(No Model.)

A. A. ALLEN.

FOLDING BED.

No. 271,760. Patented Feb. 6, 1883.

Fig. 1.

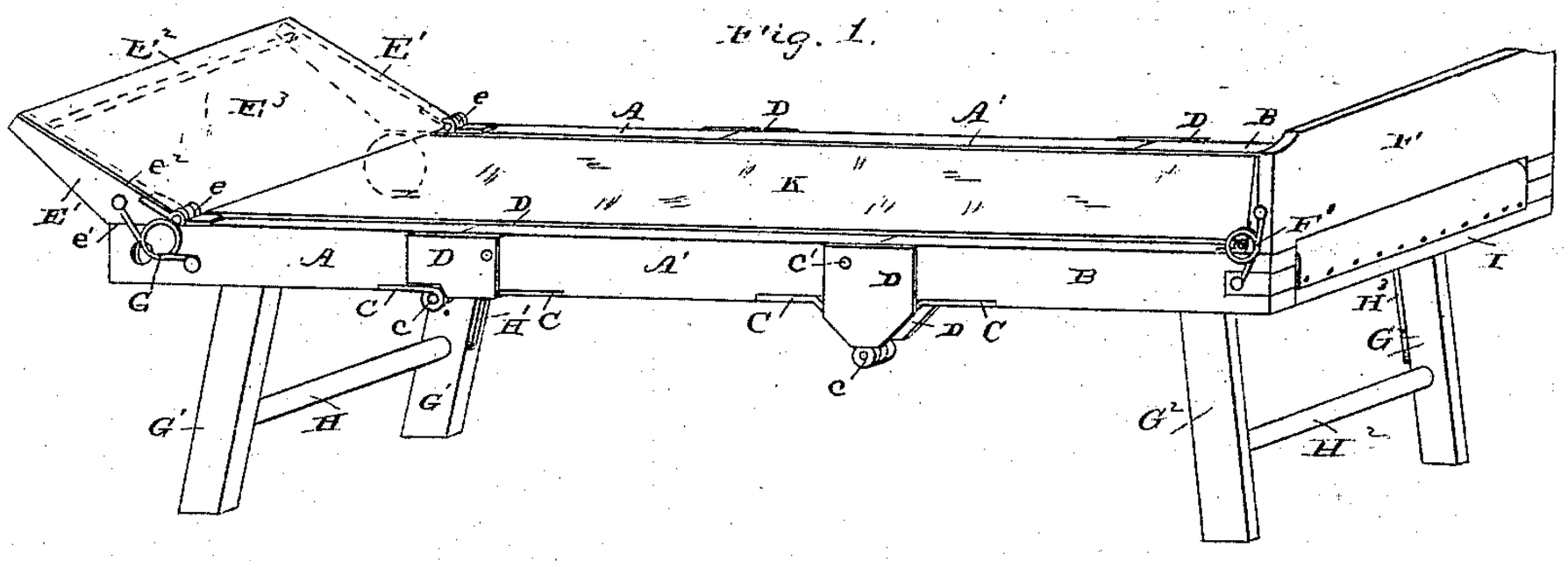


Fig. 7.

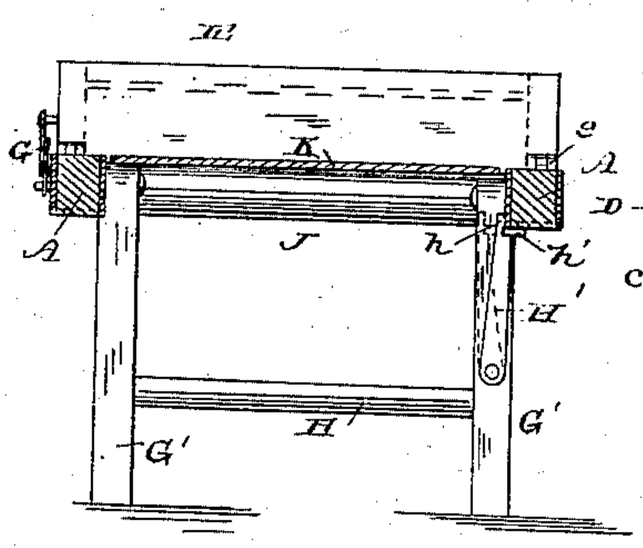


Fig. 2.

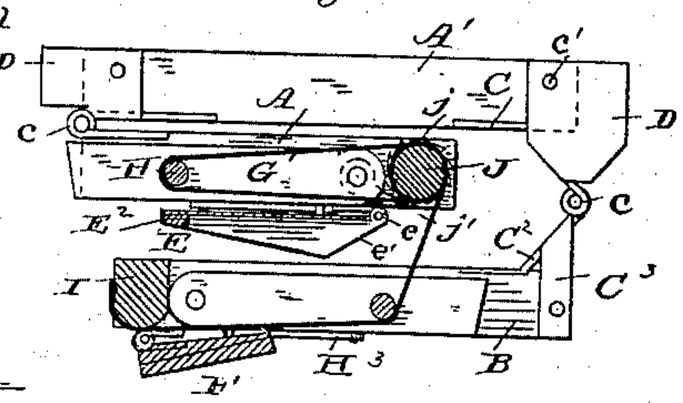


Fig. 3.

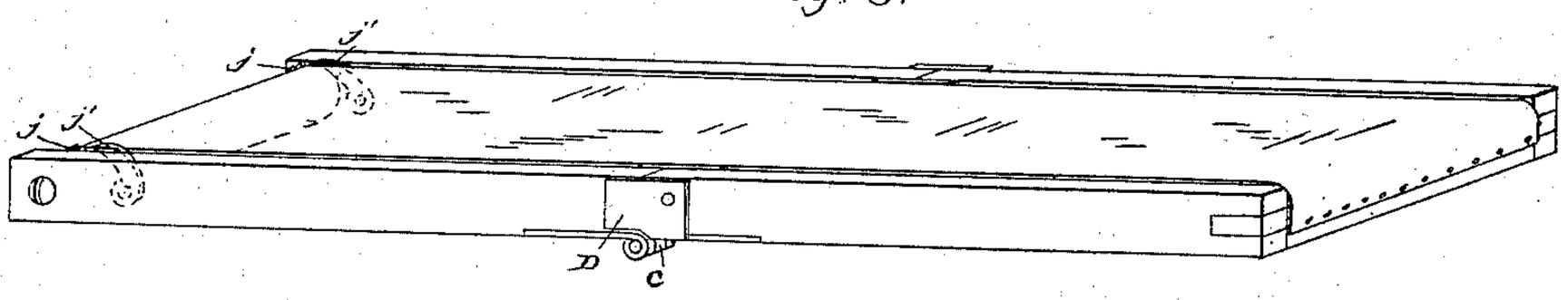


Fig. 4.

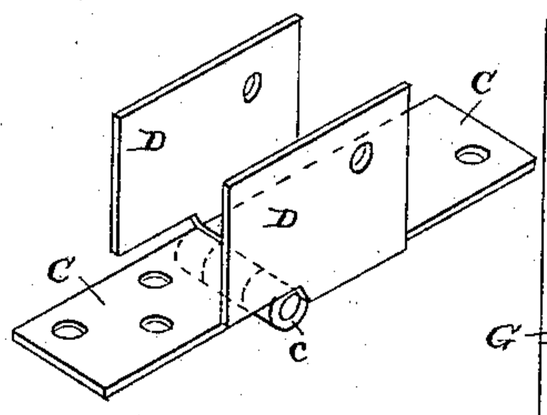


Fig. 6.

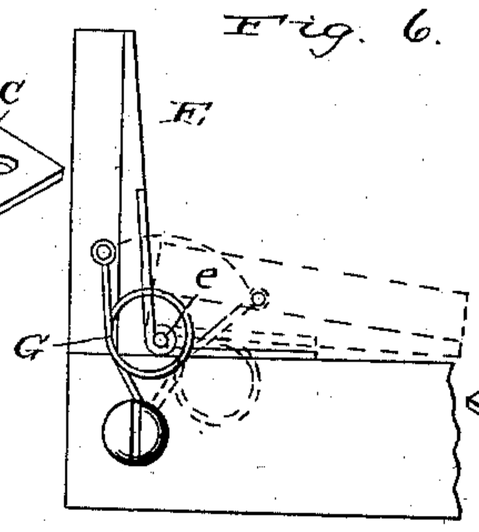
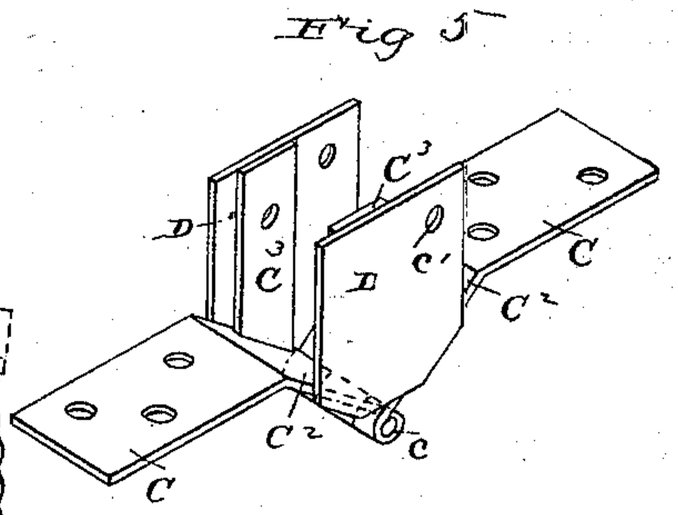


Fig. 5.



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UNITED STATES PATENT OFFICE.

ALBERT A. ALLEN, OF JACKSON, MICHIGAN.

FOLDING BED.

SPECIFICATION forming part of Letters Patent No. 271,760, dated February 6, 1883.

Application filed October 9, 1882. (No model.)

To all whom it may concern:

Be it known that I, ALBERT A. ALLEN, a citizen of the United States, residing at Jackson, in the county of Jackson and State of Michigan, have invented certain new and useful Improvements in Folding Beds, of which the following is a specification, reference being had therein to the accomyanying drawings.

Figure 1 is a perspective view of a bed embodying my improvements. Fig. 2 is a sectional view of the same when folded. Fig. 3 is a perspective view of a slightly-modified form. Fig. 4 is a perspective of one of the hinges detached. Fig. 5 is a perspective of the other style of hinge. Fig. 6 illustrates the section of the spring combined with the head-board. Fig. 7 is a transverse section of the bed, the legs under the head-board and the brace attached thereto being seen in elevation.

In the drawings I have shown the bed-bottom detached and so constructed that it can be applied to any ordinary bed. I have also shown it as provided with legs at the foot and the head, and with foot-board and head-board, in order to illustrate the various capabilities of the bottom proper. Each side rail of the bottom shown in Figs. 1 and 2 consists of three parts—a head-section, A, a foot-section, B, and an intermediate section, A′. These three parts are united by two hinges, one hinge being constructed somewhat differently from the other. The head rail-section and the intermediate one are joined by a hinge, which consists of two bottom plates, C C, which are comparatively long, so as to give a strong bearing or support on the lower side of the rail-sections, these plates being joined by an ordinary hinge-joint at *c*. To the side of one of the rail-sections there are secured strong bracing-plates D D. These loosely overlap the ends of the opposing rail-section, and project sufficiently far along the sides of the same to provide a strong lateral bracing, so as to prevent any outward or inward springing of the side rails at the hinging-points. Preferably these bracing-plates are formed, as shown, integrally with one of the bottom plates C, they being stamped out of the same sheet of metal from which the bottom plate is made. Instead of this, one of the bracing-plates may be formed with one of the bottom plates and the other with the other. However, the same end can be accomplished by having the bracing-plates formed separately from the bottom plates, and in that case, also, one may be carried by one section of the rail, and the other by the other section. The foot-section B and the intermediate section, A′, are joined together by a hinge of a modified character. It has bottom elongated plates, C C, similar to those above described, and overlapping bracing-plates D D. In this case, however, the plates C C are bent downward to a considerable degree to form inclined plates C^2 C^2, coming together at a suitable distance below the bottom of the rail and joined by a hinge at *c*. The overlapping bracing-plates D D are shown as carried by one of the downward-inclined plates C^2, though one of them may be, if preferred, carried by one of these plates C^2 and the other by the other. They are fastened by screws, rivets, or otherwise to the side-rail section, as shown at *c*. When both are carried by a single plate C^2 support straps or braces C^3 are attached to the other downwardly-inclined part C^2, and also to the rail-section, as shown. These operate to prevent the plate C^2 from bending or springing upward. In this case the overlapping bracing-plates D operate not only to give a lateral bracing to the opposing ends of the rail-sections, but also furnish vertical support for the downwardly-inclined bottom part C^2 to which they are attached.

A hinge of the form last described is considerably stronger than one of the other sort, inasmuch as the pivot of the hinge is carried to a point considerably away from the upper edges of the opposing rail-sections, so that the parts of the hinge have a lower leverage for resisting the strain from the weight upon the bed. Moreover, by throwing the hinging-line thus considerably below the bottom of the rail-sections the bed can be folded compactly in a way to be hereinafter described. When the rail-sections thus hinged are provided with foot-board and head-board, and with legs, the the ends of the rails extend entirely to the ends of the bed. The head-board E is hinged at *e* to the upper edge of the head rail-sections, the outer face of the head-board being preferably

flush with the ends of the rails. In a similar manner the foot-board F is hinged to the foot-sections of the side rails.

G is a spring attached to the head-board and the rail-sections in such a manner as to operate to hold the head-board in an upright position or closed, as it may be put. This avoids the serious inconveniences that have been experienced (during transportation especially, and at other times) with beds having folding head-boards as heretofore constructed. When they are connected by a simple free hinge there is no assurance that they shall be locked in any desired position, and so when the bed is being moved there is a constant danger of the head-board being thrown back and forth. The spring at one or both ends is pivotally secured, preferably by forming an eye or eyes on the spring and passing screws or pins through said eyes, the connection being loose enough to allow the head-board to move. When the head-board is moved in either direction there is exerted a longitudinal strain upon the spring, but not a lateral strain. I′ is a similar spring, combined with the foot-board and foot rail-section. It will be seen that the greatest tension of the spring is exerted when the head-board or foot-board is at an angle of about forty-five degrees, and that the least tension is exerted when either of the boards is at either its uppermost or at its lowermost position. (See Fig. 6.) By forming the springs G and F′ and attaching them as described and shown they permit the head and foot boards to be folded down close upon the side rails, either when the bed is set up for use or when folded for storage or transportation, thus greatly increasing its convenience.

G′ G′ represent the legs at the head of the bed, preferably connected by means of cross-bar or a brace, H. Heretofore the legs at the heads of folding beds of this character have been commonly formed with or attached rigidly to the head-board, and those at the foot to the foot-board. When so made it has been necessary to suspend the ends of the side rails upon the supporting parts by means of a simple hinge, and these supporting devices have almost invariably been found insufficient to hold the weight that is ordinarily placed upon the bed. I hinge the legs to the inner faces of the side sections, and am therefore enabled to provide them with pivot bolts or screws of as great strength as may be necessary, it being possible to use pivots much larger in diameter than can be employed with the ordinary hinge. Moreover, the foot-frame can be folded entirely inside of the side rails, so that when the bed is closed up the foot-frame shall occupy the same plane as said side rails, and therefore the article can be made much more compact than when the feet and head board are connected together.

H′ is a brace of peculiar shape and pivoted snugly against the face of one of the legs G′ G′. It has a stop-piece, *h*, projecting upwardly, to prevent its being thrust outward too far, and a bearing-piece, *h′*, adapted to be placed under and to bear against the under side of the side rail. From an examination of Fig. 7 it will be seen that the pivot around which the brace H′ swings is situated at a point inside the vertical plane of the stop-piece *h* when the latter is in position against the inner edge of the side rail. By thus pivoting the brace and by providing it with the stop-piece *h* and bearing-piece *h′* it is held firmly in position against jars or knocks, which would otherwise throw it out of proper engagement with the side rail.

When the bed is in use the brace is swung outward into the position shown in full lines in Fig. 7. When the leg-frame is to be folded up the brace is first swung back into the position in dotted lines. G^2 G^2 are legs pivoted in a similar manner to the inside of the side rails at the foot of the bed, they being provided with a cross-bar, H^2, and a pivoted brace, H^3, substantially similar to those above described at the head. The side rails are connected at the foot by means of a cross-piece, I, and at the head by another cross-piece, J, which I prefer to be in the form of a roller, as will be hereinafter described. Upon the frame thus constructed I support a bottom canvas, K, which is attached at the foot to the cross-piece I by means of tacks or other permanent fastening, and at the head is secured to the cross-piece or roller J. It has no support along the side edges, in order that certain ends, to be set forth, can be readily accomplished. When the part J is of the form of a roller it may be provided with an outwardly-extending square pintle or gudgeon, by means of which and a wrench the roller can be readily turned against any ordinary amount of resistance. However, other means of revolving the roller may be employed, if desired, and, in fact, it can be readily turned without any extra tool. *j j* are ratchet-wheels upon the ends of the roller, and with them are combined pawls *j′*, pivoted to the frame of the bottom.

When the bed is to be folded up for transportation or for storing, the roller J can be utilized to take up all the slack of the canvas bottom, it thus assisting to produce a tight, compact roll of the fabric, so that the latter shall not interfere with a complete package, the positions of the parts when they are thus packed being clearly shown in Fig. 7.

When the fabric becomes slack from use or otherwise the tension can be increased by bending upward the inner ends of the rail-sections, then turning around somewhat the roller J, fastening it by the pawls *j′*, and then bringing the inner ends of the rail-sections back into their completely-open position, this process resulting, as will be readily understood, in increasing the tension of the fabric. The fabric can be thus made very rigid, and this can be done without the danger that has been experienced with beds, as heretofore constructed, of springing apart the parts of the frame. The

bracing-plates D D at the hinging-points prevent, as said above, any outward or inward straining of the side rail-sections, making them practically equivalent to side rails extending continuously from end to end of the bed, so that any desired amount of tension can be imparted to the bottom fabric.

By hinging the rail-sections together the tension of the fabric can be increased to any desired extent without requiring a wrench, for after the inner ends are moved up the roller can be turned by the hand.

A vertical head-board may be used, substantially similar to the foot-board, instead of the inclined one shown in Figs. 1 and 2. This inclined one, however, I prefer for many purposes, especially when it is desired to have one part serve both as head-board and as a rest for the head of the occupant. I have shown the simplest and cheapest form of construction, though it may be varied somewhat. The one shown is constructed of two side pieces, E′ E′, a top brace, E^2, and a flexible fabric, E^3. The lower edge of the end piece, e', is at an acute angle to the upper edge, e^2, to give the proper inclination to the fabric E^3, which is stretched across from side to side. To vary this inclination use may be made of adjusting devices of any suitable character—as, for instance, screws passing up through the rails A and bearing against the end pieces, e', of the head part.

Instead of the solid pieces E′ E′ a skeleton frame of wire or strips may be used.

What I claim is—

1. In a folding bed, the combination, with the divided rail-sections, joined together by a hinge, of a base fabric for supporting the bed, means for taking up the fabric when the rail-sections are out of line, and the lateral braces situated by the sides of the hinges and overlapping the opposing ends, whereby lateral springing of the rail-sections is prevented when they are being forced into line, substantially as set forth.

2. The combination, with the side rails, held rigidly apart and divided into sections hinged together and provided with braces which overlap the opposing ends of the sections, of a head-board arranged to fold down upon the side rails, a foot-board arranged to similarly fold, a leg-frame at the head pivoted to the inner sides of the side rails and arranged to fold down parallel to the side rails, and a similar leg-frame pivoted to the foot of the bed, substantially as set forth.

3. The combination, with the bottom frame formed in sections hinged together, of the fabric carried by said frame and the roller mounted therein, adapted to be rotated and to form two or more superposed layers of the fabric, and thus take up the slack of the fabric when the bed is folded, substantially as set forth.

4. The combination, with the head-board, of the springs arranged, substantially as set forth, to hold the head-board up or to hold it down upon the side rails either when the bed is set up or when it is folded for transportation.

5. The herein-described means of connecting the inner ends of the rail-sections of a folding bed-bottom, it consisting of the plates C C, adapted to be secured to the bottoms of the side sections, and bracing-plates D D, formed in one piece with one of the bottom plates, C, and adapted to overlap the opposing ends of the sections, substantially as set forth.

6. In a folding bed, the combination, with the side rails and the end cross-pieces, of the leg-frames respectively pivoted to the inner sides of the ends of the main frame, and the braces H′, provided with the stops h, and bearing-shoulders h', having the points at which they are pivoted to the inner faces of the leg-frames inside the vertical planes of the inner edges of the side rails, substantially as and for the purposes set forth.

7. The combination, with the side rail of a folding bed, made in two or more sections, of a hinged joining-piece having the downwardly-extending supporting-pieces C^2, to carry the hinge at a point below the bottoms of the side rail, substantially as and for the purposes set forth.

8. In a folding bed, the combination, with the side rails formed in two or more sections, of the hinge having the downwardly-extending pin supports C^2 C^2, and the vertical braces, which prevent said supports from springing upwardly, substantially as set forth.

9. The combination, with the bed, of the head-piece E, having the fabric E^2, and the supporting-edge e', situated at an acute angle to the edge e^2 and bearing directly upon the side rails, and the hinge e, to permit the inclined head to be folded with the bed, substantially as set forth.

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

ALBERT A. ALLEN.

Witnesses:

GEO. E. BEEBE,

W. H. VAN HORN.