

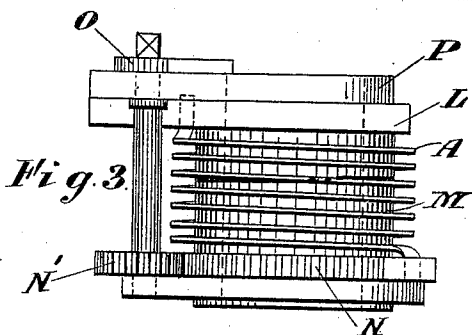
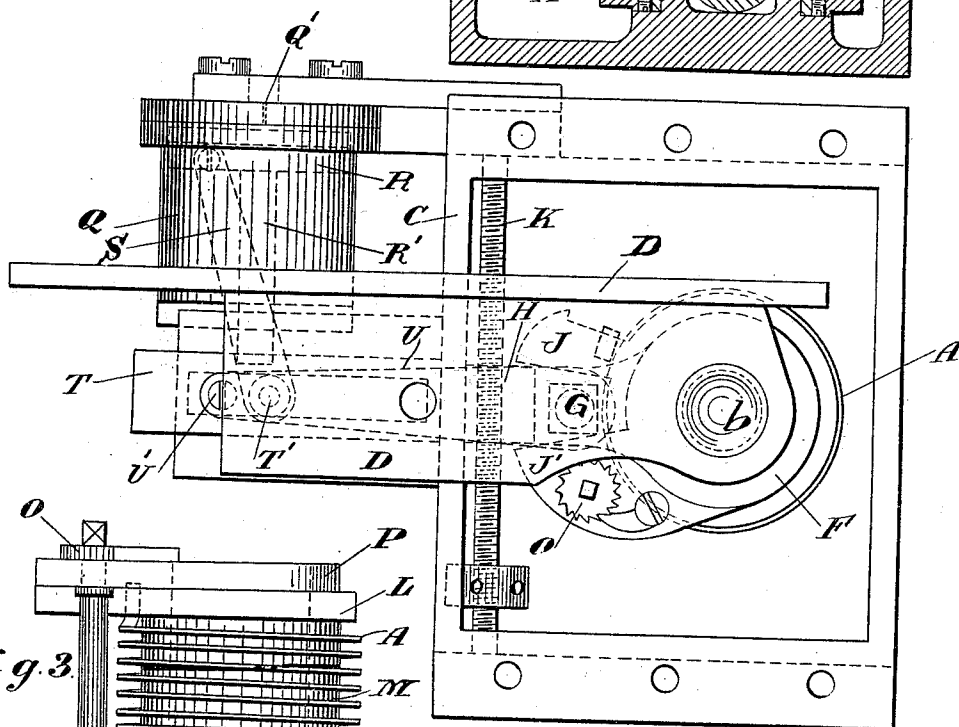
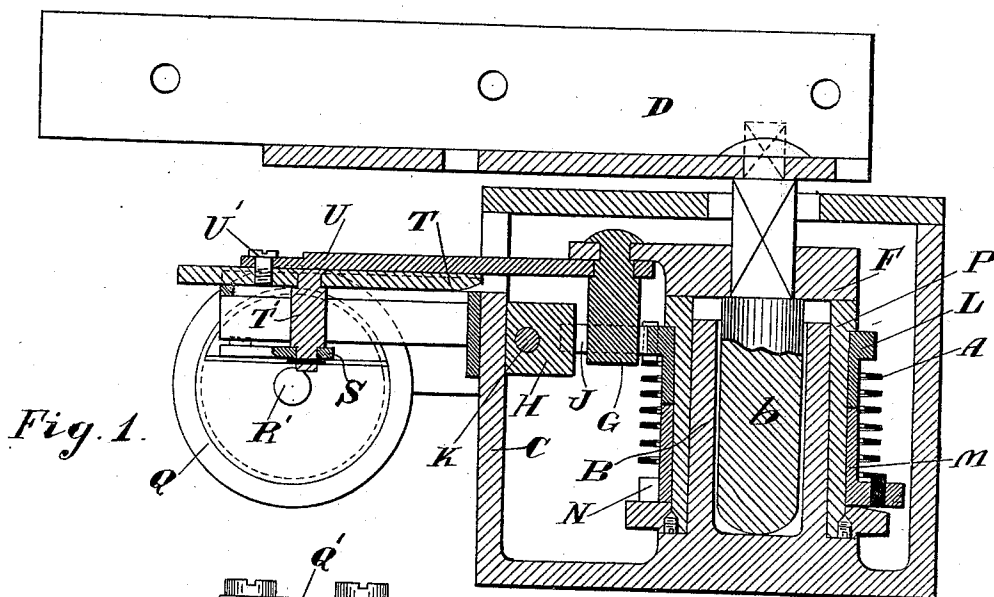
(No Model.)

2 Sheets—Sheet 1.

J. ROBINSON.
DOOR SPRING AND CHECK.

No. 513,621.

Patented Jan. 30, 1894.



Witnesses:
Geo. M. Whitney
J. F. Timby

Fig. 2.

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(No Model.)

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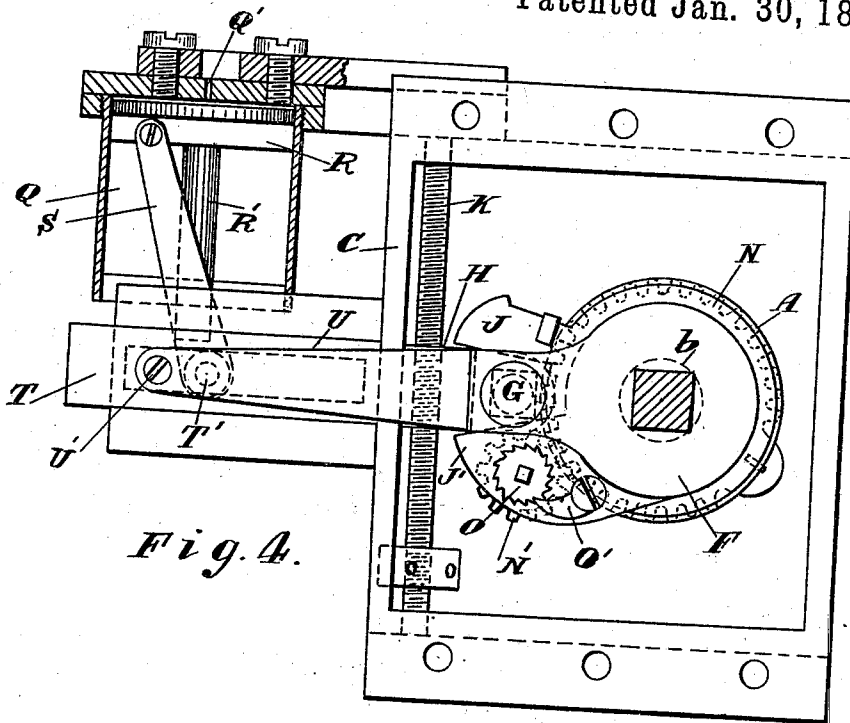


Fig. 4.

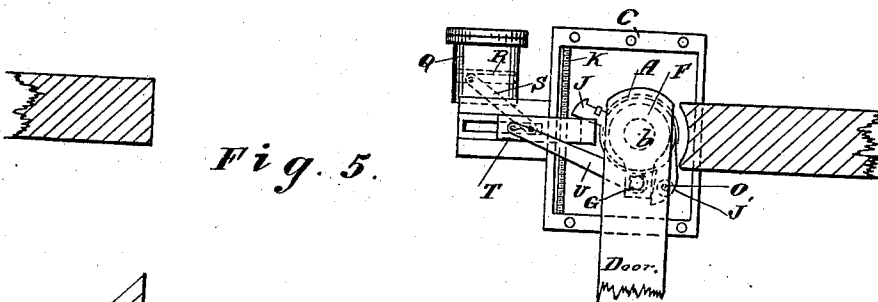


Fig. 5.

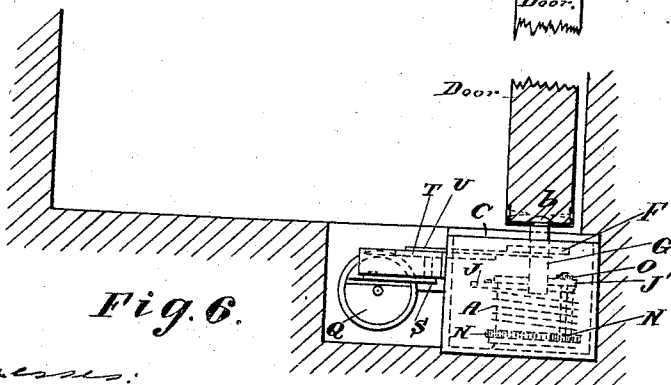


Fig. 6.

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UNITED STATES PATENT OFFICE.

JOSEPH ROBINSON, OF LONDON, ENGLAND.

DOOR SPRING AND CHECK.

SPECIFICATION forming part of Letters Patent No. 513,621, dated January 30, 1894.

Application filed April 24, 1893. Serial No. 471,639. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH ROBINSON, a subject of the Queen of Great Britain and Ireland, and a resident of London, England, have invented a new and useful Improvement in Door Springs and Checks for Swinging Doors, of which the following is a specification.

My invention relates to means whereby a double-acting swing-door is automatically brought back to its normal or closed position without shock or jar, after being swung open either way; and consists in certain novel combinations of parts hereinafter set forth and claimed.

Figure 1 of the accompanying drawings is a sectional elevation of the improved door-spring and door-check. Fig. 2 is a plan view thereof, with the cover of the spring-box omitted. Fig. 3 is a detail elevation of the spring and its tension adjusting devices detached. Fig. 4 is a plan view with the door-shoe as well as the cover of the spring-box removed, and its pivot and air-cushion piston in section. Fig. 5 is a small scale sectional plan of an open door provided with the improved door-spring and check; and Fig. 6 is a sectional elevation projected from Fig. 5.

Like letters refer to like parts in all the figures.

My combined door-spring and door-check comprises a single spiral spring A, of suitable elastic material, surrounding a fixed hollow spindle-step B, which is conveniently supported within a "spring-box" C under the heel of the door, as in Figs. 5 and 6; said step B forming the pivotal axis of said door.

The heel of the door is provided with a metallic plate or shoe D, which has a stud-pin *b* thereon, projecting downward into the said step B in the spring-box C, which pin thus becomes the pivot on which the door swings either way. There is also a crank-arm F fast on a squared portion of said pivot *b*, which is provided with a rigidly depending pin G, which crank-pin, together with a movable abutment H, is located between two normally adjacent lugs J J', which are connected with the respective ends of said spiral spring A, as hereinafter set forth. A horizontal screw K, mounted within the spring-box C at one side, supports said movable abutment H so that it may be adjusted as to position, and said lugs

J J' press upon either side of this abutment, when the door is closed, with the requisite amount of spring tension.

The spring tension is regulated or adjusted as follows: The upper end of the spiral spring A is attached directly to said lug J, which projects from a rotary sleeve L, and the other end of the spring is attached to a second rotary sleeve M below said sleeve L. This second sleeve M has a cog-rim N upon it in mesh with a pinion N', which has at the upper end of its spindle a ratchet-wheel O, with a key-square above it. This ratchet-wheel and its click O', Fig. 4, are carried by said lug J', which projects from a third sleeve P which is free to rotate independently within said sleeves L and M, and carries by a ring made fast on its lower end, as in Fig. 1, the lower bearing of said spindle of the pinion N' and ratchet-wheel O. Compare Fig. 3. It is evident that the tension of the said spiral spring may be increased at pleasure by causing the sleeve M provided with said cog-rim N to turn to any desired position by means of said pinion spindle and ratchet-wheel O; or the spring tension may be reduced by retracting said click O', and turning said sleeve M backward. When the door is pushed open either way, the crank-pin G connected with the door-shoe D pushes one spring-lug J or J' in front of it; the other spring lug reacting against the adjustable abutment H. See Figs. 5 and 6. In opening the door as here shown, the pin G coacts with the lug J', and the sleeves P and M turning together, strain the spring A by means of its lower end. When the door is opened in the opposite direction, the sleeve L rotates and the sleeves M and P remain stationary.

To facilitate closing the door, from either direction, without shock or jar, I employ, in connection with the spring mechanism above described, a single air-cushion device comprising a cylinder Q parallel with said screw K, a piston R within said cylinder, and a rod R'. A small hole Q' is provided in the otherwise closed inner end of said cylinder Q, through which air is drawn in when the piston R moves away from said inner end, and through which the air gradually escapes on the return of the piston, affording an effective cushion of air against any rapid movement of the piston. To the piston R is at-

tached a pivoted link S which is connected by a pin T' to a slide T at right-angles to said cylinder. This slide has a link U pivoted to it at U', and said link U is pivotally connected to said pin G of said crank-arm F which moves with the door as above. Thus when the door is moved from its central closed position, either way, the link U draws the slide T toward the axis of the door, and the link S draws the piston R away from said inner end of its cylinder Q. Upon the return of the door to its closed position, the reverse action takes place, and the piston R is forced back upon its air-cushion, until the confined air behind it has gradually escaped through said hole Q'.

The action of the door upon the air-cushion piston is, owing to the position of the cylinder Q, and the action of the links S and U and the slide T, an indirect action, which enables the door, upon opening in either direction, to operate the piston R quite easily, while upon the closing of the door the chief resistance or reaction of the cushion upon the door is felt at once, preventing the door from suddenly closing, and thus striking or pushing against the back of a passer; while the mechanical effect of the mechanism upon the air-cushion piston increases as the door nears its central position. The cushioning effect is thus made at once more effective and more constant or prolonged than would be the case were the door to close directly upon an air-cushion, as is generally the case.

The air-cylinder Q is above specified as parallel with said screw K, and the slide T at right-angles to said cylinder; the parts being so shown in the drawings. It is not considered essential however that this exact location of these parts should be followed in practice.

Having thus described the said improvement, I claim as my invention and desire patent under this specification—

1. In combination with a swinging door opening either way from a central closed position, and with a spring-mechanism which brings the door to rest in such central position, an air-cushion cylinder and piston, a slide connected with said piston, and a pivoted link connecting said slide to the crank-pin of said spring-mechanism, substantially as hereinbefore specified.

2. A swing-door shoe swinging horizontally about a fixed pivotal axis, and a spring for bringing said shoe to rest in a central position from either side, in combination with an air-cushion cylinder and piston, a slide moving at right-angles thereto, and pivoted links connecting said piston to said slide and said slide to the crank-pin of the spring mechanism, substantially as hereinbefore specified.

3. In a swing-door spring mechanism, a door-shoe pivot-pin and crank-pin united with each other and moving in unison, in combination with a spiral spring surrounding said pivot pin, a rotary lug-carrying sleeve connected with the upper end of said spring, a second rotary sleeve connected with the other end of said spring and provided with a cog-rim, an inner lug-carrying sleeve, and a pinion, spindle, ratchet-wheel, and click, carried by said inner sleeve, substantially as hereinbefore specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOSEPH ROBINSON.

Witnesses:

REGINALD W. JAMES,
RICHARD A. HOFFMANN.