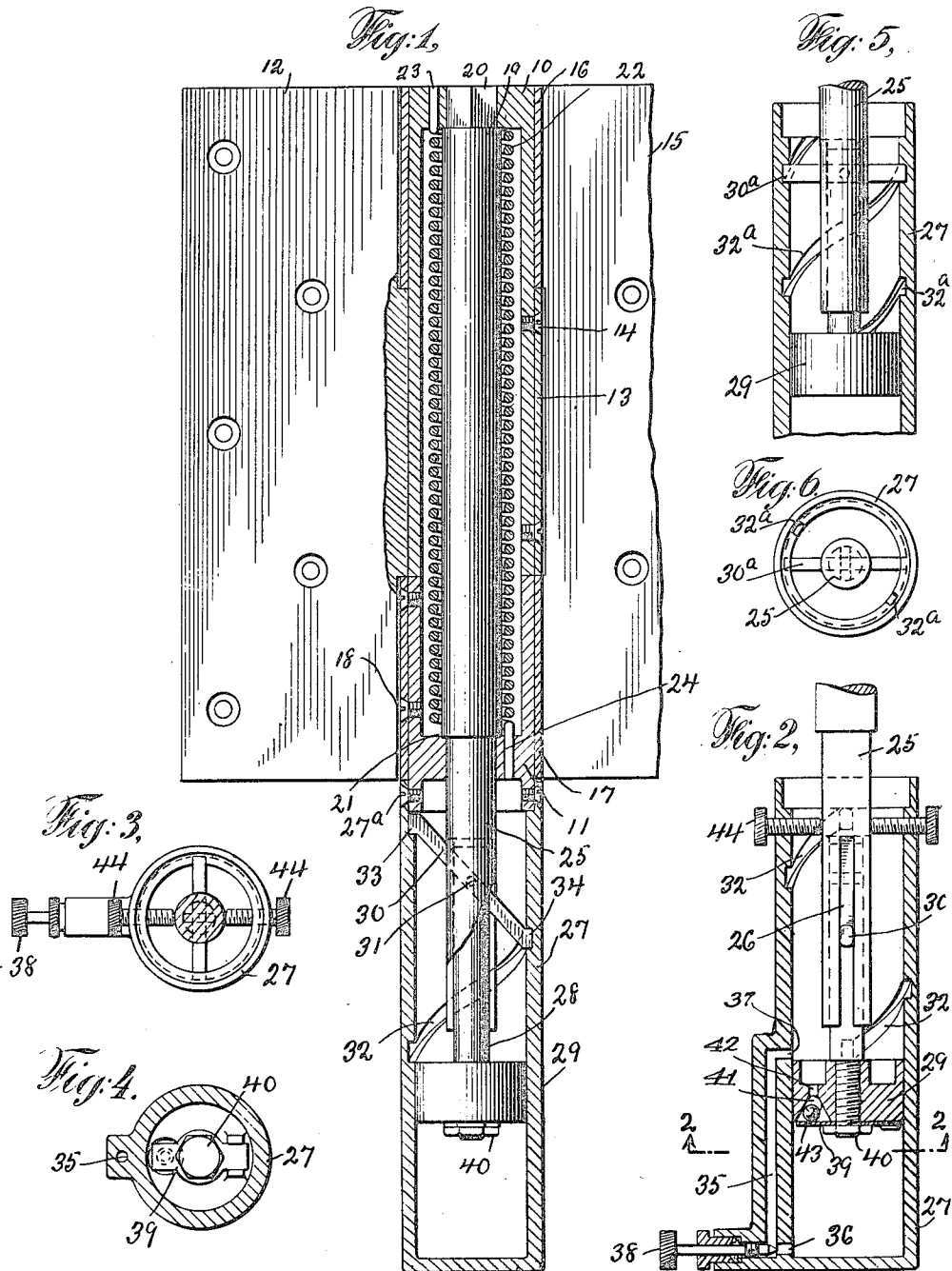


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DOOR CHECK AND SPRING.
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Patented Oct. 22, 1912.



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DOOR CHECK AND SPRING.

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To all whom it may concern:

Be it known that I, CLARENCE T. ROGERS, of the city, county, and State of New York, have invented a new and useful Improvement in Door Checks and Springs, of which the following is a full, clear, and exact description.

My invention relates to improvements in door checks and springs in which a spring is used to automatically close a door, together with means for checking or retarding the operation of the spring and preventing the sudden closing and slamming of the door. When such a spring and check are embodied in one device, it is not only expensive, but is also unsightly when attached to a door.

The object of my invention is to produce such a spring and check as will not be noticeable, and which will be cheap to manufacture as well as simple in construction.

To accomplish this end I have invented a hinge which embodies in its construction a spring to automatically close a door, together with means contained within the hinge itself for checking and retarding the reaction of the spring. This checking means is composed of a liquid containing chamber which is part of the hinge, in which is a piston having a valve port, and which has an operative connection with one leaf of the hinge, so that when the door closes the piston will be moved against the liquid in the chamber and thus retard the reaction of the spring and prevent the slamming of the door.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar reference characters indicate corresponding parts in all the views.

Figure 1 is a front elevation partly in longitudinal section, of the hinge embodying my invention. Fig. 2 is a side elevation in longitudinal section of the liquid containing chamber. Fig. 3 is a top view of Fig. 2. Fig. 4 is a cross sectional view looking up on line 2—2 of Fig. 2. Fig. 5 is a front elevation in longitudinal section of a modified form of the liquid containing chamber, and Fig. 6 is a top view of Fig. 5.

The knuckle of the spring hinge and check embodying my invention is composed of two cylindrical casings 10 and 11 which meet end to end as shown in Fig. 1. One

leaf of the hinge is rigidly secured to or integral with a sleeve 13 on the casing 10, and is rigidly secured to the casing 10 by the screws 14. The other leaf 15 of the hinge near its upper part is rigidly secured to a sleeve 16 surrounding the casing 10 and movable in relation to the casing 10. The lower part of the leaf 15 is rigidly secured to or integral with a sleeve 17 which is supported on the casing 11 and secured thereto by the screws 18.

Within the casings 10 and 11 and extending longitudinally therethrough, is a shaft 19, the upper portion of which is squared as shown at 20 in Fig. 1, this upper portion fitting into a corresponding opening in the top of the casing 10 so that the shaft 19 will rotate with the casing 10. The lower part of the shaft extends through the bottom of the casing 11, and is journaled therein as shown at 21. Surrounding the shaft 19 is a spiral spring 22, the upper end of this spring being secured to the casing 10 as shown at 23 in Fig. 1, the lower end of the spring being secured to the bottom of the casing 11, as shown at 24 in the same figure. The lower part of the shaft 19 extends down as shown at 25 into a liquid containing chamber which is composed of the casing or cap 27, which is closed at its lower end, and at its upper end is secured to the casing 11 by the screws 27^a. The lower part of the shaft 25 is chambered out and slotted on opposite sides as shown at 26 in Fig. 2. Within the chambered portion of the shaft 25 I provide a piston rod 28 which is movable longitudinally in relation to the shaft and turnable therewith. Secured to the lower end of the piston rod is a piston 29. Near the upper end of the piston rod 28 I provide a bar 30 which passes through the piston rod 28 and is secured in place by a pin 31. The inner surface of the liquid containing chamber 27 has a spiral groove 32 as shown in Fig. 1, and the ends of the bar 30, as shown at 33 and 34, engage this groove and move therein as the shaft 25 revolves. As the pitch of the groove is 45 degrees, and the pitch of the bar 30 is also 45 degrees, it is apparent that the ends of the bars 33 and 34 will engage the groove on opposite sides of the casing 27, so that when the shaft 25 revolves, the bar 30 will be moved around and along the groove 32 so as to move the piston rod 28 longitudinally in relation to the shaft 25, and at the

same time rotate with it. As shown in Fig. 1, the pitch of the groove being 45 degrees, the bar 30 will turn within the casing so as to permit of the hinge being opened 180 degrees.

In Fig. 5 I have shown a slightly modified form of the bar 30, in relation to the piston rod and piston. In this figure the bar 30^a is supported horizontally on the piston rod 28, and the opposite ends of this bar 30^a will engage parallel grooves on the inner surface of the casing 27, instead of there being one spiral groove as shown in Fig. 1. Otherwise the operation of the device shown in Fig. 5 is the same as that shown in Fig. 1.

As shown in Fig. 2, the wall of the casing 27 contains a duct 35 which has an opening 36 near the bottom of the casing below the piston 29, together with another opening 37 above the piston 29. The opening 36 can be opened or closed by the screw valve 38. The piston 29 is provided with a valve port which I have shown in Fig. 2, and consisting of a plate 39 which is supported on the lower part of the valve by the nut 40. The lower surface of the valve 39 has a recessed portion 41 which connects with the upper part of the valve by the duct 42. This recessed portion 41 is adapted to contain a ball 43 which is held in place by the plate 39, this plate 39 being so shaped as to permit of a flow of liquid down between the edge of the plate and the edge of the recessed portion 41.

The operation of the spring and check is as follows: When the hinge is opened as shown in Fig. 1, the upper end of the spring being connected with the leaf 12 and the lower end of the spring being connected with the leaf 15, the leaves will tend to close, and the shaft 19 when the hinge has been opened, has turned with the leaf 12 and raised the piston to the position shown in Fig. 1. As the casing 27 constitutes a liquid containing chamber which is filled with oil or other suitable liquid, when the piston 29 is raised, the oil above the piston will be forced through the duct 35 and through the ball valve in the piston itself, down below the piston. This ball valve permits, in addition to the duct 35, a sufficiently full flow of the liquid to allow the door to be opened easily. When, however, the door starts to close, the shaft 19 and its extensions 25, will revolve, and as it rotates the bar 30 will follow the groove 32 and move downward in relation to the shaft, thus forcing the piston against the liquid contained below it. As the piston moves downward, the ball valve in the piston will be closed so that the oil or other

liquid will be forced up through the duct 35 and thus prevent the sudden closing of the door. The rapidity with which the piston 29 is moved down when the door closes, can be very nicely regulated by the screw valve 38 which governs the amount of liquid which can flow up through the duct 35.

It will be apparent therefore that I have provided in the device above described, a door check and spring embodied in a hinge, which is simple in construction, which is not liable to get out of order and is cheap to make, which when secured to a door will not be more noticeable than the ordinary hinge, and which will be efficient and noiseless in the checking of the door and preventing its slamming. It is also apparent that changes may be made in the construction as shown above, without departing from the principle of my invention, as I claim broadly a door check and spring comprised in a spring hinge having a liquid containing chamber and means supported within that chamber which check and retard the reaction of the spring.

I claim:—

1. A combined door check and hinge comprising in combination, a liquid containing chamber having a spiral groove in the walls thereof, a hinge plate secured to the said chamber, a cylinder supported above said liquid containing chamber, a shaft supported within said cylinder, one end of said shaft being hollow and adapted to extend into said liquid containing chamber, a piston rod carrying a head adapted to operate within said chamber, the said piston rod adapted to move vertically within said hollow shaft and means for rotating said shaft.

2. A combined door check and hinge, comprising in combination a liquid containing chamber having a spiral groove formed in the walls thereof, a hinge plate connected to the chamber, a cylinder supported above the chamber and a hinge plate connected thereto, a shaft mounted in said cylinder, one end of said shaft being hollow and slotted on opposite sides thereof, the said hollow end adapted to extend into said chamber, a piston rod having one end thereof extending into said hollow shaft, a bar fixed to said piston and adapted to slide in said slots, the ends of said rod adapted to engage in said spiral groove, a head on one end of said piston rod, and means for rotating said shaft.

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