Feb. 10, 1948. W. W. WILSON 2,435,936

SOFA BED HINGE SUPPORT

Filed Sept. 1, 1944

3 Sheets-Sheet 1

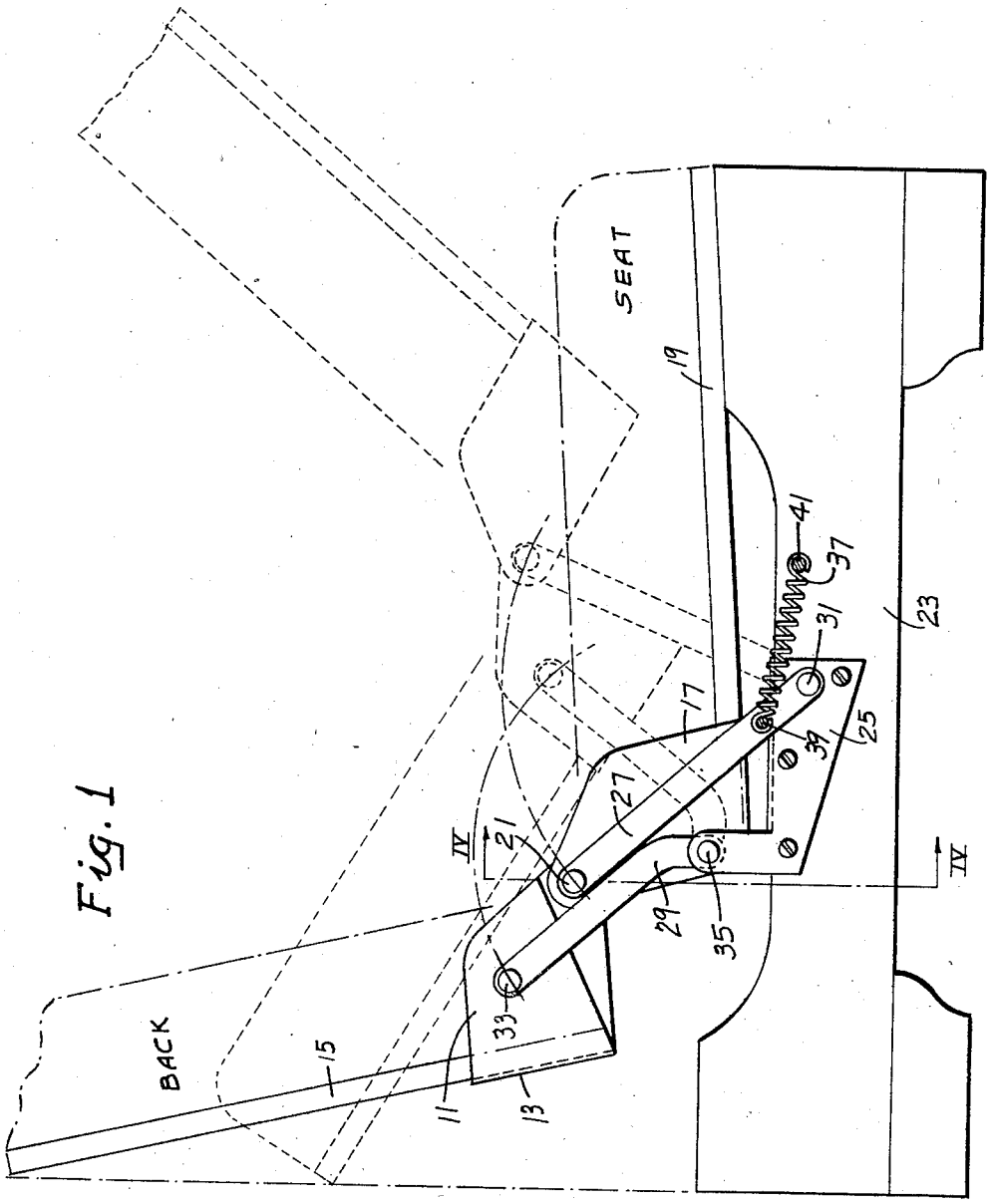


Fig. 1

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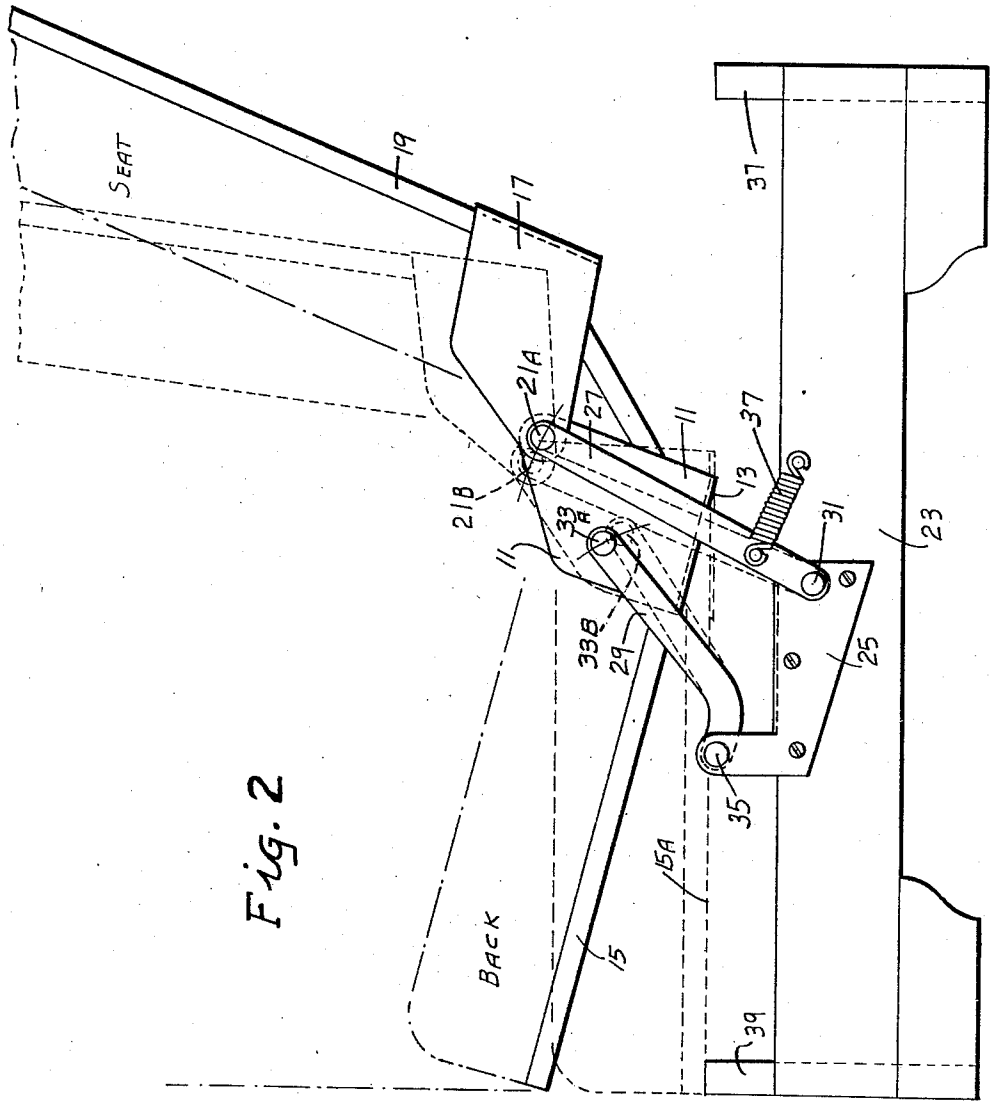


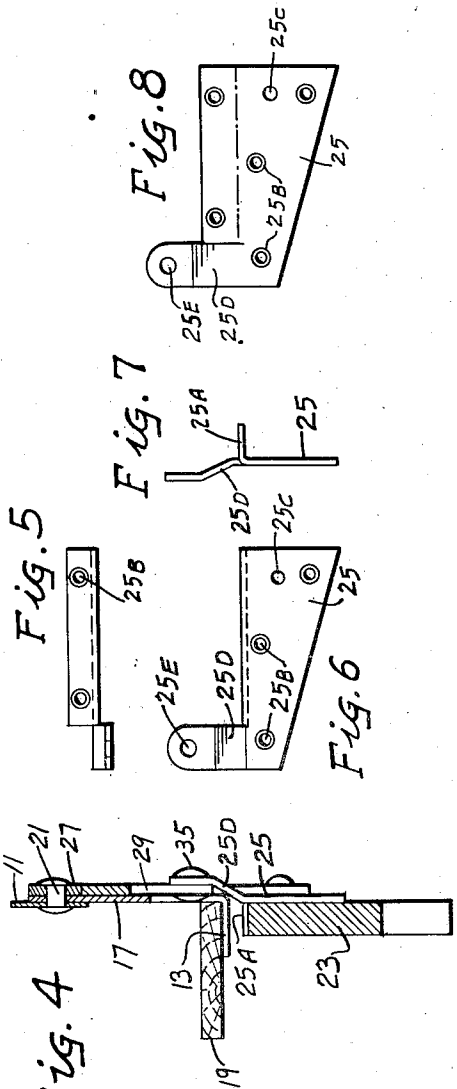
Fig. 2

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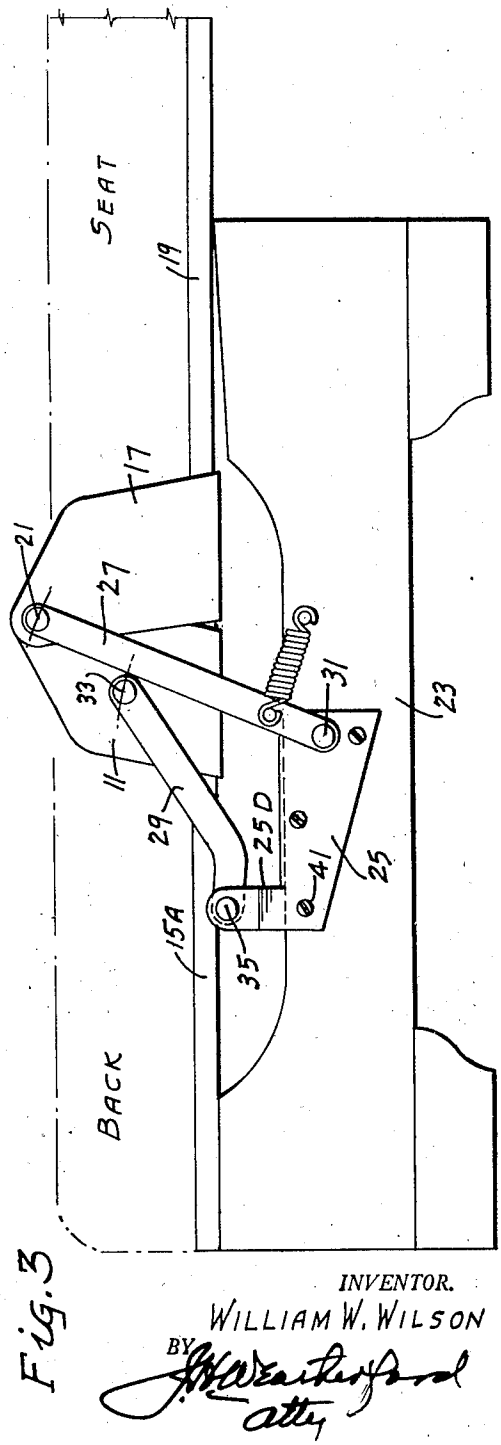


Fig. 3

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UNITED STATES PATENT OFFICE

2,435,936

SOFA BED HINGE SUPPORT

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Application September 1, 1944, Serial No. 552,244

3 Claims. (Cl. 5—47)

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This invention relates to sofa bed hinges and supports of that well known type in which brackets pivotally hinged together are secured respectively to the lower end of the back and the rear end of the seat and the hinge is carried by a pair of upwardly extending swinging arms which are pivotally supported by attachment at their lower ends to a base member.

In sofa beds in which such hinges are employed, the seat is hinged to the back by the hinge so that the seat and back may be relatively moved, the one with respect to the other, and locking means, well known in the art, which forms no part of the present invention, is interposed through which various relative positions of the seat and back may be accomplished, such means being well known in the art and a desirable form thereof being described in my pending application, for patent, Serial No. 531,031, filed April 14, 1944.

In such structures the seat and back, locked together as a rigid unit, is shifted by manipulation of the seat from sofa position until the back reaches bed position, and subsequently the seat by further manipulation is released from its locked relation to the back and lowered to bed position. After use as a bed, the movements roughly are reversed, the seat and back restored to locked relation and shifted back as a rigid unit to the original sofa position.

In shifting the unit from sofa position toward bed position, and in restoring the unit to sofa position, the upper end of the back ordinarily swings rearwardly in an undesirable arc which makes it necessary to shift the entire structure away from the wall, against which it is usually placed, in order that change to a bed may be made and after the subsequent shift back from bed to sofa position the entire structure must again be moved back against the wall. During such shifts, the seat and back as a unit are out of balance and a not inconsiderable lift must be exerted on the seat to start the movement and a similar force exerted to prevent the back slamming down on the supporting frame as the back approaches bed position, and efforts so far made to correct or improve any one of these undesirable features have in general accentuated the others thereof.

The objects of the present invention are:

To provide a sofa bed which includes an articulated seat and back unit, means for supporting said unit for shift from seat to bed positions and return, which maintains a substantially vertical path of travel of the upper end of said back during such shifts;

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To provide shiftable support means for said unit which minimize rise and fall in the path of shift of the movable centers in moving from seat to bed position and vice versa;

To provide a shiftable support means for a sofa bed unit in which final seating movement of the back into bed position is accomplished by reversal of movement and lift of the unit, tending to check the movement;

To provide a simple and efficient and economical bracket for accomplishing the hinge supports;

To provide shiftable sofa bed supporting means in which the movement of the unit toward sofa position is limited by contacting engagement of the supporting arms and a stable position of the back effected in such position, and in which the opposite movement of the unit parts toward bed positioning is likewise terminated by contact of the arms and a stable support effected for the then forward edge of the back and rear edge of the seat in bed positions.

The means by which the foregoing and other objects are accomplished, and the manner of their accomplishment, will readily be understood from the following specification upon reference to the accompanying drawings, in which:

Fig. 1 is an end elevation of a sofa bed, including the seat, back and supporting base, with the back and seat positioned as they are when in use as a sofa, the view also showing, in dotted, lines, an intermediate position of shift from sofa toward bed position which indicates that the path of travel of the upper edge of the back is substantially along a vertical line.

Fig. 2 shows the same parts with the back approaching bed position, and in dotted lines, completion of the movement of the back to bed position, this view further showing that the path of travel of the upper edge of the back is substantially along the vertical line. This figure also shows an alternate base construction.

Fig. 3 shows both the back and seat in bed position.

Fig. 4 is a sectional elevation on the line IV—IV of Fig. 1.

Fig. 5 is a plan view of the base bracket which pivotally supports the lower ends of the support arms.

Fig. 6 is a front; and

Fig. 7 an end elevation of the bracket; and

Fig. 8 an outline plan of the blank as stamped out for the bracket.

Referring now to the drawings in which the various parts are indicated by numerals:

11 is a hinge bracket having a flange 13 through which it is secured to the member 15 of the back. 17 is a similar bracket secured to the member 19 of the seat. The two brackets, hereinafter designated as back and seat brackets, are hingedly connected by a pivot pin 21, and accomplish the articulating or hinging together of the back and seat.

23 is a base and 25 a base bracket secured thereto, this bracket forming the lower support for a pair of support arms 27 and 29. The arm 27 is pivotally secured at its upper end to the hinge pin 21 and similarly pivotally secured at its lower end to the bracket 25 by a hinge pin 31. The arm 29 is pivotally secured at its upper end through a pin 33 to the back bracket 11, and at its lower end through a pin 35 to the base bracket 25, the construction as described being more or less typical.

Centrally fore and aft the upper edge of the base 23 is cut away, as shown in Figs. 1 and 3, so that the central portion will be lower than at the front and back, and the seat in sofa position may be supported by the front edge or portion of the base with the back edge of the seat at a lower level to provide desired seat slope, the forward and back edges or portions of the base being at proper level to support both the seat and back when in bed position. In Fig. 2 this is accomplished by upward extensions 37, 39 at the front and back ends of the base to effect a support at such points for the seat and back members 19 and 15 when in bed position, and at the same time allow the seat when in sofa position, as shown in Fig. 1, to be supported at its forward edge and slope downward toward the back in desirable manner.

The bracket 25 comprises a plate-like portion, designated throughout the drawings by the bracket identifying number 25, which seats against the side face of the base 23 and an inwardly turned flange portion 25A which rests on and is supported by the upper edge of the base in the centrally depressed portion thereof, the plate portion of the flange member 25 being secured to the base as by screws 41, for which suitable holes 25B are shown in Figs. 5, 6 and 8. The plate portion of the member 25 is also provided with a hole 25C for the pivot pin 31, this hole lying below the level of the depressed portion of the base when the bracket 25 is in place. At the opposite end of the bracket post a portion 25D extends upward and is provided with a hole 25E for the pivot pin 35, the post portion being off-set outwardly to overlie the arm 29.

The post 25 is of such height that the pin 35 will be positioned well above the central depressed portion of the base in close proximity to the level of the bottom of the back member in its bed position 15A, and the support arms of such length and relative positioning that the rear end of the seat member 19, in seat position, will lie well below the pin level. The pins are spaced apart along the bracket, and the bracket positioned to establish the pin 35 substantially the same distance forwardly of the pin 33 in seating position of the unit that the pin 31 is rearwardly from the position 21A of the pin 21 in its greatest position of forward shift, Fig. 2, balancing as nearly as possible the travel paths of the two pins during shift, and reducing as far as possible the rise in such paths during travel from seating toward bed position. The shortening of the arm 29 made possible by the high position of the pin 35 also makes it possible to allow the pin 21 to over-travel to the position 21A (Fig. 2) and then be compelled to move backward and upward to the position 21B as the pin 33 completes its downward movement from the position 33A to the position 33B and the back moves into the bed position 15A.

The arm 29 preferably extends vertically upward from the pin 35 and is then bent rearward to lie along the underside of the arm 27 when the back and seat are in sofa position, effecting a solid stop for these parts, a steady support for the rear edge of the seat, and a rigid brace holding the back in upright position.

37 is a tension spring attached as by pins 39 and 41 to the arm 27 and base 23 respectively, and as shown in Fig. 1, being extended when the sofa bed is in sofa position to aid in making the shift to bed position. The spring 37 is of such length that it closes and its pull on the arm 27 ceases as that arm reaches a vertical position and the need for spring tension disappears.

The pin 39 may extend entirely through the arm 27 and therebeyond into cooperative overlying relation with the bracket 25 to stop the rearward swing of the arm and rearward movement of the back, and in such case the arm 29 need not be bent.

In sofa position the back is substantially locked against either forward or backward movement. Shift to bed position is accomplished by a forward and upward pull on the seat, which is aided as the pins 21 and 33 move upward about the centers 31 and 35, by the spring 37. During this movement the top edge of the back 15 moves substantially straight downward, the deviation being so slight that it is not readily detected, and it is not necessary to move the sofa bed away from the wall to permit shifting either to or from bed position.

Also the shift of the support centers, the pins 21 and 33, are along flat horizontally disposed arcs which reduce the actual weight lift to a minimum. As shift progresses the back moves downward from upright to horizontal position and the seat oppositely, a minimum of effort being necessary to make the shift and the back moving fairly close to bed position before it is necessary to hold the seat back, to check the back movement and prevent slamming.

In these movements, the seat and back move as a unit until the back reaches bed position, and the upper end of the arm 29 swings against the arm 27, as shown in dash lines in Fig. 2, and in Fig. 3, providing a solid support for the then forward edge of the back and the rear end of the seat. The seat is unlatched in the usual manner of such beds and lowered about the pin 21 with its rear edges solidly supported until its forward end rests on and is supported on the base.

Subsequently the seat is raised and relatched to the back in well known manner, and seat and back are restored to seating relation, the supporting arm, as before, largely balancing the movements and the spring easing the shock of seating as movement and final positioning accomplished by contact of the arms 27 and 29. Unlatching and latching means are shown and described in my aforesaid application, Serial No. 531,031.

I claim:

1. In a sofa bed, including a base, a back and a seat; means at opposite ends thereof for supporting said back and seat for shift from sofa to bed positions and vice versa, each said sup-

port means including hinge members coupled by a hinge pin and secured to the bottom and rear edges respectively of said back and seat, a first arm pivotally coupled at its lower end to said base, and at its upper end to said hinge pin, a second arm pivotally coupled at its lower end to said base rearwardly of said first arm, and at its upper end to said back hinge member rearwardly of and above said hinge pin in sofa position of said back, said second arm being bent to extend upwardly from its lower pivot to engagement with said first arm and from such engagement to its upper pivot when said back is in upright position, effecting with said first arm a stop against rearward movement of, and a brace for said back, and being pivoted to swing forwardly about said lower pivot when said back is moved from sofa to bed position, and being of a length to contact said first arm when said bed position is achieved, said first arm being of length to support the hinge edge of said back level with the opposite edge thereof when so contacted by said second arm.

2. In a sofa bed, including a base, a back and a seat; means at opposite ends of said bed for supporting said back and seat for shift from seat to bed positions and vice versa, each said support means including hinge members coupled by a hinge pin and secured to the bottom and rear edges respectively of said back and seat, a bracket carried by said base, a first arm pivotally coupled at its lower end to said bracket, and at its upper end to said hinge pin, a second arm pivotally coupled at its lower end to said bracket rearwardly of and above said first arm pivot, and at its upper end to said back hinge member rearwardly of and above said hinge pin in sofa position of said back, said second arm in such position of said back extending upwardly from its lower pivot to engagement with said first arm and being rearwardly bent to extend from said engagement to its upper pivot, effecting with said first arm a stop against rearward movement of, and a brace for said back, and being pivoted to swing forwardly about said lower pivot when said back is moved from sofa to bed position and being of a length to contact said first arm when said bed position is achieved, said first arm being of length to support the hinge edge of said back level with the opposite edge thereof when so contacted by said second arm.

3. In a soft bed, including a base, depressed intermediate its ends, to allow downward inclination of said seat toward the back, a back and a seat; means at opposite ends of said sofa bed for supporting said back and seat for shift from sofa to bed positions and vice versa, each said support means including hinge members coupled by a hinge pin and secured to the bottom and rear edges respectively of said back and seat, a bracket carried by the depressed portion of said base and having at its rear end a post portion extending substantially to the level of the top of said base, a first arm pivotally coupled at its lower end to said bracket, forwardly of said post, and at its upper end to said hinge pin, a second arm pivotally coupled at its lower end to said bracket post above the rear edge of said seat in sofa position, and adjacent the bottom of said back in bed position, and at its upper end to said back hinge member rearwardly of and above said hinge pin in sofa position of said back, said second arm in such position of said back extending upwardly from its lower pivot to engagement with said first arm and being rearwardly bent to extend from such engagement to its upper pivot, effecting with said first arm a stop against rearward movement of, and a brace for said back, and being pivoted to swing forwardly about said lower pivot when said back is moved from sofa to bed position and being of a length to contact said first arm when said bed position is achieved, said first arm being of length to support the hinge edge of said back level with the opposite edge thereof when so contacted by said second arm.

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