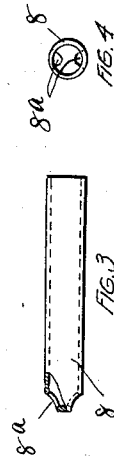
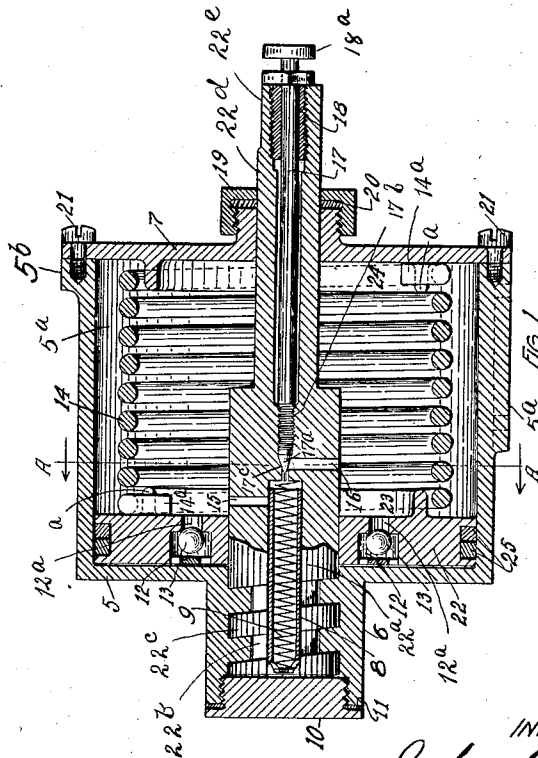
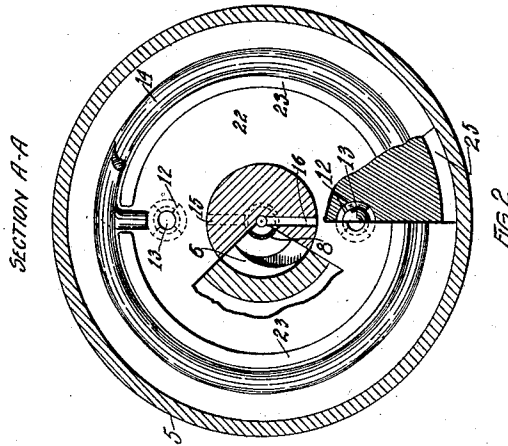


J. C. SCHMIDT.
DOOR CHECK.

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1,021,803.

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WITNESSES

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DOOR-CHECK.

1,021,803.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JOHN C. SCHMIDT, citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Door-Checks, of which the following is a specification.

My invention relates to door checks of that type in which the movements of the mechanism are governed by the flow of a liquid.

The paramount objects of the improvements which are hereinafter described and illustrated in the accompanying drawing and which constitute the subject matter of this application for patent, are as follows:—

To provide a simple, efficient and compact device for controlling the movements of a door, especially when the latter is being closed, the purpose being to produce a smooth and uniform movement which will prevent the slamming or jar which may be the effect when no hindrance is presented to the momentum of a heavy door as it is swung to.

Further objects referred to in detail are, to provide an automatic cut-off valve for controlling the flow of liquid when under compression; and to furnish a manually operated valve for varying the rate of flow of the oil through the return passages.

A very important feature of this invention lies in the coarsely threaded spindle or stem of the plunger which forces the latter to reciprocate in the cylinder when rotated.

I accomplish the above and other desirable results by means of the apparatus shown and described, the manner of constructing and assembling the various parts being disclosed in the following views.

Figure 1 is a longitudinal section of the device showing the movable parts in their normal or initial positions; Fig. 2 is a transverse section on the line A—A of Fig. 1, and Figs. 3 and 4 are side and end elevations, respectively, of the tubular cut-off valve.

Referring to the details of the drawings, the numeral 5 indicates a cylindrical casing, open at the upper end and having the opposite or lower end closed. Projecting from the lower end is a centrally located hollow stem 6, closed at the end by a cap 10, beneath which is a packing ring 11. The upper open end of the cylinder is closed by

a plate or head 7, secured to the casing by suitable screws or bolts 21. The casing thus forms a closed chamber 5^a within which is arranged a plunger 22 which fits snugly the smooth inner surface of the chamber, and is furnished with the usual packing rings 25 employed in such devices to give a liquid tight fit. This plunger is fixed upon a stem 22^a, which projects both above and below the plunger and the lower portion 22^b is provided with coarse, square threads 22^c, which engage similar threads upon the inner wall of the casing extension 6. The upper portion, 22^d, of the stem is reduced and passes through a suitable boss on the cylinder head 7, a cap 19 forming a stuffing box in which is a gasket 20 to make a tight joint. The upper end of the stem 22^d is flattened upon one side, as shown at 22^e to accommodate the eye of an operating lever (not shown). The reduced portion 22^d and the main part 22^a of the stem are bored longitudinally to receive the stem 17 of a needle valve 17^a. Said valve stem is threaded as shown at 17^b to engage suitable threads in the plunger stem 22^a, and the end of the valve is formed to properly fit a valve seat 17^c in the stem 22^a. The upper end of the valve stem passes through a bushing 18 and bears a thumb nut 18^a. The lower portion 22^b of the plunger stem is counterbored to receive a valve 8, having its upper end open and its lower end contracted to adapt it to rest against the inner surface of the cap 10, and furnished with openings or ports 8^a for a purpose hereinafter described. Within the bore of the tube 8 is a spiral spring 9, one end of which engages the upper end of the counterbore in the vicinity of the valve seat 17^c and the other impinging against the contracted end of the tubular valve, thus yieldingly holding the valve against the cap 10 at all times. The upper face of the plunger 22 is provided with an annular flange 23 and a similar flange 24 projects from the inner face of the cylinder head 7. These flanges form seats for the end coils of a torsion spring 14, and are provided with suitable notches *a* to receive the bent ends 14^a of the spring to form attachments therefor. The plunger 22 is pierced with two counterbored openings 12 in which are arranged ball valves 13, which control the ports 12^a on the upper sides of the openings. At a point just above the

upper surface of the plunger the stem 22^a thereof is bored radially to provide a duct 15 which communicates at its inner end with the counterbore in which is lodged the tubular valve 8, and as will be seen by inspection of Fig. 1, the said duct is closed by the valve when the plunger is in its lowest or initial position. Extending radially from the valve seat 17^c is a duct or passage 16 which opens at the side of the stem, and is controlled by the said valve 17^a. The casing 5 is furnished upon one side with an attaching flange 5^b.

The operation of my improved door check is as follows: A suitable liquid, preferably a heavy oil or glycerin, having been placed within the chamber 5^a, and suitable connection made between the stem 22^a and the door to be operated, the opening of the door will rotate the stem and plunger the action of the threads 22^c will carry the plunger upward toward the cylinder head 7, and this movement will exert a torsional effect upon the spring 14. As the plunger moves upward the oil will pass freely through the openings 12^a into the space below the piston or plunger. This movement will allow the valve 8 to open the duct 15 and as the plunger continues its upward movement the oil will pass through the passage 15 and also the passage 16 if the needle valve has been opened, and fill the interior of the tubular valve 8, and the bore in which it is seated. As soon as the force applied to open the door is removed the expansive action of the spring 14 will be to turn the stem of the plunger in the opposite direction from that above described and this rotary movement, through the reverse action of the threads 22^c, will carry the plunger toward its original position. This longitudinal movement of the plunger will be met by the resistance of the oil which has passed below it and will be compressed, closing the ball valves 13 on their seats 12^a and preventing the oil from returning through the apertures which they guard. The oil within the tubular valve will flow back freely through the duct 15 and more slowly by way of the contracted valve seat and the passage 16. The oil behind the plunger will find its way around the threads 22^c of the stem which are loosely fitted for that purpose and, entering the tubular valve through the apertures 8^a, will displace the oil still remaining therein. As the door nears the closing position and the plunger descends still farther, the end of the valve 8 will close the duct 15 and the only passage remaining for the escape of the compressed liquid will be the contracted passage through the valve seat 17^c, and passage 16 and, as the oil flow is thus retarded, the movement of the door will be correspondingly slow and it will thus be slowly closed. If the action of the device at this point in

the movement should be either too forceful or too weak, it can be readily varied by adjusting the valve 17^a by means of the thumb nut 18^a.

Having thus described my invention, what I claim as new, is:—

1. In a door check, the combination with a casing, having a common liquid and spring chamber, a plunger adapted to rotate and reciprocate in said chamber, and having valve controlled passages extending there- 75 through, a hollow stem fixed on the plunger, having threads engaging a threaded extension on said casing, and having a duct forming a communication between the casing chamber and the bore of the stem, a valve controlling said duct and arranged in said stem, and a spring in said chamber bearing against and adapted to rotate said plunger in one direction. 80

2. In a door check, the combination with a cylindrical casing, having an oil and spring chamber co-extensive therewith, a plunger adapted to rotate and reciprocate therein, and having valve controlled passages extending therethrough, a reciprocating hollow stem on said plunger having threads engaging female threads in an extension at the bottom of said casing, and having ducts extending radially therethrough, a cut-off valve slidably mounted in the bore of said stem and adapted to control one of said ducts upon the longitudinal movement of the plunger, a second valve adjustably arranged in said stem and adapted to control the other duct, and a torsion spring arranged in said casing bearing against and adapted to rotate said plunger and stem. 85 90 95 100

3. In a door-check, the combination with a casing having a common liquid and spring chamber and an extension at the bottom thereof, a plunger adapted to reciprocate and also to rotate in said chamber, and having valve-controlled apertures therein, a hollow stem fixed on said plunger having a radial duct therein, a needle valve controlling said duct, said stem having a second duct extending radially thereof, a valve arranged in said stem and adapted to control said second duct and independent of the needle valve, a spring for said valve, and a torsion spring mounted in said chamber bearing against and adapted to rotate said plunger in one direction. 105 110 115

4. In a door-check, the combination with a casing having a liquid and spring chamber co-extensive therewith, a plunger adapted to reciprocate and also to rotate within said chamber, a hollow stem for said plunger having radial ducts forming communications between the bore of the stem and said chamber, a tubular valve arranged axially in said stem and adapted to control one of said ducts, a spring for said valve, an adjustable needle-valve controlling the other 120 125 130

of said ducts, and having a stem projecting externally of the casing, and a torsion spring surrounding the stem of the plunger bearing against and adapted to rotate the
5 plunger in one direction.

10 5. In a door-check, a casing having a common spring and liquid chamber, a plunger mounted in said casing and having valve-controlled passages therethrough, a
15 hollow stem secured to the plunger and having radially arranged ducts therein communicating with the bore of the stem and said casing chamber, a tubular cut-off valve yieldingly arranged in said stem and adapted to control one of said ducts, and a needle-valve adapted to control the other of said ducts.

6. In a door-check, a casing having a common spring and oil-chamber and an internally threaded extension, a spring-held
20 plunger slidably and rotatably mounted in said casing and having a hollow externally threaded stem engaging the threaded extension on the casing, and having a hollow stem
25 extending through said oil-chamber and projecting from the casing, valve-controlled openings through said plunger and valve-controlled openings through said stem.

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

JOHN C. SCHMIDT.

Witnesses:

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M. A. MILORD.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."