P. QUENTIN.

DOOR CHECK OR CLOSER.

APPLICATION FILED JUNE 10, 1914.

1,249,190.

Patented Dec. 4, 1917.

2 SHEETS—SHEET 1.

fig. 1.

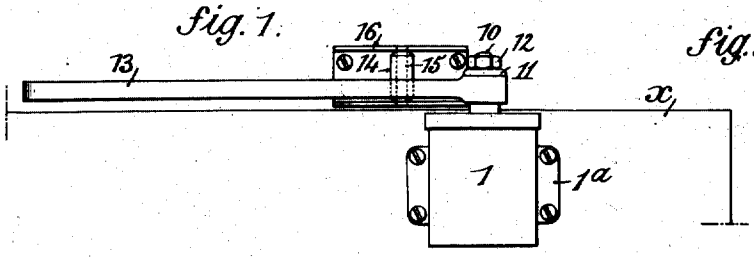


fig. 3.

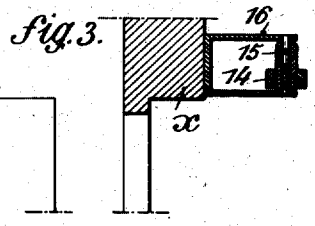


fig. 2.

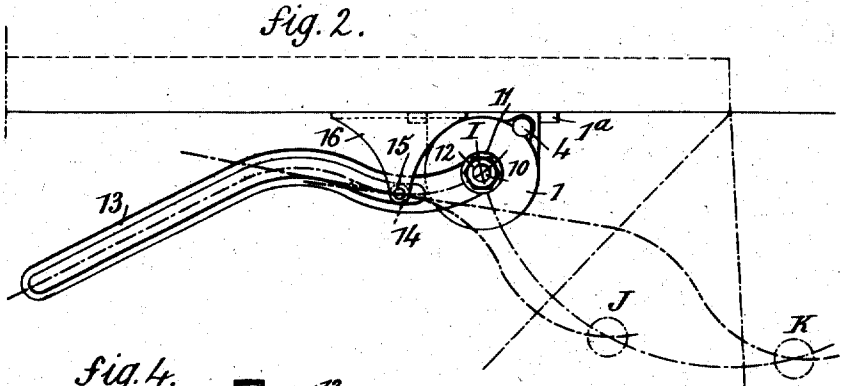


fig. 4.

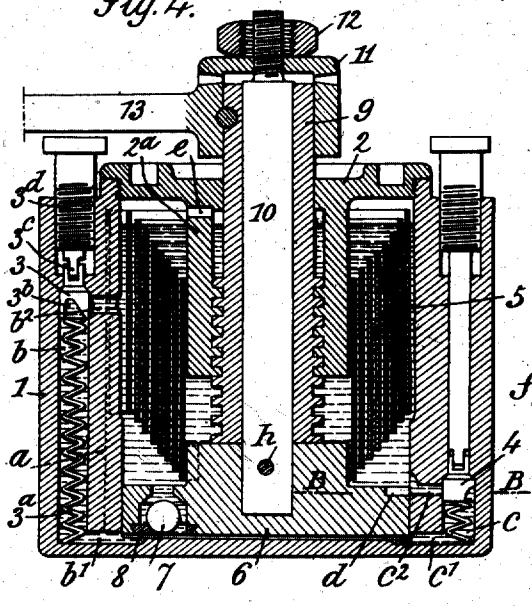


fig. 5.

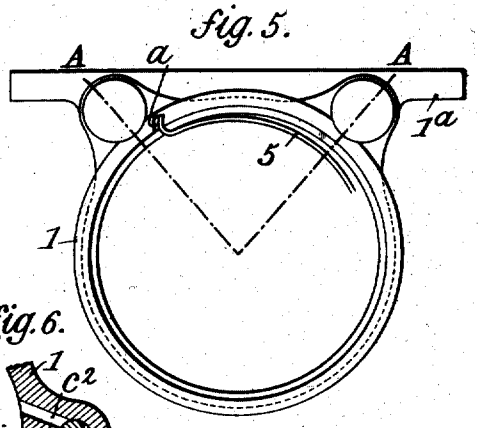
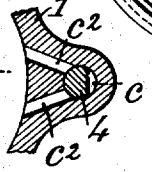


fig. 6.



WITNESSES

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2 SHEETS—SHEET 2.

fig. 7.

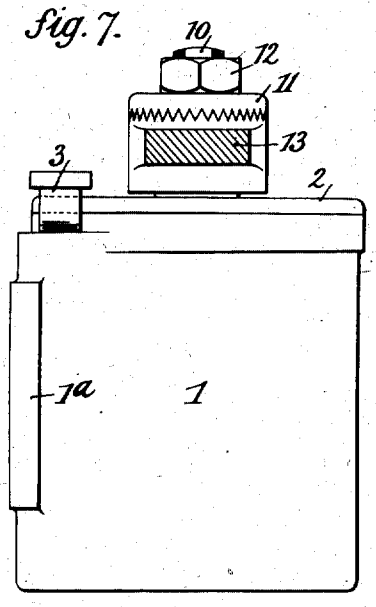


fig. 8.

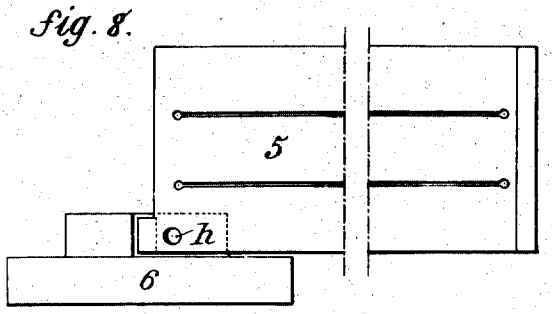


fig. 9.

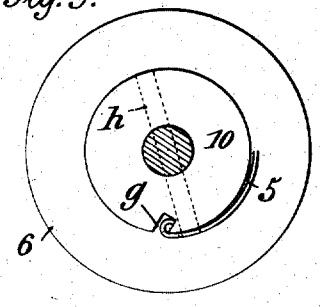
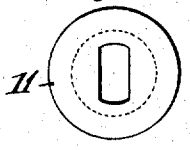


fig. 10.



fig. 11.



WITNESSES

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UNITED STATES PATENT OFFICE.

PAUL QUENTIN, OF PARIS, FRANCE.

DOOR CHECK OR CLOSER.

1,249,190. Specification of Letters Patent. Patented Dec. 4, 1917.

Application filed June 10, 1914. Serial No. 844,201.

To all whom it may concern:

Be it known that PAUL QUENTIN, a citizen of the Republic of France, residing at Paris, 145 Boulevard Péreire, in the Republic of France, engineer, have invented certain new and useful Improvements in Door Checks or Closers, of which the following is a specification.

This invention relates to door checks and closers and other similar devices which are employed for closing a door by the action of a spring and which usually comprise a liquid checking device for the purpose of moderating the closing motion of the door.

The object of my invention is to provide an improved door closer of this character the construction of which secures an efficient and durable operation while obtaining at the same time several advantages which will be described hereinafter.

Several embodiments of this invention are shown in the accompanying drawings, in which:—

Figure 1 is an elevation of one form of the apparatus.

Fig. 2 is a plan of the same.

Fig. 3 is a cross section through the axis of the roll.

Fig. 4 is a vertical section of the casing on the broken line A—A of Fig. 5.

Fig. 5 is a plan of the casing, with the lid removed.

Fig. 6 is a detail cross section on the line B—B of Fig. 4.

Fig. 7 is a side view of the casing.

Fig. 8 is an elevation of the piston and of the end of the spring secured thereto, the spring being in its blank form.

Fig. 9 is a plan of the piston and the inner catch of the spring.

Fig. 10 is a top view of the lower seat of the valve.

Fig. 11 is a top view of a washer.

The apparatus shown in Figs. 1 to 11 inclusively comprises a casing 1, a lid 2, two adjusting valves 3 and 4, a spring 5, a piston 6, a valve 7, a valve seat 8, a hollow piston rod 9, a central rod 10, a washer 11 having notches, a nut 12, a lever 13, a roller 14, a roll stud 15 and a roll support 16.

The casing is embodied with a foot 1ª secured to the door. Its interior is roughened to receive frictionally a piston 6. It comprises a vertical groove g (see Fig. 5), the cross section of which is suitable for receiving the outer end of the spring 5. It is closed by a lid 2 (see Fig. 4) which is secured to the casing by means of threads of a pitch corresponding to the direction of the opening of the door, or to the left in the example shown. It is pierced by a primary channel b which communicates through the lateral ports b^1, b^2 permanently with both the spaces located above and below the piston. Such channel comprises a convergent seat above the port b^2. The valve 3 consists of a valve head yieldingly pressed onto the said seat by a spring 3^a and having at its periphery a wedge shaped slot 3^b which comes in front of the port b^2. The valve head is provided at its upper portion with a slot which is engaged by the flat end 3^c of a screw 3^d which serves to turn the valve and to adjust the position of the slot 3^b with regard to the port b^2 to control the set of channels b^1, b, b^2. The said casing comprises in the example shown a supplementary set c^1, c, c^2 (see Figs. 4 and 6) having two upper ports c^2 which forms a bypass and establishes communication between the spaces located above and below the piston only when the piston on nearly completing the end of its stroke brings the recess d in alinement with one of the ports c^2.

The ports c^2 which open into the casing at different points on the helix described by the lateral port of the recess d, can be obstructed together or separately by the valve 4, the construction and the operation of which is substantially the same as the valve 3.

The piston 6 also contains a ball check valve 7 (see Fig. 4) which can move between its two seats the lower one 8 of which (see Fig. 10) is so cut out as to enable the ball to rest thereon without obstructing passage of liquid through the same.

The lid 2 (see Fig. 4) carries a central hub 2^a the top of which serves as a guide for the piston rod 9 and the bottom of which is threaded at a pitch the direction of which is the same as that of the opening of the door, or to the left in the example shown. It carries a hole e for communication purposes.

The piston rod 9 at its base abuts the piston 6 and is threaded to engage with the corresponding part 2^a of the lid; it has a

cylindrical extension which passes through the lid and is rigidly connected to the lever 13 at the outside.

The lever 13 (see Figs. 1 to 3) which is curved comprises also a longitudinal slot through which passes the friction roller 14 revolving on its axis 15; such axis is held vertically between the checks of a support 16 fixed on the lintel x of the door. The said lever is of such a shape that, in the different positions which it may occupy, no part of it comes in contact with the lintel.

The central rod 10, rigidly secured to the center of the piston, passes through the hollow rod 9 and terminates at its upper end in a threaded part and flattened portions.

Over such flat portions is placed the washer 11 (see Fig. 11) having a rectangular hole of the same shape as the flattened portions of the rod. The washer carries on its lower face triangular ratchet teeth which engage similar ratchet-teeth provided on the upper face of the hub of the lever 13 (see Figs. 4 and 7).

The nut 12, on being screwed, operatively connects the piston 6, the piston rod 9, the central rod 10, the notched washer 11 and the lever 13.

Both of the ends of the spiral spring 5 (see Figs. 5 and 9) are in the shape of catches and are engaged, the one in the mortise a of the casing 1, and the other in the mortise g of the piston 6; the latter mortise is made on the hub of the piston (see Fig. 3); the pin h connecting rods 10 and piston 6 is extended to penetrate into the hole made in the spring, so as to insure the vertical direction of the connection of the latter and of the piston. Such spring is divided into several strips parallel in the direction of its length by one or more slits. It is wound in such a direction that the tension increases when the piston moves up.

The casing is filled to a suitable level with a liquid and a lubricant which will not freeze.

The operation of the apparatus is as follows:—

When the door is closed, the apparatus occupies the position shown in full lines in Fig. 2.

On the opening of the door, the casing moves with the door to which it is secured. The hub of the lever moves on the circumference I, J, K and the lever slides on the roller 14. On that account, the piston rod is forced to revolve in the casing in a clockwise direction. Such rod, being engaged in the lid which forms a nut moving in a suitable direction, moves up while revolving, and all the members which are associated therewith take part in such double movement.

The piston, in thus moving up, provides a vacuum underneath which is immediately filled by the liquid of the upper space passing freely through the port which is provided in the piston and which cannot be obstructed by the ball check valve 7 resting on the seat 8.

Furthermore, the rotation of the piston has the effect of compressing the spring, which is shortened at the same time in an axial direction, such deformation not requiring any material strain on account of the division of the spring into a sufficient number of longitudinal strips.

The lever at the outside, on moving up, must slide vertically on the roll 14, which reduces friction and prevents binding or jamming, the pressure on the roller being slight, the vertical height being of little extent, and such sliding being facilitated by the horizontal rolling.

The spring when stretched pulls the lever in the direction opposite to that just mentioned, transmits its strain to the roller, which causes the support 16, to pivot around the hinges of the door when the latter is no longer pushed, such movements being continued until the door is completely shut.

The piston within the casing, when revolving, is caused to descend, in thus compressing the liquid below the same, which liquid, pressing the ball check upward as it does, cannot escape through the aperture of the valve and must pass through the channels b^1, b, b^2. The latter regulated by the valve 3 only allows it to pass slowly; by the adjustable drive of such screw, one can regulate the speed of the descent of the piston and hence that of the closure of the door.

When the door has finished its movement, it may be useful to diminish the checking action, for example to let the door get a certain speed which will help it to overcome the resistance of the lock or of anything else.

For this purpose, the recess d made in the piston is caused to register with one of the ports c^2 of the combined channels c^1, c, c^2 and offers to the compressed liquid a supplementary passage or bypass. Such combined channels can be more or less closed by the valve 4. Furthermore, according as the valve 4 uncovers one or another of the ports c^2, the beginning of the period of less resistance is advanced or retarded.

The tension of the spring is regulated by unscrewing the nut 12, thus turning in the right direction the washer 11, the nut then being screwed again.

It must be understood that in the general arrangement of the apparatus, the screw and the nut can be located in places different from that shown in the previous example.

To thus regulate the point at which the device becomes active, one places the door in the position where the attack is to be produced, and then the piston is so moved or shifted that the edges of the holes d and c^2

come in register, the nut being set on the lever in such position.

To avoid any loss of liquid by evaporation, there are applied devices which render all the joints water tight through which the air might come in contact with the liquid.

The present door-closer can also be applied (with or without a spring) as a door check to moderate the closure of the same, whether such closure is produced by any other brakeless door-closer, or by an accident, by the wind, or by anything else.

Claims:

1. A door closer comprising a cylindrical casing having a lid, a piston in such casing, a piston rod secured to the piston, a hollow rod surrounding such piston rod, the lid of the casing having a threaded opening and such hollow rod having a threaded part engaging such threaded opening, a lever secured to the hollow rod, means whereby to secure the said hollow rod in an adjustable manner to the said piston rod and a spiral spring attached at one end to the casing and the other end to the piston.

2. A door closer comprising a cylindrical casing, a piston in such casing, a piston rod traversing the top of the casing, a lever secured to such rod and a spiral spring attached at one end to the casing and at the other end to the piston, such spring being constituted by a thin blade divided by longitudinal slits extending nearly to its ends.

3. A door closer comprising a cylindrical casing, a piston in such casing, a piston rod passing through the top of the casing, a lever secured to such rod, a spiral spring one end of which is attached to the casing and the other end to the piston, means whereby to guide the piston helically in the casing, a liquid in the casing, a channel provided in the wall of the casing and having lateral branches which open into the interior of the casing at different points, a channel in the piston having a port on the periphery of the piston and a port on the top of the piston, said peripheral port being so located as to pass in front of said lateral branches of the channel in the casing, and a valve turning in such channel adapted to obstruct said branches together or separately.

In testimony, that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

PAUL QUENTIN.

Witnesses:

CHAS. P. PRESSLY,

MAURICE ROUX.

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