(No Model.) 3 Sheets—Sheet 1.

J. P. HAYES, F. ANSLEY & W. ESCHENBRENNER.

FOLDING BED.

No. 442,725. Patented Dec. 16, 1890.

Fig. 2.

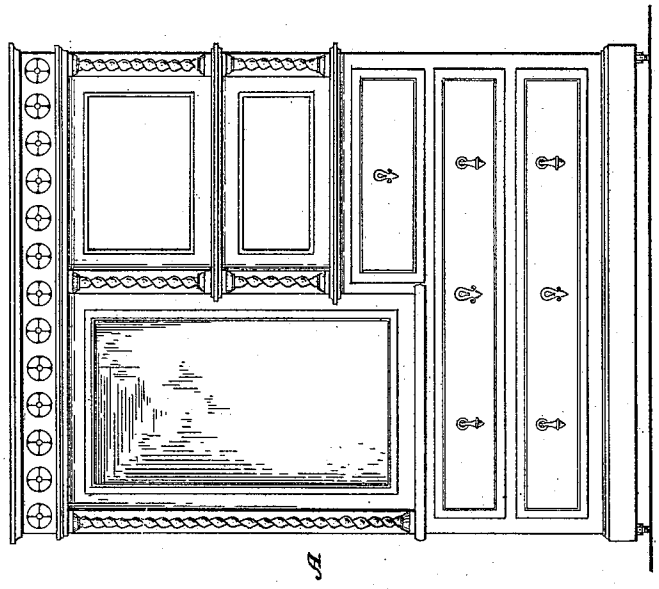
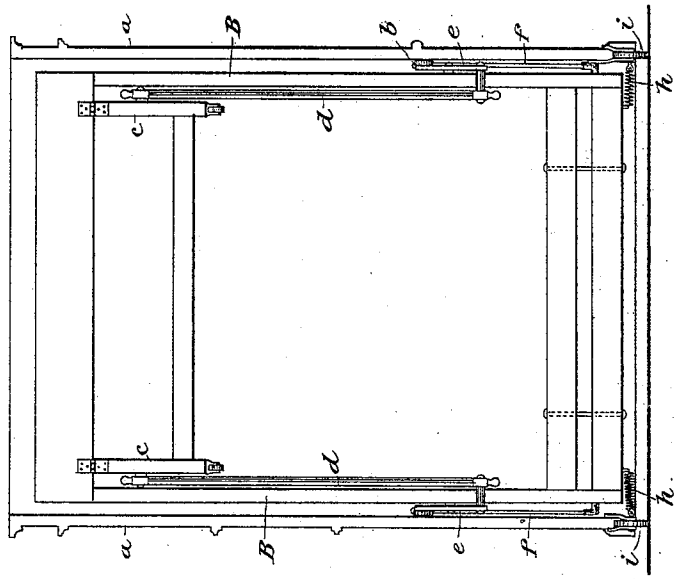


Fig. 1.



INVENTOR:
James P. Hayes.
Frederick Ansley,
William Eschenbrenner,
By Henry Connett
Attorney.

WITNESSES:
J. Boatwright
E. B. Bolton

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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J. P. HAYES, F. ANSLEY & W. ESCHENBRENNER.

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Fig. 3a.

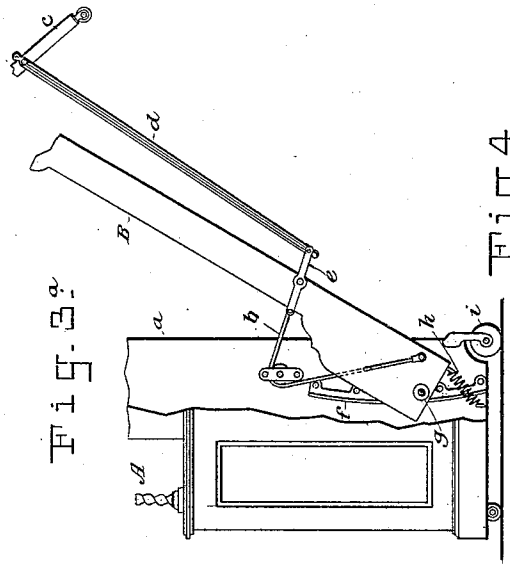


Fig. 4.

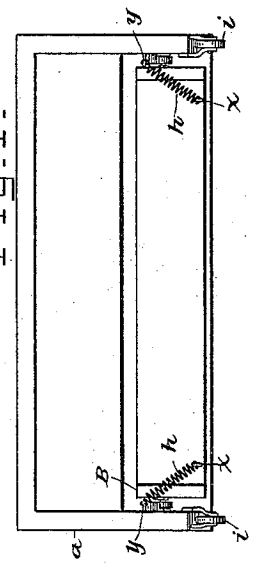
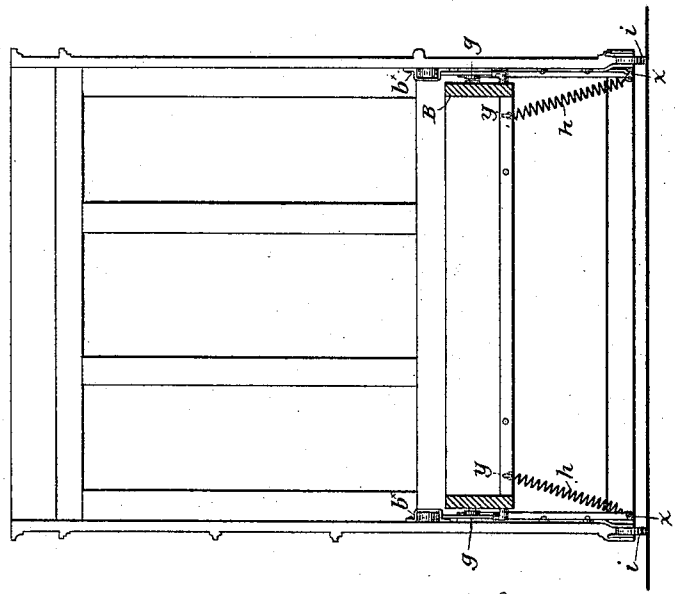


Fig. 3.



James P. Hayes. INVENTOR:
Frederick Ansley.
William Eschenbrenner,

WITNESSES:
J. Boaplinger
E. B. Bolton

By Henry Connett
Attorney.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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Fig. 6.

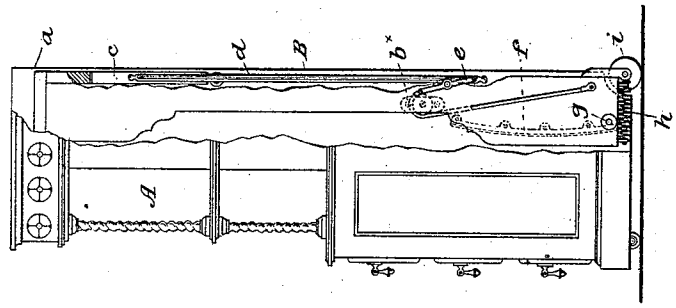


Fig. 7.

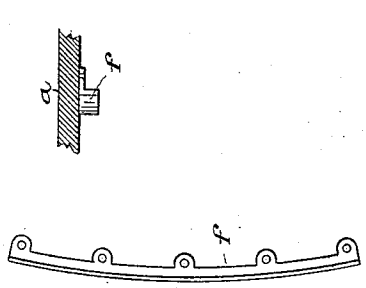


Fig. 5.

James P. Hayes
Frederick Ansley.
William Eschenbrenner,
INVENTOR:

WITNESSES:
E. B. Bolton

By Henry Connett
Attorney.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JAMES P. HAYES, OF MOUNT VERNON, FREDERICK ANSLEY, OF BROOKLYN, AND WILLIAM ESCHENBRENNER, OF NEW YORK, ASSIGNORS TO THE STANDARD FOLDING BED COMPANY, OF NEW YORK, N. Y.

FOLDING BED.

SPECIFICATION forming part of Letters Patent No. 442,725, dated December 16, 1890.

Application filed June 10, 1890. Serial No. 354,911. (No model.)

To all whom it may concern:

Be it known that we, JAMES P. HAYES, FREDERICK ANSLEY, and WILLIAM ESCHENBRENNER, citizens of the United States, residing at Mount Vernon, Westchester county, Brooklyn, Kings county, and New York city and county, respectively, in the State of New York, have jointly invented certain Improvements in Folding Beds, of which the following is a specification.

Our invention relates to that class of beds known as "folding" or "turn-up" beds, and particularly to that description of such beds wherein a spring or springs are employed to counterbalance or partially counterbalance the bed-frame and bedding.

Our improvements are more especially adapted to that construction of folding bed wherein the bed-frame is suspended between the extension-posts of the standard as distinguished from those wherein the said frame is mounted on and turns about pivots. The head of the bed-frame so suspended is provided with track-rollers, which roll on curved tracks fixed, respectively, to the inner faces of the extension-posts; and our invention consists, in part, in the peculiar shape of these tracks as distinguished from the shape or configuration of the tracks formerly employed in folding beds.

In the accompanying drawings, illustrative of our invention, Figure 1 is a rear view, and Fig. 2 a front view, of a folded folding bed embodying our improvements. Fig. 3 is a sectional front elevation of the bed as it appears when turned down. The plane of the section is indicated by line 3 3 in Fig. 5. Fig. 3^a is a fragmentary side view showing the bed-frame partly folded. Fig. 4 is a view of the under side of the bed as it appears when folded up. Figs. 5 and 6 are side views of the bed, the former showing the bed-frame turned down and the latter showing it folded up. In these views the extension-post in front is partially broken away in order to disclose the parts behind the same. Fig. 7 is an enlarged view of the curved track detached.

A represents the standard or upright standing portion of the bed as a whole. The front of this standard may be constructed and ornamented in any desired manner.

B is the bed-frame or that portion of the bed which folds up into the standard at the back thereof. In the construction represented we have shown the bed-frame suspended at its head between the extension-posts *a a* of the standard by flexible cords or chains *b b*, which play or run over pulleys or sheaves $b^{\times}$, secured to the inner faces of the respective posts *a a*. At its foot the bed-frame is supported on folding legs *c*, which are coupled by rods *d* to intermediate levers *e*, pivotally attached to the side rails of the bed-frame and connected, respectively, at their other ends to the said cords or chains *b b*.

The above-described features may be found in the United States Patent No. 311,623, granted to Lyman W. Welch February 3, 1885, and in the Patent No. 397,766, granted to said Lyman W. Welch February 12, 1889, and we make no claim to them herein, nor do we limit ourselves to the use of them.

On the inner faces of the respective extension-posts *a* are secured curved tracks *f*, one of which is seen detached in side and end elevation in Fig. 7. These tracks are so placed that when the bed-frame is turned up or down rollers *g* on the respective side rails thereof at the head of the frame roll on said tracks and guide the bed-frame in its movements. The bed-frame is counterbalanced in its movements by coil-springs *h*, the special arrangement of which forms an important part of our present invention. In this class of folding beds—that is, beds wherein the bed-frame B is suspended as distinguished from pivoted, and arranged to fold in between extension-posts *a*, provided with tracks—the bed-frame swings from the points of suspension, and is free to sway laterally between the extension-posts. To steady the head end of the bed during the latter part of its movement when being pulled down, we attach the springs to the extension-posts at one end and near the bottom of the latter and to the head of the bed-frame B at some distance inward from the side rails of the latter, whereby the springs extend obliquely inward from said extension-

posts, as seen in Fig. 3. Consequently, when the bed-frame is turned down, the strain put on the springs exerts a lateral pull on the head end of the bed-frame, one spring pulling against the other, and this serves to steady the bed-frame in its movements while the springs are under tension. In this class of beds there is also a tendency when the suspended bed-frame is folded up for the pillows and bedding at the lower or head end to force this end of the bed-frame outward or away from the standard at the back. This tendency is counteracted in our bed by the arrangement of the springs, (see Figs. 4 and 6,) which latter will be under tension when the bed-frame is folded up and will draw the bottom or head of the latter up to or toward the standard. This tension on the springs is brought about by attaching them to the lower edge of the head end of the bed-frame B at x x in Fig. 4 and to the inner faces of the respective extension-posts a at y y in Fig. 4 just below the level of the head of the folded bed-frame when the latter is turned up, as in Fig. 6. Thus the springs stand under these conditions with their axes in a horizontal plane.

The springs are loosely connected or swiveled to the parts at their extremities, and are free to turn at these points in any direction, so as to adapt themselves to the change of position necessitated by the movements of the bed-frame, and they will be under a greater tension when the bed-frame is folded to a vertical position than when it is at a position of about seventy degrees from the horizontal, which is the position represented in Fig. 3. When in this position, the tension is practically all taken off from the springs. When folded up, as in Fig. 6, the springs tend, however, only to draw the lower end of the bed-frame up to the standard A and not to turn it down.

In order to lessen the tendency to overturn the standard A in pulling down the bed-frame, we place the springs h in such a position that when viewed as seen in Fig. 5 the axis of the spring will be nearly or quite upright when the bed-frame is drawn down, its point of attachment y to the extension-post at the side of the standard being almost directly under its point of attachment x to the bed-frame and in front of a vertical plane passing through the two points of suspension $b^{\times}$. As the casters i on the rear edges of the extension-posts form the fulcrum on which the standard must turn, the attaching-points y of the springs are brought as far backward as may be in order to reduce the leverage as much as possible. It will be noted that in this bed the bed-frame B is a lever with its fulcrum at $b^{\times}$ and the weight at y, and this lever tends to overturn the standard A backward on the casters i as a fulcrum or turning-point; but as a vertical line drawn through the fulcrum-point $b^{\times}$ (see Fig. 5) falls forward of the casters i, the downward pressure at the point $b^{\times}$, which exists while the bed-frame is being pulled down, substantially neutralizes the upward pull at the point y exerted by the spring h. Consequently there is practically little or no overturning force exerted by the pulling down of the bed-frame while the spring is yielding.

In the folding beds heretofore constructed which employ suspenders for the bed-frame and curved tracks to guide it in its movements the track has been made up of reverse curves. The form of such a track is clearly illustrated in Fig. 2 of the patent granted to Welch, No. 311,623. We find that this form of the track offers a resistance to the pulling down of the bed-frame at just the point where the force tending to overturn the standard approaches the maximum, and consequently it increases the danger to the user. Of course this is not so material where the standard is to be secured to the wall, as contemplated in said patent to Welch; but our bed is not designed to be secured in such a manner, and in order to avoid this tendency to overturn the standard at the point stated we give to the head end of the standard a guided movement in a plain circular curve by giving to the operative portion of the track f (see Fig. 7) the form of a segment of a circle of comparatively large radius, avoiding reverse curves or irregularities in its contour, as clearly shown. We do not limit ourselves to any exact proportions for the curve of the track, but prefer that the radius of said curve shall be about three times the operative length of the track or the distance traveled by the roller g in turning the bed-frame up or down. When in place on the extension-post a, the upper and lower ends of the track will be situated, preferably, at about the same distance from the vertical edge of said standard.

We would call attention to the fact that substitutes or mechanical equivalents of the suspending chains or cords b and their pulleys $b^{\times}$ have been employed in folding beds, and by the descriptive term "suspended bed-frame" we mean to be understood as referring to any device of this character as distinguished from the pivots commonly employed for supporting the bed-frames of folding beds.

The coil-springs h are arranged, as will be seen by inspection of Figs. 5 and 6, to exert their force in a transverse substantially vertical plane when the bed-frame is turned down and in a substantially horizontal plane when said frame is folded up.

The bed-frame will be provided, by preference, with a bottom of woven wire under tension in the usual way; but we have not deemed it necessary to show this woven wire in Figs. 1 and 3.

We have shown our improvements as applied to a folding bed wherein the bed-frame is suspended between the suspension-posts on links in the form of chains; but they are applicable as well to those well-known forms of suspended beds where the suspending-links are not flexible, like chains, but rigid between

the points of suspension and the points of attachment to the bed-frame. Examples of such rigid connecting-links will be found in the patents to Adgate and Hickman, No. 262,882, of August 15, 1882, to Adgate, No. 264,596, of September 19, 1882, and others.

Having thus described our invention, we claim—

1. In a folding bed, the combination, with a standard having rearwardly-projecting extension-posts and a bed-frame suspended therein by links, of the counterbalancing-springs secured at one end to the respective sides of the standard below the level of the head end of the folded bed-frame and in front of a vertical plane passing through the points of suspension of said frame and secured at their other ends to the head end of the bed-frame, said springs being nearest together at their points of attachment to the bed-frame, substantially as set forth.

2. In a folding bed, the combination, with a standard having extension-posts and provided with tracks, and a bed-frame suspended in said standard and provided with rollers to roll on said tracks, of the spring or springs *h*, attached to the standard and bed-frame at their respective ends and arranged to stand under tension with their longitudinal axes in a substantially horizontal plane when the bed-frame is folded up, whereby the tension of said springs serves to hold the lower end of said folded bed-frame up to the standard, as set forth.

3. The combination, in a folding bed, of the standard provided with extension-posts and tracks, the folding bed-frame suspended in said extension-posts and provided with rollers to roll on said tracks, and the coil-springs *h*, attached in a loose manner to the extension-posts of the standard at one extremity and to the lower edge of the head end of the bed-frame at the other extremity, said springs being arranged to exert their force in a substantially vertical plane when the bed-frame is turned down and in a substantially horizontal plane when said frame is folded up, substantially as and for the purposes set forth.

4. In a folding bed, the combination, with the movable standard provided with extension-posts, and the bed-frame suspended between said extension-posts and provided with track-rollers *g*, of the tracks *f*, mounted on said standards, said tracks having the form of a plain segment of a circle, substantially as set forth.

In witness whereof we have hereunto signed our names in the presence of two subscribing witnesses.

JAMES P. HAYES.
FREDERICK ANSLEY.
WILLIAM ESCHENBRENNER.

Witnesses:
HENRY CONNELL,
J. D. COPLINGER.