E. C. BROWN.

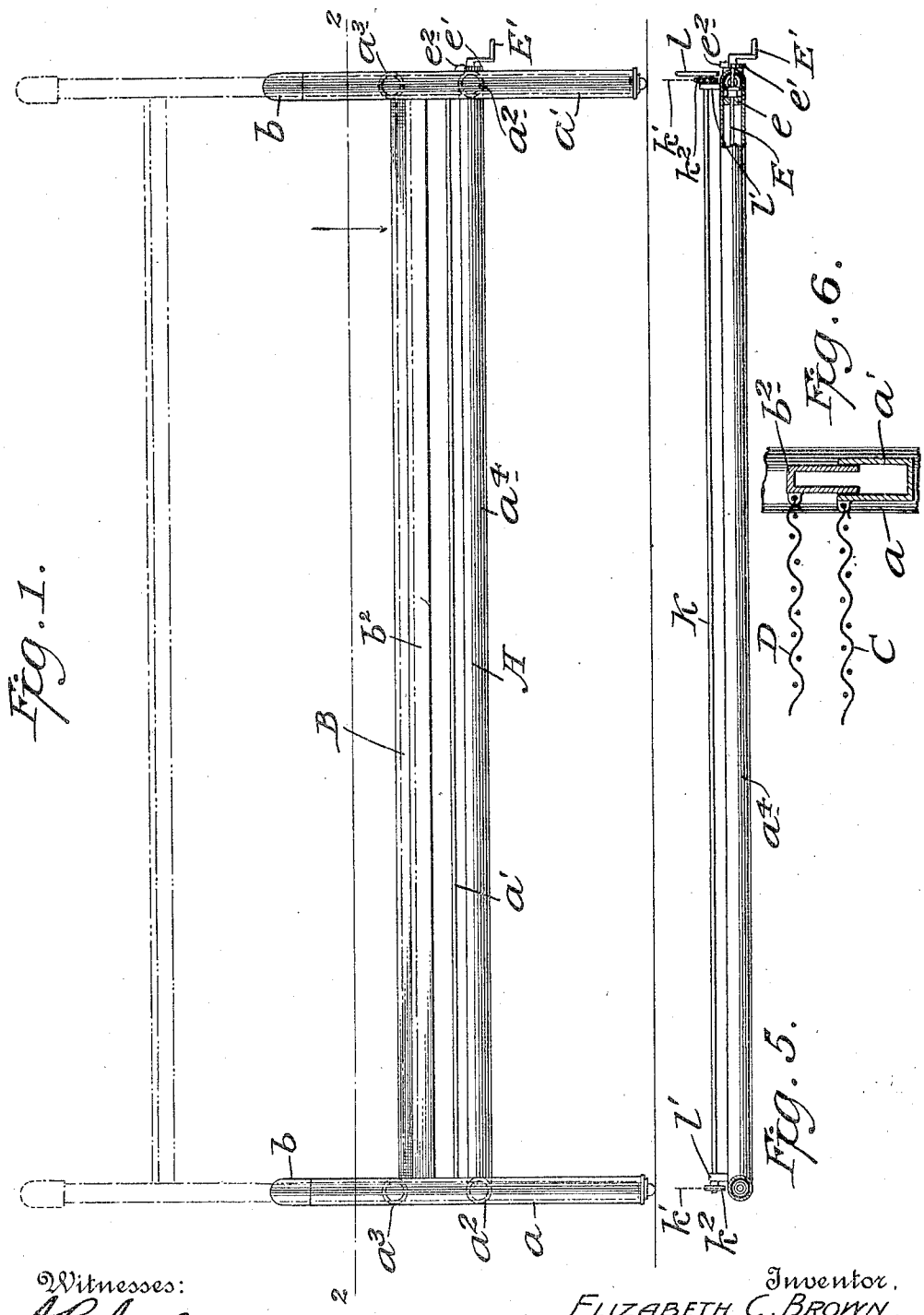
FOLDING BED.

APPLICATION FILED NOV. 6, 1914.

1,319,459.

Patented Oct. 21, 1919.

2 SHEETS—SHEET 1.



Witnesses:

A. R. Appleman

M. C. Rodriguez

Inventor,

ELIZABETH C. BROWN.

By Edson & Bernhard

Attys.

THE COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

E. C. BROWN.

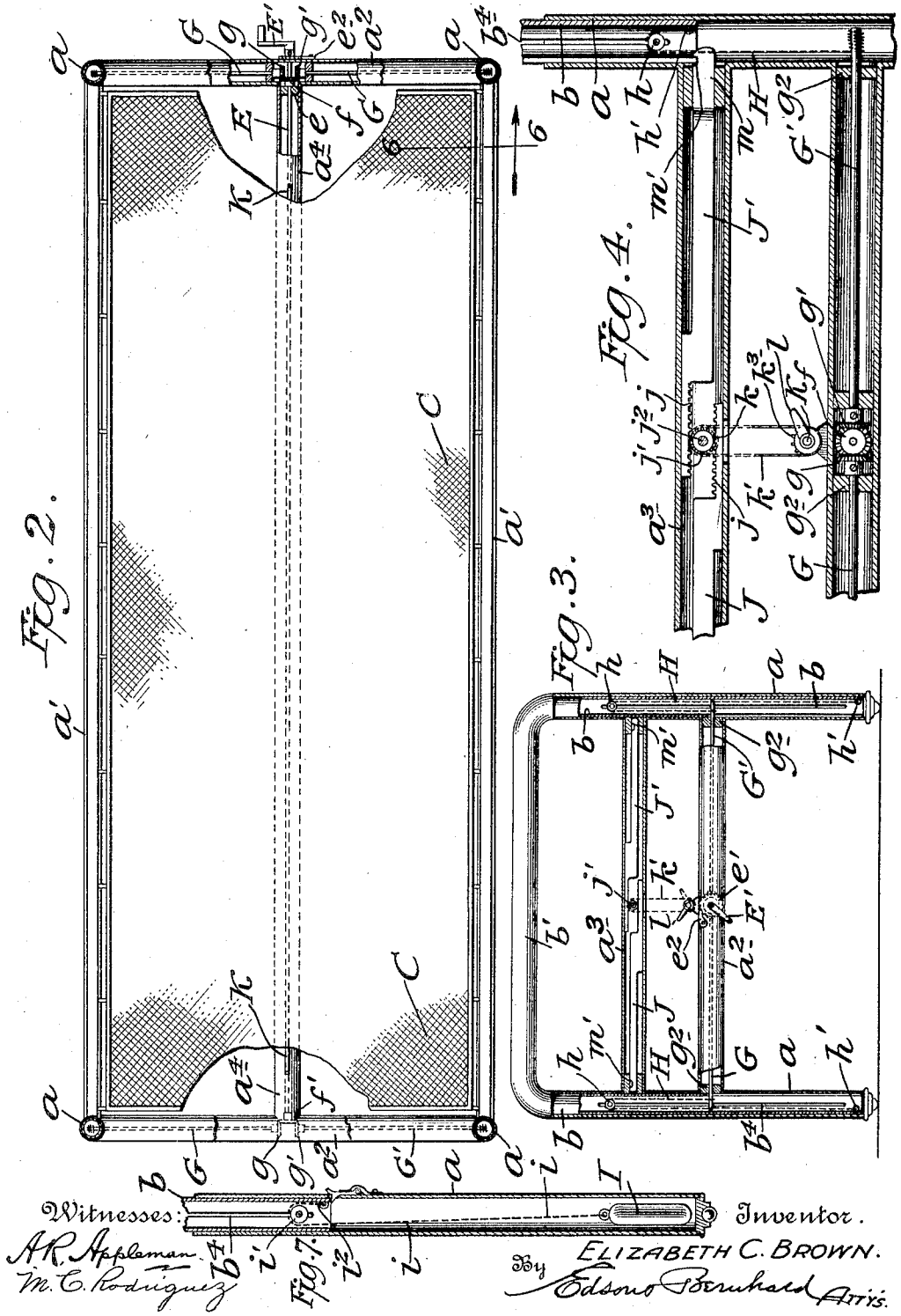
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By ELIZABETH C. BROWN.
Edson & Bernhard Attys.

UNITED STATES PATENT OFFICE.

ELIZABETH C. BROWN, OF NEW YORK, N. Y.

FOLDING BED.

1,319,459. Specification of Letters Patent. Patented Oct. 21, 1919.

Application filed November 6, 1914. Serial No. 870,562.

To all whom it may concern:

Be it known that I, ELIZABETH C. BROWN, a citizen of the United States, residing at the city of New York, borough of Manhattan, county of New York, and State of New York, have invented a certain new and useful Folding Bed, of which the following is a specification.

This invention is a folding bed of a substantially new type which, for the sake of convenient reference, I have termed a "tier" bed from the fact that a plurality of mattresses or springs are employed in such relation to each other that, when the structure is used to full capacity, one mattress or spring is positioned at a proper distance above another mattress or spring.

The bed structure of this invention is unfolded or extended for use in such manner that the area or floor surface occupied thereby is not increased to any appreciable extent, in which respect my invention is differentiated from prior beds of well known types wherein the bed when unfolded takes up substantially twice the space that it occupies when folded.

There are many places, such as in apartments, hotels, marine vessels, etc., where the bed space is too small to use to advantage the folding bed of the sliding variety because the sliding section when drawn out of the other non-sliding element takes up or covers a space equal substantially to that occupied by the non-sliding element. In my invention, however, this most serious objection does not prevail, for the reason that the sliding member is movable upwardly from the non-sliding member when the bed is unfolded, so that the floor area occupied by the bed is not increased, but at the same time the sliding section is capable of folding into compact relation to the non-sliding member so that when collapsed the two members present the appearance of a single bed.

The invention embodies two members each comprising a frame and a spring or mattress, one member having its frame slidably fitted to the frame of the other member for up and down movement relative thereto, that is, the sliding member is movable in a direction at right angles to the plane of the two mattresses or springs.

With the sliding member is associated, first, a system of counterbalance weights whereby the labor of raising the sliding member is reduced to a substantial extent; second, a convenient operating means for raising and lowering the sliding bed member, and, third, locking mechanism of one form or another for securely retaining the sliding member in its raised extended position for use whereby the load imposed upon the sliding member when drawn up for use cannot possibly result in a collapse of the bed to the manifest discomfort or injury of the occupant in the lower non-sliding member.

Other features and advantages of the invention will appear in the course of the following detailed description.

In the drawings,

Figure 1 is a side elevation of a folding bed embodying my invention, the full lines illustrating the bed in its folded position and dotted lines showing the sliding section in a raised operative position.

Fig. 2 is a sectional plan view, the plane of the section being indicated by the dotted line 2—2 of Fig. 1.

Fig. 3 is an end elevation with the tubular posts of the non-sliding section and the sliding section in vertical section in order to illustrate the raising and lowering mechanism and the latch.

Fig. 4 is an enlarged vertical section through the parts of the two bed frames illustrating the operating mechanism, and the latch mechanism a little more clearly.

Fig. 5 is an elevation, partly in section, of the tubular tie member forming a part of the lower non-sliding member illustrating in part the raising and lowering mechanism, and in part the latch mechanism.

Fig. 6 is an enlarged detail section on the line 6—6 of Fig. 2.

Fig. 7 is a vertical section through the telescopic posts of the two bed sections showing a counterbalance whereby the operator is relieved of the weight of the upper section when raising and lowering said upper section.

The two members comprising the bed of this invention are designated at A, B, respectively, the member A being normally stationary, whereas the member B is movable vertically with respect to said stationary member A.

Member A embodies a frame consisting of corner posts a, longitudinal rails a', transverse tubular tie bars a^2 a^3 connecting the corner posts a in pairs, and a longitudinal

tubular tie bar a^4, the latter being suitably joined to the transverse tubular tie bars a^2 at the respective end portions of the bed, all the parts comprising said bed being substantially united so as to retain their proper relation to each other. The longitudinal side rails a' of the stationary bed member A support or carry a spring C indicated diagrammatically in Fig. 6, said spring being of the usual or any preferred construction and attached in any desired way to side rails a; obviously, the spring may be carried on the lower stationary member A by devices other than those herein specifically mentioned, and, further, any suitable equivalent of the spring may be employed for supporting the mattress.

The sliding member B consists of a frame embodying corner posts b, cross bars b' connecting the corner posts b in pairs, and longitudinal rails b^2 rigidly fastened to the corner posts for the purpose of supporting a wire mattress or spring D, the latter being of any suitable construction and attached in any desired way to the longitudinal rails b^2, whereby a mattress and the usual bed clothing may be carried as a load upon the sliding member B of the folding bed. As shown, the corner posts b of the movable member B are tubular and slotted longitudinally at b^4, and, furthermore, the corner posts a of the stationary member A are, also, tubular, whereby the corner posts b of the sliding section B are adapted to slide within the tubular post a of the stationary member A, as clearly shown in Figs. 3, 4 and 7 of the drawings. It is apparent that the upper member B may be moved downwardly from the raised position shown in dotted lines in Fig. 1, so that the corner posts b of said member will slide or telescope within the corner posts a of stationary member A, thus folding the bed so that the members A B thereof will occupy the compact relation shown in Fig. 1 of the drawings, as a result of which the mattress D of the movable member B will be brought into compact and parallel relation to the mattress C of the stationary member A, as disclosed in Figs. 1 and 6. In this connection it will be noted by reference to Fig. 6 that the longitudinal channel rail a' of the lower stationary member A is in telescopic relation to the longitudinal channel rail b^2 of the sliding member B, the channel of the rail a' being inverted with respect to the channel of the rail b^2. The cross sectional dimensions of the rail b^2 on the upper bed section B is less than the similar cross sectional dimensions of the rail a' in the lower bed section, and when the upper bed section is folded relative to the lower bed section the lower part of the rail b^2 will enter the upper open part of the rail a', thus compactly disposing the side rails of the two bed sections. In this connection it is desired to state that the rail b^2 enters the rail a' for the purpose of closing the channel therein, thus excluding dust, dirt, etc., from entering the rails when the bed is folded.

For the purpose of raising and lowering the upper vertically movable member B, I employ a suitable hoisting mechanism, the same being supported or carried on the frame of the lower stationary section A and operatively connected with the corner posts b of the upper sliding section B. Incased within the tubular longitudinal tie bar a^4 of stationary section A is a shaft E, the latter extending the full length of the tie bar a^4 and the end portions of which shaft are journaled in suitable bearings e fixed within said tie bar a^4, as shown in Figs. 2 and 5. One end portion of the shaft E is extended through the transverse tubular tie bar a^2 connecting the corner posts at one end of the bed frame, and on this protruding end of said shaft E is attached a suitable operating means, such as the crank E'. Said shaft E is provided, also, with a ratchet e' with which engages a pawl e^2, the latter being pivoted on the tubular tie bar a^2 in a position for engagement with said ratchet, whereby the shaft E may be held from rotation in one direction. The respective end portions of the longitudinal shaft E are provided with bevel gears f f', the bevel gear f being positioned within one tubular tie bar a^2 at one end of the bed frame, whereas the other bevel gear f' shown in dotted lines in Fig. 2 is within the tubular transverse tie bar a^2 at the other end of the bed frame. Each bevel gear meshes with coöperating bevel gears g g' fixed to the adjacent ends of a divided countershaft the members of which are indicated at G G'. Said parts of the countershaft are journaled in bearings g^2 fixed within the tubular tie bar a^2, whereby the parts of the countershaft are incased within the transverse tubular tie bar a^2. One divided countershaft is thus housed within a tie bar at one end of the bed frame, and a similar countershaft is incased within the tie bar at the opposite end of the bed frame, both of said divided countershafts being geared with the longitudinal operating shaft E. The end portions of the divided countershaft G G' extend within the tubular posts a forming parts of the lower stationary bed member A, and these shafts are operatively connected with the sliding posts b of the upper movable section B of said bed. Any suitable means may be employed to operatively connect these countershafts with the movable bed section, but as shown more particularly in Figs. 3 and 4 the cables H are used for the purpose described. Said cables are attached to and coiled upon the end portions of the members G G' composing

the countershaft, or they may be coiled on drums attached to said shaft members. The cables H extend upwardly from the shafts and pass over pulleys h, the latter being journaled or mounted within the tubular posts a, and the cables then extend down from the pulleys h and are fastened in any suitable way to the posts b of the sliding bed section B, the attachment of the cables to the posts b being by means of eyes h', or other suitable devices. The slots b^4 are provided in the posts b of the sliding bed section to allow said posts b to slide within posts a and downwardly with respect to the pulleys h'.

It is apparent that the crank E′ may be rotated by hand for the purpose of turning the shaft E. This shaft imparts motion to the parts G G′ composing the divided countershafts; said countershafts coil the cables H on themselves for the purpose of pulling up on the posts b so as to raise the bed section B, whereby power is applied to all the corner posts of bed section B for the purpose of raising the latter equally at all corners thereof. It is apparent that the rotation of the shaft E in one direction will raise the bed section B relative to the section A, but when the shaft is turned in an opposite direction then the bed section B will be lowered toward section A.

For the purpose of relieving the operator from the burden of lifting the dead weight of the upper section and its load, means are employed for counterbalancing said upper section, as shown substantially in Fig. 7. In each corner post a is positioned a counterweight I, from the upper part of which extends a cable or chain i passing over a pulley i' journaled or otherwise supported in the post a, and the free end of this counterweighted cable is attached by suitable means, such as the eye i^2, to the lower part of the post b, all as clearly shown in Fig. 7. One of the slots b^4 in the post b is slidable relative to the journal of the pulley i'. It is apparent that a counterweight I is employed in each one of the four posts at the respective corners of the bed, and that these counterweights I are connected to the posts of the sliding bed section so as to balance the weight thereof. Now when the bed section B is raised the weights are free to descend, whereas the operation of lowering the bed section elevates the weights within the tubular posts.

When the bed section B is raised to its full limit and is to be occupied, it becomes necessary to provide means for locking said bed section B in its raised operative position. Various forms of locking mechanism may be employed for retaining section B in fixed relation to the section A, and in Figs. 3 and 4 there is shown a form of locking mechanism suitable for the purpose in view. Within the tubular cross bars a^3 of the lower stationary section A are positioned slidable latches J J′, two of said latches being in each cross bar a^3. The latch bars J J′ are movable in opposite directions simultaneously, for which purpose said bars are provided at their inner ends with rack teeth j, the latter meshing with a pinion j' on a shaft j^2. This shaft is journaled in the tubular cross bar a^3, and on one end thereof is a sprocket wheel k indicated by dotted lines in Fig. 4, with which sprocket wheel engages a sprocket chain k' having engagement with another sprocket wheel k^2 on a shaft K. This shaft K is provided at one end with a crank l, and said shaft extends longitudinally of the tubular tie member a^4, the latter being provided with bearings l' for supporting said shaft K. The latch bars J J′ are provided with enlarged heads m, and these heads are formed with notches m', in which notches are adapted to fit the lower ends of the posts b of the sliding bed section B. When the bed section B is raised by the operating mechanism heretofore described, the posts b thereof slide upwardly in the corner posts a and pass the notched ends m of the latches J J′. Now when the section B is raised to its full extent the operator turns the shaft K by the crank l and thus imparts motion to the chains k k' for turning the gears j^2, the latter imparting movement to the racks and the latch bars so that the notched ends of said latch bars are projected into the posts a, whereupon the bed section B is lowered slightly for the lower ends of the posts b to enter the notches m' in the heads of the latch bars. These latch bars thus have interlocking engagement with the posts of the sliding bed section for securely retaining the latter in a fixed relation to the stationary lower section A, thus precluding any tendency of the upper section B to accidentally become released and dropped upon the section A. Prior to lowering the upper section into a compact relation to the lower section, the operator should turn the shaft E slightly for the purpose of elevating the posts b of the upper section out of engagement with the notched ends of the latch bars J J′, whereupon the crank l is turned for rotating the shaft K so as to retract the latch bars J J′ from the path of the sliding posts b, and thereafter the operating shaft E is turned to lower the section B from its raised position into a compact relation to the section A, as shown in full lines in Fig. 1.

It is thought that the operation and advantages of the invention will be apparent from the foregoing description taken in connection with the drawings.

Having thus fully described the invention,

what I claim as new, and desire to secure by Letters Patent is:

1. In a folding bed, the combination with a frame provided with hollow corner posts, a stationary mattress support on said frame, a second frame provided with corner posts the latter being fitted slidably within said hollow corner posts of the first frame, a movable mattress support on the second frame, a single operating shaft extending longitudinally of said bed and journaled on said first frame, a plurality of divided countershafts supported on the first frame, one at each end of the bed, gearing connecting said countershafts to said operating shaft whereby rotation of the latter imparts motion simultaneously to said countershafts, and hoisting means operated by the countershafts for applying power simultaneously to all the corner posts of the second frame for raising the latter and the mattress support thereon relatively to the first frame and its mattress support.

2. In a folding bed, the combination with a frame provided with hollow corner posts, a stationary mattress support on said frame, a second frame provided with corner posts the latter being fitted slidably within said hollow corner posts of the first frame, a movable mattress support on the second frame, a single operating shaft extending longitudinally of said bed and journaled on said first frame, a plurality of divided countershafts supported on the first frame, one at each end of the bed, gearing connecting said countershafts to said operating shaft whereby rotation of the latter imparts motion simultaneously to said countershafts, means operated by the countershafts and cooperating with the corner posts of the second frame for applying power to said corner posts simultaneously, locking means coöperating with the corner posts of said second frame for retaining the latter in a raised position, and operating means for releasing said locking means, said operating means being independent of said longitudinal operating shaft.

3. In a folding bed, the combination with a frame embodying hollow corner posts, a stationary mattress support on said frame, a second frame embodying posts fitted slidably to the posts of the first frame, a movable mattress support carried by the second frame, a centrally longitudinally disposed operating shaft positioned below said mattress support, hoisting means actuated from said shaft and disposed within said posts and coöperating with the corner posts of the second frame, means mounted to traverse beneath the ends of the posts of the upper frame to engage therewith to hold the said frame in its raised position, and positive geared means for simultaneously moving the last-named means in opposite directions.

4. In a folding bed, the combination of a frame embodying hollow corner posts connected by hollow cross members and a central longitudinal tubular tie member, a mattress support on said frame, a second frame provided with corner posts the latter being fitted slidably in the hollow corner posts of the first frame, a second mattress support carried by the second frame, a plurality of divided countershafts, one at each end of the bed, and incased within the hollow cross members thereof, a single operating shaft incased by the longitudinal tie member of the first frame, the respective end portions of said operating shaft being geared to the members composing the divided countershafts for operating said countershafts simultaneously, a plurality of hoisting devices one incased by each hollow corner post of the first frame, each hoisting device being connected operatively with a corner post of the second frame and all of said hoisting devices being operated by the countershafts, and means for locking the second frame in a raised position with respect to the first frame.

5. In a folding bed, the combination of a frame provided with hollow corner posts, a stationary mattress-support on said frame, a second frame provided with corner posts, the latter being slidable relatively to and within said hollow posts of the first frame, a second mattress-support carried by the second frame, an operating shaft extending longitudinally between the sides of the two frames, said shaft being positioned below the two mattress-supports, counterweights independent of the hoisting device and disposed within the the corner posts of the second frame for balancing the latter, said counterweights being incased within the corner posts, and a plurality of hoisting devices embodying flexible ligaments movable within and coöperating with the corner posts of the second frame and being operated by the respective end portions of said longitudinally extending shaft.

6. In a folding bed of the class described, a stationary mattress support, and a movable mattress support, said supports embodying rails whereof the rails of the movable support are fitted telescopically to the rails of the stationary support for positioning the two named supports in compact relation when the bed is closed, combined with hoisting mechanism for raising and lowering the movable mattress support relatively to the stationary mattress support.

7. A folding bed embodying a stationary member, a movable member slidably fitted to said stationary member and movable vertically with respect thereto, latches posi-

tioned at the respective corners of the bed and coöperating with the movable member for locking the latter in fixed relation to the stationary member, a latch shaft geared to said latches for moving them into locking engagement with said movable member and for retracting the latches from the path of said member, and operating means for raising and lowering the movable member at will.

8. A folding bed embodying a stationary member, the frame of which includes channel rails for supporting a spring mattress, a movable member the frame of which includes mattress-supporting channel rails adapted to slide into the channel rails of the stationary member when the movable member is lowered into compact relation to the stationary member, means for raising and lowering the movable member relatively to the stationary member, and locking means for retaining the movable member in fixed relation to the stationary member.

9. In a folding bed, the combination of a frame embodying corner posts and hollow tie rods, a mattress-support on said frame, a second frame embodying corner posts which are fitted telescopically to said posts of the first frame, a second mattress-support on the second frame, an operating shaft extending centrally and longitudinally between the sides of said frames, said shaft being positioned below said mattress-supports, hoisting shafts positioned crosswise of the operating shaft, said hoisting shafts being incased within the hollow tie rods of said first frame, means for operating the hoisting shafts by said central shaft, and flexible means movably disposed within the posts and coöperating with the hoisting shafts and with the posts of the second frame for raising or lowering the latter.

10. In a folding bed, the combination of a frame embodying corner posts and hollow cross rods and a hollow longitudinal rod, a mattress-support on said frame, a second frame provided with corner posts fitted telescopically to the corresponding posts of the first frame, a second mattress-support carried by the second frame, a single operating shaft incased within the hollow longitudinal rod of the first frame, a plurality of hoisting shafts positioned crosswise to the operating shaft, said hoisting shafts being incased within the hollow cross rods of the first frame, gearing coöperating with the operating shaft and the hoisting shafts, and flexible means movably disposed within the posts and connecting the hoisting shafts with the corner posts of the second frame for raising and lowering the latter.

11. In a tier bed, a stationary mattress support including side rails substantially U-shaped in cross section, a movable mattress support including side rails positioned for sliding movement partially within the U-shaped rails of the stationary mattress support when said movable mattress support is lowered into compact relation to the stationary mattress support, and means for hoisting the movable mattress support with respect to the stationary mattress support.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ELIZABETH C. BROWN.

Witnesses:
H. I. BERNHARD,
M. C. RODRIGUEZ.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."