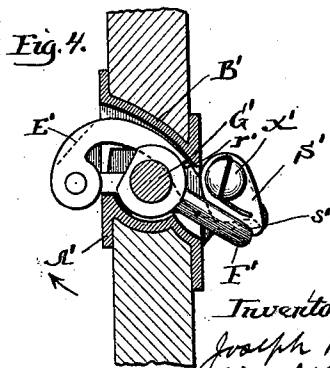
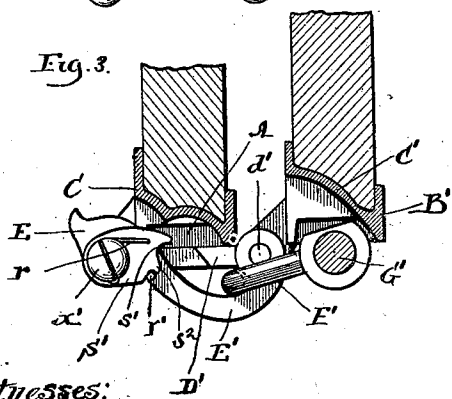
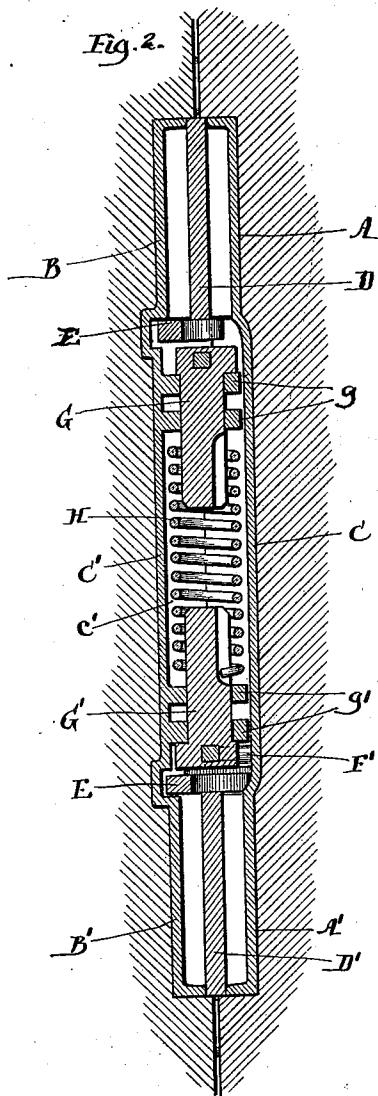
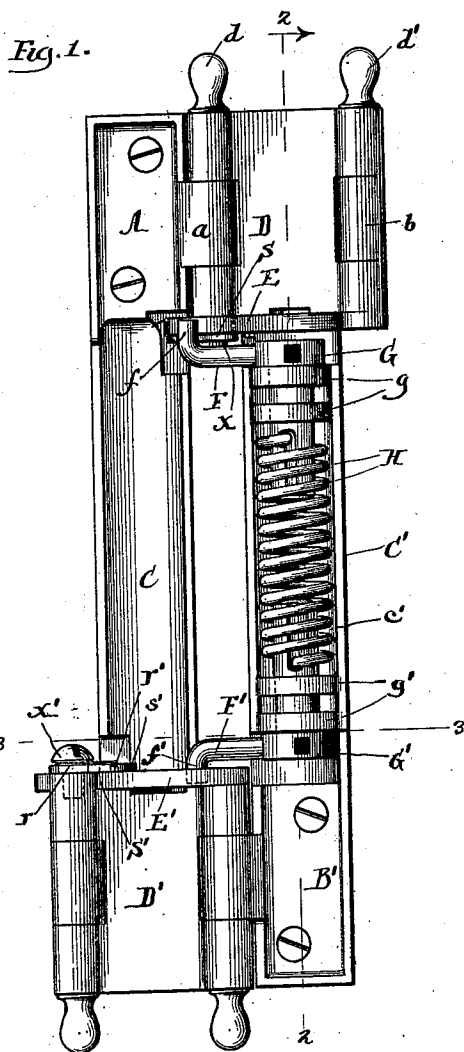


(No Model.)

J. KEENE.
SPRING HINGE.

No. 548,063.

Patented Oct. 15, 1895.



Witnesses:
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UNITED STATES PATENT OFFICE.

JOSEPH KEENE, OF CHICAGO, ILLINOIS.

SPRING-HINGE.

SPECIFICATION forming part of Letters Patent No. 548,063, dated October 15, 1895.

Application filed May 15, 1895. Serial No. 549,354. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH KEENE, a citizen of the United States, residing at Chicago, in the county of Cook, State of Illinois, have invented certain new and useful Improvements in Spring-Hinges, of which I do declare the following to be a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

The present invention has relation particularly to that class of spring-hinges in which a torsion-spring is employed to restore the door to its closed position after it has been swung therefrom, an example of this type of spring-hinge being illustrated in Letters Patent No. 397,190, granted to me February 5, 1889. In the spring-hinge shown in my said Letters Patent there was employed at each end of the torsion-spring a projecting arm connected with the spring and having a free outer end that rode against a bearing-piece upon one of the leaves, and in the preferred form of the invention shown in said patent the bearing-piece against which the free end of the arm rode was provided with a hump or cam-shaped surface in order to offer a greater initial resistance to the movement of the door from its normally-closed position. In practice, I have found that with a spring-hinge of the construction set forth in my said patent there is apt to be considerable wear upon the enlarged or humped portion of the bearing-piece against which the free end of the projecting arm rides, and the object of the present invention is primarily to overcome this objection. This object of invention is accomplished by providing the hinge with a swinging plate adapted to engage the end of the arm that projects from the torsion-spring and sustain this arm during at least a part of its traverse as the door is swung.

Figure 1 is a view in rear elevation of a hinge embodying my invention, the hinge being shown in open position. Fig. 2 is a view in vertical section on line 2 2 of Fig. 1. Fig. 3 is a view in horizontal section on line 3 3 of Fig. 1. Fig. 4 is a view in horizontal section on line 3 3 of Fig. 1, but showing the parts in the position assumed when the door is closed.

A and B denote what for convenience may be termed the upper "door" and "jamb" leaves of the hinge, since when applied to use

one of these leaves will be attached to the door and the other will be fastened to the jamb, and A' and B' denote the lower corresponding set of door and jamb leaves. The upper and lower sets of leaves A and A' are preferably united together by connecting-plate C, while the upper and lower leaves B and B' are united together by the plate C'. It is obvious, however, that in case one set of leaves only is employed these connections may be omitted.

The door and jamb leaves A and B are pivotally connected together in well-known manner by the intermediate leaf D, this leaf being pivotally connected by a pintle *d* with the leaf A and by a pintle *d'* with the leaf B, the pintles *d* and *d'* passing, respectively, through a suitable knuckle-joint *a* of the leaf A and through a knuckle-joint *b* of the leaf B, as shown in the drawings.

At the base of the intermediate leaf D is formed a bearing-piece E, somewhat similar to that shown in my said Letters Patent, although in my present invention the bearing-piece exposes but a comparatively short section of its wearing-surface to the angular end *f* of the arm F, that is fixed to the enlarged portion of a spindle G, extending through a suitable bearing *g* and connected, as shown, to the upper end of the coiled torsion-spring H. In like manner also a bearing-piece E' is provided at the top of the lower intermediate leaf D', the said bearing-piece being engaged by the bent end *f'* of the lower arm F', that is fixed to the spindle G', attached to the lower end of the spring H and journaled in the bearings *g'*.

In my said Letters Patent the angular ends *f* and *f'* of the arms F and F' under the swinging movement of the door were adapted to ride over the entire length of the wearing-surfaces of the bearing-pieces E and E'; but in practice I have found that there is apt to be excessive wear upon the surfaces of the bearing-pieces, particularly adjacent the parts whereon the arms F and F' bear when the door is in approximately closed position. In order to avoid this wear upon the bearing-pieces E and E' and secure a more effective action of the parts, I provide the swinging arms S and S', that are preferably pivoted in a manner free to turn upon suitable studs *x*

and x' , projecting respectively below and above the bearing-pieces E and E'. As the arm S' that is at the top of the lower intermediate leaf D' is more fully illustrated in the drawings, I will describe this arm S', it being understood, of course, that the construction of the arm S will be the same as that of the arm S', the arrangement of the parts being simply reversed, as the arm S is to act when the door is swung in one direction, while the arm S' acts as the door is oppositely swung. The arm S' has its end provided with a seat s' , adapted to receive the angular end f' of the arm F', that projects from the lower end of the coil-spring H. By preference a small coil-spring r , mounted upon the stud x' , engages the swinging arm S' and tends to turn this swinging arm, so as to cause its shoulder s^2 to contact with the stop r' on the face of the bearing-piece E.

By reference more particularly to Fig. 4 of the drawings, it will be seen that when the door is in closed position the angular end f' of the spring-actuated arm F' is within the seat s' of the swinging arm S', and this arm serves to resist the thrust of the spring-arm F'. If now the door be swung open in the direction of the arrow, Fig. 4, the parts will be moved from the position shown in Fig. 4 to the position shown in Fig. 3. During this swinging movement of the door the swinging arm S' will turn about its center, being forced to the position shown in Fig. 3 by the angular end of the spring-actuated arm F' and by the coil-spring r until the shoulder s^2 of the swinging arm S' contacts with the stop r' , and thus checks the further movement of the arm S', after which the end f' of the spring-actuated arm F' will continue its movement along the inclined wearing-surface of the bearing-piece E'. It will thus be seen that inasmuch as the swinging arm S' supports the spring-actuated arm F' during the initial movement of this arm all frictional wear of the angular end f' of the arm or upon the adjacent part of the bearing-piece E' is avoided, while at the same time, by properly proportioning the length of the swinging arm S', the same effect can be obtained as is secured by the enlarged portion or hump with which the bearing-piece E' is furnished in my before-mentioned patent—that is to say, it is desirable, in order to offer a strong resistance to the initial movement of the door from its normally-closed position, that the swinging arm S shall be made of such length as to increase the torsional strain upon the coil-spring through the medium of the arm F as the door reaches its closed position. By reference to Fig. 3 it will be seen that after the door has been partially opened the angular end f' of the arm F' will pass from out the seat s' of the swinging arm S' and will complete its movement along a portion of the wearing face of the bearing-piece E, but the swinging arm S' will remain in the position at which the end f' of the arm F' left it, with its seats in readiness to receive the

end f' of the arm F' as the door swings again toward a closed position.

While I have shown a coil-spring r' for holding the swinging arm S in position to receive the angular end of the arm F as the door is swung from the open to the closed position, I do not regard this coil-spring as necessary, nor do I wish my invention to be understood as restricted thereto, since any other form of spring might be used for the same purpose, or the gravity of the swinging arm itself would serve to retain this arm in position to receive the angular end of the arm F'.

The bearings g and g' , as in my before-mentioned patent, are preferably formed in piece with the connection C, that serves to unite the upper and lower leaves B and B' of the hinge, and these bearings are at such point that the body of the spring while extending in vertical direction shall largely project beyond the outer face of the leaves B and B'. When a connection C is used between the leaves A and A', this connection is preferably provided with a recess c' , adapted to form a space into which the projecting part of the coil-spring H may enter when the door is in closed position. It will be understood, of course, that the intermediate leaf D' serves to connect the lower leaves A' and B' together in the same manner as the intermediate leaf D' connects the upper leaves A and B. When the door is swung from its closed position to the open position in a direction opposite that shown by the arrow in Fig. 4, the arm S will swing about its center of revolution under the stress of the spring-actuated arm F, and in thus swinging will sustain the thrust of the arm F until the angular end f of this arm passes from out the seat of this arm S and onto the wearing-surface of the bearing-piece E. The swinging arm S will remain in the position to which it is thus swung until the door is moved toward its closed position, when the angular end f of the arm F will again enter the seat of the swinging arm S, and this arm S will then bear the thrust of the arm F and increase the torsional strain upon the coil-spring H as the door approaches its closed position. It will thus be seen that the action of the swinging arms S and S' are the same, these arms being merely arranged so that they shall act as the door is swung in opposite directions.

It is manifest that the swinging arms S and S' may be modified as to size and shape, so as to take the thrust of the spring-actuated arms F and F' during more or less of the movement of the door. Thus, for example, instead of the swinging arms or plates S and S' being of the shape shown, these arms or plates might be of disk shape, the periphery of the disks being furnished with seats corresponding to the seats at the end of the arms S and S'.

Having thus described the invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a spring hinge, the combination with

two or more leaves pivoted together and with a torsion spring having a projecting arm connected therewith and provided with a free outer end and having a bearing piece against which the free outer end of said arm may rest, of a swinging arm adapted to engage the outer end of said spring-actuated arm and take its thrust during more or less of the operation of the hinge.

2. In a spring hinge, the combination with two or more leaves pivoted together and with a torsion spring provided with a projecting arm connected therewith and having a free outer end, and with a suitable bearing to rigidly receive the thrust of the free outer end of said projecting arm of a pivoted swinging arm having an open seat adapted to receive the free end of said projecting arm and take the thrust of the spring, the open seat of said swinging arm permitting the end of said projecting arm to pass from engagement therewith.

3. In a spring hinge the combination of two or more leaves pivoted together, of a torsion

spring, a projecting arm connected therewith and having a free outer end, a pivoted swinging arm having a seat adapted to receive the free end of said projecting arm, a suitable bearing to receive the thrust of the free outer end of said projecting arm during a portion of its movement and a stop for limiting the movement of said swinging arm.

4. In a spring hinge, the combination of two or more leaves pivoted together, of a torsion spring, a projecting arm connected therewith and having a free outer end, a swinging arm provided with a seat to receive the end of said projecting arm, a suitable bearing to receive the thrust of the free outer end of said projecting arm during a portion of its movement and a spring for retaining said swinging arm in position to engage the end of said projecting arm.

JOSEPH KEENE.

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