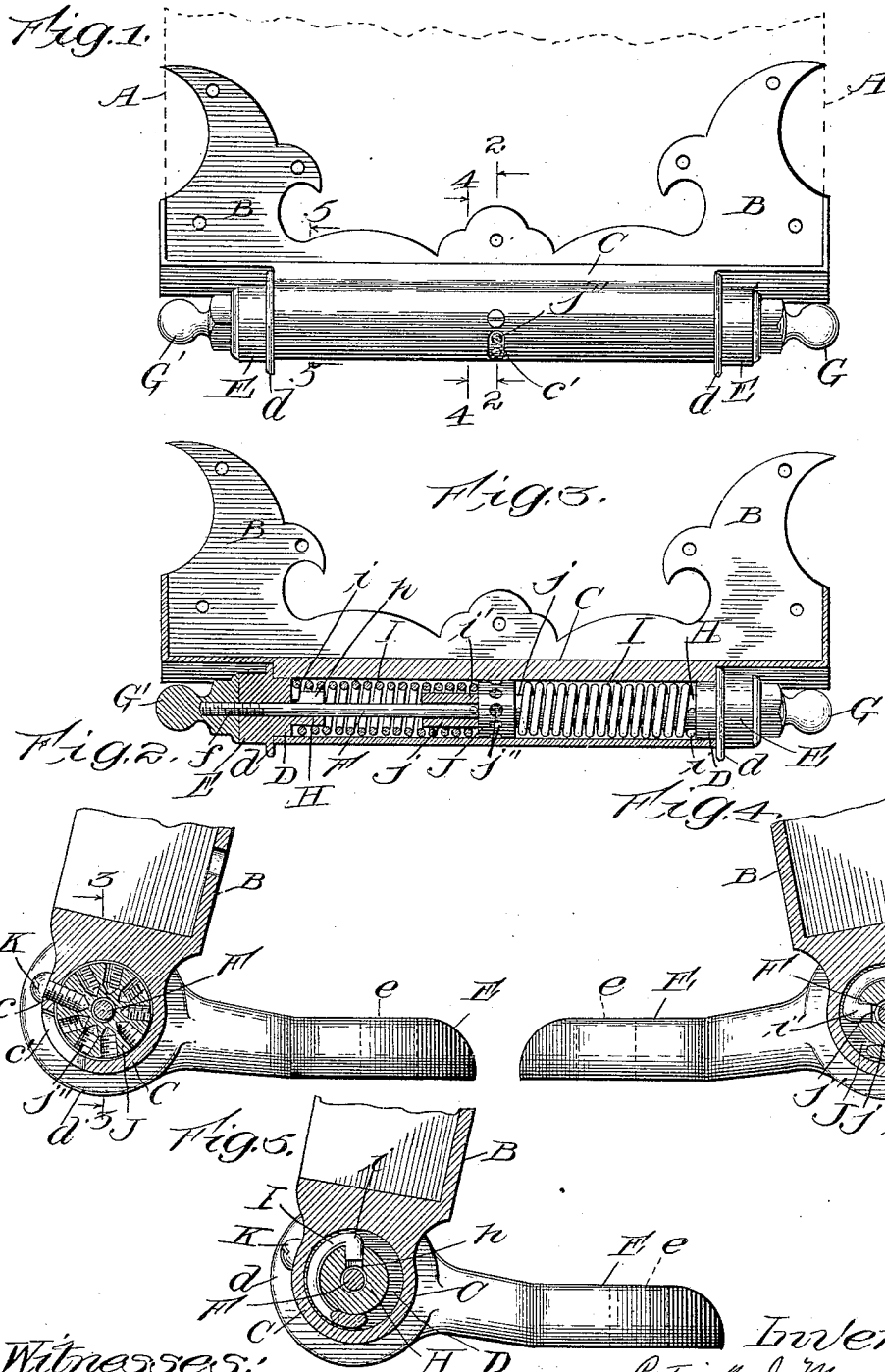


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P. J. MADDEN.
HINGE.

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PATRICK J. MADDEN, OF CHICAGO, ILLINOIS.

HINGE.

No. 841,333.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, PATRICK J. MADDEN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Hinges, of which the following is a specification.

The present invention relates to a spring-hinge, and is particularly adapted for use in water-closets for holding the seat in an elevated position inclining rearward slightly from a vertical position.

In devices of this class neatness, compactness, strength, durability, and efficiency are highly desirable; and, generally stated, the object of the present invention is to provide a spring-hinge which possesses all of these desirable features.

The invention consists in the features of novelty that are hereinafter described with reference to the accompanying drawings, which are made a part of this specification, and in which—

Figure 1 is a front elevation of a hinge embodying the invention, a portion of the seat of a water-closet being indicated by dotted lines. Fig. 2 is a vertical section thereof on the line 2 2, Fig. 1, looking in the direction of the arrow. Fig. 3 is a sectional elevation thereof, the cutting-plane of the section being indicated by the line 3 3, Fig. 2. Figs. 4 and 5 are vertical sections of Fig. 1 on the lines 4 4 and 5 5, respectively.

In the drawings I have shown a hinge for a water-closet seat embodying the invention, and a portion of the seat is indicated by dotted lines at A. It will be understood, however, that the hinge may without departing from my invention be used on doors or other parts to be controlled, and whatever this part may be it is secured to one of the hinge members, which in the instance given in the drawings consists of a metallic plate or fitting B, which is preferably cast with a tube or barrel C, the ends of which are open and occupied by large cylindrical spuds D on brackets E, which form the other hinge members and are provided with openings e for the passage of bolts or other devices by which they are secured to the fixture, door-jamb, or other object.

The invention is not limited to the brackets constructed as here shown, nor is it limited to a tube or barrel which is integral with the plate B. The large spuds D provide cylindrical bearings upon which the tube or

barrel turns as the hinge members move relatively to each other and by which it is centered or held against lateral displacement. By reason of the comparatively large wear-surfaces which they provide the joint will not quickly wear loose, and to still further maintain the joint in proper working order the spuds are provided with flanges d, which engage the ends of the tube or barrel, and they are perforated for the passage of a tie-rod F, one end of which is permanently secured to a head G, while the other end is provided at f with a screw-thread for receiving a nut G'.

Both the head G and the nut G' are polygonal in order that the parts may be tightened by means of wrenches and are preferably provided with similar ornamental features in order to preserve the symmetry of the device. Each of the spuds is provided with a centrally-disposed boss H, provided with a longitudinal notch or recess h, which notches or recesses are disposed diametrically opposite to each other with relation to the tie-rod F. The outer ends of two springs I are slipped onto these bosses, respectively, and the outer extremities i of said springs are turned in radially, so as to enter the notches h, and thereby connect the ends of the springs to the bosses. The inner ends of the springs are slipped onto bosses j, formed on the opposite sides of a cylindrical block J, the inner extremities i' of the springs being turned in radially to enter longitudinal notches j' in the bosses j, respectively, said notches being disposed diametrically opposite to each other. The diameters of the springs and of the block J are such that they fit snugly in the tube or barrel C, and the block is provided with a number of radially-disposed screw-threaded sockets j'', any of which is adapted to receive a correspondingly-threaded screw K, which passes through an opening c of the tube or barrel C.

The tube or barrel is provided also with an elongated opening c', disposed so as to give access to the sockets j'' and admit a pin or key for turning the block when the screw K is removed. This is for the purpose of putting the springs under more or less initial tension if it is found desirable to do so; but in practice I have found it desirable to make the springs exactly of such length that when the part A is in its normal position they will be under no tension whatever. The advantage of this is that the life of the springs is increased accordingly.

It is well known that springs under constant tension or even when frequently flexed lose their strength, so that even though they are not under any initial tension it will become necessary to adjust the block in order to compensate for the gradual weakening or loss of elasticity of the springs. It will of course be understood that the screw K is the means for transmitting the power of the springs from the block to the barrel. By using two springs of equal length I am enabled to locate the screw centrally with respect to all of the parts, and this has the advantage of centralizing all of the strains and avoiding torsional strains. The strains are distributed equally to the two brackets and their connections, and this has the advantage of enabling the use of brackets of lighter construction than would be required if the entire strain of the springs were transmitted to one only of them. The use of two springs the coils of which are pitched in opposite directions has the additional advantage of enabling the use of lighter springs than would be necessary if only a single spring were used. In a device of this class the load or, in other words, the work to be done by the spring is a fixed and substantially invariable quantity, and this work must be done within a limited space or distance through which the parts move. In addition to this in order to attain the advantages of neatness and compactness the mechanism for doing the work must be confined in a limited space. With these fixed factors taken into consideration the size of the spring also becomes fixed within comparatively narrow bounds.

Bearing in mind the advantage of having the spring do its entire work in the before-mentioned limited distance of movement, there is a decided advantage in using a two-part spring. Its diameter being necessarily limited, it is necessary to use a comparatively great number of coils in order to avoid straining it beyond the limit of elasticity. If the given number of coils were incorporated in a single spring, in order that this spring might do the work required of it it would be necessary to make it of very much stronger wire than is required when the spring is made in two parts. This is particularly true when the parts are so constructed and arranged that the spring is relieved of all tension when the member B is in normal position.

I prefer to make the two-part spring of slightly greater length than the space provided for it between the spuds D, so that in order to draw the flanges *d* into contact with the ends of the barrel the spring must be slightly compressed. The advantage of this is that it increases the friction between the head of the tie-rod, the nut on the tie-rod, and the outer faces of the brackets, and thereby prevents the nut from working loose. The block J is perforated for the passage of the

tie-rod, and the notches *j'* open into the perforation. They are preferably disposed at diametrically opposite points in order to avoid unnecessary weakening of the block on one side and to more evenly distribute the strains. This latter is also the object in locating the slots *h* diametrically opposite each other.

As before intimated, the hinge is not limited to use on any particular object, but being particularly adapted for use on water-closet seats this embodiment of it has been selected for the purpose of this application. In order to adapt it for doors or other movable objects, it is simply necessary to make the part or fitting B of the proper shape.

It is manifest that the spring may be used for holding the door or other object in either closed position or open position and that it may be made either right or left by simply turning the two-part spring end for end. The two parts of the spring are shown in the drawing, as being made of separate pieces of wire; but this is merely incidental, the essential feature being that its two parts or halves shall be pitched in opposite directions.

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

1. In a device of the class described, the combination of a pair of springs pitched in opposite directions, a tubular hinge member containing the springs, a block engaging the inner ends of the springs, adjustable means for transmitting pressure from the block to the tubular hinge member, and a pair of independent brackets having cylindrical bearings for the outer ends of the tubular hinge member, against which brackets the outer ends of the springs react, substantially as described.

2. In a device of the class described, the combination of a pair of springs pitched in opposite directions, a tubular hinge member containing the springs, a block engaging the inner ends of the spring, adjustable means for transmitting pressure from the block to the tubular hinge member, a pair of brackets having cylindrical bearings for the outer ends of the tubular hinge member and against which the outer ends of the springs react, and means including a rod extending through the tubular hinge member for connecting the bearings, substantially as described.

3. In a device of the class described, the combination of a pair of springs pitched in opposite directions, a tubular hinge member containing said springs, a block to which the inner ends of said springs are attached, said block being adjustable relatively to the tubular hinge member, means for transmitting pressure from the block to the tubular hinge member, a pair of independent brackets against which the outer ends of the springs react, said brackets having cylindrical bearings for the outer ends of the tubular hinge member and having also portions bearing

against the extremities of the tubular hinge member, and means for forcing said brackets toward each other, substantially as described.

4. In a device of the class described the
5 combination of a pair of springs pitched in opposite directions, a block to which the inner ends of the springs are attached, said block having a number of sockets, a barrel containing the springs and block and having
10 an opening in its side, a device passing through said opening and adapted to engage any of said sockets, and cylindrical bearings upon which the outer ends of the barrel are mounted and against which the outer ends of
15 the springs react, substantially as described.

5. In a device of the class described the combination of a pair of springs pitched in opposite directions, means to which the outer ends of the springs are secured, a perforated
20 block to which the inner ends of the springs are secured, a rod passing through the perforation of the block, and supported by the means to which the outer ends of the springs are secured, a hinge member and means in-
25 terposed between the block and hinge member for transmitting movement from one to the other, substantially as described.

6. In a device of the class described the combination of a pair of springs pitched in
30 opposite directions, a hinge member, means interposed between the inner ends of said springs and the hinge member for transmitting movement from one to the other, a pair of brackets to which the outer ends of said

35 springs are connected, said brackets being perforated, and a rod passing through the perforations of the brackets and through the springs substantially as described.

7. In a device of the class described, the combination of a pair of springs pitched in
40 opposite directions, a barrel containing the springs, a pair of brackets having spuds projecting into the ends of the barrel, means connecting the outer ends of the springs to the spuds and means for holding the spuds in
45 place in the barrel, substantially as described.

8. In a device of the class described, the combination of a pair of springs pitched in
50 opposite directions, a perforated block having bosses projecting into the inner ends of the springs, means for securing the inner ends of the springs to the block, a barrel containing the springs and block, means interposed between the block and the barrel for
55 transmitting movement from one to the other, a pair of brackets having perforated spuds projecting into the ends of the barrel, said spuds having bosses entering the outer ends of the springs, means for securing the
60 outer ends of the springs to the bosses, a tie-rod passing through the spuds and block, and means for holding the tie-rod in place, substantially as described.

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