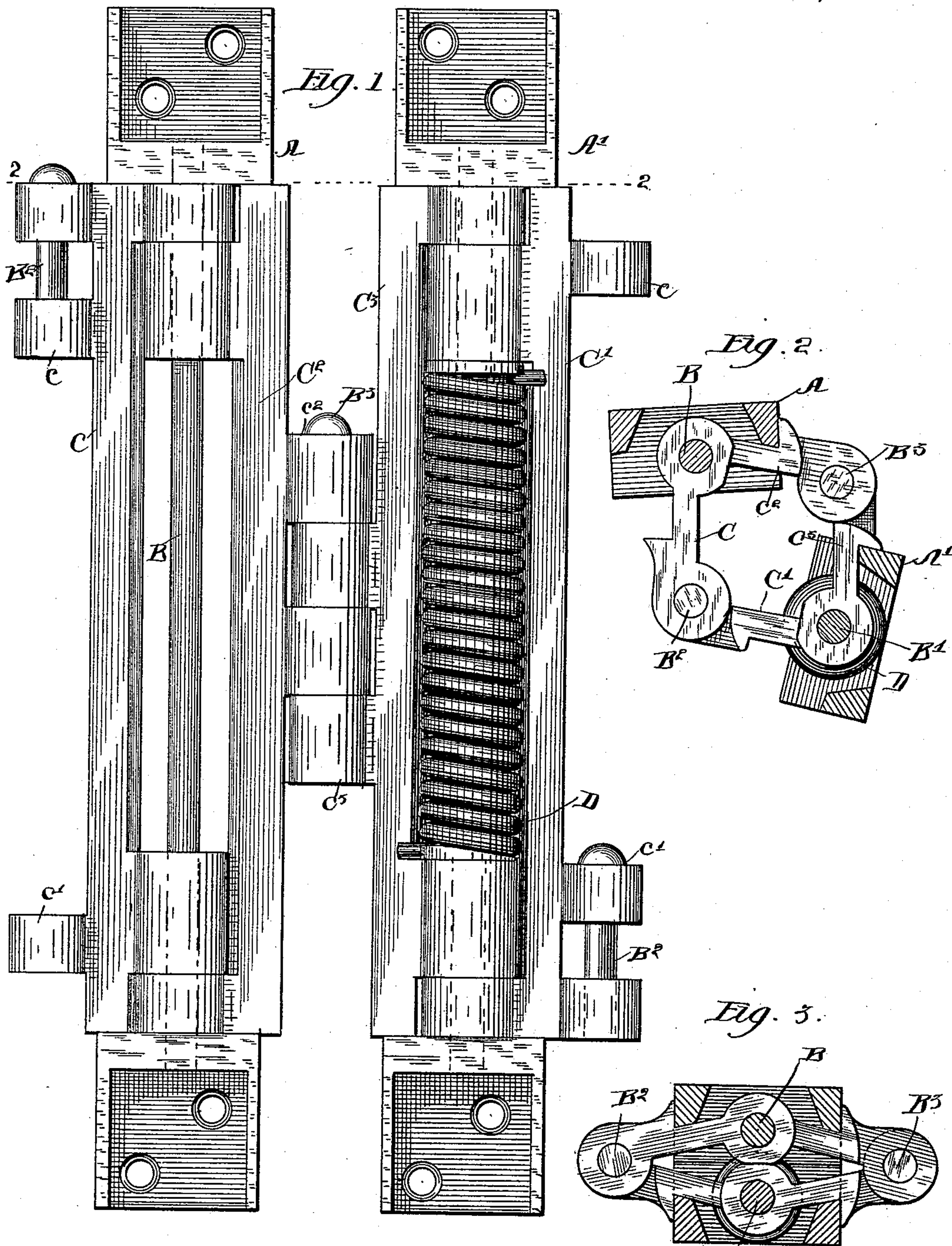


(No Model.)

R. H. WILES.
SPRING HINGE.

No. 464,406.

Patented Dec. 1, 1891.



Witnesses.

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SPRING-HINGE.

SPECIFICATION forming part of Letters Patent No. 464,406, dated December 1, 1891.

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To all whom it may concern:

Be it known that I, ROBERT H. WILES, a citizen of the United States of America, residing at Freeport, in the county of Stephenson and State of Illinois, have invented certain new and useful Improvements in Spring-Hinges, of which the following is a description.

My invention relates to the class of spring-hinges which are known as "double-acting," and which are designed to support a door so as to allow it to be opened in either direction and to return the door to its closed position when released. Hinges of this class as heretofore constructed may be divided into three sub-classes. Of these sub-classes two are what are known as "three-leaf" hinges, which consist, merely, of an ordinary hinge having one leaf secured to the door-casing and the other leaf extending between the door-casing and the door and having a third leaf pivoted to its free end and secured to the door. This, it will be seen, is the combination of two simple hinges applied to the door so that one allows it to be opened in one direction and the other in the other direction, said hinges being so united that neither interferes with the operation of the other. In one of these sub-classes a spring is applied to each of the two simple hinges in such a manner as to tend to keep these hinges closed, so that this class presents a combination of two single-acting spring-hinges. These hinges are objectionable for two reasons: First, the cost of the two springs and the attachment of the same to the hinges renders the latter unnecessarily expensive, and, secondly, the springs are arranged on either side of the door, where they, or a bulky casing in which they are inclosed, are exposed to view and make the hinge appear clumsy. In the other sub-class the middle leaf of the hinge is divided into two portions arranged one at some distance above the other and opening in opposite directions, and a single spring is applied to the two portions of this middle leaf, so as to constantly tend to bring the three leaves together. In this hinge as the door is opened one of the portions of the middle leaf is carried with the door, and the end of the spring attached to said portion is twisted out of position, so that when the door is completely opened one end

of the spring is held upon the casing and the other end upon the edge of the door, thus forcing the two ends of the spring a considerable distance out of a vertical line. To enable this to be done and to insure the return of the spring to its normal position, it is necessarily made of considerable length, which length must be, of course, added to the hinge itself. Besides this disadvantage, the bending of the spring in this way causes an unnecessary strain upon it and is liable to upset the wire and destroy the tension of the spring. The third sub-class of double-acting hinges stands alone and has been more extensively applied to gates and similar structures, which it is not necessary to close tightly, than to doors. In this class the door swings both ways upon the same pivot, and the spring is so applied that as the door passes its closed position in swinging from one side to the other the engagements of the two ends of the spring are respectively shifted—one from the casing to the door and the other from the door to the casing—which, it will readily be seen by any one familiar with the properties of a coiled spring, reverses the action thereof. To swing the door either way upon a single pivot, it is necessary either to leave a space between the door and its casing or round off either one or the other to prevent them from either binding or separating in certain positions, and even when this is done the door can only be given a limited swing in one or both directions. Hence it will be seen that this sub-class also has certain unavoidable and objectionable features.

It is my purpose to remove all of the objections that have been stated as being attendant upon any or all of these three sub-classes of hinges without the loss of the advantages possessed by any one of them.

To this end my invention consists in the combination, in a double-acting spring-hinge, of two leaves adapted, respectively, for attachment to the door and casing and pivoted together at each side of the door, so that either pivot may yield when the door is swung away from it, but not when swung toward it, and a coiled spring provided with suitable connections with the two leaves to apply the torsion of the spring at all times to

bring said leaves together without at any time forcing the spring out of a straight axial line. A great variety of constructions may be made, all of which contain the broad features of my invention.

My preferred construction is shown in the drawings presented herewith, in which—

Figure 1 shows the hinge opened wide with the pivots at one side removed to allow the different parts of the hinge to take a position where they can all be clearly seen. Figs. 2 and 3 are cross-sections taken in line 2 2 of Fig. 1, but showing the hinge as it appears when all of the pins or pintles are in place. Fig. 2 shows the position of the hinge when the door is half open, and Fig. 3 when it is closed.

Referring to the different parts of the hinge by means of letters applied thereto, A and A' are two plates adapted for attachment, one to the door and the other to the casing, the central portions of which are cut away, except at the edges, to make room for rods or pintles B B', and the swinging arms C C' C² C³, pivoted upon said pintles and extending in opposite directions therefrom, and also pivoted together—C C' at c c' by means of pintle B², and C² C³ at c² c³ by means of a pintle B³—so that the four arms form a quadrilateral the sides of which are pivoted together at the four corners. When the door, which we will suppose is attached to the plate A' in Fig. 2, is swung to the right, as seen in the figure, the plates A A' engage with the arms C² C³, spreading said arms apart upon the pivot B³, and at the same time the pivots B B' as they separate draw the pivots B² toward the pivot B³, which can be done until the arms C C' strike the arms C² C³. As it is necessary to enlarge these arms somewhat at the ends where they encircle the pivots, the pivots B B' are placed back of the faces of the plates A A', as seen in Fig. 2, and the pivots B² are separated and placed at opposite ends of the hinge, so that by shortening the pivot B³ and arranging it at the middle portion of the hinge the enlarged portions c² c³ of the arms C² C³ may swing between the enlarged portions c c' of the arms C C'.

Upon the pintle B', I mount a coiled spring D, bearing at its opposite ends upon the arms C² C³, respectively, so that its tension tends to spread these arms as far apart as their attachment will permit. This spring, unless resisted, brings the different parts of the hinge into the position shown in Fig. 3, which is the position they assume when the door is

closed. It is obvious that the spring might be applied to any one of the pintles B B' B² B³, so as to bring the four arms and the two plates into the same position. It is entirely immaterial whether it is placed upon the one or the other of the pintles B B'; but the same cannot be said of the pintles B² B³, inasmuch as the placing of the spring upon either of the latter would expose it to view when the door is closed, and thus make one side of the hinge cumbersome and unsightly. The four arms C C' C² C³ are preferably made of the same length from pivot to pivot; but this is not absolutely essential, the only difficulty in making them of different lengths being either that the door could not be opened to its fullest extent in one or the other direction or that unnecessary material would be used in their construction.

Fig. 1 illustrates a very important advantage possessed by my improved hinge in its preferred form—namely, the ease with which said hinge can be applied to the door and casing. To do this the pintles B² B³ should be first removed. The torsion of the spring is then sustained by the arms C' C², which rest upon the edges of the plate A', as is shown in Fig. 3. The plates A A' may now be attached to the door and casing, respectively, and after they are so attached the door may be lifted into position and the pintles B² B³ inserted with the same ease as if an ordinary hinge without a spring were employed.

I claim as new and desire to secure by Letters Patent—

1. The combination, in a double-acting hinge, of four arms pivoted together in the form of a flexible quadrilateral, and two plates pivoted, respectively, to opposite corners of said quadrilateral and adapted for attachment, respectively, to the door and casing, substantially as described.

2. In a double-acting hinge, the combination of two plates adapted for attachment, respectively, to the door and casing, four arms jointed together in the form of a flexible quadrilateral having opposite corners pivoted to said plates, respectively, and a spring applied to one of the corners of said quadrilateral and engaging with the two arms pivoted at said corner, so as to tend to bring the plates together, substantially as described.

ROBERT H. WILES.

Witnesses:

H. BITNER,
S. LUNDEEN.