

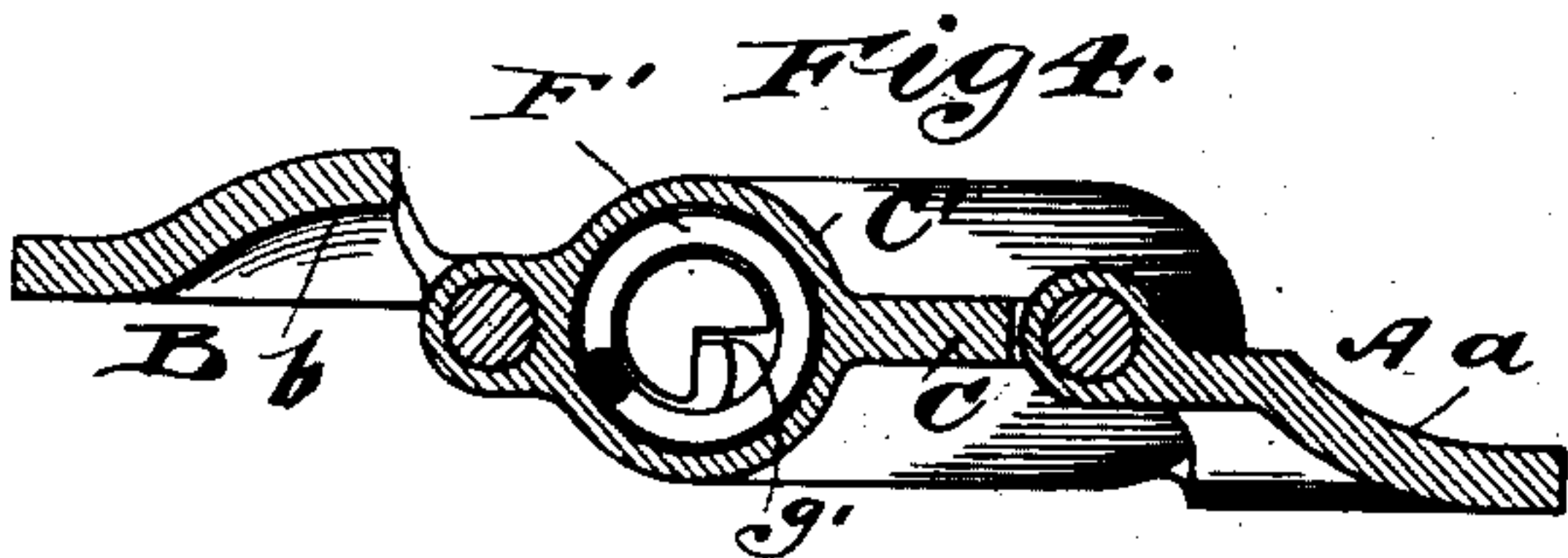
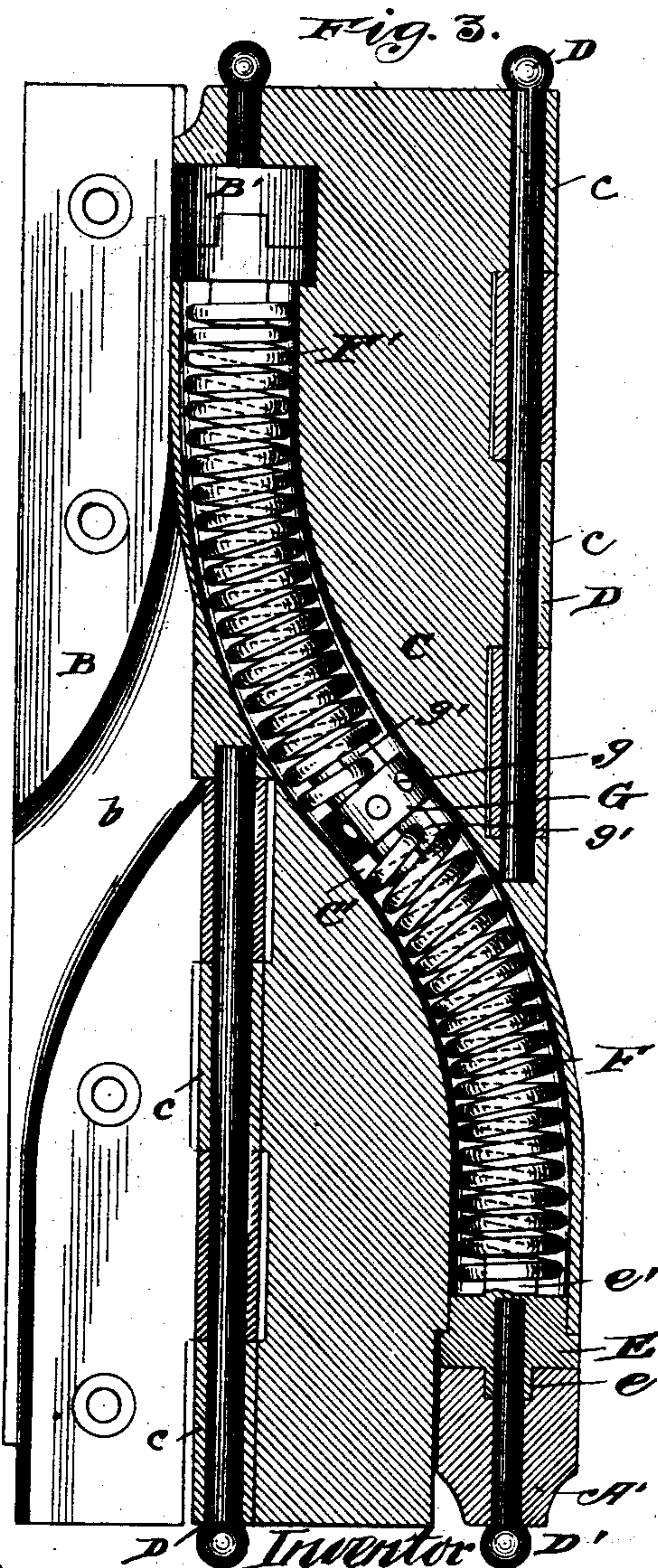
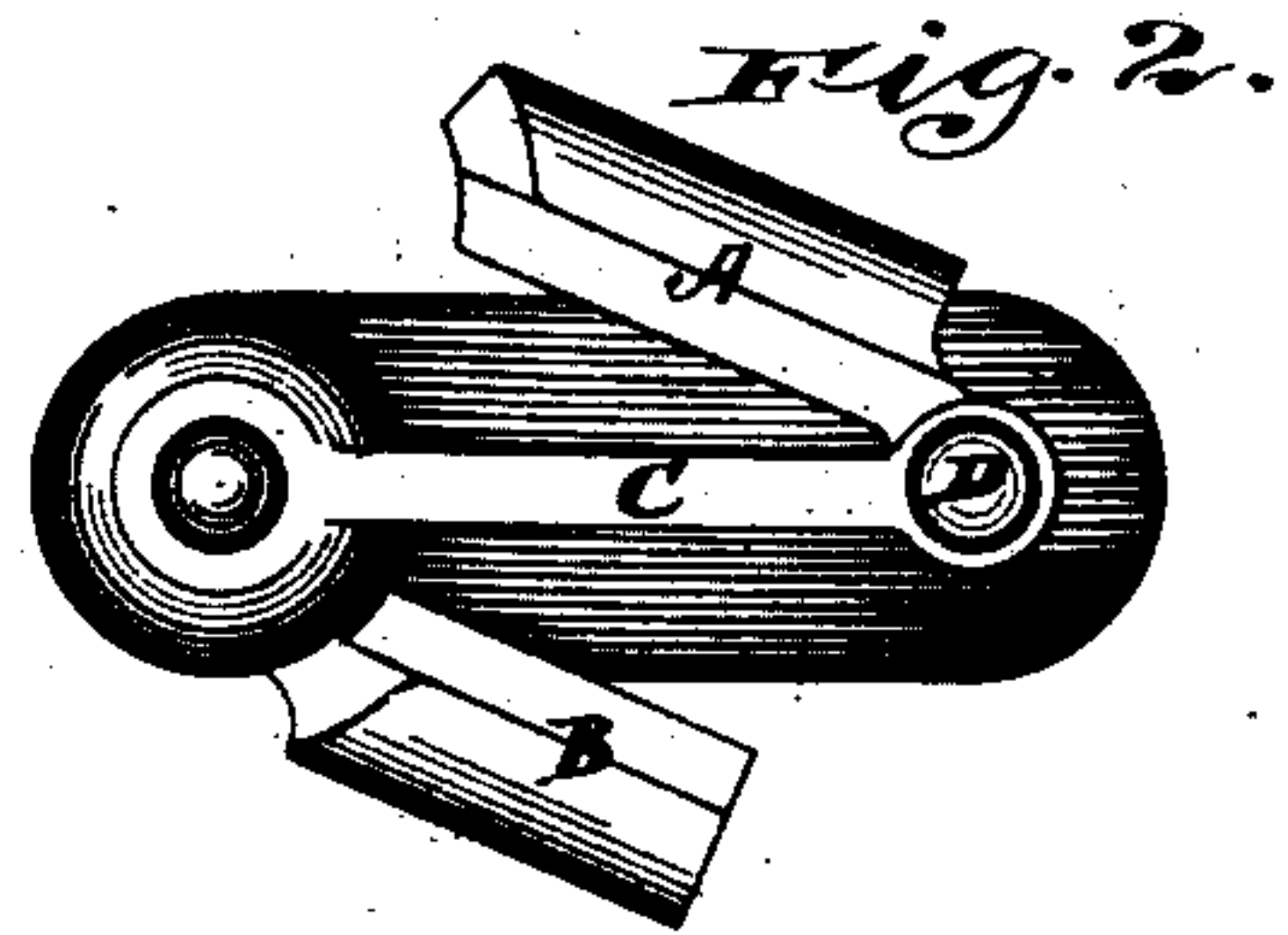
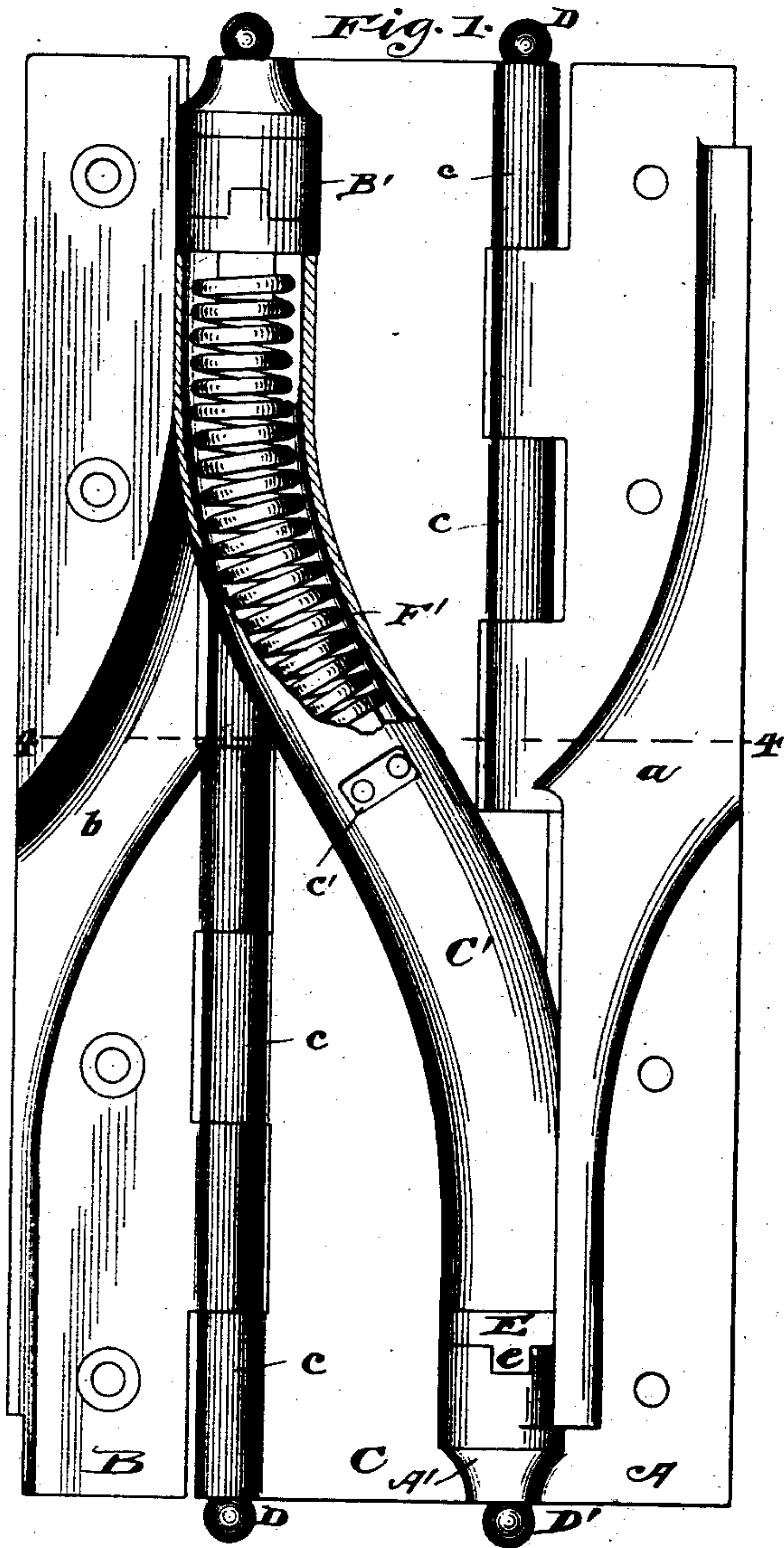
(No Model.)

G. A. PAYSON.
SPRING HINGE.

3 Sheets—Sheet 1.

No. 525,511.

Patented Sept. 4, 1894.



Witnesses,
J. D. Mann,
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By

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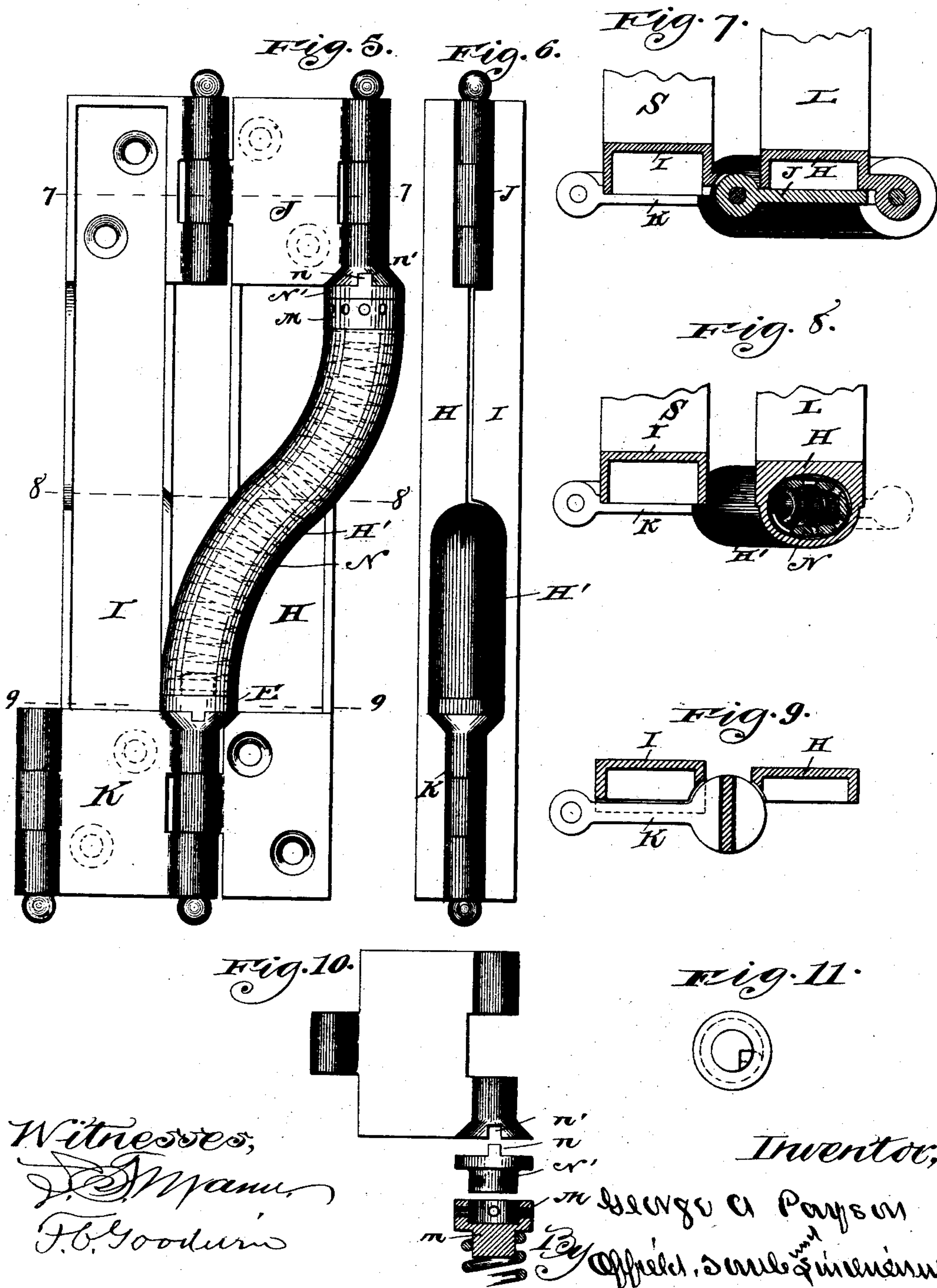
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G. A. PAYSON.
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3 Sheets—Sheet 2.

No. 525,511.

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(No Model.)

3 Sheets—Sheet 3.

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Fig. 12.

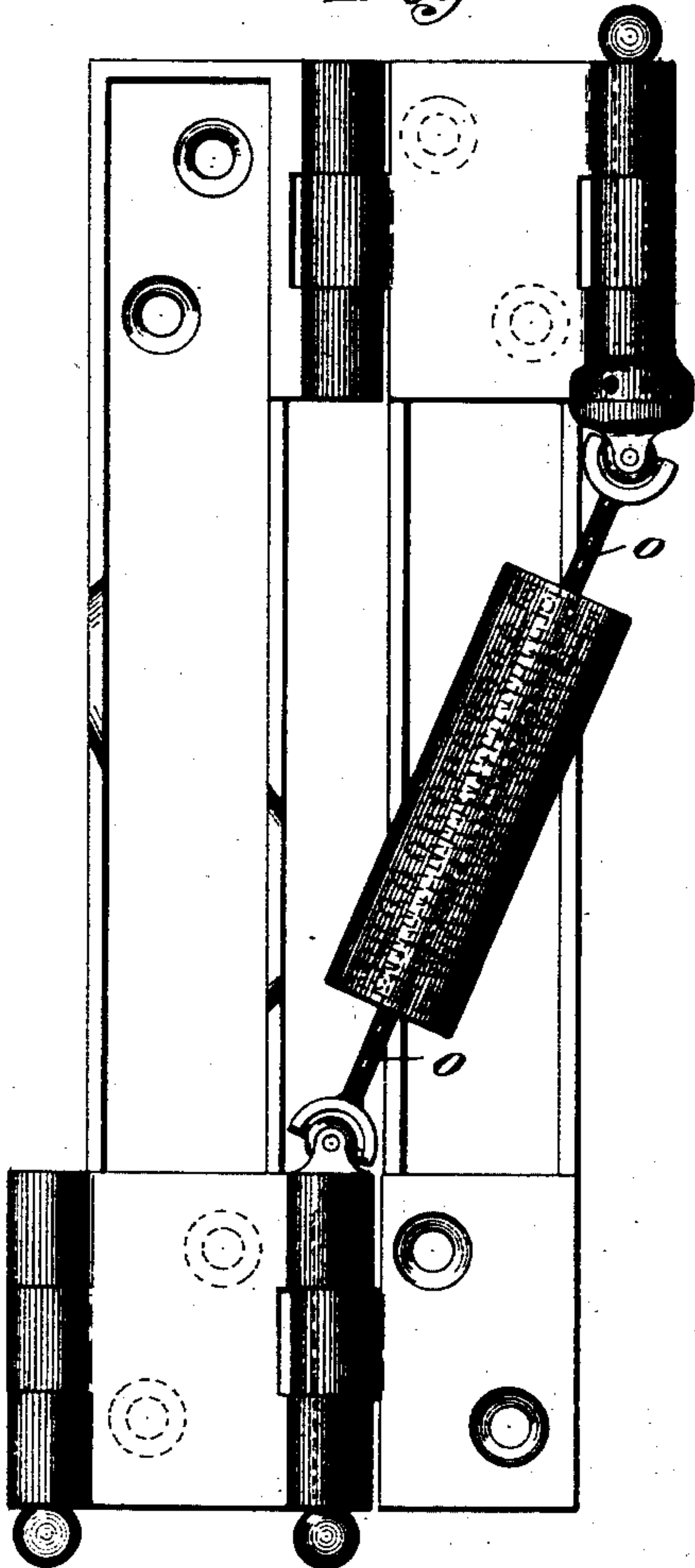


Fig. 14.

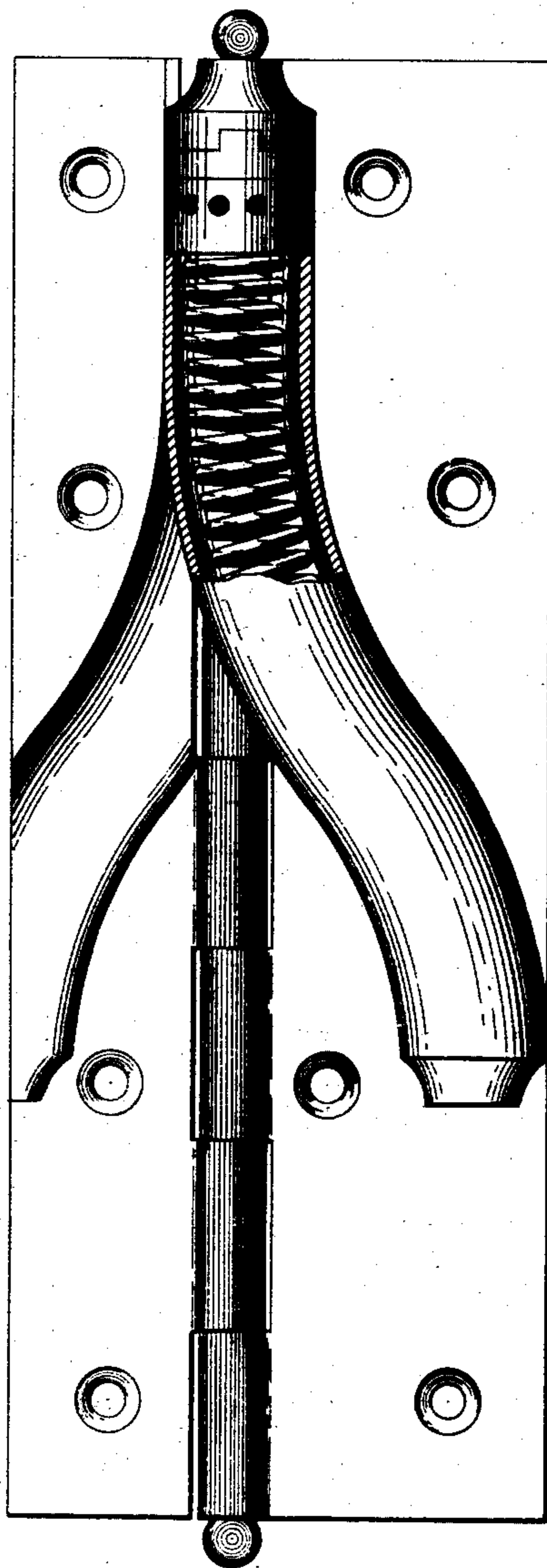


Fig. 13.



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UNITED STATES PATENT OFFICE.

GEORGE A. PAYSON, OF OAK PARK, ILLINOIS.

SPRING-HINGE.

SPECIFICATION forming part of Letters Patent No. 525,511, dated September 4, 1894.

Application filed June 3, 1893. Serial No. 476,466. (No model.)

To all whom it may concern:

Be it known that I, GEORGE A. PAYSON, of Oak Park, Illinois, have invented certain new and useful Improvements in Spring-Hinges, 5 of which the following is a specification.

My invention relates to spring hinges and is adapted to be employed in a single acting spring hinge which is designed to support a door and permit it to open or close in but one 10 direction, but is more particularly adapted to that class of spring hinges which are known as double acting and which are designed to support a door to permit it to be opened in either direction, the spring acting in both 15 cases to return the door to its closed position when released.

There are several varieties of double acting spring hinges in use, the one giving the greatest satisfaction being of that class wherein 20 the hinge is constructed with two separate pivots, one on either side of the door, and upon which the door turns as it is pushed in the one or the other direction. The preference is given to this class of spring hinge because, first, when operated by a suitable 25 spring and the door is allowed to close under the action of the spring, the force exerted in changing from one center to the other necessarily tends to retard its motion and aids in bringing it more quickly to its closed position. 30 The arrangement of the pivots, one on either side, also affords a more positive bearing, holding the door more certainly in its closed position and rendering it less liable to be accidentally opened by drafts of air. A suitable 35 tight joint can also be secured in this construction, and it is capable of quick and easy application. The most common form of this preferred double acting hinge is one having 40 a leaf secured to the door casing, a leaf secured to the edge of the door, and an intermediate leaf pivoted to the jamb leaf and door leaf. This three leaf hinge is in effect a combination of two simple hinges applied to 45 the door in such manner that one permits it to be opened in one direction and the other in the other direction, neither interfering with the operation of the other. A difficulty which has been encountered in the construction of 50 this form of double acting hinge is in the manner of applying the operating spring and it

is to this that my invention more particularly relates.

In carrying out my invention I employ a spring of the cylindrical spiral type and apply 55 the spring to the joints or knuckles of the hinge in such manner that while one end of the spring is secured to one leaf at or about its pivotal axis, the body of the spring is normally deflected and is carried by or concealed 60 in a barrel or spring chamber of an adjoining leaf. This manner of combining a spring with a hinge joint and the leaves thereof while capable of being adapted to many different forms of hinges has peculiar advantages 65 as applied to that form described above as a three-leaf hinge.

In order to retain the spring in its bent or curved position, as well as to conceal it from 70 view, a chamber is provided in one of the leaves and extending obliquely across its face. Now in the class of three leaf hinges there is one leaf to which two other leaves are pivoted, one at each of its opposite edges, and by constructing the said leaf with a chamber 75 as described, one end of the chamber having an opening at the upper end of one side of the leaf and contiguous to the knuckle of the leaf adjoining and the opposite end of the chamber having an opening at the lower end 80 of the opposite edge of the same leaf and contiguous to the knuckle of the adjoining leaf on that side, it will be seen that means are provided for the retention of an operating spring or springs, which while capable of acting 85 directly upon the opposing leaves at their respective joints or knuckles are effectually concealed from view, and at the same time but a small portion of the case or chamber containing them is exposed when the hinge 90 is in its closed position.

A peculiarity of my construction is that the spring when in action is not bent or deflected between its ends but is simply wound 95 or unwound as the door opens or closes. The inclosing chamber or barrel restrains any lateral swinging movement of the spring or flexing of its body between its ends and with reference to its secured ends. In some forms of the construction the intermediate leaf having 100 the barrel or spring chamber thereon may of course swing with the spring inclosed therein

but without in any case flexing or bending the body of the spring with reference to its secured ends. The spring chamber therefore not only serves as a means for concealing the spring, but it also restrains and defines at all times the position of the spring.

Obviously a lighter spring may be employed where it depends for its action upon the winding and unwinding of its coils rather than upon its resistance to lateral flexing or bending.

In my construction of spring hinge operating levers are dispensed with, and this of course affords advantage not only because of the saving in cost and manufacture, but because the employment of such levers complicates the structure and furnishes wearing parts which are noisy, and when reduced by wear prevent the proper operating of the hinge.

By my construction I am enabled to secure all of the advantages which are common to the approved forms of spring hinges and certain special advantages, among which may be mentioned the employment of a single spring, or what is in effect the same two springs arranged in line and confined in a single spring chamber; a single adjusting mechanism; the avoidance of swinging, flexing or lateral bending of the spring in operation; and the provision of a spring chamber or barrel wherein the spring may be entirely concealed from view.

In the accompanying drawings, I have shown my invention as applied to double acting spring hinges of different forms and also to a single acting spring.

In the drawings, Figure 1 is a front view of one form of a three leaf hinge embodying my invention, the leaves being extended or open. Fig. 2 is a top or plan view of the same, the leaves being partially closed. Fig. 3 is a vertical sectional elevation taken on the line of the pintles of the hinge as shown in Fig. 1, one of the leaves, the spring, the pintles and the spring bearing being shown in elevation. Fig. 4 is a transverse section on the line 4—4 of Fig. 1. Fig. 5 is an elevation of another form of hinge in which short leaf sections are employed at the top and bottom of the jamb and door leaves. Fig. 6 is a rear edge view of the same with the leaves closed. Figs. 7, 8 and 9 are sections on lines having corresponding numbers in Fig. 5. Fig. 10 is a detail view of the upper leaf section and showing means for holding and adjusting the upper end of the spring. Fig. 11 is a bottom plan view of the stud for holding the end of the spring. Fig. 12 is an elevation of a double acting hinge having a modified construction of the spring attaching means. Fig. 13 is a detail view showing a rear elevation of the spring barrel or casing shown in Fig. 12; and Fig. 14 is an elevation of a two leaf hinge.

Referring to the form of hinge shown in Figs. 1 to 4 inclusive, A represents a leaf which may be designated as the door leaf,

and B a leaf which may be designated as the jamb leaf.

C is an intermediate leaf pivotally connected to the door and jamb leaves respectively by the long pintles D.

Leaves A and B are each provided with curved chambers or depressions *a, b* which extend from the outer margins of said leaves diagonally across their bodies and terminate at their inner margins.

The leaf C has, and preferably integrally formed therewith, a spring barrel or chamber C', said barrel being cylindrical in form with its ends arranged parallel to the margins of the leaf and its body curved and carried diagonally across the intermediate leaf, the axis of the cylinder chamber being preferably so arranged as to be in a plane parallel with the body of the leaf, the barrel or cylinder being most conveniently formed by casting it integrally with the leaf. The leaf C is provided with the knuckle members *c* and the cylinder C' with a slot *c'* through which an adjusting lever or pin may be inserted.

The lower end of the leaf A is provided with a knuckle A', which receives the lower end of a short pintle D', and which is also transversely slotted to receive a lug *e* of the barrel E having stud *e'*, which engages one end of a spring F.

At the upper end of the leaf B are provided duplicates of the parts D' and E which serve to engage rigidly one end of a spring F' with a knuckle B' on leaf B.

The springs F and F' are reversely wound and their inner ends are engaged with a grooved hub G which can be rotated in order to adjust the tension of the spring by means of a pin inserted through the slot *c'* and entering the aperture *g* of said hub. The hub G is provided with short studs projecting from its opposing faces, and these studs have longitudinal grooves as shown in Figs. 3 and 4 and marked *g'*, the end coil of the spring being bent at an angle to the direction of the coil in order to engage over the square shoulder and seat itself in the groove. The studs *e'* are similarly formed for the purpose of engaging the outer ends of the springs F and F'.

From the above description it will be seen that when the leaves A and B are secured respectively to the jamb and to a swinging door and the springs F and F' suitably tensioned, the door may be opened in either direction, the springs tending respectively to return it to its closed position whenever swung to one side or to the other. It will also be seen that when the leaves are folded together and the door is in the closed position, the seats or chambers *a, b* will embrace the sides of the barrel C' thus reducing the hinge to small compass. In action but one spring is brought into operation in opening the door in one direction, the opposite spring remaining in its normal position with relation to its closed leaf. In opening the door in the contrary di-

recession the second spring is brought into operation by the unfolding of its leaf, while the first spring resumes its normal position with relation to its now closed leaf, the center leaf with the spring barrel and spring being carried over or swung out in the motion of the door with the said second leaf. It will be seen that in swinging the door in one direction the intermediate or spring chamber leaf lies against the jamb leaf while when opened in the contrary direction the said middle leaf rests against the door leaf and is carried with it.

In the construction shown in Figs. 5 to 11 inclusive, instead of employing a single intermediate leaf, short hinge sections are used. The leaves are marked H and I and the hinge sections J and K, respectively. The leaf H may be secured to the jamb L and the leaf I to the door S, as seen in Figs. 7 and 8. The leaf sections J and K are each pivotally connected with the leaves H and I by short pintles, and the leaf H is provided with a spring chamber H' whose ends are arranged parallel to but outside of the edges of said leaf, the barrel or spring chamber crossing the leaf diagonally upon curved lines. Within this chamber is a single coiled spring N whose upper end is secured to a stud *m* of an adjusting block M, said adjusting block having a cylindrical chamber and radial apertures intersecting said chamber, and the latter is adapted to receive the reduced portion of the cylindrical keeper N', the latter having a rib *n* to enter a slot *n'* in the upper knuckle member. By means of a pin inserted through the aperture of the hub it may be rotated in order to wind up the spring, and the insertion of the pin into the holes of the barrel furnishes means for locking the parts against further rotation. The lower end of spring N is secured with a barrel E. By this means it will be seen that the ends of the spring are rigidly held, and that as the leaves are folded or unfolded the spring will wind or unwind. It will also be seen that in this construction the barrel carrying the spring will not be shifted as to position, as the door is opened in one or the other direction. In each case but one of the short leaf sections is carried over with the door leaf, the other short section remaining closed against the rear or jamb leaf. The spring is thus alternately wound and unwound first from one then from the opposite end respectively. But the barrel in all cases confines the spring so as to prevent any flexing or lateral bending of its body, the action being that of winding or unwinding. A single spring is therefore made efficacious to return the door to its normal or closed position when opened in either direction.

The structural features may be somewhat modified. The means for confining and adjusting the spring are employed because of their simplicity of construction and because the parts can be thus readily assembled.

In Fig. 12 I have shown another means for

connecting the ends of the spring to the leaves. Said means comprise a shorter barrel than is shown in the preceding figures and the employment of arbors O connected to the knuckles by universal joints at or about the line of the pivotal axis of the respective leaves, said arbors extending at an angle to said axial line and entering the ends of the spring barrel where they are connected with the spring. The shortening of the barrel brings it within the width of the leaf with which it is formed and the ends of the spring arbors do not project beyond the margins of said leaves so as to be in the way.

In Fig. 14 I have shown the application of my invention to a two leaf or single acting hinge. Of course only a single spring is employed in this construction, and one end of said spring is secured within the spring barrel, the other end being secured to the knuckle of the other leaf in a manner previously described.

I claim—

1. A spring hinge comprising a plurality of leaves pivotally connected together and a spring having one of its ends secured to one of said leaves in or about the line of its axis and the body of said spring being normally curved or deflected and carried by a different leaf and adapted to be tensioned by the unfolding of said leaves and operating by its recoil to return them to their normal position, substantially as described.

2. A spring hinge comprising a plurality of leaves pivotally connected together, one of said leaves being provided with a spring chamber or barrel extending obliquely with reference to its pivotal axis and a spiral spring confined in said barrel and having its opposite ends operatively connected with two of said leaves whereby in the operation of unfolding or folding them the said spring is wound and unwound, substantially as described.

3. A spring hinge comprising in combination a plurality of leaves pivotally connected together, one of said leaves being provided with a curved barrel or spring chamber and a spiral spring confined in said barrel and having its opposite ends operatively connected with two of said leaves, the leaves adjoining said barrel having seats or depressions to receive the barrel, substantially as described.

4. A double acting spring hinge comprising a plurality of leaves pivotally connected together, one of said leaves being provided with a spring chamber or barrel extending obliquely with reference to its pivotal axis and a spiral spring confined in said barrel, the opposite ends of said spring being operatively connected with two other leaves at or about the center of their pivotal axes and provided with suitable tension controlling devices, substantially as described.

5. A double acting spring hinge comprising two leaf members one to be secured to the door and the other to the jamb and two shorter

leaf sections pivotally connecting the door and jamb leaves, a spiral spring operatively connected at one of its ends to one of the said shorter sections at or about its pivot line, the body of said spring being normally deflected from the said line and carried by one of the longer leaf sections the opposite end of the said spring being operatively connected to the other shorter section at or about the center of its pivot line, substantially as described.

6. A double acting spring hinge comprising a door leaf, a jamb leaf, and two shorter leaf sections intermediate the door leaf and jamb

leaf and pivotally connecting them, one of the outer leaves being provided with a curved barrel or chamber, an actuating spring confined therein and having its opposite ends operatively connected with the intermediate leaf sections at or about the centers of their pivot lines, and suitable tension devices for said spring, substantially as described.

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