

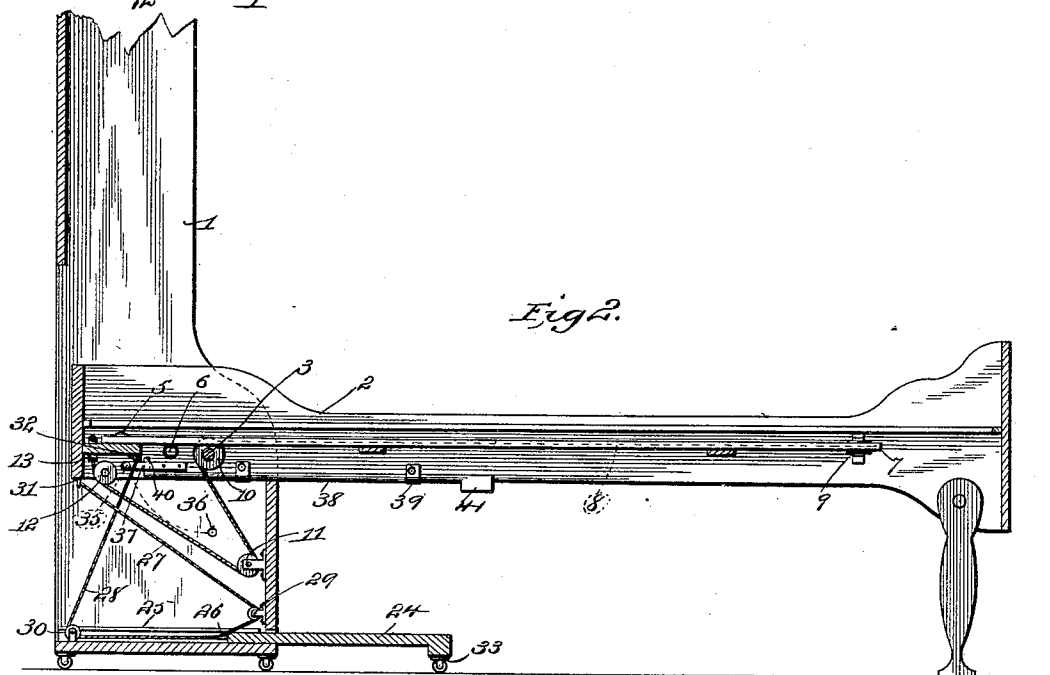
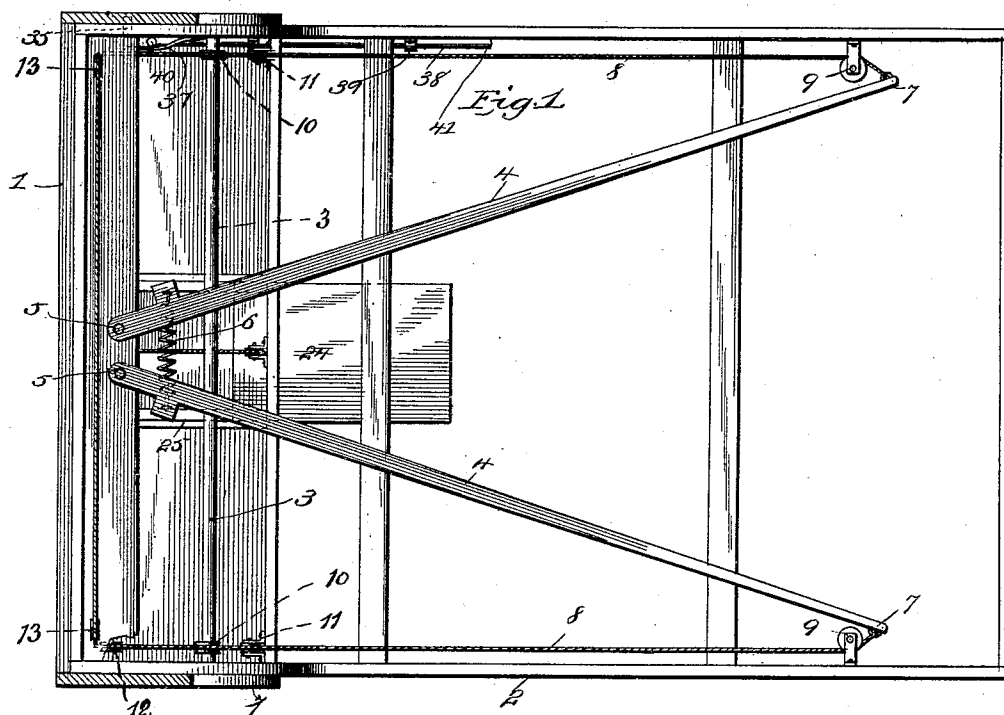
(No Model.)

4 Sheets—Sheet 1.

G. W. SHIPMAN.
FOLDING BED.

No. 496,172.

Patented Apr. 25, 1893.



Witnesses:

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George E. Lewis.

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(No Model.)

4 Sheets—Sheet 2.

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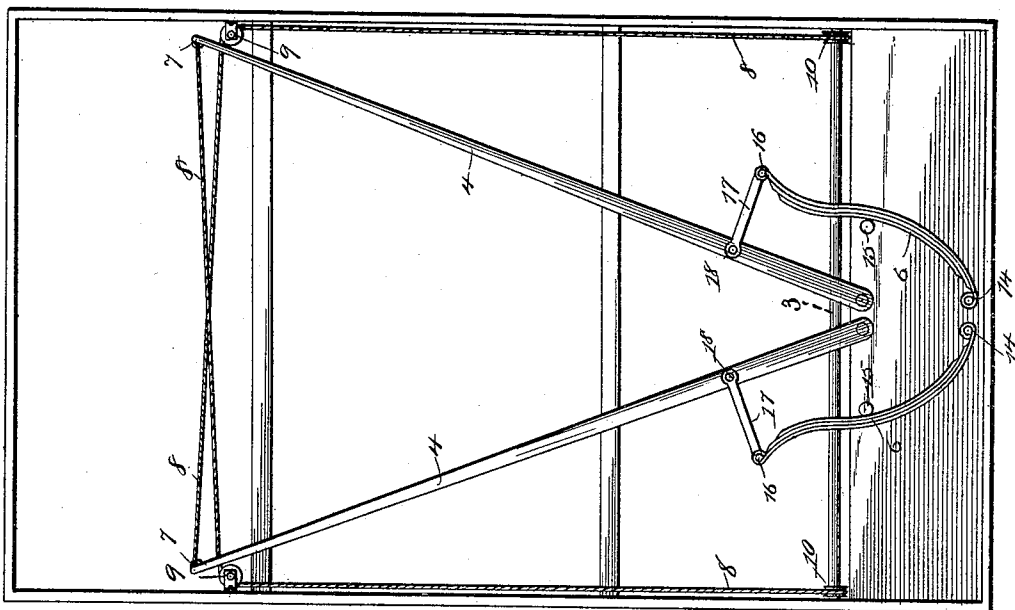


Fig. 3.

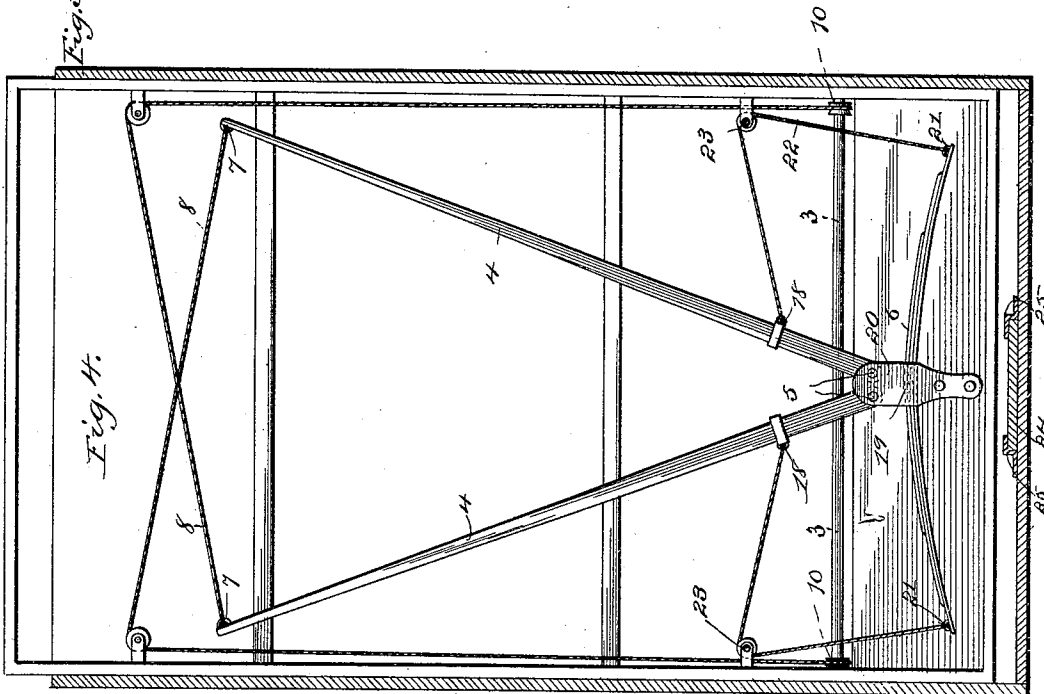


Fig. 4.

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Figs.

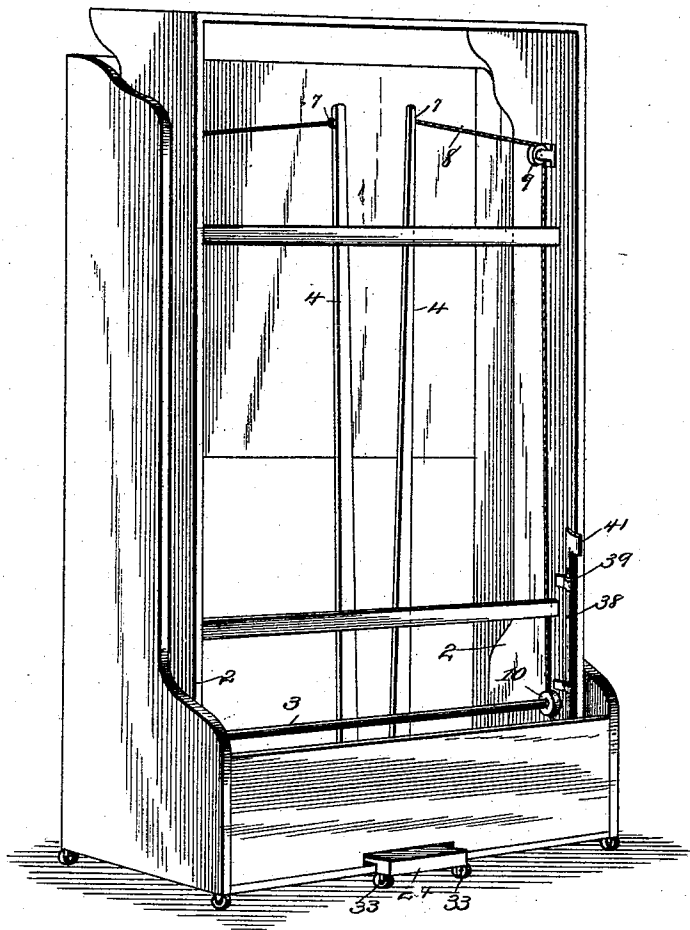
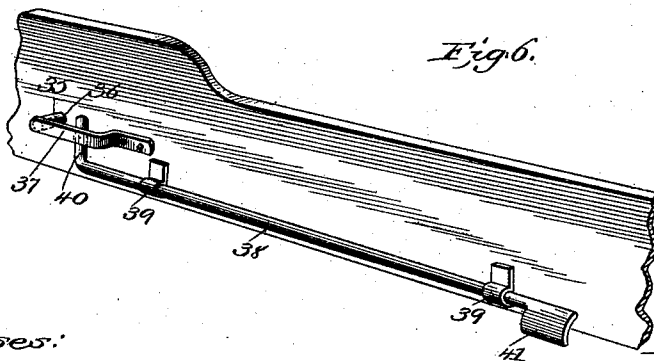


Fig. 6.



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Fig. 7.

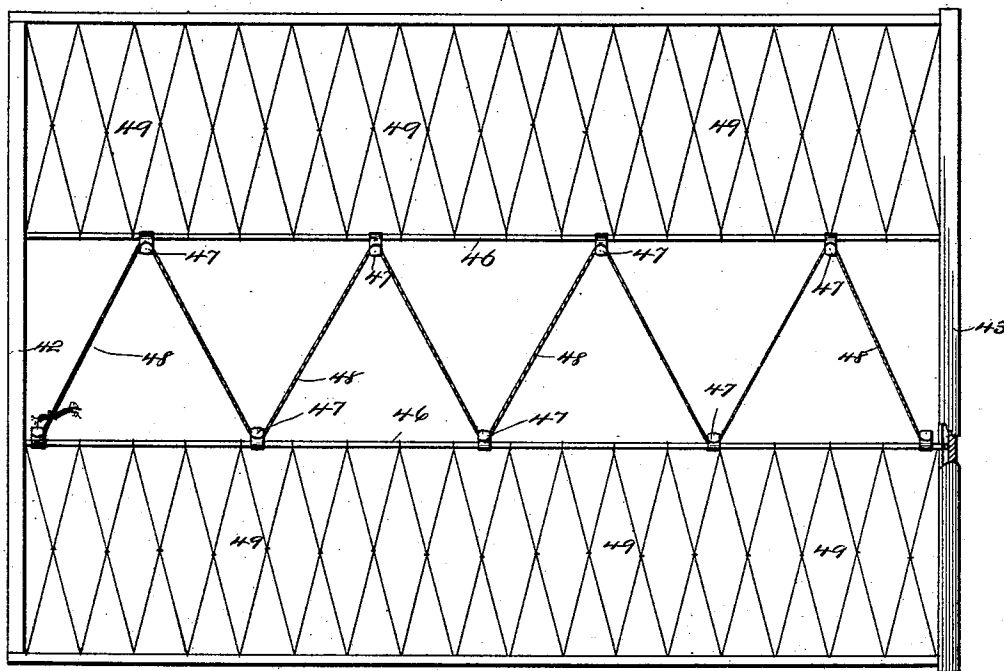
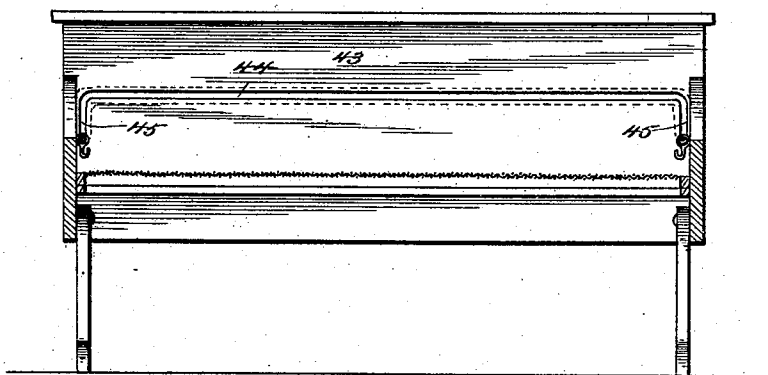


Fig. 8.



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UNITED STATES PATENT OFFICE.

GEORGE W. SHIPMAN, OF WASHINGTON, DISTRICT OF COLUMBIA.

FOLDING BED.

SPECIFICATION forming part of Letters Patent No. 496,172, dated April 25, 1893.

Application filed June 20, 1892. Serial No. 437,296. (No model.)

To all whom it may concern:

Be it known that I, GEORGE W. SHIPMAN, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Folding Beds, of which the following is a specification.

My present invention relates first, to a pair of levers, preferably pivoted in the bed-frame, controlled by a counterbalance spring connected with them near their pivots and having connection at their free ends with the base-frame and the inner end of the bed-frame, the whole serving to extend the range of movement of the counterbalance connections, without requiring excessive range of spring action; second, to an automatically projecting extension suitably guided in the base-frame and operated through the medium of suitable connections with the bed-frame to be projected or withdrawn as the bed is lowered or raised, so that the base changes with the center of gravity and overcomes the tendency of the cabinet or base-frame to tip; third, to an automatic spring bolt which locks the bed-frame relatively to the base-frame when the bed-frame arrives at either limit of its movement, but which is brought within convenient reach for unlocking at the point where the bed is grasped for lowering by a rock shaft or rod which engages the locking bolt at one end and has a pressure plate at the other by which it is controlled; and fourth, to a net-work which may be secured over the bedding, when the bed is to be raised, in order to keep the bedding from becoming displaced while in a vertical position but which may be folded back out of the way when the bed is lowered for use.

My improvement consists in novel features of construction hereinafter described and claimed.

The several parts of my invention will be readily understood upon reference to the accompanying drawings forming part of this specification, and in which:—

Figure 1 is a plan of the bed lowered to horizontal position, the base-frames being shown in section and the bed-bottom removed. Fig. 2 is a central vertical longitudinal section through the base-frame and the bed, the bed-bottom being in place. Fig. 3 is

a plan of the bed-frame showing a modification in the springs and levers of the counterbalance connections. Fig. 4 is a vertical section through the complete bed, the section being taken in a plane just behind the bed frame when in its vertical position and showing a further modification in the counterbalance connections. Fig. 5 is a perspective view of the bed in vertical position, the usual ornamental facing at the bottom of the bed-frame being removed. In this view the counterbalance connections and the automatic slide correspond to those shown in Fig. 1. The locking device is also shown in this view. Fig. 6 is a detail view showing the locking device applied to the side board of the bed-frame. Fig. 7 is a plan of the bed-frame, having applied thereto the net-work and frame for holding the bedding in place. Fig. 8 is a vertical transverse section showing the manner of mounting the sliding stretching rods of the net-work in the head and foot boards of the bed-frame. The foot board alone is shown but it will be understood that the ends of the rods are secured in the head-board in the same way.

Referring to Figs. 1 to 6 inclusive, 1 represents the base-frame, 2 the bed-frame and 3 the horizontal axis upon which the bed-frame turns in the base-frame. In the bed-frame are mounted a pair of counterbalance levers 4 pivoted at 5 near to the head of the frame and having counterbalance springs 6 connected to them near their pivots. These levers have connected to their outer ends 7 counterbalance cords 8 which pass over front pulleys 9 attached at adjacent points in the bed-frame thence over intermediate pulleys 10 journaled on the horizontal axis 3 thence over lower pulleys 11 fixed to the base-frame and thence back to the rear end of the bed-frame. In making this connection at the rear end of the bed-frame, the relative movement of which part to and from the lower pulley 11 occurs with the raising and lowering of the bed, is preferably made by passing the cord over rear guide pulleys 12 and head guide pulleys 13. In practice a single cord is used which passes between the pulleys 13 thence under pulleys 12 thence under pulleys 11, thence over pulleys 10, and thence around pulleys 9 and has its outer ends attached with the outer ends of the levers 4 at 7. By having the cord

thus arranged it will be seen that the force of the spring in lifting or opposing the lowering of the bed-frame is always evenly divided on both sides.

5 In Fig. 1 the spring 6 is a simple spiral spring having its ends attached to the inner ends of the respective levers in such a manner as to tend to draw them together, and the
10 cords 8 pass from the outer ends 7 of the levers around the pulleys 9 on the same side of the bed-frame as the levers, so that when the bed-frame is lowered, the counterbalancing effect is produced by the movement of the
15 head pulleys 13 away from the lower pulleys 11 and the consequent spreading of the levers 4 in opposition to spring 6. In Figs. 3 and 4 springs are shown for the purpose of spreading the levers apart, and the cords 8, instead of
20 passing from ends 7 around adjacent pulleys 9, as in Fig. 1, are led around opposite pulleys 9 and thence over pulleys 10, under pulleys 11, and 12 and over pulleys 13 so that the lowering of the bed and drawing of the cords, brings the levers together in opposition to
25 their spreading springs and the lowering of the bed thereby opposed sufficiently to counterbalance its weight. In Fig. 3 the counterbalance springs are made in the shape of composite leaf springs for strength each having
30 one end secured at 14 to the rear of the bed frame fulcrumed at 15 and having their other ends secured at 16 to links 17 which are in turn pivoted at 18 to the counterbalance levers. In Fig. 4, a single leaf spring 6 is used
35 which extends across the rear end of the bed-frame. This spring is fulcrumed at 19 in a bearing-head 20 in which the counterbalance levers are also pivoted and the ends of said spring 21 are attached by means of cords 22
40 which pass around pulleys 23 to the spreading levers at points 18. This form also tends to spread the levers in opposition to the counterbalance cords which draw them together when the bed is lowered. In all these forms
45 of counterbalance springs and in both arrangements of the levers, the object is to secure a great range of motion in the counterbalance connections with a much shorter range of motion in the counterbalance spring. This,
50 it will be seen, is effectively accomplished in each one of the forms described with reference to Figs. 1, 2, 3 and 4.

In order to provide for maintaining the equilibrium of the device upon its base, while
55 the bed-frame is being pulled down, means may be employed for extending the base in the proper direction simultaneously with the change of the center of gravity and while the bed-frame is being pulled out in approximately a horizontal direction. For this purpose I have shown an automatically sliding
60 extension 24 mounted in guides 25 in the base-frame and having its inner end 26 connected through cords 27, 28 with the rear end of the bed-frame, which cords pass over pulleys 29
65 and 30. These cords are for convenience at-

tached to the bed-frame at 31 and 32. The location of the pulleys 29 and 30 is such that the rear end of the bed-frame swings away from the pulley 29 when the bed is lowered 70 and away from the pulley 30 when the bed is raised. The pulley 29 is located at the outer end of the guide 25 and pulley 30 at the inner end of said guide. The slide 24 is therefore made to project when the bed is lowered 75 and to be withdrawn when the bed is raised. When the bed-frame is in its lowered position and it is desired to retract the extension the rear end of the bed-frame as the latter is folded strikes the cord 28 and pulling on it 80 causes the extension to be retracted. The slide is provided with rollers 33 which run upon the floor.

In order to lock the bed relatively to the base-frame at either limit of its movement, 85 an automatic locking-bolt 35 is provided which bolt enters holes 36 in the bed-frame and base-frame and is forced therinto by means of a spring 37. In order to retract the bolt sufficiently to permit the bed to move relatively 90 to the base-frame, I provide a rock-shaft 38 mounted in bearings 39 and having an angular extension 40 which engages beneath the spring 37. This rock-shaft extends along the side of the bed a sufficient distance to present an eccentric pressure-plate 41 within convenient 95 reach of the hand when the bed is to be raised or lowered. This pressure-plate causes the shaft to rock, the eccentric arm 40 to be thrown out and the locking bolt 35 to be withdrawn 100 from at least one of the parts which it enters. The pressure-plate 41 may be made to project out slightly beyond any ornamental facing or covering which may be utilized for the bed-bottom so as to be within convenient reach 105 and present a neat appearance.

The frame and net-work for holding the bedding in place will be understood upon reference to Figs. 7 and 8. The head-board 42 and foot-board 43 of the bed-frame are 110 each provided with horizontal grooves 44 terminating at opposite ends in vertical grooves 45. The shape of the groove is shown in Fig. 8 and is the same in both head-board and foot-board. A part of the foot board is 115 slightly broken away in Fig. 7 to disclose the depth of the groove while said groove is shown in the head-board in said figure by dotted lines. 46 represents longitudinal rods whose ends enter the respective grooves and the 120 rods are provided with lacing hooks 47 around which is laced a cord 48 for the purpose of drawing the rods 46 toward each other over the bedding. The rods are limited in their movement by net-work 49 which is connected 125 to said rods and to the side boards of the bed-frame. When the bed is to be used, having been drawn to horizontal position and automatically locked, the cord 48 is unlaced from one end and the rods are slid to the 130 respective sides of the bed, dropping into the vertical portions 45 of the grooves. The netting

hangs along the sides or may be tucked down between the bedding and the side-boards. When the bed is to be returned to vertical position the rods are drawn up from the sides over the bedding and the cord 48 laced through the hooks 47. The bed may then be raised in vertical position and the bedding will be held securely in place. If the rods are small and light, the grooves may be made in shape of T-grooves and heads formed on the rods to prevent them slipping out.

Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent:

1. The combination, with a base frame and a bed-frame pivoted therein; of the counterbalance levers, the counterbalance springs secured to the pivot ends of the levers, and actuated by the levers, and connections between the outer free ends of the levers, the base frame, and the inner end of the bed-frame; substantially as described.

2. The combination, with a base frame and a bed-frame pivoted therein; of the counterbalance levers pivoted at the head of the bed-frame, the counterbalance springs secured to the pivoted ends of the levers and actuated by the levers, the front pulleys, the intermediate pulleys, the lower pulleys and connections between the outer free ends of the levers and the inner end of the bed frame passing around the front pulleys, over the intermediate pulleys and under the lower pulleys; substantially as described.

3. The combination, with a base frame and a bed frame pivoted therein; of the counterbalance levers pivoted at the head of the bed-frame, the counterbalance springs secured to the pivot ends of the levers and actuated by the levers, the front pulleys, the intermediate pulleys, the lower pulleys the rear pulleys, the head pulleys, and a connection between the outer free ends of the levers and the inner end of the bed-frame passing around the front pulleys, over the intermediate pulleys, under the lower pulleys, under the rear pulleys and over the head pulleys; substantially as described.

4. The combination, with a base frame and a bed-frame pivoted therein; of the sliding extension 24, the pulley 29 at the front of the base frame, the pulley 30 at the back of the base frame, the cord 27 connected to the inner edge of the extension, passing over the front pulley and connected to the inner end of the bed-frame, and the cord 28 connected to the inner edge of the extension, passing over the back pulley and connected to the inner end of the bed-frame at a point in advance of the other cord; substantially as described.

5. The combination, with a base frame and a bed-frame pivoted therein; of the guides 25 in the base-frame, the extension 24 sliding between the guides having rollers 33, the pulley 29 located at the outer end of the guide, the pulley 30 located at the inner end of the guide, the cord 27 connected to the inner edge of the extension, passing over the outer pulley and connected to the inner end of the bed-frame, and the cord 28 connected to the inner edge of the extension, passing over the inner pulley and connected to the inner end of the bed-frame at a point in advance of the other cord; substantially as described.

6. The combination of the base-frame having a bolt hole 36, a bed-frame, pivoted in the base-frame, having a bolt hole 36, the automatic locking bolt 35, the spring 37 secured to the bed-frame and carrying the bolt, the bearings 39 secured to the bed-frame, and the rod 38 mounted in the bearings having an angular extension engaging the spring and a pressure-plate 41; substantially as described.

7. The combination of the pivoted bed-frame having its head-board and its foot-board provided with horizontal and vertical grooves, the net-work secured to the side-boards, the rods secured to the netting and sliding in the grooves, and lacing by which the rods are secured together; substantially as described.

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