

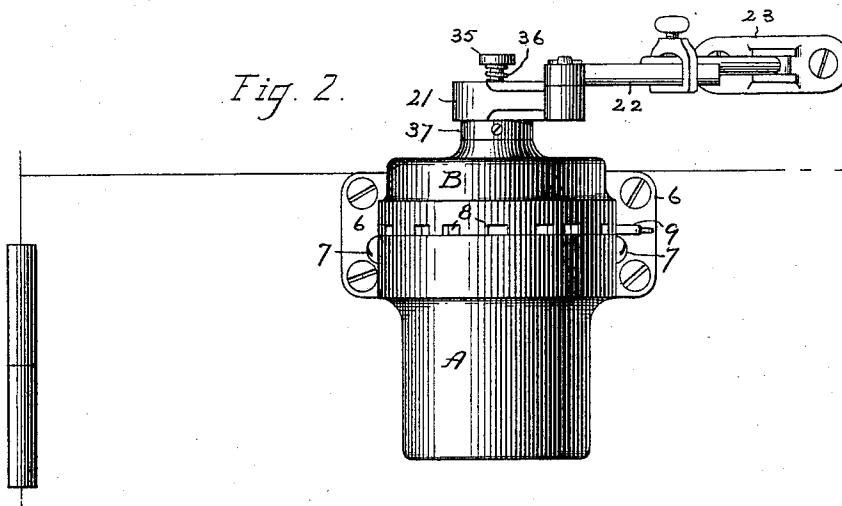
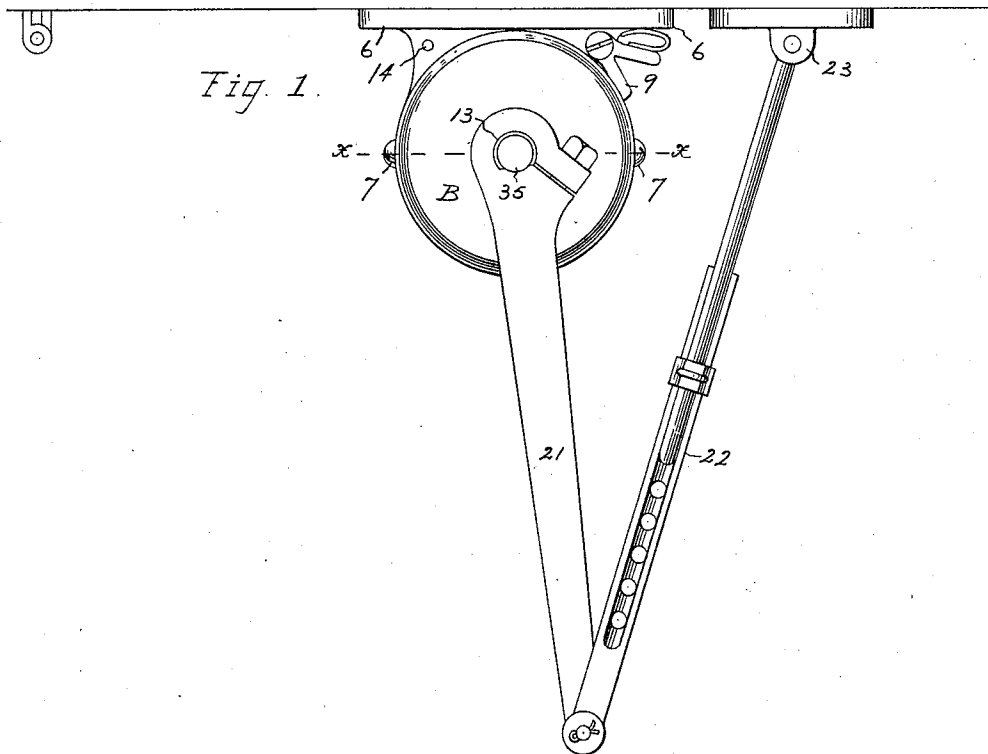
(No Model.)

2 Sheets—Sheet 1.

F. G. STEPHENSON.
DOOR CHECK.

No. 581,441.

Patented Apr. 27, 1897.



Witnesses

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P. J. Engle

Inventor

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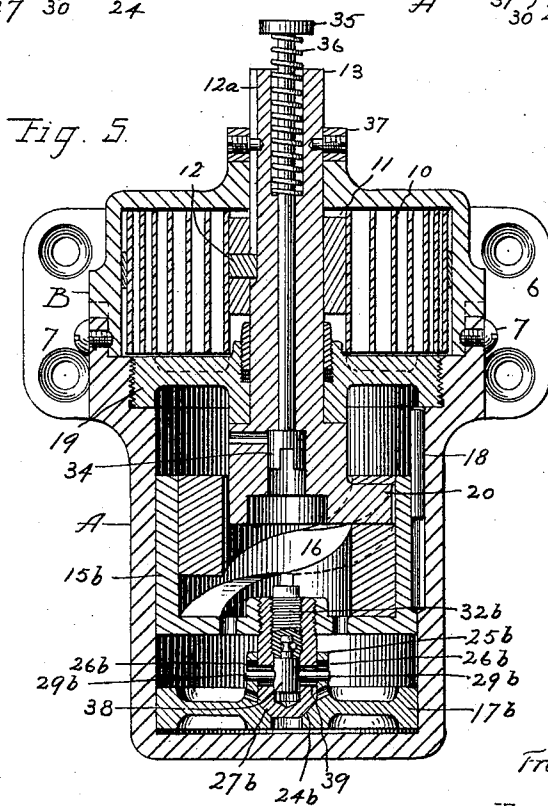
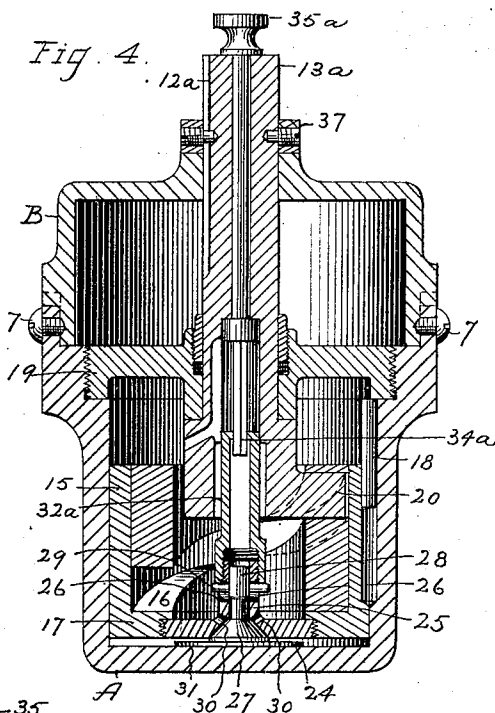
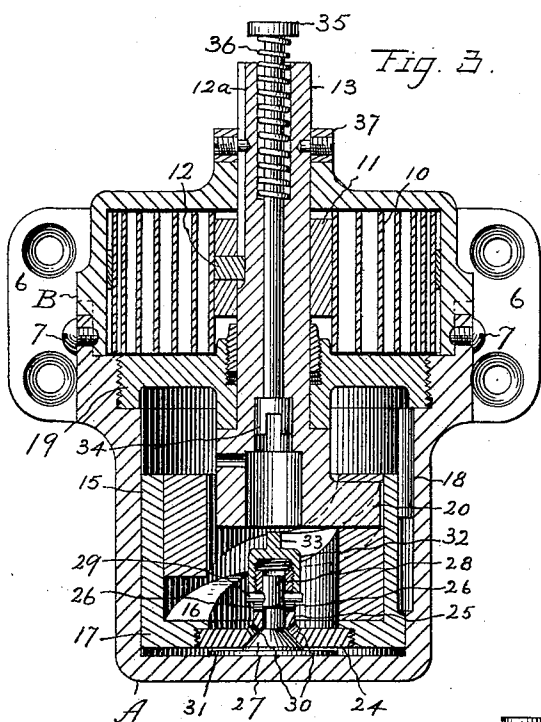
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2 Sheets—Sheet 2.

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DOOR CHECK.

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Witnesses

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UNITED STATES PATENT OFFICE.

FREDERICK G. STEPHENSON, OF PLAINVILLE, CONNECTICUT, ASSIGNOR TO
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DOOR-CHECK.

SPECIFICATION forming part of Letters Patent No. 581,441, dated April 27, 1897.

Application filed November 12, 1896. Serial No. 611,905. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK G. STEPHENSON, a citizen of the United States, residing at Plainville, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Door-Checks, of which the following is a specification.

My invention relates to improvements in door-checks; and the main object of my improvement is to regulate the leakage of the piston-valve.

In the accompanying drawings, Figure 1 is a plan view of my door-check, together with a door-hinge and a surface line for the door and casing. Fig. 2 is a front elevation of the same. Fig. 3 is a vertical section thereof on the line *xx* of Fig. 1, the crank-arms being omitted. Fig. 4 is a like view of the main parts of the same with a modified form of the adjusting devices, and Fig. 5 is a like view showing further modifications.

A designates the cylinder, provided with bracket-ears 6, by which to fasten it to a door, and B is the spring-chamber, mounted, by means of screws 7, to rotate on the upper end of said cylinder. The exterior of said spring-chamber is provided with teeth 8, Fig. 2, for being engaged by the pawl 9 to hold said spring-chamber from rotating under the influence of the spring 10. The interior of the spring-chamber is provided with any of the ordinary means (not shown) for securing the outer end of the spring to said chamber, while the inner end of the spring in like manner is connected to the collar or sleeve 11. Said sleeve is provided with a pin 12, that engages a groove 12^a in the shaft 13, whereby the inner end of said spring is connected to said shaft. The spring may be taken out and turned over to adapt the check for use on a right or left hand door. When changed, the pawl 9 may be removed and secured on the opposite side of the spring-chamber by placing its pivot-screw in the hole 14, Fig. 1, but the parts thus far described are not of my invention, and other known substitutes may be employed therefor.

Within the cylinder is a hollow piston-head 15, having on its inner wall a double-inclined

cam-groove 16. The end of this piston-head 15 forms the piston 17. Said piston-head is held against rotation in the cylinder by means of the spline 18. The shaft 13 extends through the spring-chamber and the upper cylinder-head 19 into the interior of the piston-head, where it is provided with a lateral arm 20, that rests in the cam-groove 16 of the piston-head. It is held against longitudinal movement in one direction by said head and in the other direction by the collar 37 and spring-chamber, against which said collar rests. An ordinary crank-arm 21 is secured to the outer and upper end of the shaft 13, and a link 22 is pivoted by one end to the outer end of said crank-arm and by its other end to a bracket 23, as in other door-checks of this class, whereby opening and closing of the door turns said shaft first in one direction and then in the reverse direction. Upon opening the door, thereby turning the shaft, the projection 20 acts on the cam-groove 16, carries the piston-head and piston from the position shown in the drawings toward the upper end of the cylinder, and the return movement of said shaft returns the piston to the position shown.

My invention relates to the piston-valve and its adjusting mechanism, and is particularly designed for a liquid-check.

As in ordinary cylinder-and-piston door-checks, my piston is fitted within the cylinder to be reciprocated relatively thereto, and it divides the cylinder into two separate chambers.

For convenience of manufacture I form the valve-seat 24 of a separate piece and screw the same into the middle of the piston, as shown. On the upper side of the valve-seat is a tubular boss 25, screw-threaded on its exterior and provided with transverse holes or slots 26. The valve 27 is provided with a stem 28, the upper portion of which is fitted to the central bore of the boss 25, and a cross-pin 29 extends through said stem with its ends in the holes or slots 26, the relative dimensions of the ends of the pin 29 and said holes or slots being such that the valve is permitted to move longitudinally to and from its seat. Holes 30 are made through the valve-

seat near the boss 25 to permit the liquid to escape from under the valve, and the valve-stem from the valve nearly to the cross-pin is made of slightly-reduced diameter to allow
 5 for the passage of fluid through the transverse holes or slots 26 as the valve closes. In order to make the valve act quickly under pressure of the fluid to close it, I attach a disk or dasher 31 to the outer end of the valve,
 10 the said disk being of a materially larger diameter than the outer end of the valve proper.

It will be seen in Figs. 3 and 4 that the valve is tapering or conical and has its larger diameter on the lower side of the piston. The
 15 said valve is opened automatically as the piston is raised to let the liquid pass freely through the piston and is closed automatically to prevent the free passage of liquid on the return movement of the piston, all substantially as in other door-checks of this class. Ordinarily, another separate passage and adjustable valve is provided to regulate the restricted flow of liquid for governing the movement of the piston in closing the door; but
 20 instead of providing this second passage and second valve I have provided adjusting devices for regulating the leakage of the piston-valve proper.

As before stated, the transverse slots or
 30 holes 26 in the tubular boss and the diameter of the cross-pin 29 will permit the valve to seat itself closely on its seat. In other words, the construction is such that when the valve is closely seated the pressure thereon is received by the valve-seat rather than by having the cross-pin bear on the top wall of the holes or slots in the tubular boss. I cause
 35 the valve to leak and adjust its leakage by means of the screw-tube 32, screwed upon the exterior of the boss of the valve-seat. By screwing this down below the top wall of the transverse holes or slots 26 the effect is to shorten said holes or slots vertically, and under certain conditions let the end of said
 40 screw-tube act on the cross-pin of the valve to limit its closing movement. It will readily be seen that if said tube is screwed down far enough the valve cannot be tightly closed on its seat, and by screwing said tube down or
 45 up the leakage of the valve may be finely adjusted.

In order to enable the screw-tube to be operated from the outside of the check and without taking the check apart, I provide its upper end with an angular or flattened projection 33, and within the shaft 13 I place a wrench 34. Said wrench is provided with a knob-like handle 35 and is held in an elevated position by a spring 36, the elevation being
 55 sufficient so that the projection 33 on the screw-tube will never rise far enough to engage said wrench as thus held up by the spring. In order to adjust the screw-tube, the door will be opened so as to elevate the
 60 piston to substantially the upper end of its stroke, and then the wrench can be depressed

and engaged with the screw-sleeve for adjusting it.

I have omitted some of the parts in Fig. 4, the omitted parts being the same as shown in
 70 Fig. 3. The construction differs from that shown in Fig. 4 only in the connection of the wrench and screw-sleeve, whereby the operating-handle and screw-sleeve are never disconnected. The screw-sleeve 32^a is longer
 75 than in Fig. 3, and its upper end is perforated with a square hole. The wrench 34^a is provided with a knob-like handle 35^a and a square shank which enters the perforation in the upper end of the screw-sleeve even when the
 80 piston is fully down. The wrench is confined against longitudinal movement, but is loosely fitted in the shaft 13^a, so that said shaft may turn without turning the wrench. In order to adjust the screw-sleeve, it is only necessary to turn the handle 35^a. As the piston rises and falls the upper end of the screw-sleeve slides up and down on the wrench-shank. Any ordinary device may be provided to prevent the accidental rotation of said
 85 wrench, or the screw-sleeve may be fitted so snugly that the turning of the shaft about the wrench will not turn the screw-sleeve and change the adjustment. A wrench or operating-handle that is never disconnected from
 90 the screw-sleeve has the advantage over one that has to be coupled and uncoupled therewith of having the rotation of the handle always correspond with the rotation of the screw-sleeve, so that the operator may know
 95 just how much he has rotated the screw-sleeve.

In Fig. 5 I have shown what I call a "reversal" of the arrangement of the valve shown in Figs. 3 and 4. That is to say, the taper of the valve is in the reverse direction, the
 100 smaller diameter of the conical valve being toward the lower side of the piston and the cross-pin bears upon its lower side instead of its upper side in limiting the closing of the valve. The piston-head 15^b has screwed into
 105 it the stem of the valve 27^b, and within said stem is the adjusting-screw 32^b. An adjusting-plug 38 is fitted in the end of said screw, so that the screw can revolve freely independently of said plug, while at the same time
 110 they move together in a longitudinal direction. I accomplish this by the pin-and-groove connection, (clearly shown in Fig. 5,) which construction is so well known for this purpose that I consider further description or
 115 reference-numeral unnecessary. The said adjusting-plug carries a cross-pin 29^b, and the valve-stem is provided with transverse holes or slots 39 to permit a longitudinal movement of said plug in the valve-stem. The piston
 120 17^b has the valve-seat 24^b formed therein, and a tubular boss 25^b on the piston receives the valve-stem and has transverse holes or slots 26^b to receive the ends of the cross-pin. By turning the plug down so that the cross-pin
 125 bears on the bottom wall of the slots or holes 26^b the valve may be prevented from seating

itself closely on its seat, and thereby the leakage may be regulated as may be desired. In this modification the valve-stem acts to pull and push the piston. The first act of this valve is to withdraw from its seat in the piston until the limit of longitudinal motion in the piston is reached, after which the valve-stem, through its cross-pin, elevates the piston. When the piston-head and valve-stem descend, the valve first moves to its seat or comes to a bearing on the cross-pin when the valve is not tightly closed, and then the piston is pushed down with the valve.

I claim as my invention—

1. A door-check comprising a cylinder and relatively-reciprocating piston, a reciprocating valve within said piston carrying a cross-pin to limit its reciprocation, and adjusting devices for changing the stroke of said valve substantially as described.

2. A door-check comprising a cylinder, a piston fitted within said cylinder to be reciprocated relatively thereto and dividing it into two separate chambers, a single port only in said piston for the movement of the fluid through it from the chamber on one side to the chamber on the other side, a valve fitted to said single port and acting automatically upon the reciprocating movement of the piston in one direction to open said port for the free flow of the fluid in one direction there-through from one chamber to the other and also to nearly close the said same port during

the return stroke of the piston and form a restricted flow or leakage in the opposite direction through the same port to the chamber on the opposite side of the piston, and means for adjusting said valve to regulate the leakage of the said single port, substantially as described.

3. A door-check comprising a cylinder, a piston within said cylinder arranged to be reciprocated relatively thereto, a valve-seat in said piston having a tubular boss with transverse holes or slots, a conical valve fitted to said valve-seat and having a stem fitted to reciprocate to and from said tubular boss, a cross-pin through said valve-stem with its end in said transverse holes or slots, and a screw-adjusting stop to limit the closing movement of said valve substantially as described.

4. A door-check comprising a cylinder, a piston fitted to be reciprocated relatively thereto within said cylinder, a rotary shaft for reciprocating said piston, a valve-seat and reciprocating valve in the center of said piston, screw-adjusting devices to limit the closing movement of said valve and a wrench extending through the said shaft and adapted through its exterior handle to turn the said screw-adjusting devices in the center of said piston, substantially as described.

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Witnesses:

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