L. H. OSTERUD.

FOLDING BED.

APPLICATION FILED FEB. 11, 1918.

1,366,482.

Patented Jan. 25, 1921.

4 SHEETS—SHEET 1.

Fig. 1

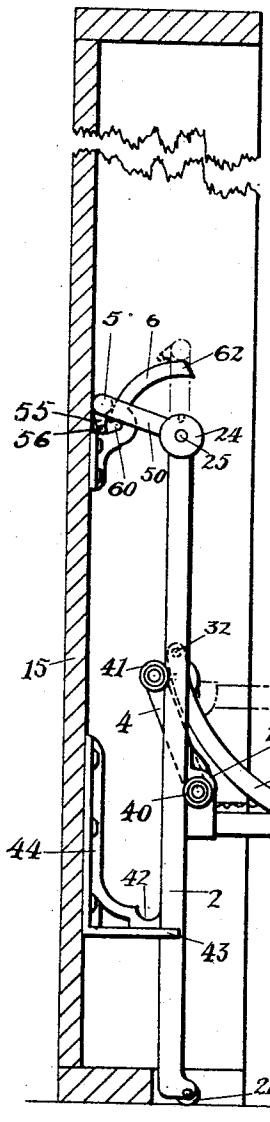


Fig. 4

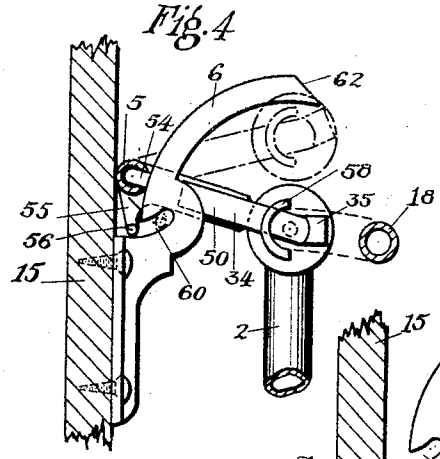
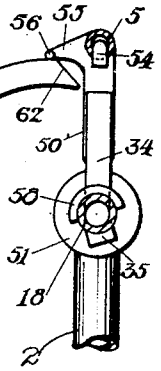
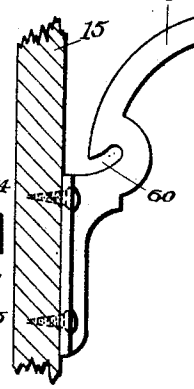


Fig. 6





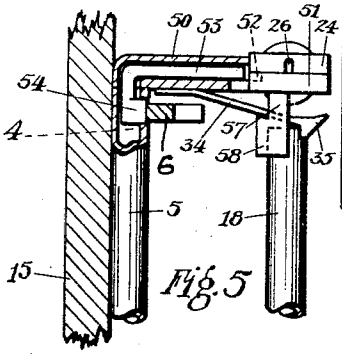


Fig. 5

Inventor

Laurits H. Osterud

By Henry L. Reynolds,

Attorney

L. H. OSTERUD.

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4 SHEETS—SHEET 2.

Fig. 2

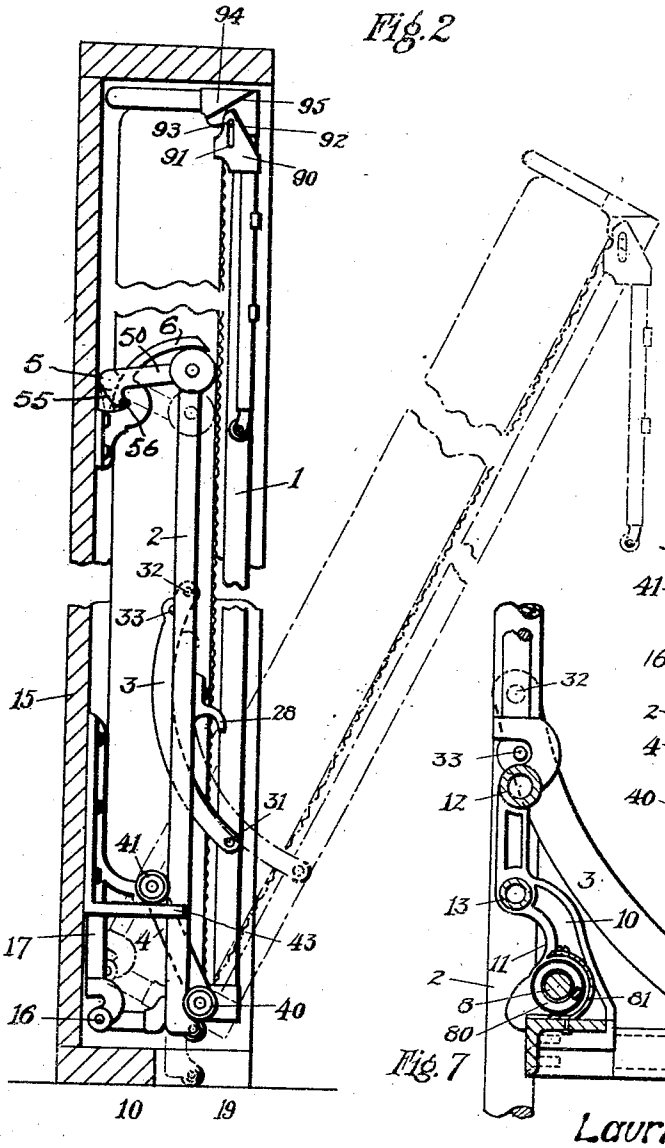


Fig. 8

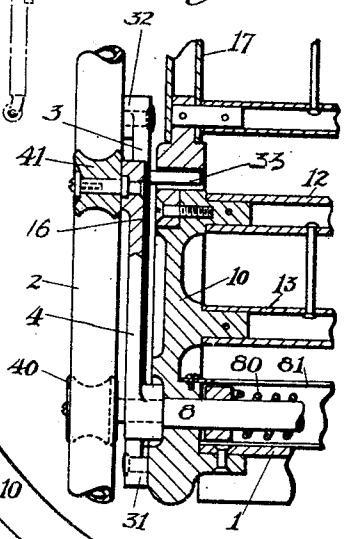


Fig. 7

Inventor

Laurits H. Osterud

By Henry L. Reynolds.

Attorney

L. H. OSTERUD.

FOLDING BED.

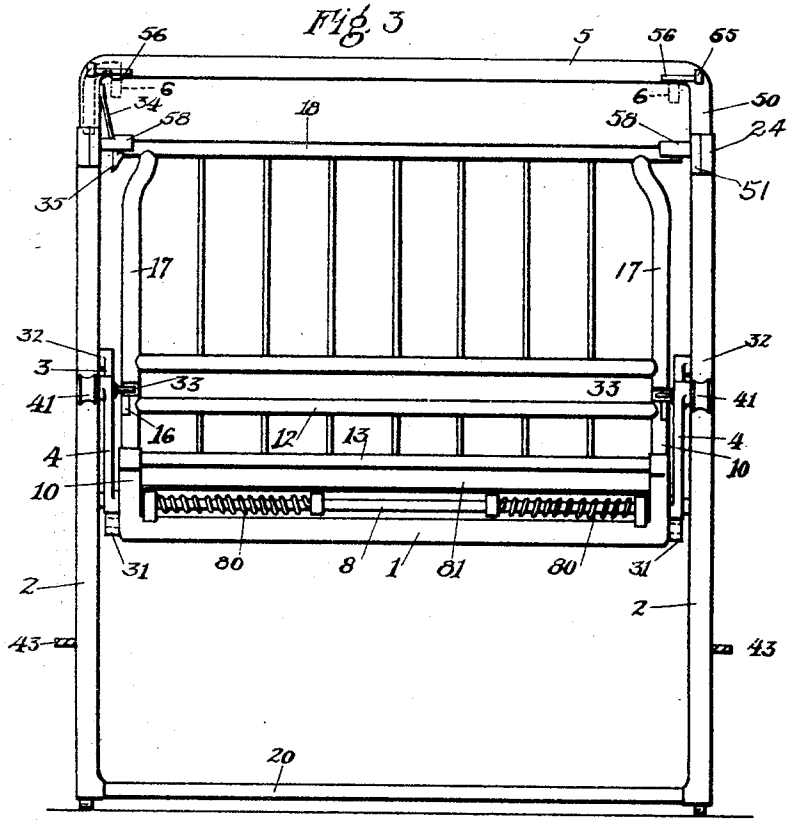
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4 SHEETS—SHEET 3.

Fig. 3



Inventor

Laurits H. Osterud

By Henry L. Reynolds.

Attorney

L. H. OSTERUD.

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4 SHEETS—SHEET 4.

Fig. 9

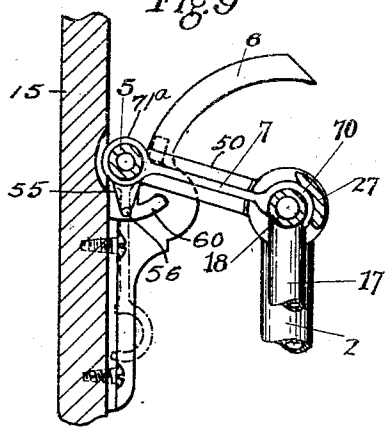


Fig. 10

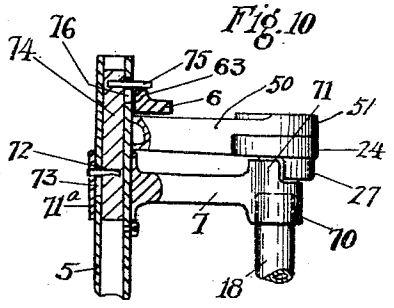
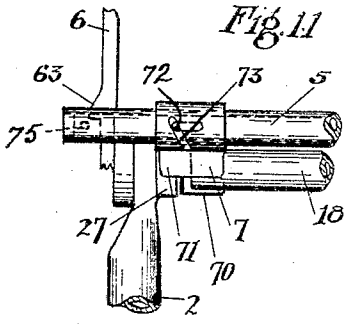


Fig. 11



Inventor

Laurits H. Osterud.

By Henry L. Reynolds.

Attorney

UNITED STATES PATENT OFFICE.

LAURITS HANSEN OSTERUD, OF SEATTLE, WASHINGTON.

FOLDING BED.

1,366,482. Specification of Letters Patent. **Patented Jan. 25, 1921.**

Application filed February 11, 1918. Serial No. 216,505.

To all whom it may concern:

Be it known that I, LAURITS HANSEN OSTERUD, a citizen of the United States, and resident of the city of Seattle, county of King, and State of Washington, have invented certain new and useful Improvements in Folding Beds, of which the following is a specification.

My invention relates to folding beds and comprises novel features of construction which are believed to have advantages over former constructions.

One of the objects of my invention is to produce a folding bed which is self supporting, that is, one which may be detached from any base or frame and moved about the floor as desired, in the same manner as ordinary beds.

Another object of my invention is to provide a folding bed which, when so detached from its inclosing casing or frame, will be locked against possibility of collapsing and will be unlocked for folding by engagement with the inclosing or storing casing or frame.

Another feature of my invention is to provide means for securing the bed frame to its storing casing or frame and other means whereby said securing means will be locked against release whenever the bed is folded, this locking being automatically secured by the act of folding the bed.

Other objects of my invention may be seen from a study of the specification and the drawings, and the particular combinations upon which I desire patent will be particularly set forth in the claims.

In the accompanying drawings I have shown my invention in the form of construction which I now most prefer.

Figure 1 is a side elevation of the bed in opened position and secured to its storing casing, the casing being however in section taken just in front of the bed.

Fig. 2 is a similar view showing the bed in folded or closed position.

Fig. 3 is a head end elevation of the bed removed from its storing case.

Fig. 4 is a section on the line 4, 4 of Fig. 5.

Fig. 5 is a plan view with one pipe in section showing the parts shown in Fig. 4.

Fig. 6 shows the relation between the locking features on the bed and the related parts upon the casing, particularly the manner of releasing the non-collapsing lock.

Fig. 7 is a section on a plane lengthwise of the bed frame showing the construction of the head piece.

Fig. 8 is a sectional elevation taken transversely of the bed through the head piece.

Figs. 9, 10 and 11 are detail views showing a slightly different mechanism.

The bed frame 1 may be, in the main, of any standard construction, consisting of a rectangular frame having springs secured therein. Head posts 2 are employed, these being connected at their lower ends by a bar 20 which is preferably close to the floor, thus leaving the space between the posts 2 clear of any obstruction. The upper ends of the posts are connected by parts which will be later described. Rollers 21 are shown in the lower ends of the posts. For convenience in guiding the bed back into position for putting it into the storing case or frame, these rollers had best not be provided with any vertical pivot support.

The bed frame is supportingly connected with the posts 2 by two links 3, pivoted at 31 to the bed frame and at 32 to the posts 2. A link 4 is pivoted to the head corner of the bed at each side. At its pivot is placed a roller 40 which engages the side of the post which faces the foot of the bed, and a similar roller 41 mounted on the end of the link engages the opposite side of the post. These act in conjunction with the post 17 to guide the head end of the bed when raising and lowering.

At the head end of the bed is journaled a shaft 8 to which the links 4 are secured. Surrounding this shaft are torsion springs 80, one end secured to the shaft and the other to the frame. These are so adjusted that they have an initial tension acting to raise the bed and hold it folded. I provide a shield for these springs consisting of the semi-tubular plate 81. The rollers 40, 41, form guiding or bearing members for the head end of the bed.

When the bed is swung upwardly, or toward the closed position, these rollers travel down the post until the upper roller 41 enters the seat 42 in the bracket 44, which is engaged to the wall 15, which is part of the storing case or support for the bed when it is folded. This contact occurs before the

bed reaches its uppermost or folded position, or that shown by broken lines in Fig. 2; further upward movement of the bed will cause the links 3 to raise the posts 2 from the floor, as is shown in Fig. 2. The bracket 44 has a finger 43, which engages the outer side face of the post 2 to insure its accurate position in the storing frame.

The upper ends of the posts 2 are connected by a bar 5, through side arms 50 at its ends. These arms 50 terminate in flat pivot ears 51 and the upper ends of the posts 2 in like pivot ears 24, these being connected by pivots 25.

The vertical wall 15 of the bed-receiving or storing case, has two brackets 6 adapted to enter just inside of the arms 50. These are at such a height that when the bed is opened, the posts 2 are on the floor and the arms 50 extend upward, as is shown in broken lines in Fig. 1, to such a height that the bar 5 will just pass over the horn or curved upper portion of the bracket. When the bar 5 is swung down by hand into the position shown in full lines in Fig. 1 the bed is held against removal from the wall 15 of the storage case or closet.

Carried by the swinging rail or bar 5 is a short arm 55, which has a short, horizontally projecting pin 56 in position to enter the slot 60 at the base of the bracket 6 when the bar 5 assumes the position shown in Fig. 2. This it will automatically do when the posts 2 are lifted by folding the bed, due to the fact that the weight of the bar 5 will prevent its rising when the posts are raised, thus changing the angle of the arms 50 to swing the pin 56 into the slot 60. In this position it is impossible to detach the bed. The bed therefore can only be detached from its storing case after it has been opened.

The head end of the bed has upwardly extending arms 10 fixed rigidly thereto. These are only of such length as may be accommodated in the storing case when the bed is folded. It may be provided with cross bars 12 and 13 and these be cross connected in any manner desired.

An extension head section 17 is pivoted at 16. The pivot hinge 16 is so constructed that when head section 17 is swung upward it engages stud or pin 33 on link 3, which link in turn is secured to post 2 at 32, see Fig. 7. This fixes the position of bed frame 1 in relation to posts 2 and, in connection with the engagement of roller 40 with stop bracket 28, see Fig. 2, forms a rigid three-point connection between bed and head posts 2.

The extension head section has a top bar 18, the ends of which project close to the posts 2. I provide means for engaging and holding this when it is raised, thereby preventing folding of the bed. Two forms of devices for this are shown. That shown in Figs. 4, 5 and 6 will first be described.

The flat pivot ear 51 has fixed to and extending therefrom, an arm 57 which has a curved segment or web 58, adapted to engage and fit the end of the bar 18 to act as a stop therefor. The arm 50 also has a spring bar 34 terminating in a hook end 35 having its outer side face inclined to be displaced by engagement therewith of the end of bar 18, the hook then engaging the bar 18 to prevent its return until the spring dog or lock is manually released. I prefer to use the hook 34 at only one side of the bed as it would be difficult to manually release two of them.

The radial arms 50 have therein a locking dog 53 which has a laterally extending arm occupying the interior of the main tube or bar 5, this having an offset 54 which may project through a hole in the inner side of bar 5. The two flat ears 24 and 51 have notches 26 and 52 which will come into registry when the connecting bar 5 is swung upward into line with the posts 2. The locking dog 53 is at this time in position to enter both of the notches 26 and 52, thus locking the bar in its raised position, or as shown in Figs. 3 and 6. The end of the bar 18 is securely held by the arcuate flange 58 and the spring dogs 34, 35. Until this has been released, the bed cannot be folded. While so held the head pieces 17, 18, act as a tie, connecting the head end of the bed frame with the cross bar 5, and preventing the lowering of the head of the bed, which lowering is necessary in folding the bed. This prevents the possibility of collapsing the bed while disengaged from the storing frame. There are two of the locking dogs 53 and it would be difficult for one person to release both at once by direct manual engagement.

I have provided inclined surfaces 62 on the ends of the horns 6 and have spaced these horns relative to the guide fingers 43 which center the bed and also with relation to the position of the ends 54 of the dogs, so that the inclined faces 62 will engage the ends 54, when the bed is put in position for securing to the casing thereby raising the dogs 53 out of the notches 26 and 52, thus releasing the bar 5 and permitting it to be swung down to thereby secure the bed to the storing and carrying member 15, and to permit folding of the bed.

The locking device shown in Figs. 9, 10 and 11, is similar in its principle and operation, but somewhat different in construction. The flat ear 24 of the post, which is here placed inside of the corresponding member 51 of the arm 50, has an inwardly projecting, arcuate flange 27, and an arm 7 which is hinged on the bar 5, has an arcuate or semi-tubular flange 70, which is notched on

the side next to the post to form a projecting ear 71, positioned to clear the flange 27 when the parts are in the position shown in Figs. 9 and 10, and to swing under the flange 27 when the bar 5 is swung upward.

When the bar 5 is swung downward and backward, or into the position shown in full lines in the figures, the hook arm 7 has its curved flange 70 engaging the ends of the bar 18 to prevent movement thereof forward or backward. When the bar 5 is swung up, the curved flange 71 turns under the arcuate flange 27 and locks the hook arm 7 and prevents movement of the bar 18 downward, or in the direction which is necessary in order to fold the bed. It, therefore, constitutes a non-folding lock.

When the bed is folded, the hook bar 7 drops downward, into the position shown by broken lines in Fig. 9. The pivot sleeve 71[a], by which the arm is mounted on the bar 5, has a diagonally positioned slot 73, Fig. 11. A pin 72 passes through this slot 73 and through a slot in pipe 5, which latter slot is parallel with the axis of the pipe, and is fixed in a short bar 74 which is slidable within said pipe. This short bar, which is free to move lengthwise of pipe 5, has a pin 75 which projects through a slot 76 in pipe 5, which slot is also parallel with the axis of the pipe.

In consequence of the diagonal position of slot 73 in sleeve 71, rotation of arm 7 will cause an endwise movement of bar 74. The direction of slot 73 is such that a downward movement of hook bar 7, causes an inward movement of bar 74 and moves the pin 75 under a lug, or projection 63, on bracket 6, so that the bar 5 which passes over bracket 6 and locks the bed to its storing frame, cannot be released until, first, the hook arm 7 has been placed in the position shown by full lines in Fig. 9. This device also serves to prevent bar 5 from sliding up on bracket 6, when in the act of folding the bed, the posts 2 are raised.

In using this kind of a lock I contemplate applying it only to one side of the bed and using the locking plunger 53, of Figs. 4 and 5, at the other side. In consequence, the hook 7 can only be released by first releasing the lock 53 and this can only be released by securing the bed to its storing frame.

The legs 9 at the foot of the bed are provided with a flat head 90 having a vertical slot 91, through which passes a securing pin 93, so that the legs may have a certain amount of vertical movement. A complemental abutment 94 is rigid with the bed frame. The two parts 90 and 94, have inclined abutting surfaces or edges, which are crowded together by downward movement of the bed frame, the pin 93 resisting this movement. Legs so secured will drop down and hinge to fold against the bed frame, after the manner shown in Fig. 2.

It may be noted that the bracket or arm 10 of the head of the bed frame, has a notch 11 so positioned that when the bed is fully folded, it accommodates the cross bar 20 which connects the bottom of the posts 2.

With the bed in folded position, the first thing to do is to swing down the foot of the bed. As the support of the bed is well toward the bottom of the bed frame, or the side which is out when folded, and as the springs 80 also act to keep it folded, there is no need for a lock.

As the bed approaches the floor the posts 2 are lowered until they rest upon the floor. The weight of the bed is thus taken off of the storing frame 13. The head piece of the bed is then swung up, this being locked in place by the catch 53 or the hook 7, whichever is used. There is then no chance for the bed to be folded, either accidentally or purposely, except after the head piece has been released.

If it be desired to remove the bed from its storing case, the bar 5, which connects the upper ends of the posts 2, is swung upward, until it reaches a vertical position, in which position the locking bolt 53 will enter the slots in both of the disks 24 and 51, thus preventing further movement in either direction.

The bed is then free to be moved wherever desired and is held against collapsing. Furthermore, to release it it must be brought back to its storing case to release the lock bars 53 by engagement thereof with the inclined faces 62 of the horns 6. When the bed is folded, the posts 2 will be raised, thus engaging the pins 56 in the notches 60, so that it is impossible to remove the bed from its storing case until it has been opened and also locked against collapse.

What I claim as my invention and desire to secure by Letters Patent is:

1. The combination with a folding bed and a receiving frame therefor, of means carried by the bed to lock it against folding, a lock releasing member carried by the bed and members carried by the receiving frame adapted to engage the said lock releasing members to put them in release position when the bed is brought to folding position in the receiving frame.

2. The combination with a folding bed and a receiving frame therefor, said parts being provided with means for locking them together, means for locking the bed against folding when removed from said receiving frame, and means whereby said latter locking means are placed in releasable position by the act of placing the bed in position to be secured in the receiving frame.

3. A folding bed structure having a head frame provided with legs adapted to rest

upon the floor when the bed is in use, a bed frame adapted to turn up in folding, a bed receiving frame, means for securing the bed within said receiving frame, and bed lifting members carried by the bed and said receiving frame engaging to lift the said bed structure clear of the floor as it is folded.

4. A folding bed structure having head posts, a bed frame folding to vertical position on said posts and a folding mechanism therefor carried wholly by said parts, a bed receiving frame, means for securing the bed within said receiving frame, brackets carried by the bed receiving frame and members carried by the bed frame and engaging said brackets to lift the head posts and bed frame during the folding operation.

5. In a folding bed mechanism, a frame for receiving the bed when folded, a folding bed provided with means for entire self support when opened; and means operated by the folding action for transferring the weight of the bed to said base when the bed is folded.

6. In a folding bed mechanism, a frame adapted to receive the bed when folded, a folding bed provided with means for entire self support when opened, means for engaging and disengaging said bed and frame when the bed is opened, and means operating by the folding of the bed to lift the head of the bed from the floor and to transfer its weight to said base when the bed is folded.

7. In a folding bed mechanism, a frame for receiving the bed when folded, a folding bed provided with means for entire self support when opened, means for engaging and disengaging said bed and frame, when the bed is opened, means for transferring the weight of the bed to said base when the bed is folded, a lock for securing the bed to the base having a movable member carried by the bed, and a supplemental lock carried by said movable member and engaging the bed to prevent collapsing when the said movable member is disengaged from the base.

8. In a folding bed mechanism, a frame for receiving the bed when folded, a folding bed provided with means for entire self support when opened, means for engaging and disengaging said bed and frame, when the bed is opened, means for transferring the weight of the bed to said base when the bed is folded, a lock for securing the bed to the base having a movable member carried by the bed, and a supplemental lock carried by said movable member and engaging the bed to prevent collapsing when the said movable member is disengaged from the base, and means automatically preventing disengagement of said parts while the bed is folded.

9. The combination with a self supporting folding bed structure adapted for free movement about the floor, a storage frame for said bed, a lock upon the bed to prevent collapse of the latter when free, means for securing the bed in said storage frame and means for releasing the said lock through the means which secure the bed in said storage frame.

10. The combination with a self supporting folding bed structure adapted for free movement about the floor, a storage frame for said bed, a manually operative catch device for securing the bed to said storage frame, and means operated by the folding of the bed to prevent disengagement of said bed securing catch.

11. The combination with a self supporting folding bed structure adapted for free movement about the floor, a storage frame for said bed, a manually operative catch device for securing the bed to said storage frame, a lock to prevent collapse of the bed when free, and means for placing the lock in position for manual release by the actuation of the catch device in securing the bed to the storage frame.

12. The combination with a self supporting folding bed structure adapted for free movement about the floor, a storage frame for said bed, a manually operative catch device for securing the bed to said storage frame, a manually operable lock for preventing collapse of the bed when free, means for placing said lock in position for manual release actuated by the catch device in securing the bed to the storage frame, and means actuated by the folding of the bed to prevent disengagement of the bed securing catch.

13. The combination with a self supporting folding bed structure adapted for free movement about the floor, a storage frame for said bed, a lock upon the bed to prevent folding when free, means for securing the bed in said storage frame and means for preventing unintentional release of said lock until the bed has been secured to the storage frame.

14. The combination with a self supporting folding bed having head posts and a bed frame swingingly supported therefrom, the whole being adapted for independent movement, a bed receiving and storing frame, members carried by the storage frame and by the bed frame adapted to engage when folding the bed to lift the head posts, a securing catch pivoted upon the head posts, a bracket carried by the bed storing frame with which said catch engages, said securing catch having a pin swung into locking engagement with the bracket when the head posts are raised to prevent release of said securing catch.

15. The combination with a self supporting folding bed having head posts and a bed frame swingingly supported thereferom,

the whole being adapted for independent movement, a bed receiving and storing frame, a safety lock preventing folding when the bed is removed from the storing frame, a swinging catch member carried by the head posts and adapted to engage with the storing frame to secure the bed thereto, means carried by said catch and controlling the said lock, a locking device holding said catch in position to prevent release of the first named lock when the bed is separated from the storing frame and a member carried by the storing frame and adapted to release said catch when the bed is placed in position within the said storing frame.

16. In a folding bed, in combination, head posts, a bed frame, links pivotally supporting the bed frame from the head posts, a head piece hinged to the frame and adapted to swing independently of the head posts, means brought into action by raising the head piece for interlocking said parts to thereby fix the bed frame relative to the head posts, and manually controllable means for locking the head piece to the head posts to prevent swinging the former into position to release the said interlocking engagement.

17. In a folding bed, in combination, head posts, a bed frame, links pivotally supporting the bed frame from the head posts, a head piece hinged to the bed frame, means for securing the upper end of the head piece to the posts and stops carried by the said links to engage the head piece to prevent upward swing of the bed while the head piece is raised.

18. In a folding bed, head posts, a bed frame, means for pivotally supporting the head end of the bed frame from the head posts, a head piece pivoted to the bed frame to swing down thereon, means interlocked by swinging up the head piece to prevent swinging up the bed, and a manually controllable lock between the head piece and the head posts for holding the head piece in raised position.

19. In a folding bed combination, head posts, connected to form an open frame, a bed frame pivotally supported therefrom and having a head piece comprising a lower section fixed to the bed frame and an upper section hinged to said lower section to fold over upon the bedding, the lower part of said upper section having a notch at the back side thereof at each side of the bed, and having pins supported from the posts and adapted to enter said notches, and means for locking the upper part of said swinging section to the posts.

20. In a folding bed, in combination, bed posts connected to form an open frame, a bed frame, links pivotally supporting the bed frame from said posts, an arm pivoted to the head end of the bed frame at each side thereof and members having guiding engagement with opposite faces of the posts, and a fixed bracket having a seat for one of said guides at a level to be engaged thereby before the bed is entirely folded, whereby the posts are lifted from the floor by the folding of the bed.

21. In a folding bed, in combination, bed posts connected to form an open frame, a bed frame, links pivotally supporting the bed frame from said posts, an arm pivoted at the head end of the bed frame at each side thereof and members having guiding engagement with opposite faces of the posts, and a fixed bracket having a seat for one of said guiding members at a level to be engaged thereby before the bed is entirely folded, whereby the posts are lifted from the floor by the folding of the bed, stops carried by the posts to engage the other of said guiding members when the bed is opened, and means for securing the upper ends of the posts to a support.

22. In a folding bed, in combination, a bed frame, head posts, suspension links connecting the head posts with the bed frame inwardly from the head end thereof, links connected with the head end of the bed frame, and fixed supporting members adapted to be engaged by the other ends of said links before the bed frame reaches its folded position.

23. In a folding bed, in combination, a bed frame, head posts, suspension links connecting the head posts with the bed frame inwardly from its head end, and means for otherwise supporting the head end of the bed frame before the bed reaches its folded position and thereafter acting to raise the head posts.

24. In a folding bed, in combination, a bed frame, and posts, suspension links connecting the head posts with the bed frame inwardly from its head end, a bed-receiving or storing frame member, means for supporting the head ends of the bed frame from the bed storing frame member before the bed reaches its folded position, and means for engaging the head posts with the said bed storing frame member when the bed is folded and for disengaging them when the bed is lowered.

25. The combination with a folding bed having a head frame, a bed frame pivotally supported from said head frame to swing up and down, a storage frame adapted to receive the folded bed, members carried by the bed frame and by said storage frame adapted for supporting engagement to raise the head frame by the upward swing of the bed, means for disengageably securing the upper end of the head frame to the storage frame, and means for locking said securing means by the upward movement of the head frame.

26. The combination with a folding bed having a head frame, a bed frame pivotally supported from said head frame to swing up and down, a storage frame adapted to receive the folded bed, members carried by the bed frame and by said storage frame adapted for supporting engagement to raise the head frame by the upward swing of the bed, a securing member hinged to the upper part of the head frame, a complemental securing member upon the storage frame, and means for locking these against separation by the upward movement of the head frame.

27. The combination with a folding bed and a storing frame therefor, of means for securing the bed to and detaching it from said storing frame while the bed is opened, and means for locking said securing parts to prevent release brought into action by the folding of the bed.

28. The combination with a folding bed and a storing frame therefor, means for securing the bed to the said frame when the bed is opened, means for locking the bed against folding, and means for securing said locking means against release by the releasing of the bed from said storing frame.

29. The combination with a folding bed and a storing frame therefor, means for securing the bed to the said frame when the bed is opened, means for locking the bed against folding, and means for securing said locking means against release by the releasing of the bed from said storing frame, and means for locking said securing means by the folding of the bed.

30. The combination with a bed storing frame and a self supporting folding bed structure, of means for connecting the bed structure with the bed storing frame to raise the bed structure clear of the floor when it is folded, means for disengageably securing the bed structure to the storing frame while the bed is opened, and means for locking said securing means against release by the raising of the bed.

31. The combination with a folding bed of a receiving frame therefor, and means for attaching the bed to and detaching it from said receiving frame, of means for locking the bed against folding, actuated by placing the attaching means in release position, and means for placing said locking means in releasable position comprising members carried by the receiving frame and adapted to act only when the bed is placed in position for securing it to said frame.

Signed at Seattle, Washington, this 29th day of January, 1918.

LAURITS HANSEN OSTERUD.