(No Model.)

W. GILFILLAN.

DOOR SPRING.

No. 373,360. Patented Nov. 15, 1887.

Fig. 1

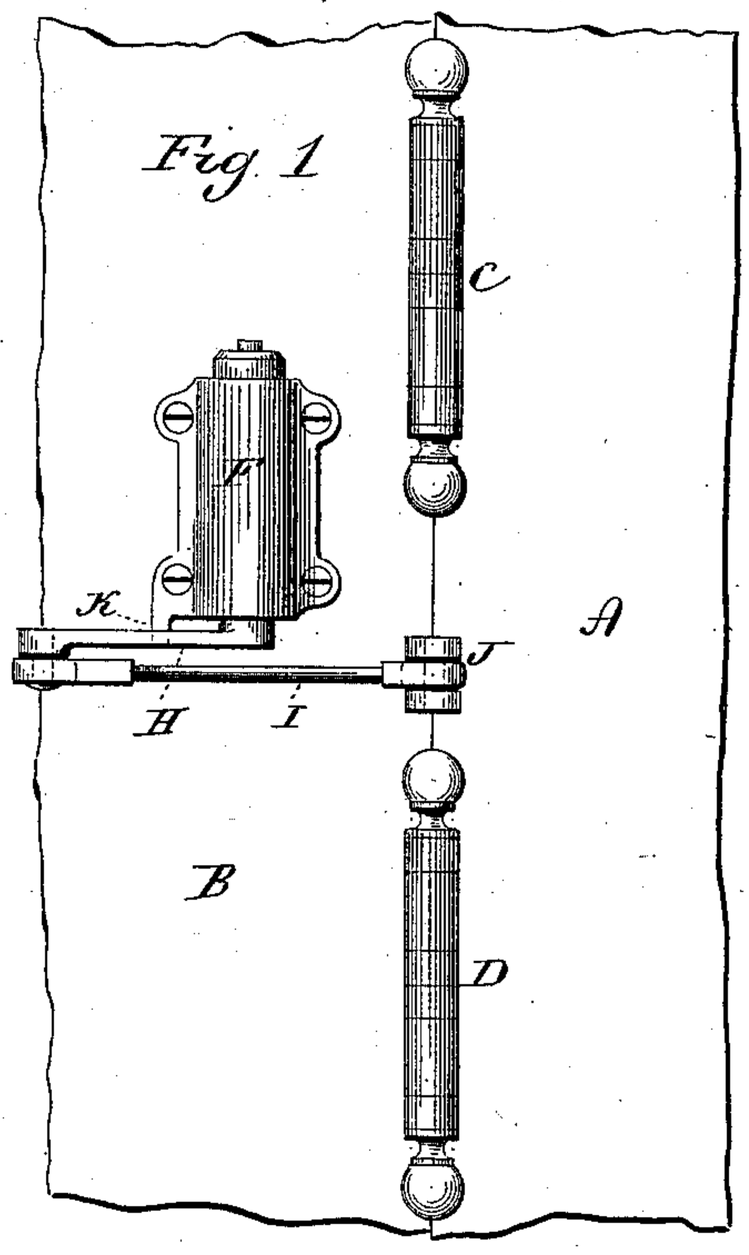


Fig. 2

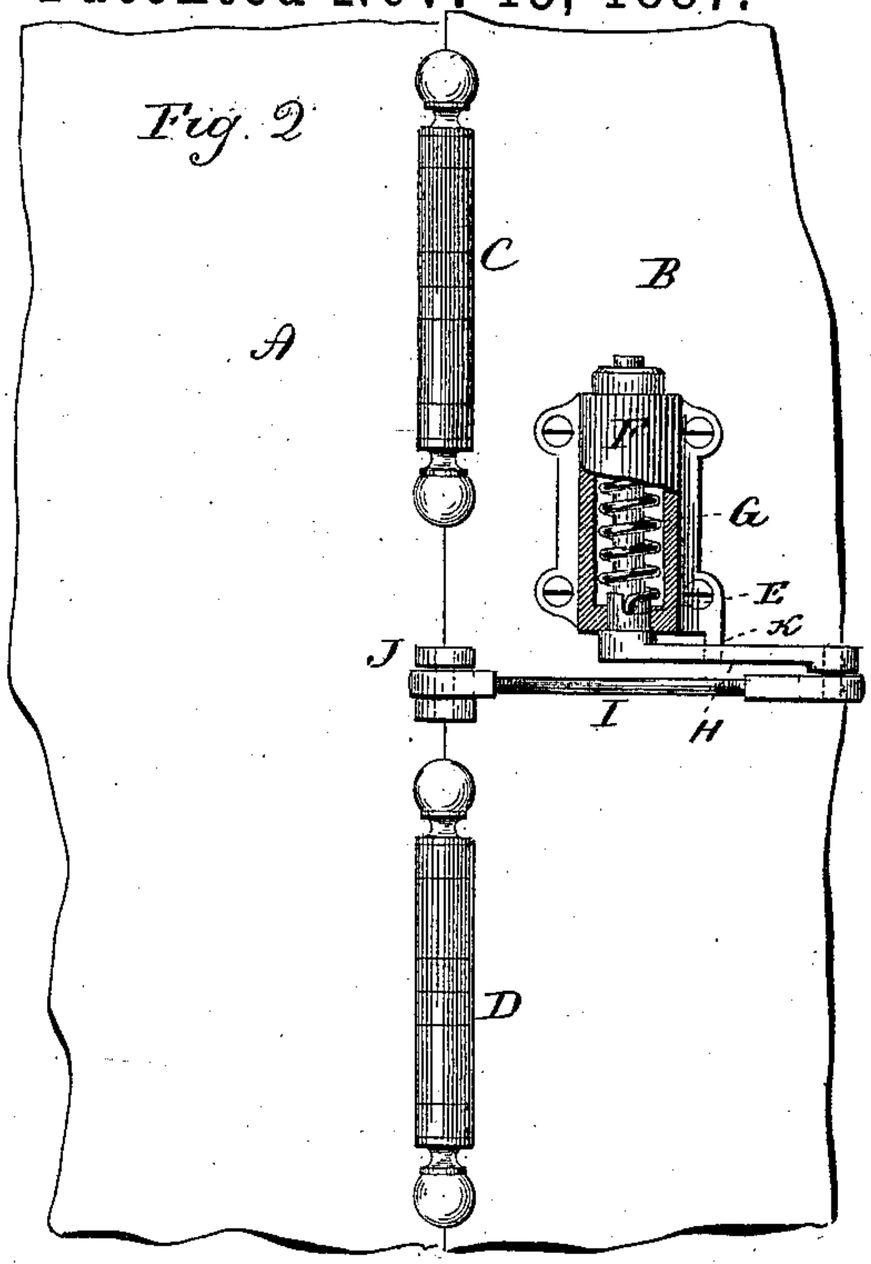


Fig. 3.

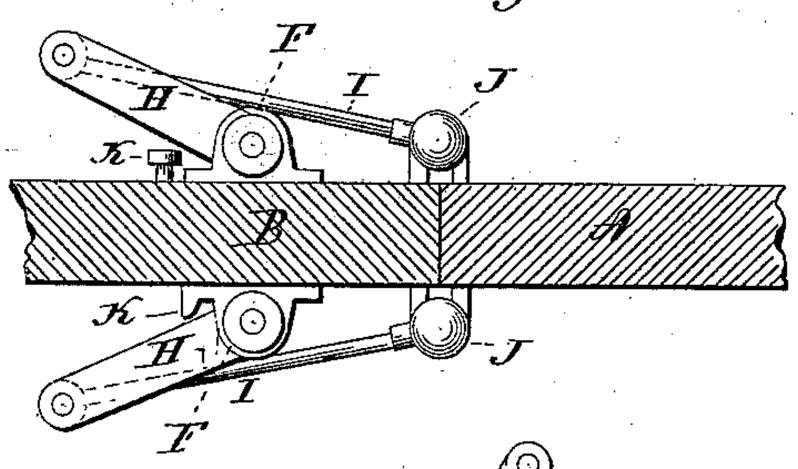


Fig. 5.

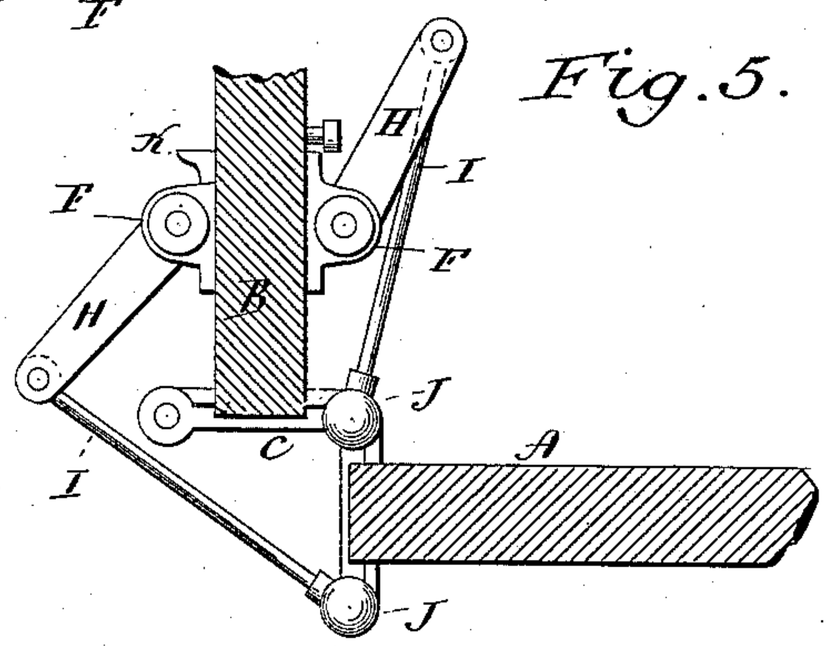
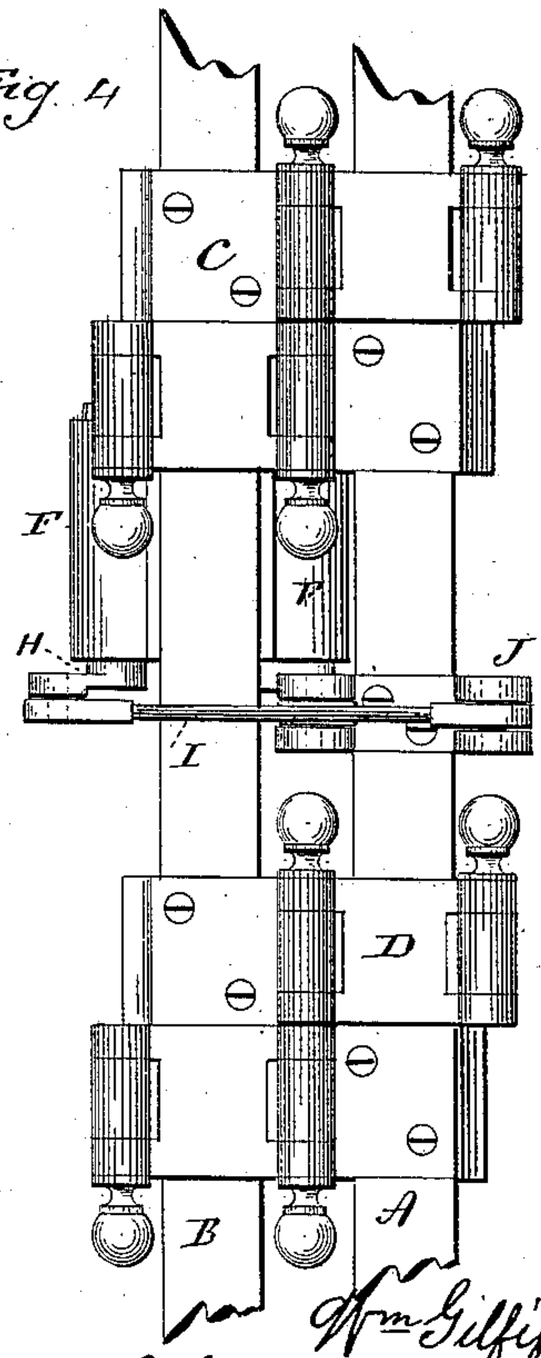


Fig. 4



Witnesses,
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By his Atty
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UNITED STATES PATENT OFFICE.

WILLIAM GILFILLAN, OF NEW HAVEN, CONNECTICUT, ASSIGNOR TO SARGENT & COMPANY, OF SAME PLACE.

DOOR-SPRING.

SPECIFICATION forming part of Letters Patent No. 373,360, dated November 15, 1887.

Application filed September 5, 1887. Serial No. 248,803. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM GILFILLAN, of New Haven, in the county of New Haven and State of Connecticut, have invented a new Improvement in Door-Springs for Double-Acting Hinges; and I do hereby declare the following, when taken in connection with accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, one side view of a portion of the door and jamb, exposing the hinges and the door-spring upon that side; Fig. 2, the reverse side of the door and jamb, exposing the hinges upon that side of the door; Fig. 3, a horizontal section through the door and jamb above the springs, looking downward, the parts in the position of the door closed; Fig. 4, a rear view of the door and the jamb, showing the hinge and springs in the wide-open position; Fig. 5, a transverse section in the same line as Fig. 3, but showing the door open.

This invention relates to an improvement in the arrangement of a spring for doors which are adapted to swing in both directions—that is, which are hung upon hinges which permit the door to swing in either direction—the object being the arrangement of a spring independent of the hinges, in contradistinction to making the spring as a part of the hinge itself; and it consists, essentially, of a shaft hung directly to the door and upon an axis parallel with the axis of the hinge, the said shaft having an arm extending therefrom, combined with a connecting-rod extending from said arm and hung to the jamb upon a pivot in substantially the axial line of the pintle of the hinge upon the spring side of the door, as more fully hereinafter described.

A represents the jamb to which the door is hung.

B represents the door, C one hinge, and D a second hinge. These hinges C D are common double-acting hinges—that is, hinges which present a pintle upon both sides of the door, the pintle of one side being carried by the leaf of the hinge secured to the door, that on the other side being carried by the leaf which is secured to the jamb, the two pintles connected by straps or intermediate leaves, so that one leaf being secured to the jamb and the other to the door the door may swing in either direction—a common and well-known construction of hinge. To adapt door-springs to these hinges and thereby avoid the cumbersome construction of hinge usually required where the springs form an integral part of the hinge, I apply two springs to the door, one upon each side. These door-springs, as here represented, are alike, and consist of a vertical shaft or arbor, E, supported in a tubular barrel, F, which is fixed to the door. Within the barrel is a helical spring, G, one end fixed to the barrel and the other to the arbor E, so that as the arbor is rotated in one direction it will wind the spring, and then left free the reaction of the spring will act upon the arbor to rotate it in the opposite direction—a common construction of door-spring. This barrel and spring, with the arbor, are fixed to the stile of the door and so that the axis of the arbor is parallel with the axis of the pintle of the hinge.

From each arbor E an arm, H, extends radially therefrom and from the pintle of the hinge on the respective sides of the door, but so as to incline from the door, as represented in Fig. 3 To the outer end of each arm a connecting-rod, I, is hung by one end, the other ends hung to ears, J, fixed upon the jamb, the axis of the pivots of the ears J, upon which the rods are hung, being in substantially the axial line of the pintles of the hinges upon the respective sides of the door—that is to say, there is a like ear upon both sides of the door corresponding to the respective springs, as seen in Fig. 3, and the ear on each side is in substantially axial line with the pintle of the hinge on the respective sides of the door.

The door in opening in either direction swings upon the pintle of the hinges upon the side of the door opposite that from which the door opens as its axis of motion; and because the spring on that side of the door has its connecting-rod hung upon a stationary pivot in axial line with the pintle of the hinge upon which the door swings, it follows that that

spring, as the door opens, simply turns with the door without any effect upon the spring itself, as the axis of the spring-arbor and the axis upon which the connecting-rod is hung cannot change their relative positions, as indicated in Fig. 5; but as the door thus opens the door-spring upon the opposite side of the door swings from the pivot-connection of the connecting-rod, which causes the arm H and the arbor to rotate, as seen in Fig. 5, and correspondingly wind the spring, that spring becoming the active spring against which the door is opened, and so that when left free it will serve to return or close the door.

The operation of the spring upon both sides of the door is alike. As the door swings in one direction, one spring remains entirely inactive upon that side toward which the door swings, because the stationary pivot upon which the connecting-rod is hung is in axial line with the pintle of the hinge upon which the door then swings, but the other spring is drawn from its stationary-pivot connection and becomes the active spring.

Because of making the stationary-pivot connection directly upon the jamb and in substantially axial line with the barrel, I am enabled to apply the springs directly to the door, so that a more compact spring may be employed than where the spring is fixed to the jamb or lintel and connected to the door, and because of this arrangement I am enabled to make one spring entirely inactive when the other is in operation, a result which cannot be attained where the springs are fixed to the jamb or lintel.

In all cases the arbor-arm H must stand at an inclination to the plane of the door to such an extent that the line of the connecting-rod between its stationary pivot and its connection with the said arm H may be outside the axis of the arbor when the door is in the closed position, as seen in Fig. 3.

To prevent the possibility of the arm H reaching a point nearer the door than would be thus permissible, I provide a stop, K, which may be made as a part of the barrel, and which stands in a position between the door and the arm H, as seen in Figs. 1 and 3, the said stop being in a position to prevent the arm from turning into a position so near the door as to bring the line of the connecting-rod too near the axis of the spring-arbor.

It will be evident that the stop for the arm may be made in various ways—say as by the introduction of a screw, as indicated in one side of the door, Fig. 3. While I have designed this arrangement of spring to be applied to double acting hinges without springs, and so that two springs are employed on each door in combination with the double-acting hinges, I have found it advantageous to apply a spring upon one side of a door adapted to swing both ways, to aid the springs of double-acting hinges—as, for illustration, in outside doors which are adapted to swing both ways, the outside only is exposed to the influence of the wind, and a stronger spring may therefore be advantageously applied to force the door to its closed position from the inside outward. In such case I apply one of my springs to the outside of the door, making the pivot connection with the spring stationary with the jamb, and in substantially axial line to the pintle of the hinge on the outside of the door, so that the power of the spring is applied to resist the inward opening of the door. In illustrating this modification the double-acting hinges shown in the drawings may be supposed to be spring-hinges, and one of the door-springs of Fig. 3 omitted. I therefore do not wish to be understood as limiting this arrangement of spring to double acting hinges in which a spring is combined as a part of one or more of the hinges.

I claim—

The combination of a door hung upon double-acting hinges, a spring attached to that side of the door from which the door opens, the axis of the arbor of the spring being parallel with the axis of the hinge upon its side of the door, the said arbor constructed with an arm extending therefrom and in a direction from the hinge of the door, a connecting rod hung by one end to the free end of said arm, and a pivot stationary upon the door jamb, but in substantially axial line with the pintle of the hinge, the other end of the said connecting-rod hung to the said pivot, substantially as described.

WILLIAM GILFILLAN.

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