No. 765,396. PATENTED JULY 19, 1904.

F. G. NEUBERTH.

DOOR CHECK.

APPLICATION FILED OCT. 22, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.

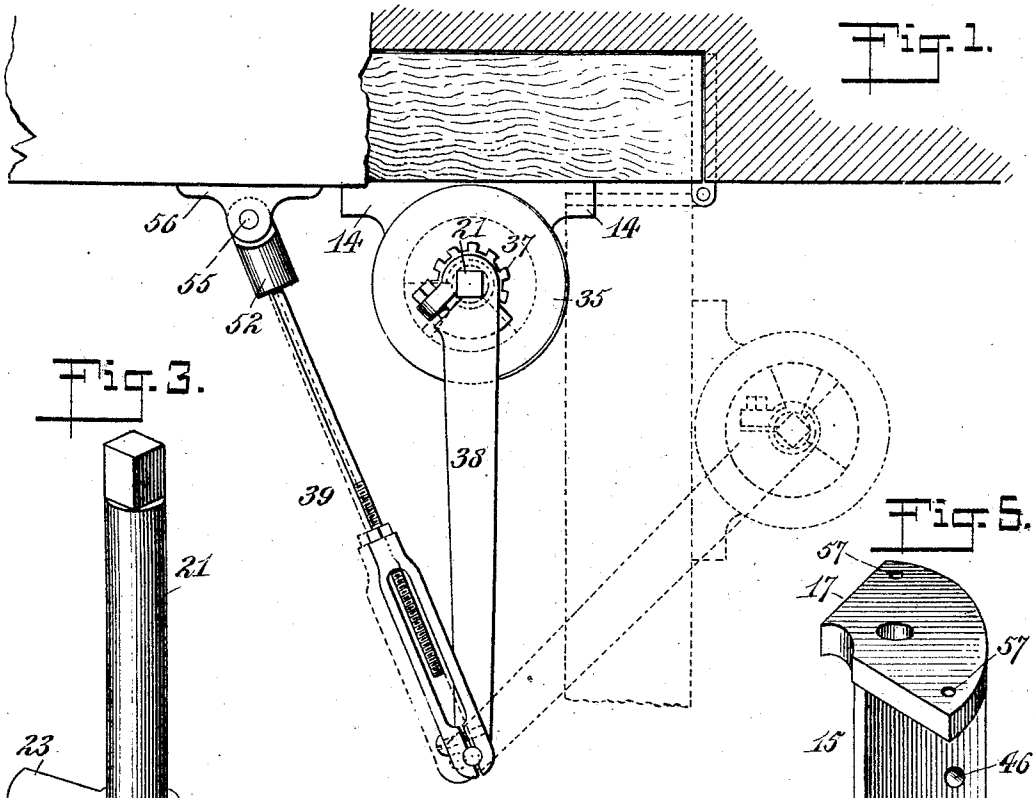


Fig. 3.

Fig. 5.

Fig. 4.

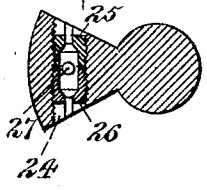
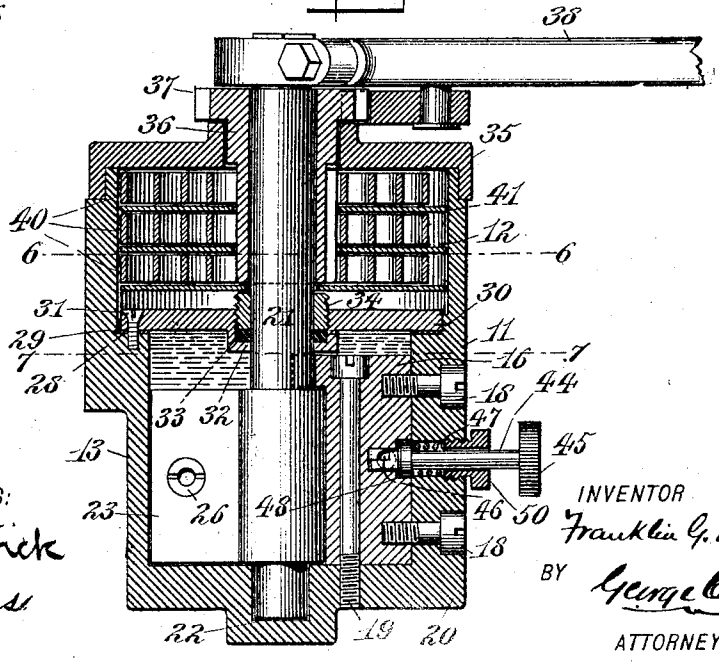


Fig. 2.



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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 6.

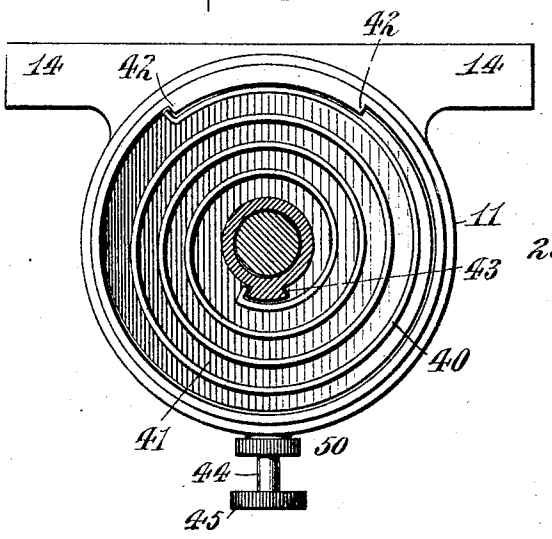


Fig. 7.

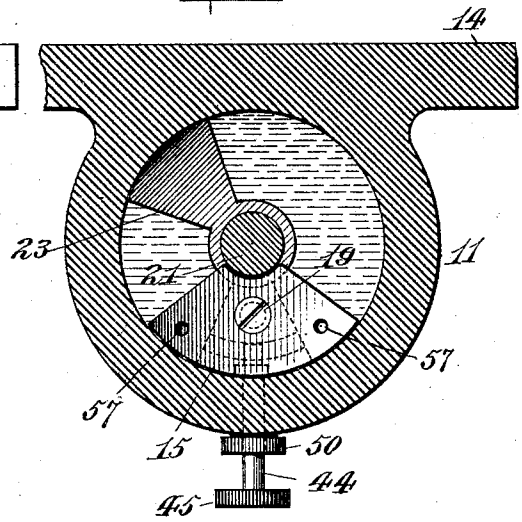


Fig. 8.

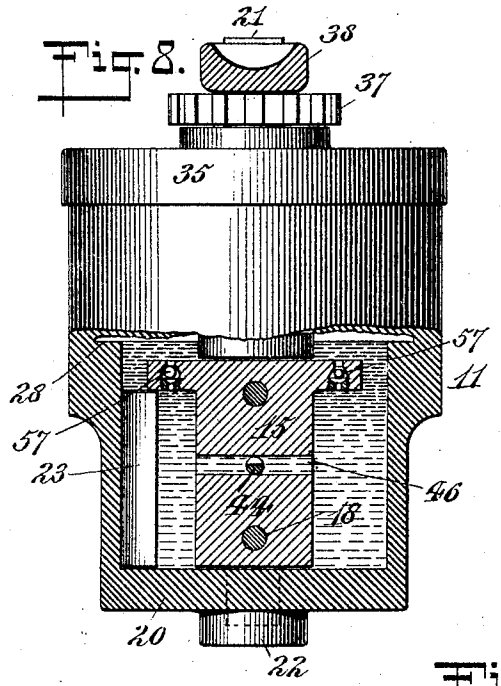


Fig. 9.

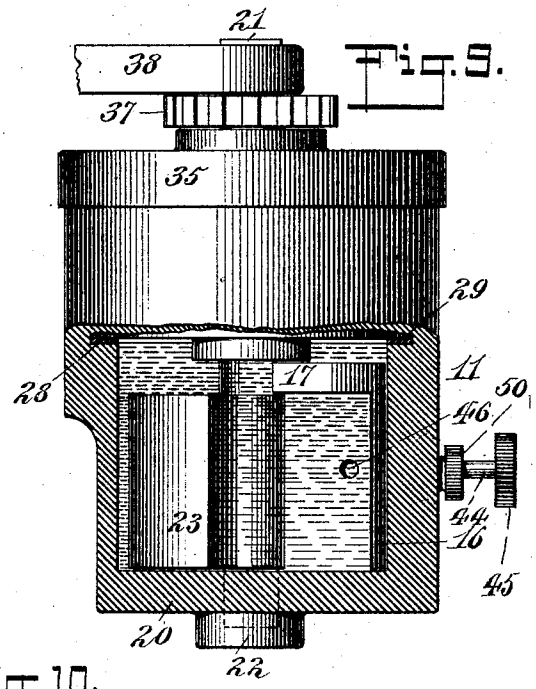
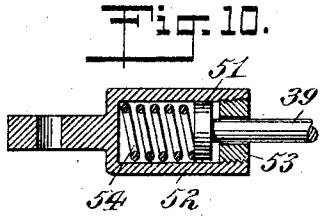


Fig. 10.



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No. 765,396. Patented July 19, 1904.

UNITED STATES PATENT OFFICE.

FRANKLIN G. NEUBERTH, OF WATERVILLE, CONNECTICUT.

DOOR-CHECK.

SPECIFICATION forming part of Letters Patent No. 765,396, dated July 19, 1904.

Application filed October 22, 1903. Serial No. 178,015. (No model.)

To all whom it may concern:

Be it known that I, FRANKLIN G. NEUBERTH, a citizen of the United States, and a resident of Waterville, in the county of New Haven and State of Connecticut, have made and invented certain new and useful Improvements in Door-Checks, of which the following is a specification.

My invention relates to an improvement in door-checks, the object of the same being to provide a device of this character which shall be simple in construction, economical to manufacture, and at the same time durable and effective in use; and with these and other ends in view it consists in certain novel features of construction and combinations of parts, as will be hereinafter fully described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a plan view of my improved check applied to a door. Fig. 2 is a sectional view taken through the barrel or cylinder. Fig. 3 is a perspective view of the piston. Fig. 4 is a sectional view of the piston, taken on the line 4 4 of Fig. 3. Fig. 5 is a perspective view of the partition dividing the cylinder into two compartments. Fig. 6 is a sectional view taken on the line 6 6 of Fig. 2. Fig. 7 is a sectional view taken on the line 7 7 of Fig. 2. Figs. 8 and 9 are views, partly in section and partly in elevation, showing the several parts in their different positions. Fig. 10 is a sectional view of the spring-buffer.

As illustrated in Fig. 1 of the drawings, the check proper is secured to the door, the link being secured to the door-casing and connected with the check by means of a lever or crank. The check proper consists of the cylinder 11, the upper portion 12 of which contains the springs, hereinafter referred to, and is of slightly larger diameter than the lower portion 13, adapted to contain the piston and the glycerin or other liquid, said cylinder being provided with lugs or flanges 14, by means of which it is screwed or otherwise secured to the door or casing. In the lower compartment 13 of the cylinder 11 is secured a partition 15, consisting of the longitudinal plate 16 and the abutment 17, this partition being secured in place by means of the screws 18, passing through the wall of the cylinder into the plate 16, and the screw 19, passing longitudinally through the plate 16 and threaded in the plate 20 of the cylinder. Through the cylinder extends the arbor or piston-rod 21, the lower end of which is fitted into a socket 22, formed in the end plate 20, this arbor having formed thereon or secured thereto the piston 23 of the shape shown in Figs. 3 and 4, the outer surface of the piston being rounded to conform to the shape of the cylinder fitting against the inner surface thereof, the length of the piston being such that when the parts are in operative position one end will fit against the inner side or surface of the end plate 20 and the opposite end against the under side or surface of the abutment 17, as illustrated in Fig. 8. The piston 23 is provided with a ball-valve, as illustrated in Fig. 4. Through the piston is formed a threaded opening 24, into which from opposite sides are threaded the hollow screws 25 26, the compartment formed by the adjacent ends of these screws containing the ball 27, adapted to rest against the valve-seats formed in the screws by restricting the opening therein, as illustrated.

Above the abutment 17 of the partition 15 is formed a shoulder 28 on the inner surface of the cylinder 11 and upon which rests a plate 30, the latter being secured in place by the screws 31, a packing-ring 29, of leather or other suitable material, being inserted between the shoulder and plate for the purpose of preventing the escape of the liquid from the compartment 13 into the compartment 12, a space being left between the abutment 17 and the plate 30, whereby, as will be hereinafter learned, when the piston 23 is rotated when opening the door the liquid contained in the compartment 13 may be forced through said space and over the end of the piston from one side of the latter to the other, it being understood that said piston, in conjunction with the partition 15, divides the chamber or compartment 13 into two sections, the liquid in one section being allowed to freely flow from one into the other until the end of the piston comes in contact with the under surface of the abutment 17, at which time there

is no escape for the liquid from one section into the other excepting through the valves, hereinafter explained.

In the plate 30 is formed the receptacle 32 for containing the packing-ring 33, made of rubber, leather, or other suitable material, the sides of the receptacle 31 being threaded to receive the threaded sleeve 34, through which passes the arbor 21, said packing-ring 33 preventing the escape of any of the liquid from the compartment 13 into the compartment 12. Around the upper end of the cylinder is fitted the cap 35, through which extends the sleeve 36, this sleeve fitting around the arbor 21 and having formed on the outer end thereof the toothed wheel 37, engaging with the lever 38, one end of which is secured to the arbor 21 and the outer end with the link 39.

Within the compartment 12 are contained the coiled springs 40, preferably three or more in number and separated by the metal disks 41, the inner surface of the cylinder being provided with the shoulders 42, as illustrated in Fig. 6, with one of which the outer ends of the springs engage, their inner ends engaging with one of the recesses 43, formed on or in the sleeve 36. the opposite shoulder formed on the inner surface of the cylinder and the opposite recess in the sleeve being employed when desired to reverse the action of the spring 40. The employment of a series of separated springs in a device of this character insures smooth action at all times, even if one of the springs becomes damaged or inoperative. Moreover, a new spring can be readily placed in position when required.

Through the wall of the compartment or chamber 13 is formed an opening in which is arranged a valve, 44 representing the valve-stem, provided on its outer end with the disk 45, by which the same may be turned, the stem extending into a circular opening 46, formed transversely through the partition 15, a portion of the extreme end of the stem being removed in order to regulate the flow of liquid through the opening in the partition from one section into the other of the compartment 13, said stem being held in its several adjustments by means of the spring 47, coiled around the stem and held between the flange 48, formed on the stem, and the sleeve 50, threaded into the wall of the compartment and through which latter the stem passes. It will be understood from this construction that when the stem 44 is turned, for instance, as illustrated in Fig. 8 it will allow the liquid to flow through the opening 46 in the partition 15 from one section of the compartment 13 to the other, the size of the opening being regulated by turning the stem in one direction or the other, thereby regulating the flow of the liquid.

The link 39, attached at one end to the outer end of the lever 38, is provided at its opposite end with the disk 51, as illustrated in Fig. 10, said disk being contained and sliding within the cylinder 52, the outer end of the cylinder being closed by the threaded sleeve 53 to prevent the link 39 from being disengaged therefrom.

Within the cylinder 52 is contained the coiled spring 54, one end of which impinges against the closed end of the cylinder and the opposite end against the disk 51, the cylinder being pivoted at 55 to the plate 56, secured to the door-frame.

From the foregoing it will be understood that when the door is opened, as illustrated in dotted lines, Fig. 1, the piston 23, by means of the lever 38 and link 39, will be rotated within the cylinder, the liquid in the compartment 13 passing freely around the end of the piston in the space between the plate 30 and the abutment 17 from one section of the compartment to the other, a small portion of the liquid also passing through the valve-opening 46 in the partition 15, the several springs 40 at the same time being tightened. When the door is released, the tendency of the springs will be to close the door, the liquid from one section of the compartment 13 passing around the end of the piston into the other section until such time as the end of the piston comes in contact with the under surface of the abutment 17, whereupon the remaining liquid will be forced through the valve-opening 46, the size of which is, as before described, regulated by the stem 44, the door at this point closing slowly or rapidly, in accordance with the size of the valve-opening.

In the case of heavy doors there is considerable strain imposed upon the several parts of the device at the time when the flow of the liquid is suddenly stopped over the end of the piston—that is, at the moment that one edge of the piston comes in contact with the abutment 17. This strain upon the piston is to a large extent relieved by the spring 54, contained within the cylinder 52, which acts in the nature of a buffer, the spring being compressed by the link 39, the tension thereof being gradually relieved as the liquid passes through the valve-opening 46.

So long as there is considerable pressure upon the liquid by the piston as the door closes the ball 27 will close the valve-opening in the piston 23; but at the time that the door is nearly shut and the pressure on the liquid almost relieved this ball will drop back into the compartment formed by the hollow screws, as before described, and allow the liquid to more freely flow from one section into the other, thereby enabling the springs 41 to exert their full tension in closing the door shut. If desired, a ball-valve 57 may be provided in the abutment 17, as illustrated in Fig. 8, acting in the same way and for the same purpose as the ball-valve already described and located in the piston, the result being that when the door is released after being opened it will

close rapidly until the piston comes in contact with the abutment 17, the strain of the sudden stoppage being relieved by the buffer, the door then closing gradually in accordance with the regulated valve-opening 46 until nearly shut, at which time the ball-valve in the piston and in the abutment will open and allow the liquid to freely escape from one section to another and the springs to completely shut the door.

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

1. In a door check and closer, the combination with a cylinder adapted to be secured to a door, of an arbor, one end of which is rotatively seated in the lower closed end of the cylinder and the other end extending through the cover-plate of the open upper end, a valved piston secured to said arbor and rotating therewith, a disk 30 seated on an annular shoulder formed in said cylinder and dividing the same into spring and liquid chambers, a partition formed with an abutment and dividing the liquid-chamber into two compartments, a space being left between said abutment and said disk and the upper end of said piston being adapted when rotated to come in contact with the under surface of said abutment, a valve in said partition to regulate the flow of liquid from one of said compartments to the other, means operatively connected to the door-casing and said arbor to rotate the latter in one direction by opening the door, and spring-actuating mechanism located in said spring-chamber and operatively connected with the arbor to rotate the same in the opposite direction, whereby the door is closed and its closing movement checked, substantially as described.

2. In a door-closer, the combination with a cylinder rigidly secured to a door and providing a spring-chamber, of an arbor mounted to rotate therein, means connected to the arbor and to the frame of a door for rotating the same, a sleeve loose on said arbor and provided on its upper end with a toothed head, means for connecting said head with the means for rotating the arbor, a series of separate springs within said chamber, one end of said springs being in engagement with a shoulder on said sleeve and the other end being in engagement with a shoulder on the inner surface of the chamber, and metal disks secured in said chamber between said springs for separating the same.

3. In a door-check, the combination with a cylinder divided into liquid and spring compartments, a rotating piston working within the liquid-compartment, a partition in said liquid-compartment and provided with a valve for regulating the flow of the liquid through the same, an arbor passing through said cylinder, a sleeve fitting around the same in the spring-compartment and provided on its outer end with a toothed wheel, and a series of springs located within the spring-compartment and separated from each other by disks, the ends of said springs engaging with said sleeve and with the inner surface of said cylinder, substantially as described.

4. In a door-check, the combination with a check proper and a lever secured thereto, of a link, one end of which is secured to said lever, and a spring-buffer secured to its opposite end for attachment to the door-frame, substantially as described.

5. In a door-check the combination with a check proper and a lever secured thereto, of a link secured at one end to said lever, of a cylinder pivotally connected to the door-frame and containing the opposite end of said link, and a spring located within said cylinder and impinging against the end of said link, substantially as and for the purpose described.

Signed at Waterville, in the county of New Haven and State of Connecticut, this 10th day of October, A. D. 1903.

FRANKLIN G. NEUBERTH.

Witnesses:
ORLIN H. GAGE,
JAS. E. CAVANAGH.