



# UNITED STATES PATENT OFFICE.

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## DOOR-CHECK.

998,732.

Specification of Letters Patent.

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*To all whom it may concern:*

Be it known that I, WILLIAM T. ADAMS, a citizen of the United States, and a resident of the city of Reading, in the county of Berks and State of Pennsylvania, have invented certain new and useful Improvements in Door-Checks, of which the following is a specification.

My invention relates particularly to that class of door checks in which the action of the closing spring is controlled by a liquid-displacing piston; and it consists in improved means for regulating the flow of the liquid under the piston pressure so as to more effectively provide for controlling the door movement.

It is customary in this class of checks to provide separate passage-ways for the liquid from one side of the piston to the other, one being operative only during the door-opening movement of the piston and the other providing a restricted escape for the liquid under pressure during the door-closing movement; such passage-ways being formed either in the piston itself or in the casing wall, and the restricted flow being in some cases reduced toward the end of the door-closing movement so as to slow down said movement.

My invention consists in providing in connection with a fixed escape or relief passage of such varying flow-capacity, a supplementary adjustable relief passage which will permit of securing any determined rapidity of movement, and in an improved valve arrangement therefor; as is fully described in connection with the accompanying drawings.

Figure 1 is a longitudinal section of a door check having my improvements applied thereto. Fig. 2 is a separate view of the piston showing more clearly the fixed relief passage of varying cross-section with which it is provided. Fig. 3 is an enlarged cross-sectional view of the casing on the line 3—3 of Fig. 1, showing clearly the valve-receiving wall aperture with the valve and retaining plug therein. Fig. 4 is an enlarged cross-section of the cylindrical valve taken on the line 4—4 of Fig. 1; the circularly grooved valve being set to cut off communication with the relief passage. Fig. 5 is a fragmentary sectional view of the casing on the line 5—5 of Fig. 3 showing more clearly a branch outlet from the

aperture to the casing. Fig. 6 shows separately a relief valve of slightly modified construction.

The general form of check casing 2, as shown, is well known; the upper portion 3 serving as a spring chamber, the lower portion 4 as a piston chamber, and the intermediate portion 5 as a liquid and crank-shaft chamber into which the piston and the cushioning liquid are alternately moved as usual. The crank-shaft 6 is indicated with its connections to the central spindle 7 and to the piston 8, respectively; and the general operation of the latter as a controlling means for the door closing spring (not shown) is well understood.

As shown the piston 8 is provided with a liquid passage-way 10, controlled as usual by a valve 11 adapted to automatically close the passage during the downward movement of the piston and to open the same during the reverse movement; and also with a restricted passage-way for gradually releasing the liquid under pressure so as to control the door closing movement of the piston, said passage-way being formed, as shown, by a longitudinal peripheral groove 15 of gradually increasing cross-section, such as is employed in my prior Patent No. 727,051, issued May 5th, 1903. This groove 15 is adapted to automatically reduce the flow therethrough as the piston descends and the door approaches closed position, and is preferably reduced to nothing below the top of the piston, in my present improved construction, so as to entirely cut off the flow therethrough shortly before the door closes.

My present invention provides for employing in connection with a relief passage such as is provided by the groove 15, a supplemental valve-controlled relief passage 20 affording adjustable communication between the opposite sides of the piston in addition to that afforded by the fixed passage 15. This passage 20 intersects a radial aperture 21 in the wall of the casing 2, and a rotary cylindrical valve 22 is mounted in said aperture to provide for delicately controlling communication between the passage 20 and the casing. This communication is effected through a circular exterior disappearing groove 23 on the body of the valve and in the plane of the passage 20; said groove connecting with the casing through

the hollow body of the valve and the opening 24 thereto, as indicated in Figs. 1, 3, 4 and 5, or by forming this valve body as indicated in Fig. 6. The valve is provided  
 5 with an outwardly extending stem or shank 25 having a screw-driver slot for rotary adjustment, and this stem is located in the enlarged outer portion 21<sup>a</sup> of the aperture 21, and is inclosed by a plug-ring 26 which  
 10 is screwed into the enlarged aperture 21<sup>a</sup> against an intermediately formed collar 27 on the valve, so as to loosely seat the latter against the circular shoulder 28 in the aperture. When thus mounted the outer end of  
 15 the valve is flush with the outer face of the plug-ring 26 and of the apertured wall of the casing, but may be readily turned by means of a screw driver so as to provide more or less communication (or none at all  
 20 as in Fig. 4) between the relief passage 20 and the casing. As the liquid in the passage 20 is under pressure and apt to work outward through the aperture 21 21<sup>a</sup>, I provide one or more branch outlets 21<sup>b</sup> from  
 25 said aperture into the casing, locating same inside of the valve collar 27, so that such liquid will be passed to the casing instead of escaping past the unpacked stem of the valve.

30 By means of my invention the action of the check may be readily regulated to suit varying conditions and requirements. The fixed relief passage 15, when operating alone with the valve 22 of my supplementary pas-  
 35 sage 20 closed as indicated in Fig. 4, permits a comparatively rapid closing movement of the door, under the action of the spring, during the early downward stroke of the piston; but when the reduced end of  
 40 the groove 15 is closed by the wall of the piston chamber such movement would be entirely stopped excepting for possible leakage around the piston. By opening the valve 22 however additional escape for the  
 45 liquid is readily provided to secure the final closing of the door with any desired degree of force, such additional flow also increasing the rapidity of the closing movement somewhat at all stages of the movement. If  
 50 strong action is required to properly close and latch the door it is readily provided to

any extent by correspondingly opening communication through the supplemental passage, while, on the other hand, the check may be made to operate satisfactorily even 55 if the fit of the piston is such as to permit sufficient passage of the fluid when both passages 15 and 20 are closed; so that greatly varying conditions, as well as varying desires as to the quickness or quietness 60 of its action may be readily met.

What I claim is:—

1. A liquid door check having a cylindrical casing, a vertically arranged rotary spindle and a spindle-operated vertically mov- 65 able piston therein, a tapering relief passage for the cushioning liquid providing different flow areas at different portions of the piston stroke, and a supplemental valve controlled passage coöperating with said tapering passage to provide a determined additional flow area of equal capacity at all portions of the piston stroke substantially as set forth.

2. In a liquid door check the combination 75 with a reciprocating piston, of a piston-chambered casing provided with a valve-receiving wall aperture and an intersecting relief passage affording communication between said aperture and the opposite end of 80 the piston chamber, said aperture having its outer portion enlarged in diameter to form a valve-seating shoulder and having a leakage outlet into the piston chamber located adjacent said shoulder; a screw-plug 85 ring in the enlarged outer portion of said aperture; and a rotatable cylindrical relief valve in said aperture having a stem extension into said ring, and an intermediate collar the opposite faces of which seat respectively 90 against said shoulder and the end of said ring; said leakage outlet serving to permit free return to the piston chamber of liquid passing said shoulder, substantially as set forth. 95

In testimony whereof, I affix my signature, in the presence of two witnesses.

WM. T. ADAMS.

Witnesses:

D. M. STEWART,  
 JOHN E. HARBSTER.