March 15, 1966 J. J. BARABAS ETAL 3,239,852

CONVERTIBLE SOFA-BED

Filed May 20, 1963 3 Sheets-Sheet 1

Fig. 1.

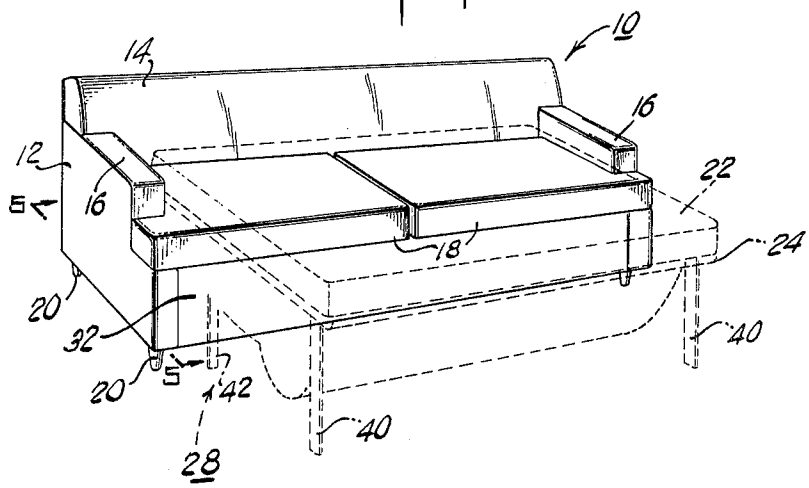
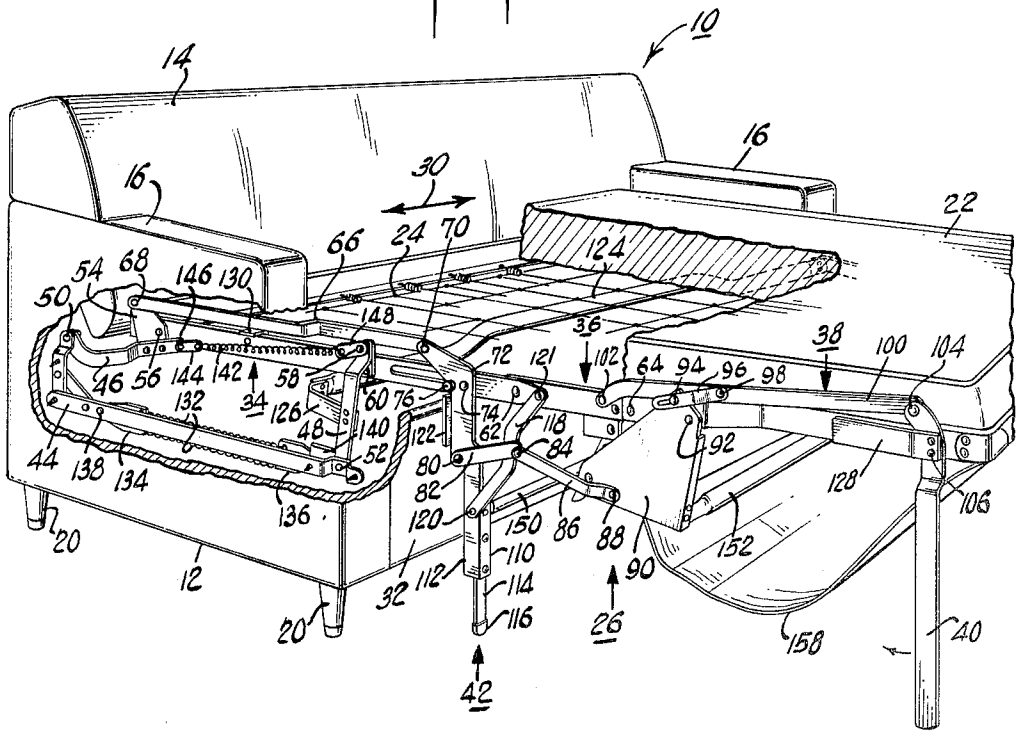


Fig. 2.



INVENTORS:
JOHN J. BARABAS
JOSEPH A. BRINDISI
BY ANDREW F. LENART

Curtis, Morris & Safford
ATTORNEYS.

March 15, 1966 J. J. BARABAS ETAL 3,239,852

CONVERTIBLE SOFA-BED

Filed May 20, 1963 3 Sheets-Sheet 2

Fig. 3.

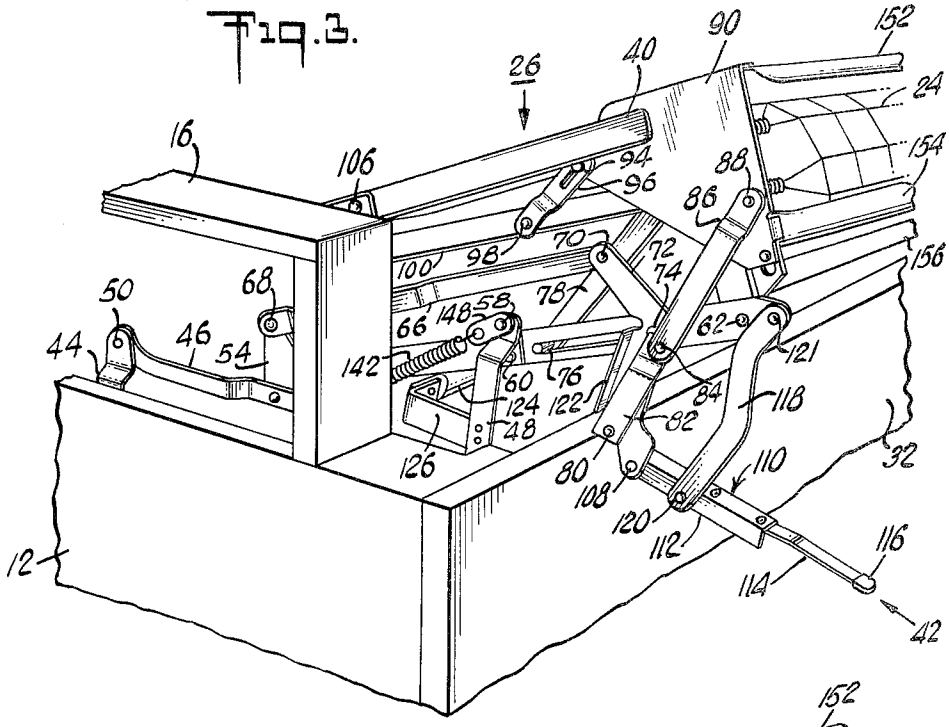
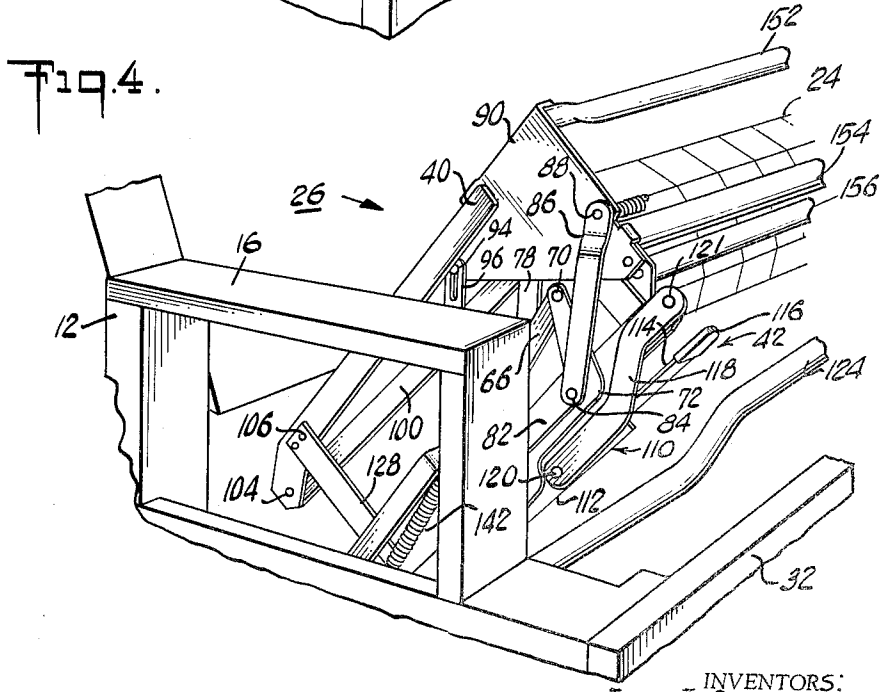


Fig. 4.



INVENTORS:
JOHN J. BARABAS
JOSEPH A. BRINDISI
ANDREW F. LENART

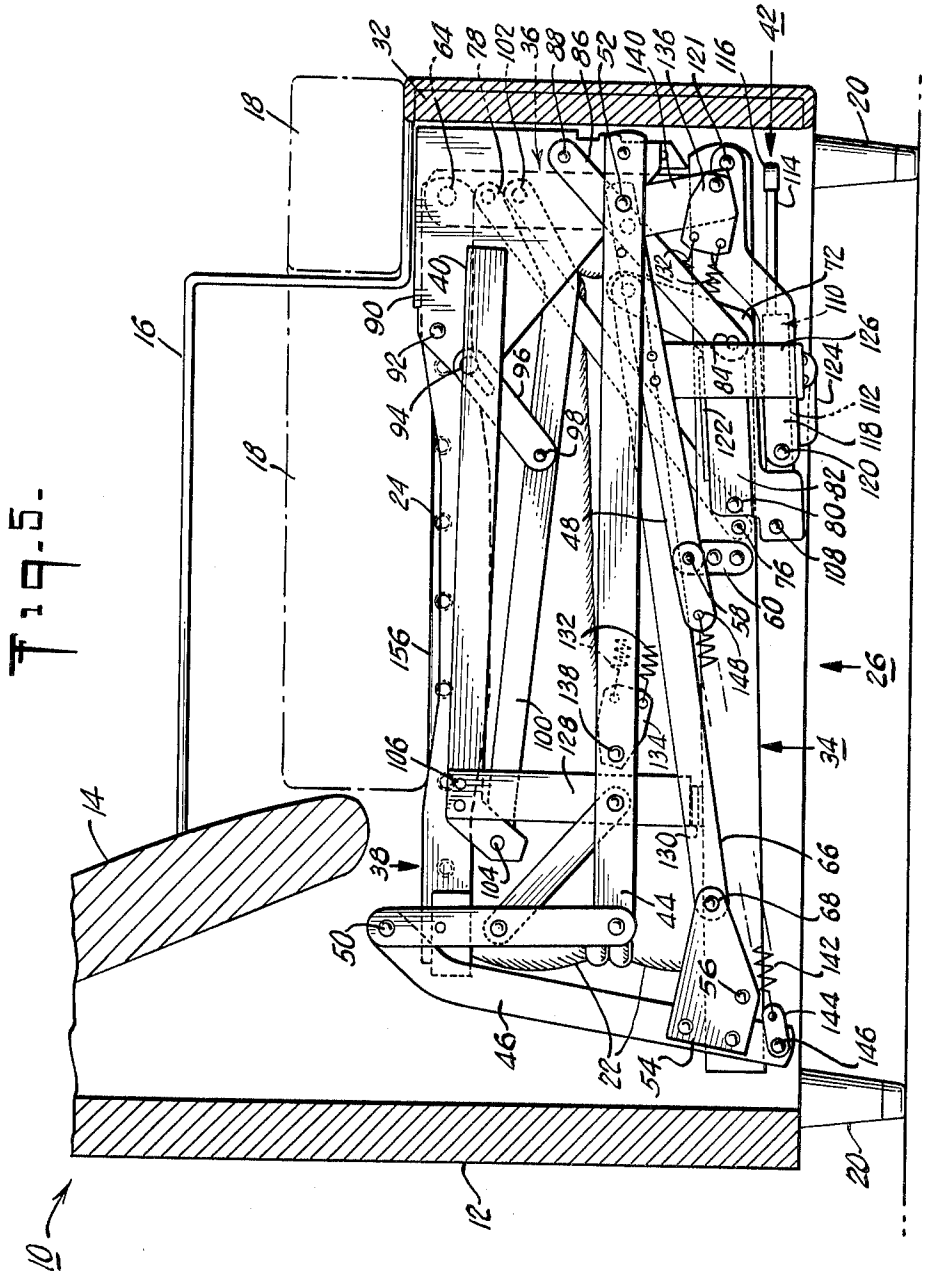
BY Curtis, Morris & Safford
ATTORNEYS.

March 15, 1966 J. J. BARABAS ETAL 3,239,852

CONVERTIBLE SOFA-BED

Filed May 20, 1963 3 Sheets-Sheet 3

FIG. 5.



INVENTORS:
JOHN J. BARABAS
JOSEPH A. BRINDISI
ANDREW F. LENART

BY Curtis, Morris & Safford
ATTORNEYS.

United States Patent Office 3,239,852 Patented Mar. 15, 1966

3,239,852

CONVERTIBLE SOFA-BED

John J. Barabas, New Rochelle, Joseph A. Brindisi, Uniondale, and Andrew F. Lenart, Jackson Heights, N.Y., assignors to Castro Convertible Corporation, New Hyde Park, N.Y., a corporation of New York

Filed May 20, 1963, Ser. No. 281,472
9 Claims. (Cl. 5—13)

This invention relates to convertible sofa-beds; more particularly, this invention relates to operating mechanisms used in convertible sofa-beds. Still more particularly, this invention relates to operating mechanisms used in convertible sofa-beds of the type in which the bed-portion of the sofa-bed is folded up and stored in the sofa frame when the sofa-bed is used as a sofa.

A sofa-bed of the type mentioned above is shown in U.S. Patent 2,968,049, and the present invention provides a sofa-bed which is an improvement over that shown in the above patent.

Although the operating mechanism of the present invention can be utilized in any of the number of varieties of the above type of sofa-bed, it is most advantageously used in the sofa-bed of the variety shown in the above-mentioned patent. In this variety, sometimes known as a "three-section" sofa-bed, the longest dimension of the bed, when opened up, is in a direction parallel to the back of the sofa; that is, in this variety the sleeper ordinarily sleeps with his body parallel to the back of the sofa.

An invention related to the present invention and especially useful in the "four-section" variety of this type of sofa-bed, that is, in the variety in which the sleeper ordinarily sleeps with his body perpendicular to the sofa back, is shown in my co-pending United State patent application, Serial No. 281,471, filed on May 20, 1963.

When sofa-beds of this type are converted from beds into sofas, the mattress, mattress support and operating mechanism are folded together compactly and stored in the sofa frame. When so folded up, the mattress support is positioned so as to provide a support for the sofa seat cushions and is hidden from view behind the "frontboard," that is, the board forming the frontal portion of the sofa frame just beneath the seat cushions. Because of the bulk of the folded mechanism and mattress, it has been customary in the past to make the "frontboard" movable by attaching it to the operating mechanism. With the frontboard attached directly to the operating mechanism, the folded mechanism and mattress can be swung out of the frame without having to rise to a great height to clear the frontboard. Instead, they need rise over only a rather low and narrow portion of the front of the sofa frame.

This arrangement presents several disadvantages. First, since the movable footboard is not attached to the frame, only a thin rail remains in the front portion of the sofa frame and this gives relatively little structural support to the sofa's arms. Thus, the arms may come loose from the sofa frame more readily than if the front of the sofa frame provided more structural support. Furthermore, any slight misalignment of the bed mechanism may cause the edges of the movable frontboard to rub against the upholstery of the sofa and wear it out in spots or rip it when the bed is opened or closed. This adds expense to maintenance of the bed in that reupholstering of the sofa or re-alignment of the operating mechanism may be necessary.

Accordingly, an object of this invention is to provide a convertible sofa-bed in which the frontboard does not abrade or rip the sofa-bed upholstery when the sofa-bed is folded or unfolded, and in which the frontboard adds to both the appearance and the structural strength of the sofa's frame.

It has been suggested in the past to solve the above problems by hinging the front board directly to the frame and linking it to the operating mechanism so that it is swung out from the sofa with the mechanism. Other arrangements also have been proposed in which the frontboard is similarly movable away from the sofa frame. However, none of these proposals has been satisfactory because, besides adding complexity to the sofa-bed's operating mechanism, the frontboard still abrades the sofa's upholstery and adds difficulty and cost to the upholstering process.

Another solution proposed in the past has been to permanently attach the frontboard to the frame and redesign the operating mechanism to clear the frontboard as it is swung out from the sofa frame. In one such proposed construction, one set of support legs for the opened bed has been eliminated so that the legs will not hit the fixed frontboard as the bed is opened. This however, reduces the support otherwise given to the mattress and allows it to sag under the weight of a sleeper. Other elaborate operating mechanisms have been proposed to clear a fixed frontboard, but they have proved to be costly and otherwise impractical.

Accordingly, it is another object of this invention to provide a convertible sofa-bed which has a frontboard affixed to the sofa frame to strengthen the frame and improve its appearance.

It is a still further object of this invention to provide such a sofa-bed in which the bed is solidly supported from the floor and does not appreciably sag under the weight of those sleeping on it.

Another object of this invention is to provide such a sofa-bed having a simple operating mechanism that rises over and easily clears the fixed frontboard of the sofa.

Still another object of this invention is to provide such a sofa-bed having a frontboard-clearing mechanism which is easily operated, is inexpensive to manufacture and maintain and is substantially free from malfunction.

One of the unsatisfactory aspects of fixed-frontboard sofa-bed arrangements proposed in the past is that the spring structure which is used as a mattress-support in such sofa-beds sags under the weight of the sleeper lying upon the mattress and makes contact with the fixed frontboard. The fixed frontboard, since it is not flexible, often protrudes upwardly into the mattress and can make sleeping on the bed very uncomfortable. This problem is most severe in the "three-section" variety of sofa-bed because the longest dimension of the bed extends in a direction parallel to the frontboard and the bed has a tendency to sag further than those in other sofa-bed arrangements.

Therefore, it is another object of this invention to provide a fixed-frontboard sofa-bed in which the fixed frontboard does not protrude into the mattress when the bed is slept upon, and which will support the sleeper in a comfortable manner.

It is a further object of this invention to provide such a sofa-bed having novel components which serve multiple functions, thereby reducing the complexity and manufacturing cost of the sofa-bed.

The drawings and description that follow describe the invention and indicate some of the ways in which it can be used so as to meet the above-stated objects. In addition, some of the advantages provided by the invention will be pointed out.

In the drawings:

FIGURE 1 is a perspective view of a sofa-bed embodying the present invention;

FIGURE 2 is a perspective, partially cut-away view of the sofa-bed of FIGURE 1 fully unfolded to form a bed;

FIGURE 3 is a perspective, partially cut-away view of of a portion of the sofa-bed shown in FIGURE 1 show-

ing the bed in an intermediate position during folding or unfolding;

FIGURE 4 is a perspective view, similar to FIGURE 3, showing the bed in another intermediate position during folding or unfolding;

FIGURE 5 is a cross-sectional and partially schematic view taken along line 5—5 of FIGURE 1, in the direction of the arrows, and showing the bed fully folded up inside of the sofa-bed frame.

The sofa-bed generally indicated at **10** in FIGURE 1 is shown folded (in solid lines) for use as a sofa, and unfolded (in dashed lines) for use as a bed. Sofa-bed **10** comprises a frame **12** with a sofa-back-cushion **14**, a pair of arms **16**, and a pair of seat-cushions **18**. Four feet **20** support the sofa-bed above the floor and give it a modern, pleasing, off-the-floor appearance. A mattress **22** and a mattress-support or bed-springs **24** (also see FIGURES 2 through 5) are supported between a pair of side-linkages, generally indicated at **26**, of an operating mechanism which is generally indicated at **28**.

In accordance with the present invention, the "frontboard" **32**, which forms the front portion of the sofa frame **12**, is secured directly to the frame instead of attaching it to the operating mechanism **28** as it has been common to do in the past. This adds substantially to the sofa's structural strength, and especially strengthens the connection of the arms **16** to the frame. The arms can be sat upon and otherwise abused without their coming loose from the frame. In addition, there are no cracks or separations between the frontboard and the frame to mar the sofa-bed's appearance. Finally, there is no abrading or ripping of the sofa upholstery by the operating mechanism **28** of the present invention because there is no movable frontboard to become misaligned and scrape the nearby upholstery when the bed is folded and unfolded.

The sofa-bed **10** is sometimes known as the "Long Line" bed because the longest dimension of its bed is in the direction parallel to the sofa back **14**. Because of this, the sleeper usually sleeps with his body parallel to the sofa back, that is, with his body aligned in the direction indicated by arrow **30** in FIGURE 2.

Sofa-bed **10** is also sometimes known as a "three-section" sofa-bed. This is because each side linkage **26** of the operating mechanism **28** is composed of three sections pivotally connected ot one another. These three sections are (referring now to FIGURE 2) an inner section, a connecting section, and an end section, which are generally indicated, respectively, at **34**, **36** and **38**. As is shown in FIGURE 5, these three sections are folded together so that the mattress-support **24** forms a resilient platform upon which the seat cushions **18** rest when the sofa-bed is used as a sofa.

The mattress **22** and its support **24** are supported from the floor by a pair of front legs **40**, a pair of intermediate legs generally indicated at **42**, and by the sofa frame **12** to which the operating mechanism **28** is attached.

When the bed is folded into the sofa frame **12**, the front legs **40** fold up as shown in FIGURES 3, 4 and 5, and in the above-mentioned U.S. Patent 2,968,049.

In accordance with the present invention, the intermediate legs **42** have a novel double-folding construction which allows them to pass over the high frontboard **32** without hitting it. This construction for the first time makes it truly practical to use an intermediate leg in a a fixed-frontboard sofa-bed arrangement. As a result, the bed of sofa-bed **10** gives, firmer, more nearly sag-free support to the sleeper without adding substantial additional cost and complexity to the operating mechanism. Other features and advantages provided by the present invention will be discussed in greater detail below.

Referring now to FIGURES 2 and 5, each side-linkage **26** of operating mechanism **28** is mounted to sofa frame **12** by means of a generally L-shaped mounting bracket **44** which is affixed to frame **12** by means of screws as

indicated in FIGURE 2. A rear swing-link **46** and a forward swing-link **48** are pivotally attached to mounting bracket **44** at points **50** and **52**, respectively, by means of bolts. Rear swing-link **46** has a bracket **54** attached to it and which is pivoted to inner bed section **34** at point **56**. Similarly, forward swing-link **48** is pivotally connected to inner bed section **34** at point **58** through a tab **60** which is affixed to section **34**.

Inner bed section **34** is pivoted at **62** to connecting section **36** which is, in turn, pivoted at **64** to end section **38**. When the bed is folded up and swung into and out of the frame **12**, swing-links **46** and **48** act as guides and aid in swinging the bed into and out of the frame. When the bed is fully unfolded into the position shown in FIGURE 2, swing-links **46** and **48** serve to support the inner bed section **34** and the innermost portion of mattress-support (bed springs) **24** and mattress **22**.

In order for the sofa-bed to fold and unfold smoothly it is desirable to locate with a relatively high degree of accuracy the points **50** and **52** about which swing-links **46** and **48** pivot. In the past it has been common practice to locate pivot points **50** and **52** on individual brackets which are attached separately to the wooden frame. Location of the pivot points on the wooden frame in this manner inherently is subject to error and often results in misalignment of the operating mechanism during assembly of the sofa-bed. Mounting bracket **44** represents an improvement over brackets previously used in sofa-beds of this type in that pivot points **50** and **52** are located accurately with respect to one another during the assembly of bracket **44**. Swing-links **46** and **48** then may easily be bolted to bracket **44** and thereby positioned accurately. This accurate positioning is maintained throughout the life of the sofa-bed since the pivot points are rigidly connected together by metal braces. This new mounting bracket **44**, therefore, simplifies assembly of the sofa-bed, reduces its manufacturing cost, improves its quality and reduces the expense of maintaining it in good repair.

A long link **66** is pivoted at one of its ends to bracket **54** at point **68**. Link **66** locks swing-links **46** and **48** in position when the bed is fully opened and prevents the inner portion of the bed from sagging under the weight of a sleeper. Any weight on the bed tends to rotate inner swing-link **46** and bracket **54** clockwise about its pivot **50**, thus imparting a forward thrust on link **66** and tending to make the bed sag. However, long link **66** is locked in position (as described below) and prevents bracket **54** and the rear swing-link from rotating. Although forward swing-link **48** also tends to rotate clockwise under any weight placed on the bed, it is prevented from rotating by the fact that rear swing-link **46** is locked in position.

The forward end of long link **66** is pivoted at **70** to crank portion **72** of intermediate leg **42**. Crank portion **72** is pivoted at **74** to inner bed section **34**. Weight on the bed causes a forward thrust on link **66**, as described above, which tends to rotate crank **72** clockwise about its pivot **74**. However, such rotation of crank **72** is prevented by the presence of a pin **76** in a mating notch in crank **72**. Pin **76** is attached to arm **78** (see FIGURES 3, 4 and 5) and moves in its slot into the locking position shown in FIGURE 2 substantially as described in the above-mentioned U.S. Patent 2,968,049.

Pivotally connected at **80** to the lower end of crank portion **72** is a first short link **82**. First short link **82** is pivoted at **84** to a second short link **86** which is pivotally connected at **88** to a rigid plate or corner-member **90**. Corner-member **90** is pivoted at **92** to the end bed-section **38**.

Corner member **90** is prevented from rotating clockwise about point **92** beyond the position indicated in FIGURE 2 by a pin **94** which abuts against the forward end of a slot in a member **96**. Member **96** is pivoted at point **98** of a front-leg-folding-link **100**. The rear end of leg-folding link **100** is pivoted at **102** to connecting bed-sec-

tion 36 and the forward end of link 100 is connected at 104 to the upper end of front leg 40.

When the forward end of the bed is lifted at the start of folding the bed, end bed section 38 pivots about point 64 with respect to connecting section 36. This causes leg-folding link 100 to shift forward with respect to end section 38 and rotate leg 40 about its pivot 106 to fold the leg in a clockwise direction. Further lifting of end section 38 folds the mattress 22 and bed springs 24 into a U-shaped package in which end section 38 is parallel to inner section 34 and connecting section 36 is perpendicular to both the inner and end section. This folding is accomplished substantially as described in the above-mentioned Patent 2,968,049.

When the mattress and bed springs are folded into a U-shaped form as described above, intermediate leg 42 is still fully extended and fully supports the weight of the partially folded bed which at this point rests at a position just above the frontboard 32. As a result, the bed is stable in this position and is not likely to fall down and cause an accident to the bed's user.

When the bed is in the above-described partially folded, U-shaped position, the bed operator lifts the bed further to swing it into the sofa frame 12. In so doing this he actuates the unique folding mechanism of the intermediate leg 42 to fold the leg quickly and allow it to clear the fixed frontboard 32 of the sofa frame as the bed passes over the frontboard.

Pivoted at 108 to the lower end of crank-portion 72 of leg 42 is its lower portion generally indicated at 110. Lower portion 110 consists of a metal section 112 to which is attached a member 114 with a foot 116. The structure of leg 42 is completed by a guiding link 118 whose lower end is pivoted at 120 to lower portion 110 and whose upper end is pivoted at 121 to the forward end of inner bed-section 34.

As the partially-folded, U-shape bed is lifted to be swung into sofa-bed frame 12, inner bed section 34 moves downwardly and rotates about point 56. This rotation imparts a forward thrust to long link 66 through bracket 54. As explained in the above-mentioned patent, when the bed is in this partially-folded U-shape, pin 76 has been moved to the rear end of the slot in which it moves so that crank portion 72 of leg 42 is free to rotate about its pivot 74 and link 66 is no longer locked in position. Thus, link 66 moves forward and rotates crank 72 about its pivot 74. The lower end of crank 72 rotates portion 110 of leg 42 about its pivot 120 and rotates guiding link 118 about its pivot 121. Thus, crank portion 72 of leg 42 is folded in a clockwise direction and lower portion 110 is folded in a counterclockwise direction.

The unique double-folding action described above is quick-acting and rapidly shortens the leg so that it easily clears the high front board 32 of sofa frame 12. The unfolding action of the operating mechanism and the operation of leg 42 are substantially the reverse of the operations described above.

As is described in the above-mentioned Patent 2,968,049, as the partially-folded bed is swung into the sofa frame, a great pulling force is exerted on corner member 90 through links 82 and 86 to compress the mattress 22 and bed springs 24 together into a compact package. When the bed is moved to a position just beyond that shown in FIGURE 3, link 82 makes contact with a tab 122 projecting from the rear edge of crank 72. As is more fully explained in the above-mentioned Patent 2,968,049 and in U.S. Patent 2,991,484, this action locks the bed in its compressed condition and saves a person from the strenuous effort of compressing it together.

When the bed is fully unfolded as shown in FIGURE 2, the bed springs 24 are close to the upper edge of frontboard 32. In this position, the mattress and springs easily can sag under the weight of a sleeper and come into forcible contact with the upper edge of the frontboard. This could cause considerable discomfort to the sleeper. In accordance with the present invention, however, an elongated, resilient stabilizing and sag-resisting member 124 is positioned beneath bed springs 24 and near the upper edge of frontboard 32 to support the bed springs and the mattress and prevent them from making contact with the upper edge. Stabilizing and sag-resisting member 124 is attached at each of its ends to a forward swing-link 48 of each side-linkage 26 of the sofa-bed by means of a bracket 126. Member 124 is tubular in shape and is bent near each of its ends so that its central portion is bent upwardly (see FIGURES 2 and 4) in order to be positioned just below the bed springs and sufficiently above the upper edge of the frontboard so as to prevent contact between the frontboard and bed springs when weight is placed on the bed. This bent shape also gives the member added resilience. Member 124, because of its resilience, not only prevents contact between the bed springs 24 and the upper edge of frontboard 32, but also flexes under the weight of the sleeper and does not cause him discomfort as would a relatively inflexible member.

Resilient tube 124 actually serves at least three separate functions. Not only does it serve as a resilient mattress support as described above, but it also serves to connect together and stabilize both of the side linkages 26 of the bed mechanism so that they move in unison when the bed is unfolded. Furthermore, when the bed is folded and stored in the frame, member 124 serves as a support to uphold the forward end of the folded-up bed. In thus being adapted to provide these three separate functions, member 124 obviates the need for additional cross-members previously required in sofa-beds of this type and reduces the cost and complexity of manufacture of the sofa-bed.

As is also seen in FIGURE 5 (together with FIGURES 2 and 4) a stop-plate 128 is attached to front leg 40 of the bed mechanism. When the bed is folded, stop-plate 128 abuts against a projection 130 which is attached to inner bed section 34. Since inner-section 34 is firmly supported by its suspension from mounting bracket 44 at point 50, this arrangement provides firm support for the inner portions of the bed when it is folded as shown in FIGURE 5. Since member 124 is supported by mounting bracket 44 through bracket 126 and forward swing-link 48, both the rear and forward ends of the operating mechanism are firmly supported and form a compact, rigid body which provides, together with bed springs 24, a stable platform for seat cushions 18.

As seen in FIGURE 2, two springs 132 are stretched between a pair of plates 134 and 136. Plate 134 is pivoted at 138 to bracket 44 and plate 136 is pivoted to a plate 140 which is rigidly attached to forward swing-link 48. When the bed is folded as shown in FIGURE 5, forward swing-link 48 is rotated counterclockwise to the position shown in FIGURE 5 so that springs 132 are stretched out. The restoring force exerted by these stretched springs acts on forward swing-link 48 through plate 140 to aid the user of the bed in opening and unfolding it, as is well known in the prior art.

In accordance with the present invention, an auxiliary spring 142 is provided to further aid in unfolding the bed. One end of spring 142 is connected to a tab 144 which is pivoted at 146 to the forward end of rear swing-link 46. The other end of spring 142 is connected to a tab 148 which is pivoted at point 58.

When the bed is folded into the position shown in FIGURE 5, rear swing-link 46 is rotated downwardly into the position shown. This stretches spring 142 and provides a force of tension tending to rotate rear swing-link 46 counterclockwise about its pivot 50 to aid the operator in opening the bed. The major portion of the tension supplied by springs 132 has vanished long before the bed is completely out of the frame 12. However, the tension force supplied by auxiliary spring 142 continues to aid in opening the bed until the bed is completely out of the sofa frame. Thus, the addition

of auxiliary spring **142** provides a sofa-bed which is substantially easier to operate than prior sofa-beds.

As is thus seen in FIGURE 2, a tubular member or strut **150** is connected between the lower portions **110** of intermediate legs **142** on opposite sides of the bed. Similarly, two other tubular struts **152** and **154** and a flat strut **156** are connected between the opposing corner members **90**. These struts add lateral stability to the bed mechanism and ensure that both side linkages **26** operate together.

A cover **158** is provided to cover the bed springs **24** when the bed is folded so as to protect the seat cushions **18** from being damaged by contact with the bed springs.

The above description of the invention is intended to be illustrative and not in limitation thereof. Various changes or modifications in the embodiment 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 in the claims.

We claim:

1. In a convertible sofa-bed having a fixed frontboard, an operating mechanism which passes over said frontboard when it is operated to convert said sofa-bed from a bed to a sofa or from a sofa to a bed, said operating mechanism including a pair of side-linkages, one of said linkages being positioned at each side of said mechanism, a foldable mattress-support attached between said linkages, at least one pair of double-folding legs for upholding said mattress-support in a position suitable for forming a bed, each leg of said pair of legs including first and second members pivotally connected together, one of said members being pivotally connected to one of said side-linkages, a guiding link pivotally connected to said one side-linkage and to the other of said members, and means connected to one of said members for effecting the simultaneous folding of said members with respect to one another and with respect to said side-linkage to shorten said leg is response to folding movement of said operating mechanism.

2. In a convertible sofa-bed having a fixed frontboard, an operating mechanism which passes over said frontboard when it is operated to convert said sofa-bed from a bed to a sofa or from a sofa to a bed, said operating mechanism including a pair of side-linkages, one of said linkages being positioned at each side of said mechanism, a foldable mattress-support attached between said linkages, at least one pair of double-folding legs for upholding said mattress-support in a position suitable for forming a bed, each leg of said pair of legs including first and second members pivotally connected together, one of said members being pivotally connected to one of said side-linkages, a guiding link pivotally connected to said one side-linkage and to the other of said members, an actuating linkage pivotally connected to said one member for folding said members with respect to one another and with respect to said side-linkage simultaneously and in opposite directions to shorten said leg in response to folding movement of said operating mechanism.

3. A convertible sofa-bed including a sofa-frame with a fixed frontboard, a foldable mattress-support, a mattress on said mattress-support, and an operating mechanism for guiding and folding said mattress and said mattress-support into said frame and for guiding and unfolding said mattress and said mattress-support out of said frame to form a bed, said operating mechanism including a pair of side-linkages, one at each side of said mattress-support, each of said side-linkages including inner, connecting, and end sections, all pivotally connected to one another, at least two pairs of legs for upholding said mattress and said mattress-support from the floor, each leg of at least one of said pairs of legs being adapted to effectively change in length to enable it to pass over said fixed frontboard when said mechanism is being folded or unfolded, each of said legs including a crank-shaped member pivotally connected to said inner section of one of said side-linkages, an elongated member pivotally connected to said crank-shaped member, a guiding link pivotally connected to said elongated member and to said inner section of said one side-linkage, an actuating link pivotally connected to said crank-shaped member, and means connected to said actuating link for imparting to it a motion which causes said members to pivot in opposite directions with respect to one another and thereby fold up to reduce the effective length said leg in response to folding movement of said operating mechanism, and to unfold and increase the effective length of said leg in response to unfolding movement of said operating mechanism.

4. Apparatus as in claim **3** including means for locking said actuating link in position and thereby locking said inner section of said side-linkage against sag or rotation under a weight placed upon the bed when said bed is fully unfolded.

5. In a convertible sofa-bed having a fixed frontboard, an operating mechanism which passes over said frontboard when it is operated to convert said sofa-bed from a bed to a sofa or from a sofa to a bed, said operating mechanism including a pair of side-linkages, one of said linkages being positioned at each side of said mechanism, a foldable mattress-support attached between said linkages, a pair of intermediate legs and a pair of forward legs for upholding said mattress-support in an unfolded position for forming a bed, each of said forward legs being positioned adjacent the end of said mattress support which is most distant from said frontboard when said mattress support is in its unfolded position, and each of said intermediate legs being positioned intermediate said frontboard and said forward legs when said mattress support is in its unfolded position, each of said intermediate legs including first and second members movably connected together, one of said members being connected to one of said side-linkages, a guiding link pivotally connected to said one side-linkage and to the other of said members, and linkage means connected to one of said members and to one of said side-linkages for effecting the simultaneous movement of said members with respect to one another and with respect to said side-linkage to shorten said leg in response to folding movement of said operating mechanism.

6. Apparatus as in claim **5** in which each of said side-linkages includes inner, connecting, and end sections, all pivotally connected to one another, a rearward swing-link pivotally connected to said inner section of said side-linkage and to the sofa-frame, a forward swing-link pivotally connected to said inner section and to said sofa-frame, said swing-links being adapted to swing and guide said bed down into and upwardly out of said sofa frame, a crank-arm attached to said forward swing-link, a spring attached to said crank-arm and to said frame, and a second spring attached to said rearward swing-link and to said inner section, said springs imparting restorative forces to said inner section which forces aid in unfolding said bed throughout its passage upwardly out of said frame.

7. Apparatus as in claim **5** including a resilient member rigidly secured at each end to one of said side-linkages and positioned adjacent and beneath said mattress support and extending near said frontboard to resiliently uphold said mattress support and prevent it from sagging and coming into forcible contact with the upper edge of said frontboard when weight is placed on said bed in its fully unfolded position.

8. Apparatus as in claim **7** in which said resilient member is tubular in shape and is bent near each of its ends so as to extend above said uppermost edge of said frontboard when said sofa-bed is fully unfolded.

9. Apparatus as in claim **7** in which said resilient member is connected to said side-linkages so as to support said bed when said bed is folded-up and positioned in

said frame to form a platform for the seat cushions of said sofa.

References Cited by the Examiner

UNITED STATES PATENTS

571,821	11/1896	Wood	5—226 X
2,742,653	4/1956	Woller	5—226
2,829,382	4/1958	Bank et al.	5—13
2,947,997	8/1960	Helton	5—13
2,964,760	12/1960	Fox	5—13
2,968,049	1/1961	Barabas	5—13
2,985,893	5/1961	Trossman	5—13
3,041,634	7/1962	Willis	5—13
3,079,167	2/1963	Russell.	

FOREIGN PATENTS

985,706	3/1951	France.

FRANK B. SHERRY, *Primary Examiner.*