Feb. 17, 1925. 1,526,422

N. B. HURD

SPRING HINGE

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Fig. 1.

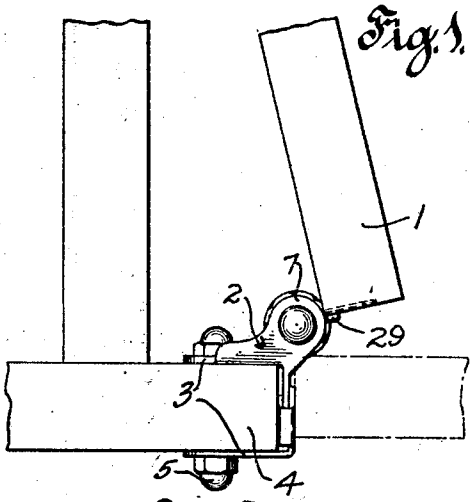


Fig. 2.

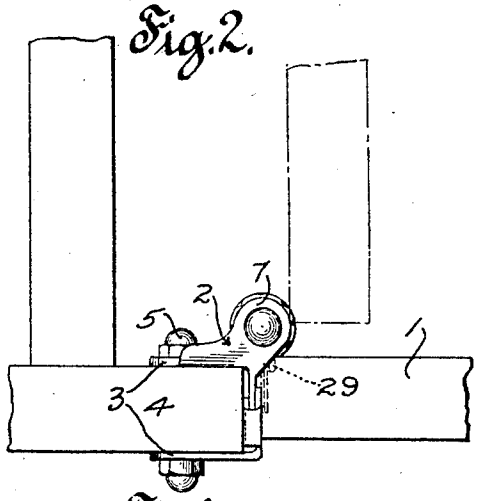


Fig. 3.

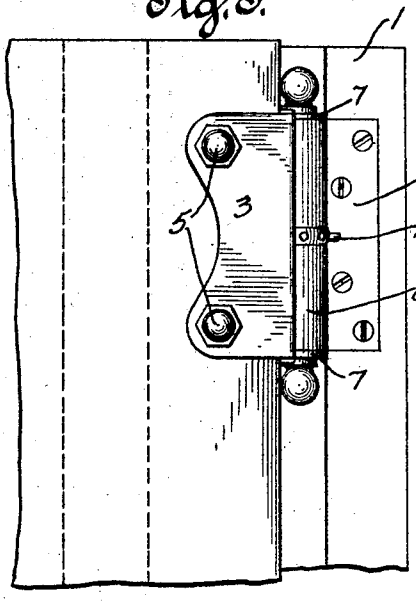


Fig. 4.

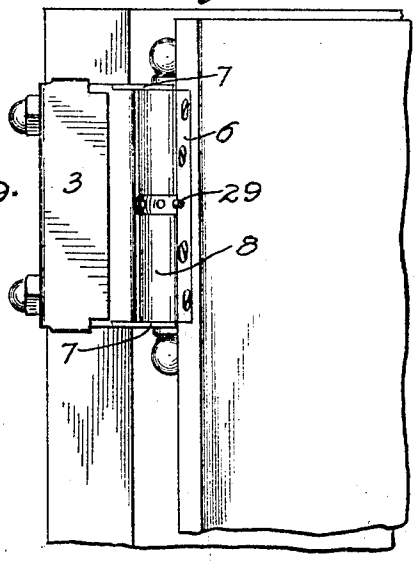
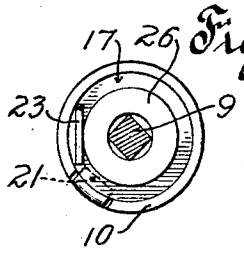


Fig. 8.



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Fig.5.

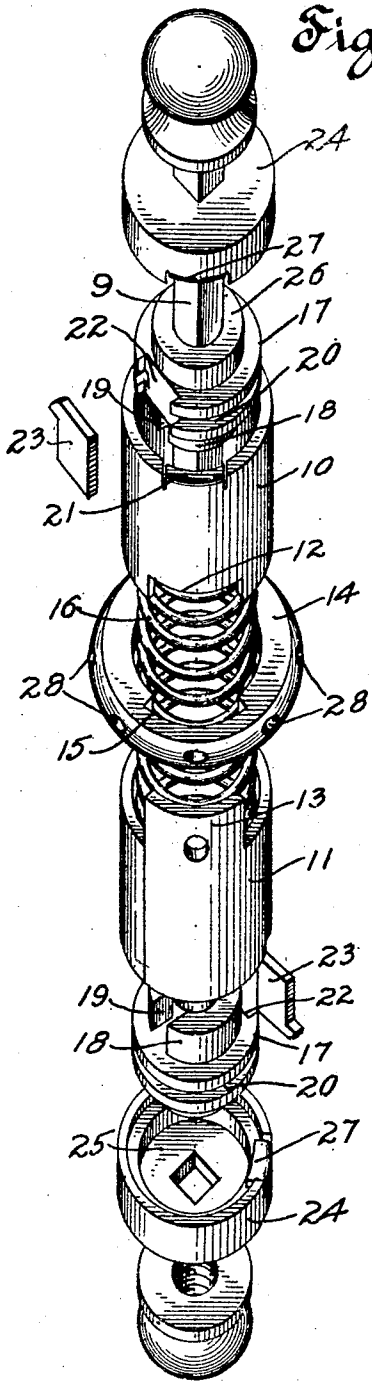


Fig.6.

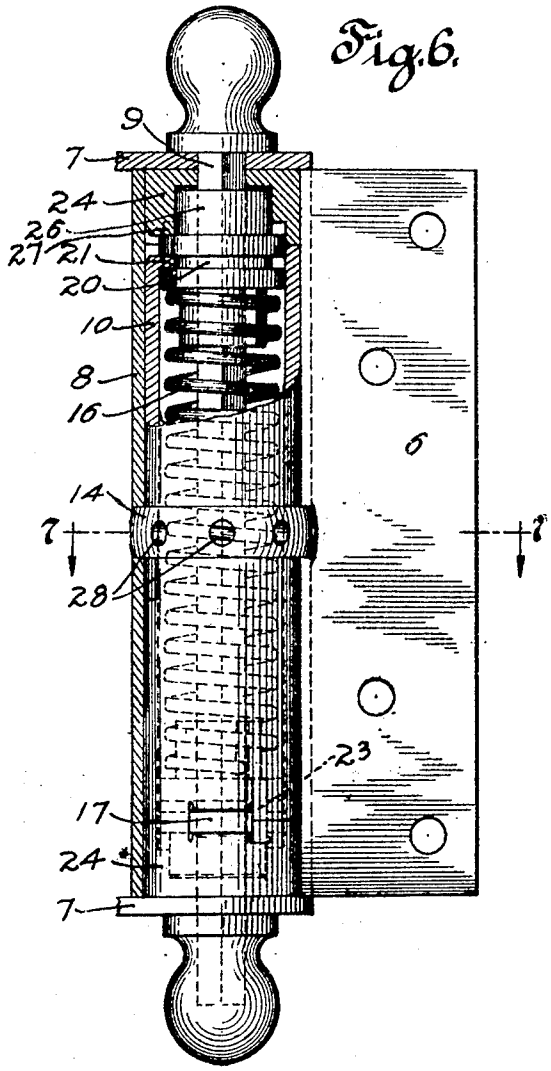
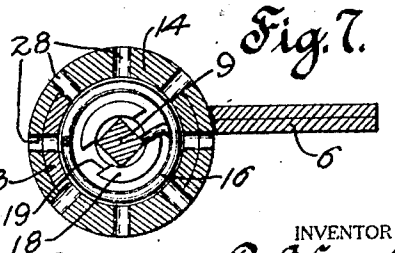


Fig.7.



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UNITED STATES PATENT OFFICE.

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SPRING HINGE.

Application filed September 15, 1923. Serial No. 662,822.

To all whom it may concern:

Be it known that I, NORMAN B. HURD, a citizen of the United States of America, residing at New Britain, Connecticut, have invented new and useful Improvements in a Spring Hinge, of which the following is a specification.

My invention relates to a spring hinge and is particularly, though not exclusively adapted for a lavatory hinge.

Sometimes it is desirable to have a spring hinge arranged to swing a door to the closed position, while with other doors it is desirable to have the hinge arranged to swing the door to the open position.

In the spring hinges with which I am familiar, it is necessary to have a specially designed hinge for a door to be swung into the closed position, and when it is desired to use the hinge for swinging the door in the opposite direction a new spring and other parts must be used so that the hinge is substantially reconstructed.

It is the principal object of my invention, therefore, to provide a spring hinge which, by a simple manipulation, may be used without change of design or parts for causing a door to swing to either the open or the closed position. Other minor objects will be apparent as the specification proceeds.

Briefly stated, in the preferred form of my invention, I provide a hinge having a pair of leaves with knuckles, one of which is preferably hollow. A spring is positioned in the hollow knuckle and is so arranged that either end thereof may be coupled to one of the hinge leaves while the other end is rigidly held, whereby the door will be swung in one direction, and when the opposite end of the spring is coupled to the hinge leaf the door will be swung in the opposite direction. The features of my invention will be better understood by an examination of the accompanying illustrative drawings forming a part of this specification, in which—

Fig. 1 is a partially diagrammatic plan view illustrating my spring hinge applied to a door arranged to be swung to the open position.

Fig. 2 is a similar view in which the hinge is arranged to swing a door to the closed position.

Fig. 3 is a view in side elevation of the parts shown in Fig. 1.

Fig. 4 is a view similar to Fig. 3 but viewed at right angles thereto.

Fig. 5 is a detail perspective view of parts of the hinge, the parts being relatively separated for the purpose of illustration.

Fig. 6 is a side view of the hinge in partial section.

Fig. 7 is a sectional view taken substantially in the plane of the line 7—7 of Fig. 6.

Fig. 8 is a plan view of certain details, the pintle being shown in section.

In said drawings, 1 represents a conventional type of door swung on the improved hinge designated generally at 2. In the form shown, the fixed hinge leaf has adjustable spaced apart plates 3—3 embracing the wall 4, usually of stone. Suitable bolts 5—5 serve to hold the fixed leaf in place. The other leaf 6 is secured to the door in the usual manner. 7—7 indicate knuckles in the form of flat plates or ears on the fixed leaf. The movable leaf 6 is provided with a knuckle 8 which in the form shown is cylindrical and hollow and fits between the fixed ears or knuckles on the fixed leaf. The hollow knuckle 8 is preferably cut away or recessed at a point intermediate its ends for a purpose to be later described. The knuckles 7—7 are provided with angular apertures for the reception of the correspondingly shaped pintle 9 holding the parts together and preventing the rotation of certain parts to be later described.

Within the hollow knuckle 8 is what may be termed a sleeve, preferably formed in two parts 10—11, having interlocking parts 12—13 for preventing relative rotation thereof. What may be termed a collar 14 is preferably interposed between the two sections 10—11, and in the form shown the collar is recessed at 15 for the reception of the tongue 13 so that both sections of the sleeve and the collar will move as a unit. So far as the operation, to be later described, is concerned, the sleeve might well be in one piece, but for ease of assembly and for the provision of a finished article, it is preferred to make the sleeve in two separate parts with the collar interposed therebetween.

A suitable spring, such as the coil spring 16, fits within the sleeve 10—11 and reaches

a point adjacent the ends thereof where the ends of the spring engage what I term spring abutments 17—17. Each abutment is provided with an inwardly extending projection 18, having a slot 19 therein for the reception of the end of the spring. Each spring abutment is of a circumferential size to fit nicely within the sleeve, and each abutment has a circumferential groove 20 therein which receives the inturned lug or projection 21 struck inwardly at each end of the sleeve 10—11. These lugs 21—21 permit rotation of each spring abutment 18, but resist axial movement thereof. Each spring abutment has a keyway 22 cut therein for the dual purpose of permitting the abutment 17 to be slid downwardly past the lug 21 into the sleeve, and for receiving the key 23 for engagement with the abutment 21 for preventing rotation of each spring abutment, and consequently of the corresponding end of the spring, in one direction.

At each end of the hinge a bearing member 24 is non-rotatably held on the pintle 9. In the form shown, wherein the pintle is angular, the bearing members 24 are provided with angular apertures through which the pintel passes. Each of the bearing members 24 is recessed as at 25 to receive a corresponding projection 26 on the spring abutment and serves as a bearing member therefor. An inwardly projecting stop or lug 27 is formed on each bearing member 24, and each said lug is adapted to be engaged by the keys 23 for preventing rotation of the keys and associated parts in one direction. The bearing members 24, when assembled with the pintle, might well be said to form a part of the pintle since they fit within and constitute a part of the bearing for the hollow knuckle.

The collar 14 is provided with a series of radial bores 28 for the reception of the pin 29 for a purpose to be described.

The assembly and operation of the device is as follows:

The collar 14 is placed within the slot or opening in the hollow knuckle, and the two parts 10—11 of the sleeve are slipped in from opposite ends and are caused to engage the collar and each other. The lower spring abutment 17 may next be put in place by inserting the same into the sleeve with the key slot passing over the inturned lug 21 and then rotated until the lug 21 is received into the circumferential groove 20. The key 23 may then be put in place to prevent relative rotation of the sleeve and spring abutment in one direction. The spring may then be put in and one end engaged with the spring abutment which is in place. The other spring abutment is next inserted in the opposite end of the sleeve and engaged with the spring in the same manner as that just described. The last spring abutment is then rotated to put the spring under the proper torsional stress, after which the other key 23 is inserted, this key engaging the keyway in the spring abutment and the inturned groove 21 to prevent unwinding of the spring. The bearing members 24 are next slid into the ends of the hollow knuckle and moved to such positions that the inturned stops or lugs 27 engage with the keys 23—23. The parts as thus far assembled are then inserted between the knuckles 7—7 on the fixed leaf, after which the pintle 9 is passed through the apertures in the fixed knuckles and through the angular apertures in the bearing members 24. The hinge is then ready for use.

The fixed leaf is secured in place on the edge of the wall 4 adjacent the door opening, and the door is of course secured on the movable hinge leaf. The pin 29 is inserted into one of the apertures 28 in the collar 14, and the direction of the swing of the door by the spring is dependent upon the particular side of the door on which the pin is inserted. If, as shown in Figs. 1, 3 and 4, the pin is inserted on the screw head side of the movable leaf, the door will be caused to swing to the open position (with the wall arrangement shown in Fig. 1); whereas with the pin on the opposite side of the leaf, as shown in Fig. 2, the door will be caused to swing to the closed position. The operation is, briefly, that one end of the spring is rigidly held against rotation in one direction, and when the pin engaging in the aperture 28 rotates the sleeve, the opposite end of the spring is moved and stressed so that when the door is released it will be swung back. For example, referring more particularly to Fig. 5, if the pin is put in one of the bores 28, and the collar moved by the pin and leaf in a clockwise direction as viewed in Fig. 5, the inturned lug 21 on the upper end of the sleeve 10 engaging the key 23, which in turn engages in the keyway 22, will cause the spring abutment 17 to rotate in a clockwise direction, thus stressing the spring, and when the door is released the latter will of course be swung back until the door is in its extreme position or until the key 23 again engages the edge of the inturned lug or stop 27 in the upper fixed bearing member 24. During this rotation of the upper spring abutment the lower spring abutment is of course held against rotation by the inturned stop or lug 27 on the lower fixed bearing member 24. It will be clear that if the pin is inserted in a bore 28 in the collar upon the other side of the movable leaf, and the collar rotated in a counter-clockwise direction as viewed in Fig. 5, the upper end of the spring will be held stationary by the upper lug 27 in the

upper member 24, and the lower end rotated in a counter-clockwise direction so that when released the door would be swung in a direction opposite to that heretofore described.

It will be seen that almost a complete rotation of each spring abutment is possible, though in practical use a door usually swings but slightly more than 90 degrees. Each of the bearing members 24, as will be clear, serves as a stop to hold either end of the spring while the opposite end is being moved by the swinging leaf and pin.

With my improved form of hinge as herein described, a door can be made to swing in either direction by the very simple manipulation of inserting the pin 29 on one or the other side of the movable hinge leaf.

While I have described a preferred form of my invention in detail, I do not wish to be limited to the form shown, for many changes may be made within the scope of the invention as defined in the appended claims.

I claim:

1. In a spring hinge, a pair of leaves having knuckles, a tubular knuckle on one leaf extending substantially the full length of the hinge, two knuckles on the other leaf mounted on the outer ends of the tubular knuckle, a pair of sleeves within said hollow knuckle and having interfitting fingers, a collar interposed between said sleeves, said collar and sleeves being relatively non-rotatable, a torsion spring within said sleeves, means on one sleeve for preventing movement of one end of said spring in one direction, means on the end of said other sleeve for preventing movement of the other end of said spring in the other direction, and means for causing said hollow knuckle and collar to move together whereby one end of said spring may be held while the other end is moved, whereby said hinge leaf will be caused to swing under the influence of said spring.

2. In a spring hinge, a pair of leaves having knuckles thereon, one of said knuckles being hollow, a pair of sleeves having interfitting parts within said hollow knuckle, a collar non-rotatably secured to and between said sleeves, a spring within said sleeves, an inturned lug at the outer end of each sleeve, a spring abutment for each end of said spring, a key engaging each said spring abutment and adapted to abut said inturned lugs, whereby said spring may be maintained under stress, and means for causing said collar and one said hinge leaf to move together, whereby said leaf may be swung in one direction under the influence of said spring.

3. In a spring hinge, a pair of leaves having knuckles, a sleeve carried by one of said leaves, a spring in said sleeve, an abutment for each end of said spring in said sleeve, means for resisting movement of each end of said spring in one direction, means coacting with said sleeve and one hinge leaf whereby upon rotation of said leaf in one direction said spring will be stressed and will tend to swing said leaf in the other direction.

4. In a spring hinge, a pair of leaves having knuckles, a two part sleeve carried by one of said leaves, a spring in said sleeve, an abutment for each end of said spring and coacting with said sleeve, a stop for limiting the movement of each end of said spring in one direction, and means for coupling said sleeve to one of said leaves whereby either end of said spring may be moved by said leaf in one direction and said leaf may be moved by said spring in the other direction.

5. In a spring hinge, a pair of hinge leaves having knuckles, one of said knuckles being hollow, a sleeve in said hollow knuckle, said sleeve having inturned stops at opposite ends, a spring within said sleeve, a spring abutment for each end of said spring and inter fitting with said inturned stops on said sleeve, a key engaging each spring abutment and inturned stop for holding said spring under tension, a pintle extending through said knuckles and having bearing members thereon fitting within said hollow knuckle, abutment members on said bearing members for engaging said keys for preventing rotation of each of said spring abutments in one direction, and means for coupling said sleeve and one hinge leaf to each other whereby upon movement of said hinge leaf said sleeve and one spring abutment will be rotated and said spring stressed for swinging said hinge leaf in the opposite direction.

6. In a spring hinge, a pair of hinge leaves having knuckles, a tubular knuckle on one leaf extending substantially the full length of the hinge, two knuckles on the other leaf mounted on the outer ends of the tubular knuckle, a two-part sleeve within said hollow knuckle, a collar interposed between the parts of said two-part sleeve, said hollow knuckle having an aperture intermediate its ends for the reception and exposure of said collar, said collar having radial bores therein for the reception of a pin, a spring within said two-part sleeve, a spring abutment for each end of said spring, stop means for preventing rotation of each end of said spring in one direction, said means coacting with said sleeve, and a pin in one of the radial bores in said collar and engaging one of said hinge leaves whereby said spring acting through said sleeve and collar and pin may swing said leaf in one direction.

NORMAN B. HURD.