Nov. 3, 1959 R. A. FISHER 2,910,706

SOFA BED

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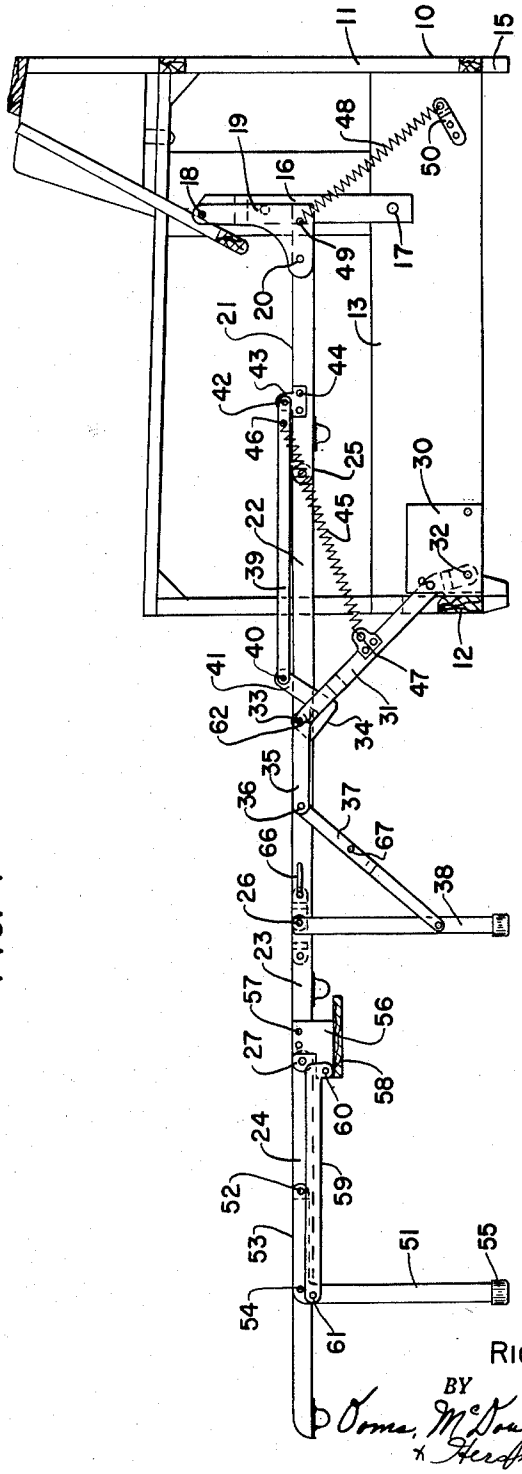


FIG. 1

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FIG. 2

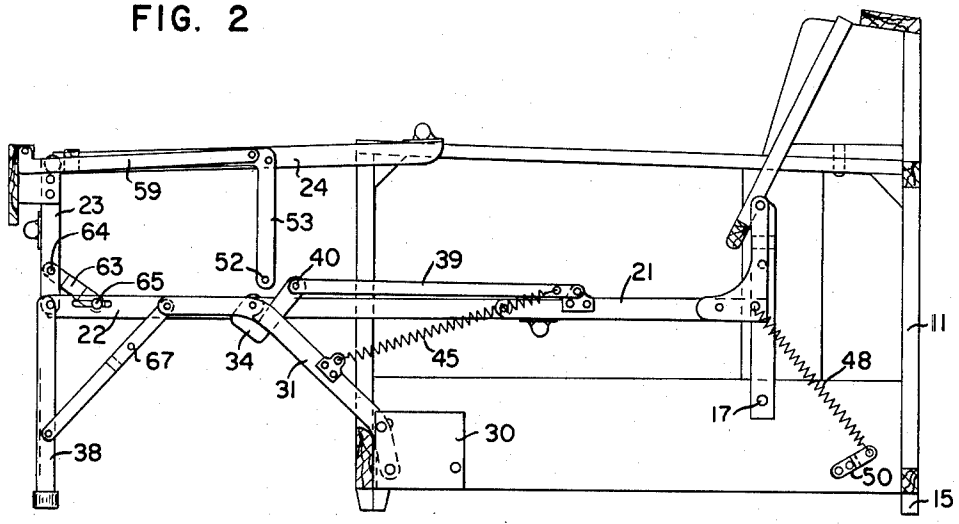
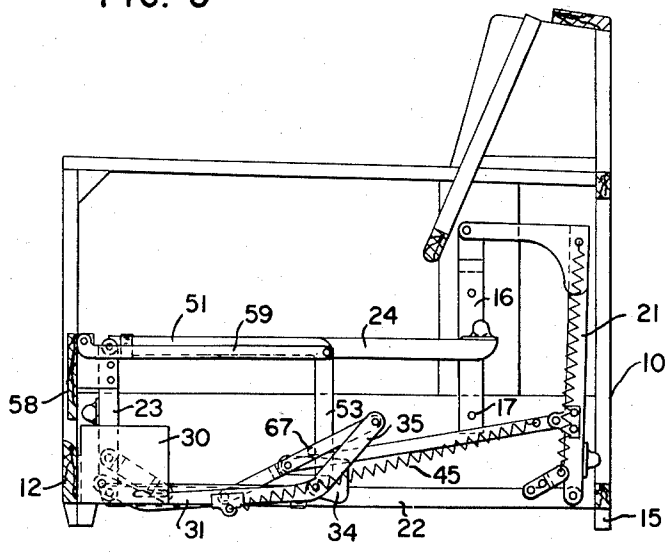


FIG. 3



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SOFA BED

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Application March 15, 1955, Serial No. 494,318

2 Claims. (Cl. 5—55)

This invention relates to a sofa bed and more particularly to a structure of the type described which, in one position of adjustment, may be used exclusively as a sofa upon which a number of persons may be comfortably seated and, in another position of adjustment, represents a full size bed upon which one or more persons may rest in comfort.

This application is a continuation-in-part of my copending application Serial No. 370,985, filed on July 29, 1953, now abandoned, and entitled "Sofa Bed."

It is an object of this invention to produce a sofa bed of the type described which may be unfolded in a simple and efficient manner to form a full-sized bed and which may as easily and quickly be folded into a sofa; which automatically operates to draw the sections of the bed frame together in folded position responsive to final movement of the bed frame for folding to form the sofa; which operates automatically to latch the elements in folded position during final movements of the bed frame to sofa position and which releases the elements of the bed frame from unfolding to bed position responsive to initial operation for conversion of the sofa bed from sofa position to bed position, and which embodies means operative to effect engagement between the bed frame members to prevent distortion when folded into position for use as a sofa.

These and other objects and advantages of this invention will hereinafter appear and for purposes of illustration, but not of limitation, an embodiment of the invention is shown in the accompanying drawing, in which—

Figure 1 is a side elevational view of the sofa bed embodying features of this invention, with parts of the sofa frame omitted for illustration of the bed frame in its extended or bed position;

Figure 2 is a side elevational view similar to that of Figure 1, but illustrating the bed frame in a partially folded position or intermediate bed and sofa position; and

Figure 3 is a side elevational view similar to that of Figure 1, with the bed frame folded to sofa position.

Since the inventive concepts described and claimed herein reside chiefly in the construction and operation of the bed frame for folding to sofa position and for unfolding to bed position, description herein will be limited thereto. It will be understood that bed springs, upholstery and the like will be applied in various ways to the completed structure.

As illustrated in the drawing, the sofa frame 10 is formed with a rear wall 11, a front wall 12, and side walls 13, all of which are interconnected to form a rigid rectangular structure supported on short legs 15. Description will now be made to the bed frame members which are folded into and out of the sofa frame between sofa and bed positions respectively. It will be understood that the bed frame sections extend crosswise between the side walls of the sofa frame, and that the frame sections on one side correspond in construction and operation to the frame sections on the opposite side, so that it will be sufficient hereafter to define the elements and their relationship along one side of the bed frame.

The bed frame comprises four elongate metal sections hereinafter referred to as the rear section 21, rear intermediate section 22, forward intermediate section 23, and foward section 24. The forward end portion of the rear section 21 is pivotally connected to the rear end portion of the rear intermediate section 22, as at 25. The forward end portion of the rear intermediate section 22 is pivotally connected to the rearward end of the forward intermediate section 23, as at 26, and the forward end of the forward intermediate section 23 is pivotally connected to the rear end of the forward section 24, as at 27.

The rearward end portion of the rear section 21 is secured, as by means of spaced-apart rivets 20, to the lower end portion of a bracket arm 19 which is pivoted at its other end 18 upon the upper end portion of a metal plate 16 rigidly secured, as by means of screws 17, to the side wall 13 in the rearward portion of a sofa frame pivotally to support the rearward end portion of the bed frame at a level to align the sections lengthwise when unfolded to bed position.

A metal plate 30 is fixed to the side wall 13 of the sofa frame 10 adjacent the forward end portion thereof and a supporting lever arm 31 of bell shape is pivoted at one end, at 32, on the plate 30. An intermediate portion of the lever arm 31 is pivoted at 33 onto a bell crank 34 while the other end portion 35 is pivotally connected at 36 to the upper end of a link 37 which is pivoted at its other end onto an intermediate portion of an intermediate leg 38 pivotally suspended from the pivot 26 between the forward intermediate section 23 and the rearward intermediate section 22.

The bell crank 34 is pivoted at 33 to the side of an intermediate portion of the rear intermediate section 22. A link 39 is pivotally connected at one end 40 onto the free upper end 41 of the bell crank while the opposite end of the link 39 is pivoted at 42 onto a bracket 43 fixed, as by rivets 44, to an intermediate portion of the rear section 21. The bracket has a portion extending upwardly beyond the frame section 21 and onto which the link is pivoted normally to space the link 39 a short distance above the aligned frame members when in open position. A tension spring 45 is anchored at one end upon a lug 46 fixed to the link 39 closely spaced from the rivet 42 while the other end of the spring 45 is secured onto a bracket 47 fixed to an intermediate portion of the bell lever 31 between the pivot 32 and the pivot 33. Another tension coil spring 48 is anchored at one end upon a stud 49 fixed to the arm 19 or the rearward end of the rear section 23 while the other end of the coil spring 48 is anchored onto a bracket 50 fixed to the side wall 13 of the frame member rearwardly and beneath the bed frame section when in open position.

Pivoted to the side of the forward section 24 intermediate the ends thereof is a forward leg 51 in the form of a bell lever having a locking pin 52 extending inwardly from the arm portion 53 which extends rearwardly from the pivot 54 of the bell lever. A cap 55 is provided on the end of the downwardly extending leg portion 51 for resting upon the surface.

A metal plate 56 is secured, as by means of rivets 57, to the side wall of the forward intermediate section 23 adjacent the pivot 27. The plate depends from the side of the frame section and supports a board 58 which becomes, in effect, an upward extension of the front wall 12 when the frame is folded to sofa position. Interconnecting the forward leg 51 with a portion of the bracket 56 is a link 59 pivoted at 60 to the bracket 56 immediately below the pivot 27 while the other end of the link is pivoted at 61

to a portion of the leg 51 immediately below and in closely spaced relation with the pivot 54.

The bell crank 34 is formed with a recess 62 in which the locking pin 52 is received as the bell crank is rocked by the link 39 about its pivot 33 during final displacement of the bed frame sections to folded or sofa position thereby, in effect, to pull the forward section 24 downwardly towards the underlying rear intermediate section 23 when in folded position and securely to latch the two sections together, as will hereinafter be described.

A short link 63 is pivoted at one end on a pin 64 extending inwardly from the side wall of the forward intermediate section 23 spaced outwardly a short distance from the pivot 26, and a pin 65 next to the other end of the link 63 is slidably received within a short slot 66 extending longitudinally in the forward end portion of the rear intermediate section 22 closely adjacent the pivot 26.

In the unfolded or extended position, generally referred to as the bed position, illustrated in Figure 1 of the drawing, the bed frame sections 21, 22, 23, and 24 are substantially aligned lengthwise and the other parts are in the positions described. In folding the bed from bed position to sofa position, the forward section 24 is rocked upwardly about its pivot 27 through an angle of about 90 degrees and then the forward intermediate section 23 is similarly rocked about its pivot through an additional angle of about 90 degrees. This brings the sections into the position shown in Figure 2 with the forward section 24 disposed in parallel relation with the rear intermediate section 22 but spaced upwardly therefrom by an amount corresponding to the length of the short forward intermediate section 23.

As the forward section 24 is rocked upwardly about its pivot 27, the link 59 causes the lever, a part of which forms the leg 51, to swing about its pivot 54 to bring the leg portion 51 substantially alongside the frame section, while the arm portion 53 having the inwardly extending locking pin 52 extends rearwardly substantially perpendicularly from the frame section.

Then as the forward intermediate frame section 23 is rocked about its pivot, the pin 65 in the end of the link 63 is displaced rearwardly within the slot 66 to the position shown in Figure 2 and the locking pin 52 on the end of the lever arm 53 is positioned immediately above the recess 62 of the bell crank 34 and forwardly of the end portion 41 to which the end of the link 39 is attached.

One of the important concepts of this invention resides in the means for pulling the forward section 24 closer to and in parallel relation with the rear intermediate section 22 responsive to the folding of the sections from the intermediate position shown in Figure 2 to the folded sofa position shown in Figure 3, and for latching the two sections together in their folded position. For this purpose, the leg 51 is formed as a bell lever having the latching pin 52 on the end of the bell arm in position to be displaced into the recess 62 of the bell crank 34 as the bell crank is rocked outwardly in the counter-clockwise direction about its pivot 33 by the link 39 as the bed frame is displaced rearwardly to folded position.

Another important feature of this invention resides in the means for preventing the folded bed frame sections from becoming distorted to form a parallelogram instead of being arranged more or less to rectangular shape, as desired for proper support and arrangement. It will be apparent from the arrangement of parts as illustrated in Figure 2 that the spaced relationship between the pivot 54 and the link pivot 61 will be insufficient by itself to maintain the elements in their squared relation so that reliance alone on this arrangement would be insufficient to prevent the interconnected bed frame sections to become displaced under load to form a parallelogram which would bring the various parts out of alignment. For purposes of maintaining the desired relationship between the parts, applicant provides a pin or stud on an intermediate portion 67 on an intermediate portion of the link 37 to extend inwardly therefrom a distance sufficient to engage the arm portion 53 of the bell lever 51 at a point spaced a substantial distance above the locking pin 52 and beneath the pivot pin 54 to prevent displacement of the arm from its upright position, as illustrated in Figure 3. Rigid support to prevent rocking movement of the arm 53 engaged at both ends by elements of the frame members functions to hold the elements in their rectangular or squared position and to prevent displacement or distortions thereof into a parallelogram or the like.

As the parts of the extensible frame are shifted from the position of Figure 2 to the sofa position shown in Figure 3, the rear section 21 swings about the pivot 18 and assumes a position at substantially right angles to the rear intermediate section 22 and becomes vertically disposed in the rear end of the sofa frame. This relative pivotal movement between the sections 21 and 22 causes the link 39 to actuate the bell crank 34 for rocking movement about its pivot 33 in the counter-clockwise direction so that the arm section 41 engages the locking pin 52 located immediately in advance thereof to displace the locking pin by cam action into the recess 62 concurrently to draw the forward frame section 24 in the direction towards the rear intermediate frame section 22. As the bell crank is rocked through an angle of more than 90 degrees, the locking pin becomes latched within the recess and beneath the arm portion 41 so as to prevent displacement of the pin upwardly or outwardly, thereby to latch the frame sections together.

As the frame sections are displaced from the position shown in Figure 2 to the folded position of Figure 3, the bell lever 31 is rocked about its pivot 32 to carry the frame sections in an arc upwardly about the pivot 32 and then down into the sofa frame. Concurrently therewith, the end portion 35 is rocked about the pivot 33 in a manner to pull the link 37 rearwardly and upwardly to pivot the intermediate leg 38 about the pin 26 into a position substantially in alignment with the rear intermediate frame section 22, while the lug 67 engages an intermediate portion of the arm 53 between the engaged locking pin 52 and the pivot pin 54 to hold the arm in the vertical position.

It will be understood that in sofa position, the seat cushions may be placed upon and be supported by the uppermost horizontally disposed forward frame section 24. The latter is held against both upward and downward movement by the locking pin 52 engaged within the bell crank 34 and it is held against forward displacement by engagement between the stud 67 and the arm 53. The board 58 attached to the plate 56 becomes located immediately above and in alignment with the front wall 12 to form an extension thereof to a level corresponding to the upper portion of the bed frame sections 24, when in folded or sofa position.

From the foregoing it will be apparent that I have provided a new and improved means for latching the extensible bed frame members in sofa or folded position and for holding the folded bed frame members in the desired rectangular relationship to prevent distortions in positions of use. It will be understood that the lug 67 for holding the parts in their squared positions may be shifted to other locations on the link 37 properly to engage the arm portion 53 of the bell lever 51, and that the stud for holding the elements in squared position may also be located on other elements which are brought into corresponding relation with the bed frame members to engage said members in a manner to prevent shifting movement from the desired rectangular or squared position when folded.

It will be understood that other changes may be made in the details of construction, arrangement and operation without departing from the spirit of the invention, especially as defined in the following claims.

I claim:

1. A sofa bed comprising a fixed sofa frame, an ex-

tensible bed frame pivotally attached to the fixed sofa bed and movable between extended bed position and a collapsed sofa bed, said extensible frame comprising a rear frame section, a rear intermediate frame section, a forward intermediate frame section and a forward frame section in which the end portion of one section is pivotally connected to the end portion of the adjacent section, means for enabling the forward frame section to be folded through an angle of about 90° relative the forward intermediate frame section and means for enabling the forward intermediate frame section to be rocked through an angle of about 90° on the rear intermediate frame section to bring the forward frame section in spaced parallel relation with the rear intermediate frame section and to position the frame sections whereby they may be displaced as a unit rearwardly into the fixed sofa frame, a link pivotally mounted on the forward frame section for rocking movement to bring one end portion of the link parallel with the forward frame section when in unfolded position and to depend perpendicularly therefrom towards the rear intermediate section when in folded position, a locking pin on said one end portion of said link, a securing lever pivotally mounted for rocking movement to the rear intermediate frame section in position to engage the locking pin on said link when the forward frame sections are displaced to folded position, means responsive to displacement of the folded frame sections to collapsed position into the sofa frame for rotating the securing lever about its pivot into locking latching engagement with the locking pin for securing the frame members in folded position and which is responsible during initial movement of the frame members from collapsed to extended position for unlatching the locking pin to release the folded forward frame sections for movement to extended position and an abutment on another link which is operatively connected to one of the forward frame sections for rocking movement responsive to movement of the frame sections to their folded positions whereby the abutment is brought into position operatively to engage an intermediate portion of the link carrying the locking pin between its pivotal connection to the forward frame section and the locking pin engaged by the latching means to maintain the desired squared relationship between the folded bed frame sections when in folded position.

2. A sofa bed comprising a fixed sofa frame, an extensible bed frame pivotally attached to the fixed sofa bed and movable between extended bed position and a collapsed sofa bed, said extensible frame comprising a rear frame section, a rear intermediate frame section, a forward intermediate frame section and a forward frame section in which the end portion of one section is pivotally connected to the end portion of the adjacent section, means for enabling the forward frame section to be folded through an angle of about 90° relative the forward intermediate frame section and means for enabling the forward intermediate frame section to be rocked through an angle of about 90° on the rear intermediate frame section to bring the forward frame section in spaced parallel relation with the rear intermediate frame section and to position the frame sections whereby they may be displaced as a unit rearwardly into the fixed sofa frame, a link pivotally mounted on the forward frame section for rocking movement, a locking pin on said link, a securing lever pivotally mounted for rocking movement to the rear intermediate frame section in position to engage the locking pin on the link when the latter is displaced to folded position, means responsive to displacement of the folded frame sections to collapsed position into the sofa frame for rotating the securing lever about its pivot into locking latching engagement with the locking pin for securing the frame members in folded position and which is responsible during initial movement of the frame members from collapsed to extended position for unlatching the locking pin to release the folded forward frame sections for movement to extended position, and an abutment on a link pivotally connected to the rear intermediate section for rocking movement responsive to movement of said rear intermediate section to folded position whereby the abutment is brought in position to engage the link supporting the locking pin at a point spaced from the locking pin and the pivotal connection to the forward frame section upon engagement of said locking pin by said securing lever to brace the link at three spaced-apart points to maintain the sections substantially perpendicularly relative to each other in the folded position and in which the abutment is free of the sections when in unfolded position.

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