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(54) "HIGH-LOW BACK FOR CHAIR"

(71) We, LA-Z-BOY CHAIR COMPANY a Company organized and existing under the laws of the State of Michigan, United States of America, of 1284 N. Telegraph Road, Monroe, Michigan, United States of America, do hereby declare the invention, for which we pray that a Patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to an improved chair in which the back and seat are movable relative to each other.

A lounging chair usually has a high back extending upwardly from a seat so as to be engaged by the shoulders and head of an occupant when reclining in the chair. Such a high back on a chair usually does not fit well in a room having low backs on the davenport, settees, chairs and the like.

The present invention, in its preferred form, pertains to a lounging chair which has a low hollow back in which an extensible back section is pivotally mounted for swinging movement rearwardly, upwardly and forwardly over the top of the back frame to provide a substantial extension thereto. After the back section is moved to this position in extension of the back frame, the back and its extension can be moved rearwardly and downwardly to move the seat forwardly and upwardly to a reclining position. In this position, a leg rest may be extended forwardly to provide a complete reclining position for the chair occupant.

Reference may be had to United States Patent Specification No. 2,863,495 which provides teaching of extensible backs for seats.

According to the invention there is provided a chair comprising a base frame; a seat frame; a back frame having spaced side members forming a hollow back which is open rearwardly; linkage means for inter-connecting the back and seat frames for

movement relative to each other; a back section; upper and lower pairs of links, a pair of plates secured one to each of the inner surfaces of the side members; pivot means securing the upper ends of the links of said pairs of links to the plates and the lower ends to the back section, said plates each having an arcuate slot located adjacent to the pivot thereon which supports one of the lower links, said lower links each crossing the arcuate slot of the associated plate to which it is pivoted; operating rods each having means at its upper end projecting through an associated lower link and an associated arcuate slot; and means connecting the lower ends of the operating rods to the seat frame whereby movement of the seat frame relative to the back frame produces movement of the operating rods to move the back section relative to the back frame. In the later described preferred construction, the operating rods extend downwardly for securement to a cross tube having one arm of a bellcrank secured to each end thereof. The bellcranks operate the seat linkage means initially to advance and raise the seat frame when the back section is moved to extend position. The movement also releases a hook from the linkage at each side of the seat frame and permits the links to operate to move the back and seat to reclining position.

The lower part of each plate has the arcuate slot struck therefrom and the lower links have a pivoted roller carried by the projecting means and received in the slot to cause the bottom of the back to move outwardly, upwardly and inwardly to a position over the top of the back frame. The back section is locked in this position when the rollers move into the slot extensions at the top of the arcuate section. The back section will move with the back to reclined position when the weight of the occupant is applied thereto. The back will be raised from reclining position to upright position when

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weight of the occupant is moved forward on the seat frame which will move down and to the rear. The end of this movement moves the roller in the straight portion of the arcuate slot downwardly so that the back section can be moved backwardly, downwardly and forwardly to nested position within the back frame.

The invention will be further described, by way of example with reference to the accompanying drawings, wherein:

Figure 1 is a diagrammatic view in elevation of a chair embodying the present invention having a chair frame with an extensible back section nested in a back frame with the back frame in upright position;

Figure 2 is a reduced scale view of the chair illustrated in Figure 1 with the back section moved to extended position;

Figure 3 is a view of the chair illustrated in Figure 2 with the back frame in reclined position and with the seat frame in raised, forward position;

Figure 4 is a plan view of the mechanism between the base frame and seat and back frames at the lefthand side of the chair;

Figure 5 is a plan view of the mechanism between the back frame and back section at one side of the seat, and

Figure 6 is a reduced view of the structure illustrated in Figure 3, with the back frame, back section and seat frame in completely inclined position and with the leg-rest extended.

A chair 11 of the reclining type has a base frame 12, a seat frame 13 and a back frame 14. The seat frame 13 and back frame 14 are interconnected at each side of the base frame 12 by linkage means 15. The seat frame 13 has a rear bracket 16 to which a lever 17 is secured by a pivot 18, the upper end of the lever 17 being secured to the back frame by a screw 19. The lever 17 is also secured by a pivot 21 to a bracket 22 secured by screws 23 to the base frame 12. The bracket 16 also has a bellcrank 24 secured thereto by a pivot 25. The lower ends of the bellcranks 24 are interconnected by a tube 26. The upper end of the bellcrank 24 is secured by a pivot 27 to the rear end of a link 28 having a downwardly extending end 29 containing a bushing 31 which is disposed within a slot 32 in a link 33 which is secured to the end of the lever 17 by a pivot 34. The link 33 is bent downwardly beyond the slot 32 to provide a downwardly extension 35 which is secured by a pivot 36 to the end of one arm 56 of a bellcrank 37. The other arm of the bellcrank is secured by a pivot 38 to a plate 39 which is secured to the base frame 12 by a plurality of screws 41.

A bracket 42 is secured to the forward portion of the seat frame 13 to which a link 43 is secured by a pivot 44. The opposite end of the link 43 is secured by a pivot 45 to the apex

of the bellcranks 37 where the base of the two arms join. A spring 46 has one end secured in an aperture through a finger 47 extending downwardly from the bracket 16, the opposite end being connected to the end 48 of a C-shaped link 50 of the leg rest operating mechanism. A second spring 49 has one end connected to the forward end of the link 28 and to an extension on the pivot 45.

A hook link 51 is secured by a pivot 52 to the upper portion of the downwardly extending end of the link 33 having the end opposite to that containing the hook secured by a pivot 53 to a link 54 which is secured by a pivot 55 to the arm 56 of the bellcrank 37. The hook of the link, as illustrated in Figure 1, is in engagement with bushing 31 on the end of the downwardly extending portion 29 of the link 28 when the back is in erect position. This stabilizes the linkage systems so that all of the links are properly oriented when the back section is moved to upright position illustrated in Figure 1. The movement of the back section on the back frame upwardly into extended position moves the hook on the end of the hook link 51 from engagement with the end of the bushing 31.

The back frame 14 embodies two side members 59 interconnected by a cross member 57 at the bottom and by an arcuate cross member 58 at the top. The side members 59 of the back frame are spanned by sinuous type springs (not shown) which extend forwardly thereof, with the upholstered material placed thereover and over the sides in the usual manner. This leaves the inside of the back frame hollow and open to the rear for supporting a back section 61 which is mounted to move rearwardly, upwardly and forwardly over the top of the back frame, as illustrated in Figure 2.

The back section 61 is herein illustrated as being made from a plywood board 62 which has an arcuate extension 63 at the rear top edge. The board 62 has a bracket 64 at each side containing forwardly extending fingers 65 and 66 to which bottom links 67 are secured by pivots 71. The links are mounted by pivots 70 to the plates 72 which are secured to each inner face of the back frame side members 59 by screws 73. A roller 74 is pivoted to the links 67 for travel in a slot 75 in the plates 72 struck from the lower pivots 70 having extensions 76 and 77 at the lower and top end, respectively. The pivots for the rollers 74 support one end of rods 78 which are interconnected near the top by a cross rod 79. Brackets 81 through which the end of the rods 78 pass secure the ends in predetermined relation to the ends of the tube 26.

When the back frame is in upright position, as illustrated in Figure 1, the bottom of the plywood board 62 is pulled outwardly and upwardly with the roller passing through the arcuate portion of the slot 75 raising the

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arm of the bellcrank 24 to substantially a horizontal position as illustrated in Figure 4. The back section 61 moves forwardly at the end of its upward movement over the top edge of the back frame in an upward extension thereof. The roller moves within the upper extension 77 of the slot and thereby locks the back section in extended position, as illustrated in Figure 2. The back frame and section can then be moved rearwardly and downwardly to completely reclined position, as illustrated in Figure 3.

When in the position illustrated in Figure 3 the operating handle (not shown) rotates a shaft 82 to extend the links 83 and move the leg rest 84 forwardly of the seat frame so that a complete reclining position for the occupant of the lounging chair may be had, as illustrated in Figure 6.

The forward movement of the occupant on the seat frame will cause it to move downward and backward to move the back frame to the erect position illustrated in Figure 2. The forward weight on the seat frame 13 moves the rollers 74 downwardly from the slot extension 77 and permits the back section 61 to be swung downwardly and forwardly into nested position within the back frame as illustrated in Figure 1. The leg rest may be retracted before or after this final movement by the manipulation of the handle in the reverse direction from that by which it was extended. The leg rest 84 has not been described herein in detail as a description thereof is found in the patent to United States Patent No. 3,357,739 for "LOUNGE CHAIR". The links 83 are secured to the seat frame 13 on the bracket 42 to have the leg rest and its link mechanism move therewith. In the final movement of the back frame and section from the position illustrated in Figure 2 to that illustrated in Figure 1 the link 54 will cause the hook link 51 to swing back to its initial position illustrated in Figure 1 with the hook extending over the bushing 31 in secured latched position.

The base frame, seat frame, back frame and leg rest are all upholstered in the usual manner with the exception that the back frame is open from the rear for the nesting of the back section therein. The back frame is completely upholstered as well as the back section so that when nested the back section will hardly be recognized as a separate element. When the back section 61 is extended, its upholstery matches that of the back frame the inside of which is preferably upholstered in the same material. It will be noted that the seat frame 13 is in its downwardmost retracted position in Figure 1 and has moved slightly forwardly and upwardly by the movement of the back section to extended position, as illustrated in Figure 2, and that the seat is moved substantially further upwardly when the back frame 12 is moved to

inclined position, as illustrated in Figure 6. Maximum comfort is provided for the occupant when the chair 11 is in completely inclined position and the leg rest 84 has been extended forwardly, as illustrated in the figure.

WHAT WE CLAIM IS:—

1. A chair comprising a base frame; a seat frame; a back frame having spaced side members forming a hollow back which is open rearwardly; linkage means for interconnecting the back and seat frames for movement relative to each other; a back section; upper and lower pairs of links, a pair of plates secured one to each of the inner surfaces of the side members; pivot means securing the upper ends of the links of said pairs of links to the plates and the lower ends to the back section, said plates each having an arcuate slot located adjacent to the pivot thereon which supports one of the lower links, said lower links each crossing the arcuate slot of the associated plate to which it is pivoted; operating rods each having means at its upper end an associated lower link and an associated arcuate slot; and means connecting the lower ends of the operating rods to the seat frame whereby movement of the seat frame relative to the back frame produces movement of the operating rods to move the back section relative to the back frame.

2. A chair as claimed in claim 1, wherein said arcuate slots extend downwardly at the bottom for receiving said projecting means for locking the back section in said hollow back of the back frame, movement of the seat frame relative to the back frame upon initially moving the back frame from seating position moving the projecting means upwardly into the arcuate portion of said slots for releasing the back section so that it may swing into a position of extension with the back frame.

3. A chair as claimed in claim 1 or 2, wherein said arcuate slots extend upwardly at the top for receiving said projecting means for locking said back section in extension of said back frame by the further movement of said seat frame toward reclining position without any longitudinal movement between the back frame and the operating rod.

4. A chair as claimed in claim 3, wherein said linkage means interconnects the side members of the back frame with the seat frame to cause the seat frame to move forwardly and upwardly when the back section and back frame are moved to reclined position.

5. A chair as claimed in claim 4, wherein a cross bar is adjustably secured to the lower ends of the operating rods, and wherein said means connecting the operating rods to the seat frame are bellcranks having a pair of angularly disposed arms with pivot means therebetween which are secured to opposite



arm of the bellcrank 24 to substantially a horizontal position as illustrated in Figure 4. The back section 61 moves forwardly at the end of its upward movement over the top edge of the back frame in an upward extension thereof. The roller moves within the upper extension 77 of the slot and thereby locks the back section in extended position, as illustrated in Figure 2. The back frame and section can then be moved rearwardly and downwardly to completely reclined position, as illustrated in Figure 3.

When in the position illustrated in Figure 3 the operating handle (not shown) rotates a shaft 82 to extend the links 83 and move the leg rest 84 forwardly of the seat frame so that a complete reclining position for the occupant of the lounging chair may be had, as illustrated in Figure 6.

The forward movement of the occupant on the seat frame will cause it to move downward and backward to move the back frame to the erect position illustrated in Figure 2. The forward weight on the seat frame 13 moves the rollers 74 downwardly from the slot extension 77 and permits the back section 61 to be swung downwardly and forwardly into nested position within the back frame as illustrated in Figure 1. The leg rest may be retracted before or after this final movement by the manipulation of the handle in the reverse direction from that by which it was extended. The leg rest 84 has not been described herein in detail as a description thereof is found in the patent to United States Patent No. 3,357,739 for "LOUNGE CHAIR". The links 83 are secured to the seat frame 13 on the bracket 42 to have the leg rest and its link mechanism move therewith. In the final movement of the back frame and section from the position illustrated in Figure 2 to that illustrated in Figure 1 the link 54 will cause the hook link 51 to swing back to its initial position illustrated in Figure 1 with the hook extending over the bushing 31 in secured latched position.

The base frame, seat frame, back frame and leg rest are all upholstered in the usual manner with the exception that the back frame is open from the rear for the nesting of the back section therein. The back frame is completely upholstered as well as the back section so that when nested the back section will hardly be recognized as a separate element. When the back section 61 is extended, its upholstery matches that of the back frame the inside of which is preferably upholstered in the same material. It will be noted that the seat frame 13 is in its downwardmost retracted position in Figure 1 and has moved slightly forwardly and upwardly by the movement of the back section to extended position, as illustrated in Figure 2, and that the seat is moved substantially further upwardly when the back frame 12 is moved to

inclined position, as illustrated in Figure 6. Maximum comfort is provided for the occupant when the chair 11 is in completely inclined position and the leg rest 84 has been extended forwardly, as illustrated in the figure.

WHAT WE CLAIM IS:—

1. A chair comprising a base frame; a seat frame; a back frame having spaced side members forming a hollow back which is open rearwardly; linkage means for interconnecting the back and seat frames for movement relative to each other; a back section; upper and lower pairs of links, a pair of plates secured one to each of the inner surfaces of the side members; pivot means securing the upper ends of the links of said pairs of links to the plates and the lower ends to the back section, said plates each having an arcuate slot located adjacent to the pivot thereon which supports one of the lower links, said lower links each crossing the arcuate slot of the associated plate to which it is pivoted; operating rods each having means at its upper end an associated lower link and an associated arcuate slot; and means connecting the lower ends of the operating rods to the seat frame whereby movement of the seat frame relative to the back frame produces movement of the operating rods to move the back section relative to the back frame.

2. A chair as claimed in claim 1, wherein said arcuate slots extend downwardly at the bottom for receiving said projecting means for locking the back section in said hollow back of the back frame, movement of the seat frame relative to the back frame upon initially moving the back frame from seating position moving the projecting means upwardly into the arcuate portion of said slots for releasing the back section so that it may swing into a position of extension with the back frame.

3. A chair as claimed in claim 1 or 2, wherein said arcuate slots extend upwardly at the top for receiving said projecting means for locking said back section in extension of said back frame by the further movement of said seat frame toward reclining position without any longitudinal movement between the back frame and the operating rod.

4. A chair as claimed in claim 3, wherein said linkage means interconnects the side members of the back frame with the seat frame to cause the seat frame to move forwardly and upwardly when the back section and back frame are moved to reclined position.

5. A chair as claimed in claim 4, wherein a cross bar is adjustably secured to the lower ends of the operating rods, and wherein said means connecting the operating rods to the seat frame are bellcranks having a pair of angularly disposed arms with pivot means therebetween which are secured to opposite



sides of said seat frame with one arm of each said pair secured to said cross bar near the ends thereof.

6. A chair as claimed in claim 1, 2, 3 or 4, including brackets provided at each side of the seat frame near the forward and rear portions thereof, bellcranks each having a pair of angularly disposed arms thereon extending from a central portion, pivot means for securing the central portions of said bellcranks to said rear brackets with the arms disposed upwardly extending arms of the bellcranks, and a first further pair of links pivoted to the upwardly extending arms of said bellcranks about which the bellcranks pivot when the seat is initially moved to have the downwardly extending arms of the bellcranks actuate said operating rods.

7. A chair as claimed in claim 6, wherein said linkage means includes a lever which is secured at each outer side of the back frame, means are provided for pivoting each said lever to the base frame with a portion extending downwardly therefrom, a second further pair of links pivoted to the downwardly extending ends of said levers have slots therein, and bushings the forward ends of the links which are pivoted to the bellcrank arms extend into the slots are removable therein.

8. A chair as claimed in claim 7, wherein a second pair of bellcranks each have a pair of angularly disposed arms with the end of one arm pivoted to said base frame, a third further pair of links are each connected at the junction of the arms of the second pair of

bellcranks and to the forward brackets on the seat frame for producing upward and forward movement thereof when the back frame is tilted to inclined position.

9. A chair as claimed in claim 8, wherein a hook link is pivoted to each of said second further links, and fourth further links are pivoted to the other arms of the second bellcranks and to the hook links to cause the latter to be swung into engagement with said bushings to retain the second links against movement until the back section is moved to raised position.

10. A chair as claimed in claim 8, wherein spaced lazy-tong link means are supported on the seat frame front brackets and actuated by a shaft supported on the base frame, a leg rest being supported on the forward ends of said lazy-tong link means.

11. A chair as claimed in any preceding claim, wherein the links of said upper pair of links are L-shaped to have the back section move forwardly over the top of the back frame at the end of back section movement for a position within the back frame to a position thereabove.

12. A chair constructed and arranged to operate substantially as herein described with reference to and as shown in the accompanying drawings.

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