

L. D. MALONE & H. E. HUBBS.  
 SPRING HINGE.  
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1,180,307.

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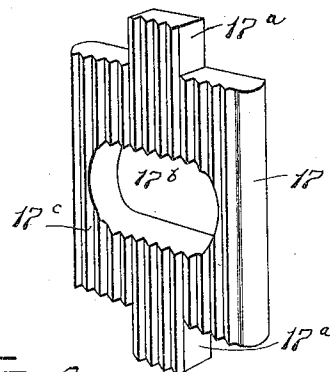
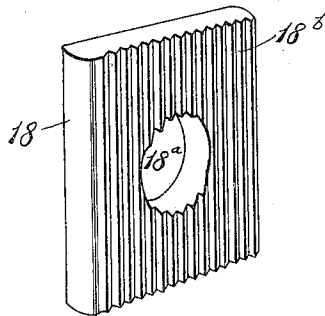
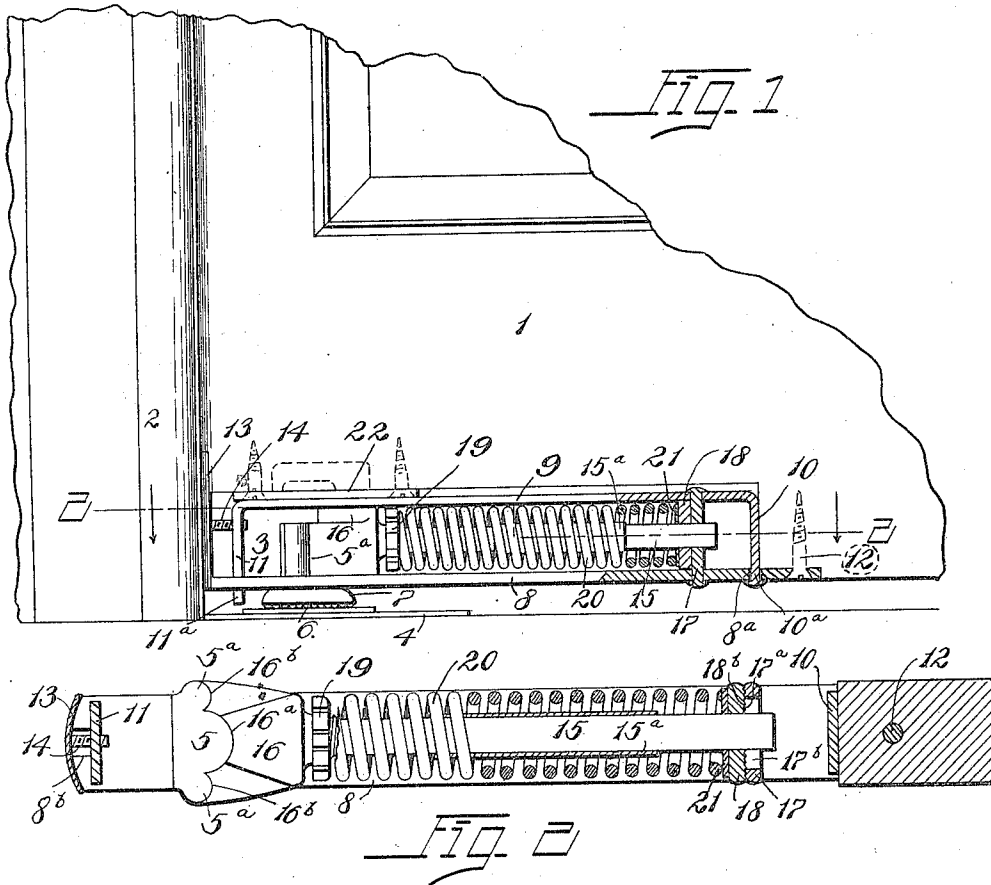


Fig. 3  
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Fig. 4  
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# UNITED STATES PATENT OFFICE.

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## SPRING-HINGE.

1,180,307.

Specification of Letters Patent.

Patented Apr. 25, 1916.

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*To all whom it may concern:*

Be it known that we, LEVI D. MALONE and HENRY E. HUBBS, citizens of the United States, residing at Shelby, in the county of Richland and State of Ohio, have invented a certain new and useful Improvement in Spring-Hinges, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

This invention relates to double acting spring hinges of the type shown in the re-issue patent of H. W. Steele No. 12,978 dated June 22, 1909. The hinge disclosed in the aforesaid patent comprises generally a rigid or stationary post which is suitably secured to the floor or threshold beneath a door and a frame inserted in a recess in the bottom of the door and pivoted with respect to the post and having therein a coiled spring operating in such a manner as to tend to retain the door in closed position and to restore it to such position after it has been swung to either side of such position. In the construction shown in the aforesaid patent, the door-closing spring is mounted upon a bolt which is adapted to rock upon laterally spaced shoulders carried by the post, the outer end of the bolt being mounted in a plate carried by the frame which plate serves as a guide for the bolt and also as an abutment for the outer end of the coiled spring. When a hinge of this type is applied to a door, it is desirable, if not absolutely necessary that it shall aline the door in closed position. In the particular type of hinge shown in the aforesaid patent, this result will be secured by alining the bolt with respect to the door; that is to say, the longitudinal axis of the bolt should substantially coincide with a line drawn from the rear or hinged end to the front or swinging end of the door and midway between the inner and outer surfaces of the door; or the axis of the bolt should be substantially parallel with such a line.

It is the purpose of this invention generally stated to provide means whereby the door may be so alined in closed position and, more limitedly stated to provide means whereby the bolt of a hinge such as described may be conveniently alined; also to secure this result through a simple and relatively inexpensive construction.

With these and other objects in view,

which will appear hereinafter, the invention may be defined further as consisting of the combinations of parts and elements embodied in the claims hereto annexed and illustrated in the drawings forming part hereof, wherein:

Figure 1 represents a sectional elevation of a portion of a door and its frame, disclosing a hinge constructed in accordance with our invention; Fig. 2 is a sectional detail corresponding to the line 2—2 of Fig. 1; and Figs. 3 and 4 are perspective views of the supporting and aligning plates for the "front" end of the bolt.

For convenience of description, the hinged end or edge of the door will be referred to hereinafter as the "rear" end or edge and the opposite swinging edge will be referred to as the "front," and these same terms will be applied to the similarly located parts of the hinge.

Describing by reference characters the various parts illustrated herein, 1 denotes the lower rear corner of a door and 2 a part of the frame thereof. The bottom of the door is provided in its rear corner with a recess 3, adapted to receive the swinging or pivoted part of the hinge.

The hinge consists generally of a fixed part and a movable part. The fixed part is secured to the floor or threshold below the rear corner of the door and comprises a post projecting into the door recess; the movable part is secured within the recess and co-operates with the fixed parts in the manner hereinafter described.

4 denotes a plate which may be secured to the floor or threshold in any suitable manner, as by means of screws. This plate is provided with a post 5 rigid therewith and projecting into the recess 3. The lower end of the post is reduced and is surrounded by a ball bearing, the balls 6 whereof are mounted upon a cone surrounding the post, the cup 7 of said bearing being carried by the lower plate 8 of the frame forming part of the movable member of the hinge.

The movable hinge member comprises generally a frame containing the spring and bolt to which reference has been made hereinbefore. The frame is generally rectangular in shape and comprises the bottom plate 8 and the top plate 9 the ends whereof are bent downwardly and connected to the plate 8, thereby forming front and rear plates

and 11 respectively. The front plate 10 may be conveniently connected to the bottom plate 8 by means of a reduced end 10<sup>a</sup>, which may constitute a rivet extending through a hole 8<sup>a</sup> in the bottom plate and upset against the bottom of said plate. The rear plate 11 may be conveniently connected to the bottom plate 8 by providing a slot 8<sup>b</sup> in the rear end of the bottom plate and cutting away the sides of the plate 11 to provide a narrow tongue adapted to enter said slot, the plate being provided with a T-head 11<sup>a</sup> beneath said tongue. The bottom plate 8 by means of a reduced end 10<sup>a</sup>, 10 and provides means for securing the frame to the door, screw 12 being shown as employed for this purpose. The rear end of the plate 8 is rounded, whereby it is adapted to receive a rounded plate 13, said plate being secured to the rear vertical plate 11 by means of a screw 14 which is threaded into an opening in the last mentioned plate. This plate coöperates with side plates (not shown) of a casing similar to that illustrated in the Steele patent hereinbefore identified.

The upper end of the post 5 is provided with a laterally extended head, said head comprising an intermediate rounded portion 5 with rounded ears or projections 5<sup>a</sup> located on each side of said intermediate portion. The parts 5 and 5<sup>a</sup> provide bearings for the bolt 15, said bolt having at its rear end a laterally extending head 16 provided with a concaved central portion 16<sup>a</sup> and concaved side portions 16<sup>b</sup> coöperating with and arranged complementarily to the parts 5 and 5<sup>a</sup>. The front of the bolt projects through a pair of plates which are interposed between the top and bottom plates 8 and 9 of the frame. One of these plates 17 is anchored to the plates 8 and 9, this anchoring being conveniently accomplished by providing said plate with tongues or reduced extensions 17<sup>a</sup> adapted to be inserted into vertically opposed openings in the plates 8 and 9, the extreme ends of these tongues or projections then being upset to provide in effect a rivet-connection between the plate and the supporting plates of the frame. The plate 17 is provided with a transversely elongated slot 17<sup>b</sup>, and the rear surface of this plate is provided with a series of vertical corrugations 17<sup>c</sup>.

In rear of the plate 17 is a plate 18 having a central aperture 18<sup>a</sup> therethrough of a diameter to receive and guide the end of the bolt 15. The plate 18 is of substantially the same size as the body part of the plate 17, so as to be received between the plates 8 and 9, the side plates (not shown) providing sufficient clearance to permit lateral adjustment. The front face of the plate 18 is provided with a series of vertical corrugations 18<sup>b</sup> similar to the corrugation 17<sup>c</sup>

whereby the projections of one plate will fit within the recesses of the other.

At the rear of the head 16 the bolt 15 is provided with an adjusting ring 19 threaded thereon. The rear end of the bolt 15 projects through the openings 18<sup>a</sup> and 17<sup>b</sup>, and the bolt is alined thereby with reference to the door. Surrounding this bolt is a helical spring 20 which bears at one end against the ring 19 and at its other end against a washer 21, inserted between the front end of the spring and the plate 18. A sleeve 15<sup>a</sup> may be applied to the bolt 15, between the latter and the spring.

22 denotes a plate which may be secured in the door recess 3 above the rear end of the plate 9 and provide means whereby the hinge frame may be supported against lateral adjustment.

With the parts constructed and arranged as described, suppose the hinge has been applied to the door and that the bolt 15 is out of alinement, whereby the door is normally held out of closed position. This defect can be cured by shifting the outer end of the bolt in the appropriate direction to cause the spring to hold the door in proper alined position. In the construction shown herein, this adjustment may be very conveniently effected merely by using a nail set or blunt punch to force the plate 18 in the appropriate direction with respect to the plate 17 against the frictional assistance exerted by the interengaging corrugations on the plates. The spring 20 will yield sufficiently to permit this shifting of the plate 18 across the plate 17 to the desired position and, when the bolt is properly positioned it will be held in such position by reason of the interengagement of the projections of one plate with the recesses of the other and the pressure of the spring holding these plates in such engagement.

In this construction, there is no necessity for pivoting the plate 17, since the slot 17<sup>b</sup> is of sufficient lateral extent to accommodate the lateral movement of the front end of the bolt 17 as this bolt is rocked on the shoulders 5<sup>a</sup> by the swinging of the door.

By the construction disclosed and illustrated herein, it will be apparent that we have provided an extremely simple but efficient construction whereby the door may be alined through the alinement of the bolt 15. While we have necessarily shown and described in detail the embodiment of our invention illustrated herein, we do not propose thereby to be limited to such details of construction except as the same may be positively included in the claims hereto annexed or as their inclusion may be rendered necessary by the state of the prior art.

Having thus described our invention what we claim is:—

1. The combination, with a door having

a bottom recess, of a post pivotally supporting said door and having a head within the recess, a bolt within said recess and cooperating with the said head, a spring surrounding the bolt and adapted to be compressed by a longitudinal movement of the bolt within the recess, a plate in said recess and having a laterally elongated slot therein for the front of said bolt, and a plate interposed between the spring and the first mentioned plate and through which the bolt extends, said plates being provided with interengaging means whereby they may be held in various adjusted relations with respect to each other.

2. In a spring hinge, the combination of a frame, a post having a head within the frame, a bolt within said frame and cooperating with the said head, a spring surrounding the bolt and adapted to be compressed by a longitudinal movement of the bolt within the frame, a plate carried by the frame and having a laterally elongated slot therein for the front of said bolt, and a plate interposed between the spring and the first mentioned plate and through which the bolt extends, said plates being held in contact with each other by spring pressure whereby they may be held in various adjusted relations with respect to each other.

3. In a spring hinge, the combination of a frame, a post having an operating head within said frame, a bolt within the frame and cooperating with the head to be moved longitudinally thereby, a spring surrounding the bolt and adapted to be compressed by such longitudinal movement of the bolt, a plate secured to the frame and having a laterally elongated slot for the front of the bolt, and a second plate interposed between the spring and the first mentioned plate and through which the bolt extends, said second plate being laterally adjustable with reference to the first plate and said plates having vertically extending laterally spaced recesses and projections.

4. In a spring hinge, the combination of a frame, a post having an operating head within said frame, a bolt within the frame cooperating with the head and adapted to

be moved longitudinally thereby, a spring surrounding said bolt, a support for the front end of the bolt carried by the frame, and means interposed between the spring and the support whereby the front end of the bolt may be adjusted laterally with respect to said support and be retained in such adjusted position by spring pressure.

5. In a spring hinge, the combination of a frame having top and bottom plates, a post having an operating head within said frame, a bolt within the frame cooperating with the head and adapted to be moved longitudinally thereby, a spring surrounding said bolt, a plate interposed between and connected to the top and bottom plates of the frame, said plate having a laterally elongated slot for the front of the bolt, a plate laterally adjustable with respect to the first plate and having an opening for said bolt, and a spring surrounding said bolt, and pressing against the last mentioned plate, and means for securing said plates in adjusted position.

6. In a spring hinge, the combination with a frame, of a post and a bolt engaging said post, a plate fixed in the frame and having a transverse slot, a second plate having an opening adapted to receive the front end of bolt, said second plate being laterally adjustable upon the slotted plate, and longitudinally operating means for holding said plates in contact.

7. In a spring hinge, the combination with a frame, of a post and bolt and spring, a plate fixed in the frame and having a laterally elongated slot, a second plate having a central opening, said second plate being laterally adjustable upon the slotted plate, the spring pressing upon said second plate and holding the same in contact with the slotted plate.

In testimony whereof, we hereunto affix our signatures in the presence of two witnesses.

LEVI D. MALONE.  
HENRY E. HUBBS.

Witnesses:

H. W. STEELE,  
M. SPAMER.