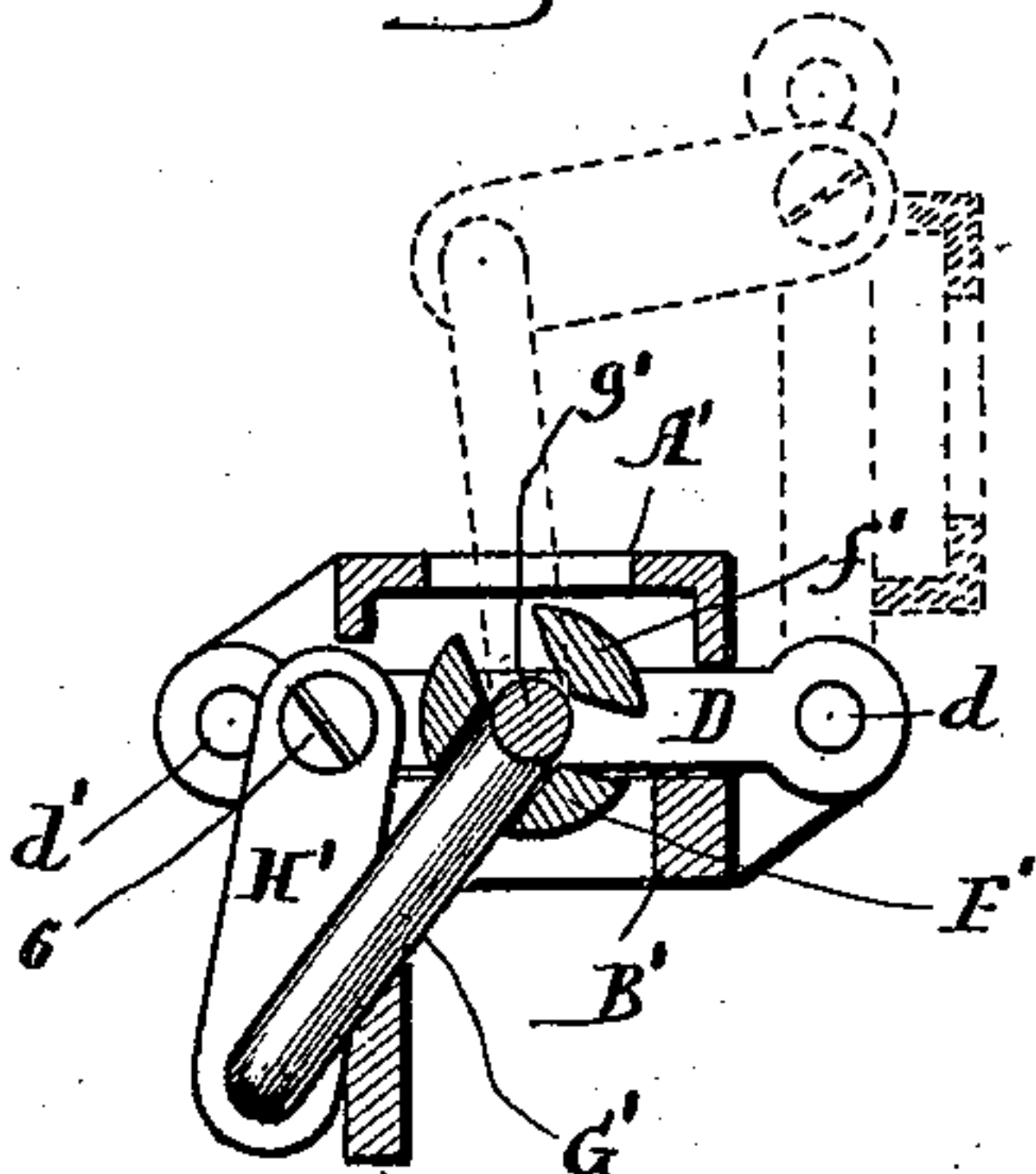


3 Sheets—Sheet 1.

Patented Oct. 15, 1895.



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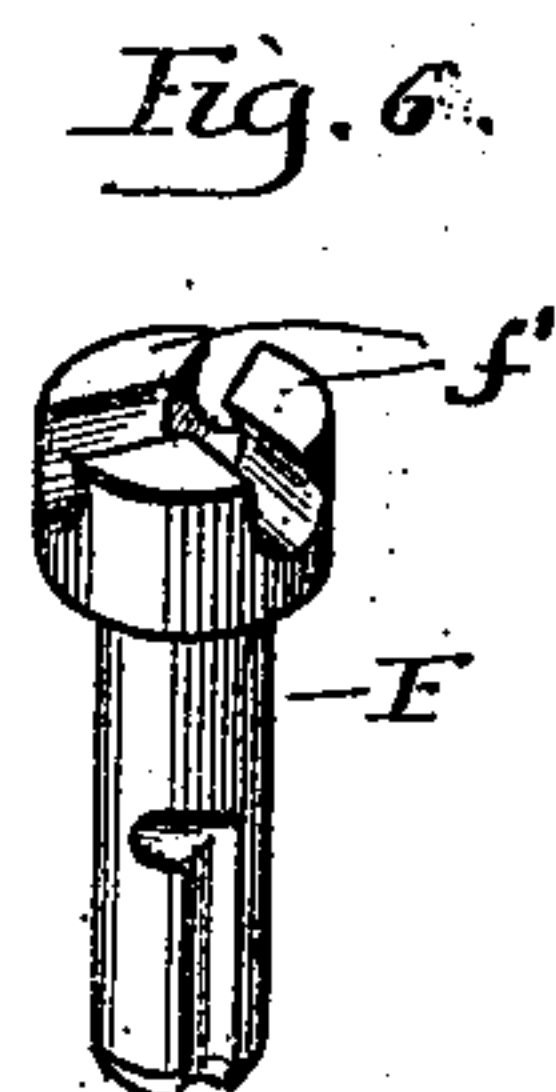
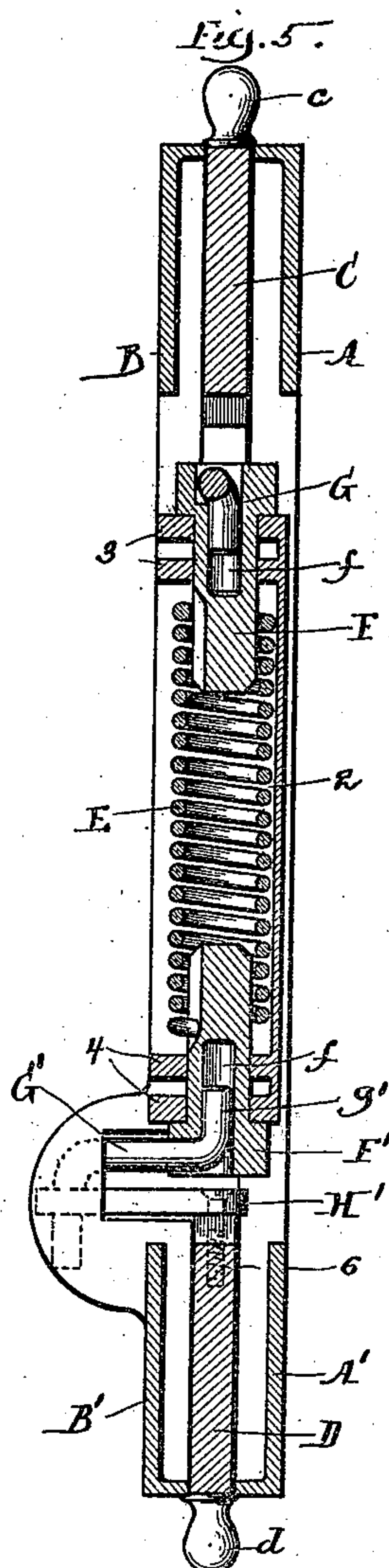
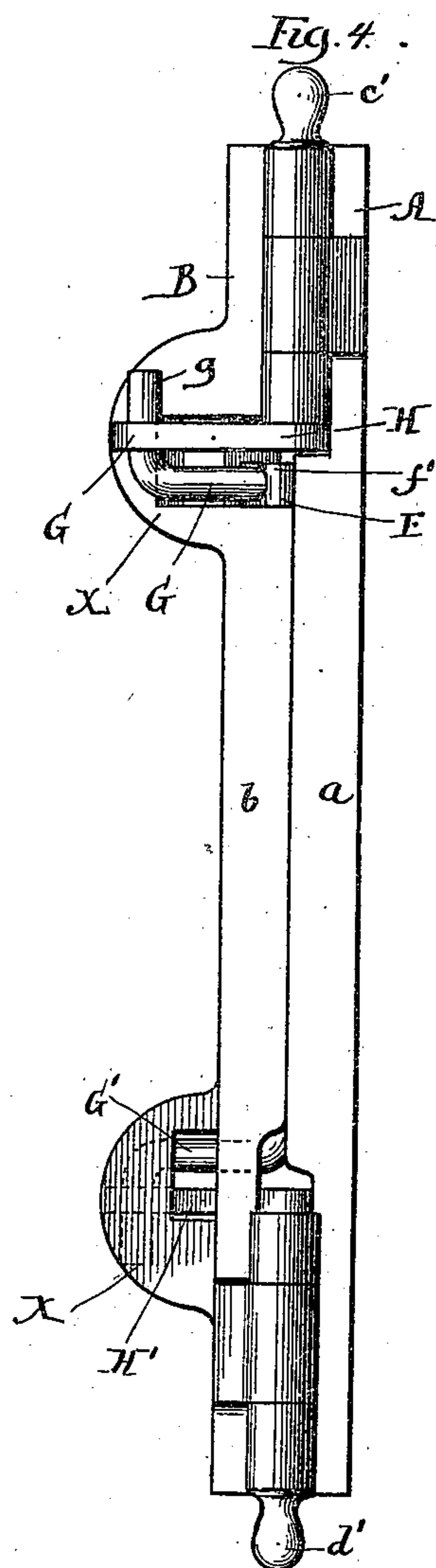
(No Model.)

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SPRING HINGE.

No. 548,064.

Patented Oct. 15, 1895.



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3 Sheets—Sheet 3.

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No. 548,064.

Patented Oct. 15, 1895.

Fig. 7.

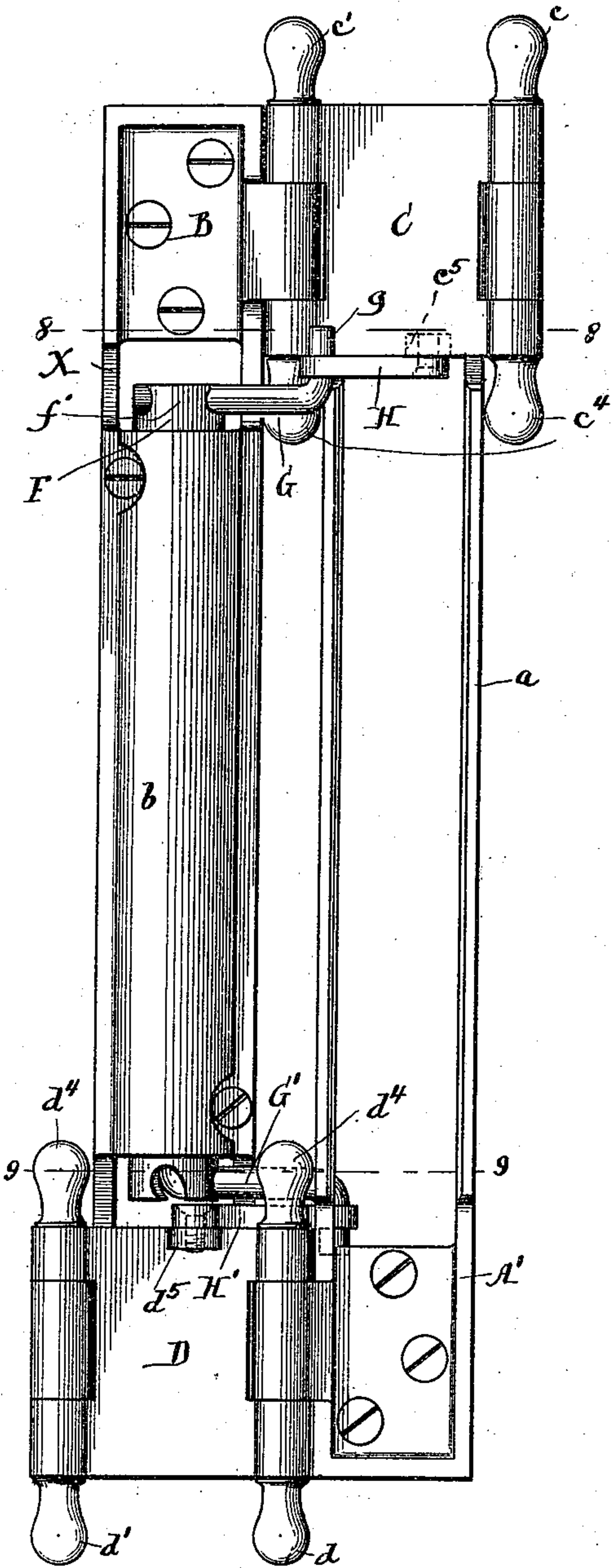


Fig. 8.

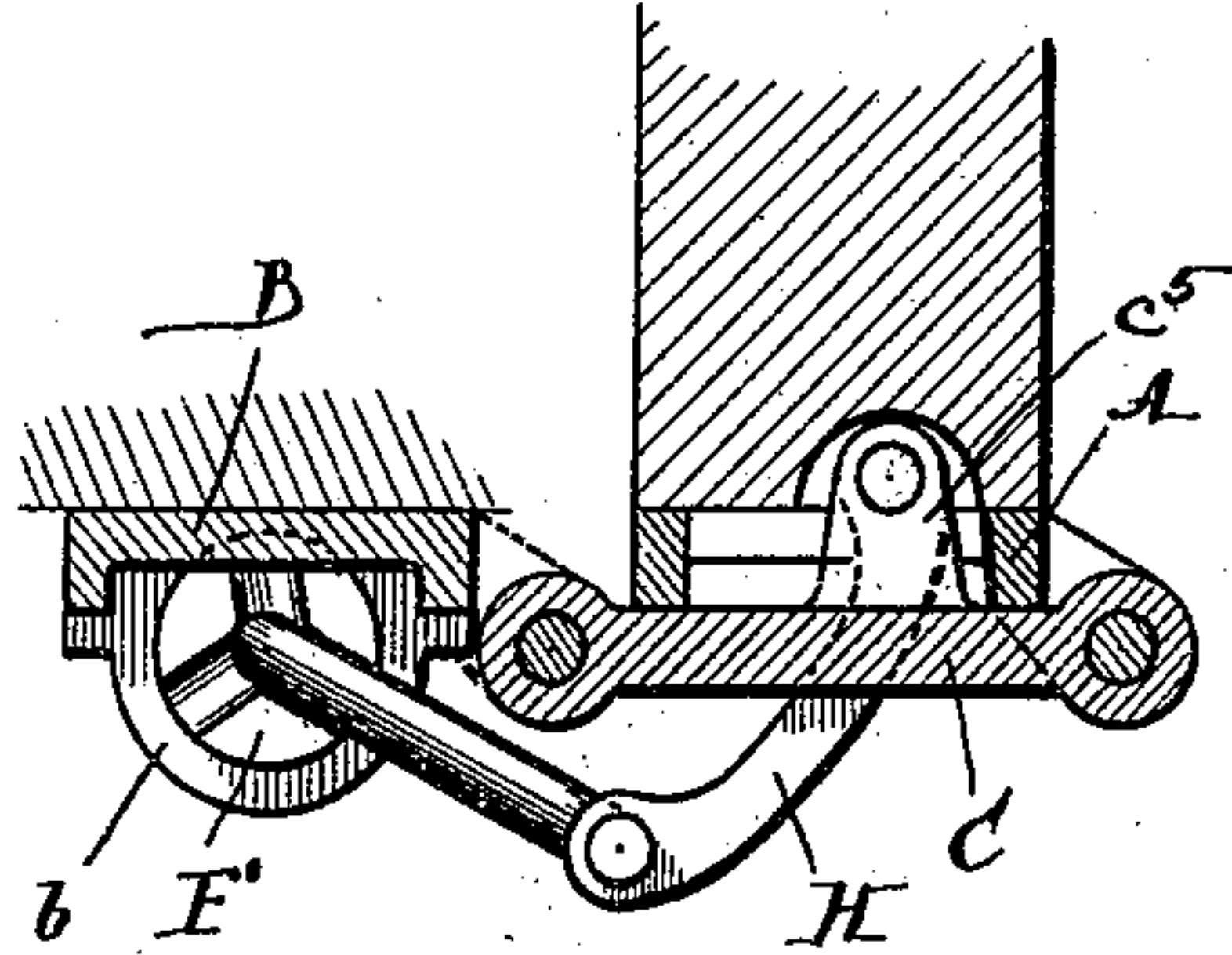
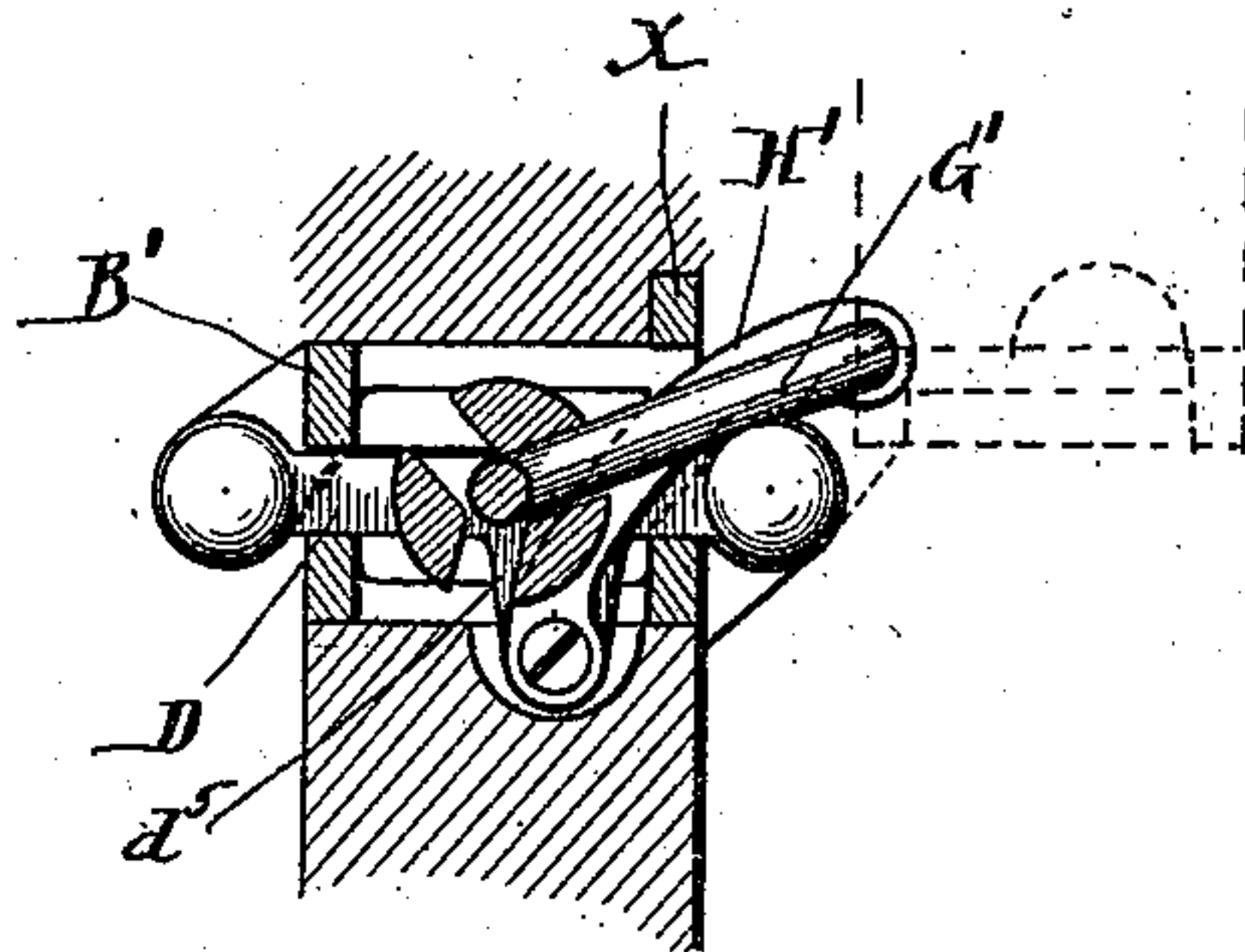


Fig. 9.



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# UNITED STATES PATENT OFFICE.

JOSEPH KEENE, OF CHICAGO, ILLINOIS.

## SPRING-HINGE.

SPECIFICATION forming part of Letters Patent No. 548,064, dated October 15, 1895.

Application filed May 15, 1895. Serial No. 549,353. (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.

My present invention has relation more particularly to that class of spring-hinges known as "double-acting" hinges, and especially designed for sustaining doors that are adapted to be swung in either direction from a centrally-closed position.

The object of the invention is to provide a simple, durable, and effective construction of double-acting spring-hinge and one that will better serve to retain the door against accidental swinging from its normally-closed position, and as well, also, will better resist the tendency of the door to sag or drop away from the jamb.

The invention consists in the novel features of construction hereinafter described, illustrated in the accompanying drawings, and particularly defined in the claims at the end of this specification.

Figure 1 is a perspective view of a spring-hinge embodying my invention, the leaves being shown partially open. Fig. 2 is a view in rear elevation. Fig. 3 is a view in horizontal section on line 3 3 of Fig. 2. Fig. 4 is a view in side elevation, the leaves of the spring being shown in closed position. Fig. 5 is a view in vertical section on line 5 5 of Fig. 2. Fig. 6 is a detail perspective view of one of the torsion-spring spindles. Fig. 7 is a view in elevation of a modified form of the invention, one of the leaves of the hinge being shown open. Figs. 8 and 9 are horizontal sections on the line 8 8 of Fig. 7, parts being shown in different positions.

A and B denote, respectively, the upper door and jamb leaves of the hinge, and A' and B' designate, respectively, the lower door and jamb leaves of the hinge, the upper leaves A and B being connected by an intermediate or central leaf C, while the lower leaves A' and B' are connected by the intermediate or central leaf D. The central leaf C is pivotally connected by a pintle *c* with the door-leaf A

and is pivotally connected in like manner by a pintle *c'* with the jamb-leaf B, and in like manner the lower central leaf D is pivotally connected by a pintle *d* with the door-leaf A' and by a pintle *d'* with the jamb-leaf B'.

The upper and lower door-leaves A and A' are shown as united together by or formed in piece with a central connecting portion *a* and the upper and lower jamb-leaves B and B' are shown as united by or formed in piece with a connecting portion *b*. The part *b* that connects the upper and lower jamb-leaves B and B' is formed with a space 2 to receive a coil-spring E, to the upper end of which is connected a spindle F and to the lower end of which is connected a spindle F', these spindles being journaled, respectively, in the transverse bearing-plates 3 and 4 at the top and bottom of the space 2, wherein the coil-spring E is held.

The spindle F is formed with a recess *f*, adapted to receive the inwardly-turned end of an arm G, the body of which arm rests between raised portions *f'*, formed at the top of the spindle F. My purpose in thus forming the spindle F (and the companion spindle F' at the opposite end of the spring E) is to enable the tension of the spring to be modified as desired by shifting the position of the arm G with respect to the projections *f'* upon the spindle F. The body of the arm G projects outwardly from the head of the spindle F and has an upturned end *g*, that passes through an eye formed in one end of a link H, the opposite end of this link H being united by a pin or screw 5 to the intermediate leaf C at a point one side of its vertical center.

Under the strain of the coil-spring E the spring-actuated arm G serves to normally hold the leaf C in closed position, as seen in Figs. 2, 4, and 5. In like manner the spindle F' at the lower end of the coil-spring E has its head formed with a central opening *f* to receive the inwardly-turned end *g'* of the arm G' that rests between the raised portions *f'*, projecting from the head of the spindle F'. So, also, the outer downwardly-turned end of the arm G' enters an eye formed in the end of the link H', the opposite end of this link being connected, as at 6, to the intermediate leaf D at one side of its vertical center.

By reference more particularly to Figs. 1



and 2 it will be seen that the spring-actuated arms G and G' at the opposite ends of the coil-spring E extend outwardly from a center line in opposite directions, and the links H and H', to which these arms are connected, are attached to opposite sides of the vertical centers of their respective intermediate leaves C and D.

From the foregoing description it will be seen that when the door is moved in one direction to open the same it will turn about the pintles c' and d' as a center, and by reference to Fig. 1 of the drawings it will be seen that as the door is thus turned the link H will be drawn outward and will carry with it the outer end of the projecting arm G against the force of the torsion-spring E. By connecting the outer end of the link H to the intermediate leaf C at one side of the vertical center of said leaf, and preferably at a distance therefrom, the point of attachment of this link, and consequently the point of application of the power of the spring in resisting the swinging movement of the door, is removed as far as possible from the pintle c', about which the door at such time is turning as a center. Consequently the force of the torsion-spring E is most effectively exerted to retain the door in normally-closed position. As the door is thus swung open in the direction of the arrow, Fig. 1, the angle of the link H with respect to the arm G is increased, and consequently the force of the spring is less effectively applied in resisting the movement of the door as it approaches the limit of its open position. So, also, when the door is in closed position the links H and H' are brought more nearly in the plane of the door (see Fig. 4) than would be the case if these links were connected at the center of the leaves, and consequently the force of the spring in resisting the sagging of the door is more effectively applied.

It has heretofore been the practice to connect the ends of a coil-spring to spindles, in the surface of which were provided pin-holes for the insertion of a tool for turning the spindles to permit the tension of the spring to be varied. This necessitated the lengthening of the spindle-head and consequent increase of cost. By forming the spindle-head with an open socket to receive the bent end of the spring-actuated arm G and with projections to engage such arm I am enabled by inserting a suitable tool, such as a nail or the like, to hold the spindle while the spring-actuated arm is withdrawn and then turn the spindle and set the arm in a different position, so as to increase or diminish, as desired, the tension of the spring.

In the form of my invention illustrated in Figs. 7, 8, and 9, which is the preferred form of the invention, the links H and H' that connect the spring-actuated arms G and G' with the intermediate leaves C and D are shown as curved, the purpose of thus forming the links being to permit ornamental knobs c<sup>4</sup> and d<sup>4</sup> to be attached to the knuckle-joints at the

inner edges of the hinge-leaves in correspondence with the heads of the pintles c' and d', thus making the ornamentation of the hinge more symmetrical. So, also, the intermediate leaves C and D are shown as provided with offset-lugs c<sup>5</sup> and d<sup>5</sup>, to which the ends of the links H and H' are pivotally connected. These lugs c<sup>5</sup> and d<sup>5</sup> serve to throw the pivot point of the links H and H' outside the vertical centers of the intermediate leaves C and D and consequently enable the torsion-spring to more effectively exert its pressure in holding the door in normally-closed position and in resisting the tendency of the door to sag. Moreover, when the offset-lugs c<sup>5</sup> and d<sup>5</sup> are employed the links H and H' do not need to swing so far backward toward the jamb as in the construction illustrated in Figs. 1 and 2 of the drawings, and consequently the cutting of the edge of the jamb to permit the swinging of the links need be but very slight. Thus it will be seen that the open casting X at the inner end of the hinge-leaves is much smaller in the construction shown in Figs. 7, 8, and 9 than in the form of the invention illustrated in Figs. 1 and 4.

I have found in practice that where the links H and H' are connected to the intermediate leaves instead of to the outside leaves of the hinge, as has been heretofore proposed, the sagging of the door is more effectively guarded against, and when the ends of the links are connected outside the vertical centers of the intermediate leaves the force of torsion-spring is most effectively exerted.

It is obvious that the details of construction may be modified without departing from the spirit of the invention and that features of the invention may be employed without its adoption as an entirety.

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

1. A double-acting spring hinge comprising upper and lower door and jamb leaves and intermediate connecting leaves in combination with a torsion spring, projecting arms connected to the opposite ends of said torsion spring and pivoted links connected to said projecting arms and connected to said intermediate leaves.

2. In a spring hinge, the combination with door and jamb leaves and an intermediate connecting leaf and with a torsion spring having a projecting arm, of a link pivotally connected to said projecting arm at one end and connected at its opposite end to said intermediate leaf at one side of its vertical center.

3. A double-acting spring hinge comprising upper and lower door and jamb leaves and intermediate connecting leaves in combination with a torsion spring, projecting arms connected to the opposite end of said torsion spring and pivoted links connected to said projecting arms and connected to said intermediate leaves, the point of connection to said links of said intermediate leaves being



at one side of the vertical center of said leaves whereby the force of the spring is more effectively applied.

4. In a spring hinge, the combination with  
5 door and jamb leaves and an intermediate connecting leaf and with a torsional spring having a projecting arm, of a link pivotally connected to said projecting arm at one end and connected at its opposite end to an off-set  
10 lug extending from the intermediate leaf at one side of its vertical center.

5. In a spring hinge, the combination with

a door and jamb leaves and an intermediate connecting leaf and with a coil spring, of a spindle for said coil spring having a vertical  
15 socket in its end and having its end formed with projections adjacent said vertical socket and an arm having an angular portion set within said vertical socket and having a part extending between said projections.

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Witnesses:

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