

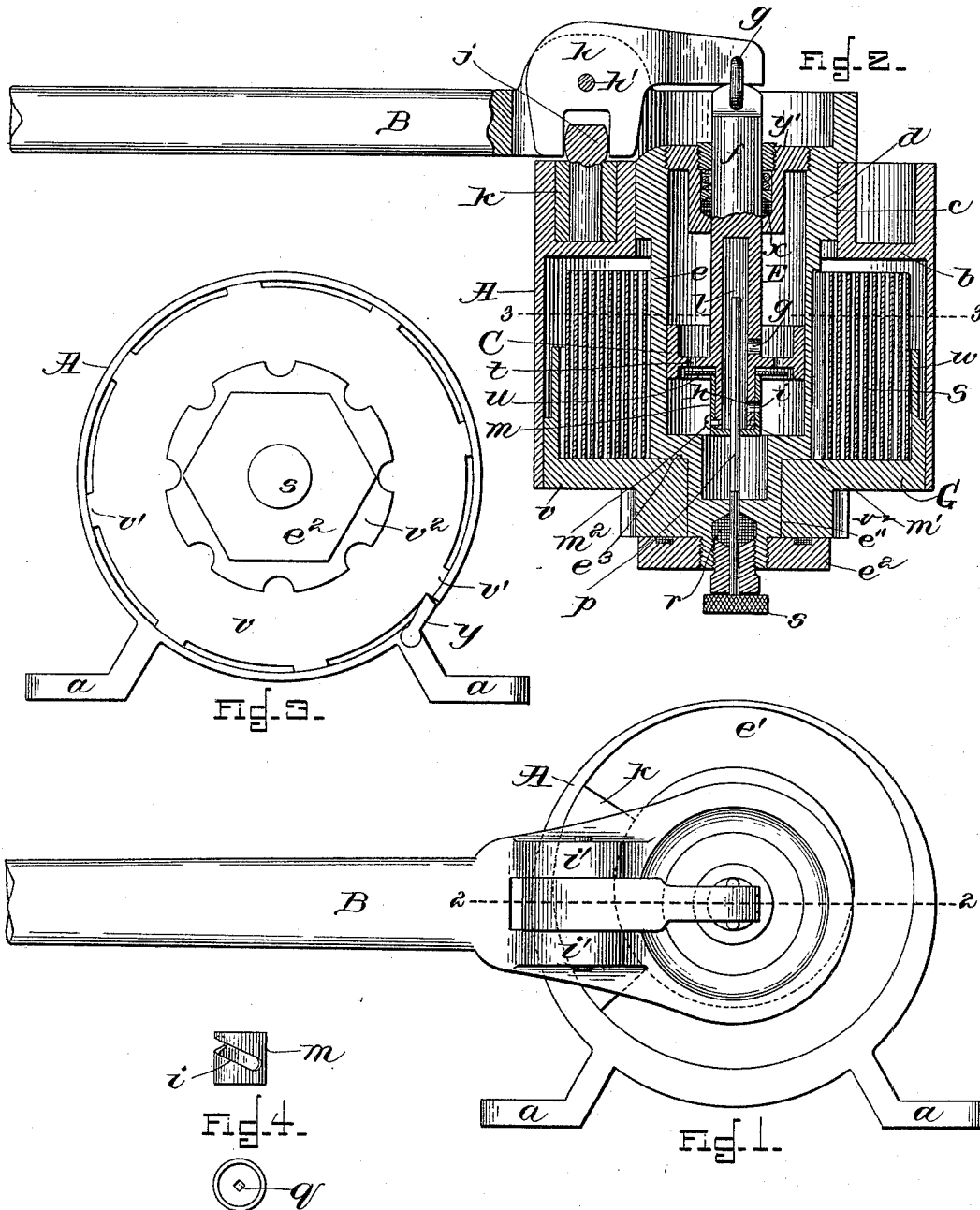
(No Model.)

2 Sheets—Sheet 1.

F. T. RUSSELL.
DOOR CHECK AND SPRING.

No. 584,273.

Patented June 8, 1897.



Witnesses
Arthur J. Randall,
Helen J. Stiles

Inventor
F. T. Russell,
By A. W. Crosley,
Att'y.

(No Model.)

2 Sheets—Sheet 2.

F. T. RUSSELL.
DOOR CHECK AND SPRING.

No. 584,273.

Patented June 8, 1897.

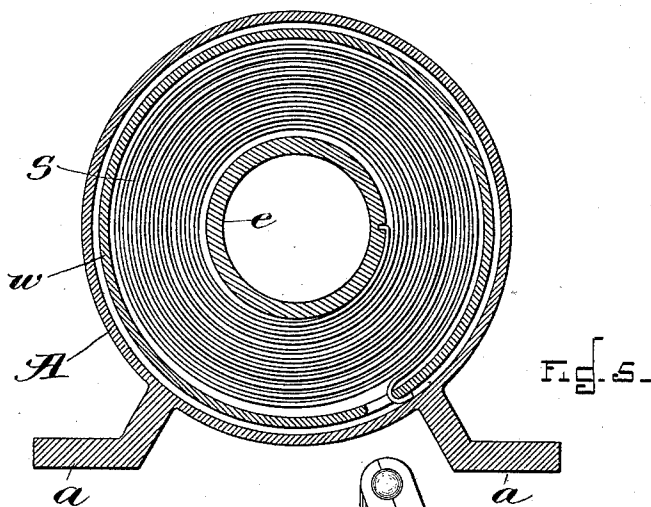
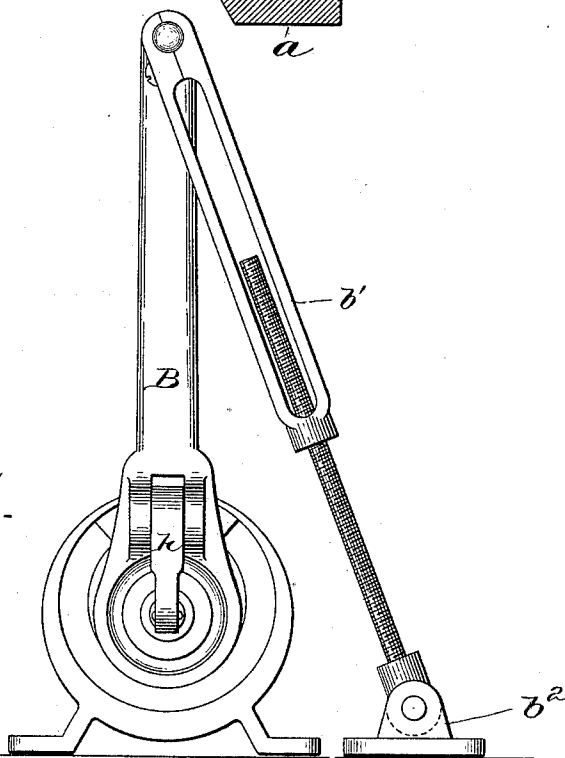


Fig. 6.



Witnesses.

Arthur F. Randall
Robert J. Stiles

Inventor.

F. T. Russell
By *A. W. Crossley*,
att'y.

UNITED STATES PATENT OFFICE.

FREDERIC THOMAS RUSSELL, OF GARDNER, MASSACHUSETTS.

DOOR CHECK AND SPRING.

SPECIFICATION forming part of Letters Patent No. 584,273, dated June 3, 1897.

Application filed August 11, 1896. Serial No. 602,463. (No model.)

To all whom it may concern:

Be it known that I, FREDERIC THOMAS RUSSELL, of Gardner, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Door Checks and Springs, of which the following is a description sufficiently full, clear, and exact to enable those skilled in the art to which it appertains or with which it is most nearly connected to make and use the same.

This invention has relation to that class of combined door checks and springs in which a liquid is employed to prevent the slamming of the door by the power exerted by the door-spring and in which also the flow of the liquid from place to place is made to so control the operation of the spring as that the door may be softly though certainly closed and latched.

It is the object of the invention to provide a door check and spring of the kind mentioned which shall be at once efficient and serviceable in a maximum degree and of a minimum cost or expense in its manufacture and use.

It is also the object of the invention to provide such improvements in liquid door-checks as will insure them against leakage of the liquid either through the body of the liquid-chamber or around movable parts which enter the said chamber.

It is also the object of the invention to provide such improvements as will permit of the more ready adjustment of the door-spring and the adjustment of the port-controlling devices than is the case with door-checks now commonly employed.

It is also the object of the invention to provide such improvements as will lighten the weight of door springs and checks as a whole, render the parts easy of assemblage and ready of renewal, repair, and adjustment, and generally enhance in the device its usefulness and power or quality of producing the desired or intended effects, all as will more fully appear from the detailed description hereinafter given.

The invention consists of the improvements particularly pointed out in the appended claims.

Reference is to be had to the annexed drawings, and the letters and figures of reference marked thereon, forming a part of this speci-

fication, the same letters indicating the same parts or features, as the case may be, wherever they occur.

Of the drawings, Figure 1 is a plan view of the improved door check and spring. Fig. 2 is a section taken on the line 2 2 of Fig. 1. Fig. 3 is a plan view of the end opposite to that shown in Fig. 1. Fig. 4 is a detail hereinafter more particularly referred to. Fig. 5 is a section taken on the line 3 3 of Fig. 2. Fig. 6 is a general plan view of the device.

Proceeding to a description of the invention, its construction and mode of operation, particular reference is had to Figs. 1 and 2 of the drawings, in which at A is shown the cylindrical casing or body, which may be composed of cast metal and which is provided with lugs *a a*, by means of which it may be secured to a swinging door or the like. The upper end of the cylindrical body A is partly closed by the partition or end portion *b*, through which a hole is formed constituting a bearing *c*, in which is journaled the hub *d* of the swinging arm B. The hub of the swinging arm B is formed with a hollow depending cylindrical portion or extension *e*, which constitutes the liquid-chamber E, and in its construction I preferably employ malleable iron or similar metal, as in cast-iron blow-holes and other irregularities are liable to occur, which renders cast-iron objectionable from the fact that it is not secure against the leakage therethrough of the liquid employed in the use of the invention.

The liquid-chamber E, formed, as stated, in the depending portion *e*, may be bored or machined only throughout that part thereof along which the piston or plunger C travels. The remainder of the length of the chamber E can be cored out, thus doing away with considerable machine work and lessening the cost of manufacture.

The stem *f* of the piston or plunger C extends upwardly through a stuffing-box *x*, provided in the cap or head *y'*, which cap or head is threaded to fit the internally-threaded mouth or end of the liquid-chamber E to tightly close the latter, as shown. At its upper end the stem *f* of the piston is loosely connected, as by the link *g*, to one arm of a bell-crank lever *h*, that is fulcrumed by the pin *h'* between lugs *i' i'*, projecting from the

lever-arm B. The other arm of the bell-crank lever k is forked, and the said forked end engages a stud j , projecting from a segmental block k' , that is formed to fit the eccentric groove e' , formed in the face of the portion b of the cylindrical body portion A, and in which groove the said block k' is adapted to travel. It will thus be seen that by swinging the lever B around its center or upon its pivotal point the block k' will be carried to and from the longitudinal center or axis of the liquid-chamber, and by means of the lever k , operatively connecting the block with the lever B, the piston will be raised and lowered, the downward movement of the latter being resisted by the checking liquid. In other words, when the lever B is swung around or to and fro the vertical arm of the lever k will be moved nearer to and farther from the axis of the liquid-chamber, and as a consequence the other arm of the lever k will be moved up and down, so as to raise and lower the piston.

In the downward movement of the piston or plunger in the liquid-chamber the liquid therein will pass from below the piston through the chamber or hollow l , formed in the rod or stem of the piston, a port g' above the said piston and a port below the same communicating with the said hollow or chamber l .

On the extension of the piston rod or stem below the piston there is fitted a cap m , and the said extension of the piston-stem is formed or provided with an annular groove m' , into which a pin m^2 , projecting from the cap m , extends and serves to support the said cap in its proper position. The cap m is provided with an inclined or spiral slot or opening i , which slot at one point in its length may be caused to coincide or match with the port h and at other points may to a greater or less extent be in position partially above or below the same, so that by revolving the cap m on the end of the piston rod or stem the port h may be fully or partially opened or closed.

A rod p is mounted to turn in the base of the portion e and projects through a stuffing-box r , formed therein, and the upper portion of the said rod is square in cross-section and projects through a square hole q , formed in the closed end or head of the cap m , so that when the rod is turned, as it may be by means of the knurled head s on the lower end thereof, the cap may be revolved and the extent to which it is desired the port h shall be opened, regulated, and controlled to regulate the flow of the liquid from side to side of the piston or plunger. As the slot in the cap is formed on an incline or inclined with respect to the axis of the liquid-chamber it will be understood that the said cap may be turned to such an extent as to entirely close the port h , and again it may be turned so as that the inclined slot will gradually open the said port and, if need be, open it to its fullest extent.

In order to provide for the passage of the liquid freely from above to below the piston or plunger C as the latter is drawn upwardly

during the operation of the device and at the time when the door or the like is being swung open, I provide through the web of the piston C a number of ports t , through which, during the upward movement of the piston, the liquid is free to pass. A disk-like valve or clapper u , located below the piston C, is mounted upon the stem f of the piston and is free to slide thereon to a slight extent to open and close the ports t , the upper edge of the cap m being the limit of its downward movement and the under side of the piston constituting a seat upon which the valve or clapper u is forced by the liquid as the piston or plunger descends. It will thus be seen that during the downward movement of the piston, which takes place as the door or the like is being closed through the action of the spring hereinafter referred to, the ports t will be closed and the liquid forced through the opening i and port h into chamber l and out above the piston through port g' , the passage of the liquid through the said ports being regulated to the desired extent by means of the cap m , and the desired resistance to the movement of the piston thus effected.

S designates the door-closing spring, which spring is heavy and constructed so as to exert quite a powerful tension. The said spring is arranged spirally or coiled around the liquid-chamber and within the casing, one end thereof being secured to the said liquid-chamber and the other end being attached to the cylindrical flange w , formed on the base v , as shown in Fig. 5. The base of the portion e is reduced in diameter, as at e'' , and threaded to receive the nut e^2 , between which nut and the shoulder e^3 , formed upon the portion e , the base v is mounted to turn. The periphery of the base v is formed or provided with projections or ratchet-teeth v' to be engaged by the free end of the pawl y , pivoted upon the body of the casing.

v^2 is a rounded projection on the bottom of the base v , and is provided on its periphery with notches, as shown, for the reception of a spanner whereby the flanged base may be turned in the casing.

As the spring S is connected with the liquid-chamber and flanged base, as described, it will appear obvious that by means of a spanner employed as described the spring S may be wound up or relaxed to increase or diminish its tension, the pawl y holding the base against turning back to unwind the spring.

The outer or free end of the lever B may be connected with the casing of the door in any well-known manner. I have shown it as connected with an adjustable casing-lever b' , the opposite end of which carries a bracket b^2 , adapted to be secured to the casing of the door.

As before stated, by my improvements I am enabled to make the liquid-chamber out of malleable iron or other similar metal not likely to contain blow-holes, so as to be leaky, while the casing may be made out of cast-

iron or like comparatively cheap material and need not be liquid-tight. This feature is important, since it not only lessens the cost of the device, but also increases its efficiency. Again, the casing is of slight expense of manufacture by reason of the fact that it can be cast without the employment of cores or other expensive means.

By reason of the compact form of the device it can be brought within small compass and be made comparatively light in weight—two points of considerable importance in many instances.

The means for adjusting the tension of the spring being on the bottom of the device, it can be readily reached and manipulated, a thing which cannot be so easily or conveniently done in door checks and springs as now commonly constructed. Other points of advantage will be apparent to those skilled in the art by an inspection of the drawings, and need not, therefore, be specially mentioned herein.

Having thus explained the nature of this invention and described a way in which the same may be made and used, though without setting forth all of the forms of its construction or modes of its employment, it is declared that what is claimed is—

1. A door check and spring comprising in its construction a casing, a lever adapted to be connected with the door and provided with a hollow hub, constructed as a liquid-tight liquid-chamber adapted to rotate and arranged centrally in the casing, a spring surrounding the liquid-chamber and connected at one end thereto and at the other end to the casing, a reciprocating piston in the liquid-chamber, and operative connections between the piston and the lever and casing.

2. A door check and spring comprising in its construction a casing, a lever adapted to be connected with the door and provided with a hollow hub, constructed as a liquid-tight liquid-chamber adapted to rotate and arranged centrally in the casing, a spring surrounding the liquid-chamber and connected at one end thereto and at the other end to the casing, a reciprocating piston in the liq-

uid-chamber, a bell-crank lever pivoted upon the first-mentioned lever, and operative connections between the bell-crank lever and the piston and between the bell-crank lever and the casing.

3. A door check and spring comprising in its construction a casing having an eccentric groove formed in its head, a traveling block arranged in the said groove, a liquid-chamber rotatively arranged in the said casing and provided with a lever-arm, a piston in the liquid-chamber, a bell-crank lever fulcrumed on the lever-arm and connected by one of its arms to the piston and by the other to the traveling block, and a door-operating spring connected with the casing and liquid-chamber.

4. A door check and spring comprising in its construction a casing, a liquid-chamber arranged centrally within the casing, and extending therethrough, a piston in the liquid-chamber adapted to move vertically therein, and provided with a hollow rod or stem extending from both sides of the piston, ports communicating with the interior of the said rod, means for controlling the extent of opening of one of the said ports, and a rod connected with the said means and extended through the lower end of the said liquid-chamber.

5. The combination, with the casing, of the rotary vertically-flanged base, the said flange extending upwardly into the casing, a vertically-disposed closed liquid-chamber within the casing and flanged base, an actuating-spring connected at one end to the liquid-chamber and at the other end to the flange of the base, the said base being provided with ratchet-teeth or projections, a pawl to engage therewith, and a projection on the bottom of the base provided with spanner-receiving notches, as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 25th day of July, A. D. 1896.

FREDERIC THOMAS RUSSELL.

Witnesses:

ARTHUR W. CROSSLEY,
ARTHUR F. RANDALL.