July 11, 1961 S. C. WILLIS 2,991,484

CONVERTIBLE BED

Filed Oct. 31, 1957 2 Sheets-Sheet 1

FIG. 1.

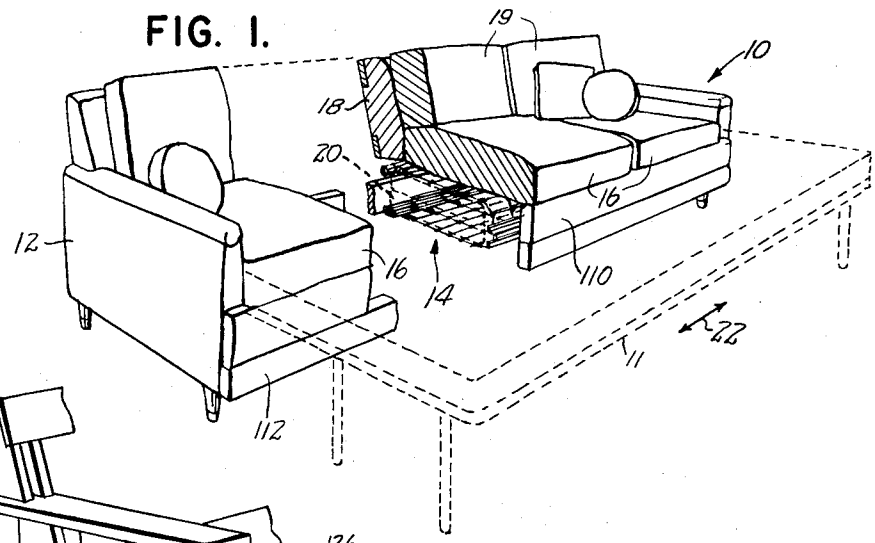


FIG. 2.

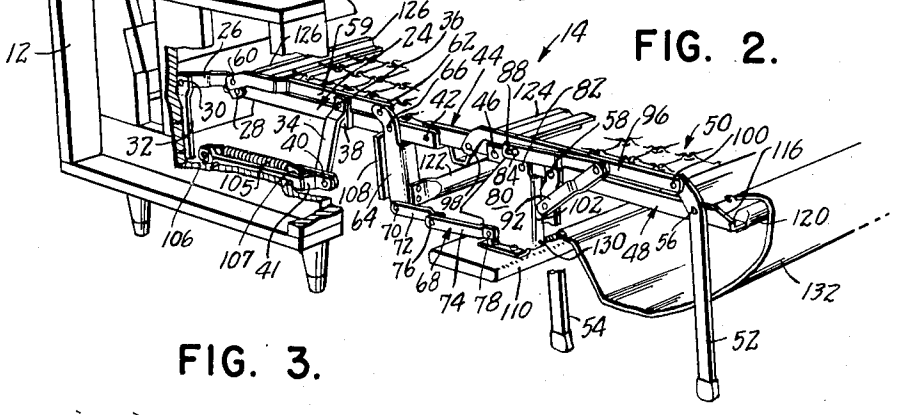
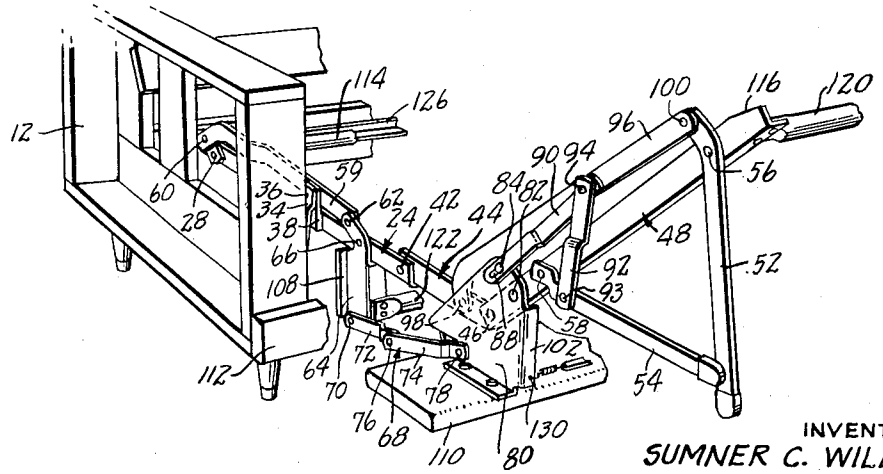


FIG. 3.



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July 11, 1961 S. C. WILLIS 2,991,484

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Filed Oct. 31, 1957 2 Sheets-Sheet 2

FIG. 4.

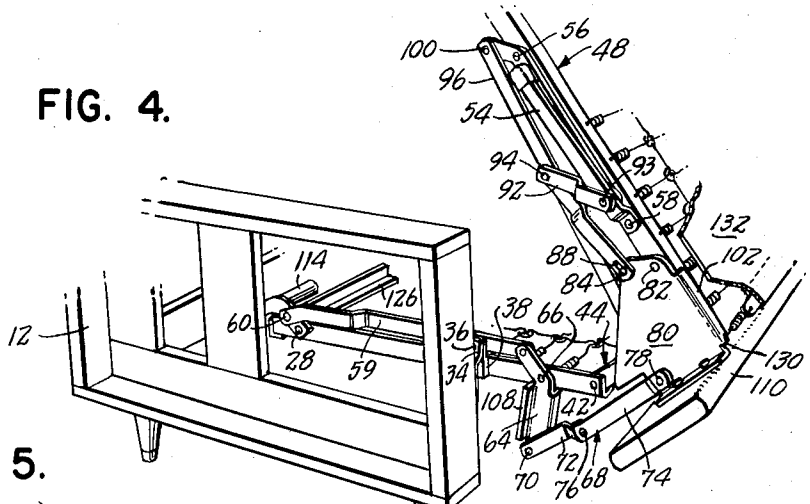


FIG. 5.

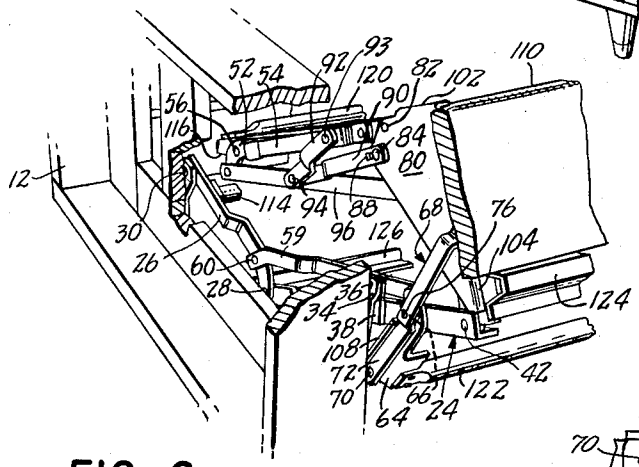


FIG. 7.

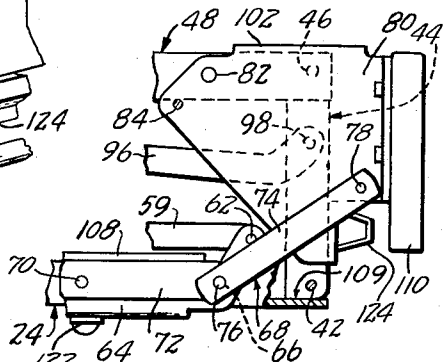
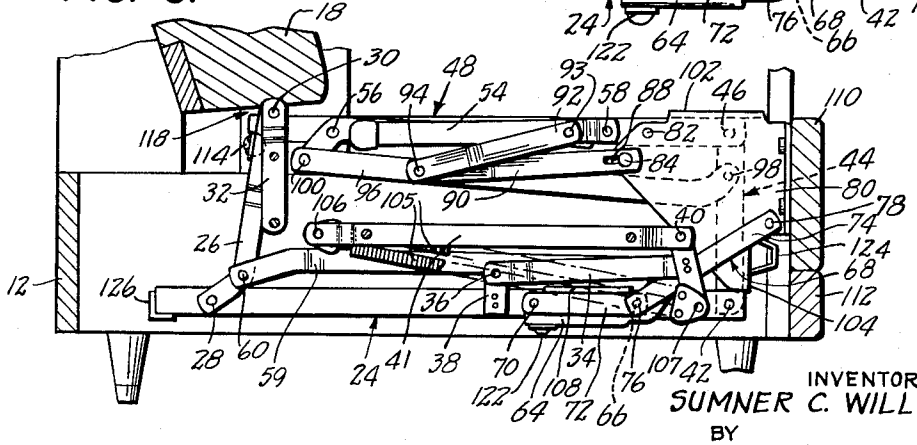


FIG. 6.



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2,991,484

CONVERTIBLE BED

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Filed Oct. 31, 1957, Ser. No. 693,637
13 Claims. (Cl. 5—13)

This invention relates to a convertible sofa-bed.

An object of this invention is to provide in a sofa-bed an improved mattress-supporting mechanism having superior operating efficiency and permitting the very best appearance, comfort and convenience.

Another object is to provide such a bed mechanism which is less complicated and less expensive but which at the same time is sturdier, more rugged and more reliable than previous sofa-bed mechanisms.

Still another object is to provide a bed mechanism of this kind which easily and automatically locks itself rigid in either open or closed position.

A further object is to provide a convertible bed mechanism which does not require critical tolerances in manufacture and which can be mass produced at relatively low cost with uniformly excellent quality.

These and other objects will in part be pointed out in and in part understood from the following description.

One popular type of a sofa-bed at the present time is known in the trade as a "longboy." In a "longboy" type sofa-bed, when unfolded into the bed position the occupant sleeps with his head near one arm of the sofa and his feet near the other arm. Such a unit usually has three sections supported on swinging links from a stationary frame and arranged to be extended in a straight line out from the frame to support a mattress and make a bed, the longest dimension of which is parallel to the frame. Alternatively these sections can be folded in sofa position within the frame, the end section being doubled back over the inner section, to form a supporting platform for sofa seat cushions.

It is essential that the opening and closing action of any such bed mechanism should be smooth and effortless and that in either open or closed position the pivoted sections of the mechanism should be rigidly held in place. Failure to provide such rigidity results in a product which is neither a comfortable bed nor a comfortable sofa. Designers of previous sofa-beds have attempted to solve this problem by providing various arrangements to inter-engage the bed sections and hold them rigid. Some of these arrangements were manually actuated locks and, though relatively simple, were often inconvenient to use and often quite unmanageable. Other locks, though more nearly automatic, were very complicated and had to be made to close tolerances so that they were readily vulnerable to abuse or even normal wear. The present invention in one of its aspects provides a greatly improved locking arrangement in answer to this problem.

A most important factor in promoting the acceptance by the public of sofa-beds is the feasibility of styling them to look exactly like ordinary sofas. This question of styling is now being accentuated of course by the modern trend toward slimmer and more streamlined furniture. Many previous convertible bed mechanisms, because of their complexity and unwieldliness, imposed a box-like appearance on the enclosing furniture frame. In the past, some people who would otherwise buy a sofa-bed to have in their homes as an occasional or extra bed, simply refused to buy one because its look was ungainly and it clearly revealed its double purpose, or because its style was of necessity out of keeping with their other furniture. The present invention provides a

multi-section bed mechanism which is greatly simplified and very streamlined in comparison with previous mechanisms and which therefore lends itself to the most modern "off-the-floor" sofa styles. Even though this mechanism has fewer parts than prior mechanisms, it is sturdy and sag-free, especially in sofa position. In actual fact, a sofa-bed constructed according to the invention is virtually indistinguishable in appearance and comfort from a most elegant and stylish conventional sofa.

People who buy sofa-beds demand not only a structure of pleasing aesthetic appearance but also one which can be operated easily and which is always reliable. It is highly aggravating, especially to a person who has invested his money in a sofa-bed, for the bed mechanism to refuse to fold or unfold properly or to tear and rip the bed linen. Previous bed mechanisms sometimes were prone during folding or unfolding to catch or pinch blankets and sheets and either jam themselves to a stop or else to inexorably move on to final position grinding up and ruining the sheets, blankets or whatever else was caught. The present invention provides a sofa-bed mechanism which minimizes this difficulty. Those elements which in previous mechanisms were most likely to become entangled with the bed linen have been eliminated and replaced by a simple and most effective linkage. During folding of this bed mechanism, the outer or end section is drawn back, down, and over the inner section thereby compressing the mattress between them with a powerful squeezing action. When the bed is finally folded, the end section, upon which the sofa seat cushions rest, is securely held against movement, either upward or downward, and in exact position within the furniture frame so that the seat cushions can be placed upon the folded mechanism at the proper height and angle to make a comfortable sofa.

In accordance with one aspect of the present invention there is provided a basic convertible bed mechanism having three sections serially pivoted to each other and interconnected by a unique operating linkage. These sections are supported in a stationary furniture frame and are adapted to fold or unfold to the alternative positions described above. The two right angle corners, formed at the front part of the sofa by the three sections when folded, are rigidly locked against movement in any direction by the unique operating linkage to be described in detail below. This linkage operates completely automatically and so smoothly that the bed can be opened or closed with utmost ease. The parts of this linkage are few in number and, during their movement, are not subject to sudden or excessive forces; they do not depend for their locking action upon the latching, or the camming of one part against another, so that they are inherently free of the more serious causes of wear. They are not prone to jamming or failure to operate because of mis-alignment.

A better understanding of the invention together with a fuller appreciation of its many advantages will be gained from the following description given in connection with the accompanying drawings in which:

FIGURE 1 is a perspective view, partly in cross-section, of a sofa-bed embodying features of the invention;

FIGURE 2 is a perspective view of one side of the operating mechanism and frame of the bed seen in FIGURE 1 and shown here completely unfolded into its bed position;

FIGURE 3 is a view similar to FIGURE 2 but showing the mechanism just after the folding into its sofa position has begun;

FIGURE 4 is a view of the bed mechanism more nearly closed than in FIGURE 3;

FIGURE 5 is a view of the mechanism shown nearly completely folded;

FIGURE 6 is a side view of the mechanism completely folded; and

FIGURE 7 is an enlarged view of one of the corner portions shown in FIGURE 6.

The sofa bed **10** seen in FIGURE 1, shown folded but with its unfolded position indicated by the broken lines **11**, comprises a stationary frame **12** in which is suspended a mattress supporting mechanism, generally indicated at **14**. Removably positioned on top of this mechanism are the seat cushions **16** whose rear edge abuts a back cushion **18** permanently affixed to the frame. Lying in front of this cushion are the removable pillows **19**. Doubled back upon itself within the folded mechanism **14** is a mattress **20** (shown dotted) which, when the bed is opened as indicated by the broken lines, is supported a convenient distance above the floor by the unfolded bed mechanism.

The width and length of the mattress and its supporting mechanism are proportioned so that two persons can sleep on the bed lying along the direction of the double arrow **22**, i.e. parallel to the length of frame **12**.

As seen in FIGURE 2, wherein the bed is shown unfolded with parts broken away and with the mattress and the frame upholstery omitted, the bed mechanism **14** includes three sections serially pivoted together. The innermost of these sections, inner section **24**, is suspended for outward and upward movement to the position shown by a rear swing link **26** pivoted at **28** to section **24** and pivoted at **30** to a bracket **32** fastened to stationary frame **12**. The forward end of section **24** is suspended from frame **12** by a front swing link **34** pivoted at **36** to a tab **38** attached to section **24**, the lower end of link **34** being pivoted at **40** to a strap **41** fastened to frame **12**.

Serially pivoted to the front end of inner section **24** at **42** is the second or connecting section **44**, to which in turn is pivoted at **46** the third or end section **48**. The three sections **24**, **44** and **48**, as seen in FIGURE 2, when unfolded extend horizontally in line outward from frame **12** and are adapted to support the mattress (not shown here) on the taut bed spring **50** which is attached within these sections along their edges.

End section **48** is supported horizontally above the floor by the two legs **52** and **54** pivoted to it at points **56** and **58** respectively. Connecting section **44** is supported solely by its attachment to the sections on either end of it, and inner section **24** is supported by links **26** and **34**. To prevent the rear end of section **24** from sagging under a load, link **26** in the position of FIGURE 2 is locked against clockwise rotation about its pivot **30** by the rearward thrust of the long link **59** which is pivoted to link **26** at point **60** just above its pivot **28**. Weight resting on the rear of section **24** is transmitted through pivot **28** to link **26** and tends to rotate it clockwise about pivot **30**. This is resisted however by the thrust of link **59** against pivot **60** which develops an equal and opposite moment of force on link **26** about pivot **28**. Downward force on the forward end of section **24** similarly tends slightly to rotate link **34** clockwise about its pivot **40** but since link **26** cannot rotate clockwise beyond the position shown, neither can link **34**.

The forward end of link **59** is pivoted at **62** to the upper portion of the short pivoted crank-arm **64**, which in FIGURE 2 extends vertically downward below the point **66** at which it is pivoted to section **24**. Forward thrust of link **59** against pivot **62** tends to rotate arm **64** clockwise around pivot **66** but this in turn is resisted by a forward pull on the lower end of arm **64** by the articulated linkage **68** pivoted to it at **70**. Linkage **68**, which comprises two short lengths **72** and **74** pivoted together at **76** and extending generally in line, pulls against its own forward pivot point **78** on the rigid plate or corner

member **80**. The latter at its upper end is pivoted at **82** to end section **48** and forms in conjunction with links **72** and **74** a folding and locking means for the bed.

The pull by linkage **68** on corner **80**, which pull tends to rotate it clockwise about pivot **82**, is resisted by a counter thrust on the pin **84** carried by corner **80** above pivot **82**. Pin **84** rides in a slot **88** in the rear end of the link **90** and in the position of FIGURE 2 abuts the front end of the slot thus preventing clockwise rotation of corner **80**.

As seen perhaps even more clearly in FIGURE 3, the forward end of link **90** is pivoted, in common with the link **92**, at point **94** to the long link **96**. The rear end of the latter is pivoted at **98** to connecting section **44** and the forward end of this link **96** is pivoted at **100** to leg **52**. At the beginning of folding of the bed as seen in FIGURE 3, end section **48** is manually lifted from the floor and pivots around its point of attachment **46** to connecting section **44**. This causes link **96** to shift forward relative to end section **48** and in so doing to fold the legs **52** and **54**, the latter being controlled through link **92** which is pivoted to it at **93**. Leg **52** stops against link **92** when fully folded as seen in FIGURE 4.

Folding of the bed continues beyond the position of FIGURE 3 to that of FIGURE 4 wherein end section **48** is disposed approximately at right angles to connecting section **44** and wherein section **44** is being brought up toward right-angle relation with inner section **24**. This last section may by now be shifted slightly back into the frame so that the short arm **64** has begun to rotate clockwise about point **66**. In so doing this arm, pulling on linkage **68**, with great force draws the upper flange **102** of solid corner **80** gradually into extended contact with end section **48** and also, see FIGURE 5, draws the front or lower flange **104** of corner **80** into contact with connecting section **44**. This forces the connecting section to be generally perpendicular to both the end and the inner sections. The mattress (not shown here) is compressed and folded double upon itself and the end and connecting sections are held with complete rigidity in folded position relative to the inner section. Because of the powerful drawing together of these sections from the position of FIGURE 4 to that of FIGURE 5 produced by the action of corner **80**, in turn caused by the clockwise rotation of arm **64** upon movement of section **24** back and down within frame **12**, a person closing the bed is saved the strenuous effort of pushing the end section into fully folded relation above the inner section against the resistance of the doubled-over mattress.

To complete the folding of the bed, the now folded sections **24**, **44** and **48** shown in FIGURE 5 are lowered as a rigid unit from this position to that of FIGURE 6 wherein they are fully seated within frame **12**. Their weight is largely counterbalanced by the springs **105** fixed to the end of strap **41** at **106** and connected at **107** to front swing link **34** to be stretched when this link swings counterclockwise i.e. from the position of FIGURE 5 to that of FIGURE 6, about its pivot **40**. Even though during this final folding the short arm **64** continues to rotate from the position of FIGURE 5 clockwise into side-by-side relation with section **24** as shown in FIGURE 6, the inward and downward pulling movement of linkage **68** against corner **80** ends when the mechanism in folding from the position of FIGURE 4 reaches the position of FIGURE 5. Here, arm **64** is parallel with linkage **68**, the lower portion **72** of the linkage lying side-by-side along arm **64** with pivot **76** lying generally opposite and on the same axis with pivot **66**. As arm **64** continues to rotate clockwise from the position of FIGURE 5 to that of FIGURE 6, the raised flap or abutment **108** (see also FIGURE 4) integral with it bears against the top side of the lower portion **72** of linkage **68**. This rotates portion **72** in unison with arm **64** around its pivot **66** and the linkage pivot **76**, which two pivots in all positions between FIGURES 5 and 6 have effectively a common axis. As a

consequence, the tension force developed in the upper portion 74 of linkage 68 can be brought to a maximum in the position of FIGURE 5 and thereafter be maintained without further increase even though the lower pivot point 70 of the linkage moves past the line of centers of points 76 and 78. Thus the very desirable self-locking action of a toggle is obtained but without encountering an excessive and possibly destructive build-up and then wasteful decrease in the link tension as the pivots move past center. To insure that connecting section 44 will come to generally right-angle relation with inner section 24 and then stop and stay rigid under the tension of linkage 68, the lower end of connecting section 44, as seen in FIGURE 7, has a toe portion 109 which butts against section 24 to the rear of their common pivot 42.

When the bed is in the position of FIGURE 6, the rear end of section 24 is suspended by rear swing link 26 which is now downwardly extending and slightly back past vertical. The weight of the front end of the bed is borne by corner 80 which in turn is rigidly bolted to the frontboard 110, see also FIGURE 1, the lower edge of the latter resting upon the transverse rail or cross-brace 112 fixed to the lower front edge of frame 12. Since no "play" or sagging of the bed sections relative to each other is allowed by corner 80 and linkage 68, these sections are held almost as rigid relative to each other and frame 12 as though they were welded in this position. They therefore provide a steady, comfortable and sagless support for the sofa cushions. While not necessary, an auxiliary support beneath the inner end of folded end section 48 can be provided in the form of the strut 114 fixed at each of its ends to a rear swing link 26 on each side of the mechanism. This strut is positioned so that when the bed is folded, the tapered end 116 of the end section rests upon it.

As seen in FIGURE 6, the top surface of the inner or rearmost end of folded end section 48 is spaced at 118 by only a very short distance beneath the lower edge of the stationary back cushion 18. The leaving of such a small clearance here is possible because the end section even before the bed is finally closed has already been drawn down fully relative to the inner section. Accordingly, this top end moves substantially only horizontally backward during the final seating of the mechanism within frame 12. Also, since the end section 48 is so rigidly held relative to inner section 24, practically no allowance here for up and down "play" of the end section is necessary, even without transverse strut 114.

The left side of the bed mechanism (shown herein) is rigidly joined or tied to the right side (not shown, but a mirror image of the left) by several transversely extending members. A first of these, seen in FIGURE 2, is riveted to the forward-most end of end section 48 and comprises the hollow round tube 120 whose own end is flattened at its point of attachment to section 48. In addition, riveted to the lower end of short arm 64 is a second transverse tube 122 similar to tube 120. A third transverse member, riveted near the center of connecting section 44, is the flanged channel 124 which while providing torsional rigidity also supports bed spring 50 along the longitudinal centerline of the mattress when the bed is open. This isolates to a certain extent the two halves of the bed and provides greater sleeping comfort for two people.

A fourth transverse member is provided at the rear of inner side of the bed and comprises the rail 126 which is welded to the rear end of inner section 24. Channel 124 lies equidistant from this rail 126 and the front transverse member, tube 120. These members, and tube 122, provide great transverse rigidity and insure that both sides of the bed move in unison in opening or closing.

As seen only in FIGURE 2 there is resiliently fastened to the top end of corner 80 at 130 and stretched to extend just behind along the top edge of frontboard 110, a flexible sheet 132 of a suitable padded material. When the bed is folded (see FIGURE 4) this sheet serves to cover springs 50 and to protect and support the seat cushions. the forward end of sheet 132 extends around transverse tube 120 and is fastened to the springs. The general way this sheet is attached to the bed mechanism and the position it has when the bed is folded are completely described in U.S. Patent No. 2,752,613.

It will now be apparent that the bed mechanism described herein is simplified in design and streamlined in appearance relative to previous bed mechanisms. Fewer parts are needed in this mechanism and this means an appreciable savings in cost and a reduction in weight. Even so, the mechanism is exceptional in ease of operation and in freedom from sag, especially when in sofa position. The mechanism folds compactly within the stationary frame and makes utmost use of the space available. Thus, off-the-floor sofa styles, such as that illustrated, are permitted but yet the seat cushion platform (i.e. end section 48) when the bed is folded will lie at the proper height for best seating comfort. The width of the seat cushions can easily be made small enough for comfort without excessive space behind the back cushion, and the pitch of the seat platform can be slightly downward and back, as in a conventional sofa. No large and wasteful internal spaces or clearance gaps between frame and mechanism are required to permit folding and unfolding of the bed.

FIGURES 2 through 6 of the drawings were made from photographs of an actual bed mechanism and they show substantially exactly the relative sizes, shapes and positions of the various parts and elements.

The invention described herein is not limited to use solely with a three-section sofa-bed. In some instances it may be desirable to lengthen the lower end of crank-arm 64 so that it serves also as a support leg. The description of the invention given herein is intended in illustration and not in limitation of it. Various changes or modifications in the structure described may occur to those skilled in the art and these can be made without departing from the spirit or scope of the invention as set forth.

I claim:

1. In an improved sofa bed mechanism: an inner section, a connecting section, an end section, said sections being pivoted serially together and adapted when folded to lie with the inner section generally horizontal, the end section generally parallel above it and with the connecting section generally vertical and perpendicular to said inner and end sections, and when unfolded being adapted to lie generally horizontally in a straight line, support means connected to said mechanism to retractably suspend it from a stationary frame, an arm-like member pivoted at a first point to said inner section near its forward end, means for swinging said arm-like member downward and forward to generally perpendicular relation with said inner section when said sections are unfolded and backward and up beneath or alongside said inner section when said sections are folded, a first short link pivoted to the lower end of said arm-like member at a second point, a second short link pivoted to said first link at a third point, the distances between said first and second points and between said second and third points being substantially equal, a corner linkage extending between said second link to a fourth pivot point on said end section forward of its rear end, said short links and corner linkage and said arm-like member when said sections are folded acting to hold said sections rigid, said corner linkage engaging said connecting section when said sections are folded and being adapted to swing forward and downward out of engagement with said connecting section when said sections are unfolded, said first and third pivot points lying substantially opposite each other when said sections are folded, and at least one leg pivoted to said end section and adapted when said sections are unfolded to extend down to support said end section horizontally above the floor.

2. The structure as in claim 1 wherein said corner linkage comprises a rigid member having a top flange and a front or lower flange adapted to bear against said end and connecting sections respectively when said sections are folded, said flanges being at right angles to each other, said rigid member being directly pivoted to said second short link.

3. The structure as in claim 2 in further combination with means tending to rotate said rigid corner member to tension said short links when said sections are unfolded.

4. The structure as in claim 1 wherein said arm-like member carries an abutment which bears against said first short link to move it in unison with said arm member when said sections are folded and said arm-like member is brought up against said inner section.

5. An improved sofa bed comprising: a stationary frame; an inner section; a connecting section pivoted to the front end of said inner section; an end section pivoted to the front end of said connecting section; a bed spring stretched within said section to support a mattress; said sections when folded lying within said frame with the inner section closely above the floor, the end section lying folded back over and generally parallel above the inner section and with the connecting section lying approximately vertical at the front of said frame and generally perpendicular to said inner and end sections, the mattress being compressed double within said sections; said sections when unfolded extending in line outward from said frame horizontally above the floor to support the mattress in bed position; and elements on each side of said sections, the elements on one side being the mirror image of those on the other, said elements including a front swing link and a rear swing member, each pivoted between one side of said frame and said inner section, a crank-arm member pivoted at a first point to said inner section near its forward end and having a lower portion which extends down when said sections are unfolded, means for rotating said crank-arm backward and toward said inner section as said sections are moved into said frame and vice-versa, a first short link pivoted to the lower end of said crank-arm, a second short link pivoted at a second point to said first short link, an abutment means to move said crank arm and said first short link in unison as said crank-arm is rotated backward, said first and second points having effectively the same axis when said crank-arm moves in unison with said first short link, a rigid corner member pivoted at its inner or lower end to said second short link and pivoted at its upper end to said end section at a third point lying forward of its rear end, a frontboard rigidly mounted on the front face of said corner member, a first leg pivoted to said end section near its front end and having an upward extending tab, a leg-actuating link pivoted between said connecting section and said tab to fold said leg when said sections are folded, and means to prevent said inner and connecting sections from folding together substantially more than a right angle.

6. The structure as in claim 5 wherein said means for rotating said crank arm comprises a long push link pivoted at its rear to said rear swing member, said rear swing member being pivoted to the rear end of said inner section, the forward end of said long push link being pivoted to said crank-arm at a point above said first point, and in further combination with means for preventing backward rotation of said crank-arm when said sections are unfolded, said means including a link pivoted to said rigid corner member above said third point and to said leg-actuating link at a fourth point forward of said third point.

7. The structure as in claim 6 in further combination with a second leg pivoted to said end section near its rear end and a short leg link pivoted to said second leg and to said leg-actuating link at said fourth point, said first leg stopping against said short leg-link when said legs are folded.

8. The structure as in claim 5 wherein said rigid corner member is a plate having a top shoulder to engage said end section and a front shoulder to engage said connecting section to hold them at right angles.

9. An improved convertible bed mechanism comprising: an inner section, a connecting section and an end section serially pivoted together and being adapted to fold and unfold, a rotatable member pivoted to said inner section near its forward end at a point number one and adapted to extend generally downward when said sections are unfolded, said sections being adapted to be movably suspended within a furniture frame, means to rotate said rotatable member downward and forward when said sections are unfolded, and backward and upward when said sections are folded, and folding and locking means pivoted at one end at a point number two to said end section and pivoted at its other end at a point number three to said rotatable member near the lower end thereof, said point two being the only direct pivot between said folding and locking means and said inner and end sections, said folding and locking means being bendable at a point number four, the distance between points three and four being generally equal to the distance between points one and three, said points one and four being adapted to move into generally side-by-side relation during folding of said mechanism and to remain in said relation upon further backward rotation of said rotatable member, said folding and locking means serving to draw said sections with great force into generally perpendicular relation with each other when said rotatable member is rotated backward.

10. In an improved sofa bed mechanism: an inner section, a connecting section, an end section, said sections being pivoted serially together and adapted when folded to lie with the inner section generally horizontal, the end section generally parallel above it and with the connecting section generally vertical and perpendicular to said inner and end sections, and when unfolded being adapted to lie generally horizontally in a straight line, a front swing link and a rear swing member connected to said mechanism to suspend it from a stationary frame, an arm-like member pivoted at a first point to said inner section near its forward end, a long link pivoted to said rear swing member and to said arm-like member for swinging said arm-like member downward and forward to generally perpendicular relation with said inner section when said sections are unfolded and backward and up beneath or alongside said inner section when said sections are folded, an articulated linkage pivoted to said arm-like member near the lower end thereof at a second point, a rigid corner link pivoted to said articulated linkage and to said end section, said articulated linkage lying beneath and generally parallel to said sections when unfolded, at least one leg pivoted to said end section and adapted when said sections are unfolded to extend down to support said end section horizontally above the floor, and means acting on said rigid corner link when said sections are unfolded and in conjunction with said long link to hold said articulated linkage taut.

11. An improved convertible bed mechanism comprising: at least three folding sections including an inner section, a connecting section and an end section serially pivoted together and being adapted to fold and unfold, a rotatable member pivoted to said inner section near its forward end at a point number one and adapted to extend generally downward when said sections are unfolded, said sections being adapted to be movably suspended within a furniture frame, means to rotate said rotatable member downward and forward to generally perpendicular relation with said inner section when said sections are unfolded, and backward and upward when said sections are folded, a rigid member connected at one end by a pivot pin to said end section slightly forward of the connection between said end section and said connecting

section, and articulated linkage means pivoted adjacent one end at a point number two adjacent the other end of said rigid member and pivoted adjacent its other end at a point number three to said rotatable member, said linkage means near its midpoint being bendable at a point number four, the distance between points three and four being generally equal to the distance between points one and three, said points one and four being drawn into generally side-by-side relation by initial backward rotation of said rotatable member upon partial folding of said mechanism and effectively remaining in said relation upon further backward rotation of said rotatable member, said articulated linkage means serving to draw said sections with great force into generally perpendicular relation with each other when said rotatable member is rotated backward and said points one and four move toward side-by-side relationship.

12. In a bed mechanism having at least three sections: an inner section, a connecting section and an end section serially pivoted together and being adapted to fold and unfold, a rotatable member pivoted to said inner section near its forward end at point number one and adapted to extend downward when said sections are unfolded, means to suspend said sections within furniture frame, means to rotate said rotatable member downward and forward when said sections are unfolded, and backward and upward when said sections are folded, a first short link, serial link means pivoted at one end to said end section adjacent its rear end and pivoted at its other end only to one end of said first short link at point number two, the other end of said short link being pivoted to the lower end of said rotatable member, the length of said short link being such that when said sections are folded and with said short link parallel alongside said rotatable member, pivot point number one lies substantially opposite pivot point number two, means for holding pivot points one and two substantially opposite each other upon further rotation of said rotatable member after said sections have reached substantially perpendicular relation to each other, said serial link means serving to draw said sections into generally perpendicular relation with each other when said rotatable member is rotated backward, the upper portion of said serial link means and said end and connecting sections being held rigid relative to each other by the force of said first short link as soon as point one moves opposite point two during the folding of said bed.

13. The structure as in claim 12 wherein said serial link means includes a rigid approximately triangular corner plate pivoted at its upper end to said end section, and a second short link pivoted at its forward end to said plate and at its rear end to said first short link at pivot point number two.

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