United States Patent

Mikos et al.

[15] **3,694,828**

[45] **Oct. 3, 1972**

[54] **SOFA SLEEPER WITH SEAT HEIGHT ADJUSTMENT**

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[52] **U.S. Cl.** **5/13**, 5/29

[51] **Int. Cl.** **A47c 17/14**

[58] **Field of Search** 5/13, 28

[56] **References Cited**

UNITED STATES PATENTS

3,281,870	11/1966	Katz	5/13
3,516,096	6/1970	Mikos	5/13
3,525,106	8/1970	Perry	5/13

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[57] **ABSTRACT**

A sofa sleeper of the type in which three pivotally interconnected bed sections are mounted on linkage means including front support arms at the ends of a rectangular sofa frame on which the bed sections swing between a sofa position within the frame and an intermediate position above and extending forwardly of the frame with one of the bed sections providing a seat deck in sofa position, a stabilizing cross bar on the front support arms which supports the forward end of the bed sections in sofa position, said cross bar being movable to adjust the pitch of the seat deck.

4 Claims, 4 Drawing Figures

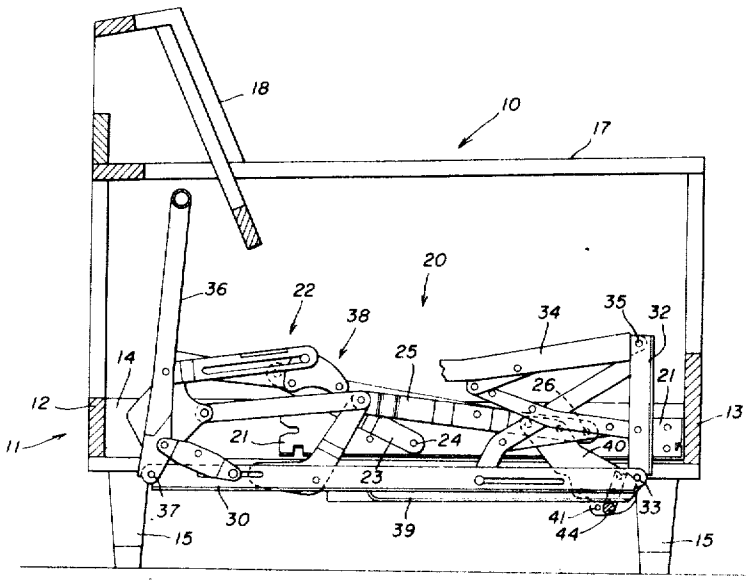

FIG. 1

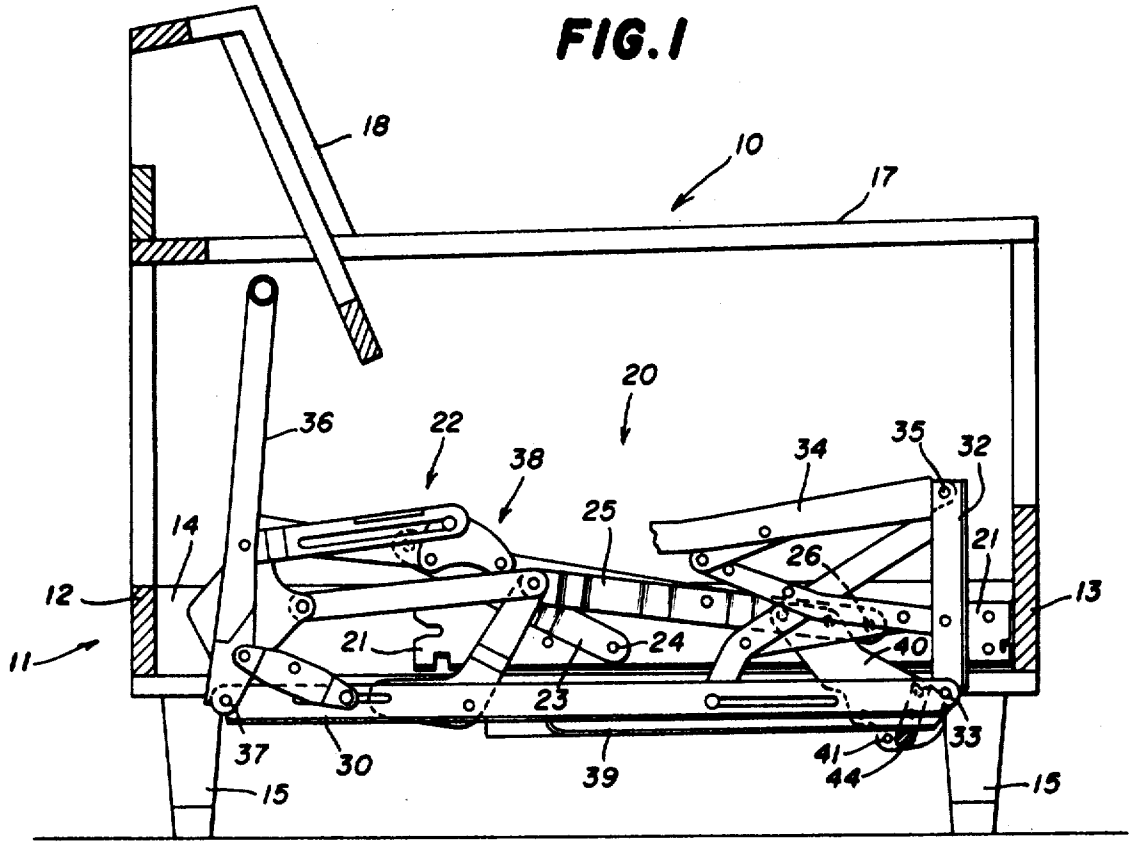

FIG. 2

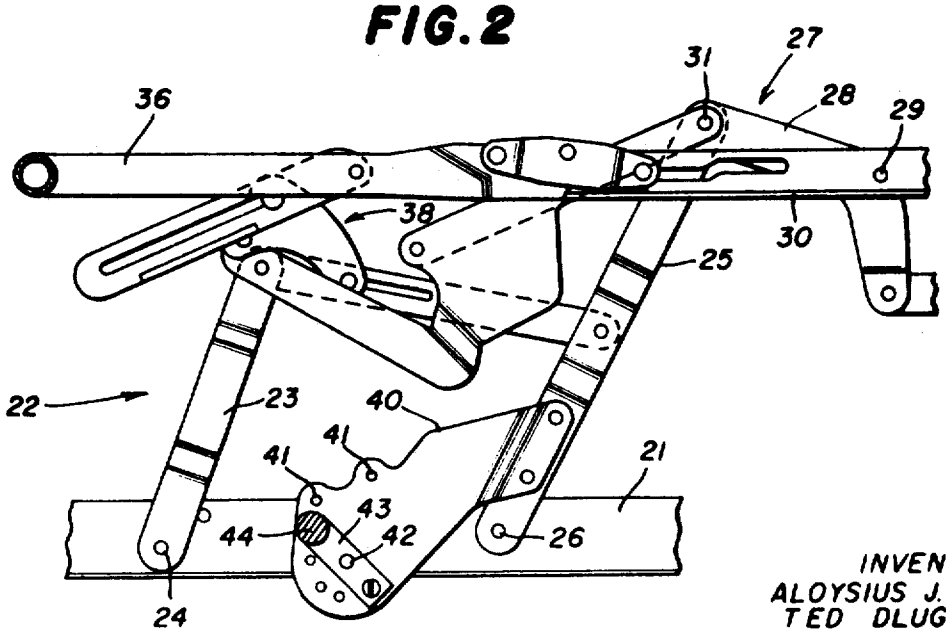

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FIG. 3

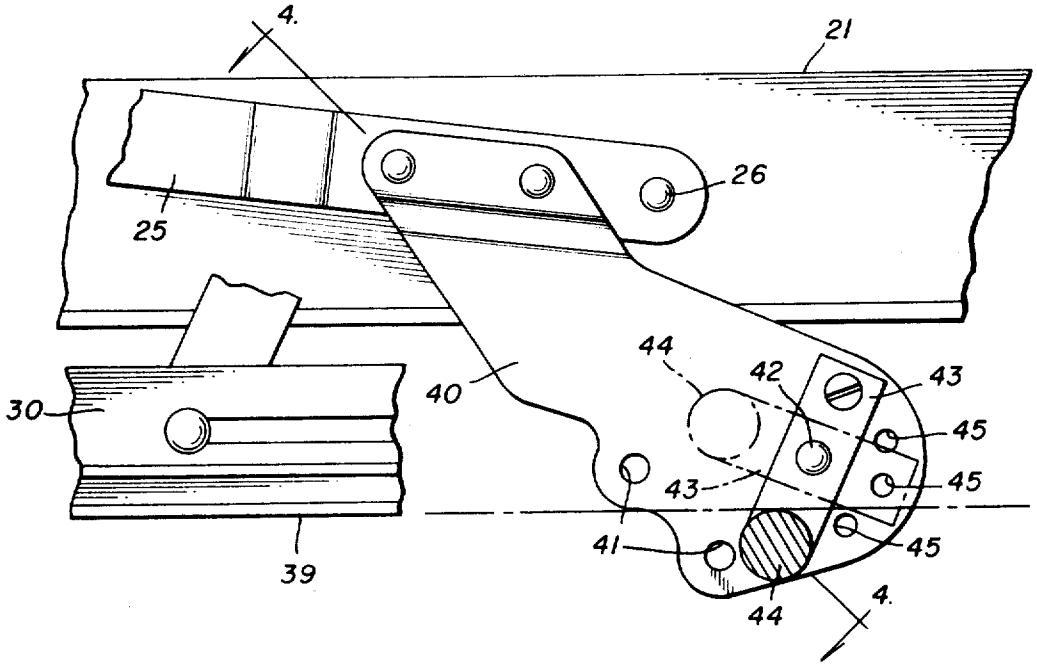
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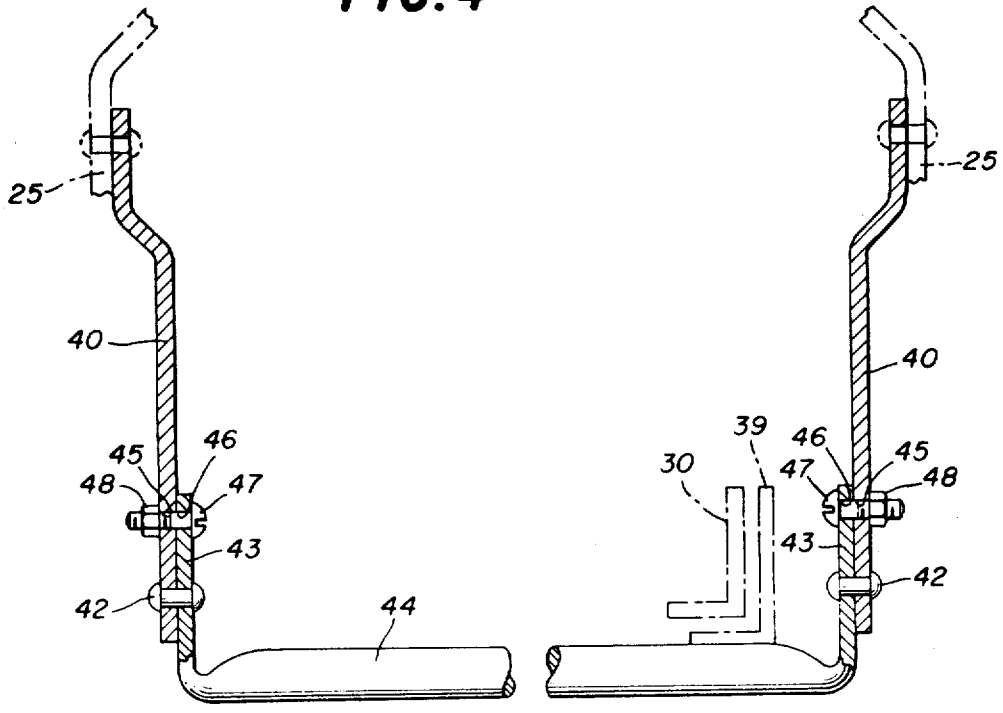
FIG. 4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SOFA SLEEPER WITH SEAT HEIGHT ADJUSTMENT

BACKGROUND OF THE INVENTION

Most sofa sleepers today are of the type in which an outer bed section which is the foot section in a four section sofa sleeper is folded over a main section to provide a seat deck in the sofa position of the unit. Since the pivotally interconnected bed sections are mounted in the sofa frame on a support linkage including pivoted arms, the height of the sofa seat and its front to rear pitch depend very heavily upon the construction of the supporting linkage because the folded bed sections must be a certain minimum distance above the floor in order to have sufficient clearance to swing out of the frame to the intermediate position from which they are unfolded to bed position.

With one exception, all manufacturers of sofa sleepers are either furniture manufacturers or bedding manufacturers who buy folding bed structures from companies which specialize in the supply of such mechanisms to the furniture industry and mount the prefabricated bed structures in their sofa frames. In view of the complexities of the folding bed mechanisms, and the extremely competitive nature of the entire business, it is not practical for the manufacturers of sofa sleeper mechanisms to custom build such mechanisms for different furniture or bedding manufacturers; but instead they must be mass produced to a few basic designs which offer the furniture or bedding manufacturer very little opportunity for changing the height of the seat and the pitch of the seat in their sofa sleepers.

The purpose of the present invention is to provide a simple and inexpensive structure which permits the furniture or bedding manufacturer who makes sofa sleepers to change the seat height and the seat pitch for different sofa sleeper models while using a single mass produced folding bed mechanism in all of them.

SUMMARY OF THE INVENTION

The present invention constitutes an improvement upon the folding bed structure of Mikos' U.S. Pat. No. 3,516,096, and in particular relates to the structure illustrated in FIGS. 24 and 25 of the drawings of that patent which is, basically, the current commercial structure of the assignee of that patent and the present application.

In accordance with the present invention, brackets on the pivoted front support arms for the folding bed mechanism which provide connections for the counter balancing springs also provide a mounting for a stabilizing cross bar of a type which is commonly used in sofa sleeper constructions to prevent side sway by rigidly connecting the mounting arms to one another. It is also common for such a cross bar to be so positioned that it is beneath the forward portion of the folded bed structure in sofa position and thus provides the support for the front end of the folded bed.

In accordance with the present invention, such a stabilizing cross bar is pivotally mounted on the supporting brackets so that its distance from the pivots of the front support arms on the ends of the sofa frame may be varied and thereby adjust the height of the front of the folded bed mechanism and the pitch of the seat deck.

The height of the mounting brackets for the folding bed structure in the ends of the rectangular sofa frame may be varied slightly to change the height of the seat, and generally speaking a lower seat requires less pitch from front to rear so that where the manufacturer of the sofa sleeper wishes to provide a minimum seat height he also may provide a minimum seat pitch by a proper positioning of the adjustable cross bar. Conversely, where a higher seat is provided the pitch may be increased by raising the adjustable cross bar.

THE DRAWINGS

FIG. 1 is a transverse sectional view of a sofa frame and a folding bed structure embodying the invention, with the bed structure in its sofa position;

FIG. 2 is a fragmentary view of the folding bed structure of FIG. 1 showing the supporting linkage, the main bed frame and the head bed section in the positions that they occupy either in intermediate position or in bed position;

FIG. 3 is a fragmentary view of a portion of FIG. 1 on a greatly enlarged scale; and

FIG. 4 is a broken longitudinal sectional view taken substantially as indicated along the line 4—4 of FIG. 3.

DETAILED DESCRIPTION OF THE INVENTION

As previously indicated, the present invention constitutes an improvement upon the apparatus of U.S. Pat. No. 3,516,096, and the folding bed mechanism illustrated in FIGS. 1 and 2 is the same as that illustrated in FIGS. 24 and 25 of that patent except for the specific improvements effected by the present invention. In FIG. 1 a sofa frame, indicated generally at **10**, includes a rectangular base frame, indicated generally at **10**, includes a rectangular base frame, indicated generally at **11**, which has a rear rail **12**, a front rail **13** and end rails such as the illustrated rail **14**, all supported upon legs **15**; and in addition the sofa frame includes arm frames **17** and a back frame **18**.

The folding bed structure, indicated generally at **20**, has identical mechanisms at both ends of the sofa frame, only one of which is shown. A mounting plate **21** is bolted to the sofa frame end rail **14**, and a supporting and actuating linkage, indicated generally at **22** includes a rear support arm **23** which is pivoted at **24** on the mounting plate **21**, and a front support arm **25** which is pivoted at **26** on the mounting plate **21**. Forward link means **27** including a bell crank **28** is pivoted at **29** on a main bed section **30**, and has a pivotal connection **31** to the top of the front support arm **25** so as to provide pivotal connecting means between said front support arm and the main bed section. The folding bed structure also includes an intermediate bed section **32** which is pivotally connected to the main bed section at **33**, and an outer bed section **34** which is pivoted to the intermediate bed section at **35**. In the folded sofa position of FIG. 1 the outer bed section **34** overlies the main bed section **30** and the intermediate bed section **32** is upright immediately inside the front rail **13** of the sofa frame. The folding bed structure also includes a head bed section **36** which is pivoted at **37** on the rear of the main bed section **30** so as to be suspended therefrom in cantilever fashion in the position of FIG. **2**; and a head bed section actuating and control linkage, indicated generally at **38**, produces the folding and

unfolding of the head bed section **36** as the folding bed structure is moved between the sofa position illustrated in FIG. **1** and an intermediate position illustrated in FIG. **2** in which the bed sections **30**, **32** and **34** occupy the same relative positions that they do in FIG. **1** but are positioned above and project forwardly from the front rail **13** of the sofa frame. A folding intermediate leg **39** is mounted on the pivot **33** and is unfolded during the movement from sofa position to intermediate position.

The intermediate position of the folding bed is illustrated in FIG. 4 of U.S. Pat. No. 3,516,096, and from that position the intermediate bed section 32 and the outer bed section 34 may be further moved to a bed position as illustrated in FIG. 5 of the drawings of that patent. The mechanism as heretofore described is that of FIGS. 24 and 25 of the patent.

The improvement of the present invention comprises a bracket **40** which is riveted to the front support arm **25** and is one of a pair of such brackets which are parallel to one another and occupy positions extending generally rearwardly in the intermediate position of FIG. **2** and generally downwardly in the sofa position of FIG. **1**. Holes **41** in the brackets **40** provide connections for counterbalancing springs (not shown) in the usual way.

A pair of loose rivets **42** provide pivotal connections for parallel mounting arms **43** of a stabilizer bar **44** which is seen in FIGS. **1** and **3** to underlie the folded intermediate legs **39** in sofa position so as to support the front of the main frame **30** and thus support the front of the folding bed structure in that position. It is apparent, therefore, that by shifting the horizontal plane of the stabilizer bar **44** with respect to the horizontal plane of the front arm mounting pivots **26** in sofa position the height of the front of the folded bed structure from the floor may be adjusted, and this adjusts the pitch of the seat deck which is carried in the outer bed section **34**. For details of a preferred seat deck construction reference is made to U.S. Pat. No. 3,380,082, which issued on an application that was divided out of application No. 555,599, the original ancestor of application 834,201 that issued as U.S. Pat. No. 3,516,096.

Adjustment of the stabilizer bar **44** is permitted by pivoting the arms **43** about their pivots **42**, and the bar **44** may be fixed in any of four adjusted positions by reason of a series of holes **45** in each of the brackets **40** which are equidistant from the pivots **42**. A hole **46** in each of the mounting arms **43** may be selectively aligned with any one of the series of holes **45**, and pin means in the form of bolts **47** impale the aligned holes **45** and **46** and are secured with nuts **48**.

As most clearly seen in FIG. **3**, the stabilizer bar **44** is illustrated in its lowermost position, and the broken line showing of the mounting arms **43** and stabilizer bar **44** shows the bar in one of its more elevated positions.

The foregoing detailed description is given for clearness of understanding only and no unnecessary limitations should be understood therefrom, as modifications will be obvious to those skilled in the art.

I claim:

1. In a sofa sleeper which has pivotally interconnected main intermediate and outer bed sections, and linkage means including a pair of front support arms which are pivotally mounted on the ends of a rectangular sofa frame for movement between a generally horizontal position and a generally upright position, and said arms being pivotally connected to the front portion of the main bed section to swing the bed sections during said movement between a sofa position within the frame and an intermediate position above and extending forwardly of the frame, in both of which positions the main section is lowermost, the outer section is inverted over the main section to provide a seat deck, and the intermediate section is upright at the front, means for varying the angle of said bed sections to the horizontal in sofa position to adjust the pitch of the seat deck, said means comprising, in combination:

a pair of parallel brackets on the front support arms, said brackets extending generally rearwardly in intermediate position and extending generally downwardly in sofa position;

a stabilizer bar mounted on said brackets, said bar in sofa position supporting the front portion of the main bed section;

and adjusting means interconnecting said bar and said brackets to vary the distance between a horizontal plane through the bar and a horizontal plane through the pivotal mountings of said arms.

2. The combination of claim **1** in which the adjusting means comprises integral parallel arms at the two ends of the bar, coaxial pivots connecting said arms to the brackets, and means for securing the arms to the brackets selectively in any of a plurality of positions.

3. The combination of claim **2** in which the securing means includes a series of holes in each bracket equidistant from the arm pivots, a locking hole in each arm which may be selectively aligned with any of the series of holes in the associated bracket, and pin means to impale said aligned holes.

4. The combination of claim **3** in which the arms are connected to the coaxial pivots intermediate their ends, the stabilizer bar is at one end of the arms and the locking holes are at the other ends of the arms.

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