(No Model.) 2 Sheets—Sheet 1.

# L. V. MOULTON.

## FOLDING BED.

No. 474,849. Patented May 17, 1892.

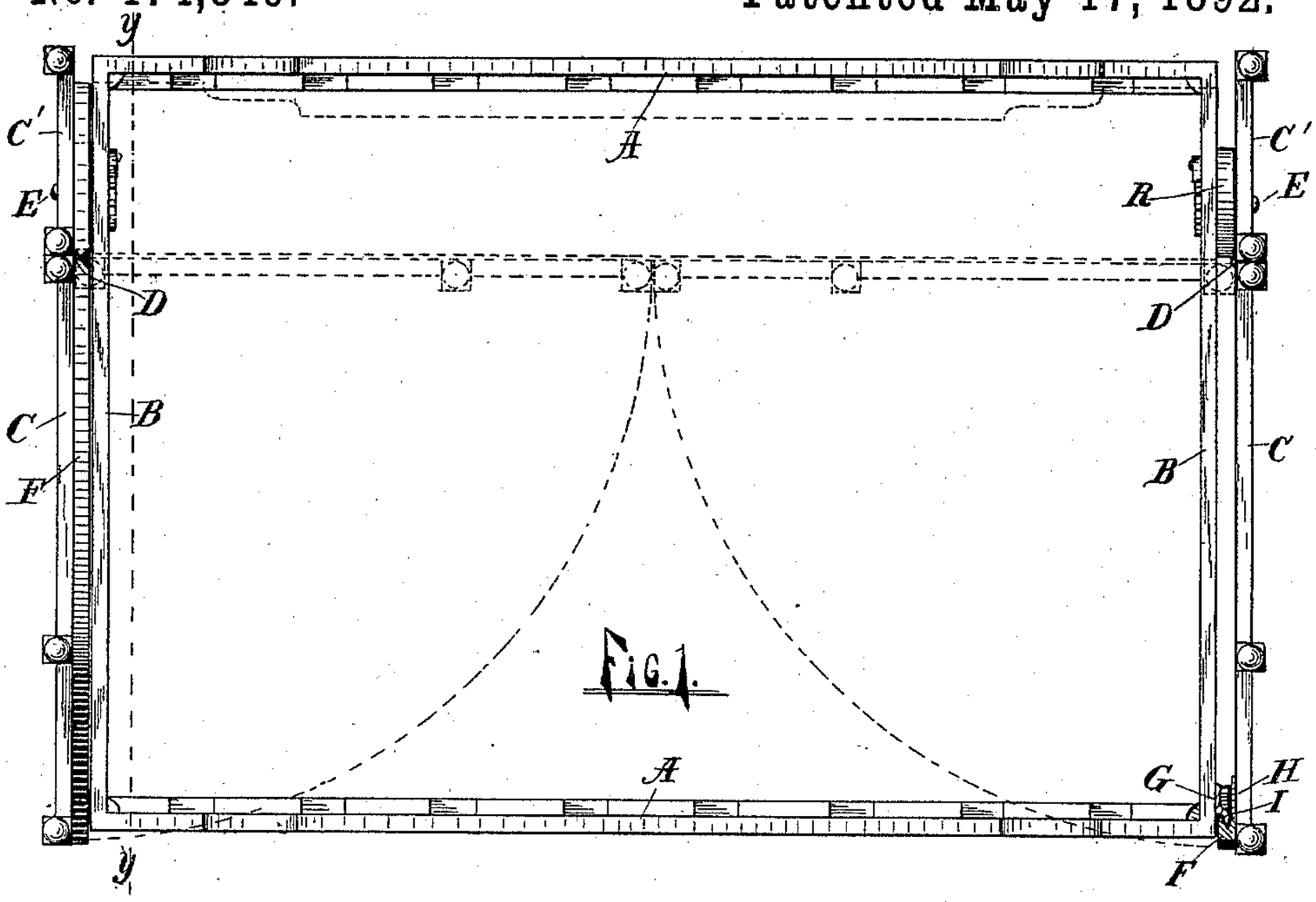


Fig. 1.

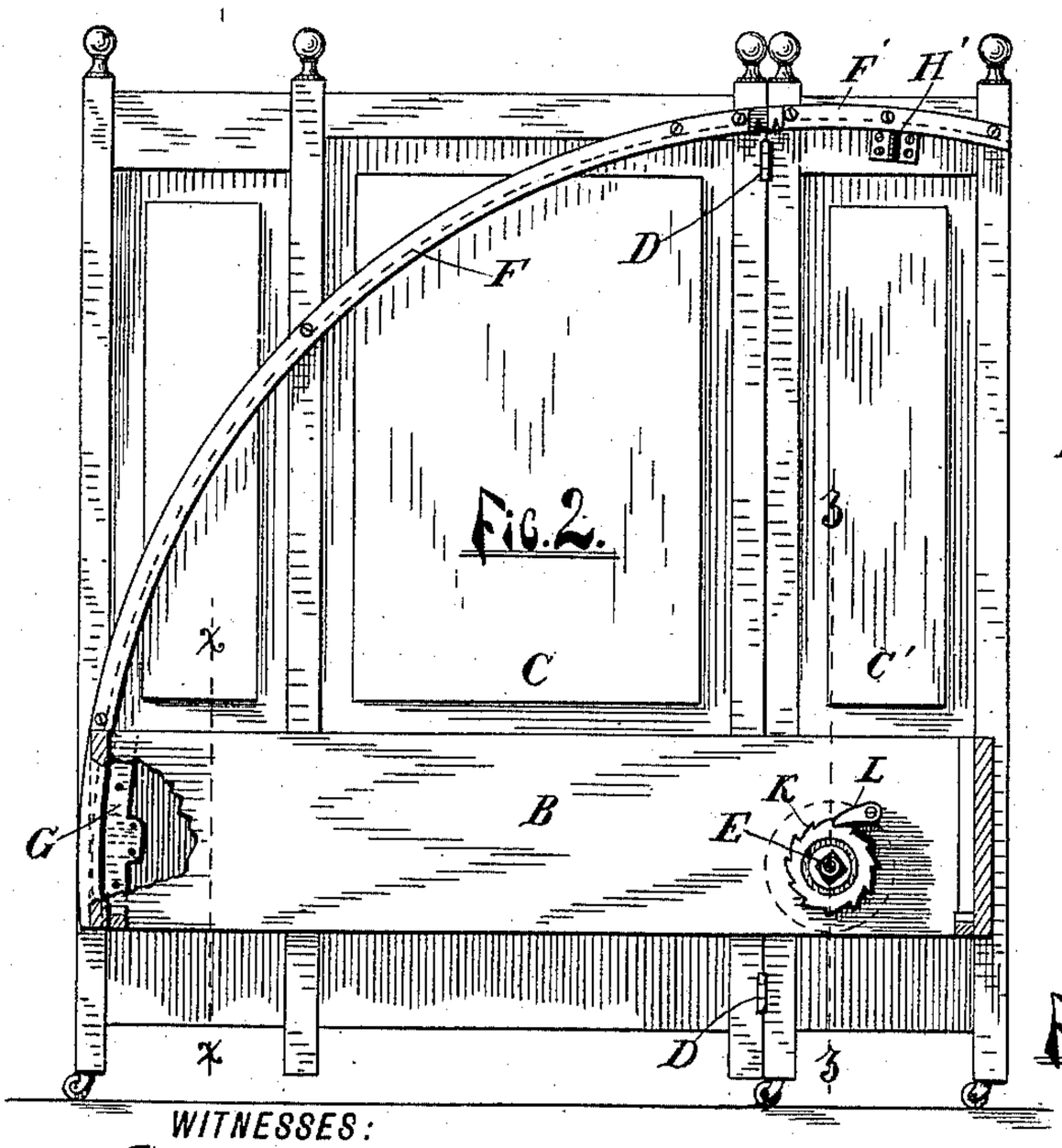


Fig. 2.

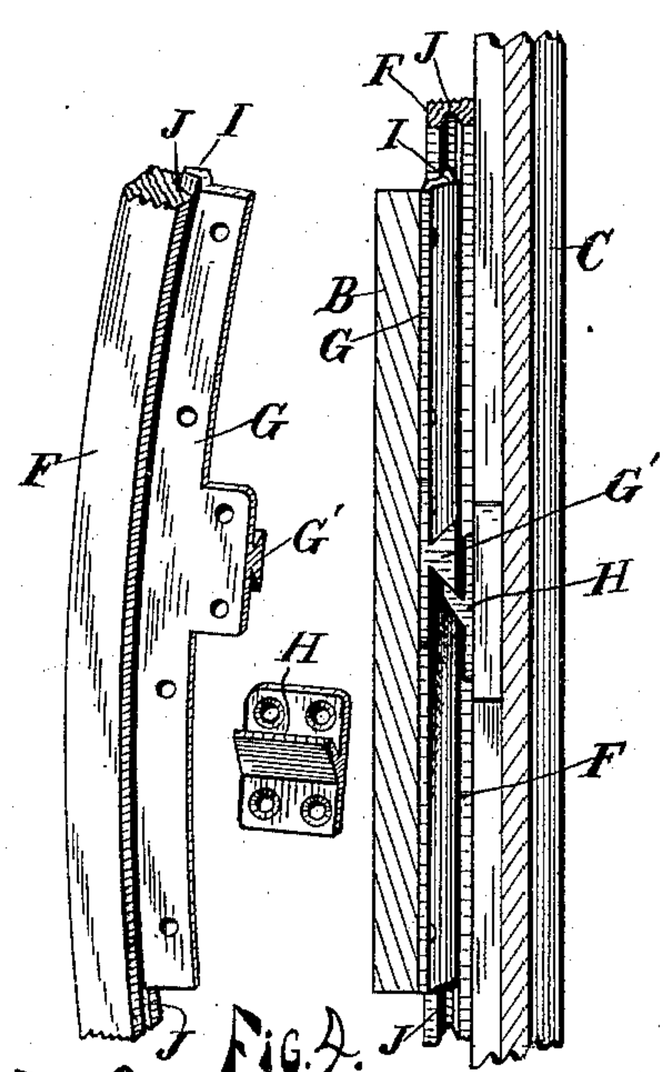


Fig. 3.




Fig. 4. Fig. 5.

WITNESSES:

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Myron Flowers

INVENTOR

Luther V. Moulton

(No Model.) 2 Sheets—Sheet 2.

# L. V. MOULTON.

## FOLDING BED.

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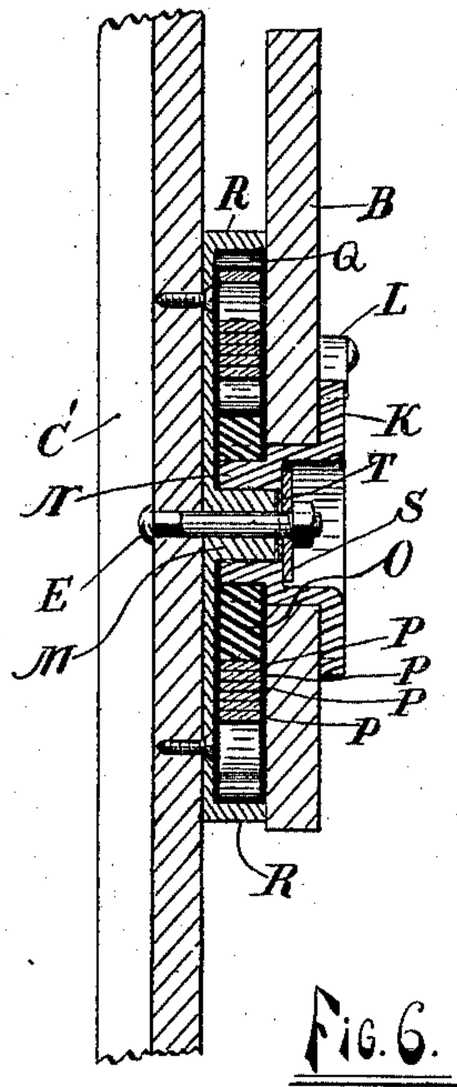


FIG. 6.

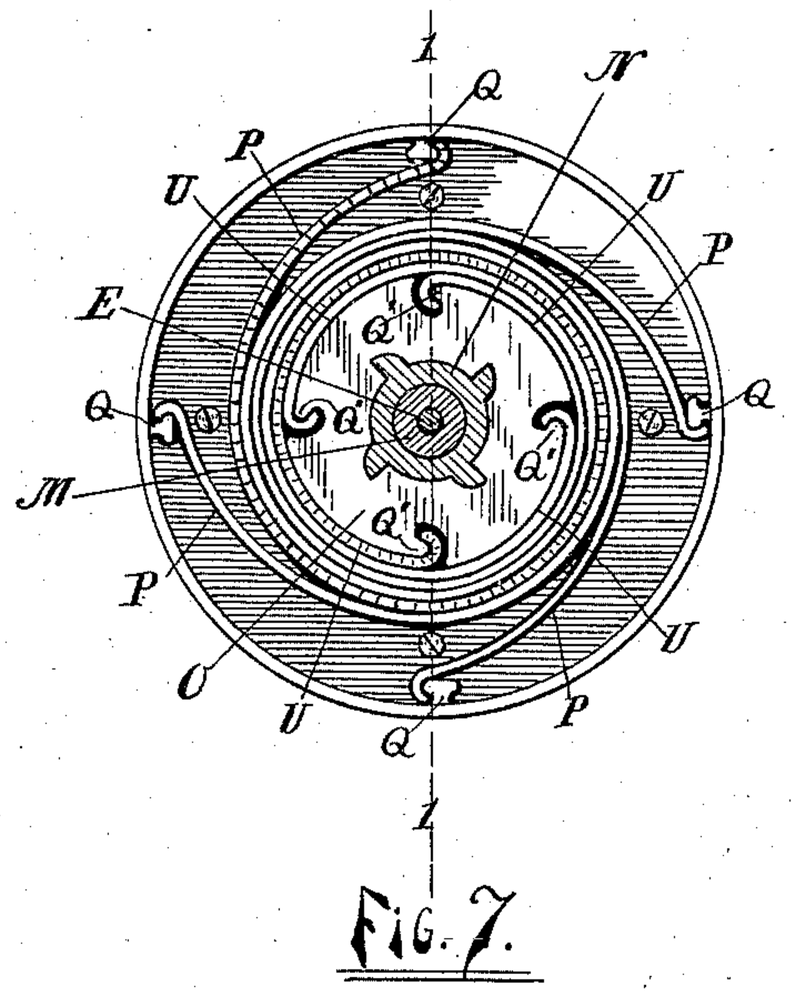


FIG. 7.

WITNESSES:

George W. Shook
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# UNITED STATES PATENT OFFICE.

LUTHER V. MOULTON, OF GRAND RAPIDS, MICHIGAN.

## FOLDING BED.

SPECIFICATION forming part of Letters Patent No. 474,849, dated May 17, 1892.

Application filed February 24, 1891. Serial No. 382,620. (No model.)

*To all whom it may concern:*

Be it known that I, LUTHER V. MOULTON, a citizen of the United States, residing at Grand Rapids, in the county of Kent and State of Michigan, have invented certain new and useful Improvements in Folding Beds; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in folding beds, and more particularly to that class which are pivoted to turn up at one side between the head and foot boards, which latter are adapted to close toward each other and form the front of the case.

The objects of my invention are to provide a structure of the class described that shall be rigid and substantial, easy and convenient of operation, and having certain other novel and useful features hereinafter described, and more particularly pointed out in the claims, reference being had to the accompanying drawings, in which—

Figure 1 is a plan view of a device embodying my invention with a portion broken away; Fig. 2, a vertical section of the same on the line *y y* of Fig. 1; Fig. 3, an enlarged detail of the guide-plate and a portion of the track; Fig. 4, the same of one of the hook-plates; and Fig. 5, the same, showing a vertical section on the line *x x* of Fig. 2; Fig. 6, a vertical section on the line 1 1 of Fig. 7, and Fig. 7 an elevation of the case R and contents.

Like letters refer to like parts in all the figures.

A A are the sides, and B B are the ends, of a rectangular frame adapted to contain the bed.

C C represent the movable sections of the head and foot boards, which are hinged at D D to the respective stationary parts C′ C′ of the same, to which latter at E E are also pivoted the respective ends B B of the bed-frame.

F F are curved tracks arranged concentric to the pivots E E, attached to the respective head and foot boards, cut through at an angle of forty-five degrees opposite the hinges D D to permit of closing the parts C C and having a V-groove in their concave, side with which engage the flanges I I of the guide-plates G G, which plates are attached to the ends of the bed-frame B and B near the corners opposite to the pivots E E. Said plates have also the hooks G′, each having oppositely-inclined faces to engage the hook-plates H, two of which are attached to the respective head-boards, as shown at H in Fig. 1, to engage the under side of the hooks G′ when the bed is open, and two others to the same, as indicated at H′ in Fig. 2, to engage the upper side of the hooks G when the bed is closed.

R is a short cylindrical case between the bed-frame B and the stationary part C′, secured to the latter, having a central stud M, through which passes the pivot-bolt E, and upon which turns the hub of the ratchet-wheel K, to which hub is detachably secured a ring O, having any convenient number of eccentric faces U, corresponding to the number of springs, (not less than two,) the inner ends of which faces terminate in equidistant hooks Q′. The eccentricity of each face U equals the thickness of one of the flat convolute springs P, which springs have at their inner ends hooks engaging the hooks Q′ and at their outer ends hooks engaging the hooks Q on the inner surface of the case R, which latter hooks are adapted to engage the springs P in either position. These springs are made shorter than the usual forms of flat convolute springs and are of such length that they are fully wound up by turning the hub N a little more than ninety degrees. Said hub N extends through the end B, has the ratchet K on its inner end, with which engages a pawl L, attached to the bed-frame B, and is secured in place by the washer S, which is fixed against the end of the stud M by the pivot-bolt E. Under this washer S are the thin washers T, by increase and decrease of which the device is adjusted to the exact thickness of B, and thus contact insured between the face of the frame B and the rim of the case R to secure rigid parallelism between the surfaces of the end of the bed-frame B and the stationary part C′ of the head and foot boards. By using short springs their tension increases in proper ratio to balance the bed at all points in its movement and I am able to utilize the springs fully. By dividing the service I can use an increased number of thin and flexible springs, thus avoiding breakage; also, I am able to balance

them against each other about the axis and avoid side strain and great friction on the same. By taking out and turning over the springs P and ring O the action is reversed, so that the same may be used at either end of the bed. By the use of the ring O greater leverage for the springs is obtained and a smaller hub may be used, allowing a smaller hole in the ends B. The eccentric faces furnish seats for the springs to rest upon and avoid presenting any angle as they reach the next spring, thus furnishing a regular involute curved surface for each spring to wind upon, which guards against breakage. By this construction the frame containing the bed is at all times attached to the respective head and foot boards at both front and rear. The inclined hooks H H′ serve as stops to limit the movement of the same, and also when engaged with the hooks G′ tend to force the flange I against the inner side of the groove J. The long bearing of the guide-plates, together with the assured contact between the ends B B and the cases R R, tend to secure satisfactory stability without otherwise connecting the head and foot boards to each other. The track and plate also serve to guide the head and foot boards to place and also automatically secure the horizontally-movable sides of the head and foot boards to the vertically-movable side of the bed-frame.

What I claim is—

1. In combination, a frame adapted to contain a bed, head and foot boards to which the said frame is pivoted near one side, curved guide-plates attached to the said frame near its opposite side, and curved tracks engaging said guide-plates and attached to said head and foot boards, substantially as described.

2. The combination, with a frame adapted to contain a bed and head and foot boards vertically divided and hinged, one part of each board pivoted to the end of said frame and covering the end thereof when closed, the other parts of said boards swinging inward and covering the bottom of said frame when closed, of curved tracks attached to said boards, concentric to said pivots and divided opposite the hinges of said boards, and guide-plates attached to said bed-frame and engaging said tracks, substantially as described.

3. In a folding bed, the combination of a frame adapted to contain a bed and a case having stationary sides pivoted to said frame, and a front hinged to said sides opening in line with said sides and permitting said frame to open between the same, curved tracks attached to the inner surface of said case, concentric to said pivots, and guide-plates secured to said frame and engaging said tracks, substantially as described.

4. In a folding bed, a frame adapted to contain a bed, head and foot boards pivoted thereto, curved tracks attached to said boards concentric with said pivot, guide-plates attached to said frame and engaging said tracks, inclined hooks on said guide-plates, and oppositely-inclined hooks on said boards, engaging the hooks on said guide-plates, substantially as described.

5. In a folding bed, a cylindrical spring-case having a central stud, a hub journaled on said stud and supporting the bed-frame, a ring surrounding said hub and detachably secured to the same, and a series of convolute springs attached to said ring at one end and to said case at the other end, substantially as described.

6. In a folding bed, in combination with a frame adapted to contain a bed and a case to inclose the same, a cylindrical spring-case, a hub journaled therein and supporting said frame, a ring detachably secured to said hub and having eccentric faces forming portions of involute curves, and a series of convolute springs attached to said ring and case, substantially as described.

7. In a folding bed, in combination with a frame adapted to contain a bed and a case to inclose the same, a cylindrical spring-case attached to said case, having an annular bearing-surface engaging the surface of said frame and a central stud having an axial bolt, a hub journaled on said stud, said hub passing through said frame and having a ratchet engaging the inner surface of the same, a pawl on the frame engaging said ratchet, a washer surrounding said bolt and securing the hub in place, and adjusting-washers between said washer and the end of said stud, substantially as described.

8. In a spring-balancing mechanism for folding beds, a cylindrical case having a central stud and oppositely-inclined hooks on its inner surface, a hub journaled on said stud, a detachable and reversible ring on said hub, and a series of flat convolute springs attached at their inner ends to said ring and at their outer ends detachably and reversibly attached to said hooks, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

LUTHER V. MOULTON.

Witnesses:
MYRON FLANDERS,
GEORGE W. SHOOK.