Jan. 19, 1965 W. C. ROGERS, JR 3,165,757

SOFA BED MECHANISM

Filed Dec. 21, 1961 3 Sheets-Sheet 1

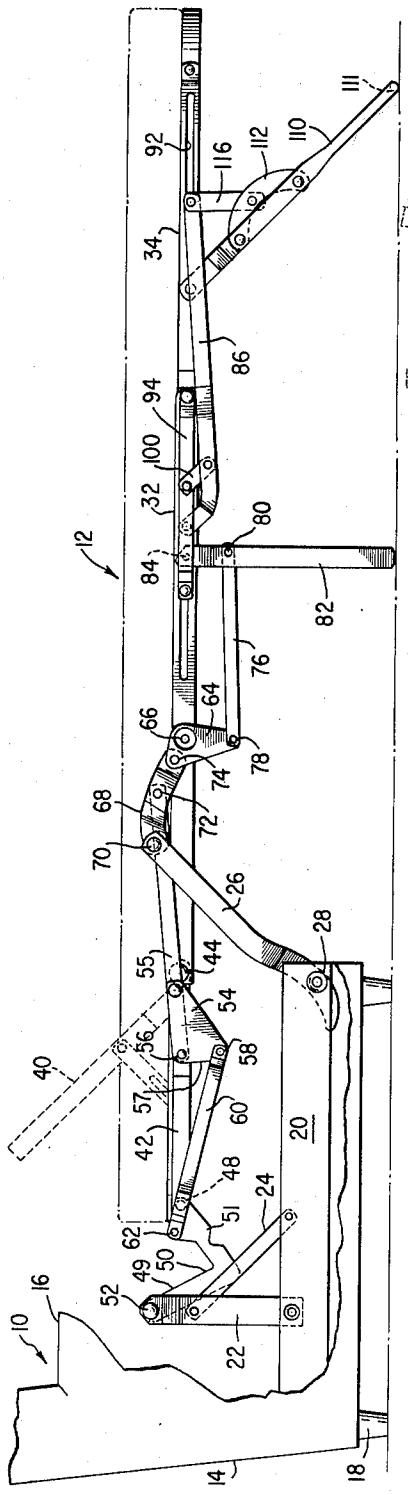


FIG. 1

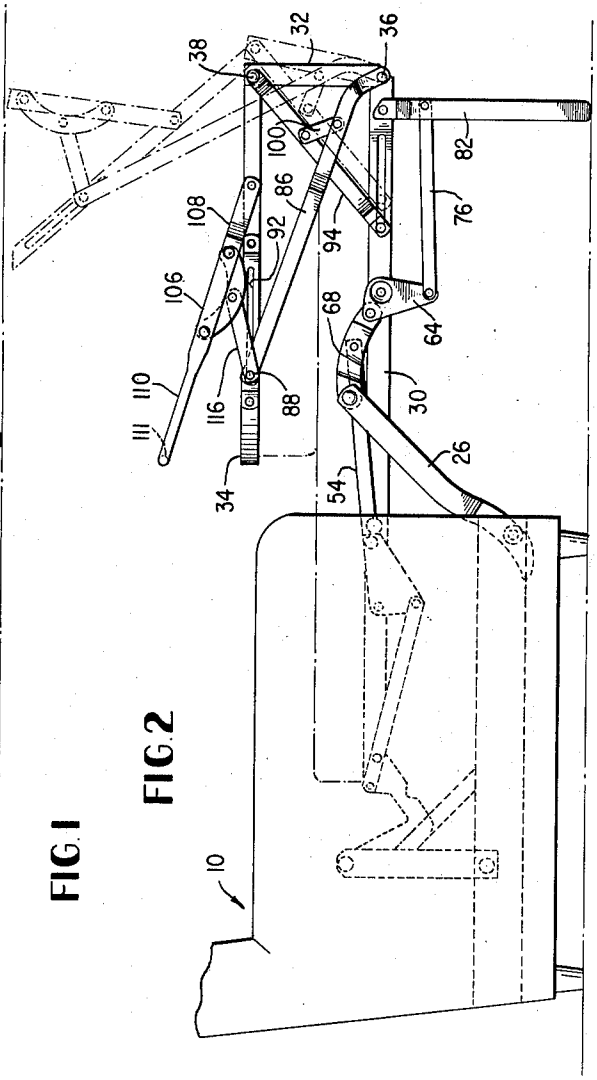


FIG. 2

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SOFA BED MECHANISM

Filed Dec. 21, 1961 3 Sheets-Sheet 2

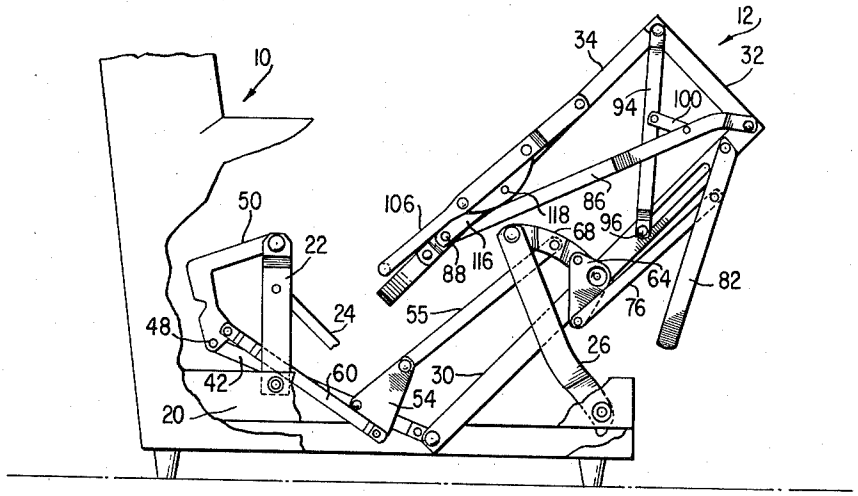



FIG. 3

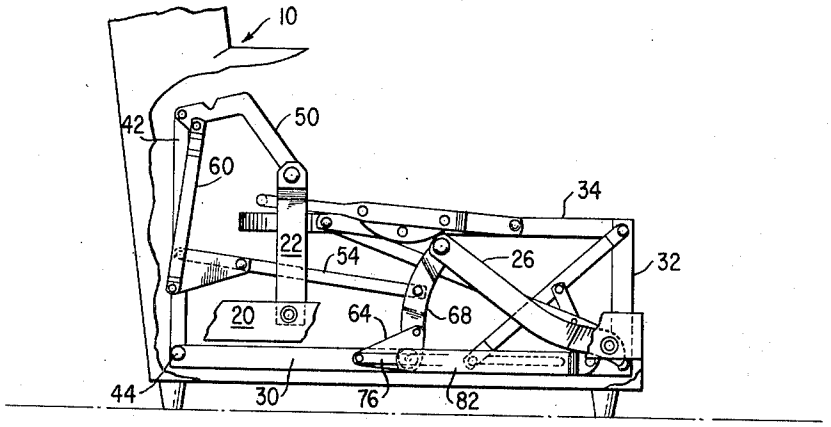



FIG. 4

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Jan. 19, 1965 W. C. ROGERS, JR 3,165,757

SOFA BED MECHANISM

Filed Dec. 21, 1961 3 Sheets-Sheet 3

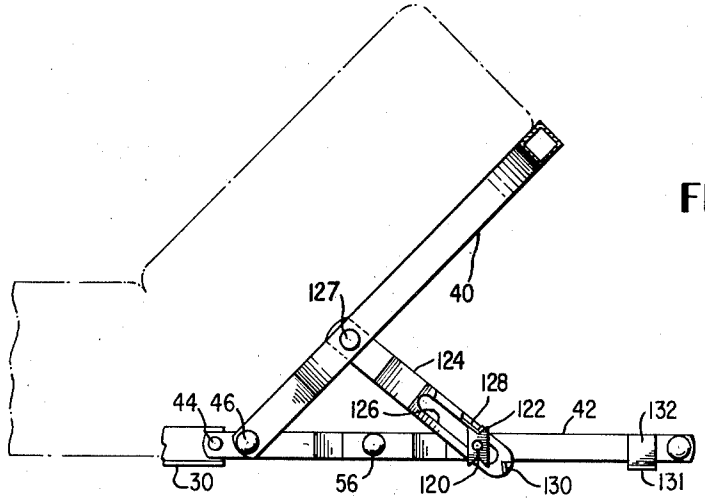



FIG. 5

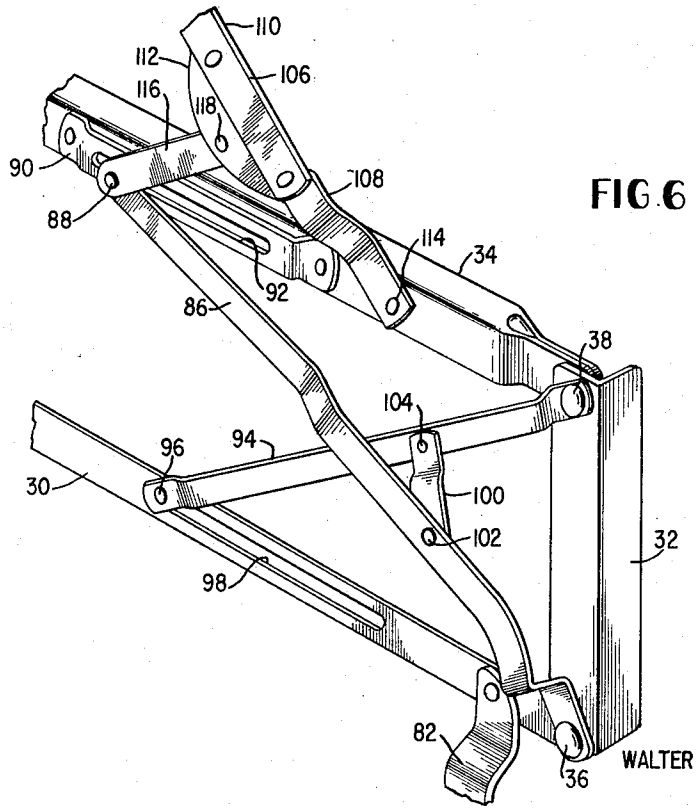



FIG. 6

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3,165,757

# SOFA BED MECHANISM

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Filed Dec. 21, 1961, Ser. No. 161,019
14 Claims. (Cl. 5—13)

This invention relates to sofa beds of the type having a bed frame with a plurality of articulated sections successively pivotally connected which are foldable and unfoldable between a sofa position and an extended bed position with the sections in horizontal alignment. A mattress is associated with the frame in such a manner that it lies flat on the extended frame when the device is unfolded to define a bed, and doubles upon itself when the frame is folded to define a sofa. The frame in the folded or collapsed position can be retracted within the sofa. Cushions are placed over the folded frame in the sofa position, and the frame is hidden from view.

In many sofa beds of this type noise and discomfort are caused by relative movement of the folded bed frame sections while persons are sitting on the sofa. This condition is aggravated by the action of the mattress which is folded between the articulated frame sections. Movement of the occupants of the sofa causes the mattress to resiliently expand and contract which exerts forces on the sections tending to unfold them, and the mattress frequently becomes misaligned with respect to the frame.

It is, therefore, an object of this invention to prevent relative movement of the articulated sections of a bed frame when the sections are in a folded or collapsed position.

A more specific object is to lock the sections of a foldable sofa bed frame against relative movement when the sections are folded or collapsed together.

Another object is to control the movement of the articulated sections of a foldable sofa bed frame between its folded and extended position with a smooth continuous movement and with a minimum of applied force.

Another object is to provide a foldable sofa bed with an auxiliary frame link that can be selectively moved to an inclined position to provide an elevated headrest.

These and other objects are attained by the provision of a frame having rear, intermediate and forward sections which are successively pivotally connected so as to be foldable and unfoldable. Pivotally connected to the forward section is a substantially U-shaped leg member for supporting the forward section in the extended position. Interconnecting the leg member and the bed frame sections is a linkage system which controls movement between the folded and unfolded positions and distributes applied force among the operating parts to obtain a maximum mechanical advantage. The linkage system also serves to maintain the bed frame sections in rigid alignment when in the extended bed position. Connected to the leg member is a locking link which is associated with the linkage system in such a manner that as the frame moves to its folded or collapsed position, the leg member moves to a position overlying the forward section and also moves the locking link to an overcenter position to lock the sections against relative movement and thus firmly hold the mattress in place folded between the frame section; and since the parts are locked against relative movement, the mattress cannot cause the parts to unfold. Movement of the folded leg member is required to actuate the linkage as it moves from its folded to floor-engaging position to unfold the frame to the extended position. For retracting the folded frame into the sofa portion, the rear frame section is connected to a support link which swingably and pivotably connects the frame section to the sofa. Carried by the support link is an auxiliary frame



link that can be selectively raised to an inclined position relative to the extended bed frame to provide an elevated headrest, and to rigidly support the articulated sections relative to each other when in the extended position.

Other objects and advantages of the invention will become apparent from the following description taken in connection with the accompanying drawings in which:

FIG. 1 is a side view of the sofa bed with the bed frame projected from the sofa portion to an extended bed position;

FIG. 2 is a view similar to FIG. 1 with the frame in the partially folded or collapsed position with an intermediate position indicated by phantom line;

FIG. 3 is a view similar to FIG. 1 with the collapsed bed frame in a position intermediate the retracted sofa position and the projected bed position;

FIG. 4 is a view similar to FIG. 3 with the collapsed bed frame retracted wholly within the sofa portion;

FIG. 5 is a detail of the headrest portion of the bed frame; and

FIG. 6 is an enlarged perspective view of the linkage system interconnecting the articulated bed frame sections.

Referring first to FIG. 1, the sofa bed comprises a sofa portion indicated generally at 10; and a bed portion indicated generally at 12 with the bed portion being shown in the extended position projected from the sofa portion. Sofa portion 10 is of conventional construction including a back 14, arms 16, legs 18 and having side frame members 20. Indicated in phantom lines is a mattress which is supported by the bed frame. Only the right half of the sofa bed will be described and is illustrated in the drawings; it being understood that the left half is a mirror image of the right half.

Supporting the mattress on the bed frame is a spring (not shown) which is mounted between the left and right halves of the bed frame in a conventional manner.

Bed frame 12 is swingably mounted on the side frame members 20 of the sofa 10 in such a manner that it can be retracted into and projected from the sofa 10. For this purpose a support member 22 is mounted on side frame member 20 and rigidly braced by a bracing member 24. Pivotally mounted at 28 on side frame member 20 is one end of a forward support lever member 26, the other end of which is pivotally connected to the bed portion.

Bed frame 12 includes a rear section 30, an intermediate section 32 and a forward section 34 which are successively pivotally connected by pins 36 and 38. Rear and intermediate sections 30 and 32 are illustrated as angle sections while forward sections 34 may be of square cross-section. Pivotally connected to the rear of section 30 is a headrest portion 40 which is movable between a reclined position and an elevated position, indicated by the broken lines in FIG. 1.

Pivotally connected at point 44 to the end of rear frame section 30 is the forward end of a support link 42, and headrest portion 40 is pivotally connected to support link 42 at a point 46 spaced from, but near to point 44 (see FIG. 5). Connected at a pivot point 48 at the other end of support link 42 is a leg 51 of a substantially L-shaped control lever 50 which has a leg 49 pivoted at 52 to support member 22. Support link 42 has a bell-crank lever 54 pivotally connected thereto at a point 56 intermediate its ends. Bell-crank lever 54 has a short leg 57 which is pivoted at 58 to one end of a link 60, the other end of which is pivotally connected to leg 51 of control lever 50 at a point 62 spaced from point 48.

To interconnect forward support lever 26 with frame section 30, a triangular lever 64 has its apex pivotally connected at 66 to section 30, and is connected with one end of a link 68 at 74, the other end of link 68 being pivoted at point 70 to forward support lever 26. Link 68

is also connected to triangular lever 64 at a point 74 at the end of its short leg and thus moves as a unit with triangular lever 64. Bell-crank lever 54 has a long leg 55 which is pivoted to link 68 at a point 72 intermediate points 70 and 74. Triangular lever 64 has a long leg which is pivoted at 78 to an end of a link 76, which in turn is pivoted at point 80 to a rear leg member 82. Rear leg member 82 is pivoted at 84 to the forward end of rear frame section 30 for supporting the frame in the extended bed position.

With the bed frame in the folded or collapsed position (FIG. 2) with forward frame section 34 in a vertically spaced, parallel relation with rear frame section 30, the operator grasps section 34 and lifts it upwardly and rearwardly toward the sofa 10. This causes control lever 50 to pivot clockwise about support member 22, and causes forward support lever 26 to pivot counterclockwise about its pivot 28. As lever 50 pivots about point 48, link 60 transmits a counterclockwise movement to bell-crank 54 about its pivot 56; and forward support lever 26 causes link 68 and triangular lever 64 to pivot clockwise about pivot 66 on rear frame section 30 until rear leg 82 assumes a folded position parallel to rear frame section 30. The entire assembly then swings to the position shown in FIG. 4 with rear frame section 30 resting in a horizontal position on supports (not shown) mounted on side frames 20.

As pointed out previously, the bed portion 12 is foldable between an extended position with the rear, intermediate and forward frame sections 30, 32 and 34 disposed in horizontal alignment (FIG. 1), and a folded or collapsed position illustrated in FIGS. 2, 3, 4 and 6. Mechanism for controlling movement of the frame sections 30, 32 and 34 between the extended and folded positions will now be described.

In the collapsed position, the forwardmost frame section 34 is disposed vertically above the rear frame section 30 and is substantially parallel therewith, with the mattress, shown in phantom line in FIG. 2, folded upon itself between the sections. The linkage system which controls the movement of sections 30, 32 and 34 between the extended and collapsed position also includes means for locking the sections in the collapsed position against relative movement, thereby preventing forward section 34 from moving relative to sections 30 and 32 when the bed portion is retracted to the position shown in FIG. 4.

Referring to FIG. 6, the mechanism includes a control lever 86, a guide lever 94 interconnected with control lever 86 by a connecting link 100, a forward leg member 106, and a leg-operated locking link 116.

Control lever 86 has one end pivoted to the connection 36 between rear and intermediate frame sections 30 and 32. Mounted on the other end of control lever 86 is a pin 88 which is slidably engaged in slot 92 formed in a plate 90 mounted on the outer edge of forward section 34. One end of guide lever 94 is pivoted at the interconnection 38 between intermediate frame section 32 and forward frame section 34. Mounted on the opposite end of guide lever 94 is a pin 96 for slidably and pivotally mounting the guide lever in a slot 98 formed in rear frame section 30. Connecting link 100 is pivoted at 104 to guide lever 94 and at 102 to control lever 86 for transmitting motion from control lever 86 to guide lever 94.

Forward leg member 106 is pivoted at 114 to the forward frame section 34. Leg member 106 consists of a lower U-shaped member 110 having a horizontal member 111 which extends the width of the bed (see FIGS. 1 and 2). Leg member 110 is rigidly connected at spaced points to an upper leg member 108. Only the right vertical portion of U-shaped member 110 is illustrated; the left half of the bed has a similar vertical leg portion connected by the horizontal portion 111 with the right portion 110. Upper leg portion 108 has an inwardly curved portion 112 for a purpose to be described below. Locking



link 116 is pivotally connected to pin 88 at the end of control lever 86, and its other end is pivoted at 118 to curved portion 112 of leg member 108.

To fold the bed portion from the extended position of FIG. 1 to the collapsed position of FIGS. 2, 3, 4 and 6, the operator grasps the free forward end of frame section 34 and moves it upwardly about its pivot 38. Upon the initial upward movement, control lever 86 pivots about point 36 and pin 88. This initial movement is transmitted, through connecting link 100, to guide lever 94 and intermediate frame section 32 causing guide lever 94 to pivot counterclockwise about pin 96 and section 32 to pivot counterclockwise about pivot point 36.

When connecting link 100 moves to a substantially horizontal position parallel to rear frame section 30, pin 96 begins to move rearwardly in slot 98. At the same time pin 88 is cammed forward in slot 92 carrying with it the end of locking link 116 which in turn causes leg member 106 to pivot counterclockwise about pivot 114 toward its folded position. Connecting link 100 remains in its substantially horizontal position until pin 96 approaches the end of slot 98 (the position shown in phantom lines in FIG. 2) whereupon link 100 swings clockwise about pivot 104 to the position shown in FIG. 6. At the same time pin 88 has reached a position slightly to the rear of the forward end of slot 92, and the various parts are in the position illustrated in FIG. 6, which may be termed the "unlock" position.

In this position, intermediate frame section 32 has assumed a vertical position, and forward frame section 34 has assumed a position substantially parallel to rear frame section 30. Leg member 106 and locking link 116 are inclined upwardly from forward section 34. In this position, the parts can be unfolded to the extended position by merely reversing the above operation, that is by grasping the free end of forward frame section 34 and moving it upwardly and clockwise about its pivot 38.

However, as pointed out previously, the frame sections can be locked against relative movement in the folded position. This is accomplished by grasping leg member 106 and moving it to the position shown in FIGS. 3 and 4 in which it overlies the end of forward frame section 34. This in turn moves pivot 118 of locking link 116 to a position below the plane of pin 88 and pivot 114 due to the configuration of curved portion 112 of leg member 106. This is the overcenter or "locking" position of locking link 116. In this position, any upward movement of the forward free end of frame section 34 will tend to cause clockwise rotation of locking link 116 about pivot 118 which in turn would tend to cause leg member 106 to move downwardly or pivot counterclockwise about its pivot 114. But since leg member 106 overlies frame section 34, there can be no further relative movement of the parts in this direction. Therefore, any force acting upwardly on forward frame section 34 merely tends to force leg member 106 more firmly into engagement with frame section 34.

Since the frame sections 30, 32 and 34 are firmly locked against relative movement by locking link 116 and leg member 106, the mattress which is compressed between the frame sections is firmly held in place at all times. Forces applied to the folded sections by persons sitting on the sofa serve only to more firmly lock the sections in position, thereby preventing any relative movement of the sections.

When it is desired to move the bed portion to the projected position of FIG. 2, the sofa cushions are removed; and the operator grasps the forward section 34 pulling upwardly and outwardly on the assembly, and the frame will move to the position shown in FIG. 2. The operator then grasps the leg member 106 and moves it upwardly about its pivot 114 to the "unlock" position and unfolds the sections as previously described.

Referring to FIG. 5, an auxiliary frame link 40 is pivotally mounted at 46 to support link 42. Frame link 40

is illustrated in an inclined position relative to support link 42 and the extended bed frame sections to provide a headrest for the extended bed. Freely pivoted by a pin 120 on link 42 is a latch member 122 having V-shaped notches formed in its ends. Pivotally connected to auxiliary frame link 40 at 127 is an auxiliary support link 124 formed with an elongated slot 126. Pin 120 extends through slot 126 to slidably and pivotally connect auxiliary support link 124 to support link 42.

Mounted on link 124 is a latching lug 128 which is L-shaped in cross-section for cooperation with the V-shaped notches of latching member 122. Projecting from the lower end of auxiliary support link 124 is a latch actuating lug 130. Mounted on support link 42 at the rear of latching member 122 is an L-shaped support member 132, the horizontally extending leg 131 of which receives auxiliary frame link 40 to support it in a horizontally aligned position.

When it is desired to move auxiliary frame link 40 from the inclined position illustrated in FIGURE 5 to a horizontally aligned position relative to support link 42, auxiliary frame link 40 is pivoted upwardly relative to support link 42. Upward pivotal movement of auxiliary frame link 40 from the inclined position of FIG. 5 causes latching lug 128 to move out of engagement with the notch of latching member 122 at the same time latch actuating lug 130 engages the lower side edge of latching member 122 causing it to pivot clockwise, as viewed in FIG. 5, until the straight sides of latching member 122 assume a position substantially perpendicular to link 124 with the notches out of alignment with latching lug 128. Thereafter, as auxiliary frame link 40 is pivoted downward toward support link 42, latching lug 128 strikes against the straight side of latching member 122 causing it to rotate clockwise permitting latching lug 128 to slide past the latching member. Auxiliary support link 124 slides along pin 120 until assuming a horizontal position relative to support link 42, whereupon frame 40 engages leg 131 of support member 130 and is supported thereby.

To move auxiliary frame link 40 to the inclined position, it is pivoted counterclockwise about pin 46 until latch actuating lug 130 strikes the lower notch of latching member 122 to align the upper notch with latching lug 128. Then, as the auxiliary frame link is pivoted downward slightly, latching lug 128 seats in the notch of member 122. Further clockwise pivotal movement is prevented since the force on latching lug 128 acts vertically along the longitudinal axis of latching member 122 preventing it from rotating further. Since auxiliary frame link 40 is not directly connected with main frame sections 30, 32 and 34, its operation does not influence or interfere with the operation of the main frame sections and the portion of the mattress and spring supported by link 40 can be selectively raised to the inclined position illustrated in FIG. 5. The latching member 122 can be provided on either side of the frame; i.e., only one latching member is necessary to support auixiliary frame link 40 in the inclined position.

While a specific embodiment of the invention has been described for purposes of illustration, it will be understood by those skilled in the art that various modifications in the structure and operation can be obtained without departing from the scope of the following claims.

What I claim is:

1. In a sofa bed having side frame members swingably supporting a bed frame having pivotally connected sections foldable between a collapsed position and an extended position and a leg member pivotally connected to the forwardmost section of said frame and movable between a floor engaging position for supporting said forwardmost section in the extended position and a folded position overlying said forwardmost section in the collapsed position, a leg operating and bed frame locking linkage system interconnecting said leg member and said frame sections for moving said leg member between its



folded and floor engaging position upon movement of said bed frame sections between the collapsed and extended positions including means controlled by movement of said leg member to its folded position for locking said bed sections in the collapsed position against relative pivotal movement, said bed frame sections including a rear, intermediate and forward section, and said linkage system including control lever means having one end slidably and pivotally connected to said forward section and the other end pivotally connected at the interconnection between said rear and intermediate sections, guide lever means having one end pivotally connected at the interconnection between said intermediate and forward sections and the other end pivotally and slidably connected to said rear section, connecting link means pivotally interconnecting said control lever means and said guide lever means intermediate their ends, and said locking means comprising a locking link having one end pivotally connected to said one end of said control lever means, and the other end pivotally connected to said leg member intermediate the ends thereof, said other end of said locking link means being movable by said leg member to an overcenter position below the plane of said forward section in the collapsed position to lock said sections in the collapsed position against relative movement.

2. In a sofa bed mechanism, a frame having rear, intermediate and forward sections successively pivotally connected, said sections being foldable between collapsed and extended positions, a linkage system interconnecting said sections for guiding and controlling movement of said sections between the collapsed and extended positions including control lever means having one end pivotally and slidably connected to said forward section and the other end pivotally connected at the interconnection between said rear and intermediate sections, guide lever means having one end pivotally connected at the interconnection between said intermediate and forward sections and the other end pivotally and slidably connected to said rear section, and a connecting link pivotally interconnecting said control lever and said guide lever intermediate their ends, said control lever being curved between said one end thereof and its pivotal connection with said connecting link in a direction to project below the plane of said rear, intermediate and forward sections in the extended position, said guide lever assuming a position substantially parallel with said rear, intermediate and forward sections in the extended position, and said connecting link projecting from said guide lever below the plane of the extended bed frame sections to its connection with the control lever.

3. In a sofa bed mechanism, a frame having rear, intermediate and forward sections successively pivotally connected, said sections being foldable between collapsed and extended positions, a linkage system interconnecting said sections for guiding and controlling movement of said sections between the collapsed and extended positions including control lever means having one end pivotally and slidably connected to said forward section and the other end pivotally connected at the interconnection between said rear and intermediate sections, guide lever means having one end pivotally connected at the interconnection between said intermediate and forward sections and the other end pivotally and slidably connected to said rear section, a connecting link pivotally interconnecting said control lever and said guide lever intermediate their ends, a leg member pivotally connected to said forward section and movable between a floor engaging position for supporting said forward section in the extended position and a folded position overlying said forward section in the collapsed position, and locking link means having one end pivotally connected to said other end of said control lever means and the other end pivotally connected to said leg member intermediate the ends thereof, said other end of said locking link means being movable to an overcenter position below the plane of said

forward section by movement of said leg member to its folded position to thereby lock said sections in the collapsed position against relative movement.

4. In a sofa bed mechanism, a frame having rear, intermediate and forward sections successively pivotally connected and being foldable between a collapsed position with said forward section disposed in vertically spaced substantially parallel relation with said rear section and an extended position with said sections disposed in horizontal alignment, a leg member pivotally connected to said forward section and movable between a floor engaging position for supporting said forward section in the extended position and a folded position overlying said forward section in the collapsed position, a leg operating and bed frame locking linkage system comprising links and levers interconnecting said leg member and said frame sections for moving said leg member between its folded and floor engaging positions upon movement of said frame sections between the collapsed and extended positions, and said bed frame locking linkage including a locking link having one end pivotally and slidably connected with the forward section and its other end pivotally connected with the leg member, said other end of the locking link being movable to an overcenter position below the plane of said forward section by movement of said leg member to its folded position for locking said frame sections in the collapsed position against relative movement.

5. In a sofa bed mechanism, a frame having rear, intermediate and forward sections successively pivotally connected and being foldable between a collapsed position with said forward section disposed in vertically spaced substantially parallel relation with said rear section and an extended position with said sections disposed in horizontal alignment, a leg member pivotally connected to said forward section and movable between a floor engaging position for supporting said forward section in the extended position and a folded position overlying the forward section in the collapsed position, a leg operating and bed frame locking linkage system comprising links and levers interconnecting said leg member and said frame sections for moving said leg member between its folded and floor engaging positions upon movement of said frame sections between the collapsed and extended positions, said linkage system including control lever means having one end slidably and pivotally connected to said forward section and the other end pivotally connected at the interconnection between said rear and intermediate sections, guide lever means having one end pivotally connected at the interconnection between said intermediate and forward sections and the other end pivotally and slidably connected to said rear section, connecting link means pivotally interconnecting said guide lever means and control lever means intermediate their ends, and locking link means having one end pivotally connected to said leg member intermediate the ends thereof and the other end pivotally connected to said one end of said control lever means, said one end of said locking link means being movable by said leg member to an overcenter position below the plane of said forward section when said leg member moves to its folded position to lock said rear, intermediate and forward sections in the collapsed position against relative movement.

6. In a sofa bed having side frame members, a bed frame having rear, intermediate and forward sections successively pivotally connected and foldable between a collapsed position with said forward section disposed in substantially parallel relation with said rear section and an extended position with said sections disposed in horizontal alignment, means swingably mounting said frame on the side frame members for movement in the collapsed position between a retracted sofa position and a projected bed position, a leg member pivotally connected to said forward section and movable between a floor engaging position for supporting said forward section in the extended position and a folded position overlying said forward section in the collapsed position, a leg operating and bed frame locking linkage system comprising links and levers interconnecting said leg member and said frame sections for moving said leg member between its folded and floor engaging positions upon movement of said sections between the collapsed and extended positions, said linkage system including control lever means having one end slidably and pivotally connected to said forward section and the other end pivotally connected at the interconnection between said rear and intermediate sections, guide lever means having one end pivotally connected at the interconnection between said intermediate and forward sections and the other end pivotally and slidably connected to said rear section, connecting link means pivotally interconnecting said guide lever means and control lever means intermediate their ends, and locking link means having one end pivotally connected to said leg member intermediate the ends thereof and the other end pivotally connected to said one end of said control lever means, said one end of said locking link means being movable by said leg member to an overcenter position below the plane of said forward section when said leg member moves to its folded position to lock said rear, intermediate and forward sections in the coollapsed position against relative movement.

7. In a sofa bed having side frame members, a bed frame having rear, intermediate and forward sections successively pivotally connected and foldable between a collapsed position with said forward section disposed in substantially parallel relation with said rear section and an extended position with said sections disposed in horizontal alignment, means swingably mounting said frame on the side frame members for movement in the collapsed position between a retracted sofa position and a projected bed position, a leg member pivotally connected to said forward section and movable between a floor engaging position for supporting said forward section in the extended position and a folded position overlying said forward section in the collapsed position and having an inwardly curved portion intermediate its ends, a leg operating and bed frame locking linkage system comprising links and levers interconnecting said leg member and said frame sections for moving said leg member between its folded and floor engaging positions upon movement of said sections between the collapsed and extended positions, said linkage system including control lever means having one end slidably and pivotally connected to said forward section and the other end pivotally connected at the interconnection between said rear and intermediate sections, guide lever means having one end pivotally connected at the interconnection between said intermediate and forward sections and the other end pivotally and slidably connected to said rear section, connectng link means pivotally interconnecting said guide lever means and control lever means intermediate their ends, and locking link means having one end pivotally connected to the inwardly curved portion of said leg member and the other end pivotally connected to said one end of said control lever means, said one end of said locking link means being movable by said inwardly curved portion to an overcenter position below the plane of said forward section when said leg member moves to its folded position to lock said rear, intermediate and forward sections in the collapsed position against relative movement.

8. In a sofa bed having side frame members swingably supporting a bed frame having pivotally connected sections foldable between a collapsed position and an extended position, support link means pivotally and swingably connecting the bed frame to the side frame members, an auxiliary frame link pivotally connected to said support link and movable between horizontally aligned and inclined positions relative to the support link and bed

frame in the extended position, auxiliary support link means pivotally connected to the auxiliary frame link and pivotally and slidably connected to the support link, a latching member pivotally mounted on said support link means, a locking member and a latch actuating member on said auxiliary support link means, said locking member being engageable with the latching member when said auxiliary frame section is in the inclined position to restrain the auxiliary frame link against pivotal movement toward the support link means, and said latch actuating member being operable upon upward pivotal movement of said auxiliary frame from the inclined position to disengage said latching member and locking member to permit movement of the auxiliary frame to the horizontally aligned position.

9. The construction defined in claim 6 in which said swingably mounting means include support link means pivotally connected to said rear section, and including an auxiliary frame link pivotally connected to the support link means for movement between inclined and horizontally aligned positions relative to the support link and bed frame in the extended position, and means for selectively locking and unlocking said headrest frame section in said inclined position.

10. In a sofa bed including a sofa portion and a collapsible bed frame:

means supporting said bed frame for movement between a retracted position in which it is received within the sofa portion and a projected position in which it projects from the sofa portion to permit the bed frame to be unfolded to define a bed, said support means including;

a control lever having one end pivotally mounted on the sofa portion,

a support link having one end pivotally connected with the control lever at a point spaced from said one end of the control lever and its other end pivotally connected with the bed frame,

a lever pivotally mounted on said support link intermediate the ends of said link,

means for pivotally interconnecting one end of said lever and said control lever at a point spaced from said one end of said control lever and said one end of said support link,

a link having one point pivotally connected to the other end of said lever,

means for pivotally interconnecting a second point on said link and said bed frame at a point spaced from said other end of the support link,

and means for pivotally interconecting a third point on said link and said sofa portion forward of the connection to said control lever.

11. In a sofa bed including a sofa portion having side frame members and a bed portion including a bed frame foldable between collapsed and extended positions:

means supporting said frame for movement between a retracted position in which the frame is received within the sofa portion and a projected position in which the bed frame is projected forward of the sofa portion to permit the bed frame to be unfolded to its extended position to define a bed, said support means including;

a control lever having one end pivotally mounted on the side frame member of the sofa portion,

a support link having one end pivotally connected with the control lever at a point spaced from said one end of the control lever, the other end of the support link being pivotally connected with the bed frame,

a bell crank lever fulcrumed on said support link intermediate the ends thereof,

means for pivotally interconnecting one end of said bell crank lever and said control lever at a point spaced from said one end of the control lever



and spaced from said one end of the support link,

a link having one point pivotally connected to the other end of said lever,

means for pivotally interconnecting a second point on said link and said bed frame at a point spaced from said other end of the support link,

and means for pivotally interconnecting a third point on said link and said sofa portion forward of the connection to said control lever.

12. A sofa bed comprising;

a sofa portion,

a bed frame,

means supporting the bed frame for movement between a retracted position in which the bed frame is received within the sofa portion and a projected position in which the bed frame extends from the sofa portion to define a bed, said support means including;

a control lever having one end pivotally connected with the sofa portion,

a support link having one end pivotally connected with the control lever at a point spaced from said one end of the control lever and its other end pivotally connected with the bed frame,

a lever pivotally mounted on said support link intermediate the ends of said link,

means for pivotally interconnecting one end of said lever and said control lever at a point spaced from said one end of said control lever and at a point spaced from said one end of said support link,

a link having one point pivotally connected to the other end of said lever,

means for pivotally interconnecting a second point on said link and said bed frame at a point spaced from said other end of the support link,

and means for pivotally interconnecting a third point on said link and said sofa portion forward of the connection to said control lever,

an auxiliary frame link,

means connecting the auxiliary frame link to said support link for pivotal movement between horizontally aligned and inclined positions relative to the bed frame,

an auxiliary support link slidably and pivotally connected between said auxiliary frame link and said support link to form a lost motion connection,

a latching member pivotally mounted on one of said links,

a locking member and a latch actuating member on said auxiliary support link,

said locking member being engageable with the latching member when said auxiliary frame link is in the inclined position to restrain the auxiliary frame link against pivotal movement toward the support link,

and said latch actuating member being operable upon upward pivotal movement of said auxiliary frame link from the inclined position to disengage said latching member and locking member to permit movement of the auxiliary frame link to the horizontally aligned position.

13. In a sofa bed having a side frame member,

a bed frame having rear, intermediate and forward sections successively pivotally connected and foldable between a collapsed position with said forward section disposed in substantially parallel superposed relation with said rear section, and an extended position with said sections disposed in horizontal alignment,

a control lever having one end pivotally mounted on the side frame member,

a support link having one end pivotally connected with the control lever at a point spaced from said one end

of the control lever and its other end pivotally connected with the rear frame section,

a lever pivotally mounted on said support link intermediate the ends of said link,

means for pivotally interconnecting one end of said lever and said control lever at a point spaced from said one end of said control lever and spaced from said one end of said support link,

a rear leg member pivotally connected with said rear frame section,

a link having one point pivotally connected to the other end of said lever,

means for pivotally interconnecting a second point on said link with said rear frame section and with said rear leg member for actuating said rear leg member from an inoperative position in horizontal alignment with said rear frame section to an operative, or engaging position as said bed frame moves from its retracted to projected positions,

a forward support lever having one end pivotally connected with a third point on said link and its other end pivotally connected with said side frame member, said forward support lever and control lever swingably supporting the bed frame for movement between a retracted position in which it is received within the sofa portion and an extended position projecting forward of the sofa portion,

an auxiliary frame link,

means pivotally connecting the auxiliary frame link with the support link for movement between horizontally aligned and inclined positions relative to the extended bed frame and support link,

an auxiliary support link pivotally and slidably connected between said auxiliary frame link and said support link for movement between an inclined position relative to the extended bed frame when the auxiliary frame link is in its inclined position, and a position parallel with said auxiliary frame link when the auxiliary frame link is in its horizontally aligned position,

a locking member and a latch actuating member on said auxiliary support link,

a latching member pivotally mounted on one of said links other than said auxiliary support link, said locking member being engageable with the latching member when said auxiliary frame link is in the inclined position to restrain the auxiliary frame link against pivotal movement toward the support link, and said latch actuating member being operable upon upward pivotal movement of said auxiliary frame link from the inclined position to disengage said latching member and locking member to permit movement of the auxiliary frame link to the horizontally aligned position.



14. In a sofa bed including a sofa portion with frame members swingably supporting a bed frame having a plurality of pivotally connected sections foldable relative to each other between an extended position in which said sections are in horizontal alignment and a folded position in which said sections are folded out of horizontal alignment,

a support link pivotally connected to an adjoining section of said bed frame,

means for pivotally and swingably connecting said bed frame and support link to said sofa frame members for movement between a projected position in which said bed frame in said folded position projects from said sofa portion to have said support link horizontally aligned with said adjoining bed section and a retracted position in which said bed frame is entirely received within said sofa portion to have said support link and said adjoining bed section angularly disposed at substantially less than 180°,

an auxiliary frame link,

an auxiliary support link,

means for pivotally connecting said auxiliary frame link, said support link and said auxiliary support link in a lost motion connection for movement between a lowered position in which said links are nested to be generally coincident and parallel, and a raised position in which said auxiliary frame link forms a substantial angle with said support link with said auxiliary support link subtending said angle,

a locking member on one of said links,

and a latching member on another one of said links engageable with said locking member upon sliding movement of said lost motion connection to secure said auxiliary frame link at said raised position and release it therefrom.


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