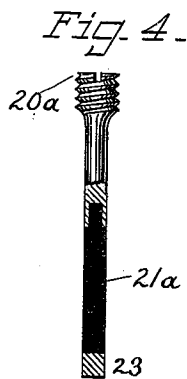
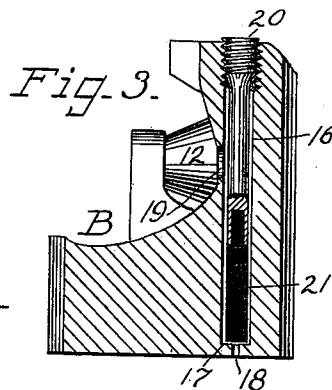
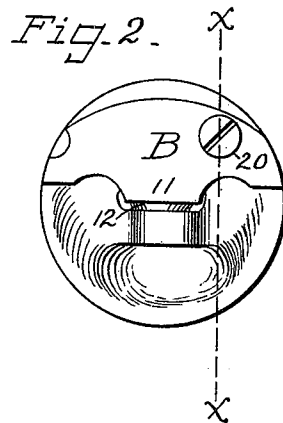
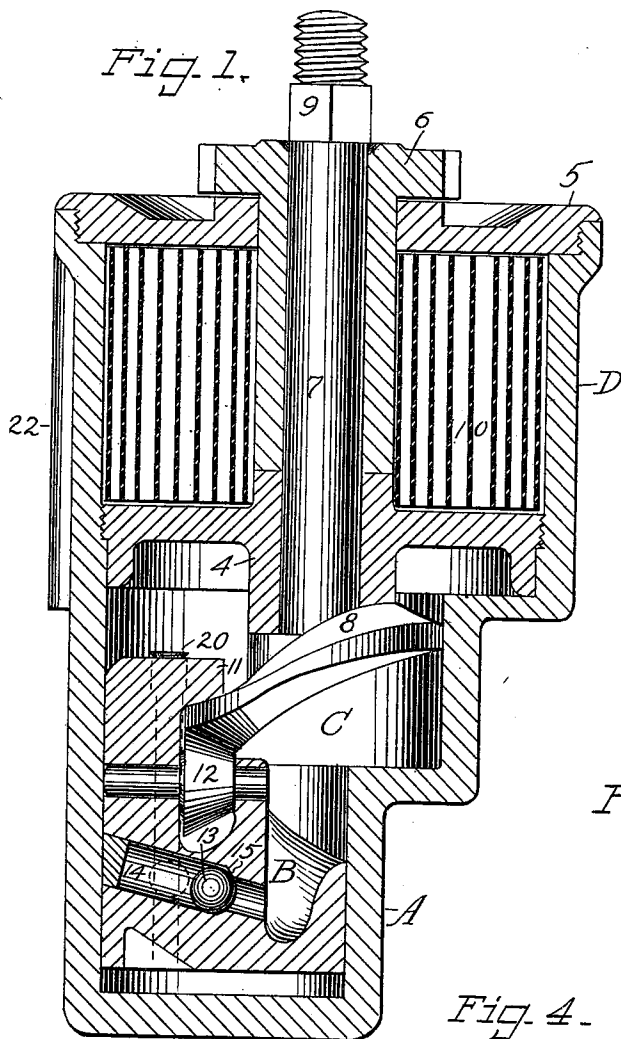


No. 672,033.

Patented Apr. 16, 1901.

N. W. CRANDALL.
LIQUID DOOR CHECK.
(Application filed Dec. 28, 1900.)

(No Model.)



Witnesses
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UNITED STATES PATENT OFFICE.

NATHAN W. CRANDALL, OF MERIDEN, CONNECTICUT, ASSIGNOR TO THE
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LIQUID DOOR-CHECK.

SPECIFICATION forming part of Letters Patent No. 672,033, dated April 16, 1901.

Application filed December 28, 1900. Serial No. 41,362. (No model.)

To all whom it may concern:

Be it known that I, NATHAN W. CRANDALL, a citizen of the United States, residing at Meriden, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Liquid-Checks, of which the following is a specification.

My invention relates to improvements in liquid-checks for doors; and the object of my improvement is to provide a simple and efficient self-regulating vent-valve to compensate for the changes in the consistency of the liquid under varying temperatures.

In the accompanying drawings, Figure 1 is a vertical section of my liquid-check for doors with the central parts in elevation. Fig. 2 is a detached plan view of the piston of the said check. Fig. 3 is a sectional view of the same on the line *xx* of Fig. 2 with some of the parts in elevation. Fig. 4 is a sectional side elevation of a modified form of vent-valve.

The principal parts of the check are the cylinder A and piston B. As shown, this cylinder and piston are embodied in an ordinary or known form of door-check, in which the case comprises the said cylinder A, the cam-chamber C, and spring-chamber D. In the lower part of the spring-chamber D is a diaphragm 4 and at the upper part the cap 5, within which cap is the sleeve 6. The cam-shaft 7 extends through the said sleeve and the hub of the diaphragm 4 and carries at its lower end the cam 8, while its upper end 9 is made angular to receive the crank-lever or ordinary connecting and operating mechanism of a door-check. The spring 10 may be connected with the sleeve and case in any ordinary manner and the case provided with a bracket 22 for securing it in place. The piston is provided with an overhanging wing 11 and friction-roller 12 for being engaged by the cam to reciprocate the said piston. The said piston is also provided with a valve that opens to let the liquid pass freely through it during the upward movement of the piston and closes to prevent the said passage during the downward movement of the piston. As shown, this valve is formed by the ball 13 in the passage 14, which is contracted near its lower end to form the valve-seat 15, the said

passage leading to the upper side of the piston, as shown, while another passage that is cut off in the section, Fig. 1, leads to the lower end or under side of the piston, the position of said passage as it starts toward the front from the passage 14 being indicated by the broken ring.

The parts thus far described are all old and by themselves are not claimed herein.

My improvement relates to the application to the foregoing or equivalent check mechanism of an automatic vent-valve composed of a screw adjustable portion and a self-regulating portion. I form a vertical passage 16 through the piston B with a valve-seat 17 and contracted passage or vent 18. The said passage is also provided with a lateral opening 19, Fig. 3, that leads to the upper side of the piston. The upper end of the vertical passage is threaded to receive and adjustably hold the body portion 20 of the valve, which body portion is also screw-threaded at its upper end. The valve-body 20 is provided with a self-regulating portion 21, the lower end of which may act as the valve proper for the vent 18, the said portion 21 being in the form of an elongated block and secured in any proper manner to the valve-body. As shown, it is of a cylindrical form, and it and the valve-body, except at the upper end, are smaller than the passage within which they are placed, so that the liquid may freely pass to and through the lateral passage 19. The portion 21 is constructed of some material that expands and contracts freely under varying temperatures, so that when the liquid within the cylinder thickens by reason of a lower temperature the valve will contract and let the vent open correspondingly, whereby the liquid check will offer substantially the same resistance to the downward movement of the piston in all the varying degrees of temperature to which it may be subjected. A suitable material for the self-regulating portion 21 of the valve is ebonite or hard rubber.

While it is a convenience to secure the self-regulating portion of the valve to the screw adjustable or body portion, it is not essential so to do. Neither is it essential that the self-regulating portion shall of itself serve as the vent-valve proper. The vent-valve proper

may be of metal, provided it is so arranged that the expansion of the self-regulating portion shall act to move the valve nearer to its seat. In Fig. 4 the vent-valve proper, 23, is
5 of metal, and the self-regulating portion 21^a is interposed between the body portion 20^a and the said valve 23. The operation is practically the same whether the valve 23 lies
loosely in place or is cemented or otherwise
10 secured to the self-regulating portion. The expansion of the self-regulating portion will force the valve toward its seat, and its contraction will permit the valve to be forced
farther away from its seat by the flow of liquid through the vent 18, so that the effect is
15 the same as if the contraction drew the valve itself away from its seat.

After the proper tests have been made the complete valve may be put in place when
20 under approximately a uniform temperature and screwed down until the valve is closed. Then turning the screw back a given distance determined by experiment the valve will require no more attention.

25 It will be noticed that the valve is directly in the piston which in use is inclosed within the cylinder, and consequently is inaccessible from the outside of the case. This is an

advantage, as it will prevent unskilled persons from tampering with the vent-valve. 30

It is apparent that some changes from the specific construction herein disclosed may be made, and therefore I do not wish to be understood as limiting myself to the precise
form of construction shown and described, 35 but desire the liberty to make such changes in working my invention as may fairly come within the spirit and scope of the same.

I claim as my invention—

1. In a liquid-check, the combination of a
cylinder and piston with a vent-valve within
the said piston, said valve being composed of
a screw adjustable portion and an expansible
and contractile self-regulating portion, sub-
stantially as described. 45

2. In a liquid-check, the combination of a
cylinder and piston, provided with a vent-
passage, a valve acting in connection with said
vent-passage, and an elongated block of hard
rubber acting to force the said valve nearer
50 to its seat under expansion, substantially as described.

NATHAN W. CRANDALL.

Witnesses:

M. S. WIARD,

W. E. WIGHTMAN.