

July 19, 1960

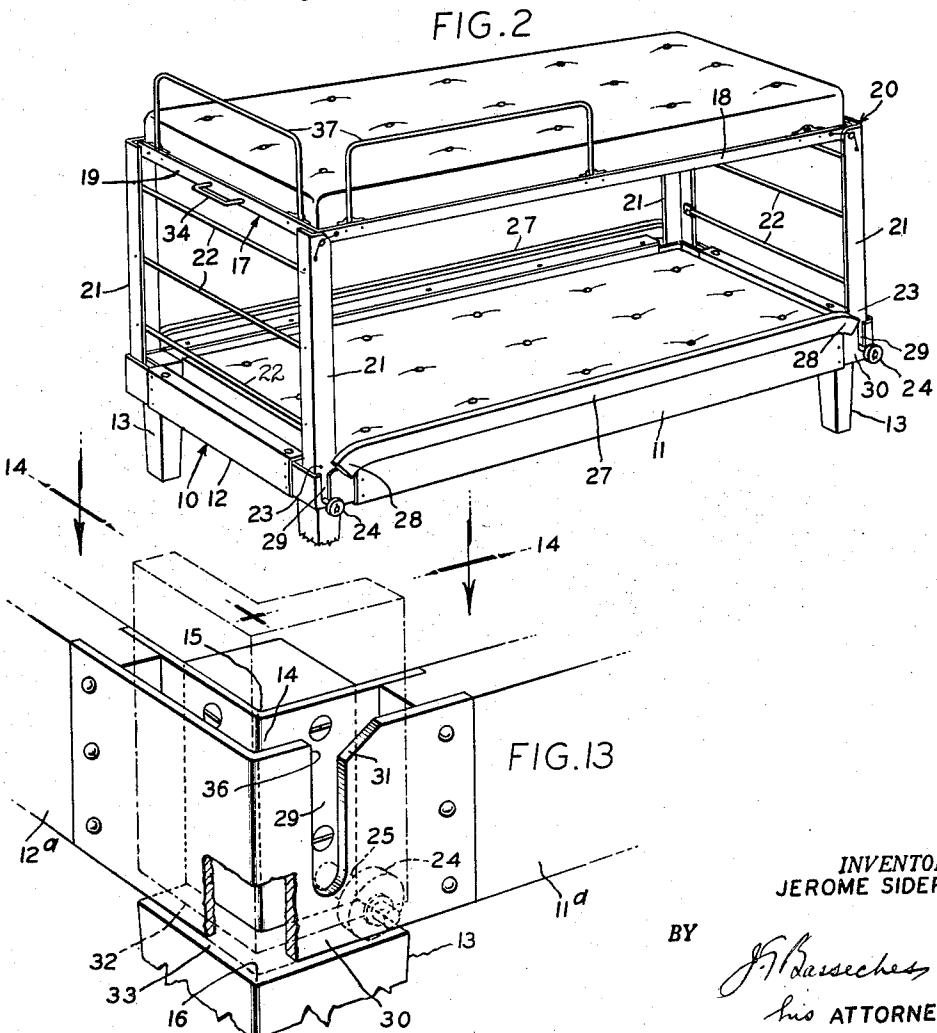
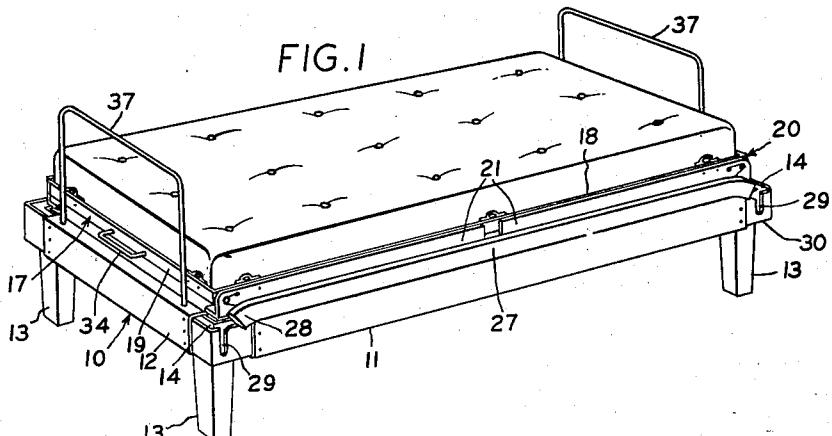
J. SIDEROFF

2,945,241

## CONVERTIBLE BED

Filed April 26, 1957

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## CONVERTIBLE BED

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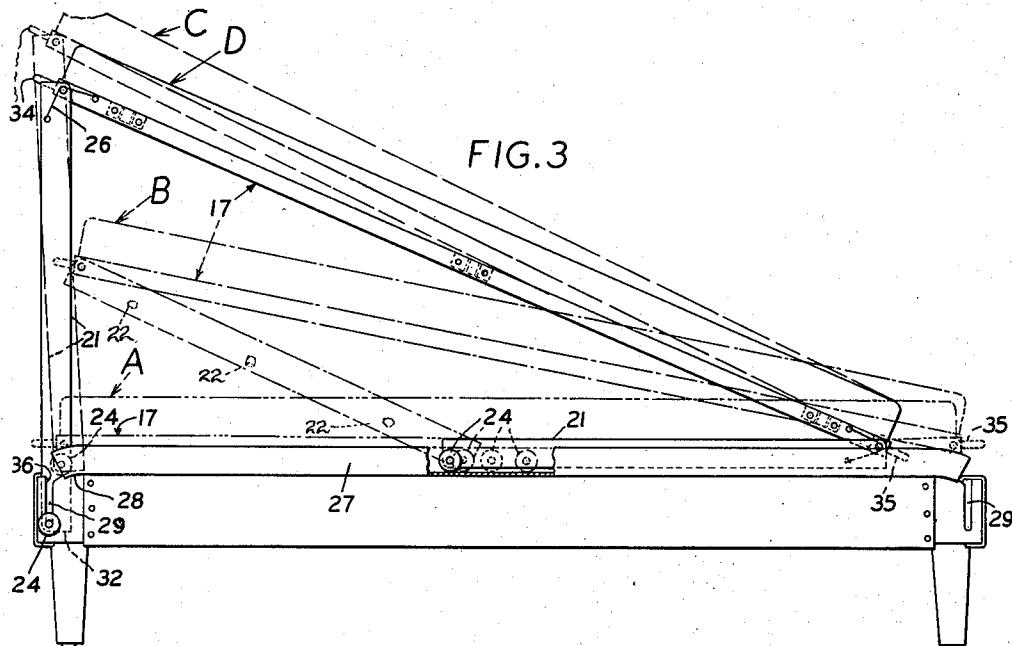
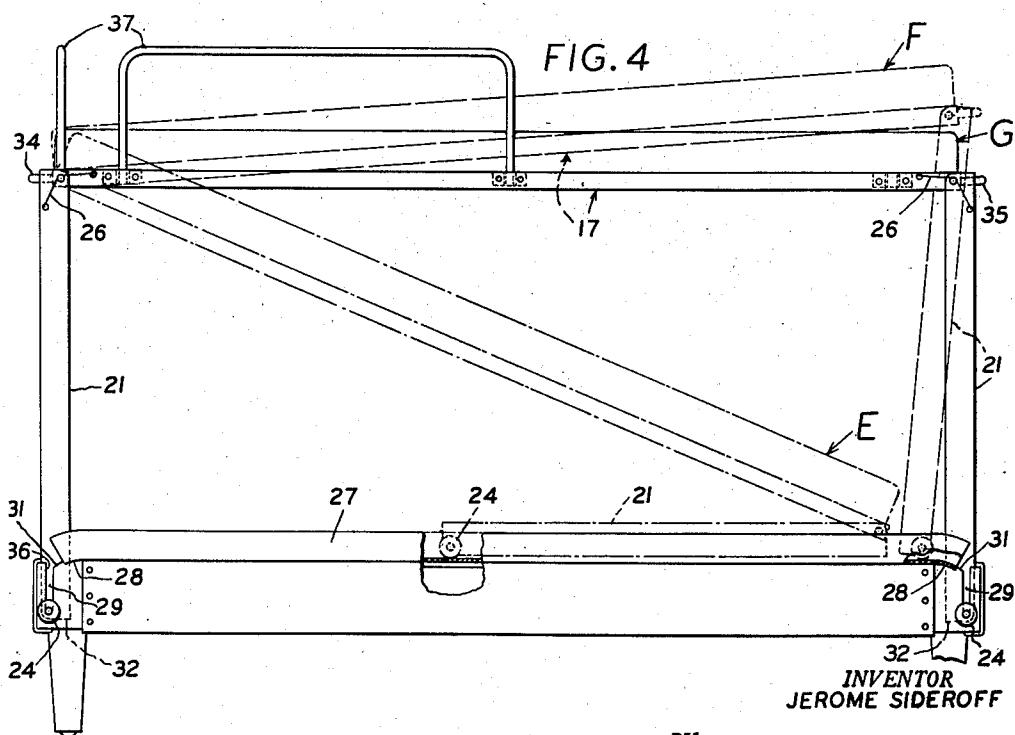


FIG. 4



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INVENTOR  
JEROME SIDEROFF

BY

J. F. Basseeches  
his ATTORNEY

July 19, 1960

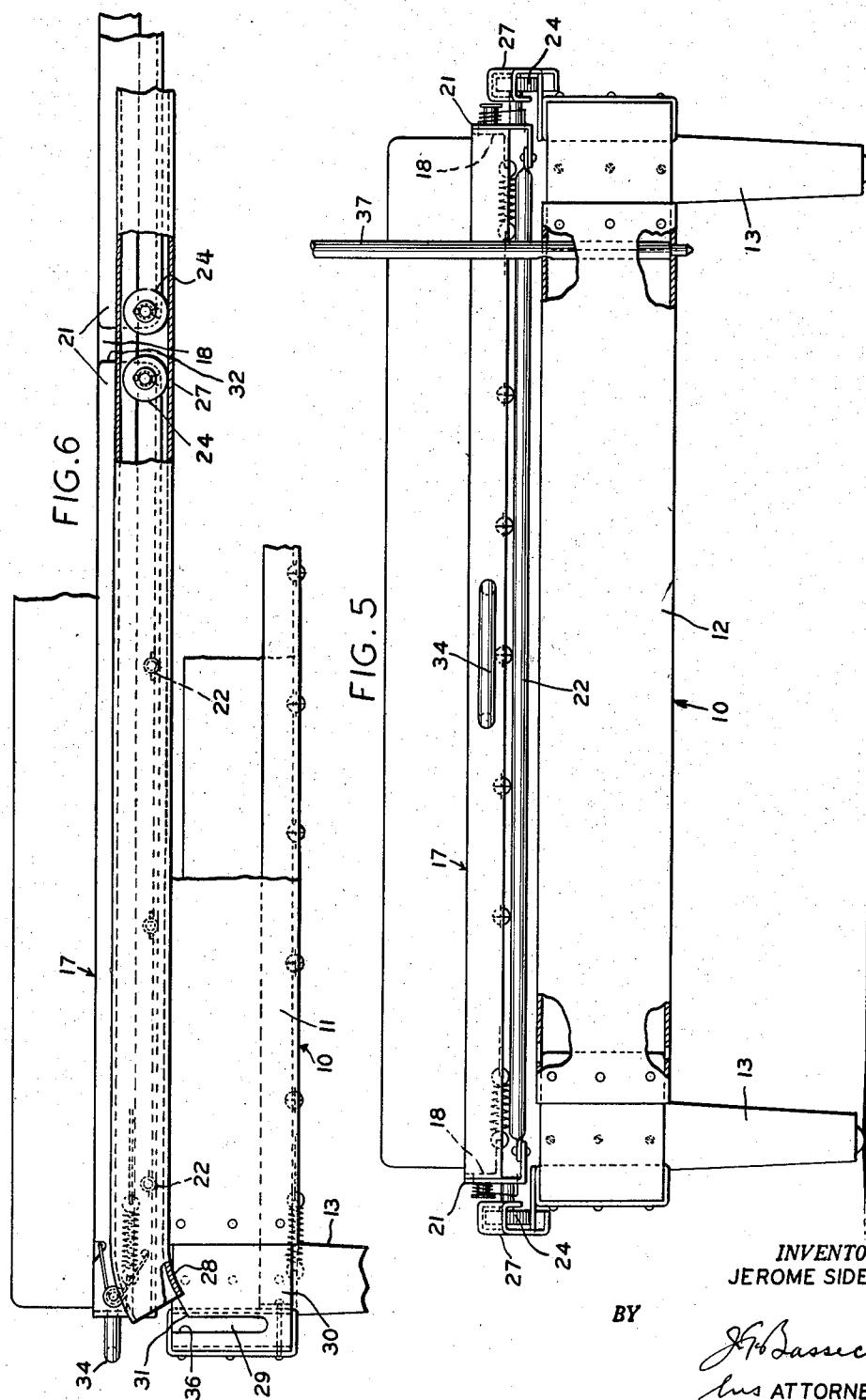
J. SIDEROFF

2,945,241

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INVENTOR  
JEROME SIDEROFF

BY

*J. Basseches*  
his ATTORNEY

July 19, 1960

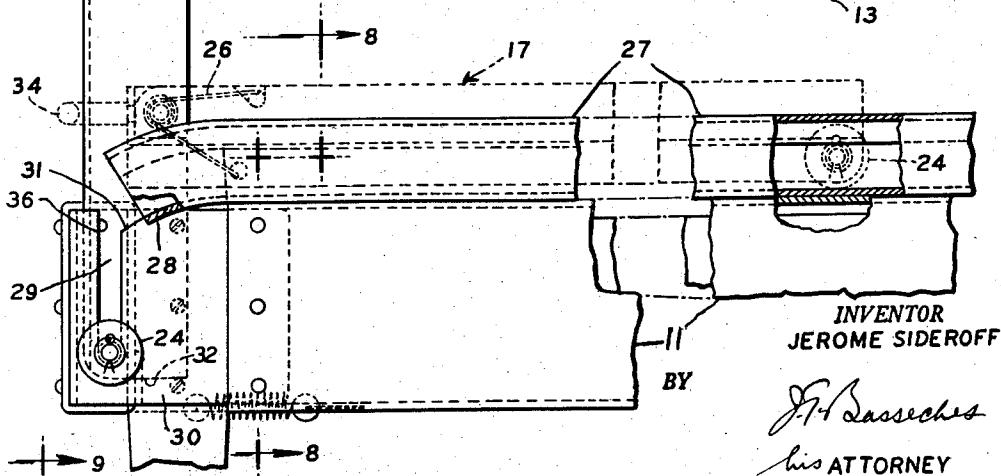
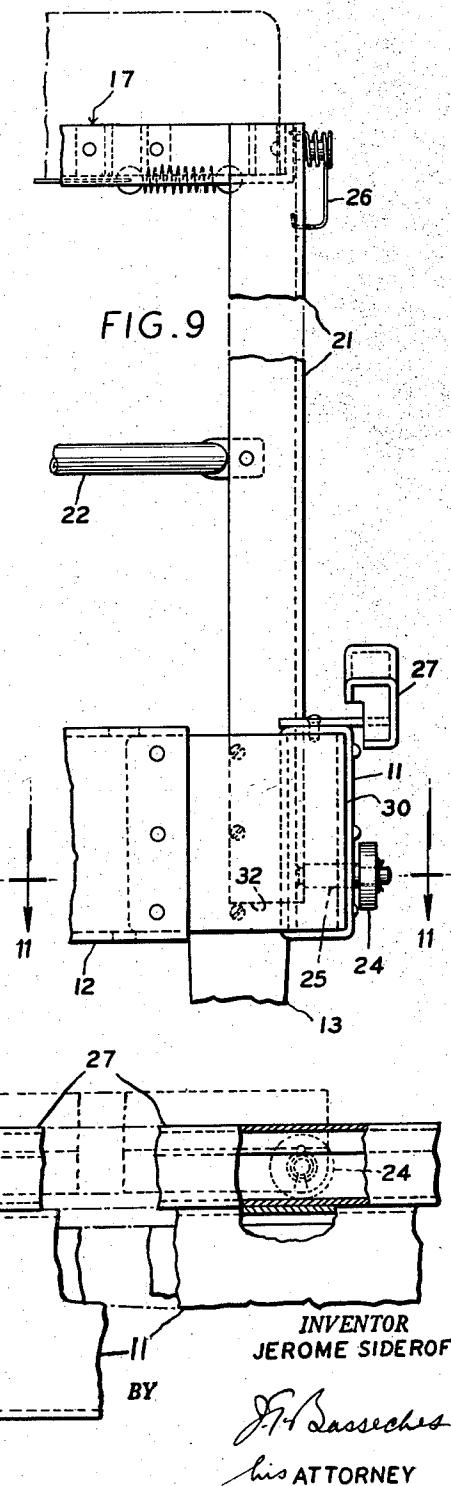
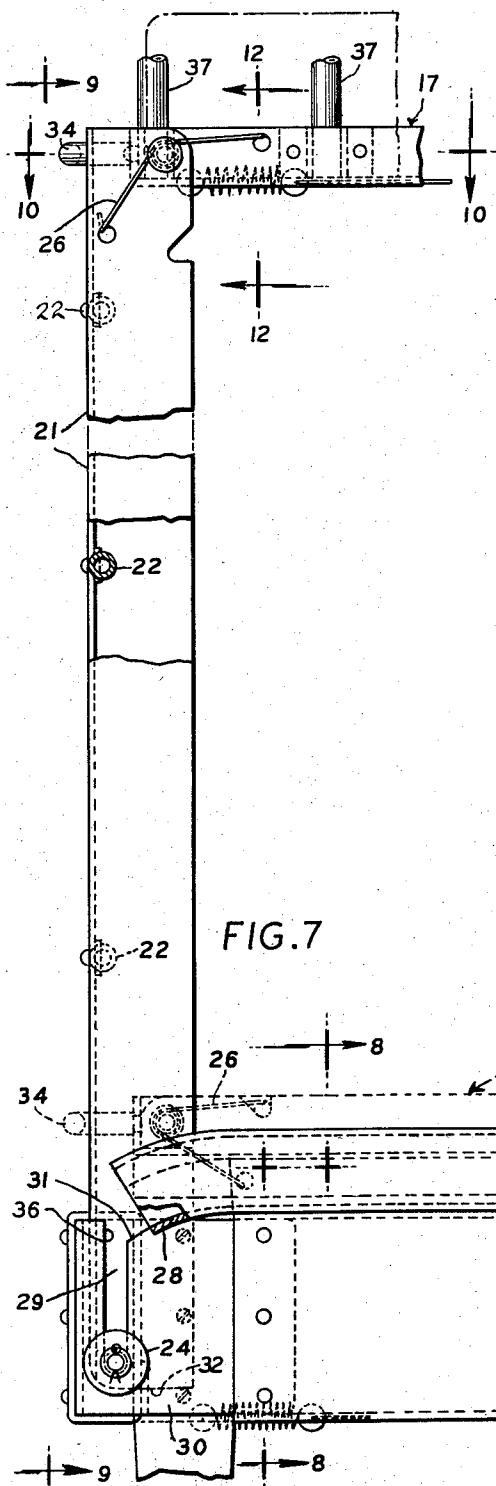
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J. SIDEROFF

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FIG.10

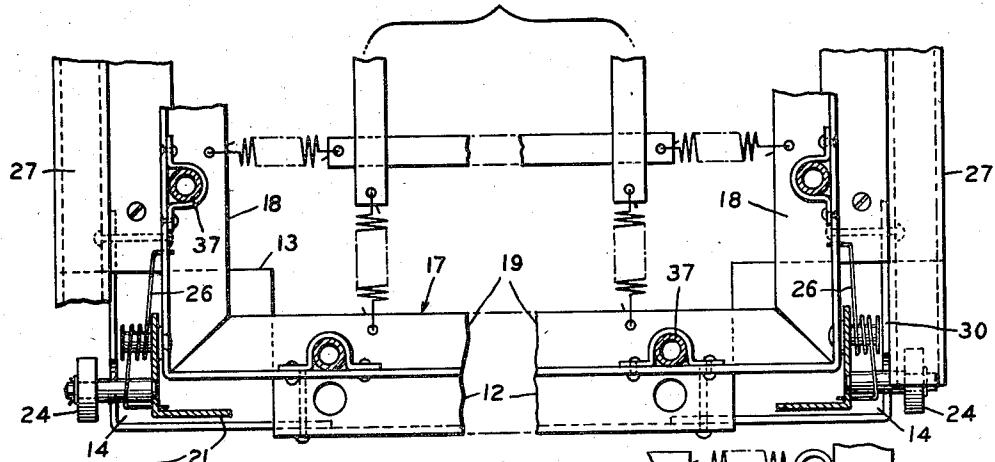


FIG.12

FIG.14

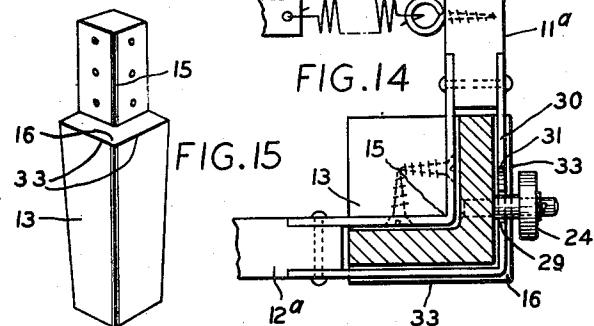


FIG.15

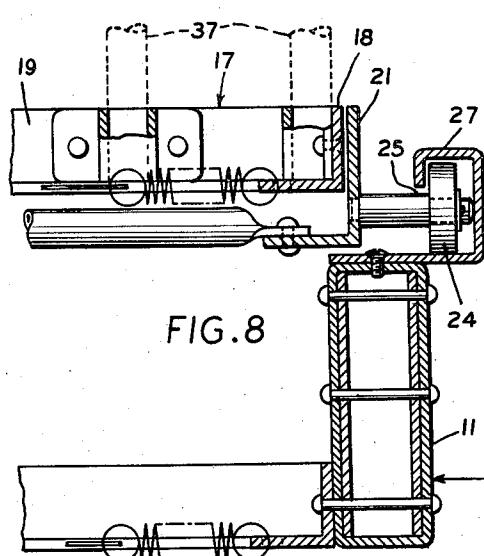
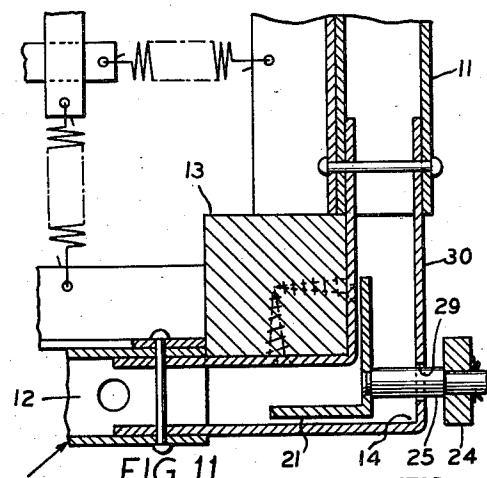


FIG.8



BY

J. Sideroff  
his ATTORNEY

INVENTOR

JEROME SIDEROFF

# United States Patent Office

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## CONVERTIBLE BED

Jerome Sideroff, 4303 Ely Ave., New York 66, N.Y.

Filed Apr. 26, 1957, Ser. No. 655,403

3 Claims. (Cl. 5—8)

This invention relates to a bed of the type commonly known as a convertible or expansion bed because of a construction which permits a plurality of frames or bunks to be compacted into a unit which gives the appearance of a single bed or sofa.

More particularly, this invention relates to a bed convertible from one which resembles a single bed or sofa into a structure commonly known as a double deck bed, in which one body support frame member is positioned above the other support, whereby floor space is economically used.

Still more particularly, this invention relates to a structure which appears to be a decorative sofa or studio bed, yet nevertheless may be quickly and facilely converted to a double deck type bed. Likewise, this invention relates to the means for accomplishing convertibility.

Known to me are bed units of the type adapted to be expanded from the single to the double deck position. Such units have, in the past, been attended by serious disadvantages which have prevented widespread public acceptance thereof.

Extreme structural rigidity is required by reason of the relatively large weights which the expanded beds must support. Known to me is the practice of supplying the necessary rigidity by prior devices of this type which have resorted to the use of exceedingly heavy structural support components. Such heavy components, in addition to being expensive, have introduced ancillary problems to the production of a satisfactory convertible double deck bed. Increased weight has made manual conversion from a single bed to a double deck bed difficult, if not impossible, and as a result the known structures have incorporated mechanical advantage multipliers, such as cranks, gears, pulleys, jacks and the like. Such conversion expedients further increase both cost and weight, and as a practical matter restrict the use of expandible bed assemblies to institutions, Pullman trains and the like where skilled manual service is available.

The use of mechanical converting means and heavy, bulky structural components, in addition to detracting from the decorative appearance of the unit, tend to increase the amount of space which the unit must occupy, thereby discouraging the use of the bed for the primary advantage of convertibility.

While attempts have been made to provide double deck convertible beds fabricated of relatively light weight components, such attempts have heretofore been uniformly unsuccessful in that the structures embodying such components have, inter alia, lacked rigidity and ease of conversion.

Accordingly, it is an object of my invention to provide a compact sofa or bed convertible by simple manipulation to a rigid double deck bed. A further object of my invention is to provide a convertible portable bed which may easily be manually extended to either the double deck position or compacted from the double deck to the single layered, settee position safely, within the reason-

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able capacity of the user and without special skill to effect the same.

A still further object of my invention is to provide a decorative sofa or bed structure fabricated of relatively light weight components, which may easily be converted to a rigid double deck bed without the necessity of resorting to expensive, slow and costly mechanical advantage expedients to achieve the changes from one position to another.

A still further object of my invention is to provide a bed as aforesaid, combining the qualities of neatness, compactness, ease of convertibility, rigidity, and economy of production, and adaptability to simple upholstery decoration.

Still a further object of my invention is to provide means for coordinating two bed frames to form a convertible double deck bed as aforesaid.

To attain these objects and such further objects as may appear herein or be hereinafter pointed out, I make reference to the accompanying drawings, forming a part hereof, in which—

Figure 1 is a perspective view of my device in the sofa or studio bed position;

Figure 2 is a perspective view of my device in the double deck position;

Figure 3 is a magnified side elevational view of my device in a partial stage of conversion from the sofa position, with diagrammatic intermediate positions in dot and dash lines for setting up an end of the assembly;

Figure 4 is a magnified side elevational view of my device in the double deck position, with diagrammatic intermediate positions in dot and dash lines for completing the setting up of the assembly;

Figure 5 is a further magnified end elevational view, with parts broken away to show details;

Figure 6 is a fragmentary magnified side elevational view, with parts broken away to show details;

Figure 7 is a further magnified fragmentary side elevational view of the left hand corner of the assembly, set up to the double deck position;

Figure 8 is a section taken on the line 8—8 of Figure 7;

Figure 9 is a fragmentary end view taken along the arrows 9—9 of Figure 7;

Figure 10 is a fragmentary plan view taken along the line 10—10 of Figure 7;

Figure 11 is a fragmentary section taken on the line 11—11 of Figure 9;

Figure 12 is a magnified fragmentary section taken on the line 12—12 of Figure 7;

Figure 13 is a magnified fragmentary perspective view, partially in phantom, showing details of another embodiment of the leg, frame and upright strut junction;

Figure 14 is a reduced sectional view taken on the line 14—14 of Figure 13;

Figure 15 is a perspective view of a leg of the assembly.

Describing my invention in detail, I provide a lower mattress support frame 10, comprising parallel side rails 11 and end rails 12, which frame is rigidly maintained in elevated horizontal position from the floor by legs 13 mounted at the corner-wise positioned socket 14 of the side rails 11 and end rails 12. The legs 13 (see also the additional embodiment, Figures 13 to 15) have their upper ends reduced in cross section to form a right angular corner portion as at 15, the lowermost section of said reduced portion defining a right angular shoulder or ledge 16. Each of the legs 13 is fastened to the frame 10, with the right angular corner 15 and shoulder 16 butted against the inner face and lower portion, respectively, of the socket 14. The socket 14 is, for purposes which will hereafter appear, of double-walled construction.

An upper mattress support frame 17, comprising side rails 18 and end rails 19, is provided at the corners 20 with vertically swinging struts 21, which are made of L-shaped angle irons. The struts 21, depending from end rails 19, are paired by lateral braces 22 so as to permit the pair to swing in unison. The struts 21, adjacent their free swinging ends 23, are provided with rollers 24, outwardly spaced from the struts 21 by the tubular spacers 25 (see Figure 11).

Torsion springs 26 are biased between the struts 21 and the side rails 18 and tend to swing the struts 21 to the perpendicular position relative to the upper frame 17.

A pair of channels or tracks 27 are positioned along the outer edges of side rails 11 of the lower frame 10. The ends of the tracks 27 are formed into downwardly curved guide lips or deflectors, as at 28, the purpose of which will later become apparent.

The sockets 14 are of double-wall construction (see also Figures 13 and 14) and are formed with vertically depending slots 29, formed through the outer walls 30 thereof. The slots 29, which are of a width to span the diameter of spacers 25, are formed, in addition, with an angularly, downwardly depending guide portion 31.

In the collapsed position of the assembly (see Figures 1, 5 and 6), the struts 21 lie longitudinally nested outside the upper side rails 18 of the upper frame 17. In this position, the rollers 24 of the struts 21 ride in the channels 27 and are approximately medially positioned therein (see Figure 6).

In the set-up, erected or double deck position (see Figure 2), the free ends 23 of the struts 21 are snugly nested within the double-wall sockets 14, the rollers 24 falling outside of the slots 29 and the spacers 25 being guided by and lying within the slots 29. The snug fit of the strut and socket connection, coupled with the right angular construction, provides an exceptionally rigid assembly, substantially free from any tendency to shift under the influence of longitudinal or lateral stress. In the said erected position, the then lowermost portion 32 of the strut 21 rests against a shoulder 33 formed by the floor of the socket 14. It should be noted that the slot 29 is of a length sufficient to permit the spacer 25 to be maintained free from engagement with the base of the slot 29 when the end portion 32 of the strut 21 abuts the shoulder 33.

The operation of converting the collapsed assembly to the double deck position is diagrammatically illustrated in Figures 3 and 4. To facilitate conversion, end handles 34 and 35 are provided. To convert the assembly in the collapsed position A (see Figure 3), one end of the upper frame 17 is pivoted upwardly through the intermediate position B to the position designated "C." This upward movement is accompanied by an outward, vertical swinging of the struts 21, the said lifting and swinging being facilitated by the outward biasing action of the torsion springs 26.

During the outward swinging, frictional resistance is minimized by the contact of the rollers 24 riding within the channels 27. When the upper frame 17 is raised to the C position, the rollers 24 will have traversed the length of the channels 27. In the C position, the end portion 32 of the strut 21 overlays the socket 14, and upon lowering, by releasing the frame 17 to the D position, the struts 21 are locked in the sockets 14. The deflectors 28 and the guides 31 cooperate with the shoulders 36 of the slots 29, the rollers 24 and the spacers 25, to cam the struts 21 into exact meshing position over the socket 14, thereby eliminating the necessity for manual alignment of the respective parts to be locked.

Conversion to the double deck position of the assembly, now in the E position (see Figure 4) is completed by raising the lowered end to the F position, thereby automatically aligning the remaining pair of struts 21 with the locking sockets 14, and by lowering the thus aligned members to the locked position G.

The transformation from double deck to compacted or settee position is accomplished by performing the steps outlined above in reverse order. One end of the erected assembly is lifted to the position F, thereby uncoupling strut 21 and socket 14 connection, the lifting action serving simultaneously, by the camming contact of the deflectors 28 and the rollers 24, to swing the struts 21 vertically inward, the inward movement being facilitated by manual pressure on the strut 21. The rollers 24 follow inwardly along the tracks 27, swinging the struts 21 to the lowered position E under the weight of the frame 17. Similarly, the opposed end is then lifted and lowered, the collapsing assembly thereupon progressively assuming the C, B and finally the A positions.

While I have illustrated my invention in conjunction with the use of removable safety shields or bales 37 (see Figure 5 for the details of the bale and frame connection), it is to be understood that the assembly may be used without such bales. Likewise, if the upper frame 20 17 is made in the form of a sofa, the function of the safety bales may be performed by the back and arm supports thereof.

In Figures 13, 14 and 15, there are illustrated side rails 11a and end rails 12a which, contra to the prior embodiment, may be made of solid components, such as wood instead of the tubular structures illustrated in Figures 1 to 12. This construction is employed where it is desired to have the frames form the skeleton of an upholstered piece of furniture, such as a sofa, as will be 30 readily understood.

It will be readily recognized that by providing an assembly which may be erected or compacted by swinging but one end of the upper frame at a time, the weight which is encountered during any operation is reduced 35 approximately a half the amount which would be ordinarily expected.

The use of support struts which, in the collapsed position of the assembly, are stowed longitudinally along the side rails of the frames rather than projecting thereabove, 40 adds to the beauty and versatility of the device.

By my invention there is provided a device which can be quickly and easily transformed from a decorative studio bed or sofa to a rigid and efficient double deck bed.

Due in part to the highly efficient design, rigidity may 45 be achieved without necessitating the use of heavy structural materials or braces, thereby effecting substantial economies and increasing the ease with which the device may be used.

It will also be observed that I provide a plurality of 50 rungs 22, three in number being shown. These rungs, coupled with the hand grip member 34, are an aid to the ready installation or erection of the upper mattress member, which will be observed from viewing Figure 3, and provide hand-under-hand progressive lifting means, 55 instead of bodily raising the mattress to the limit of its capacity, utilizing the leverage incident to such grip to facilitate the lifting movement.

Having thus described my invention and illustrated its use, what I claim as new and desire to secure by Letters 60 Patent is:

1. An expandible bed assembly comprising a bottom frame, a movable top frame, a plurality of struts, each having a free swinging end provided with laterally directed, slidible anchoring means and an end pivotally depending from one of said frames, a plurality of sockets each having a slot therein for receiving said anchoring means, mounted on the other of said frames, longitudinal tracks, guide means mounted adjacent each of said slots, said guide means having downwardly directed curved portions leading to said slots, said struts being adapted, upon elevation of said top frame, to swing through a vertical plane with their free ends sliding along and held by said tracks, thereby leading said free ends into contact with said guide means, said guide means serving 70 75

to deflect the free ends of said struts into the opening in said sockets whereby rigid vertical supports for said upper frame are formed.

2. A manually expandible bed assembly comprising a bottom frame and a movable top frame, each of said frames including end rails and side rails, the side rails of said bottom frame including longitudinally extending, laterally directed channeled tracks, means for supporting said top frame in a double deck position over said bottom frame comprising normally lengthwise disposed struts having free ends including laterally directed means engaging said tracks pivotally to guide the ends along the tracks, and ends pivotally affixed to the corners of said top frame, and strut sockets positioned at the corners of said bottom frame deflector means on said tracks adjacent said sockets comprising downwardly directed portions at the end of said tracks leading toward said sockets arranged to cooperate with said struts as said top frame is raised to double deck position sequentially to limit upward movement of said frame by engagement of said laterally directed means and said downwardly di-

rected means of said tracks, to align said ends of said struts with respect to said sockets and direct said ends downwardly into said sockets.

3. An assembly in accordance with claim 2 wherein 5 said ends and sockets comprise angularly cross-sectioned members.

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