July 11, 1944. E. E. WOLLER 2,353,329

SOFA BED

Filed May 15, 1941 4 Sheets-Sheet 1

Fig. 1

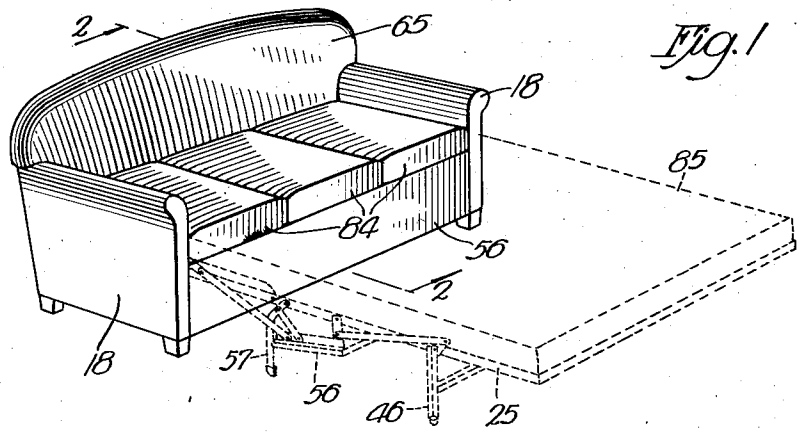
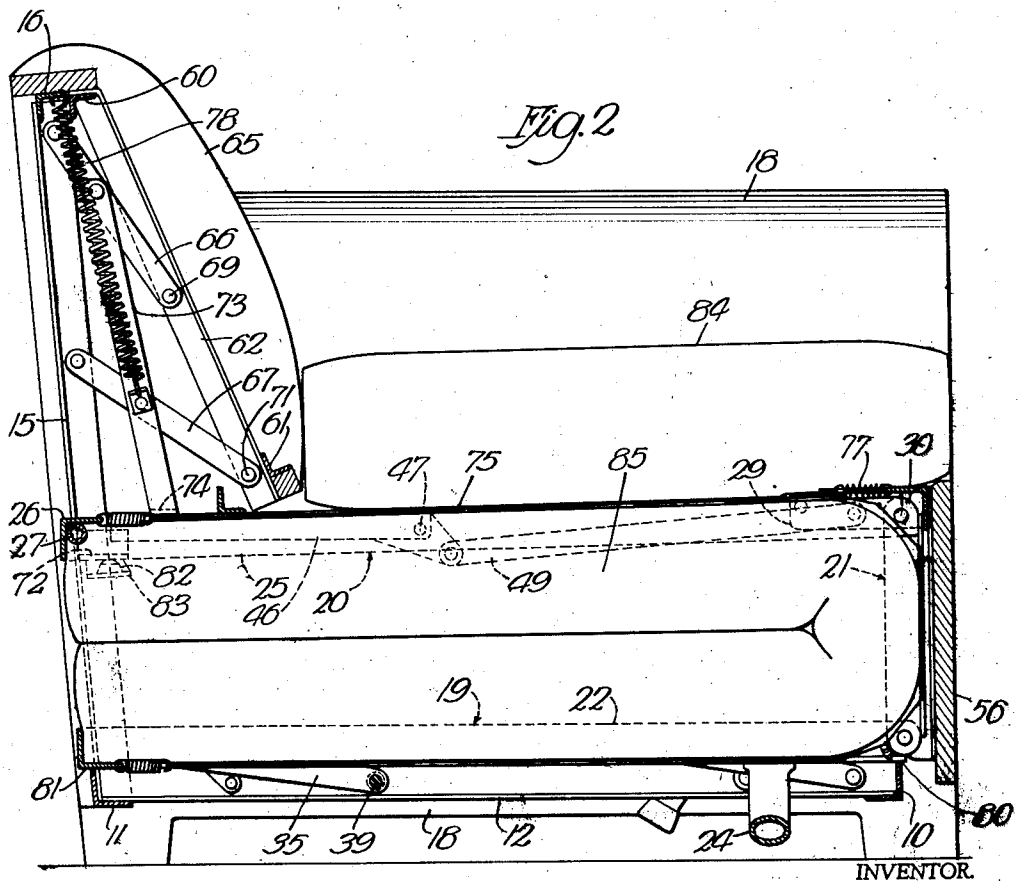


Fig. 2



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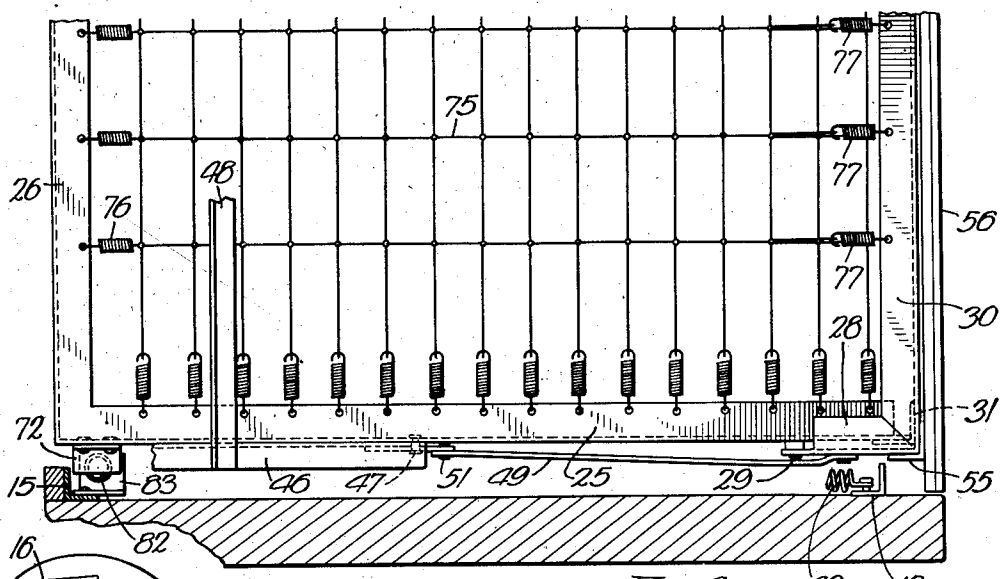
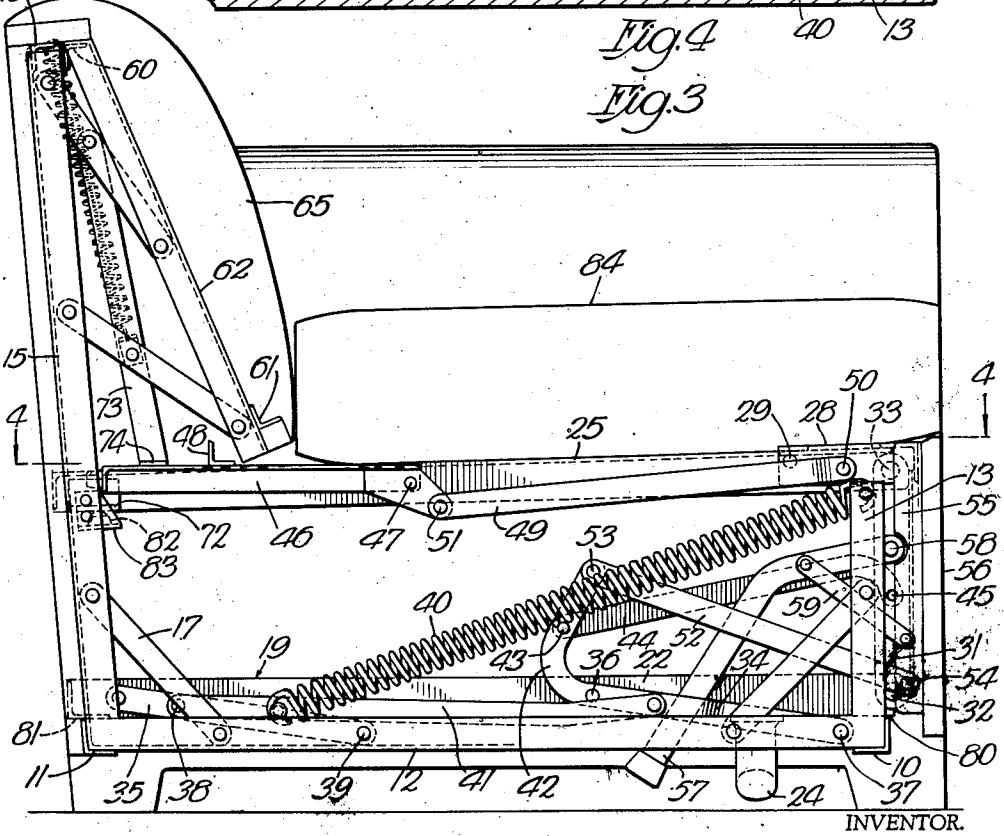


Fig. 4

Fig. 3



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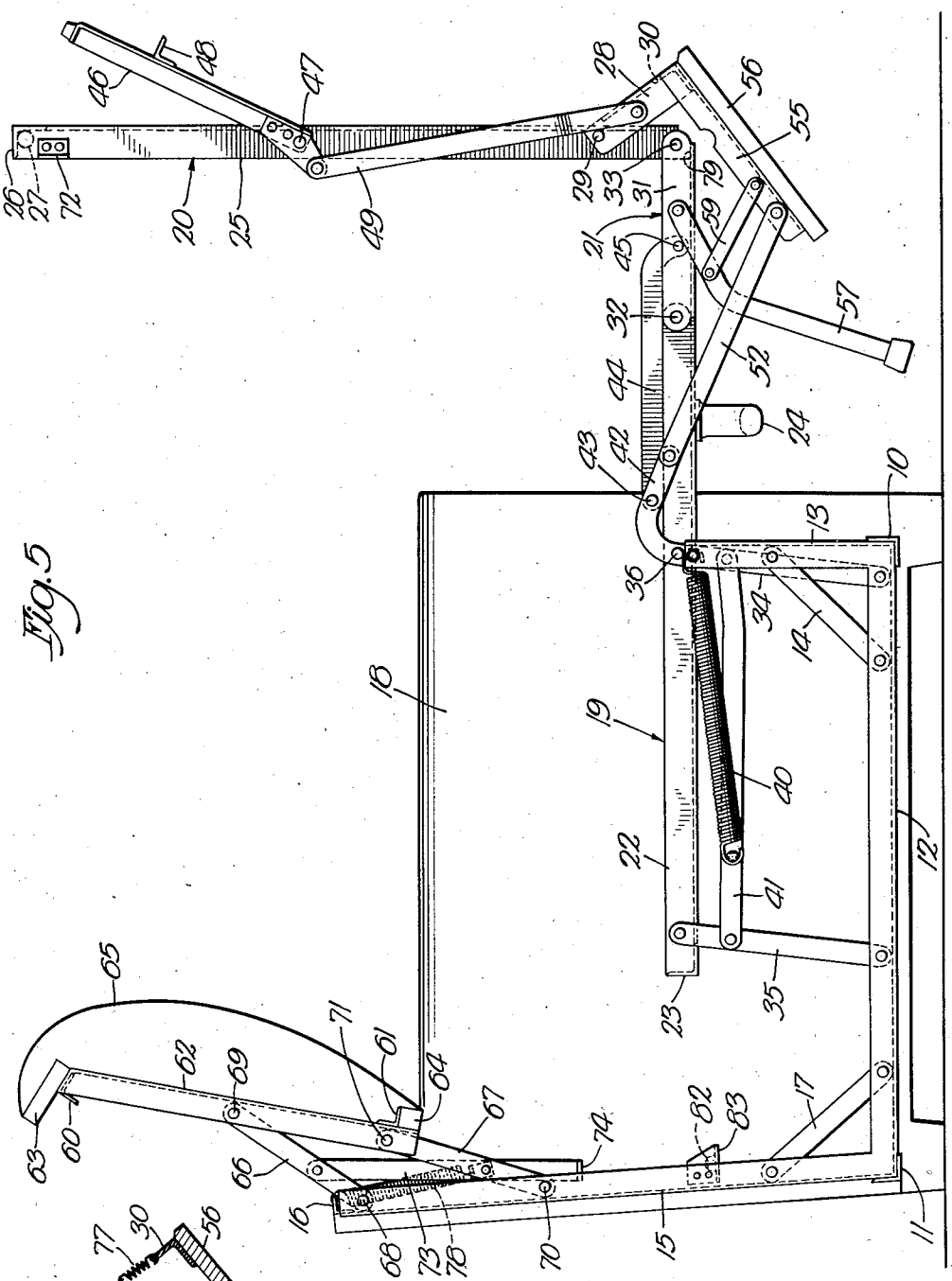


Fig. 5

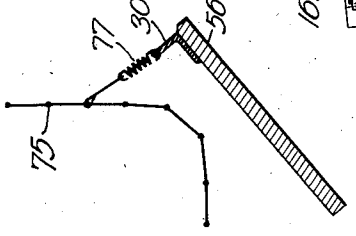


Fig. 6

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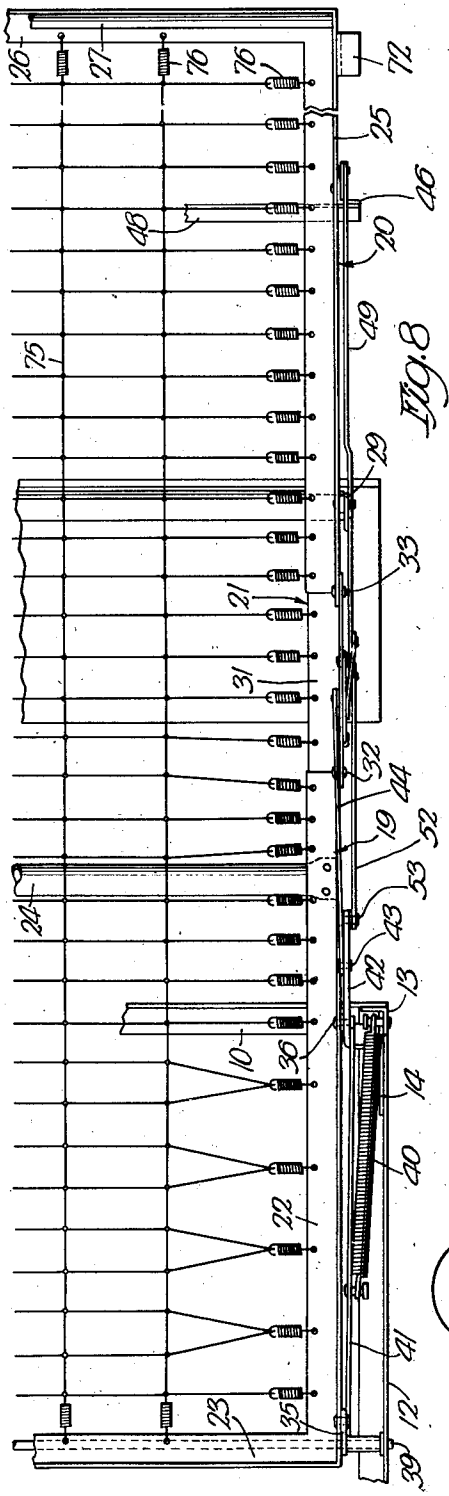


Fig. 8

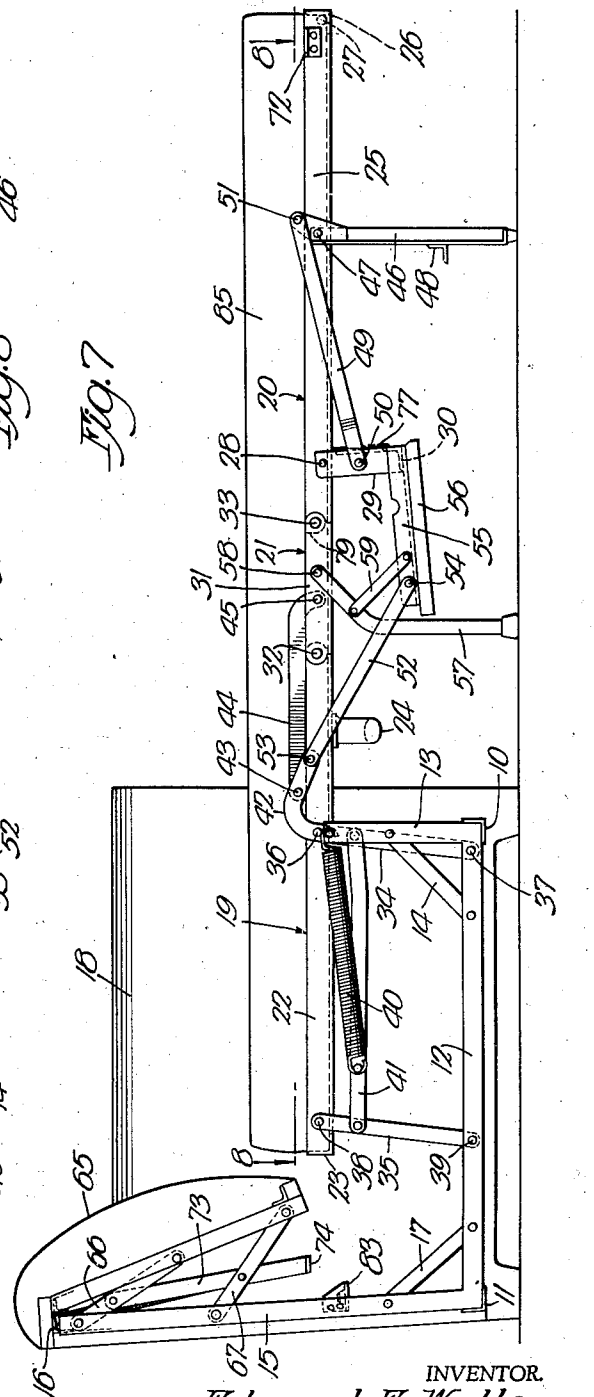


Fig. 7

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Patented July 11, 1944

2,353,329

UNITED STATES PATENT OFFICE

2,353,329

SOFA BED

Edward E. Woller, Kenosha, Wis., assignor to Simmons Company, a corporation of Delaware

Application May 15, 1941, Serial No. 393,523

3 Claims. (Cl. 5—31)

This invention relates to a sofa bed and more particularly to a sofa bed in which there are a pair of bed spring sections foldably connected and mounted in a normally stationary supporting frame, so that one section may be folded into overlying relation to the other with a mattress between the folded sections and in which relationship one of the sections is adapted to serve as a seat cushion support. In the present embodiment of the structure, there is also an independent back rest which overlies a portion of the folded bed springs and is adjustable from normal back rest position to an elevated position to permit unfolding of the bed springs and adjustment thereof to bed position.

The main objects of the invention are to provide a simplified sofa bed of the character indicated wherein a full length bed may be formed from a pair of hingedly connected sections and wherein the structure is such that when it is adjusted to sofa position the depth of the seat area, that is, the front to rear dimension thereof, is such as to afford a comfortable seat and back rest for an occupant; to provide a structure of the character indicated which will be easy to adjust from sofa position to bed position and vice versa; and in general, it is the object of the invention to provide an improved sofa bed of the character indicated.

Other objects and advantages of the invention will be understood by reference to the following specification and accompanying drawings (4 sheets) wherein there is disclosed a sofa bed structure embodying a selected form of the invention.

In the drawings:

Fig. 1 is a perspective illustrating the general appearance of the structure in sofa condition together with an indication in dotted lines of the structure in extended or bed position;

Fig. 2 is a cross section on the line 2—2 of Fig. 1;

Fig. 3 is an end elevation of the structure as it would appear upon removal of one end member or arm rest;

Fig. 4 is a fragmentary plan section on the line 4—4 of Fig. 3;

Fig. 5 is an end elevation of the principal elements of the structure showing the parts in a position intermediate sofa and bed positions;

Fig. 6 is a fragmentary detail illustration relating particularly to a bed spring supporting feature;

Fig. 7 is an end elevation corresponding to Fig. 3 but showing the parts in extended or bed position; and

Fig. 8 is a fragmentary plan of an end portion of the structure in extended position.

Referring now to the drawings, the bed-davenport therein illustrated comprises an angle iron base frame disposed in a generally horizontal plane and having front and rear longitudinal members 10 and 11, respectively, connected at their opposite ends by end members such as indicated at 12. In the two front corners of the frame there are upstanding angle iron posts such as indicated at 13, the same being suitably braced by diagonally disposed braces such as 14 to maintain the said corner posts rigidly in their proper upright position. At the rear at each end of the base frame there are upstanding angle iron posts such as indicated at 15, the same being rigidly connected at their upper ends by a longitudinal angle iron member 16. Bracing such as indicated at 17 may be provided wherever necessary to rigidly maintain the upstanding rear posts 15 in their proper position.

The frame structure comprising the parts thus far described is supported at a desirable elevation from the floor by means of end members such as represented at 18, the same being suitably upholstered or otherwise finished and formed to constitute the end arm rests for the sofa. Such arm rests may be rigidly attached at each end to the frame members 12, 13 and 15 so that said end members or arm rests are firmly supported in their operative position.

The folding bed bottom structure herein disclosed comprises an inner section 19, an outer section 20 and an intermediate or hinge section 21, the latter being of relatively short length. The section 19 comprises angle iron end members such as indicated at 22 connected at their rear ends by means of a longitudinal angle iron member 23. The end members 22 are connected near their front ends by means of a tie rod 24 which is bowed downwardly intermediate its ends as indicated so as to avoid engagement by the bed spring fabric when the bed is occupied.

The outer section 20 comprises angle iron end members such as indicated at 25, the same being connected at their outer ends by means of a longitudinally extending angle iron member 26 which is rigidly connected at its ends to the end members 25. The outer member 26 may be additionally reinforced by means of a torsion tube indicated at 27 positioned in the angle of the member 26 and welded thereto along its length and at its ends to the end member 25. Near

their inner ends, the end members 25 are rigidly held in spaced relation by being pivotally connected as shown at 28 to the free ends of the angle iron posts 29, the latter being extended upwardly from a longitudinally extending angle iron member 30. The posts 39 are rigidly secured to the member 30 and suitably braced, if necessary, to insure rigidity of the U-shaped structure formed by these parts.

The adjacent ends of the inner and outer sections 19 and 20 are connected by the hinge section 21 which comprises short angle iron lengths 31 which are pivotally connected as indicated at 32 and 33 at their ends to the respectively adjacent ends of the end member 22 and 25 of the inner and outer bed sections.

The inner section 19 is adjustably mounted on the main frame structure by means of front and rear links 34 and 35, respectively. The front link 34 is pivotally connected at its upper and lower ends as shown at 36 and 37, respectively, to the inner bed section 19 and main frame member 12 and the rear link 35 is similarly pivotally connected as shown at 38 and 39 at its upper and lower ends, respectively, to the said inner bed section 19 and main frame element 12.

The links 34 and 35 constitute parallel link means by which the inner section 19 is supported on the main frame for movement from a rearwardly disposed and lowered position as shown in Figures 2 and 3 to an elevated and forwardly disposed position as shown in Figures 5, 7 and 8. Springs such as indicated at 40 are provided at each end of the structure for assisting the upward and forward movement of the bed sections, one end of the spring being anchored to a stud carried by the upper end of the adjacent front corner post 13 and the other end being connected to an intermediate point of a link 41 which is pivotally connected at its ends to the parallel links 34 and 35.

The link 41 is not an important element since the spring 40 could be connected directly to a corresponding point of the adjacent end member 22 of the inner bed section. However, it is preferred to employ the link 41 so as to avoid locating the spring 40 too close to the top plane of the bed section 19 and thereby to avoid some possibility of catching bedding in the spring.

The front link 34 at each end of the structure has its upper end extended and bent to provide a forwardly extending arm portion 42 to which there is connected as indicated at 43 a link or thrust arm 44, the other or forward end of which is pivotally connected as shown at 45 to the hinge section end member 31 intermediate its ends. The purpose of the thrust arm 44 is to control the folding and unfolding movement of the hinge section 21 relative to the inner section 19 as will presently be explained.

The outer section 20 is provided at each end with a leg 46 pivotally secured at its upper end as shown at 47 to the adjacent end member 25. The legs are interconnected intermediate their ends by means of an angle iron member such as indicated at 48 so as to maintain the legs rigidly in desired parallel relationship. The legs 46 are thus foldably mounted on the outer section and provision is made for effecting folding and unfolding thereof automatically as an incident to the adjustment of the bed sections from extended to bed position and vice versa. The last mentioned provision comprises for each leg a link such as 49 pivoted at one end as indicated at 50 to the post element 29 and at its other end as indicated at 51 to an upwardly extending bracket element carried by the leg 46.

Movement of each post element 29 which will be transmitted through the link 49 to the leg 46 for effecting its folding and unfolding movement, is effected by means of a link 52 at each side of the structure, such link being pivoted at one end as shown at 53 to the free end of the arm 42 and at its other end as shown at 54 to an angle iron element 55 which is rigidly connected to the post 29.

The angle iron element 55 at each side of the structure together with the longitudinally extending angle iron element 30 has attached to it a front board 56 which serves, when the structure is in sofa position, to conceal the folding bed frames and to provide a finished front for the portion of the sofa below the seat cushions.

The hinge section 21 is also provided with an automatically folded and unfolded leg at each side, one such leg being shown at 57. Such leg is pivoted at its upper end as shown at 58 to each end member 31 of the hinge section and it is connected by means of a link 59 to the member 55 of the front board supporting structure.

Any suitable form of bed fabric is provided for the bed sections and in this instance it is illustrated as comprising wire link fabric designated in its entirety by the reference numeral 75, such fabric being resiliently supported by suitable helicals 76 extending between the periphery of the wire link structure and the surrounding bed frame structure. For a purpose which will presently appear, the bed fabric 75 is also connected by a plurality of helicals indicated at 77 to the longitudinal angle iron member 30 of the front board supporting structure.

An adjustably mounted back rest is provided and in this instance comprises an approximately rectangular back rest frame having upper and lower longitudinal angle iron frame members 60 and 61, respectively, and end angle iron members 62 rigidly connected to said upper and lower horizontal members. Suitable nailing wood strips indicated at 63 and 64 are attached to the back rest frame structure and any desired form of cushioning indicated generally at 65 is applied to the frame.

The upholstered back rest frame is adjustably connected to the upstanding rear posts 15 by means of upper and lower links 66 and 67. The upper link 66 is pivoted as shown at 68 to the rear post 15 and, as shown at 69, to the back rest frame end member 62 intermediate its top and bottom edges and the link 67 is pivoted as shown at 70 to the rear post 15 at a point spaced downwardly from the pivot connection 68 and to the back rest frame 62 as shown at 71 at a point spaced downwardly from the pivot connection 69.

The spacing between the pivot points 69 and 71 is somewhat less than the spacing between the pivot points 68 and 70 and the links 66 and 67 are each made of such length that the back rest will be shiftable from a forwardly and downwardly inclined, operative back rest position to an upwardly offset, inoperative position in which it preferably does not extend rearwardly of the normal plane of the stationary back rest supporting frame parts 15 and 16.

Upward movement of the upholstered back rest may be arrested by engagement of the link 66 with the frame member 16. Downward movement of the upholstered back rest structure may be limited by a member 73 pivotally connected to the links 66 and 67 and extending downward-

ly below the link 67 to provide a foot 74 for engagement with the folded bed frame structure. A spring 78 connected between the upper longitudinal member 16 of the stationary rear frame structure at a suitable point in the linkage or frame of the movable rear cushioned structure is provided for counterbalancing the weight of the latter to thereby facilitate upward adjustment thereof when desired.

Assuming that the parts are in the extended or bed position shown in Figure 7 with the upholstered back rest in lowered position, conversion of the structure to a sofa is effected by first adjusting the upholstered back rest to its upwardly disposed, inoperative position as shown in Figure 5. This may be accomplished by grasping the upper edge portion 63 of the back rest and lifting the same with the assistance of the spring 78. The spring 78 is preferably of such strength that it will be effective to temporarily support the upholstered back rest in its elevated position. Then the outer section of the bed bottom structure is folded upwardly about its pivotal connection 33 with the hinge section 21 to the approximately right-angular relation thereto as shown in Figure 5. This right-angular relation may be determined by providing the end members 25 of the outer section with squared ends as indicated at 79 for engagement with the horizontal flange of the hinge section member 31 to which it is pivoted.

Incident to such preliminary folding of the outer section, the supporting legs 46 thereof are partially folded. This results from the relative downward movement of the post member 23 caused by the connection thereof through the link 52 to the arm part 42, which up to this point has remained stationary. Folding of the legs 57 is also started incident to the indicated movement of the members 55 and the link connection 59 between the leg 57 and said member 55.

Continued folding movement of the outer section 20 causes the hinge section 21 to fold on its pivot connection 32 with the inner section 19, whereby the thrust link 44 transmits rearwardly directed force to the arm 42 and link 34 to impart rearward and downward movement to the inner section simultaneously with the continued rearward and downward folding of the outer section.

Incident to the corresponding rearward and downward rocking movement of the link 34 and its arm extension 42, the front board structure 55—56 will be caused by the links 52 to approach a parallel relation to the hinge section 21 as shown in Figures 2 and 3.

In the completely folded position of the parts as shown in Figures 2 and 3, the front portion of the bottom structure is supported by engagement indicated at 80 between the upper edge of the stationary front frame member 10 and the immediately overlying portion of the end member of the inner section 19 (see Figures 2 and 3).

The rearward portion of the inner section 19 is supported in folded position by engagement indicated at 81 between the rear frame member 11 and the immediately overlying portion of the frame structure of said inner section. The rearward portion of the outer section 20 is supported in folded or seat position by engagement of a bracket 72 carried by said outer section 20, with a suitable stop element 82 carried by a bracket 83 rigidly secured to each upstanding rear post 15.

When the sections are folded to the position shown in Figure 4, the upholstered back rest member may be moved downwardly to its operative position which is determined by engagement of the foot portion 74 of the link 73 with the then underlying portion of the respective end members 25 of the outer bed section. Suitable cushions such as indicated at 84 may then be placed on the bed spring fabric of the outer or then upper section and the structure is ready for occupancy as a sofa.

The bed spring fabric in the folded position of the bed sections is to a substantial extent supported by the embraced mattress indicated at 85 which is folded between the inner and outer sections as an incident to the folding of the same as shown in Figure 2. It will be understood that the mattress may be suitably anchored or tied to the bed bottom sections to maintain the mattress in operative position relative to the sections during the folding and unfolding movements thereof.

To additionally support the seat cushions adjacent the front of the structure in seat position, the helical connections 77 between the bed spring fabric and the angle iron member 30 are provided as aforesaid. As indicated in Figures 2 and 6, the said springs 77 assume a substantially horizontal position in continuation of the main area of the bed spring fabric in the outer section when in seat position, so that said springs 77 and their connections to the bed spring fabric take the place of underlying, downwardly folded portions of the bed spring fabric.

It will be observed that in the structure described the inner and outer bed bottom sections are of considerably greater front to rear dimension than could be practicably employed for the seat area of a sofa. The described arrangement of the back rest serves, however, to more or less house and conceal the rearward portion of the bed spring sections which are not utilized for seat purposes in the seat position of the structure, so that the effective front to rear dimension of the structure in seat position is reduced to a desirable dimension which enhances the comfort characteristics of the structure. The seat cushions 84 are, of course, selected of such thickness that they will raise the seat level to a desired elevation.

To adjust the structure from sofa condition to bed position, the seat cushions 85 are first removed, the upholstered back rest then adjusted to its inoperative, elevated position and the bed sections then unfolded. The latter operation is conveniently effected by grasping the bed spring fabric of the then upper section at a suitable point intermediate the front and rear edges of the section and pulling upwardly and forwardly thereon in a more or less continuous motion until the parts are extended to their full bed position.

During the initial portion of the unfolding movement, the inner section 19 and hinge section 21 are brought to the position shown in Figure 5 as a result of the lifting action of the spring 40 on said inner section, after which only the relatively small weight of the outer section will have to be supported against dropping to extended bed position. It will be apparent that the structure is one which may be very easily converted from sofa condition to bed position.

Changes in the described structure may be made without departing from the spirit of the invention, the scope of which should be determined by reference to the following claims, the same being construed as broadly as possible, consistent with the state of the art.

I claim:

1. In a sofa bed of the class described, the combination of a main supporting frame including a normally horizontally disposed, rectangular frame structure, a foldable bed bottom comprising inner and outer sections and a hinge section intermediate said inner and outer sections and pivotally connected at its ends respectively to said inner and outer sections, said bed bottom sections being foldable from co-planar bed position to sofa seat forming position wherein the outer section is disposed in spaced, superposed and approximately parallel relation to said inner section and said hinge section extends generally vertically between the connected ends of said inner and outer sections, a pair of parallel links having their lower ends pivotally connected to said horizontal main frame and their upper ends pivotally connected to said inner section, said foldable bed frame structure being thereby movable from co-planar bed position to folded sofa seat position wherein said inner section is disposed in lowered and rearwardly disposed position closely adjacent the normal plane of said horizontal supporting frame, means for controlling the folding movement of said hinge section relative to said inner section comprising a bell crank arm extension of one of said parallel links and a thrust rod pivotally connected at its opposite ends to said bell crank arm and to said hinge section, spring means connected between a portion of said main frame structure and one of said parallel links for normally urging said inner section to move upwardly and forwardly relative to said main frame, whereby initial upward and forward unfolding movement of said outer section will automatically be accompanied by upwardly and forwardly directed unfolding movement of said inner section and unfolding movement of said hinge section, a member for covering the space between the hingedly connected ends of said inner and outer sections when in sofa seat forming position, and means connecting said member to the bed bottom frame for movement from operative position closely adjacent the hingedly connected ends of said inner and outer sections to materially spaced relation thereto when the bed bottom is unfolded, said last mentioned means embodying a connection to one of said parallel links for controlling said movement of the cover member automatically as an incident to the folding and unfolding movement of the bed bottom sections.

2. In a sofa bed of the class described, the combination of a main supporting frame including a normally horizontally disposed, rectangular frame structure, a foldable bed bottom comprising inner and outer sections and a hinge section intermediate said inner and outer sections and pivotally connected at its ends respectively to said inner and outer sections, said bed bottom sections being foldable from co-planar bed position to sofa seat forming poistion wherein the outer section is disposed in spaced, superposed and approximately parallel relation to said inner section and said hinge section extends generally vertically between the connected ends of said inner and outer sections, a pair of parallel links having their lower ends pivotally connected to said horizontal main frame and their upper ends pivotally connected to said inner section, said foldable bed frame structure being thereby movable from co-planar bed position to folded sofa seat position wherein said inner section is disposed in lowered and rearwardly disposed position closely adjacent the normal plane of said horizontal supporting frame, means for controlling the folding movement of said hinge section relative to said inner section comprising a bell crank arm extension of one of said parallel links and a thrust rod pivotally connected at its opposite ends to said bell crank arm and to said hinge section, spring means connected between a portion of said main frame structure and one of said parallel links for normally urging said inner section to move upwardly and forwardly relative to said main frame, whereby initial upward and forward unfolding movement of said outer section will automatically be accompanied by upwardly and forwardly directed unfolding movement of said inner section and unfolding movement of said hinge section, a member for covering the space between the hingedly connected ends of said inner and outer sections when in sofa seat forming position, means connecting said member to the bed bottom frame for movement from operative position closely adjacent the hingedly connected ends of said inner and outer sections to materially spaced relation thereto when the bed bottom is unfolded, said last mentioned means embodying a connection to one of said parallel links for controlling said movement of the cover member automatically as an incident to the folding and unfolding movement of the bed bottom sections, a pair of supporting legs respectively pivotally connected to said outer and hinge sections and connections between said covering member and said legs for automatically folding and unfolding the same as an incident to the folding and unfolding movement of the bed bottom sections.

3. A sofa bed comprising a supporting frame structure having a horizontally extending base portion of predetermined front to rear dimension and an upwardly extending back portion rigidly connected to the rear of said base portion, a folding bed bottom comprising a pair of bed spring sections hingedly connected so as to be foldable to relatively superposed relationship over said frame base portion, both of said sections being of such front to rear dimension that when folded, each extends substantially from the front to the rear of said frame base portion, means for mounting said sections on said frame base portion for unfolding and laterally forward movement from the back frame portion to extended, substantially co-planar bed position, and a back rest movably mounted on said back portion so as to normally extend upwardly and rearwardly from adjacent the rear edge of the bed bottom when extended, and from adjacent the upper surface of the uppermost of said bed spring sections well forwardly from its rear edge when folded, said back rest being movable upwardly to clear the rear portion of said uppermost section for folding and unfolding movement, the forwardly disposed position of said back rest relative to said frame back portion serving to reduce the effective seat width of the folded bed bottom sections, to substantially less than the front to rear dimension thereof, and the lateral forward movement of the bed bottom serving to space the rear edge of the bed bottom when extended, from said frame back portion and from the path of movement of said back rest.

EDWARD E. WOLLER.