Feb. 5, 1952 J. MARTIN 2,584,145

FOLDABLE SOFA BED

Filed June 7, 1949 5 Sheets-Sheet 1

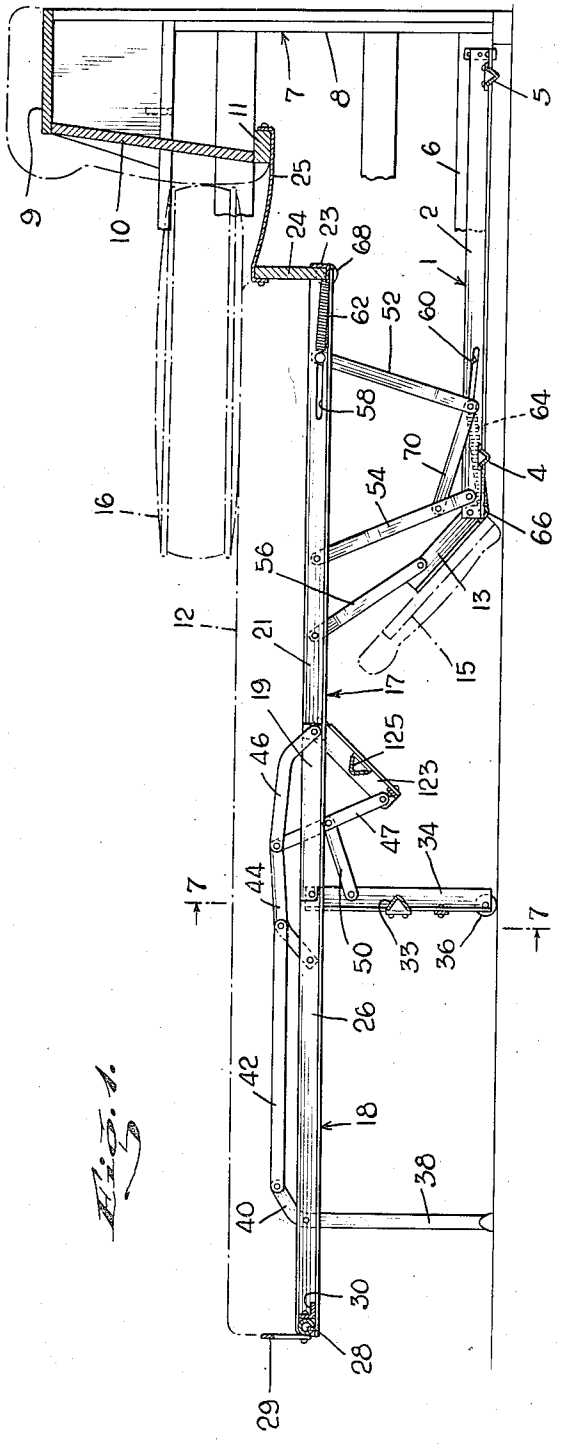


Fig. 1.

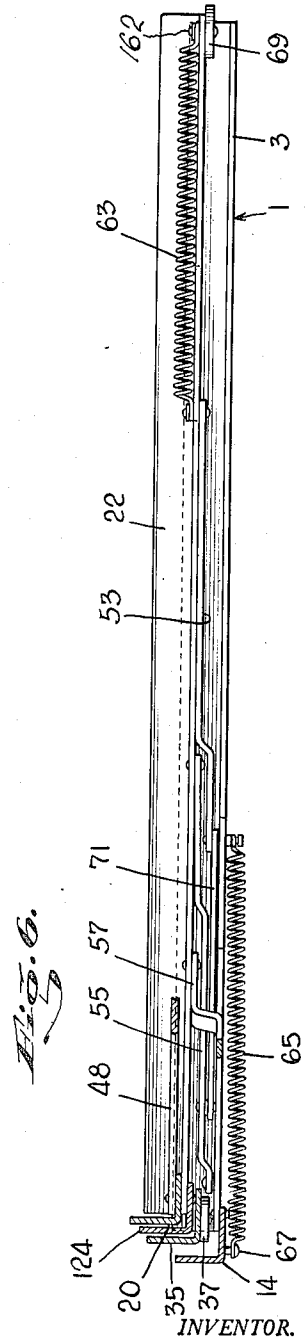


Fig. 6.

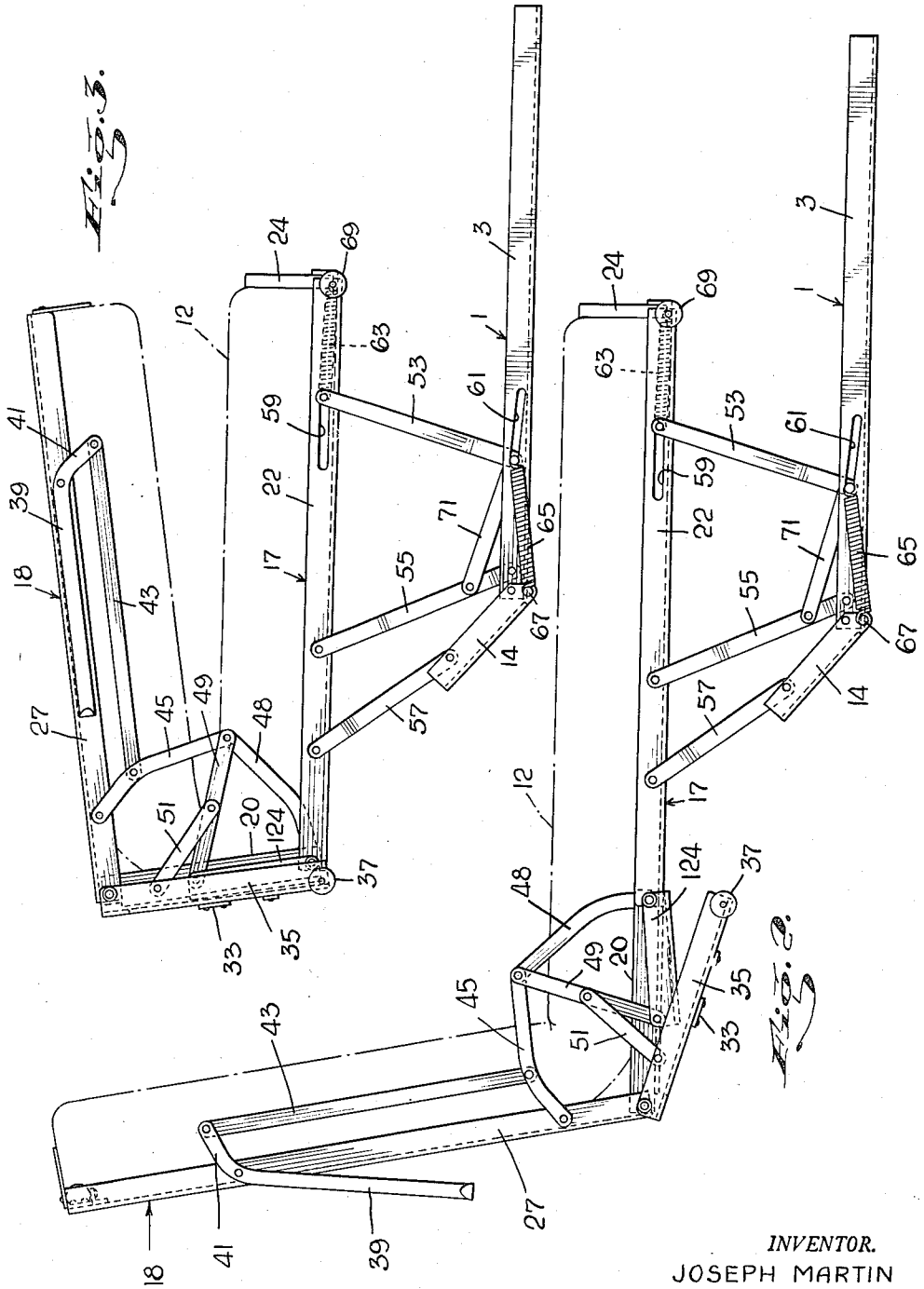
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Fig. 4.

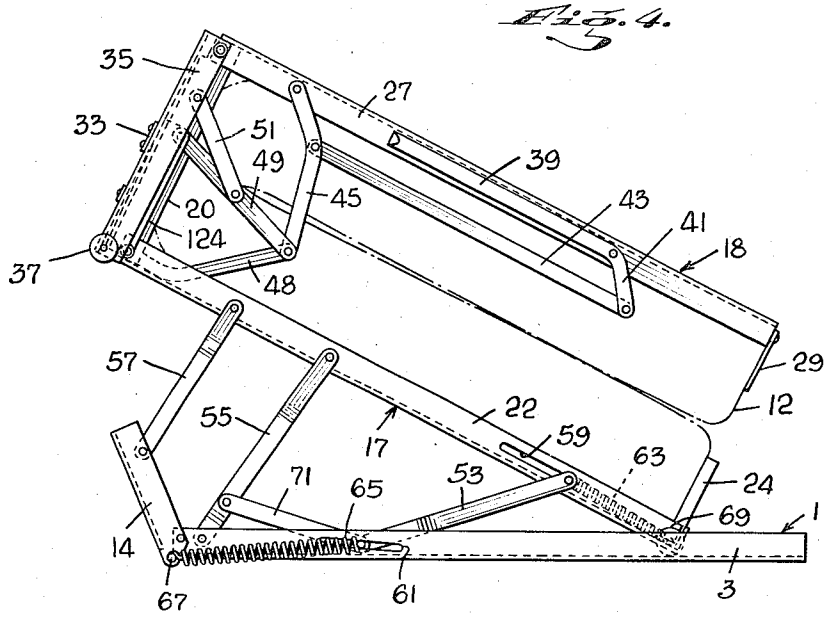
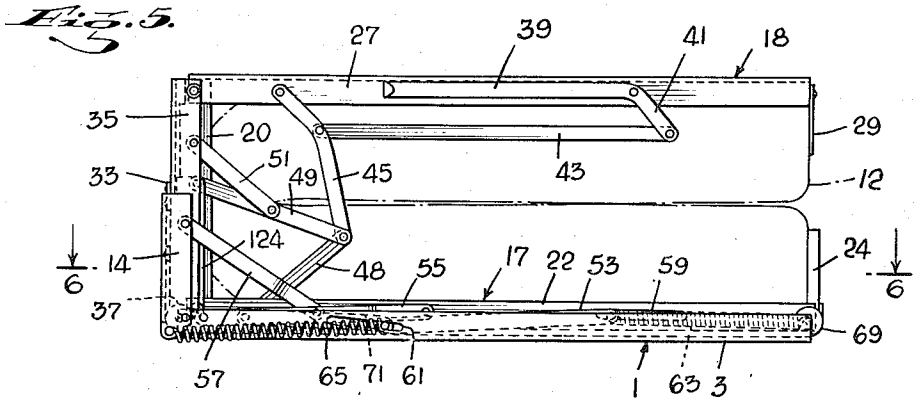


Fig. 5.



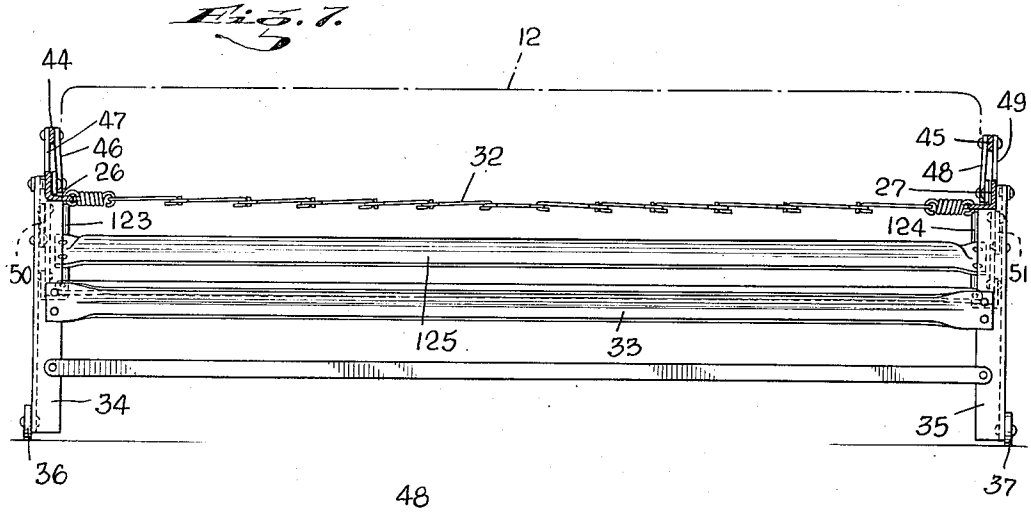
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FOLDABLE SOFA BED

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Fig. 7.



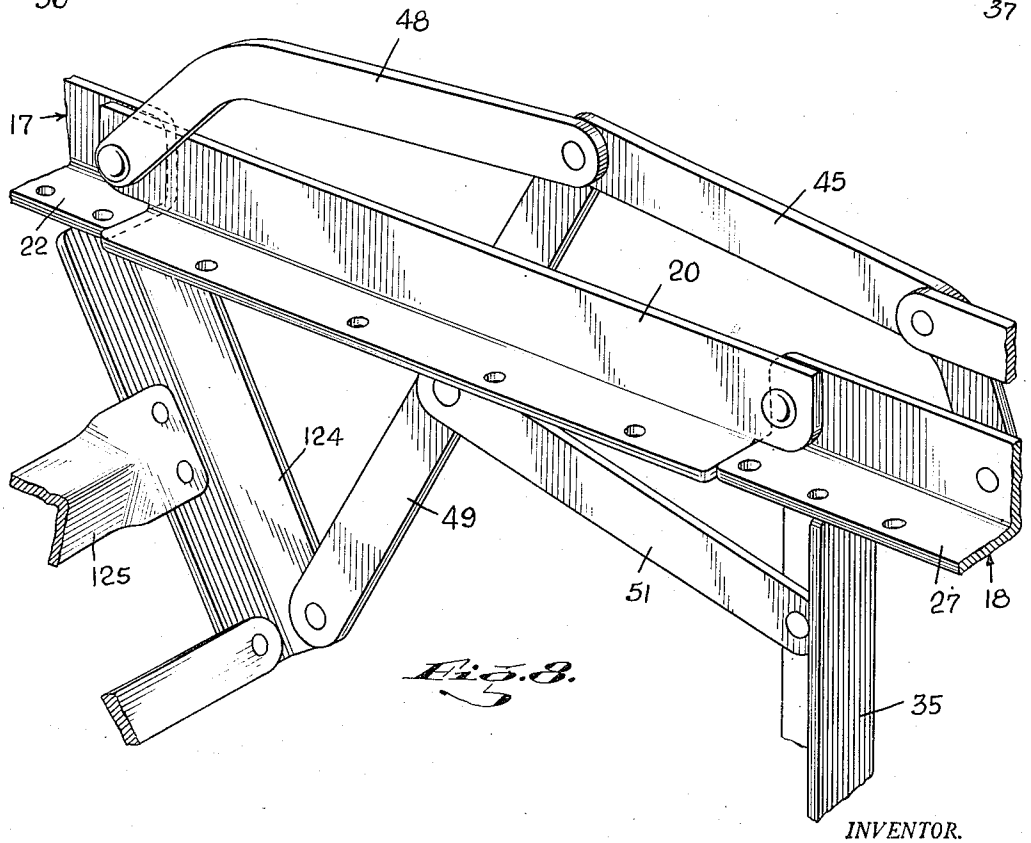


Fig. 8.

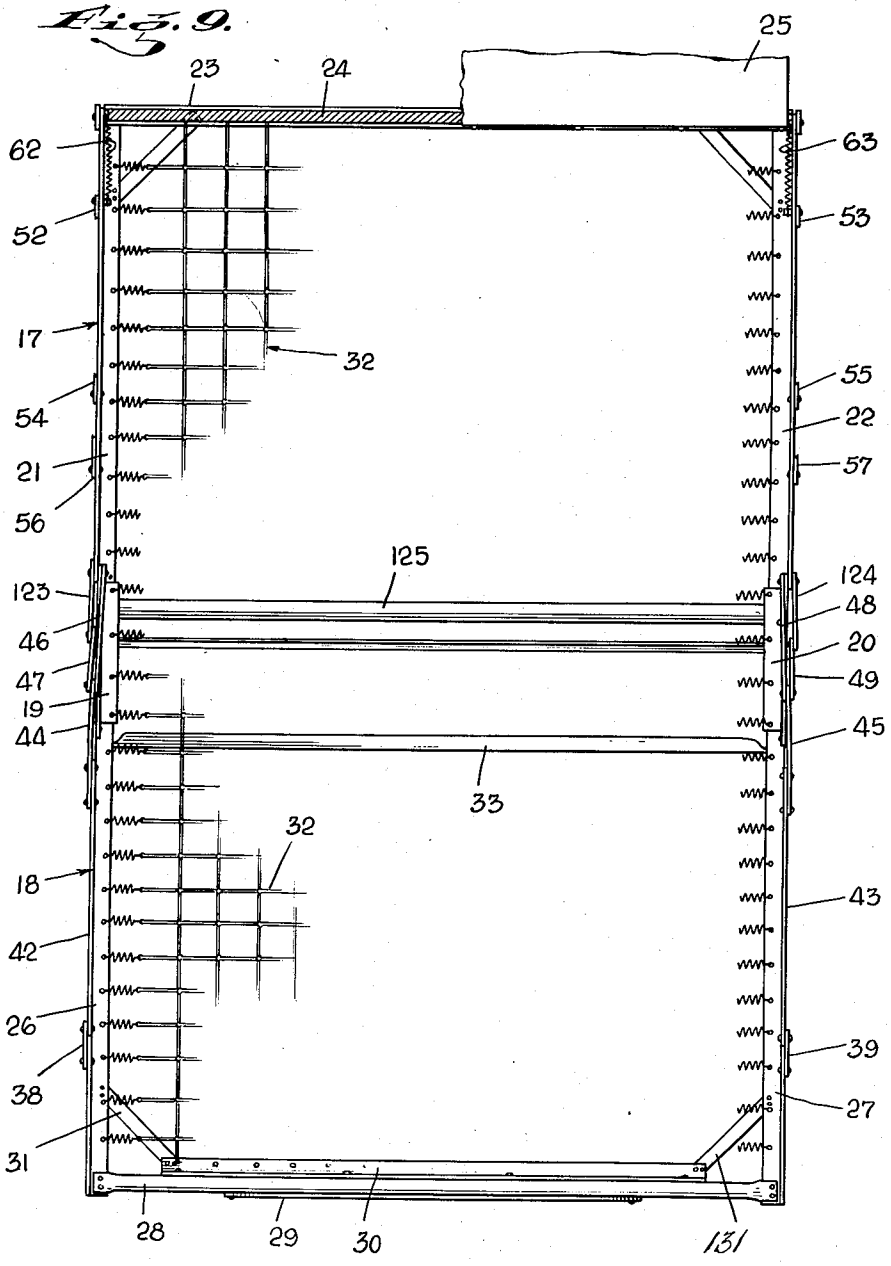
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Fig. 9.



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2,584,145

FOLDABLE SOFA BED

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Application June 7, 1949, Serial No. 97,558

7 Claims. (Cl. 5—31)

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This invention relates to collapsible beds in general and more especially to collapsible beds having two bed sections and a main frame interconnected with one another which may be converted from bed formation either into or out of couch formation or chair formation depending upon the width of the bed sections.

Among the objects of the present invention it is aimed to provide an improved collapsible bed having two bed sections and a main frame interconnected to one another to enable the bed sections to be nested one above the other in the main frame in couch or chair formation and in turn to enable the bed sections to be extended into alinement with one another in bed formation at a level above the floor level while the main frame remains stationary.

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

Fig. 1 is a transverse section of the two bed sections and main frame in bed formation with the upholstery and mattress sections shown in dash and dot lines.

Figs. 2, 3, 4 and 5, are end elevations of the two bed sections and part of the main frame showing four successive positions of the same when being moved out of the bed formation shown in Fig. 1 into the couch formation shown in Fig. 5.

Fig. 6 is a section on the line 6—6 of Fig. 5.

Fig. 7 is a section on the line 7—7 of Fig. 1.

Fig. 8 is a fragmental and enlarged perspective showing a part of the linkage connecting the two bed sections to one another.

Fig. 9 is a fragmental plan view of the bed sections in bed formation.

In the embodiment shown there is provided a metal main frame section 1 composed of two angle irons or side bars 2 and 3 connected to one another by the V-shaped braces 4 and 5. The side bars 2 and 3 have their upwardly extending webs connected to the side bars 6 of the main frame 7. The side bars 6 are in turn connected to the rear upright 8 which in the present instance has extending forwardly from the upper end thereof the transversely extending frame board 9 having a forwardly inclined downwardly extending frame board 10, to the lower end of which there is secured the short rearwardly extending frame board 11 in the present instance disposed above the side bars 6 and just below the upper level of the inner spring mattress 12 shown in dash and dot lines, see Figs. 1 and 2.

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To the front ends of the side bars 2 and 3 of the frame 1, there are pivotally connected the short angle iron links 13 and 14, respectively. To the inwardly extending webs of these links 13 and 14 there is connected the foot board 15 shown in dash and dot lines in Fig. 1. This foot board 15 in the conventional way will be positioned in front of the frame 7 in couch formation from a point just above the level of the supporting floor to a point adjacent the seat cushion 16.

To the metal main frame 1 there is connected by linkage the inner bed section 17 which is in turn connected to the outer bed section 18 by the two side rails consisting of the angle irons 19 and 20.

The inner bed section 17 consists essentially of two side bars or angle irons 21 and 22 with their transversely extending webs extending inwardly. The rear ends of the side bars 21 and 22 are connected to one another by the transversely extending brace or angle iron 23. To the front of the upwardly extending web of the angle iron 23, in the present instance, there is secured the upwardly extending frame board 24 which in the present instance in the interest of appearance has connected thereto the front end of a sheet 25 of fabric or the like, the rear end of which is connected to the frame board 11 as shown in Fig. 1.

For maintaining the front ends of the side bars 21 and 22 in spaced relation to one another, there are provided the short angle iron links 123 and 124 pivotally connected at one end to the front ends of the side bars 21 and 22 and connected to one another by the V-shaped metal brace 125. The front bed section 18 has two side bars or angle irons 26 and 27, the lower transverse webs of which extend toward one another, and the front ends of which bars 26 and 27 are connected to one another by the tubular cross bar 28, see Fig. 9, to the front of which is secured the upwardly extending front metal frame 29, and to the rear of which there is secured the upwardly extending web of the angle iron 30 which is connected by the inclined flat braces 31 and 131 to the inwardly extending webs of the side bars 26 and 27, respectively.

The transversely extending strands of the spring 32 as shown in Fig. 9 are connected to the inwardly extending webs of the side bars 26 and 27 of the frame 18 to the inwardly extending webs of the links 19 and 20, and to the inwardly extending webs of the side bars 21 and 22 of the frame 17, and the longitudinally extending strands of the spring 32 are connected to the in-

wardly extending webs of the angle iron 30 of the frame 18 and to the angle iron 23 of the frame 17.

In bed formation the inner spring mattress 12 rests on the spring 32 as shown in Fig. 1, and the seat cushion 16 rests on the inner spring mattress 12 and extends to and beyond the transverse frame board 24, as shown, as a head rest if desired.

The rear ends of the frame 18 are spaced from one another by the V-shaped brace 33 connected to the angle iron leg members 34 and 35, the upper ends of which are pivotally connected to the outer faces of the side bars 26 and 27 of the frame 18 with the transversely extending webs formed at the front ends of the leg members 34 and 35 as shown in Fig. 1. The free ends of the legs or leg members 34 and 35 have rotatably mounted thereon the rollers or disks 36 and 37, respectively. In addition to the leg members 34 and 35, the bed section 18 is also provided with the leg members 38 and 39 pivotally connected to the outer faces of the bars 26 and 27, with the short bent arms 40 and 41 extending above the side bars 26 and 27 to be connected to the links 42 and 43, respectively. The links 42 and 43 constituting a sixth pair of links in turn are connected to the intermediate portions of the links 44 and 45, respectively, constituting a fourth pair of links, the front ends of which links 44 and 45 are pivotally connected to the outer faces of the vertically extending webs of the side bars 26 and 27, respectively, connected to, but spaced from, the rear ends thereof. The rear ends of the links 44 and 45 are pivotally connected to the conjunction of the bars 46, 47 and 48, 49. The bars 46, 48 are bent, and one of their ends is fixed to the rear ends of the angle iron links 123 and 124, respectively, and the bars 47, 49 at one of their ends are connected to the front ends of the angle iron links 123 and 124, respectively, to form pairs of substantially triangular frames.

To the outer faces of the intermediate portions of the bars 47, 49, there are pivotally connected one of the ends of the links 50, 51, respectively, constituting a fifth pair of links, the other ends of which links 50, 51 are pivotally connected to the inner faces of the intermediate portions of the vertically extending webs of the leg members 34, 35, respectively.

With the linkage just described and their associated leg members 38, 39 and 34, 35 it will appear that when the bed sections 17 and 18 are unfolded into bed formation, that shown in Fig. 1, the leg members 38, 39 and 34, 35 are disposed in leg forming or supporting position, and the brace 125 is spaced from and disposed below the links 19 and 20, and in turn in folded position, that shown in Fig. 5, the leg members 38, 39 will lie adjacent to the side bars 26, 27, respectively, the leg members 34, 35 will lie adjacent to the rails 19, 20, respectively, and the braces 125 and 33 will lie adjacent to one another and perpendicular to the rails 19 and 20.

The linkage connecting the bed section 18 to the metal frame 1 consists of a pair of rearmost links 52, 53, a pair of intermediate links 54, 55 and a pair of short links 56, 57 pivotally connected to the links 13, 14, respectively.

The upper ends of the links 52, 53 constituting a first pair of links are provided with pins which are slidably mounted in the slots 58, 59 formed in the side bars 21, 22, respectively, and the lower ends of the links 52, 53 are provided with pins that are slidable in the inclined slots 60, 61 formed in the side bars 2, 3, respectively.

The pins at the upper ends of the links 52, 53 are connected to the springs 62, 63, respectively, the rear ends of which are connected to pins 162 extending through the vertically extending webs of the side bars 21 and 22, respectively. The pins at the lower ends of the links 52, 53 in turn are connected to the front ends of the springs 64, 65, respectively, the front ends of which springs 64, 65 are connected to the pins 66, 67 formed on the links 13, 14, respectively, at a point below the pivotal connection of the links 13, 14, with the side bars 2, 3, respectively.

The upper ends of the links 54, 55 constituting a second pair of links are pivotally connected to the outer faces of the vertically extending flanges of the intermediate portions of the side bars 21, 22, respectively, and the lower ends of the links 54, 55 are pivotally connected to the inner faces of the vertically extending flanges of the front ends of the side bars 2, 3, respectively. The length of each link 54, 55 is substantially equal to the distance from the front ends of the side bars 21, 22 to the pivotal connection with the links 54, 55, so that when the bed sections 17 and 18 are folded down into the frame 1 into the couch formation position shown in Fig. 5, the links 54, 55 aid in fixing the position of the bed sections 17 and 18 just inside of the links 13 and 14 as shown in Fig. 5.

The links 56, 57 are in turn pivotally connected at their upper ends to the outer faces of the vertically extending flanges of the side bars 21, 22 intermediate the front ends of the side bars 21, 22, and the pivotal connection of the links 54, 55 with the side bars 21, 22, and the lower ends of the links 56, 57 are pivotally connected to the inner faces adjacent to the front ends of the vertically extending webs of the links 13, 14.

Rotatably mounted on the outer faces of the side bars 21, 22 and journalled on the pins 162 there are provided the rollers or disks 68, 69.

In bed formation, that shown in Fig. 1, the fabric 25 is extended and the springs 62, 63 and 64, 65 are contracted with the pins at the upper ends of the links 52 at the rear ends of the slots 58, 59 and the pins at the lower ends of the links 52, 53 at the front ends of the slots 60, 61, and as shown the rear bed section 17 is securely mounted or supported in raised position by the pairs of links 52, 53 and 54, 55 inclining outwardly away from one another and away from the perpendicular. The links 70 and 71 constituting a third pair of links serve to actuate the lower ends of the links 52, 53 to the rear ends of the slots 60, 61 by the actuation of the links 54, 55. These links 70, 71 as shown are pivotally conected at their rear ends to the lower ends of the links 52, 53 and at their front ends are connected to the links 54, 55 at a short distance above the lower ends of the links 54, 55, so that the links 54, 55 will act as levers to force the links 70, 71 rearward when the bed sections 17 and 18 are folded into the position shown in Fig. 3 and then inclined over into the position shown in Fig. 4, and then moved rearwardly into the final position shown in Fig. 5. The links 70, 71 will in this action move the lower ends of the links 52, 53 rearwardly along the slots 60, 61 into the final position shown in Fig. 5. At the same time, the upper ends of the links 52, 53 will be forced forwardly along the slots 58, 59 against the tension of the springs 62, 63 into the final position shown in Fig. 5. When the bed sections 17 and 18 are initially tilted into the position

shown in Fig. 4 the rollers 68 and 69 at the rear ends of the side bars 21, 22 of the bed section 17 will ride on the inwardly extending webs of the angle irons 2 and 3.

With the linkage between the bed sections 17 and 18, it will be seen that in extended position the inner spring mattress will be extended on the bed sections 17 and 18 from the frame board 24 to the frame 29 and the leg members 38, 39 and 34, 35 will be disposed in supporting position, and in turn when the bed section 18 is folded over onto the bed section 17, the linkage will enable the formation of a rectangular housing with the inner spring mattress 12 folded in half as shown in Figs. 3, 4 and 5, and the leg members 38, 39 and 34, 35 folded out of the way with the leg members 38, 39 adjacent to the side bars 26, 27 of the bed section 18, and the leg members 34, 35 in alinement with and adjacent to the links 19, 20.

In turn, the linkage between the bed section 17 and the frame 1 will enable the bed section 17, after the bed section 18 has been folded over into the position shown in Fig. 4 to rest on the transversely extending webs of the side bars 2 and 3 of the frame 1. The pairs of springs 62, 63 and 64, 65 will of course serve to aid the attendant in opening the bed thereby to counteract to a certain extent the weight of the bed sections 17 and 18 with the inner spring mattress 12 and associated parts, whereas when converting the bed sections 17 and 18 from bed formation into couch formation the springs 62, 63 and 64, 65 will yield but at the same time act as cushions to minimize the noise when moving the bed sections 17 and 18 from bed formation into couch formation.

It is obvious that the mechanism here disclosed can be used with a combination chair bed, that is where a chair is converted into and out of bed formation, as well as where a couch is converted into and out of bed formation, without departing from the general spirit of the invention.

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.

I claim:

1. In a couch bed having a main frame, and a plurality of bed sections movable into said main frame in couch formation and movable out of said main frame into bed formation, and a linkage for cushioning said bed sections when moving into couch formation and for facilitating the operation when moving said bed sections into bed formation, said linkage comprising a first pair of links having pins at their ends, there being slots in said main frame and in one of said bed sections for slidably receiving said pins, springs for yieldably urging said links into erect supporting position with said pins at one of the ends of said slots, a second pair of links pivotally connected at one of their ends to said main frame and at their other ends to said one of said bed sections, a third pair of links connecting said second pair of links to the lower ends of said first pair of links, said second pair of links with said first bed section cooperating with said third and first pairs of links when movable inwardly to lower said bed sections, said springs enabling said first pair of links to descend and to enable the pins of said first pair of links to move toward the other ends of said slots.

2. The combination as set forth in claim 1 in which the upper ends of said first pair of links and the upper ends of said second pair of links in erect position or bed formation are inclined away from the perpendicular in opposite directions and said slot and pin connections enable said pairs of links to recline adjacent to one another in couch formation.

3. In a couch bed having a main frame and a pair of bed sections, rails pivotally connected at their ends to the adjacent ends of said bed sections, and control linkage connecting said bed sections and rails to fold into spaced relation with one another to enclose a folded inner spring mattress, and a second linkage for cushioning said bed sections in folded relation to one another and moving them inwardly into couch formation and for facilitating the operation and moving said bed sections outwardly into bed formation; said second linkage comprising a first pair of links pin and slot connected at their ends with one of said bed sections and said main frame, springs connected to said first pair of links and normally urging said first pair of links into upright position, and a second pair of links pivotally connected at their ends with one of said bed sections and said main frame, said two pairs of links being erect in couch formation and movable into reclining position adjacent to one another when said bed sections are folded and moved inwardly into said main frame.

4. The combination as set forth in claim 3 in which the upper ends of said two pairs of links are inclined away from one another and away from the perpendicular in opposite direction in bed formation.

5. The combination as set forth in claim 3 in which the upper ends of said second pair of links are inclined away from the upper ends of said first pair of links in couch formation and in which the upper ends of said second pair of links are swung over toward and adjacent to said first pair of links in couch formation.

6. The combination as set forth in claim 3 in which the control linkage for said bed sections includes a pair of substantially triangular frames pivotally connected to the front ends, respectively, of the sides of the rear one of said bed sections at one of their alined corners, a fourth pair of links pivotally connected to the sides, respectively, of said front bed section at one of their ends and at their other ends pivotally connected to another alined pair of corners, respectively, of said triangular frames, a pair of legs pivotally connected to the rear ends, respectively, of the sides of the front one of said bed sections, and a fifth pair of links pivotally connected at one of their ends to said legs, respectively, and at their other ends pivotally connected to one of the sides, respectively, of said triangular frame.

7. The combination as set forth in claim 3 in which the control linkage for said bed sections includes a pair of substantially triangular frames pivotally connected to the front ends, respectively, of the sides of the rear one of said bed sections at one of their alined corners, a fourth pair of links pivotally connected to the sides, respectively, of said front bed sections at one of their ends and at their other ends pivotally connected to another alined pair of corners, respectively, of said triangular frames, a pair of legs pivotally connected to the rear ends, respectively, of the sides of the front one of said bed

sections, and a fifth pair of links pivotally connected at one of their ends to said legs, respectively, and at their other ends pivotally connected to one of the sides, respectively, of said triangular frame, and a second pair of legs pivotally connected to the sides, respectively, of said front one of said bed sections and having upwardly extending arms, and a sixth pair of links connected at one of their ends to the free ends, respectively, of said upwardly extending arms and at their ends pivotally connected to said fourth pair of links, respectively.

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