H. C. STEINHOFF.

Door-Springs.

No. 199,383. Patented Jan. 22, 1878.

Fig: 1.

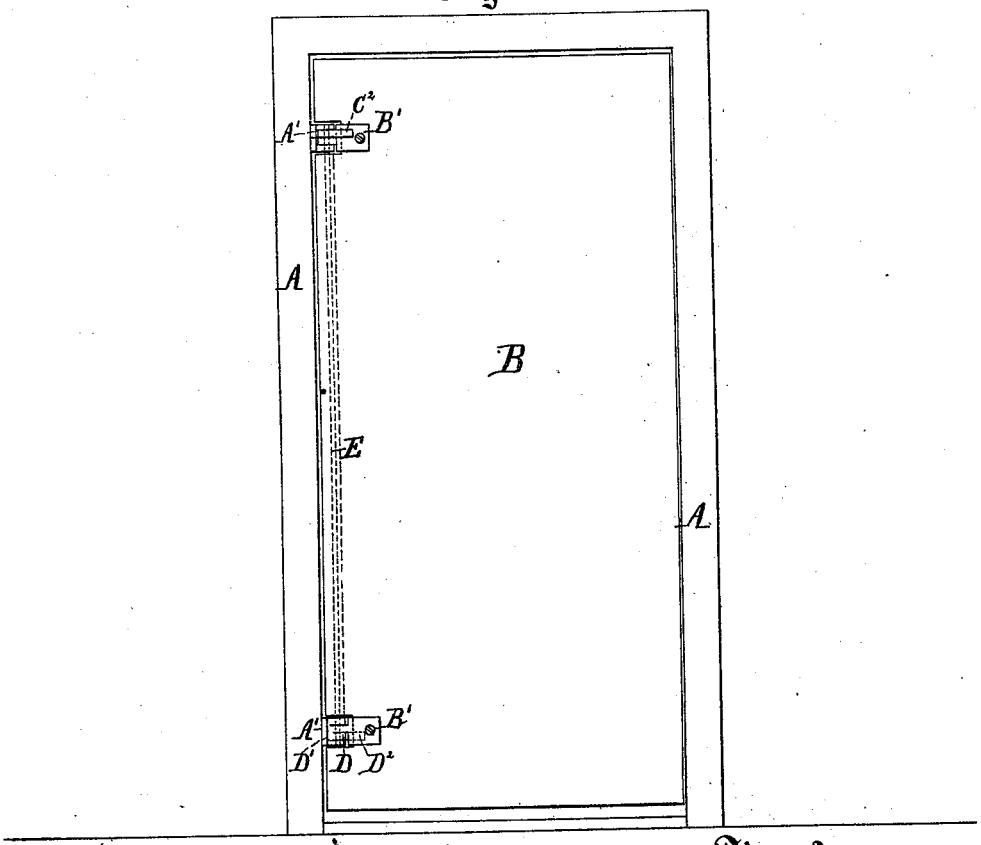


Fig: 4.

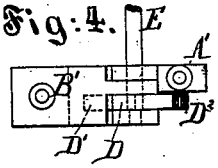


Fig: 2.

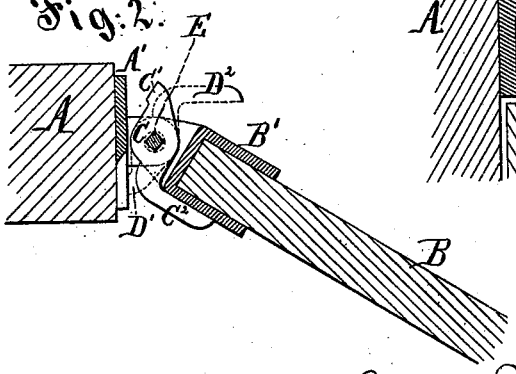
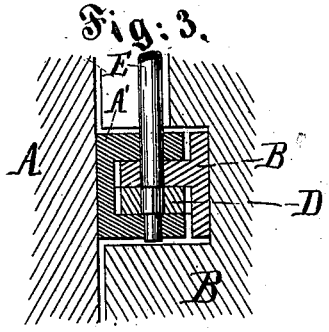


Fig: 3.



Witnesses:

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Inventor:

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UNITED STATES PATENT OFFICE.

HERMAN C. STEINHOFF, OF WEEHAWKEN, NEW JERSEY.

IMPROVEMENT IN DOOR-SPRINGS.

Specification forming part of Letters Patent No. **199,383**, dated January 22, 1878; application filed August 14, 1877.

To all whom it may concern:

Be it known that I, HERMAN C. STEINHOFF, of Weehawken, Hudson county, in the State of New Jersey, have invented certain new and useful Improvements relating to Door Springs and Hinges, of which the following is a specification:

My invention is adapted for use on doors which swing both ways, or what are sometimes known as "summer-doors." A single spring is allowed to act efficiently in each direction. It may be set so as to exercise any required amount of force in both directions. The parts which support the spring serve also as the hinges on which the door is supported and turns, all as hereinafter more fully described and claimed.

The accompanying drawings form a part of this specification, and represent what I consider the best means of carrying out the invention.

Figure 1 is a front elevation of a door and door-frame connected by springs and the proper accompanying parts according to my invention. Fig. 2 is a horizontal section through a portion on a larger scale, such being a section through the upper hinge; and Fig. 3 is a vertical section on a still larger scale. It is a section through the lower hinge. Fig. 4 shows one of the hinges—the lower one—detached. It is a face view of the turning part, with the other parts turned as nearly as may be in the same plane.

Similar letters of reference indicate like parts in all the figures.

A is the fixed frame-work, and A′ A′, &c., are metallic parts firmly screwed thereto. B is the door, and B′ B′ are metal parts screwed or otherwise firmly fixed thereto and turning therewith. C C^1 C^2 is a piece turning on the same axis of motion in the upper hinge. D D^1 D^2 is a corresponding piece similarly turning in the lower hinge. E is a long and slender rod, of tempered steel or other suitable metal, to serve both as a pivot or axis of motion in both hinges, and as a torsional spring to urge the door toward a closed position whenever it is moved out of such position.

The part C^2 lies against the outer face of the door. The part D^2 lies against the inner face of the door. When the door B is pushed open outward it carries with it the piece C C^1 C^2, by reason of the fact that it presses fairly against the arm C^3 of the latter. The other piece, D D^1 D^2, does not follow, by reason of the fact that its other arm, D^1, abuts against the fixed framing A. The torsional spring E is applied with a certain amount of initial strain or twist, tending to press both the arm C^2 of the upper hinge and the arm D^2 of the lower hinge firmly against the adjacent parts of the door. The same torsional force tends also to press the arm C^1 of the upper hinge and the arm D^1 of the lower hinge against the adjacent parts of the door-frame. When the door is liberated from other force this torsional spring throws it rapidly into the closed position, where both the arm C^1 and D^1 bear against the frame, and both the arms C^2 and D^2 bear against the door. When the door is opened either way it carries one of the pieces C C^1 C^2 or D D^1 D^2 with it, leaving the other at rest, and stiffly serving as an abutment for the spring, to cause the door to return again to the closed position.

I take care to form the parts A′ so that they receive the pressure of the arms C^1 D^1, and prevent the force of the latter from indenting the door-frame. So, also, the parts B′ are adapted to receive the considerable force of the arms C^2 and D^2, by which they act on the door.

Fig. 2 shows the door swung inward, thereby turning the part C C^1 C^2, and leaving the lower part D D^1 D^2 to serve as an abutment for the spring, which increases its tension slightly as the door is opened, and is relieved a little as it is again swung back to the closed position. If the door is swung outward, it will leave the part C C^1 C^2 stationary, to serve as an abutment for the spring E by pressing its arm C^1 against the metal surface A′, and will carry the piece D D^1 D^2 around with the door, exerting a constant force to bring it back.

Besides forming bearings for the respective arms described, the pieces A′ and B′ perform important functions by locking together after the manner of ordinary hinges. In the upper hinge the part B′ bears directly on the part A′, and thus aids to support the weight of the door by transferring a portion upon the

fixed parts at that point. In the lower hinge the part B′ bears upon the piece D D^1 D^2, and through it transfers a portion upon the fixed part A′. The effect is equally to transfer a part of the weight of the door upon the fixed work at that point. The lower hinge is exactly like the upper hinge, but inverted.

In applying the parts, a half-turn or some other considerable twist is given to the spring E to induce the proper initial strain. If at any time it should be desired to increase or diminish the force with which the door tends to close, the change may be effected by either substituting a different spring, E, of greater or less thickness, or by giving it a greater or less preliminary twist.

Various modifications may be made by any good mechanic. The arms C^1 D^1, and especially the arms C^2 D^2, may be considerably elongated without departing from the spirit of my invention.

I propose in most instances to let the spring E into the edge of the door by simply grooving the door deeply by a saw or other suitable tool; but I can insert the spring through a hole bored by a proper and accurate tool, if preferred, and can in nice doors line the hole with a metallic tube, if the expense is warranted.

I propose to sell the hinges in pairs, with springs of proper length for ordinary doors, ready for immediate application. If a longer or shorter spring is required in any case, it will not be difficult to effect the exchange.

I claim as my invention—

1. The oppositely-mounted pieces C C^1 C^2 D D^1 D^2 and the connected spring E, combined and adapted to serve, relatively to a door and door-frame, as and for the purposes herein specified.

2. The metal parts A′ B′, adapted to serve the double functions of a hinge and of supports for the spring E, in combination with such spring, and with the pieces C C^1 C^2 D D^1 D^2, one of which shall turn with the door in one direction, while the other serves as an abutment or hold for the spring, as herein specified.

In testimony whereof I have hereunto set my hand this 10th day of August, 1877, in the presence of two subscribing witnesses.

HERMAN C. STEINHOFF.

Witnesses:
FR. STEINHOFF, Sr.,
GEORGE FISCHER.