(Model.) 2 Sheets—Sheet 1.

S. S. NILES.

SPRING HINGE.

No. 317,410. Patented May 5, 1885.

Fig. 1.

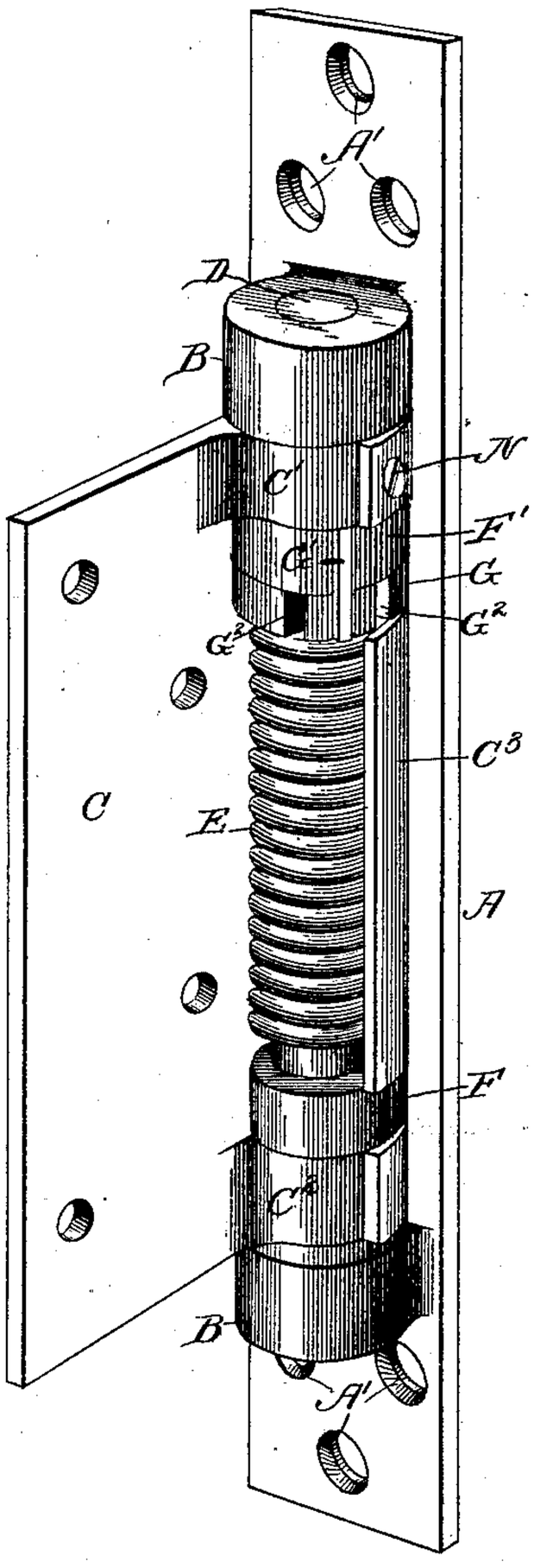


Fig. 2.

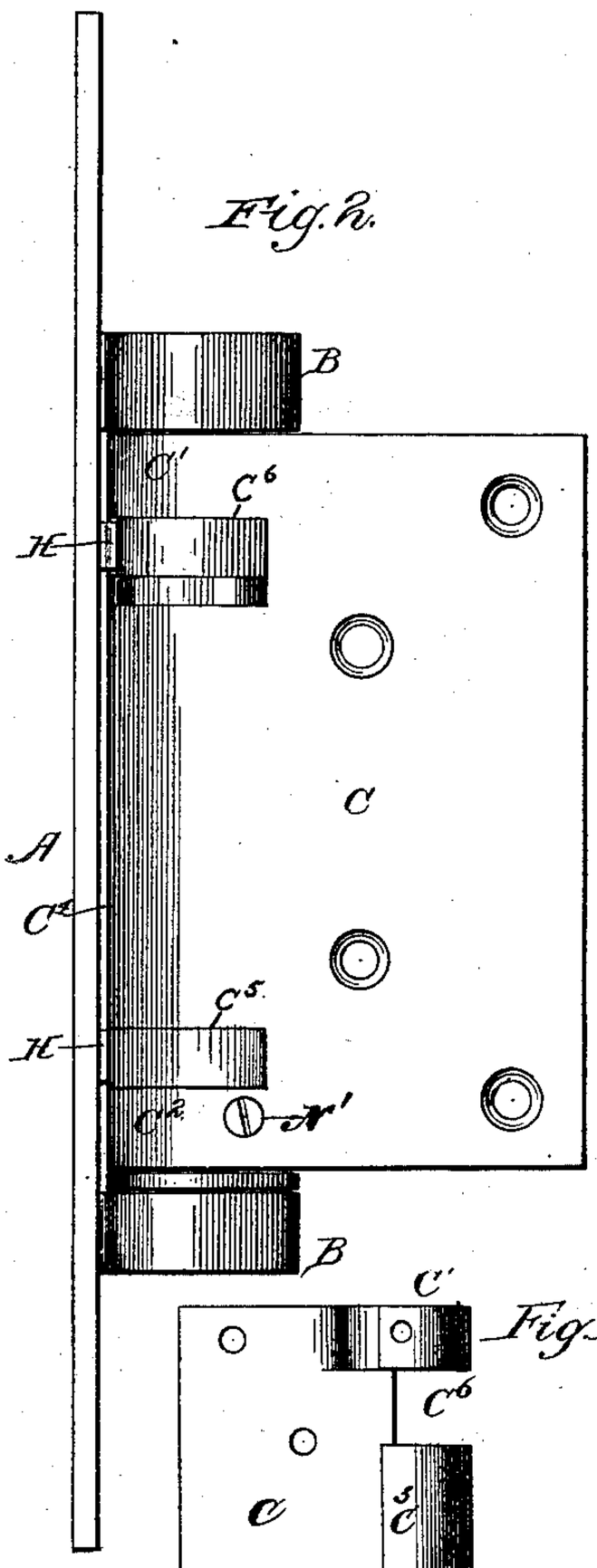
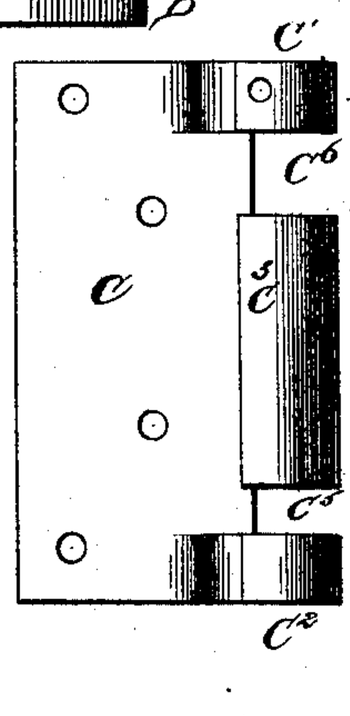


Fig. 11.



Witnesses.
Chas. G. Page

Inventor
Sidney S. Niles
By Jno. G. Elliott
Atty.

(Model.)

2 Sheets—Sheet 2.

S. S. NILES.

SPRING HINGE.

No. 317,410. Patented May 5, 1885.

Fig 3

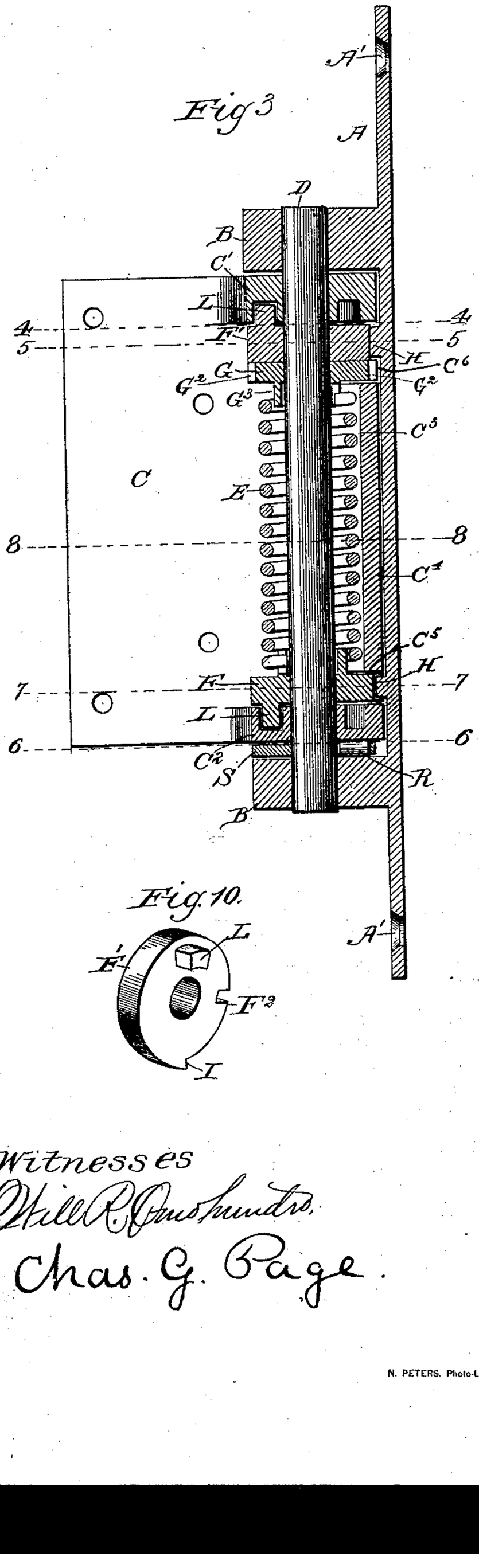


Fig. 4.

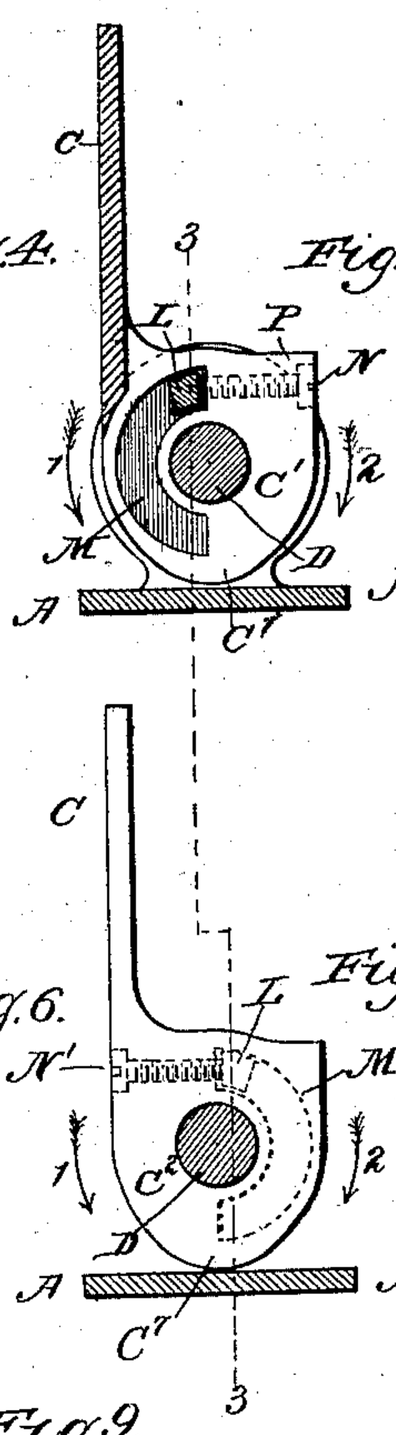


Fig. 5.

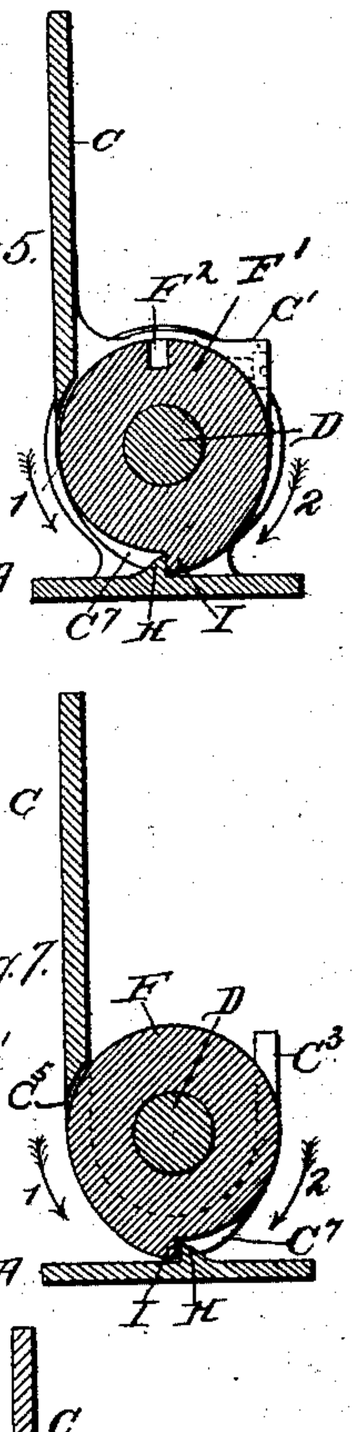


Fig. 6.

Fig. 7.

Fig. 9.

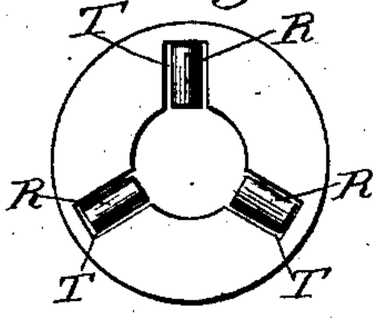
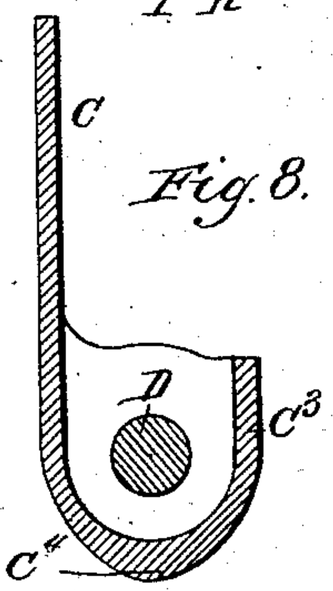


Fig. 10.

Fig. 8.



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UNITED STATES PATENT OFFICE.

SIDNEY S. NILES, OF CHICAGO, ILLINOIS.

SPRING-HINGE.

SPECIFICATION forming part of Letters Patent No. 317,410, dated May 5, 1885.

Application filed May 6, 1884. (Model.)

To all whom it may concern:

Be it known that I, SIDNEY S. NILES, a citizen of the United States, residing in Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Spring-Hinges, of which the following is a specification.

This invention relates to right-and left spring-hinges of the class in which the spring is wound from one or the other of its ends according to the direction in which a door to which the hinge is applied is swung open from its normally-closed position.

It also relates to right-and-left spring-hinges for doors, operating upon the above said principle, and provided with adjusting-screws arranged to constitute adjustable abutments, which can be adjusted so as to take up lost motion and cause the door, when closed, to come to a stop in proper position within its frame.

Broadly considered, it is not new to construct a hinge with a base or fastening plate provided with a pair of pintle-eyes, for in some instances a hinge has been constructed with two leaves, each provided at one edge with a pair of eyes for the pintle or pintles, which hinge, however, is obviously only suitable for a door opening in one direction, unless one of the said leaves should be bent at an angle to allow the eyes on its edge to set in proper position in the door-frame. In another instance a hinge, more especially adapted for gates, has been constructed with two fastening-plates, each provided with a pair of arms having eyes for the pintles, and arranged at right angles to the faces of the plates, under which construction one arm of each plate is provided with a stop for holding one end of the spring while the spring is wound from its opposite end, whereby the arms of one pair necessarily interlock and alternate with the arms of the remaining pair, which arrangement precludes the possibility of a swinging leaf, provided with end eyes or knuckles, and with a casing for the spring intermediate of said knuckles, being mounted upon a pintle, so that its knuckles and casing for the spring shall be confined between a pair of pintle-eyes upon a base or fastening plate. The approved mode, therefore, of constructing right-and-left spring-hinges has heretofore been to provide the hinge with a pair of separate pintle-eyes, disconnected from each other and designed to be secured to the jamb and to arrange the movable portion of the hinge between said disconnected pintle-eyes.

One of the objects of my invention is to provide a simple and efficient right-and-left spring-hinge, in which a single bed or base plate adapted to be fitted in a mortise in the face of the jamb is provided with a pair of pintle-eyes and a pair of fixed stops at points between the said pintle-eyes, and also in which the movable member or swinging leaf of the hinge, and the devices for alternately engaging the stops on the base-plate, so as to hold the spring at one end while it is being wound at the other, are all mounted upon the pintle and arranged between the pintle-eyes, in which way the pintle-eyes shall, both prior and subsequent to the application of the hinge to a door, be maintained in direct opposition to and in alignment with each other, and also a simple and effective construction provided which will admit of compactness in the arrangement of the several members of the hinge, and which will insure certainty of action with but few operative members.

A further object of my invention is to avoid the complicated construction, the multiplicity of members, and the exposure of certain parts which heretofore have been involved in the construction of a spring-hinge in which the movable member has been provided with adjustable abutment-screws for determining the position of the door when the hinge is in a state of equilibrium.

In a right-and-left spring-hinge, as heretofore constructed, the hinge has been provided with a pair of pintles, one having a lug exposed between one of the pintle-eyes and a knuckle at one end of the swinging leaf, for which said lug a screw passing through the leaf has constituted an adjustable abutment, while at the opposite end of the hinge the pintle has been provided with a collar connected with the spring and having a lug, and the knuckle provided with an end projection standing parallel with the pintle and carrying a screw has been arranged to constitute an adjustable abutment for the lug on the collar, in which way a space equal to the length of the lug is necessarily left between the collar and the knuckle. Under my invention, how-

ever, as will be hereinafter more fully explained, I am enabled to dispense with the feature of a pintle-lug and end projection on either knuckle of the swinging leaf, and to arrange the inner ends of the screws forming adjustable abutments within the knuckles on the swinging leaf, which construction allows the knuckles to have a uniform configuration and admits of the employment of a pair of narrow stop-rings, loosely mounted on the pintle and connected with the ends of the spring, which said stop-rings set close up to the knuckles, and can be alternately held by one of a pair of stops on a base-plate, according to the direction in which the door is swung open.

A further object is to close the space which will otherwise occur between the movable part of the hinge and the base-plate at a time when the door is closed, such space, under the construction of hinge heretofore employed, being left in consequence of the pintle being set at such distance from the jamb as to allow the door to be swung fully open.

Further objects are to provide certain novel and improved features of combination and construction in spring-hinges, all as hereinafter fully described and pointed out in the claims, and illustrated in the annexed drawings, in which—

Figure 1 is a perspective view of a right-and-left spring-hinge constructed in accordance with my improvement. Fig. 2 is a side elevation of the same. Fig. 3 is a longitudinal section taken on a line indicated by the line 3 3, shown running through Figs. 4 and 6. Fig. 4 is a transverse section taken on a line 4 4, Fig. 3, and looking toward the end of the hinge. Fig. 5 is a like section on line 5 5. Fig. 6 is a like section on line 6 6. Fig. 7 is a like section on line 7 7. Fig. 8 is a transverse section through the leaf on line 8 8. Fig. 9 shows a radially-slotted disk removed from the hinge, with the anti-friction rollers for supporting the movable member of the hinge arranged in the slots of the disk. Fig. 10 is a perspective view of one of the stop-rings. Fig. 11 shows a portion of the swinging leaf.

Referring by letter to the several figures of the annexed drawings, in which like letters denote like parts, A designates an oblong and preferably rectangular base or bed plate provided upon one side with a pair of eyes, B, which constitute bearings for the pintle. These pintle-eyes are both cast in one piece with the bed-plate, and the latter is provided at its ends with perforations A′ for the fastening-screws by which the bed-plate is secured to a door-jamb. The pintle-eyes which are thus rigidly united with the bed-plate preserve at all times a fixed relation to each other, and hence the pintle can be set so as to work true and easily in the eyes under all circumstances.

C indicates the movable member or swinging leaf of the hinge which is adapted to be attached to and swung with the door. The leaf is provided at one end with a knuckle, C′, and at its opposite end with a knuckle, C^2, and it is further provided with a curved lip or edge portion, C^3, arranged between the knuckles and adapted to form a partial casing or housing for the spring.

The pintle D is mounted at its ends in the pintle-eyes on the bed-plate, and the hinge-leaf is arranged between the pintle-eyes and mounted upon the pintle, which passes through the knuckles on the leaf.

The coiled spring E is arranged in the housing formed by the curved lip C^3, and surrounds the middle portion of the pintle. The spring is connected at each end with one of a pair of stop-rings loosely mounted upon the pintle, one of which stop-rings serves to hold one end of the spring when the leaf is swung to the right, while the remaining stop-ring serves to hold the opposite end of the spring when the leaf is swung to the left.

The stop-ring F is provided with a slotted hub or neck, with which one end of the spring engages, and is arranged to operate in a space, C^5, formed between one of the knuckles and one end of the curved lip on the leaf.

The stop-ring F′ is arranged to operate in a similar space, C^6, between the opposite end of the curved lip and the remaining knuckle, and is connected with one end of the spring through the medium of a tension-adjusting ring G, loosely mounted upon the pintle and connected with the stop-ring by means of a key, G′, fitting at one end in a peripheral notch, F^2, Fig. 10, in the stop-ring, and at its opposite end engaging in one of a series of peripheral notches, G^2, with which the tension-adjusting ring is provided. This tension adjusting ring is arranged alongside the stop-ring and has a slotted hub or neck, G^3, with which an end of the spring engages, in which way the tension of the spring can be varied by a rotary adjustment on the part of the tension-adjusting ring.

The bed-plate is provided upon its face side with a pair of lugs, H, one of which is arranged under each one of the stop-rings. These latter are each provided upon its periphery with a shoulder, I, which said shoulders face in opposite directions, as will be seen by a comparison of Figs. 5 and 7, whereby when the leaf is swung from its normal position the rotation of one stop-ring shall be checked by reason of its shoulder I striking against one of the fixed stops or lugs, H, on the bed-plate, while the remaining stop-ring shall be free to turn with the swinging leaf, and conversely, when the leaf is swung from its normal position in an opposite direction, the first-mentioned stop-ring will be free to turn with the leaf, while the remaining stop-ring will be held by reason of the contact of its peripheral shoulder with one of the fixed lugs H.

The stop-rings are alternately engaged and operated by one or the other of the knuckles on the leaf, according to the direction in which the latter is swung from its normal position,

so that when the leaf is swung to the right the spring shall be wound up from one end, and, conversely, when the leaf is swung to the left, the spring shall be wound up from its opposite end. As a means for effecting this engagement of the knuckles with the stop-rings, these latter are each provided with an end stud, L, arranged parallel with the axis of the pintle and projecting in a semi-annular slot or groove formed in the inner end of a knuckle.

The knuckle C′ is provided with a semi-annular groove or opening, M, Fig. 4, and the knuckle C² is provided with a semi-annular groove or opening, M′, similar in conformation to the groove in the knuckle at the opposite end of the hinge, and best illustrated in dotted lines, Fig. 6. These grooves are, however, formed in the knuckles so as to be respectively at opposite sides of the spindle passing through the knuckles, as will be understood by a comparison of Figs. 4 and 6, in which way, when the leaf is swung so as to carry its knuckles round in the direction indicated by the arrow 1, the spring will be held at one end and wound up from its opposite end, since when the leaf is swung in this direction, which, under the arrangement illustrated, will be to the left, the spring-tension ring and the stop-ring F′ connected therewith will be turned by reason of the engagement of knuckle C′ with the stud on the said stop-ring, during which operation the peripheral shoulder on the stop-ring F′ will leave the fixed stop lug H on the bed-plate below the same, while the opposite stop-ring, F, connected with the spring, will be checked against a rotary movement by reason of its peripheral shoulder engaging another fixed stop-lug, H, formed on the bed-plate below said stop-ring. And, conversely, when the leaf is swung to the right, so as to carry round its knuckles in the direction indicated by arrow 2, the stop-ring F′ will be held stationary by reason of its peripheral shoulder engaging a fixed stop-lug, H, below the said ring, in which way the spring will be now held stationary at this end while it will be wound up from its opposite end by the stop-ring F, which is turned by the engagement of knuckle C² with its stud L, the peripheral shoulder of the stop-ring F in this instance leaving the fixed stop-lug below the said stop-ring.

In a right-and-left hinge of this construction it has been found desirable to provide adjustable abutments, by means of which the normal position of the door when closed can be varied, so that should the entire hinge be unevenly set, or the parts become unevenly worn by use, the door can be made to stand closed in a proper position within the door-frame. My mode for providing such adjustable abutments consists in passing set or adjusting screws through opposite sides of the knuckles so as to vary the length of the slots or openings in the latter, which said screws constitute adjustable abutments or ends for these slots or openings, as follows: A screw, N, (best shown in dotted lines, Fig. 4), is fitted in a hole formed through one side of the knuckle C′ and opening into and at one end of the slot, groove, or opening, M, which is formed in the said knuckle. The knuckle is provided at this point with a peripheral enlargement, P, so as to provide a long bearing for the screw, and the end of the screw entering the opening M in the knuckle constitutes an abutment against which, when the hinge is in a state of equilibrium, the stud on the stop-ring rests.

The knuckle C² is also provided with a similar peripheral enlargement, P, for the sake of uniformity in the knuckles, or for affording a bearing for an adjusting-screw in case the relative position of the openings in the abutments are reversed. In this instance the screw N′ (best shown in dotted lines, Fig. 6) passes through the knuckle C² at a side opposite to that shown in Fig. 4, and enters the slot or opening M′ in said knuckle at one end of the said slot or opening, so as to provide an adjustable abutment for the stud on the stop-ring F. It will be seen that, by reason of the union of the knuckle with the leaf, this screw will have a bearing quite equal to that provided for the screw carried by knuckle C′. These screws can be readily adjusted from opposite sides of the hinge and have their heads countersunk in the knuckles, both for the sake of neatness and to prevent them from striking the bed-plate when the leaf is swung at right angles to the position shown in the several figures.

The peripheral enlargements P, while simply tending to swell out the knuckles at the points where the screws enter the same, could of course be dispensed with, but in either case it will be seen that the screw passes through the knuckles at points intermediate of their ends, whereby the abutments are not lengthened at any one point, in which way each knuckle carries an adjusting or abutment screw, and is provided with a concealed slot or recess in its inner end, and each stop-ring is fitted closely up against the inner end of a knuckle, and has its end stud received and working within the end slot or recess in a knuckle.

In a right and-left hinge in which the pivoted leaf is formed with a pair of knuckles and a curved edge intermediate of the knuckles and partially surrounding the spring, the pintle or pintles passing through the knuckles must of necessity be set in the eyes at such distance from the base portions of the eyes as will allow the door to be swung fully open before striking the jamb at either side of the hinge, and, to allow the door to be swung beyond a plane at a right angle to the doorway, such distance will necessitate a construction of hinge which will involve a considerable and objectionable space between the jamb and the movable part of the hinge when the door is in a closed position. Under my present construction of hinge the bed-plate, made continuous from one to the other of the pintle-

eyes, fills up such mortise as will be made in the jamb for its reception, and in order to close the space which would otherwise occur between this bed-plate and the movable portion of the hinge when the door is in a closed position, I form the curved or hollow edge portion C^3 of the leaf with an external swell, C^4, Fig. 8, which runs longitudinally along the curved portion C^3 from end to end thereof. This external longitudinal swell or enlargement serves to close such space as would otherwise exist between the bed-plate and the curved portion of the lip, if the latter was made with its outer side on the arc of a circle. For the same purpose each knuckle has a peripheral enlargement or swell, C^7, constituting a continuation of the swell of the curved-edge portion C^4 of the leaf, and each stop-ring is preferably formed with a swell terminating abruptly in a shoulder, I, forming a tooth for engaging one of the lugs on the bed-plate, although it will be obvious that an ordinary tooth-lug or projection on the periphery of the stop-ring would accomplish all of the desired results.

Between one of the knuckles and such one of the pair of pintle-eyes as will be the lower eye of the two when the hinge is applied to a door or gate, I arrange a set of small anti-friction rollers, R, upon which the said knuckle will rest, in which way the movable portion of the hinge will be supported upon anti-friction rollers, and hence turn easily to the right or to the left, as the case may be. These anti-friction rollers are conveniently arranged in a disk, S, fitted upon the pintle, and arranged between the knuckle and pintle-eye at the lower end of the hinge, said disk being provided with radially-arranged slots T, in each one of which one of the anti-friction rollers is loosely fitted.

It will be observed that in a hinge constructed as herein shown the pintle-eyes, knuckles, and stop-rings can all have their perimeters made flush with one another.

It will be also observed that the pintle-eyes stand at right angles to the base-plate, and that the leaf or movable member of the hinge is mounted between the two pintle-eyes. This leaf is provided at each extreme end with a knuckle, and at points between the knuckles provided with a pair of transverse slots or openings, C^5 and C^6, commencing at one edge of the hinge, in which way spaces are provided for a pair of stop-rings and also for an adjusting-ring arranged alongside of one of the stop-rings. Such construction admits of extreme compactness in the arrangement of the several members necessary to a successfully-operating right-and-left spring-hinge in which but one spring is employed.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a right-and-left spring-hinge, the movable leaf provided with a knuckle and an adjustable screw passing through the same, in combination with a stop-ring provided with a stud on its upper surface, which enters the knuckle, and is held by the spring against the adjustable screw when the hinge is in a state of equilibrium, and shoulders engaging with lugs on the base-plate, substantially as described.

2. The base-plate, the stop-lugs, and pintle-eyes formed on said plate, in combination with the movable member provided with knuckles and pivoted to the pintle-eyes, the stop-rings arranged between and next said knuckles, and the spring located between the opposing stop-rings, substantially as described.

3. The bed-plate provided upon one side with a pair of pintle-eyes, and a pair of lugs located between the said eyes, in combination with stop-rings connected with the springs and mounted upon the pintle, said stop-rings being provided with shoulders for alternately engaging the lugs on the bed-plate, in the manner set forth.

4. The combination, in a right-and-left spring-hinge, of a single pintle, with the movable leaf provided with knuckles, through which the pintle passes, and a pair of stop-rings, constructed substantially as described, and connected with the ends of the spring, said knuckles being provided with end recesses, and the stop-rings being provided with end studs extending in the recesses in the knuckles, substantially as described.

5. In a spring-hinge of the character described, the swinging leaf, provided with a curved-edge portion adapted to partially inclose the spring, and formed with an external longitudinal swell adapted to close the space back of the hinge when the door to which the hinge is applied is closed, substantially as described.

6. In a spring-hinge of the character described, the stop-rings, and the leaf provided with knuckles and with a curved-edge portion between said knuckles, all provided with an external swell at a point which will close up the space back of the hinge at a time when the door to which the hinge is attached is closed, substantially as described.

7. In a right-and-left spring-hinge, the knuckles formed with the swinging leaf and respectively provided with recesses M and M′, in combination with the fixed studs H, and the stop-rings, each provided with a stud, L, entering a recess in one of the knuckles, and with a peripheral tooth, I, arranged in line with one of the said fixed studs, substantially as described.

8. In a spring-hinge, the bed-plate and a pair of pintle-eyes formed therewith, in combination with the spring, the stop-rings, and the movable leaf confined between the pintle-eyes, substantially as described.

9. In a right-and-left spring-hinge, the leaf provided at each end with a knuckle and with tranvsersely-arranged openings at points between the knuckles, in combination with the stop-rings received in the openings in the leaf, the spring connected with the stop-rings, and the pintle-eyes located beyond the knuckles

and set at right angles to a bed-plate, substantially as described.

10. The leaf provided with internally-recessed end knuckles and formed with a curved portion, C^3, and spaces between the ends of the latter and the knuckles, in combination with the stop-rings F and F′, each provided with a peripheral shoulder and an end stud, the spring connecting said stop rings with one another, the pintle-eyes located at points opposite the ends of the leaf, and a pair of fixed stops located in position to be engaged by the stop-rings, substantially in the manner set forth.

11. In a spring-hinge, the long narrow bed-plate A, adapted to fit in a mortise in a door-jamb and provided with a pair of pintle-eyes, B, and a pair of lugs, H, located between said eyes, in combination with the swinging leaf and the stop-rings, all pivotally mounted between the pintle-eyes, substantially as described.

12. In a right-and-left spring-hinge, the oblong bed-plate A, formed with pintle-eyes B, standing at right angles to its face, in combination with a single pintle journaled at its ends in the said eyes, the swinging leaf C, provided with a pair of knuckles, the stop-rings F and F′, and the tension-adjusting ring connected with one of the stop-rings, all mounted upon the single pintle and confined between the pintle-eyes, substantially as described.

SIDNEY S. NILES.

Witnesses:
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