July 3, 1962 S. C. WILLIS 3,041,634

CONVERTIBLE BED

Filed May 2, 1958 3 Sheets-Sheet 1

Fig. 1

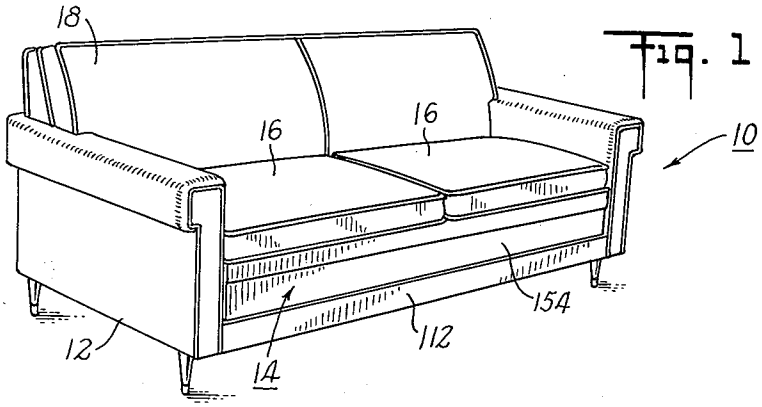


Fig. 2

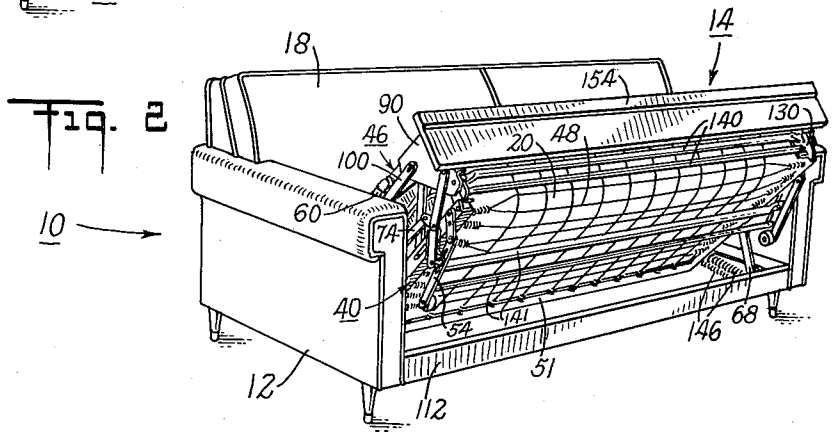
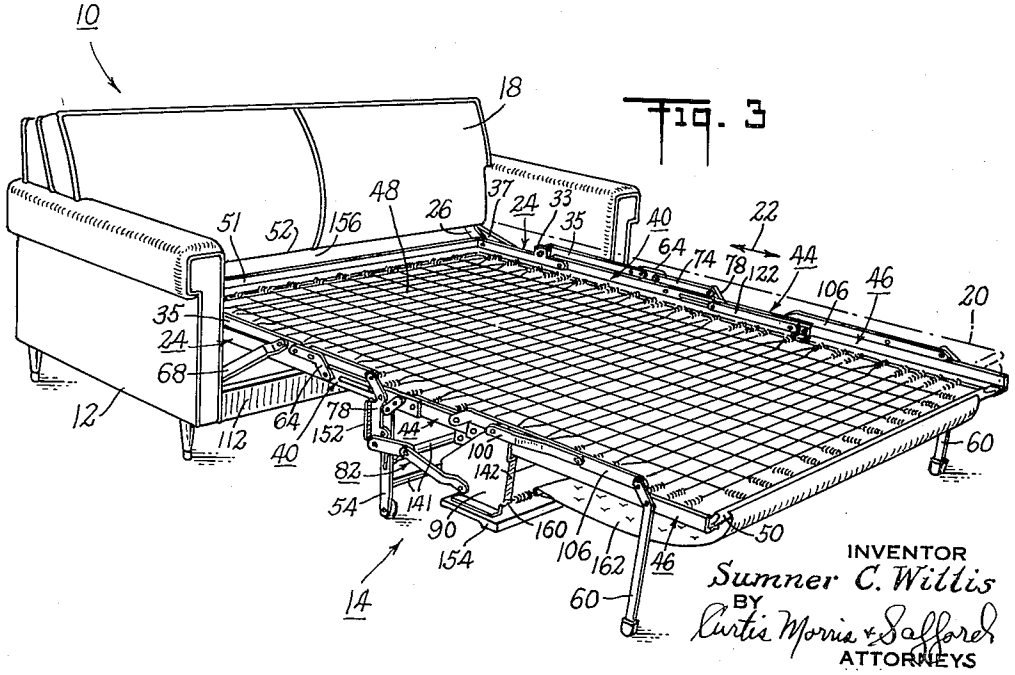


Fig. 3



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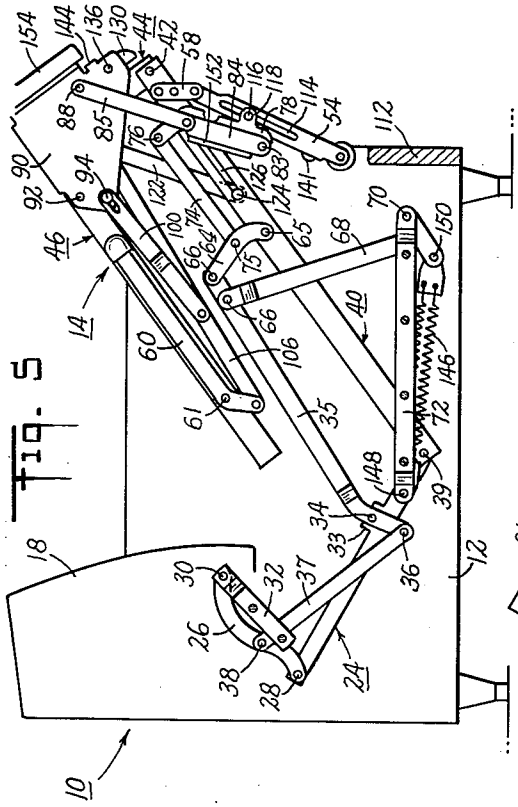


Fig. 5

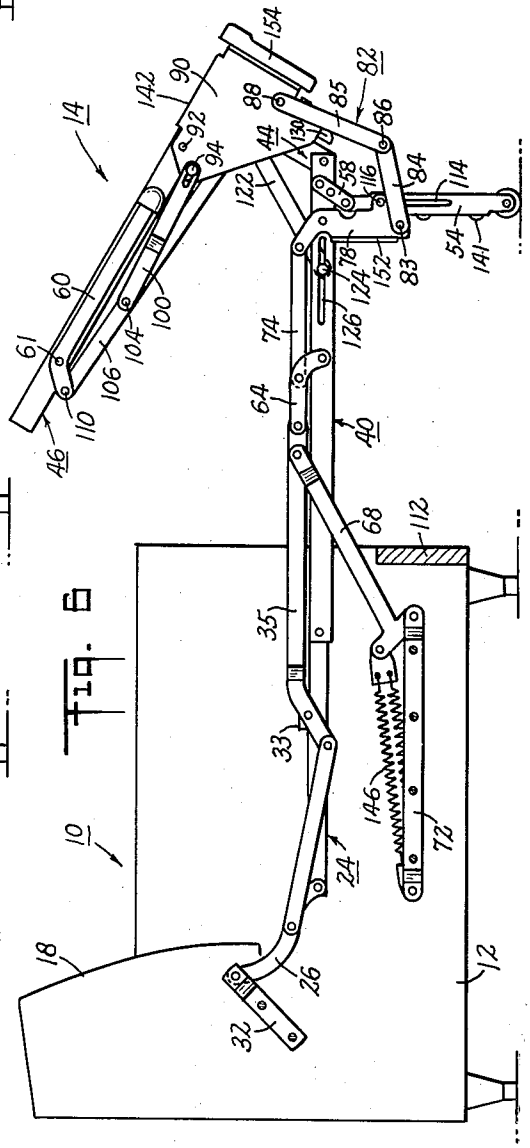


Fig. 6

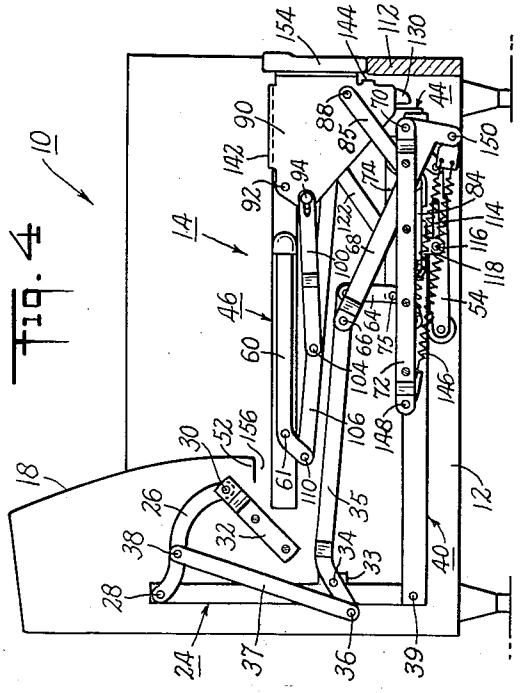


Fig. 4

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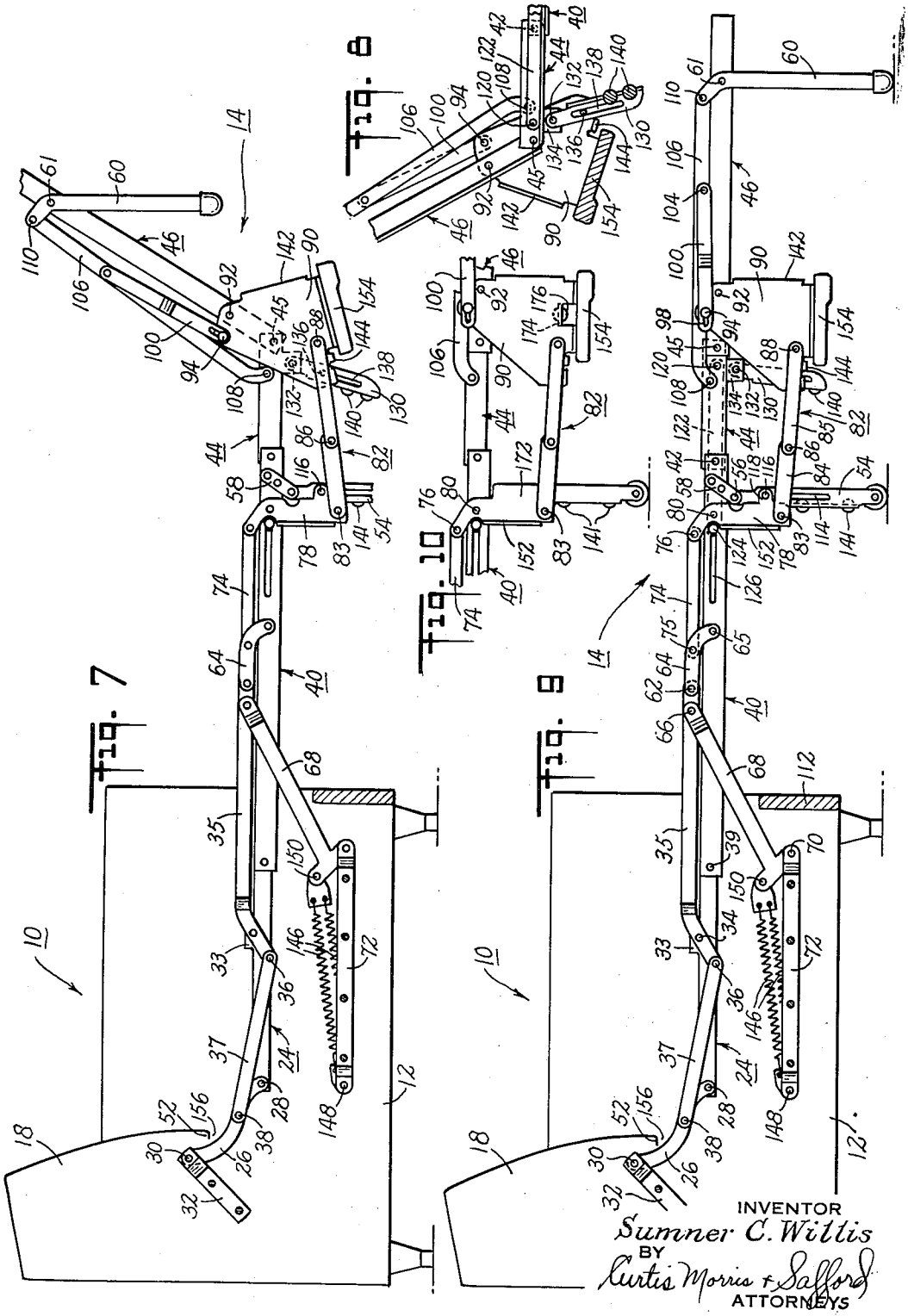


Fig. 7

Fig. 8

Fig. 10

Fig. 9

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3,041,634

CONVERTIBLE BED

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Filed May 2, 1958, Ser. No. 732,714
5 Claims. (Cl. 5—13)

This invention relates to a convertible bed, such as a 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.

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.

A more specific object is to provide a four-section sofa-bed mechanism for use with a full or even an extra length mattress and which together with the mattress can be folded easily and very compactly with a minimum of waste space into a sofa frame.

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

A particularly popular style of sofa today is that having a length sufficient to seat no more than two or three persons. Because the length of the frame in such a sofa is not as long as a full length bed it is necessary, when making a convertible sofa-bed in this style of frame, to provide a bed mechanism which unfolds from the frame and supports a mattress extending with its length at right angles to the frame. One of the most difficult problems in the past with this kind of unit has been to provide a folding bed mechanism which is sufficiently compact, lightweight and easy to operate and yet sufficiently strong and sag free.

When a bed mechanism is folded within a furniture frame to make a sofa, it is desirable for best seating comfort for the seat cushion platform provided by the bed mechanism to have a limited depth from front to rear, to have a certain height off the floor, to have a slight tilt downward to the back, and to be firm and sag free without being so solid and unyieding as to be uncomfortable as a sofa. It is also desirable that the back edge of the seat platform lie very closely beneath the lower edge of the fixed back cushion of the sofa frame so that when a person sits on the unit there will be no gapping in this region to spoil the appearance of the unit or to permit the seat cushions to creep in under the back. Furthermore, with some models it is desirable to have the frame raised off the floor on short legs. This means that the bed mechanism when folded within the frame must be supported high enough above the floor so that it is above the top of these short legs and thus remains effectively hidden. So far as is known no previous sofa bed mechanism of sufficient simplicity, rigidity, and sturdiness has been able to meet all of these requirements.

The mechanism provided according to the invention and described herein does, however, possess all of the above desirable qualities. Moreover this mechanism can be made long enough to accommodate a full 78 inch mattress and support it in bed position so that it is usable throughout its full length. A sofa-bed incorporating this mechanism has, when closed, the appearance and comfort of a most stylish conventional sofa and gives no hint

of its dual purpose, while in open or bed position it provides a full width, full length double bed.

In accordance with the present invention there is provided a sofa bed unit having a matress supporting mechanism consisting of four sections, an inner, an intermediate, a connecting, and an end section, serially pivoted to each other. The inner and intermediate sections are suspended by links from a stationary sofa frame and, with the connecting and end sections, are adapted when in bed position to extend outward from the sofa frame and be supported horizontally above the floor to support a mattress. When folded, the inner section is positioned at the rear of the unit, generally vertically and closely behind and within the fixed back cushion of the sofa frame. The intermediate section then extends forwardly from the lower end of the inner section approximately horizontally just above the floor. The connecting section extends therefrom upward vertically behind the front of the sofa frame. Finally, the end section is folded back generally at right angles to the connecting section and approximately parallel to the intermediate section so that its upper side forms a platform for the sofa seat cushions. With the sections so folded, the forward part of the bed mattress is doubled-over between the intermediate and end sections while its rear portion extends vertically upward in front of the inner section. When folded, these sections are rigidly held relative to each other and to the frame. The rearwardly extending end of the end section lies just beneath the lower edge of the stationary back cushion of the sofa frame. Because the top surface of the folded end section forms a platform for the sofa seat cushions, the weight of a person on the seat cushions is thus transmitted through the folded mechanism to the sofa frame and there is no sagging or slipping of the seat cushions, although the doubled-over mattress compressed beneath the end section provides a comfortable amount of resilience under the seat cushions. The end section in the final stages of folding-up this bed mechanism moves mainly horizontally to its final position so that the amount of clearance necessary between the rearwardly extending end of this end section and the bottom of the backrest of the sofa frame can be made very small, for example, of the order of one inch. The suspending links which pivotally connect the bed sections to the sofa frame are proportioned so that the inner section when completely folded is almost exactly vertical thereby utilizing to best advantage the limited space available within the sofa frame. When the bed sections are being folded and unfolded the suspending links act to keep the lowest portions of the mechanism from passing too near the floor or from rubbing against portions of the sofa frame itself. When the bed is unfolded these links, together with legs which unfolded and extend down to the floor, support the four articulated sections rigidly in line at a convenient height above the floor. When the bed is being folded a unique corner linkage arrangement, closely similar to that disclosed and claimed in the inventor's co-pending application, Serial No. 693,637, now Patent No. 2,991,484, with great force pulls the end section over and down parallel to the intermediate section, thereby compressing the forward part of the mattress in doubled-over relation between them. As a consequence, the unit moves with effortless ease into fully closed position and there is no necessity for manually operating locks or latching cams, or of wrestling against the mattress to fold it over. This bed functions so easily that even a little girl can operate it.

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

FIGURE 1 is a perspective view of a sofa bed embodying features of the invention and showing the unit in its completely folded position wherein it does not reveal its dual purpose;

FIGURE 2 is another view of the unit of FIGURE 1 but shown here with the seat cushion removed and the bed mechanism partly unfolded;

FIGURE 3 is still another view of the unit showing the bed mechanism completely unfolded and with the mattress shown in dotted outline;

FIGURE 4 is a cross-section view of the unit in FIGURE 1 slightly enlarged and showing one side of the bed mechanism in completely folded position, it being understood that the opposite side is a mirror image of this one;

FIGURE 5 is a view similar to FIGURE 4 but showing the bed mechanism slightly unfolded and corresponding to its position in FIGURE 2;

FIGURE 6 is a view similar to FIGURE 5 but showing the mechanism still more unfolded;

FIGURE 7 is a view showing the mechanism still more unfolded than in FIGURE 6;

FIGURE 8 is an opposite side view of a portion of the mechanism taken in the position of FIGURE 7;

FIGURE 9 is a side view of the mechanism showing it completely unfolded and corresponding to its position in FIGURE 3; and

FIGURE 10 is a side view of a portion of a modified bed mechanism also embodying features of the invention.

A sofa bed **10**, shown completely folded as a sofa in FIGURE 1, generally 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 edges abut a back cushion **18** permanently affixed to the frame. To unfold the unit and make a bed, the seat cushions are removed and, as seen in FIGURE 2, the front of the folded bed mechanism is lifted up and swung outward, being unfolded progressively, as indicated in FIGURES 5 through 7, to the completely unfolded position indicated in FIGURES 3 and 9.

When the seat cushions **16** have been removed from the sofa-bed **10** and mattress-supporting bed mechanism **14** is partially unfolded, as shown in FIGURE 2, a mattress **20** may be seen folded back upon itself within the mechanism **14**.

When the sofa-bed **10** is opened fully, as seen in FIGURE 3, the mattress **20** is supported a convenient distance above the floor by the unfolded bed mechanism **14**, as shown in the dotted lines in this drawing.

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

As seen in FIGURES 3 and 9, the bed mechanism **14** includes four sections, an inner section, an intermediate section, a connecting section and an end section, generally indicated at **24**, **40**, **44** and **46**, respectively. These four sections are serially pivoted together to form the bed mechanism **14**.

Referring to FIGURE 9, 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**. Near the forward end of section **24** is a tab **33** to which is pivoted at **34** a long link **35**. The rear end of the latter is curved downward and is pivoted at **36** to a connecting link or strut link **37** whose rear end in turn is pivoted at **38** to swing link **26**.

Serially pivoted to the front end of inner section **24** at **39** is the second or intermediate section **40**. The front end of this intermediate section **40** in turn is pivoted to the third or connecting section **44** at **42**. Finally, the front end of this connecting section **44** is pivoted to the end section **46** at **45**. When this bed mechanism **14** is unfolded then these four sections extend horizontally in line outward from frame **12** to support the mattress on a taut bed spring **48** (see FIGURE 3) which is attached to them along their inner edges and along a front tubular cross brace **50** and a rear rail **51**. The rear rail **51**, when the bed is unfolded, lies forward of and approximately on a level with the front bottom edge **52** of the stationary back cushion **18**. Thus, no part of the mattress is obstructed so that its full length is usable. The distance between the front brace tube **50** and rear rail **51** can be made sufficient to accommodate a mattress **78** inches long, for example.

When the bed is unfolded as seen in FIGURE 9, inner section **24** is supported horizontally above the floor by swing link **26** and by intermediate section **40**. The front end of the latter is supported by a foldable leg **54** pivoted at **56** to a tab **58** fixed to this section. Similarly, the front end of end section **46** is supported by a foldable leg **60** pivoted to it at **61**. To prevent the forward end of inner section **24** from sagging under a load, long link **35** in the position shown in FIGURE 9 is rigidly held parallel to and above section **24** and section **40**, the front end of link **35** being pivoted at **62** to an angle link **64** which in turn is pivoted at **65** to section **40**. Part of any weight resting on the rear of section **40** is transmitted to the frame through link **35** by its attachment near its front end at point **66** to a supporting link **68**. The lower end of the latter is pivoted at **70** to a strap **72** fixed on the side of the frame.

In the position shown in FIGURE 9, upward thrust of supporting link **68** against link **35** tends to rotate angle link **64** clockwise. The latter, however, is locked in the position shown by the push of a thrust link **74** pivoted to it at point **75**, and by the pull of link **35**. The distance between pivots **62** and **65**, and the distance between pivot **34** at the rear of link **35** and pivot **39** joining sections **24** and **40**, are such that when the sections are being folded or unfolded, as indicated for example in FIGURE 5, link **35** moves closely parallel to and beneath end section **46**. This provides a double safeguard against the end section sagging under a heavy weight when in final folded position.

As seen in FIGURE 9, the forward end of thrust link **74** is pivoted at **76** to the upper portion of a short pivoted crank-arm **78**, which here extends vertically downward below a point **80** at which it is pivoted to section **40**. Forward thrust of link **74** against pivot **76** tends to rotate arm **78** clockwise around pivot **80**, but this in turn is resisted by a forward pull on the lower end of arm **78** by an articulated linkage **82** pivoted to it at **83**. Linkage **82**, which comprises two short lengths **84** and **85** pivoted together at **86**, pulls against its own forward pivot point **88** on a rigid corner plate **90**. The latter at its upper end is pivoted at **92** to end section **46**.

The pull by linkage **82** on corner plate **90**, which pull tends to rotate it clockwise about pivot **92**, is resisted by a counter thrust on a pin **94** carried by corner **90** just above pivot **92**. This pin rides in a slot **98** in the rear end of a link **100** and, in the position shown in FIGURE 9, abuts the front end of the slot, thus preventing clockwise rotation of corner plate **90**. The forward end of link **100** is pivoted at point **104** to a leg link **106**. The rear end of the latter is pivoted at **108** to connecting section **44** and the forward end of this link **106** is pivoted at **110** to leg **60**.

At the beginning of folding of the bed as seen in FIGURE 7, end section **46** is manually lifted from the floor and pivots around its point of attachment to connecting section **44**. This causes leg link **106** to shift forward relative to end section **46** and in so doing to fold leg **60**. During final folding or initial unfolding of the bed, as indicated in FIGURES 4 and 5, leg link **106** lies at a slight angle beneath end section **46** with long link **35** moving parallel to and just beneath and in the same vertical plane.

In the positions shown in FIGURES 4 and 5, end section 46 and intermediate section 40 are rigidly held approximately parallel to each other but with the rear end of the end section 46, i.e. the end of this section nearest back cushion 18, an inch or so lower than its forward end relative to section 40. The rigid locking of these sections is accomplished by corner plate 90 and linkage 82 whose action in cooperation with other elements will be described shortly.

In the position shown in FIGURE 4, both of the foldable legs 54 and 60 lie generally parallel to each other and to their respective sections 40 and 46, leg 54 being held flush against the under side of intermediate section 40 so that no part of the folded mechanism is visible beneath sofa frame 12. During the initial stages of the opening of the bed, as indicated in FIGURES 2 and 5, the unfolding of leg 54 is controlled so that its lower end clears a rail 112 which is fixed across the lower front of the sofa frame and rigidly connects its two sides. To accomplish this unfolding, leg 54 has a longitudinal slot 114 in it which engages a pin 116 projecting from a tab 118 on crank-arm 78. As the latter is rotated, by the pull of thrust link 74, from parallel position relative to section 40 as shown in FIGURE 4 through the position shown in FIGURE 5 to the perpendicular position as seen in FIGURE 6, pin 116 moves upward along slot 114. This unfolds leg 54 at a rate such that the lower end of this leg easily clears cross-rail 112 without requiring the forward end of intermediate section 40 to swing up and out at an angle too steep for easy opening.

As the bed sections are unfolded beyond the position shown in FIGURE 6 to that shown in FIGURE 7, connecting section 44 moves about its pivot 42 into straight line relation with intermediate section 40. In moving from the position shown in FIGURE 6, the connecting section, which near its upper end (see also FIGURE 8) is pivoted at 120 to a throat link 122, draws the rear end of the latter forward, this rear end having a projecting pin 124 which slides in a longitudinal slot 126 in section 40. When sections 40 and 44 have reached a straight-line relationship, as shown for example in FIGURE 7, pin 124 will be pulled against the rear of crank-arm 78 thereby doubly locking it in this position. When these elements are in the position shown in FIGURE 5, for example, pin 124 abuts the rear end of slot 126 and prevents further inward folding of connecting section 44 about its pivot 42.

As the bed sections are unfolded further to the position shown in FIGURE 7, corner plate 90 swings about its upper pivot 92 so that it extends down beneath the bed sections. In doing this, the plate draws downward with itself a short strut 130 whose upper end (see also FIGURE 8) is pivoted at 132 to a tab 134 on connecting section 44. This strut is coupled to the plate 90 by a pin 136 projecting from the plate and riding in a longitudinal slot 138 in the strut 130. As seen in FIGURES 2 and 7, the struts 130, one on each side of the bed mechanism, are rigidly joined together by cross braces 140 which help to insure that the two sides of the bed mechanism 14 move as a rigid unit. When the bed is folded these struts 130 and their connecting braces 140 are folded flush against connecting section 44. However, when the bed is open, to prevent the braces from interfering with the bedspring as it deflects under the weight of the mattress and a person upon it, the braces and struts are swung downward away from section 44 in the manner just described. As seen in FIGURES 2 and 3, the folding legs 54 carry a similar pair of braces 141. These members along with brace 50 and rail 51 give great transverse rigidity to the bed mechanism 14 and insure that the two sides move in unison during folding and unfolding of the bed.

To fold the bed back into the frame from the extended position shown in FIGURES 3 and 9, the end section 46 is lifted back through the position shown in FIGURE 7 to that in FIGURE 6 wherein the end section 46 is

disposed approximately at right angles to connecting section 44 and wherein this section 44 is being brought up toward right-angle relationship with intermediate section 40. Progressing to the position in FIGURE 5, the latter section 40 is by now shifted somewhat back into the frame 12 so that the crank-arm 78 has rotated an amount clockwise about point 80. In so doing, this arm, pulling on linkage 82 with great force, draws an upper flange 142 (see also FIGURE 8) of corner plate 90 into extended contact with end section 46 and also (see FIGURE 8) draws a front or lower tab 144 of plate 90 against strut 130 which thereby is forced tightly against connecting section 44. This action of corner plate 90 thus draws the connecting section 44 and the end section 46, as well as the connecting section 44 and the intermediate section 40 into approximately right angle relationship. The forward part of the mattress (not shown here) is thus compressed and folded double upon itself, and the end and connecting sections are held with great rigidity in folded position relative to the intermediate section. Because of the powerful drawing together of these sections produced by the action of corner plate 90, upon movement of intermediate section 40 back and down within frame 12, a person closing the bed is saved the strenuous effort of folding the end section 46 over the intermediate section against the resistance of the doubled-over mattress 20.

To complete the folding of the bed, the sections 40, 44 and 46 now folded as shown in FIGURE 5 are lowered as a rigid unit from this position to that in FIGURE 4 wherein they are fully seated within frame 12. Their weight is largely counterbalanced by tension springs 146 (see FIGURE 5) fixed to the rear end of frame strap 72 at 148 and connected at 150 to the lower end of supporting link 68. These springs are stretched when link 68 swings counterclockwise about its pivot 70 from the position in FIGURE 5 to that in FIGURE 4.

Even though during this final folding the crank-arm 78 continues to rotate from the position in FIGURE 5 clockwise into side-by-side relation with section 40 as shown in FIGURE 4, the inward and downward pulling movement of linkage 82 against corner plate 90 ends when the mechanism in folding from the position shown in FIGURE 6 reaches the position in FIGURE 5. Here, crank arm 78 is parallel with linkage 82, the lower portion 84 of the linkage lying side-by-side along arm 78 with the linkage's pivot 86 lying generally opposite and on the same axis with the arm's pivot 80. As crank arm 78 continues to rotate clockwise from the position in FIGURE 5 to that in FIGURE 4, a raised flap 152 (see also FIGURE 6) integral with it bears against the top side of the lower portion 84 of linkage 82. This rotates portion 84 in unison with crank-arm 78 around its pivot 80 and the linkage pivot 86, which two pivots in all positions between FIGURES 4 and 5 have effectively a common axis. As a consequence, the tension force developed in the upper portion 85 of linkage 82 can be brought to a maximum in the position shown in FIGURE 5 and thereafter be maintained without further increase even though the lower pivot point 83 of the linkage moves past the line of centers of pivots 86 and 88. 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. Throat link 122 by abutment of pin 124 at the rear end of slot 126 insures that connecting section 44 will come to generally right-angle relationship with intermediate section 40 and then stop and stay rigid under the tension of linkage 82.

When the bed is in the fully folded position shown in FIGURE 4, the rear end of intermediate section 40 is suspended by inner section 24 which is now substantially vertical, being held in this vertical position by link 37 acting between pivots 36 and 38 to lock swing link 26 relative to the inner section. The weight of the front end of the folded sections at each side is borne by the

corner plates **90** between which is rigidly bolted a frontboard **154** (see also FIGURES 1 and 2) the lower edge of the latter resting upon the transverse cross-rail **112**. Since no "play" or sagging of the bed sections relative to each other is allowed by corner **90** and linkage **82**, 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. The presence of link **35**, in the fully folded position in FIGURE 4, closely beneath leg link **106** additionally prevents sagging of the rear end of the end section when subjected to heavy weight.

As seen in FIGURE 4, the top surface of the inner or rearmost end of folded end section **46** is spaced at **156** 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 intermediate section. Also, this top end moves substantially only horizontally backward during the final seating of the mechanism within frame **12**. Thus, since the end section **46** is so rigidly held relative to intermediate section **40**, effectively no allowance here for up and down "play" of the end section is necessary.

As seen only in FIGURE 3 there is resiliently fastened to the top end of corner plate at **160** and stretched to extend just behind along the top edge of frontboard **154**, a flexible sheet **162** of a suitable padded material. When the bed is folded this sheet serves to cover the top of bedspring **48** and to protect and support the seat cushions. The forward end of sheet **162** extends around transverse brace **50** and is fastened to the bedspring. 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.

FIGURE 10 shows a slightly different bed mechanism **170** which also embodies features of the invention. Members and elements the same as those in mechanism **14** shown in the preceding figures are given the same reference numbers. In FIGURE 10, the member corresponding to leg **54** and crank-arm **78** in FIGURE 9, is a one piece leg-arm **172** which when unfolded extends down to the floor. To permit adequate clearance for this leg **172** when folding and unfolding, the member (not shown) corresponding to the fixed transverse rail **112** in FIGURE 9 can be made very low above the floor. In FIGURE 10, corner plate **90** has a punched-out integral tab **174** to which is rigidly fastened one end of a transverse brace **176**, tab **174** and this brace being provided in place of strut **130** and braces **140** in FIGURE 9.

It will now be apparent that each bed mechanism described herein is simplified in design and streamlined in appearance relative to previous bed mechanisms. When fully open, there are no metal parts or sharp corners projecting up to the level of the mattress along its sides and the mechanism has a clean, low silhouette making it additionally attractive to prospective buyers. Only a moderate number of 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 **46**) when the bed is folded will lie at the proper height for best seating comfort. The depth 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 4 through 9 were drawn to scale from an actual bed mechanism and they show substantially exactly the relative sizes, shapes and positions of the various parts and elements.

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. An improved convertible bed comprising a stationary frame having a back rest, two sides and a lower front rail connecting said sides, a first, a second, a third and a fourth bed section serially pivoted end to end, said sections when folded lying with said first section generally vertical at the back of said frame behind said back rest, said second section extending forward generally horizontally from the lower end of said first section, said third section extending upward from the front end of said second section and with said fourth section extending backward above said second section from the upper end of said third section and sloping slightly downward with its rear end extending closely beneath said back rest, a long link pivoted near its rear end to the lower part of said first section, a crank link pivoted below its upper end just rearward of the front end of said second section, means connecting the front end of said long link and the upper end of said crank link, a folding leg pivoted to said second section immediately in front of said crank link and coupled thereto by a pin and slot connection to fold and unfold so as to clear said front rail, a rear swing link pivoted at its rear end to the upper end of said first section and at its forward end pivoted to said frame behind said back rest, a strut link pivoted at its upper end near the middle of said swing link and at its lower end pivoted to the rear end of said long link, forward swing link means pivoted at one end to said frame and pivoted at its other end near the forward end of said long link, a corner plate pivoted at its upper rear end to said fourth section rearward of its pivot connection to said third section, said plate having two transverse shoulders at right angles to each other and adapted to bear against said fourth and third sections respectively to hold them generally perpendicular when folded, two short links serially pivoted together at a central point and with their front end pivoted to said plate near its lower forward end and pivoted at their rear end to said crank link near its lower end, said central pivot point of said short links when said sections are folded lying opposite the pivot connection of said crank link to said second section, said short links pulling said second and third sections generally perpendicular and pulling said plate against said third and fourth sections to hold them generally perpendcular, a second folding leg pivoted to said fourth section near its outer end, and a leg actuating link pivoted between said second leg and said third section to fold and unfold said leg.

2. The structure as in claim 1 wherein said long link and said leg actuating link when said sections are folded lie closely parallel to each other in the same vertical plane and abut when an excessive load is placed on the folded over fourth section.

3. The structure as in claim 2 in further combination with a strut pivoted to said third section near its upper end and adapted to fold down against said sections, a cross brace carried by said strut, and a pin and slot connection coupling said strut and said plate.

4. An improved convertible bed comprising a stationary frame having a back rest, two sides and a lower front rail connecting said sides, a first, a second, a third and a fourth bed section serially pivoted end to end, said sections when folded lying with said first section generally vertical at the back of said frame behind said back rest,

said second section extending forward generally horizontally from the lower end of said first section, said third section extending upward from the front end of said second section and with said fourth section extending backward above said second section from the upper end of said third section and sloping slightly downward with its rear end extending closely beneath said back rest, a long link pivoted near its rear end to the lower part of said first section, a folding arm pivoted below its upper end just rearward of the front end of said second section, a crank link pivoted near the middle of said second section and having its upper end pivoted to the forward end of said long link, linkage means connecting said crank link and the upper end of said folding arm, a rear swing link pivoted at its rear end to the upper end of said first section and at its forward end pivoted to said frame behind said back rest, a connecting link pivoted at its upper end near the middle of said rear swing link and at its lower end pivoted to the rear end of said long link, forward swing link means pivoted at one end to said frame and pivoted at its other end near the forward end of said long link, a corner plate pivoted at its upper rear end to said fourth section rearward of its pivot connection to said third section, said plate having two transverse shoulders at right angles to each other and adapted to bear against said fourth and third sections respectively to hold them generally perpendicular when folded, two short links serially pivoted together at a central point and with their front end pivoted to said plate near its lower forward end and pivoted at their rear end to said folding arm near its downward end, said central pivot point of said short links when said sections are folded lying opposite the pivot connection of said folding arm to said second section, said short links pulling said second and third sections generally perpendicular and pulling said plate against said third and fourth sections to hold then generally perpendicular, a folding leg pivoted to said fourth section near its outer end, and a leg actuating link pivoted between said leg and said third section to fold and unfold said leg, said long link and said leg actuating link when said sections are folded lying closely adjacent each other in the same vertical plane whereby an excessive load on said folded-over fourth section causes them to abut and prevent sagging.

5. In an improved sofa bed mechanism of the character described, an intermediate section, a connecting section, an end section, said sections being pivoted serially together and adapted when folded to lie with the intermediate section generally horizontal the end section generally parallel above it and with the connecting section generally vertical and perpendicular to said intermediate 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, a crank member pivoted at a first point to said intermediate section near its forward end, means for swinging said crank member downward and forward to generally perpendicular relation with said intermediate section when said sections are unfolded and backward and up beneath or alongside said inner section when said sections are folded, a first 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 a second leg connected to said crank member for folding and unfolding, said second leg being pivoted to said intermediate section immediately in front of said crank member and being coupled thereto by a pin and slot connection to fold and unfold so as to clear a front portion of the frame, said pin sliding along said slot as said crank member folds so that said second leg folds at a faster rate than said member.

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