

April 29, 1952

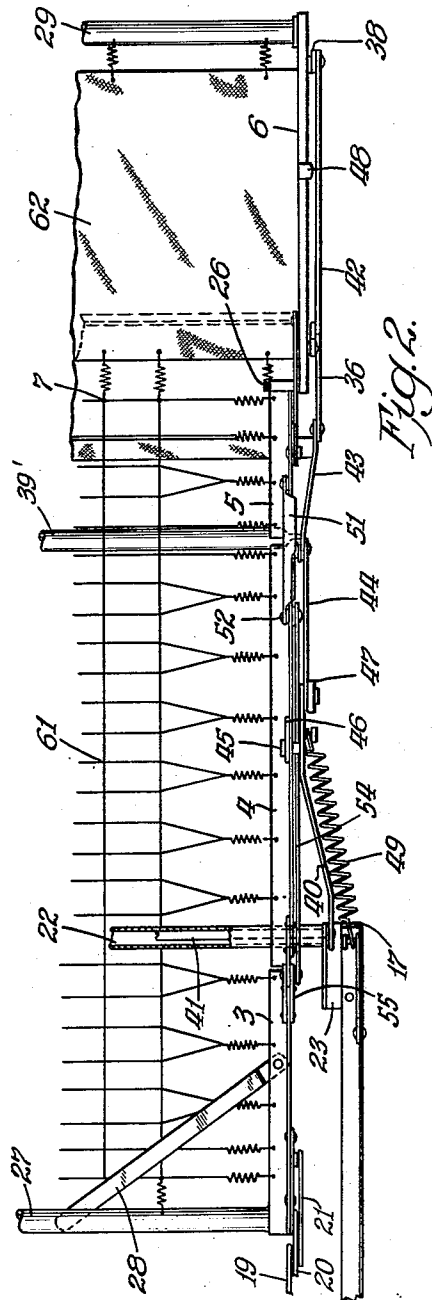
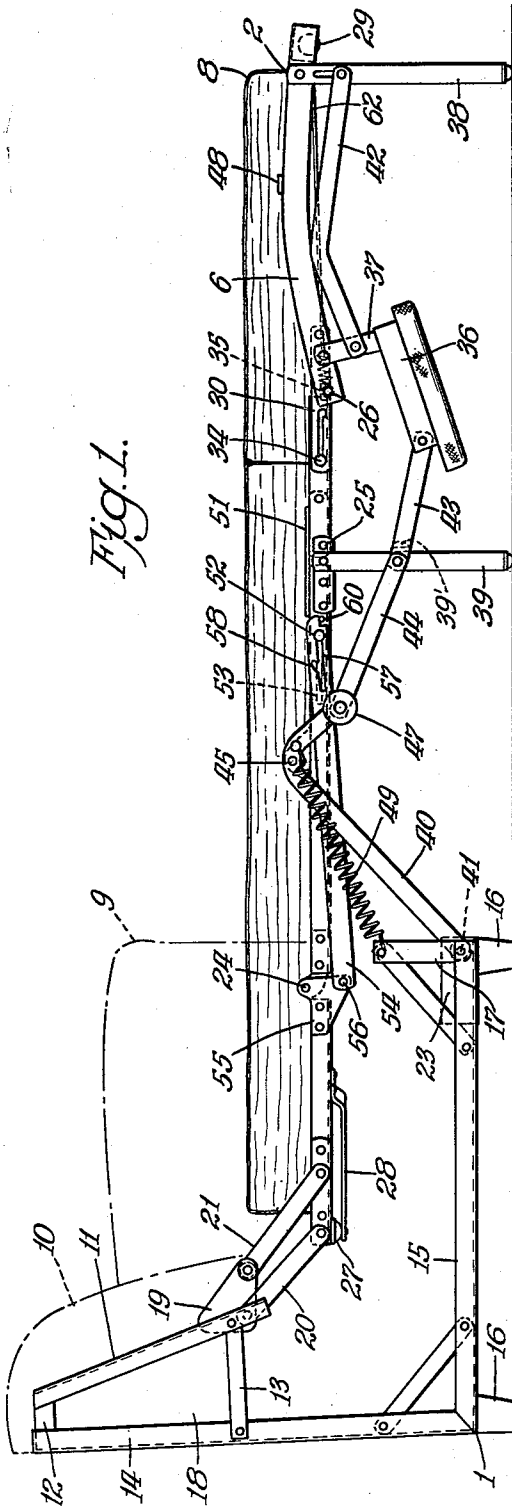
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2,595,038

SOFA BED

Filed June 10, 1946

4 Sheets-Sheet 1



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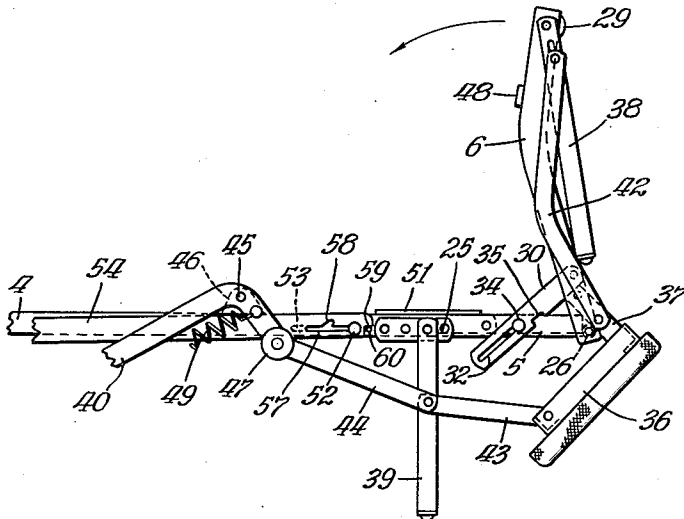
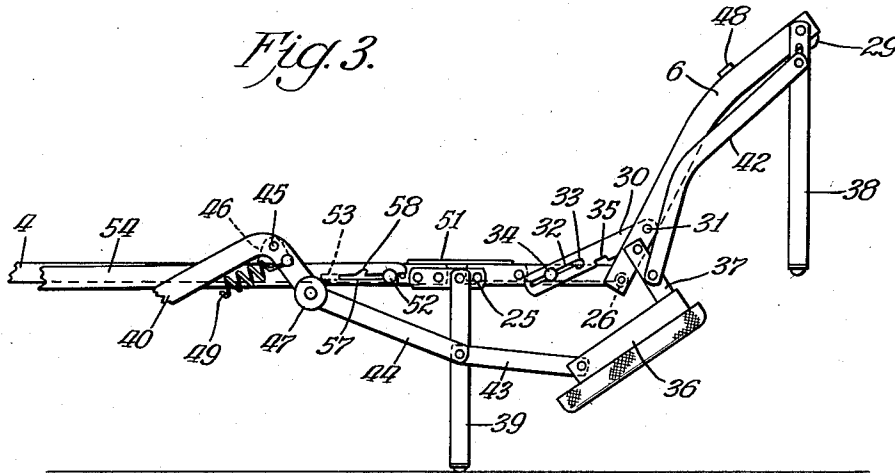


Fig. 4.

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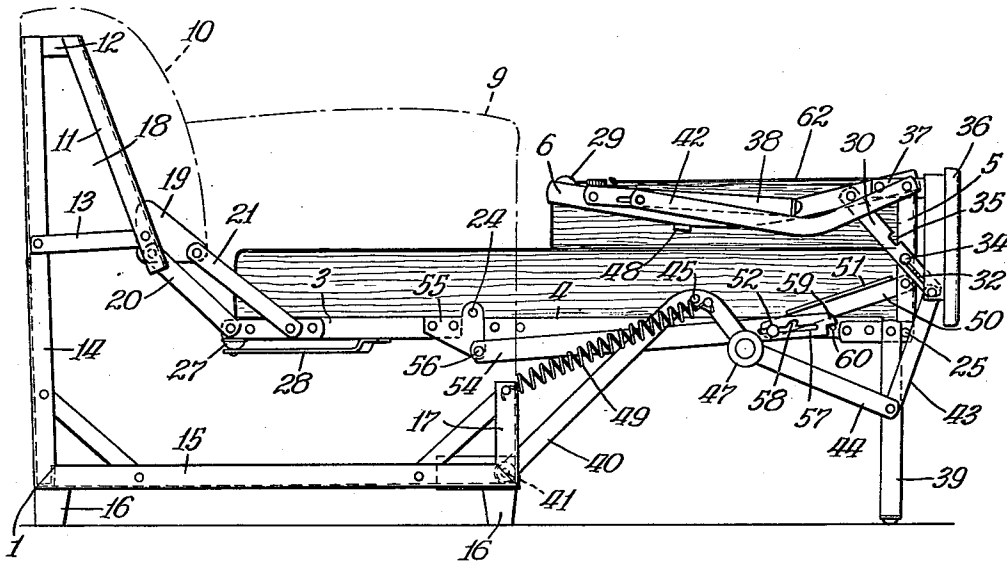


Fig. 5.

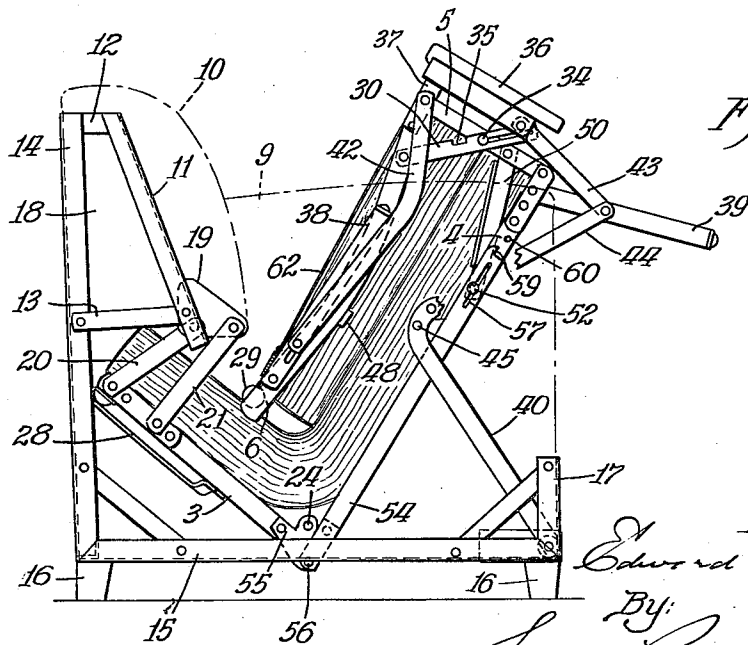


Fig. 7.

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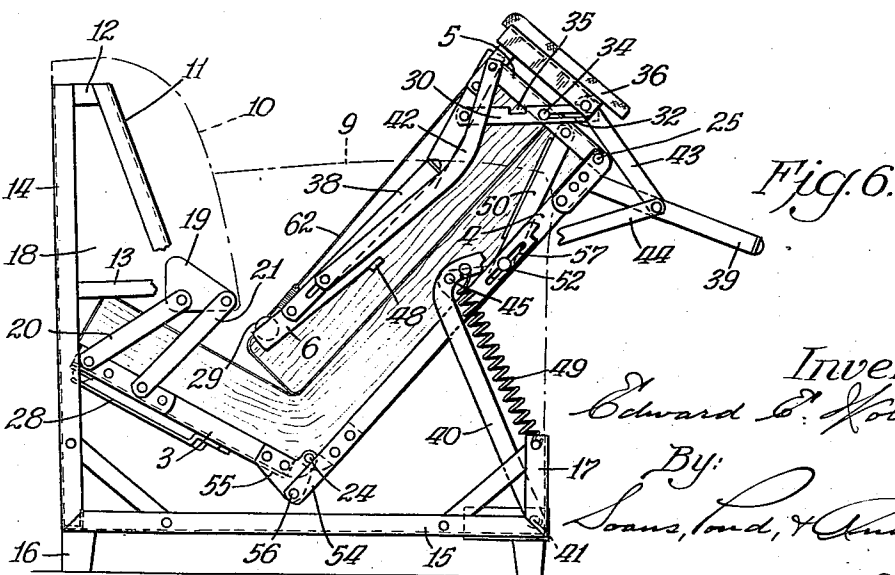
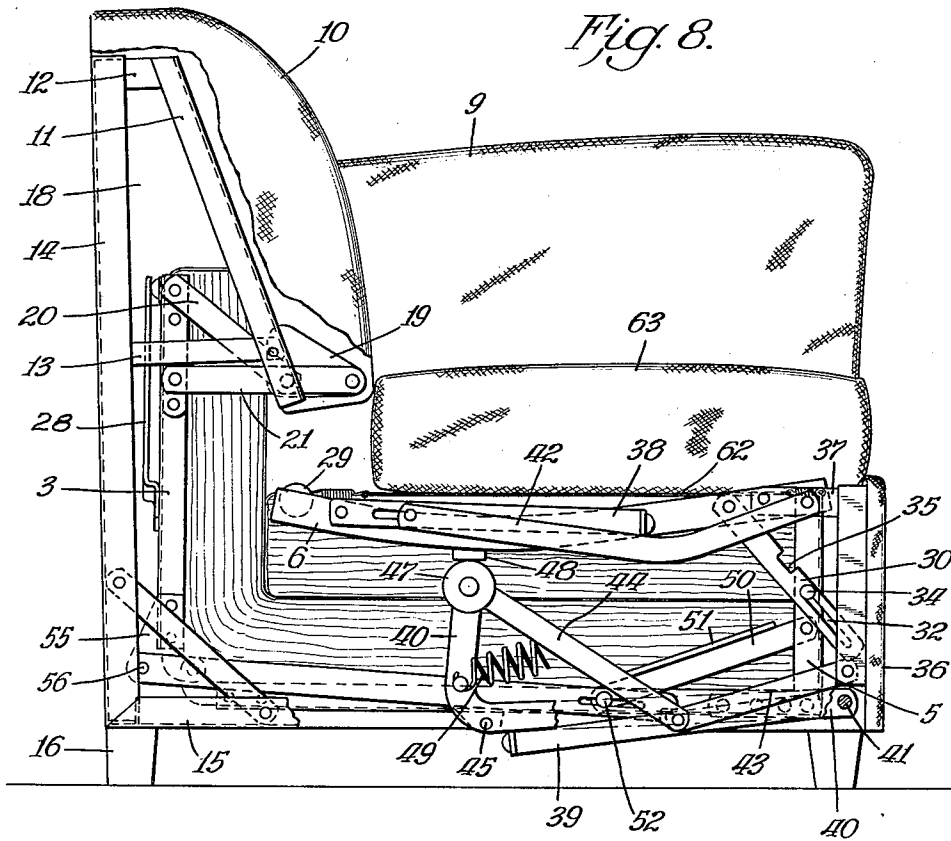
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UNITED STATES PATENT OFFICE

2,595,038

SOFA BED

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Application June 10, 1946, Serial No. 675,590

5 Claims. (Cl. 5—29)

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This invention relates to sofa beds of the general type which includes a foldable bed bottom comprising a plurality of interconnected hinged sections which may be extended in horizontal alignment to form a bed or folded to form a sofa seat as disclosed in my Patent No. 2,352,989, issued July 4, 1944.

In such constructions, the outer or foot section of the bed bottom is foldable over an intermediate section to form the sofa seat while the inner or head section is movable into vertical position in a compartment behind the stationary back of the sofa.

One of the objectionable features of bed davports heretofore in common use has been the excessive height of the seat when a bed mattress of standard thickness was used. When attempts were made to lower the seat in folded position, the sections when extended to bed position were positioned too close to the floor.

The main objects of this invention are to provide a sofa bed having improved mechanism for supporting and interconnecting the bed sections whereby they are positioned at comfortable heights for use as a seat or as a bed; to provide a sofa bed of this kind which will accommodate a full-sized mattress of standard thickness; to provide improved locking means for holding the outer or seat section in folded position overlying the intermediate section when the bed is closed to form a sofa; and to provide a sofa bed of this type which may be quickly and easily converted to either bed or sofa position.

An illustrative embodiment of this invention is shown in the accompanying drawings, wherein:

Figure 1 is a side elevation, partly broken away, showing the sections in fully extended position for use as a bed.

Figure 2 is a fragmentary plan view of the bed bottom without the mattress.

Figures 3 and 4 are fragmentary side elevations illustrating intermediate positions of the outer or foot section of the bed bottom.

Figures 5, 6, and 7 are side elevations, partly broken away, showing various intermediate positions of the bed bottom sections in their movement from the fully extended position shown in Figure 1 to the fully closed position.

Figure 8 is a side elevation, partly broken away, showing the parts in folded position for use as a sofa seat.

In the form shown, the improved sofa bed includes a stationary frame 1, and a movable bed bottom 2 comprising interconnected hinged sec-

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tions 3, 4, 5, and 6, on which is mounted a flexible fabric 7 for supporting a mattress 8.

The frame 1 includes a pair of arm rests 9, and a fixed upholstered back 10 having end bars 11 supported on arms 12, 13 extending forwardly from upright members 14 mounted on a base section 15 supported on feet 16 and provided with upright posts 17 at the two front corners thereof. Rearwardly of the upholstered back rest 10 is a space or compartment 18 for receiving the inner or head section 3 of the bed bottom when the sections are folded into seat position, as illustrated in Figure 8.

At each end of the back rest, is a bracket 19 which pivotally supports links 20, 21 which are also pivotally secured to the head section 3. These links are operative to cause the inner or head section of the bed bottom to move in its entirety through a fixed path of travel between its upwardly extending, folded position and its unfolded, horizontally extending bed position, as shown and described in Bayer Patent No. 2,333,087.

Extending between the posts 17 is a tubular member 22 having its ends secured to brackets 23 mounted at the forward corners of the base 15.

The four bed bottom sections 3, 4, 5, and 6 comprise side bars having their opposed ends pivotally connected together by hinge pins 24, 25, and 26.

The side members of the section 3 are connected to a cross bar 27 and diagonal braces 28 connected to the bar and offset downwardly as shown in Figure 1. The forward ends of the side members of the foot section 6 are connected to a cross bar 29.

Adjacent the hinge pins 26, are braces 30 having their forward ends pivotally connected to the section 6 by pins 31. Formed in the rear end of each of the braces 30, is a slot 32 and notch 33 for receiving a pin 34 on the adjacent section 5. These braces 30 are operative to cause the intermediate section 5 to assume a vertical position normal to the sections 4 and 6 when the bed sections are folded to form a seat and also to serve to latch the section 6 in such angular relationship with the intermediate section.

The lower edge of the braces 30 are notched, as shown at 35, so as to permit the braces to be lowered into the plane of the open bed sections without being obstructed by the hinge pins 26.

When the bed bottom is folded to seat position, it is concealed at the front of the sofa by a front board 36 having arms 37 pivotally secured to the side members of the section 6.

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When the bed bottom is extended to bed position its inner end is supported by the links 20, 21 connected to the head section 3, and its outer end is supported on a pair of foldable legs 38 pivotally connected to the section 6, a pair of foldable legs 39 pivotally connected to the section 4, and a pair of bell crank levers 40, the lower ends of which are rigidly connected to a pivot rod 41 rotatably mounted in the tubular member 22 of the stationary frame 1.

The legs 38 have pin and slot connections with a pair of links 42 which are pivotally connected to the arms 37 of the front board. The legs 39 are connected to the front board by links 43 and to the upper ends of the bell cranks 40 by links 44. The legs 39 are rigidly connected together by a tubular bar 39' so as to operate as a unit. With this construction, the legs are automatically folded and extended by the closing and opening of the bed bottom.

At its apex, each of the bell cranks is pivotally connected to the adjacent side bar of the section 4 by means of a hinge pin 45 which engages an upstanding lug 46. On the outer end of each bell crank, is a roller 47 positioned to engage a lug 48 on the section 6 to firmly support the seat section when the bed bottom is folded as shown in Figure 8.

Coil springs 49 are connected to the posts 17 and to the outer legs of the bell cranks 40 to assist the operator in effecting the folding and unfolding of the structure and to cushion the movements thereof.

Extending between the intermediate sections 4 and 5 at each side of the bed bottom, is a brace bar 50 having a flange 51 positioned to overlie the upper edges of the side members of the sections 4 and 5 when the bed is open, as shown in Figures 1 and 2. The forward end of this brace is pivotally secured to the section 5 and its rear end carries a pin 52 which slidably engages a slot 53 in the side bar of the section 4.

Mounted on each side of the structure, is an improved latch bar or closing element 54, the inner end of which is pivotally connected to a bracket 55 on the section 3 by means of a pin 56 which is offset from the pin 24 whereby movement of the section 3 around the pivot 24 effects a longitudinal shifting of the latch bar. Formed in the latch bar adjacent its outer end, is a slot 57 and notch 58 for receiving the pin 52 of the bar 50. When the seat section 6 is folded so as to overlie the section 4, the brace 50 moves downwardly until the pin 34 enters the notch 33, and the brace 50 moves inwardly, shifting its pin 52 inwardly along the slot 53. As the partially folded bed bottom is shifted into the frame, the latch bar or closing element 54 is shifted longitudinally rearwardly whereupon the notch 58 engages the pin 52, enabling the latch bar 54, acting through the braces 50 and 30 to lock the sections 4, 5 and 6 against unfolding and to draw the section 6 downwardly toward the section 4.

When the bed bottom sections are positioned as shown in Figure 5, the pins 52 are located to the rear of the notches 58 and when the sections 5 and 6 are unfolded the pins 52 move forwardly. To prevent the pins 52 from entering the notches 58 during this forward movement of the pins, the latch bars are provided with shoulders 59 adapted to engage pins 60 on the sections 4 to hold the latch bars in elevated position during the time in which the sections 3 and 4 are positioned in horizontal alinement.

In the form shown, the flexible fabric 7 which

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supports the mattress comprises a metal link section 61 connected to the bed sections 3, 4, and 5, and a textile fabric section 62 connected to the seat section 6.

As shown in Fig. 2 the metal fabric section 61 is connected to the bed sections 3, 4, and 5 through a series of helicals, as in my previous Patent 2,352,989. In the structure of that patent, the pull of the fabric 61 and its connecting helicals is resisted in part by an intermediate tubular cross brace which is united to the opposed side frame members of the intermediate bed-bottom section. In the present structure no such intermediate cross tube is used or needed, because the pull exerted on the side members by the fabric is resisted by the braces 28 which braces also have the additional function of preserving the rectangularity of the bed section frame 3 when the latter is subjected to any unbalanced or racking stresses.

The mattress 8 is of standard thickness and is split at the center of the bed section 5 so as to facilitate folding. The mattress may be tied to the supporting fabric by any suitable means.

When the structure is folded to sofa position, seat cushions 63 are placed on top of the fabric 62.

In the sofa seat position, as illustrated in Figure 8, the bed bottom is folded so that its section 5 is disposed vertically behind the front board 36, the seat section 6 overlies the section 4, and the head section 3 is disposed vertically behind the fixed back 10. In this folded position, the seat section is supported by the rollers 47 as well as by the hinge pins 26 and braces 30, and the structure is secured against accidental unfolding by the improved latch bars 54 through the links 30 and 50.

To open the bed, the cushions 63 are removed and the forward edge of the structure is raised in order to withdraw the head section 3 from the compartment 18. The bed bottom is then moved forwardly to the position shown in Figure 5. During this unfolding movement, the links 20, 21 are operative to cause the head section 3 to move in its entirety through a fixed path of travel, while the hinge pins 24 cooperate with the bell cranks 40 to guide the movement of the outer sections, and the legs 39 are automatically unfolded by the links 44 connected to the bell cranks.

During this portion of the unfolding operation, the latch bars 54 are shifted forwardly so as to disengage the pins 52 from the notches 58. The sections 5 and 6 may then be locked forwardly around the pins 25 and during this movement the pins 34 become disengaged from the notches 33 so as to permit the section 6 to pivot on the pins 26. Forward movement is continued until the legs 38 are unfolded and all of the bed sections are horizontally aligned as shown in Figure 1.

To fold the structure, the sections are moved rearwardly through the various positions illustrated in Figures 3, 4, 5, 6, and 7 until they finally assume the positions illustrated in Figure 8.

Although but one specific embodiment of this invention has been herein shown and described, it will be understood that details of the construction shown may be altered without departing from the spirit of the invention as defined by the following claims.

I claim:

1. In a sofa bed having a normally stationary

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frame and a foldable bed bottom comprising inner and outer sections, first and second intermediate sections pivotally connected together and respectively to said inner and outer sections, and shiftable supporting means pivotally interconnecting said inner section and said first intermediate section with said frame whereby said bed bottom sections may be extended from said frame in coplanar relation or retractably folded into said frame with said inner section extending upwardly at the rear of said frame and with said first intermediate section disposed at the bottom of said frame and with said outer section overlying said first intermediate section and spaced therefrom by said second intermediate section to form a sofa seat; a linkage operative to draw said outer section downwardly toward said first intermediate section as said sections are shifted into the aforesaid folded position and to lock said outer and intermediate sections against relative unfolding movement while said sections occupy said folded position, said linkage including a first link pivotally connected to said outer section and having formed therein a slot slidably engaging a pin on said second intermediate section, said link also having a recess offset from said slot at one end thereof and extending downwardly therefrom when said sections are coplanarly extended, said pin being positioned to limit the relative folding movement of said outer and said second intermediate sections by its abutment with said link at said slot end and engageable by said recess to lock said outer and said intermediate sections together when said outer section overlies said first intermediate section, a second link pivotally connected to each of said intermediate sections, the pivotal connection between said second link and said first intermediate section being shiftable longitudinally of said first intermediate section to permit relative folding movement of said intermediate sections, a latch bar pivotally connected at one of its ends to said inner section at a point displaced from the pivotal connection between said inner and first intermediate section and shiftablely connected at its other end to the shiftable pivotal connection of said second link to said first intermediate section, said latch bar being longitudinally shiftable by relative folding movement of said inner and first intermediate sections, and means on said latch bar adapted to holdingly engage and draw rearwardly second-link shifting-pivot upon rearward shifting motion of said latch bar through the movement of said inner section into said upwardly extending position.

2. In a sofa bed having a normally stationary frame and a foldable bed bottom comprising inner and outer sections, first and second intermediate sections pivotally connected together and respectively to said inner and outer sections and shiftable supporting means pivotally interconnecting said inner section and said first intermediate section with said frame whereby said bed bottom sections may be extended from said frame in coplanar relation or retractably folded into said frame with said inner section extending upwardly at the rear of said frame and with said first intermediate section disposed at the bottom of said frame and with said outer section overlying said first intermediate section and spaced therefrom by said second intermediate section to form a sofa seat; a linkage operative to draw said outer section downwardly toward said first intermediate section as said sections are shifted into the aforesaid folded position and to lock said outer and

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intermediate sections against relative unfolding movement while said sections occupy said folded position, said linkage including a first link pivotally connected to said outer section and having formed therein a slot slidably engaging a pin on said second intermediate section, said link also having a recess offset from said slot at one end thereof and extending downwardly therefrom when said sections are coplanarly extended, said pin being positioned to limit the relative folding movement of said outer and said second intermediate sections by its abutment with said link at said slot end and engageable by said recess to lock said outer and said second intermediate sections together when said outer section overlies said first intermediate section, a second link pivotally connected to said second intermediate section and having a pin slidably engaging a longitudinally extending slot formed in said first intermediate section to permit relative folding movement of said intermediate sections, and a latch bar pivotally connected to said inner section at a point displaced from the pivotal connection between said inner and first intermediate sections and having formed therein a slot slidably engaging said second-link pin, said latch bar being longitudinally shiftable by relative folding movement of said inner and first intermediate section, said latch bar also having formed therein a recess offset from said latch-bar slot and communicating therewith, said recess being adapted to holdingly engage and draw rearwardly said second-link pin upon rearward shifting motion of said latch bar by the movement of said inner section into said upwardly extending position.

3. A sofa bed structure which comprises a normally stationary frame and a bed bottom comprising a plurality of foldable sections including two sections having means hingedly connecting said two sections whereby said two sections are relatively foldable with one of the two sections overlying the other, mounting means movably supporting said plurality of sections on said frame whereby said sections when folded are movable inwardly of said frame with one of said two sections uppermost to form a sofa seat, means interconnecting and carried by said two sections for drawing said two sections toward each other, and means carried by one of the plurality of sections and releasably engageable with said interconnecting means for effectively operating said interconnecting means by the movement of said foldable sections relative to the frame when the foldable sections are moved inwardly toward said frame.

4. A sofa bed structure which comprises a normally stationary frame and a bed bottom comprising a plurality of foldable sections including two sections having means hingedly connecting said two sections whereby said two sections are relatively foldable with one of the two sections overlying the other, mounting means movably supporting said plurality of sections on said frame whereby said sections when folded are movable inwardly of said frame with one of said two sections uppermost to form a sofa seat, means interconnecting and carried by said two sections for drawing said two sections toward each other, and a link carried by one of the plurality of sections at one end thereof and having a lost motion connection with said interconnecting means for effectively operating said interconnecting means by the movement of said foldable sections relative to the frame when the foldable sections are moved inwardly toward said frame.

5. A sofa bed structure which comprises a nor-

mally stationary frame and a bed bottom comprising a plurality of foldable sections including two sections having means hingedly connecting said two sections whereby said two sections are relatively foldable with one of the two sections overlying the other, mounting means movably supporting said plurality of sections on said frame whereby said sections when folded are movable inwardly of said frame with one of said two sections uppermost to form a sofa seat, interconnecting means carried by said two sections for drawing said two sections toward each other, said interconnecting means including a member connected with the upper of said two sections and having thereon a pin, and means carried by one of said plurality of sections and releasably engageable with said pin for effectively operating said interconnecting means by the movement of said foldable sections relative to the frame when the foldable sections are moved inwardly toward said frame.

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