United States Patent

[11] 3,571,825

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[45] Patented **Mar. 23, 1971**

[54] **AUTOMATIC SOFA BED**
4 Claims, 7 Drawing Figs.

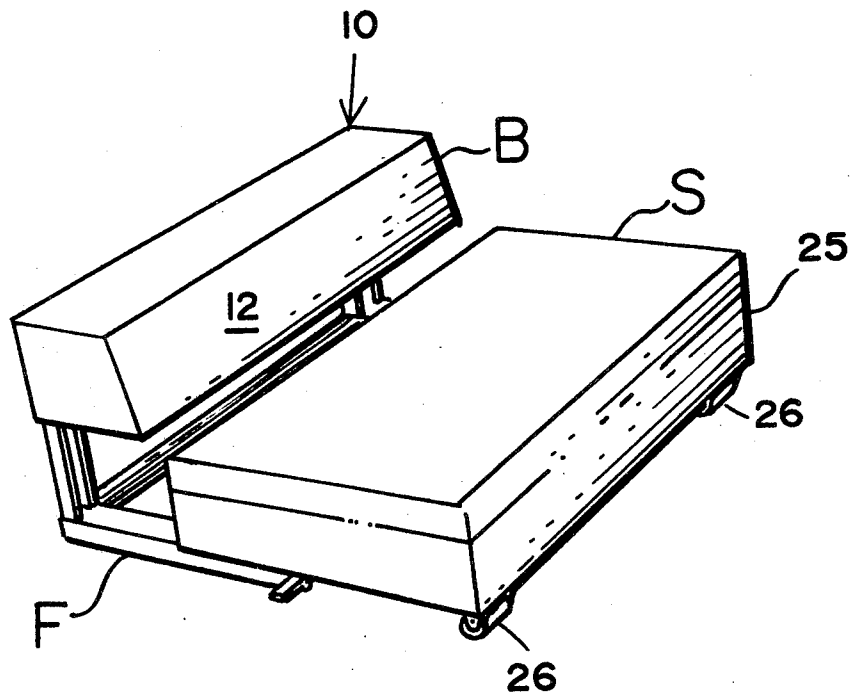
[52] **U.S. Cl.** **5/17,** 5/56
[51] **Int. Cl.** **A47c 17/14,** A47c 17/22
[50] **Field of Search** 5/13, 17, 18, 55, 56, 59

[56] **References Cited**
UNITED STATES PATENTS

3,284,813	11/1966	Sevick	5/17
3,139,629	7/1964	Kamp et al	5/17
3,123,836	3/1964	Bendell	5/17

Primary Examiner—Casmir A. Nunberg
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ABSTRACT: An automatic sofa bed having a pair of rectangular frame members, one slidably mounted on the other. The upper frame member having floor-engaging rollers at its forward edge portion with further rollers at its rear edge portion engaging tracks formed on the lower frame member. The lower frame member having a bolster support along its rear portion and a latch at its forward edge for securing the upper frame member at its retracted position for use as a sofa with a pair of adjustable spring members yieldingly urging the upper frame member to slide to its extended position for use as a bed and which requires a minimal of force to return the upper frame member to its retracted position for use as a sofa.



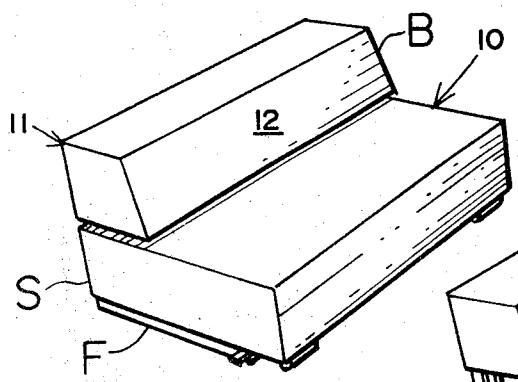


FIG. 1

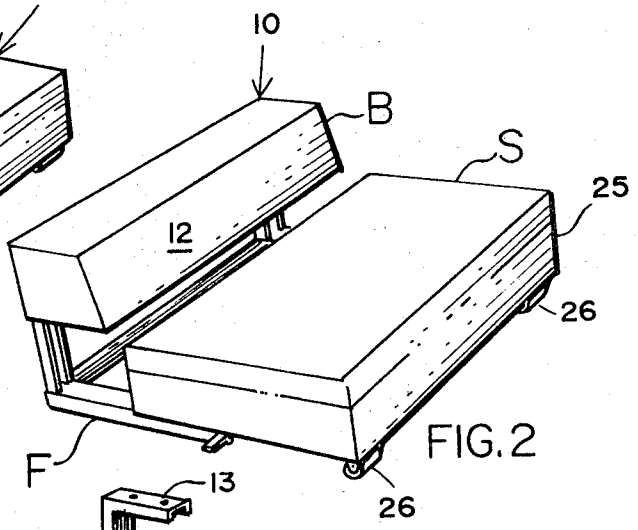


FIG. 2

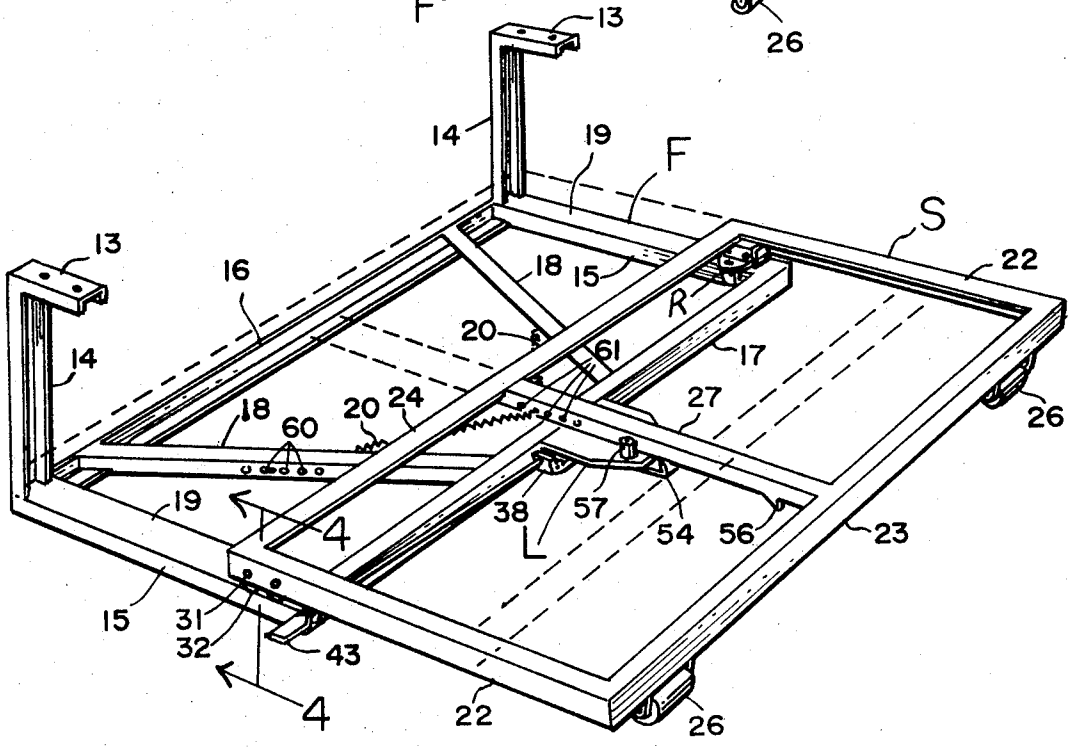


FIG. 3

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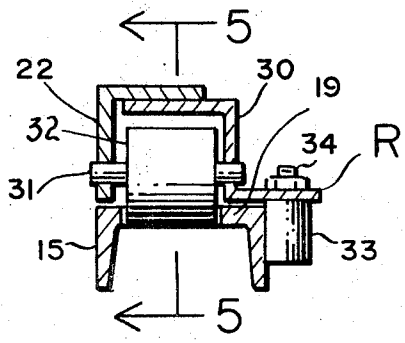


FIG.4

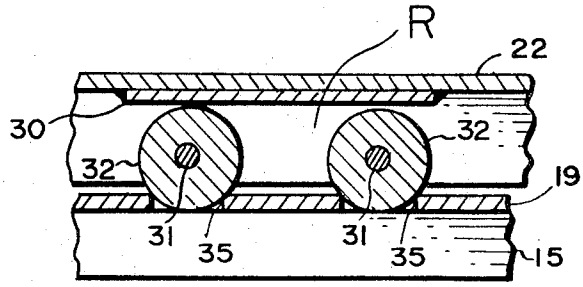


FIG.5

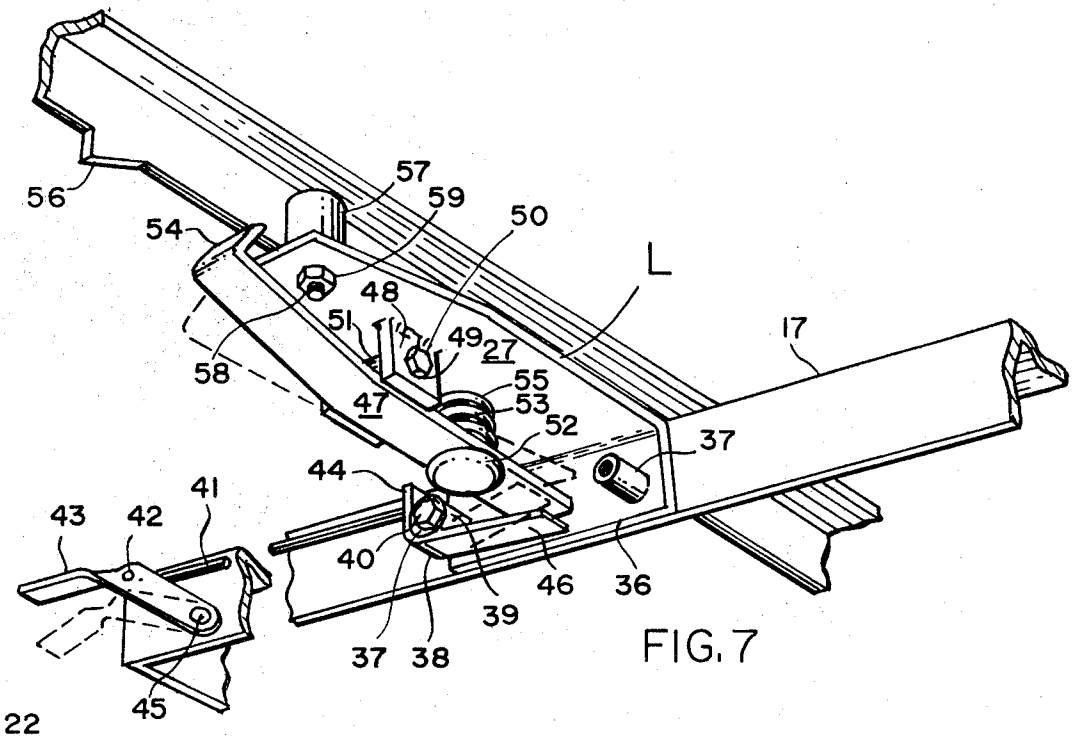


FIG.7

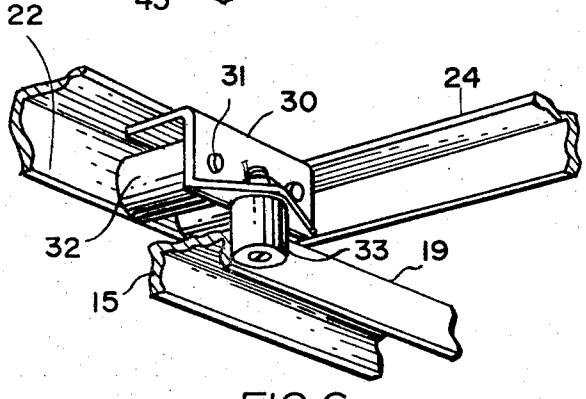


FIG.6

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AUTOMATIC SOFA BED

This invention relates to an article of furniture and is more particularly directed to a sofa bed that is readily converted from use as a sofa to that of a bed automatically.

This invention is an improvement over my U.S. Pat. No. 3,123,836, issued on Mar. 10, 1964, for DUAL PURPOSE SOFA, wherein a sofa bed is shown capable of being converted from use as a sofa to a bed and vice versa. However, in the present invention a fewer number of springs are used as well as other improvements made therein to render the present invention automatic in operation.

Therefore a principal object of the present invention is to provide a sofa bed that converts from use as a sofa to that of a bed upon merely releasing a latch mechanism and the sofa automatically slides outwardly on its frame to become a bed.

Another object of the present invention is to provide an automatic sofa bed that requires only a pair of adjustable coil springs as a source of energy for converting the sofa for use as a bed and when returning the bed back to its position as a sofa, a minimal amount of force is required by the user.

A further object of the present invention is to provide an automatic sofa bed that is a space saver especially adaptable for use in apartments and small houses as well as being simple in construction, inexpensive in cost and readily operable by women and children.

With these and other objects in view, the invention will be best understood from a consideration of the following detailed description taken in connection with the accompanying drawings forming a part of this specification, with the understanding, however, that the invention is not confined to any strict conformity with the showing of the drawings but may be changed or modified so long as such changes or modifications mark no material departure from the salient features of the invention as expressed in the appended claims.

In the drawings:

FIGS. 1 and 2 are perspective views of a sofa bed constructed in accordance with my invention and shown in position for use as a sofa and as a bed respectively;

FIG. 3 is a perspective view of the framework of my sofa bed shown with the bolster and bed springs removed;

FIG. 4 is a fragmentary cross-sectional view taken along the line 4–4 of FIG. 3.

FIG. 5 is a cross-sectional view taken along the line 5–5 of FIG. 4.

FIG. 6 is a fragmentary perspective view of the roller assembly shown in FIGS. 4 and 5.

FIG. 7 is a fragmentary perspective view of the latch mechanism as seen from the underside of the sofa frame.

Referring to the drawings wherein like numerals are used to designate similar parts throughout the several views the numeral 10 refers to an automatic sofa bed constructed in accordance with my invention and comprising generally of a sofa S, support and carriage frame F and a bolster B.

The bolster B is conventional in construction consisting of an appropriately upholstered boxlike member 11 having a front wall 12 hinged along one edge to form a compartment for storing pillows, bed clothes, blankets and the like. The bolster B is supported by and secured to horizontal channel members 13 that are welded to the upper ends of vertical support channel members 14 mounted on the rear portion of the support frame F.

The support and carriage frame F which rests on the floor is rectangular in shape consisting of a pair of channel member 15 forming the sides of the support frame F and having a web portion 19 acting as a track for the sofa S with angle members 16 and 17 forming the rear and front sides and welded at their ends to the channel member 15. Extending diagonally between the angle members 16 and 17 on each side of the center line of the frame F is an angle member 18 which acts as braces for strengthening the frame support F and as supports for springs 20 as is explained in greater detail hereinafter.

Slidably mounted on the frame F along the channel members 15 is the sofa frame S which consists of side angle members 22, front angle member 23 and rear angle member 24 welded at their ends to form a rectangular base for a box spring and mattress 25. Mounted on the front angle member 23 is a pair of floor-engaging rollers 26 while at each of the rear end portions of the side angle members 22 is a roller assembly R having a Z-bar 30 welded or otherwise secured to the lower surface of the angle member 22. Extending between the angle member 22 and Z-bar 30 is a pair of roller shafts 31 whose ends are received by bores formed in the angle member 22 and Z-bar 30. A roller 32 which is rotatably supported on the shafts 31 has its lower surface extending below the lower edge of the angle member 22 and resting on the track 19 so that the sofa frame 22, 23 24 is supported on rollers 26 and 32. To maintain the two sets of rollers 32 on the tracks 19, a further roller 33 mounted on the Z-bar 30 and engages the inner vertical wall of each of the channel member 15. The rollers 33 are rotatably mounted on a vertically disposed shaft 34 secured at the upper end to the Z-bar 30. The outermost movement of the sofa S, when the sofa bed 10 is being converted to use as a bed, is arrested by openings 35 formed on the tracks 19, which receive the rollers 32 as shown by FIGS. 3 to 5. At the midportion of the sofa frame is an angle member 27 whose ends are secured to the front and rear angle members 23, 24.

When the sofa bed 10 is slid back to its use as a sofa, the sofa S is maintained in its innermost position by means of a latch and guide mechanism L secured to the front surface of the angle member 17 and extending forwardly thereof. An L-shaped support plate that supports the latch and guide mechanism is provided with a vertical leg portion 36 that is secured to the angle member 17 by a pair of bolts (not shown) extending through companion bores in the angle member 17 and leg portion 36 and threaded into axially threaded cylinders 37. Mounted on either of the cylinders 37 is foot-operated trip lever 38 whose midportion is rotatably mounted on the cylinder 37 and secured thereon by a bolt 40. One leg 44 of the trip lever 38 is secured to a rod 41 that extends along the angle member 17 to the outer edge of the frame F where the end of the rod 41 is secured by a pin to a foot pedal 43. The foot pedal 43 is pivoted at one end by a pivot pin 45 mounted on the angle member 17 so that upon stepping on the foot pedal 43, the rod 41 is pulled outwardly and the leg portions 44, 46 are pivoted in a counterclockwise direction as viewed by FIG. 7.

The leg portion 46 of the trip lever 38 engages the rear end of a latch lever 47 that is pivoted to the underside of a horizontal leg 27 of the latch plate so that the latch lever 47 swings in a vertical plane. Depending from the horizontal leg 27 is a pair of lugs 48 with bores 49 for receiving a pin 50 upon which a hub 51 secured to the latch lever 47 is pivotally mounted.

To support a coil spring 55 and the latch mechanism L against any sagging or twisting on the angle member 17, there is provided a support button 52 secured to a threaded bolt portion 53 that extends through a plain bore (not shown) in the latch lever 47 and threaded in a bore (not shown) in the horizontal leg 27 of the latch plate L with the coil spring 55 extending between the latch plate L and latch lever 47 to maintain the latch lever 47 in contract relation with the leg 46 of the trip lever 38. With the coil spring 55 so disposed, the forward end of the trip lever 47 upon which a latch or lip 54 is mounted and normally in its uppermost position so as to engage a shoulder 56 mounted at the forward end portion of the middle positioned angle member 27 when the sofa frame S has been shifted to its retracted position for use as a sofa.

To assist the rollers 33 in maintaining the sofa frame S properly on the frame support F and permit one to slide it in a smooth manner on the tracks 19, there is provided a pair of rollers 57 rotatably mounted on a vertically disposed pin 58 that is secured at their lower end by a nut 59 to the horizontal leg 27 of the latch plate L. The rollers 57 engage each side of the vertical leg of the angle member 27 thereby assuring the correct alignment at all times of the sofa frame S as it slides on the frame support F so as to require a minimum of force to slide the sofa S from its sofa to bed position and vice versa.

A pair of springs 20 which generate the momentum for sliding the sofa S from the retracted to the bed position and against which a minimal force is required to return the bed to its sofa position extends between the diagonal angle members 18 and the midpositioned angle member 27. A plurality of bores 60 and 61 are formed on the vertical leg portions of the angle members 18 and 27, selected ones of which receive the ends of coil springs 20 as determined by the amount of spring force required of the coil springs 20. By trial and error adjustment, the coil springs 20 are placed in the proper bores 60 and 61.

In the normal use of my automatic sofa bed 10 the sofa S is maintained in the retracted position as shown by FIG. 1 and when it is desired to use the same as a bed, the sofa S takes the position as shown by FIG. 2. This is accomplished by merely stepping on the foot pedal 43 causing the latter to pivot about its pivot pin 45 and drawing the rod 41 outwardly which in turn causes the trip lever 38 to pivot about its pivot cylinder 37. The leg 46 of the trip lever 38 abuts against and rearward end of the latch lever 47 causing the latter to swing about its pivot pin 50 against the spring pressure 55. The catch 54 swings downwardly to disengage itself from the shoulder or detent 56.

The coil springs 20 are free now to slide the sofa frame S forwardly on the frame support F. The rollers 32 roll over the tracks 19 as the alignment rollers 33 and 57 maintain the sofa frame S in proper alignment with frame support F so that a minimum of spring forces are required to slide the sofa frame S to its forwardmost position when the rollers 32 arrive at the position of the openings 35. At this forwardmost position, the coil springs 20 act as brakes to slow down the forward movement of the sofa frame S as the rollers 32 arrive at the openings 35.

With the sofa bed 10 in its extended position for use as a bed, the coil springs 20 are extended only sufficiently to have brought the sofa bed 10 to its extended position and maintain the rollers 32 in the openings 35 so that the sofa bed 10 is locked in its open position. Also, the coil springs 20 should have a sufficient force to commence the sliding movement of the sofa S to its retracted position when the user pushes rearwardly on the forward edge of the sofa S to slide the rollers 32 out of the openings 35 and onto the tracks 19. Now this slight rearward force by the user will slide the sofa S to its rearmost position when the latch 54 engages the detent 56 to lock the sofa S in its retracted position for use as a sofa.

I claim:

1. An automatic sofa bed comprising a stationary support frame, said support frame having a front and rear frame member secured at their ends to side members forming a substantially rectangular frame portion, an intermediate member extending between said front and rear frame members on each side of substantially the center thereof, a sofa frame slidably mounted on said support frame, said sofa frame having a front and rear frame member secured at their ends to side members forming a substantially rectangular frame portion, a centrally disposed member extending between said last-named front and rear members, a pair of floor-engaging roller means mounted on said front frame member of said sofa frame, further roller means mounted on said side members of said sofa frame and positioned on said side members of said support frame, latch means mounted on said front frame member of said support frame, shoulder means on a forward portion of said centrally disposed member of said sofa frame engaged by said latch means for retaining said sofa frame on said support frame in a retracted position, release means operatively connected to said latch means for disengaging said latch means from said shoulder means, a pair of resilient members connected at one end to said centrally disposed member and extending rearwardly to each of said intermediate members yieldingly urging said sofa frame to slide in a forward direction to its extended position, stop means preventing said further roller means from rolling beyond a certain position on said side members of said support frame and guide means cooperatively engaging said support frame and said sofa frame for guiding the sliding movement of said sofa frame on said support frame.

2. The structure as recited by claim 1 taken in combination with adjustable means on said intermediate and centrally disposed members securing said resilient members for adjusting the forces exerted by said resilient members for sliding said sofa frame to its extended position for use as a bed upon the release of said latch means.

3. The structure as recited by claim 2 wherein said guide means comprise rollers mounted on said side members of said sofa frame engaging said side members of said sofa frame and further rollers mounted on said latch means and engaging said centrally disposed member of said sofa frame.

4. The structure as recited by claim 3 taken in combination with support means mounted on the rear portion of said support frame supporting a bolster in above and in spaced relation to said sofa frame.