Feb. 5, 1952 J. MARTIN 2,584,146

COUCH BED LINKAGE FOR FOLDING, UNFOLDING, AND POSITIONING A FULL LENGTH MATTRESS IN COUCH OR BED FORMATION

Filed April 21, 1950 3 Sheets-Sheet 1

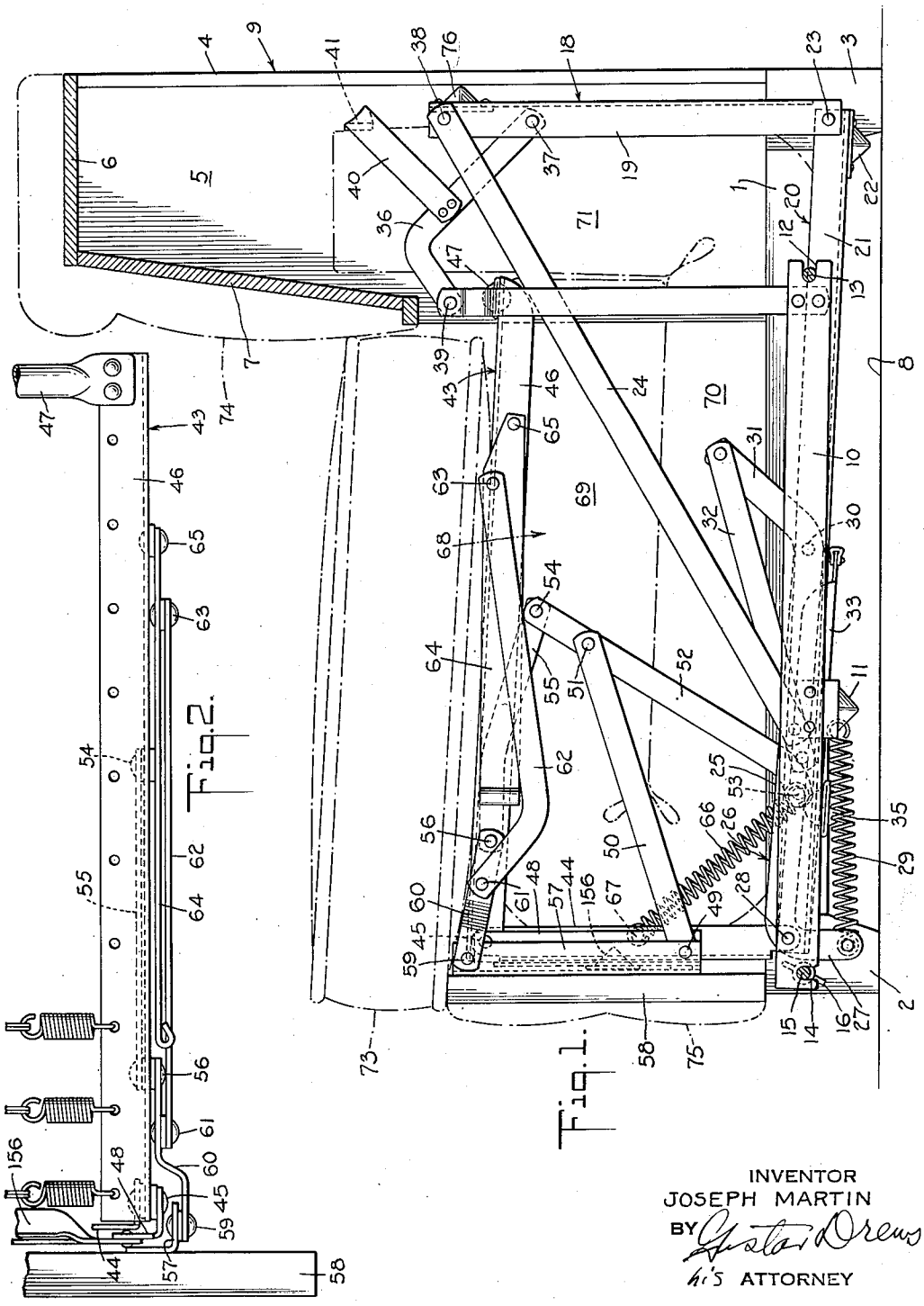


Fig. 1.

Fig. 2.

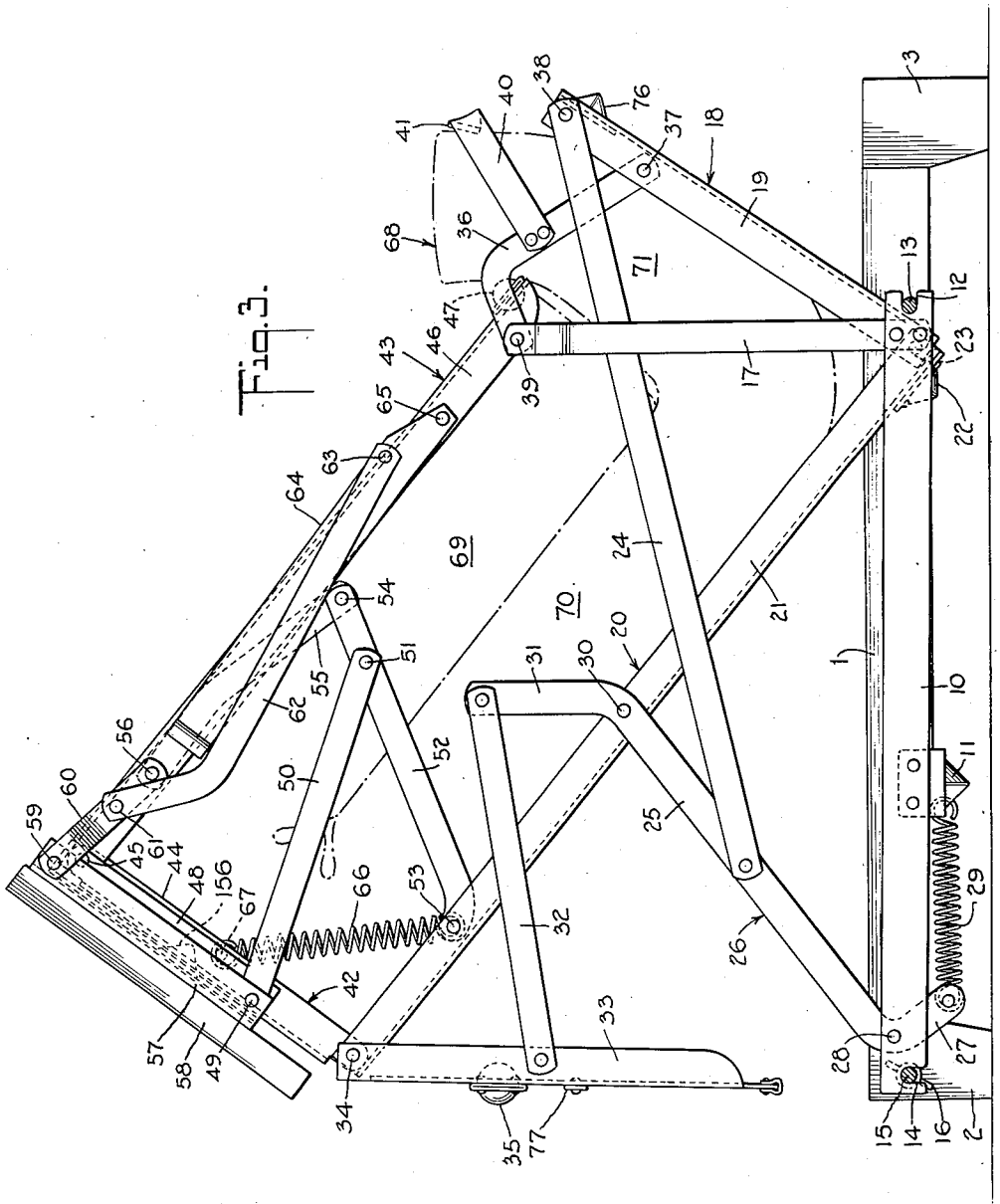
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Filed April 21, 1950 3 Sheets-Sheet 2

Fig. 3.



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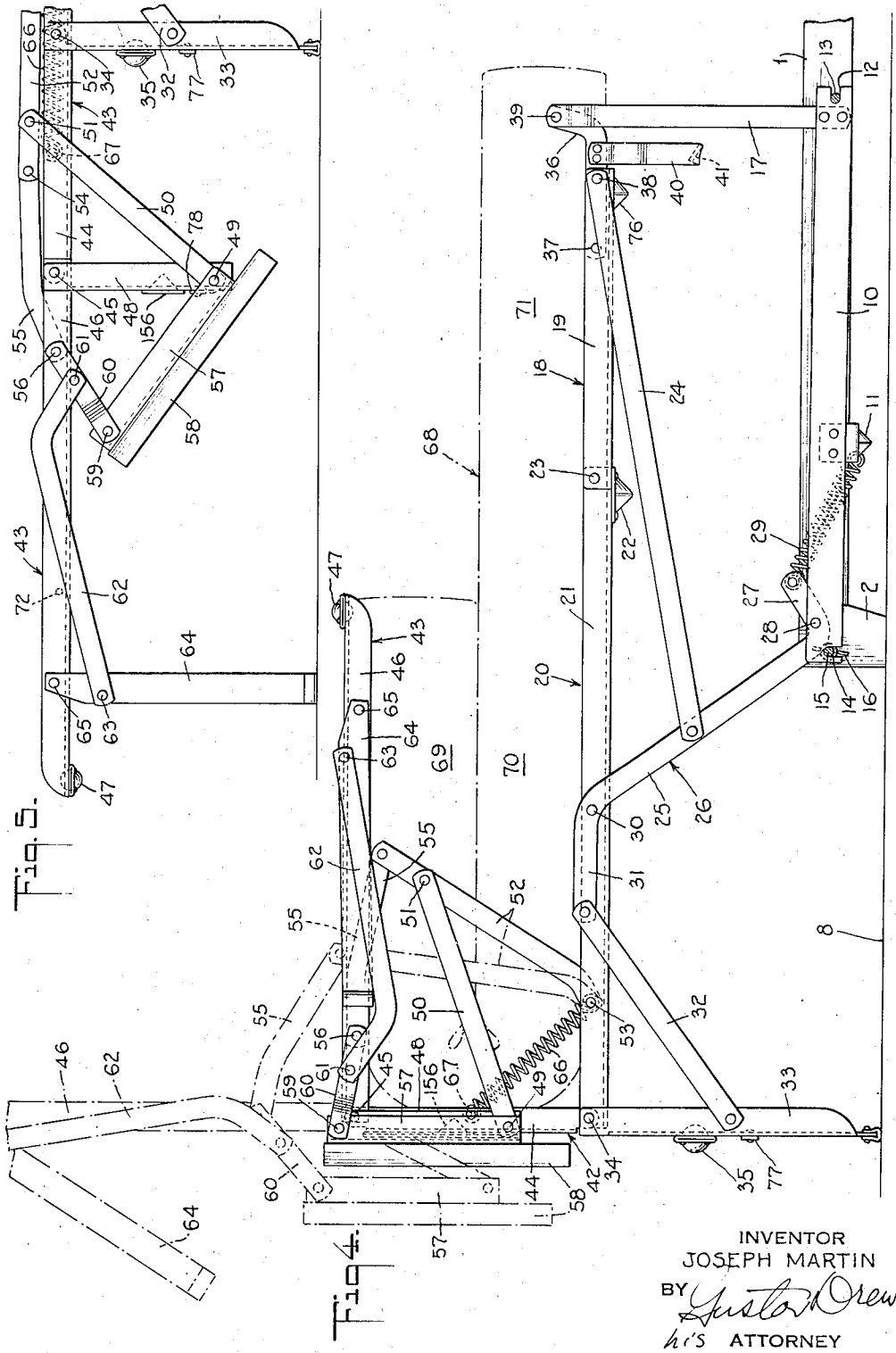


Fig. 5.

Fig. 4.

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COUCH BED LINKAGE FOR FOLDING, UNFOLDING, AND POSITIONING A FULL LENGTH MATTRESS IN COUCH OR BED FORMATION

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4 Claims. (Cl. 5—29)

1

This invention relates to couch beds in general and more especially to couch bed linkage for folding, unfolding and positioning a full length mattress in couch or bed formation.

Among the objects of the present invention, it is aimed to provide an improved couch bed linkage whereby a full length uninterrupted mattress may be unfolded into bed formation where its entire length may be fully and effectively used, the upper level of which may be positioned at the preferred nineteen inch level from the supporting surface, which is easy to handle and which in turn may be folded into couch formation where the upper level of the seat cushion may be positioned at the preferred nineteen inch level from the supporting surface.

More specifically, in order to convert a couch bed with a full length uninterrupted mattress secured thereto in unfolded bed formation with an upper level of the mattress approximating the conventional preferred nineteen inch level from the supporting surface, into couch formation with the upper level of the cushion seat also approximating the conventional preferred nineteen inch level from the supporting surface, it is aimed to provide a linkage which will fold the mattress in three parts, so that only two parts overlap one another at the seat but descend sufficiently to receive a seat cushion with the third part of the mattress moved upward into an erect or substantially vertical position within the back frame of the couch bed.

These and other features, capabilities and advantages of the invention will appear from the subjoined detailed description of one specific embodiment thereof illustrated in the accompanying drawings, in which

Fig. 1 is a side elevation partly in section of the couch bed in couch formation.

Fig. 2 is a plan view partly broken away looking down at the outermost bed section inverted in couch formation.

Fig. 3 is a side elevation partly broken away showing the bed sections tilted in a position intermediate couch formation and bed formation either when moving from bed to couch formation or from couch to bed formation.

Fig. 4 is a similar side elevation partly broken away showing the inner bed section fully extended and the outer bed section still folded over onto the inner bed section indicating a third position when moving from the position shown in Fig. 1 into bed formation.

Fig. 5 is a similar side elevation partly broken away showing the outer bed section in extended

2

or bed formation relative to the inner bed section.

In the embodiment shown, there is provided a fixed frame, composed of wood as an instance, consisting of two side base boards 1 mounted on suitably tailored legs or feet 2, 3. Extending upwardly from the two rear feet 3, there is a back board or wall member 4 and upwardly extending side walls 5, see Fig. 1. In the present instance, the back board 4 extends up approximately thirty-three inches, has a forward extension 6 at the upper end thereof from which there extends downwardly in a forwardly inclining direction the front wall member 7 to a level about seventeen inches from the supporting surface 8. The lower edge of the front wall 7 is spaced from the supporting surface 8 to afford access to the chamber formed by the walls 4, 5, 6 and 7 for a portion of the mattress and the rear end of the inner bed section hereinafter to be described.

The frames of the bed sections and associated linkage are preferably composed of angle iron, flat stock metal and the like, which after assembly are connected to the fixed frame 9 aforesaid. As an instance, two flat bars 10 are connected to one another at their lower edges intermediate their ends by the cross bar 11. The bars 10 are bifurcated at their rear ends to form the recesses 12 to receive the pins 13 extending inwardly from the base boards 1. The bars 10 are also provided with notches or recesses 14 opening downwardly adjacent their front ends to receive the pins 15 also extending inwardly from the base boards 1 adjacent their front ends. The bed sections are connected to the side bars 1 by means of these flat bars 10. The notches 12 and 14 afford an easy method of connecting the bars 10 to the side bars 1. The connecting procedure contemplates first positioning the recesses 12 into position with the pins 13, and then with the pins 13 as a fulcrum to swing the bars 10 downwardly so that the recesses 14 will receive the pins 15, thereupon to anchor the flat bars 10 to the side bars 1. Wing nuts 16 screw threadedly connected to the outer ends of the pins 15 are then turned to clamp the flat bars 10 to the side bars 1.

Adjacent the rear ends of the flat bars 10 and extending upwardly therefrom there are secured the flat bars 17.

The flat bars 10 and 17 in couch bed use are fixed to the frame 9, and the linkage bed sections and mattress now to be described are all movable relative to these bars 10 and 17.

The inner bed section comprises an innermost narrow flat spring section 18 having angle iron side bars 19 connected to one another by the

conventional flat spring structure and an intermediate wide bed section 20 having angle iron side bars 21 also connected to one another by the conventional flat spring structure. The innermost ends of the angle iron side bars 20 are connected by the cross bar 22 and are pivotally connected to the front ends of the angle iron side bars 19 by the pivot pins 23. The rear ends of the angle iron side bars 19 are in turn pivotally connected to the rear ends of the side links 24, the front ends of which side links 24 are pivotally connected to the intermediate webs 25 of the Z-shaped levers 26. At the bend in each lever 26 between its lowermost arm 27 and the intermediate web 25, it is pivotally connected at 28 to a flat bar 10 just rearwardly of its recess 14. The free end of each short arm 27 is in turn connected by a spring 29 to the cross bar 11.

Each lever 26 in turn is pivotally connected at the bend at 30 between its front short arm 31 and its intermediate web 25 to a side angle bar 21. In turn the free end of each short arm 31 is connected by a link 32 to a leg 33 pivotally connected at one end to the front end of an angle iron side bar 21 at 34. The two legs 33 are in turn connected to one another by the cross bar 35 disposed between the free ends of the legs 33 and their pivotal actions 34.

In turn, each angle iron side bar 19 is pivotally connected to a bent link 36 at a point 37 forward of the pivotal point 38 between a link 24 and its associated angle iron side bar 19. The other end of each bent lever is pivotally connected at 39 to the upper free end of a vertical flat bar 17. Intermediate the pivotal points 37 and 39 of each bent link 36 and connecting the two bent links 36 to one another, there are secured the free ends of the U-shaped bar 40. The intermediate web 41 of the U-shaped bar is positioned at the lower end of the U-shaped bar 40 in bed formation, that shown in Fig. 4, which intermediate web 41, however, is positioned at the upper end of the U-shaped bar 40 in couch formation, that shown in Fig. 1. The linkage so far described for operating the inner sections 18 and 20 of the bed frame are self-sufficient, that is, only effect the operation of the bed sections 18 and 20 from couch formation to bed formation, and in turn from bed formation into couch formation.

The outer bed section which also includes two bed section units, to wit, the short bed section 42 and the longer bed section 43, are connected to one another and to the bed section 20 by the linkage now to be described.

The short outer bed section 42 has two angle iron side bars 44 connected to one another by a conventional flat spring unit. The inner free ends of the angle iron bars 44 are pivotally connected at 34 to the outer free ends of the side angle bars 21 of the bed section unit 20. The outer free ends of the angle iron side bars 44 are pivotally connected at 45 to the inner free ends of the angle iron side bars 46 of the outermost bed section 43. These angle iron side bars 46 are also connected to one another by a conventional flat spring unit, and in addition the outermost free ends of the angle iron side bars 46 are connected to one another by the cross bar 47. As shown in Fig. 5, pivotally connected at 45 and extending downwardly therefrom, are provided the links 48. The lower ends of the links 48 are in turn pivotally connected at 49 to the links 50, which links 50 in turn are pivotally connected at 51 to the bent links 52. The inner free

ends of the links 52 are pivotally connected at 53 to the angle iron side bars 21 of the bed section unit 20.

The outer free ends of the bent links 52 in turn are pivotally connected at 54 to the bent links 55, which in turn are pivotally connected at 56 to the angle iron side bars 46 of the outermost bed section unit 43.

The links 48 are connected to one another by the cross bar 156 at a point removed from the pivotal points 45 and adjacent the pivotal points 49. The lower ends of the links 48 are also pivotally connected at 49 to the links 57 for the foot board 58 which extends from one link 57 to the other. The upper free ends of the links 57 at 59 are pivotally connected to the short links 60, the other ends of which are pivotally connected at 56 to the angle iron side bars 46. Intermediate the pivotal points 56 and 59 of the links 60 at 61, the short arms of the bent links 62 are pivotally connected. The other free ends of the links 62 at 63 are connected to the legs 64 which are pivotally connected to the side bars 46 at 65. In the conventional way to serve as an aid in folding the bed section units 43 and 42 from bed formation into couch formation, there are provided the springs 66, in the present instance connected to the angle iron side bars 21 at 53 and to the angle iron side bars 44 at 67.

With the exception of the cross bars 11, 22, 35, 47 and 56, the U-shaped link 40 and the foot board 58, all of the other links and elements described are in pairs identical to one another on each side of the couch bed. In order to protect the body of the user when reclining on the device in bed formation from rigid cross bars, and yet anchor the two sides of the bed couch rigidly to one another, the cross bar 35 in bed formation is positioned at a safe distance below the flat spring unit of the bed section 20 which is also the case with the cross bar 56 and the foot board 58.

With the bed sections and linkage so far described, it is possible to use a one piece uninterrupted full length mattress 68. In bed formation this mattress 68 extends from the outermost free end of the bed section 43 to and beyond the innermost free end of the bed section unit 18. In couch formation, however, the mattress 68 is bent at three points into three sections 69, 70 and 71, the portion 69 being folded up over the portion 70, see Fig. 1, and the portion 71 being bent up substantially at right angles to the portions 69 and 70 to extend into the chamber formed by the back 9. In order to facilitate folding the mattress, the portion 69 of the mattress is hingedly connected at about the middle of the outermost bed section unit 43. In order to prevent the formation of a rigid cross bar at this point, a short rigid bar 72, spaced from the sides of the bed section, is secured to the flat spring unit and the lower face of the mattress. With a double width bed about forty-nine inches in width by seventy-five inches in length, the bar may be about twenty-five inches in length spaced about twelve inches at its ends from each side of the bed section unit 43 and spaced about eleven inches from the outermost free end of the bed section unit 43.

The dimensions heretofore specified are all given in explanation of a double width bed. With a single width bed or twin bed, the dimensions will of course be different. With a double width bed, the foot board 58 will be about eleven inches from top to bottom, extend about one-quarter

of an inch above the upper end of the link 57 and about two and three-quarters inches below the lower end of the link 57.

When so proportioned, the foot boards 58, see Fig. 1, will form the support for the front end of the cushions 73 in couch formation.

The back frame 9, of course, is upholstered as shown at 74, and the foot board 58 will of course also be upholstered as shown at 75 in accordance with convention.

The manipulation of the mattress 68 from bed formation into couch formation, and in turn from couch formation into bed formation constitutes one of the main features of the present invention. Due to the connection 72, when the combination is converted from bed formation into couch formation, the outer bed section, including the bed section units 42 and 43, are initially folded from the position shown in Fig. 5 to the position shown in Fig. 4 where the portion 69 is folded over onto the portion 70. Thereupon the sections 43 and 42 are swung up into the position shown in Fig. 3 when the bail or U-shaped link 40 will swing upwardly from the position shown in Fig. 5 into the position shown in Fig. 3, where the cross bar 41 will engage the lower face of the innermost portion 71 of the mattress and guide it up into the chamber formed in the back 9 as the sections 42 and 43 are swung down from the position shown in Fig. 3 into the position shown in Fig. 1.

After the bed sections are so moved into couch formation, then the foot board 58 will assume the position shown in Fig. 1 and the cushion 73 will be placed upon the lower face of the outermost bed section unit 43 and the upper edge of the foot board 58.

Preferably as shown, in the interest of rigidity, a cross bar 76 connects the innermost ends of the angle iron side bars 19.

Also the legs 33 pivotally connected at the intersection between the bed sections 42 and 20 have in addition to the cross bar 35 also the flat cross bar 77 connecting the two legs to one another. In addition, the links 48 which are connected to one another by the cross bar 156 are also connected to one another by the flat cross bar 78.

With the mechanism aforesaid, due in part to the fact that the mattress 68 has only a double thickness, to wit, the portions 69 and 70 disposed below the outermost bed section 43 in couch formation, the upper level of the section 43 in couch formation will be low enough so that with the cushion 73 positioned on the same, the level from the upper face of the cushion 73 to the supporting surface 8 will not exceed nineteen inches with a double bed construction of the type here described, which distance, nineteen inches, will substantially equal the distance from the upper face of the mattress 68 to the supporting surface 8 in bed formation. The height, nineteen inches, corresponds to the conventional preferred height of the upper face of a mattress to the supporting surface for an adult's double bed and in turn to the conventional preferred distance between the upper faces of the cushion seats to the supporting surface. The dimensions here specified for a double bed of approximately seventy-five inches by forty-nine inches are of course merely indicative of the excellent results obtainable with a bed of these dimensions. The dimensions may of course be varied without departing from the general spirit of the invention, as an instance with a single bed, twin bed, or a child's bed.

It is obvious that various changes and modifications may be made to the details of construction without departing from the general spirit of the invention as set forth in the appended claims.

From the foregoing it will appear that the bed sections, in couch formation, will form a rectangular enclosure with the innermost bed section 18 and the third innermost bed section 42 extending vertically, and the second innermost bed section 20 extending horizontally at the bottom, with the outermost bed section 43 inverted and extending horizontally at the top. In this couch formation, the mattress 68 will be folded into three portions with the portion 69 folded over upon the portion 70 between the bed sections 43 and 20, and the mattress portion 71 extending substantially at right angles between the innermost bed section 18 and the outermost end of the mattress portion 69. It will also appear that the links 36 constitute the first set of links connecting the innermost bed section 18 to the upper free ends of the fixed upright bars 17, the links 24, 32 and levers 26 constitute the second set of links which connect the intermediate pair of legs 33 to the horizontally fixed bars 10 and to the innermost end of said innermost bed section 18, and the links 50, 52, 55, 57, 60 and 62 constitute the third set of links which connect the second innermost bed section 20 to said third innermost bed section 42 to said outermost bed section 43, and to the outermost pair of legs 64 enabling said innermost bed section 18 and said third innermost bed section 42 to assume an erect position with said outermost bed section 43 parallel to and above said second innermost bed section 20 in couch formation.

I claim:

1. The linkage for the four bed sections of a couch bed pivotally connected to one another at their adjacent ends to enclose two portions of an uninterrupted full length mattress overlapping one another and a third portion of the mattress extending upwardly at substantial right angles to the first two portions and into a back housing, said linkage being characterized by fixed horizontally extending lower bars and a vertically extending fixed bar extending upwardly from each of said horizontally extending fixed bars, a first set of links pivotally connecting the innermost bed section to the upper ends of said upwardly extending bars, a first pair of legs pivotally connected to the intersection between the second innermost and the third innermost bed sections, a second set of links pivotally connecting said first pair of legs to said fixed horizontally extending bars and to the innermost end of said innermost bed section, a second pair of legs pivotally connected adjacent to the outermost ends of the outermost bed section, a third set of links pivotally connecting the second innermost bed section to said third innermost bed section, to said outermost bed section and to said second pair of legs enabling said innermost bed section and said third innermost bed section to assume an erect position with said outermost bed section parallel to and above said second innermost bed section in couch formation.

2. The linkage set forth in claim 1 characterized by a hinge connection between the upper

face of said outermost bed section and the mattress.

3. The linkage set forth in claim 1 characterized by a hinge connection between the upper face of said outermost bed section and the mattress, and a U-shaped link pivotally connected at its free ends to said first set of linkage adjacent the upper ends of said first vertically extending fixed bars.

4. The combination of a full length uninterrupted mattress foldable into substantially equal three portions laterally, and four bed sections of a couch bed pivotally connected to one another at their adjacent ends in alinement with one another and supporting the mattress stretched out in bed formation and foldable relative to one another with the mattress in couch formation, said combination being characterized by a hinge connection between the outermost of the three mattress portions and the outermost of the four bed sections, a first means for anchoring the third innermost bed section at right angles to the outermost, and to the second intermost bed sections of said four bed

sections in couch formation, and a second means for anchoring the innermost bed section at right angles to said second innermost bed section and spaced from the outermost edge of said outermost bed section in couch formation with the mattress in couch formation having its outermost portion and its intermediate portion folded upon one another between said outermost and said second innermost bed sections, and the innermost portion of said mattress extending upwardly in engagement with, and parallel to, said innermost bed section and adjacent to the outermost edge of said outermost bed section in couch formation.

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