutely tight joints the operative portions of the door-check would not work with the ease and freedom required to perform their duty. In this connection I would also state that the use of liquids is found to be the most satisfactory means for this purpose, provided the foregoing difficulty can be remedied, because a door-check employing liquids when once adjusted remains in working order much longer, is more efficient in its operation than door-checks of this class depending on springs or air for their action, and being entirely closed excludes dirt and dust and is therefore not so liable to clog and get out of order.

The special object of my present invention, therefore, is to construct a door-check with the mechanism so arranged that while it depends on the liquid for its action in checking the movement of the door there is absolutely no strain on the joints or packing, and the liquid is not forced against or through the packing while the door is being closed, as will now be set forth in detail.

Referring to the accompanying drawings, Figure 1 is a front view of my improved door-check applied to a door and casing; Fig. 2, a top view of the same; Fig. 3, a central vertical section of the door-check; Fig. 4, a horizontal section through line X of Fig. 3; Fig. 5, a perspective view of the outer side of one of the segmental blocks in the liquid-chamber, which has the double transverse channels and valves; Fig. 6, a horizontal section through line *y* of Fig. 3; Fig. 7, a perspective view of the spindle or arbor; Fig. 8, a perspective view of the outer side of the segmental blocks, which has the single transverse channel and rotatable valve-stem; Fig. 9, a perspective view of the inner side of the same block; Fig. 10, a front view of the segmental block, showing position of the rotatable valve for checking the liquid in one direction; Fig. 11, a front view of the same, showing valve reversed to check the flow of the liquid in the opposite direction; Fig. 12, a perspective view of the barrel for holding the spring and the toothed wheel for the pawl of the checking-lever; Fig. 13, a perspective view of the inner side of the segmental block containing the two transverse channels and valves; Fig. 14, a vertical longitudinal section of the transversely-movable head through line *z* of Fig. 4; and Fig. 15 a side view of the block, showing the plug turned past the vertical.

The check-case is composed of a shell A, of any suitable size, open at both ends and having midway between the ends a partition A′, so as to form two compartments B B′. The rear side of the case has two ears B^2, with holes therein to provide means for securing the case to the door. The upper end of the shell has a cap C, with a boss centrally and a hole therein to receive the spindle and barrel for the spring. The lower end of the shell has a base C′ screwed thereto, and projecting from this base is a boss C^2, on the inner side of which is a socket to receive the lower end of the arbor or spindle. In the upper chamber of the shell I locate the spring F^2 for closing the door, and as this portion of the mechanism, together with the arm and lever attached to the door-casing, is well known in the class to which this pertains it is not necessary to particularly point out their structure, except in so far as it is necessary to show the operation of the same in connection with the mechanism in the lower chamber, which

forms the distinctive feature of the present invention. The spindle or arbor D, which passes centrally through the cap C and partition-wall A′, rests in the socket D′ in the base of the case. The upper end of the arbor projects above the cap and is provided with screw-threads D^2 to receive a nut D^3. Below the screw-threads is a square portion E to receive the lever E′, the outer end of which is attached to the arm E^3, that is hinged to the casing above the door. Below the lever E′ on the spindle is a loose tubular sleeve or barrel F, having in one side a groove to receive the inner end of the spring F^2, and on the upper end of the barrel is a toothed wheel F^3. On the under side of the lever E′ is a double-acting pawl E^2, which engages with the toothed wheel F^3, so that the action of the spring may be reversed. The spring has a scroll F^4 at its outer end which hooks within the vertical slot A^2 in the rear side of the shell A, so that the spring itself may be taken out and reversed when desired.

Referring now to mechanism in the lower chamber, which produces the check on the movement of the door, it will be observed that a transverse way G is formed in the chamber B′ by means of two segmental blocks H I. The block H has two transverse channels H′ H^2, each having midway between the ends a vertical wall H^3. These walls contain apertures and valves H^4, the valve in one channel being designed to permit the liquid to flow in one direction and the valve in the other channel in the other direction. Approximately one-third of the way from each end the vertical wall of the block has an aperture J, one in each channel, and these are so located with reference to the movement of the valves H^4 that when the liquid flows from the transverse way G through the aperture J the valve in that channel will open. Thus in Fig. 5 we will suppose the liquid is flowing through the aperture J into the upper channel, as shown by the dart. The motion of the liquid opens the valve H^4, allowing it to pass through. At the same time the liquid also flows into the lower channel through the groove J′, closing the valve H^4 in the lower channel. The inner face of the block H has a tapering groove J^2, extending out from each aperture J, for purposes which will be fully explained in connection with the operation of the sliding transverse head. This block is held in its place by means of a screw J^3, Fig. 4. The segmental block I is the same size as block H, but is provided with only a single transverse channel I′, and has at each end a groove I^2 to admit the liquid from the way G. Midway between the ends is a vertical wall I^3 or a portion of a wall, as I place a rotatable plug K through this block, intersecting the wall. The inner end of the plug has a head K′ rotating in a counterbore-seat K^3 in the inner face of the block. The outer end of the plug-stem projects through the wall of the case and has thereon a lever L for turning the same, and a metal washer L′ and gasket L^2, seated against the outer face of the case, the whole being held in position by means of the screw M and washer M′. The plug-body between the wall of the case A and the head K′ is flattened, so that it is approximately the thickness of the wall I^3, and through this portion I place, preferably, two holes N and centrally a smaller hole N′. In this smaller hole N′ is a stem O, with a valve-head O′, the opposite end of the stem having a head O^2 to hold the stem in place. On one side this body of the plug has circular cut-away portions P above and below, so that when the plug K is rotated slightly in either direction the liquid will flow through the cut-away portion and the amount of the flow can be regulated by the turn of the plug. At the same time the plug can be completely rotated, so as to check the flow of the liquid in either direction.

It should be borne in mind that the operation and uses of the channel and valve in this block are entirely different from the uses of the channels and valves in the other block. In the block H the channels and valves are so arranged that the liquid will open the valve of the channel which is being fed by the liquid, while in the case of the channel and valve in block I the plug K is turned so that the valve closes when the liquid passes into the channel, and the rotatable plug has the additional function of being adjustable, so that while no liquid will flow through the valve when the door is closing a limited amount can pass through one of the cut-away portions P when the plug is turned a short distance from a vertical line. The object of having the cut-away portions above and below on the same side is to provide a vent in case the user should turn the plug in either direction.

The transversely-sliding head Q within the way G is composed of two vertical walls, which rest snugly between the straight walls of the blocks H I. The head has curved ends, as shown, and its length is such that it may slide a limited distance within the way G. Interiorly the head has two horizontal ledges R R′, projecting from the end walls, one of these ledges being higher than the other, and each ledge has a portion of its body cut away from the center, as shown at S. The arbor or spindle passes through this sliding head, and on its body within the sliding head are two cams T T′, both projecting out on one side, but located above each other, so as to engage, respectively, with the ledges R R′. The contact-faces of the cams project out in different directions, so as to move the sliding head to and fro properly when the spindle is rotated.

The dotted line U, Fig. 4, shows the relative location of the aperture J and tapering groove J^2. (Shown more fully in Fig. 13.)

In order to show the action of the liquid, we will suppose the door is open, bringing the sliding head in the position shown in Fig. 4.

In this position the valve H^4 in the upper channel H′ is open and the valve in the lower channel H^2 closed, because the liquid in passing through by the operation of opening the door left them in the position shown. The lever L being in a horizontal position would permit the liquid to flow through the channel I′ uninterruptedly. Now, in order to produce a check on the action of the door while in the process of being closed, the plug is turned to the position shown in Fig. 10, and when once turned to that position it need never be changed, except to move it slightly from or to the vertical (Fig. 15) in case more or less passage of liquid is required through the cut-away portions P. When, therefore, the spring F^2 exerts its tension to close the door the sliding head is moved up in the direction of dart V, Fig. 4, forcing the liquid through the aperture J in the block H and through the groove I^2 in block I. As the end of the sliding head approaches the aperture J and passes the same a portion of the flow through the aperture and tapering groove is cut off, and as the head moves farther along the flow is gradually decreased until the entire flow is cut off before the head has reached the limit of its movement. Now, if no other means were provided, the door would not completely close, because the body of the liquid confined between the head and the case would prevent complete closure. It is for this reason that the rotatable plug-valve K is provided with the cut-away portions P, because thereby I am enabled to so regulate the flow that by allowing a very small amount of liquid to pass through the door will close gently, however great the tension of the spring may be. Again, it is desirable that when the door is released and the spring takes effect, the closing movement will be retarded instead of accelerated. The natural action of a spring is to accelerate movement if unrestricted. If this were permitted, by the sudden cutting off of the flow of liquid at any point the shock of an immediate stoppage in the swing of the door would be disagreeable and annoying, to say nothing of the disastrous result on the hinges as well as wear to the check mechanism. The tapering groove J^2 obviates this by gradually decreasing the outflow of the liquid during the initial movement of the door, completely cutting it off at a point short of complete closure, permitting the flow during the final movement of the door to be wholly diverted to the regulating-valve in the block I, which is always under control. It should be observed that the liquid fills the entire chamber B′, so that the sliding head simply moves back and forth in the body of the liquid, and since the spindle D and the plug K present the weak points for leakage, owing to the fact that they are movable in their bearings, I call particular attention to their location and operation with their relation to the other mechanism in order to illustrate wherein I absolutely obviate any liability of leakage. The spindle D has below the central partition-wall A′ a collar W, and between this collar and the under side of the wall a gasket W′.

Within the lower end of the shell I place a thin metal disk W^2, so that in screwing up the base-plate C′ the disk will be between said base and the liquid-operating mechanism. The body of the liquid within the sliding head is never affected by the pressure of the liquid at either end. Hence there is no liability of leakage around the spindle, and should there be, the collar and gasket being on the under side of the wall A′ the tendency would be to press the gasket against its seat. The same remarks apply to the rotatable plug K, because the liquid merely passes from one side to the other, and as the inner end of the plug has a larger head and the outer end a gasket and screw the same can be secured in place and insure a tight joint.

As it is desirable to place all the operative parts in the chamber B′ and close the same before filling, I have provided an opening Y in the partition-wall A′ at a point within the way G, so that the space within the sliding head as well as the space outside can be filled. This opening is provided with a screw-cap Y′ and gasket, so that it may be sealed tightly after filling. By locating the filling-tube within the upper chamber, no projecting tubes for this purpose are required on the outside of the case. The filling takes place, of course, before the cap and spring are placed in position.

I also particularly call attention to the fact that all the operative mechanism is surrounded by or immersed in the liquid, so that no vacuums are formed during the operation of the check, and while it would be difficult, probably, to construct a sliding head so that no liquid would pass over the top or under the same while in action, still such leakage would not affect the efficiency of the check, and if it should an easy remedy would be found in using a liquid of greater viscidity. This structure and arrangement of parts enables me to provide a most efficient check without in any degree affording a chance for leakage of the liquid through high pressure, while at the same time neither the spindle nor the sliding head offer any resistance during the motion of opening the door, because no excessive packing is required to tighten the bearings.

In operation we will suppose that the check is placed on what is called a "right-hand" door. The spring F^2 in Fig. 3, the valves in the segmental block H, Fig. 5, and the rotatable valve in segmental block I, Fig. 10, represent the respective positions of these parts. During the operation of opening the door a portion of the liquid is forced through the aperture or port J in the upper channel of the block H, thence through the valve-orifice, and in through the groove J′ to the way G on the other side of the head. A portion of

the liquid also passes through the groove passage-way I^2, entering at the left side, Fig. 10, and passing thence through the valve-apertures N in the rotatable plug, and to the way G through the groove at the opposite end of the block. When the door is open, therefore, the sliding head is at the forward end of the way, as shown in Fig. 4. When the door is released and the spring F^2 turns the spindle D in the direction indicated by the dart Z, the cam T strikes the ledge R and moves the sliding head in the direction of the dart V, closing the valve in the upper channel of the block H and opening the valve in the lower channel, thereby permitting a certain amount of the liquid to pass through until the sliding head entirely closes the port J, which completely checks the door. During the movement of the head the valve O′ in the rotatable plug is closed; but the plug having been slightly turned past the vertical, a slight opening Z′ is formed, Fig. 15, between the cut-away portion P and the wall I^3 sufficient to allow a small flow of liquid which is ample to permit the door to gently close. For a "left-hand" door the plug is reversed or rotated to the position shown in Fig. 11.

The reversible venting-plug and valve, constructed substantially as herein shown, is set forth by me and claimed in another pending application, Serial No. 319,017, dated July 31, 1889, and I therefore lay no claim to the same in this invention.

What I claim as new is—

1. A liquid-containing case having therein a head movable transversely between suitable walls, with ports, channels, and valves in the wall for transferring the liquid through the same from one end of the sliding head to the other, as shown.

2. A liquid-containing case having therein a head movable transversely between suitable walls, with ports, channels, and reverse valves in one wall and a port, channel, and reversible valve and venting mechanism in the other wall, whereby the liquid is transferred from one end of the sliding head to the other end under the control of the user, substantially as herein set forth.

3. A door-check having a reversible venting-plug and valve in one piece, said valve-seat being composed of a flattened body with holes therein, and a valve and cut-away portions on one side, as shown, in combination with a segmental block provided with inlet and outlet ports, and a transverse channel having an intermediate wall between said ports wherein said plug and valve are seated, substantially as herein set forth.

4. A reversible venting-plug and valve seated therein, in combination with and seated within a segmental block having a transverse channel therein, and an intersected wall and grooves at each end for the passage of the liquid, and a transverse way having therein a sliding head for moving the liquid to and fro through the channels in the segmental plate, substantially as herein set forth.

5. A door-check having a segmental block provided with two transverse channels, and vertical walls across the same having valved openings in opposite directions, each channel having at one end a groove and near the opposite end an aperture through the vertical wall of the segment, the position of these openings being reversed in the other channel, and a transverse way having therein a sliding head for moving the liquid back and forth through the channels of the segmental block, substantially as herein set forth.

6. A door-check having a tightly-fitting chamber, in combination with an arbor in the same, said arbor being provided with two cams or eccentrics within the chamber, a transversely-sliding head in engagement with said cams, and the walls of the transverse way having suitable ports and valves for controlling the liquid as it moves to and fro from one side of the sliding head to the other, substantially as herein set forth.

7. A door-check having a tightly-fitting chamber, in combination with an arbor therein provided with two cams or eccentrics within the chamber, a transversely-sliding head in engagement with said cams, one of the walls of the transverse way having an aperture near each end, with a tapering groove leading from the same, a segmental block having double channels with intermediate valves located therein, and a groove or opening at each end for the passage of the liquid in the transverse way from one side to the other, substantially as herein set forth.

8. A door-check having a tightly-fitting chamber, in combination with an arbor therein provided with cams or eccentrics within the chamber, a transversely-sliding head in engagement with said cams, a segmental block forming one of the walls of the transverse way having at each end an opening or groove, and a transverse channel with an intermediate reversible valve and venting-plug located in the segmental block, substantially as herein set forth.

9. A door-check having within a tightly-fitting chamber containing liquid, a transverse way formed by two removable segmental blocks, one block containing two channels, ports and valves for conducting the liquid in opposite directions, the other block containing a single channel, and reversible valve and vent-plug for changing the direction of the flow of the liquid and regulating the speed of the vent, combined with a sliding block, and a spindle having cams therein for moving said block within the chamber formed by the two segmental blocks, whereby the liquid is forced back and forth through the channels, substantially as herein set forth.

10. In a door-check, a rotatable venting-plug having a valve and orifice, in combination with a reversible spring, a spindle with

cams thereon, and a transversely-movable sliding head and intermediate ports, channels, and valves for moving the liquid to and fro through the vent and valve-orifice, substantially as herein set forth.

11. In a door-check, a rotatable venting-plug having a valve and orifice, in combination with a reversible spring, a spindle with cams thereon, a transversely-movable sliding head, a segmental block having graduated or tapering grooves leading from the ports in the side thereof for retarding the action of the spring, and intermediate ports, channels, and valves for moving the liquid to and fro, substantially as herein set forth.

12. A door-check having a liquid-containing case, a hollow sliding head within said case, and a spindle passing through said head, said case and head being filled with liquid, and the head moving to and fro within the liquid, whereby the pressure of the liquid by the movable head does not force the liquid through the spindle-bearing, substantially as shown.

13. A door-check having a liquid-containing case, with a rotatable spindle passing vertically therethrough, in combination with a base screwed thereon, and a disk interposed between the base and the liquid mechanism, substantially as herein set forth.

Signed at New York, in the county of New York and State of New York, this 27th day of October, A. D. 1890.

WILLIAM GILFILLAN.

Witnesses:
J. S. ZERBE,
S. MARVIN.