

(No Model.)

W. F. FALLS.

COMBINED DOOR SPRING AND CHECK.

No. 329,032.

Patented Oct. 27, 1885.

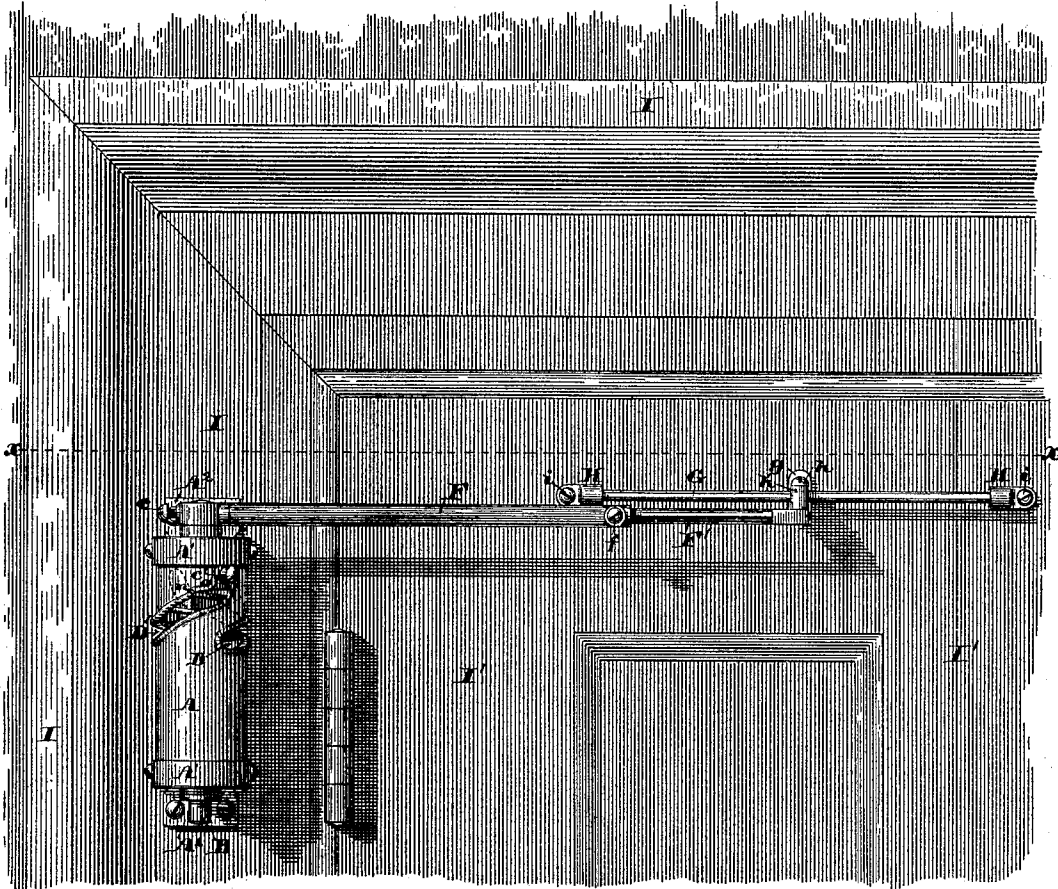


Fig. 1.

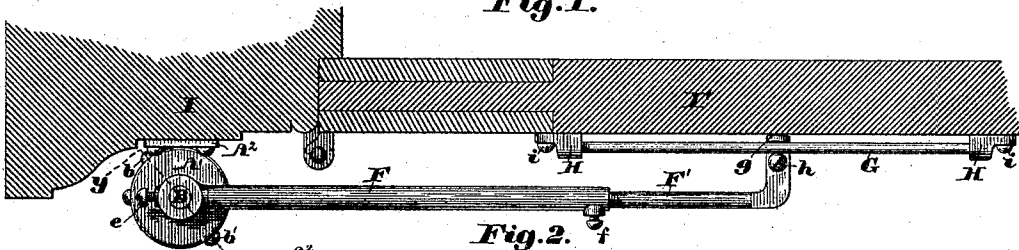


Fig. 2.

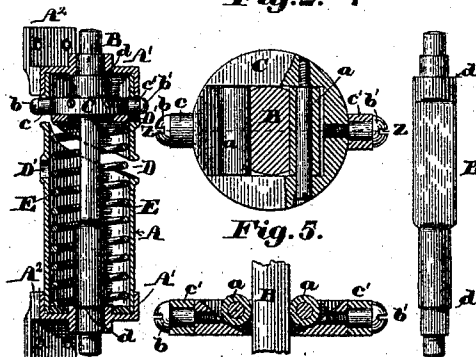


Fig. 3.

Fig. 6.

Fig. 4.

Witnesses:
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UNITED STATES PATENT OFFICE.

WILLIAM F. FALLS, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE
FALLS AUTOMATIC DOOR SPRING AND CHECK COMPANY.

COMBINED DOOR SPRING AND CHECK.

SPECIFICATION forming part of Letters Patent No. 329,032, dated October 27, 1885.

Application filed February 24, 1885. Serial No. 156,614. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM F. FALLS, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Combined Door Springs and Checks, of which the following, taken in connection with the accompanying drawings, is a specification.

My invention relates to a mechanical device for insuring the closing of doors without slamming; and it consists in certain novel constructions, arrangements, and combinations of devices, which will be readily understood by reference to the description of the drawings and to the claims to be hereinafter given.

Figure 1 of the drawings represents a portion of the upper part of a door and its casings with my improved door spring and check applied thereto. Fig. 2 is a horizontal section of the same on line *x x* on Fig. 1. Fig. 3 is a vertical section of the spring and its casing on line *y y* on Fig. 2. Fig. 4 is a side elevation of the central shaft removed from the spring-casing. Fig. 5 is a sectional plan of the spring-actuated and shaft-turning collar, and Fig. 6 is a section of the same on line *z z* on Fig. 5.

In the drawings, A is a cylinder provided with removable heads A' A', which are each provided with a foot, A², by which said cylinder is secured in position upon the door-casing I at the hinged side of the door I', as shown in Fig. 1.

B is a shaft mounted in bearings in the heads A' A', and having a portion of its length made rectangular, or nearly so, or provided with two broad flat sides opposite each other, as shown in Figs. 3, 4, and 5.

C is a circular collar having a central opening through it, and provided with the two anti-friction rolls *a a*, set within said opening with their axes parallel to each other and their peripheries at a distance apart just sufficient to allow the free passage of the flattened portion of the shaft B, as shown in Figs. 5 and 6. The collar C has mounted upon screw-studs *b b'*, set in opposite sides of its periphery, the anti-frictional rolls *c* and *c'*, arranged to revolve freely upon said studs and to serve as a means of causing a partial rotation of

said collar, and through it of the shaft B, as will be presently described.

The cylinder A has cut through its walls two irregular spiral slots, D and D', arranged exactly opposite to each other and of uniform shape, to receive and guide the anti-friction rolls *c* and *c'*, respectively, whereby a partial rotation of the collar C and the shaft B is produced when said collar is moved in the direction of the length of the cylinder A.

E is a spiral spring interposed between the lower head A' of the cylinder A and the collar C, the tension of which tends to force said collar toward the upper end of the cylinder A and the shaft B, said shaft being provided with shoulders *d d*, which abut against the heads A' A', so that said shaft cannot be moved endwise in its bearings.

To the upper end of the shaft B is firmly secured, by the set-screw *e*, the lever F F', made in two parts, the outer part, F', being fitted to a bearing in the part F so as to be adjustable therein, the part F being provided with the set-screw *f*, by means of which the part F' may be secured in any desired position to vary the length of the lever F F', for the purpose of increasing the leverage upon the door.

The outer end of the part F' of the lever F F' is bent at right angles to the main portion thereof, and is provided with the upwardly-projecting ear or lug *g*, and has mounted upon a stud, *h*, set therein an anti-friction roll, *h'*, which truck bears against and rolls in contact with the rod G, secured by means of the stands H H and screws *i i* to the door I', in a position parallel to the top edge of the door, as shown in Fig. 1.

It will be obvious from examination of the drawings, in connection with the foregoing description, that if the door be opened the lever F F' will be moved about its axis of motion, causing a partial rotation of the shaft B and collar C, and as the collar C cannot be revolved without being moved endwise of the shaft B in one direction or the other, on account of the rolls *c* and *c'* engaging with the spiral slots D and D', it follows that said collar must be moved toward the lower end of the cylinder A, thereby compressing and increasing the tension of the spring E, the re-

sult of which is, that when the pressure exerted to open the door is removed the reaction of the spring E moves the collar C upward, and the upper edges of the spiral slots D and D' acting upon the rolls *c* and *c'* causes a partial rotation of said collar and the shaft B, thereby causing a pressure of the roll *h'* upon the rod G, and closes the door.

It will also be obvious that the tension of the spring is very much greater when the door is open than when the door is closed, and exerts its greatest power just when most needed—viz., when the door is open and in a state of rest.

To prevent a slamming of the door when it closes, as is generally the case when springs are used for closing them, I make the slats D D with a short section of their upper side, as from *n* to *o*, Fig. 1, of a finer pitch, in fact nearly horizontal, the result of which is to check the momentum of the door momentarily and permit it to be closed without noise, the portion of said slots from *o* to the top thereof being made of a much quicker pitch, so that the weakened spring may have sufficient force to complete the closing of the door after the rolls *c* and *c'* have passed the points *o* in the slots D and D'.

The object of the lug *g* is to insure the lever F F' following the movement of the door when closed suddenly by a gust of wind or otherwise.

The spring is shown as applied to a door which, when opened by pulling it toward the person opening it, swings to the left; but if it is desired to apply it to a door that swings to the right it is only necessary to secure the cylinder to the casing with the other end upward, and secure the lever or arm F F' upon the opposite end of the shaft B.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. A combined door spring and check embodying the following elements, viz: a hollow cylinder closed at both ends and provided with two spiral slots cut through its cylindrical walls, a flat-sided shaft mounted centrally in said cylinder, a lever or arm rigidly secured upon said shaft by one of its ends, with its other constructed and arranged to press upon

a door to close it and to be moved about its axis of motion thereby, a circular collar provided with a central opening, and two anti-friction rolls to engage the flat sides of said shaft, and two anti-friction rolls to engage with the spiral slots in the cylinder, and a spring inclosed in said cylinder and arranged to press upon said collar and expand and contract in directions at right angles to the plane of movement of the door—pressing lever or arm, substantially as described.

2. A combined door spring and check containing the following elements, viz: a cylinder closed at both ends and having cut through opposite sides of its periphery two spiral slots, each having near one end thereof a section made of finer pitch and another section of quicker pitch than the main portion thereof, a shaft mounted in bearings in the heads of said cylinder, a collar fitted upon said shaft so as to be movable endwise thereon and revolve therewith, and having mounted upon suitable bearings upon its periphery two anti-friction rolls which engage with and move in said spiral slots, a spiral spring surrounding said shaft between said collar and one head of the cylinder, and a lever or arm rigidly secured by one of its ends to said shaft and arranged to press upon the door by its other end, substantially as described.

3. In combination with the cylinder A, shaft B, collar C, and spring E, the lever or arm F F', made in two parts, whereby its length is rendered adjustable, substantially as described.

4. In combination with the spring-actuated lever or arm F F', the anti-friction roll *h'*, and the lug *g*, mounted upon said lever, and the rod G, mounted upon the door and co-operating with said roll and lug to guide the movable end of said lever, substantially as described.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 19th day of February, A. D. 1885.

WILLIAM F. FALLS.

Witnesses:

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