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INVENTOR.
FRIDTJOF F. SCHLIEPHACKE
BY
Amster & Levy
ATTORNEYS

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F. F. SCHLIEPHACKE
HEAD-REST AND CONTROL ARRANGEMENT FOR
MULTIPLE POSITION CHAIR

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FIG. 4.

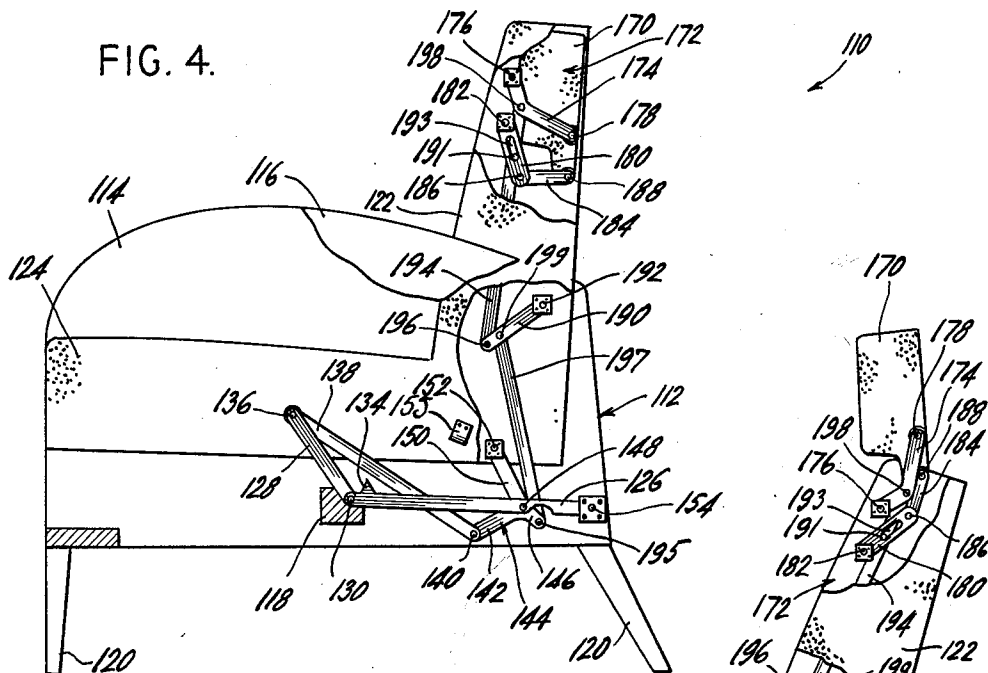


FIG. 5.

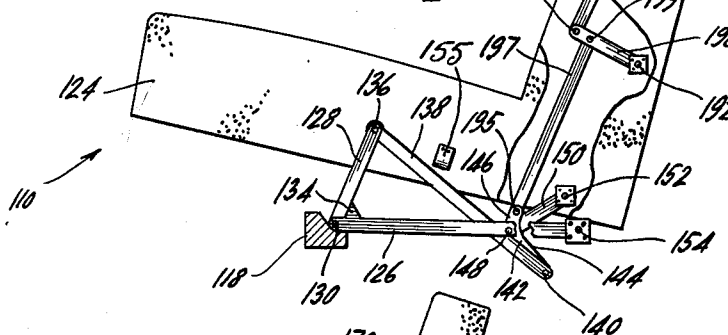
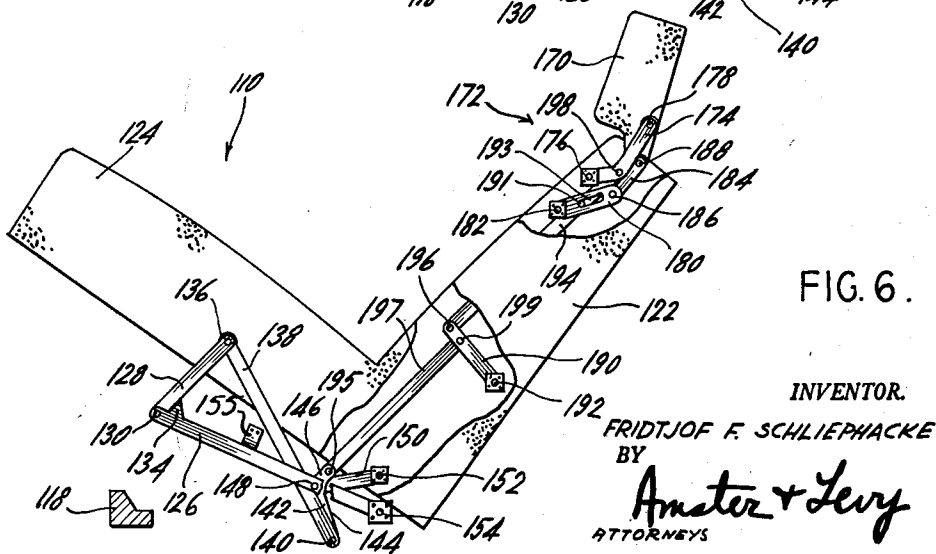


FIG. 6.



INVENTOR.

FRIDTJOF F. SCHLIEPHACKE

BY

Amater & Levy
ATTORNEYS

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HEAD-REST AND CONTROL ARRANGEMENT FOR MULTIPLE POSITION CHAIR

Fridtjof F. Schliephacke, Berlin-Schmargendorf, Germany, assignor to Anton Lorenz, Boynton Beach, Fla.
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11 Claims. (Cl. 297-61)

The present invention relates generally to reclining chairs of the multiple movement type, and in particular to an improved head-rest and mounting and control arrangement for such reclining chairs.

The recently developed multiple movement reclining chair includes a support and a body-supporting means mounted on the support for movement from a sitting position to an intermediate tilted sitting position during a first motion phase and for movement from the intermediate tilted sitting position to a reclining position during a second motion phase. Such chair may be of the rester type including a seat fixedly associated with a back-rest in which the seat and back-rest move without change in their angular relationship whatsoever, during either of the motion phases.

The multiple movement chairs of the rester type usually incorporate a leg-rest which is mounted for movement into a substantially elevated leg-supporting position during the first motion phase such as to provide an adequate leg-support for the chair occupant in the intermediate tilted sitting position and in any of the reclining positions achieved during the second motion phase. Further, the multiple movement chairs may incorporate a head-rest which is mounted for movement on a back-rest from a stored position to an extended head-supporting position during the first motion phase such as to provide an adequate head-support for the chair occupant in the intermediate tilted sitting position and in the infinite number of reclining positions during the second motion phase. The incorporation of the head-rest within the back-rest of the chair facilitates modern styling while enabling the comfort requirements to be realized in a chair having a relatively low back-rest.

Broadly, it is an object of the present invention to provide an improved head-rest and mounting and control arrangement adapted to be incorporated into a multiple movement chair of the recliner or rester type and specifically it is within the contemplation of this invention to utilize a head-rest in association with a rester type of multiple movement chair. Further, it is within the contemplation of the present invention to provide a head-rest which is moved to an extended head-supporting position in response to the first motion phase of a multiple movement chair of the rester type such that during the second motion phase, as the seat and back-rest is pivoted about a single pivot point, the head-rest is in its head-supporting position and remains stationary relative to the back-rest for the head-supporting function.

It is a further object of the present invention to provide improved mounting arrangement for movably mounting a head-rest on a back-rest for movement between a stored position within the outline of the back-rest to an extended head-supporting position spaced above and forwardly of the back-rest.

In accordance with one of the embodiments of the invention demonstrating objects and features of the present invention there is provided a multiple movement chair which comprises a support, body-supporting means including a seat and back-rest adapted to be mounted on the support for movement from a sitting position to an intermediate tilted sitting position during the first motion phase and from an intermediate tilted sitting position to a reclining position during a second motion phase, a car-

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rier member pivotally mounted on the support frame, front and rear guide links interconnecting the seat with the carrier member, a head-rest mounted on the back-rest for movement from a stored position to an extended head-supporting position during a first motion phase, and actuating means operatively connected to the mounting means for the head-rest, to the body-supporting means and to the support for moving the head-rest to an extended supporting position during the first motion phase of the chair. The actuating means includes a displaceable pivot which may include a pin riding in a slot in the carrier member or may include a bell crank lever to which the pin is fixed and rotatable with. The relative movement of the displaceable pivot causes movement of said head-rest with respect to said back-rest.

Still further objects and features of this invention reside in the provision of a multiple position reclining chair of the rester type which is provided with a head-rest for operation during the first motion phase to a fully extended head-supporting position, which multiple position chair is simple in construction, ornamental in appearance, and easy to operate.

These, together with the various ancillary objects and features of the invention which will become apparent as the following description proceeds, are obtained by this multiple position chair, preferred embodiments of which have been illustrated in accompanying drawings, by way of example only, wherein:

FIG. 1 is a side elevational view of a typical multiple movement rester type of chair incorporating an improved head-rest and mounting and control arrangement in accordance with the present invention, the head-rest being shown in its retracted or stored position and the chair being shown in the sitting position;

FIG. 2 is a side elevational view similar to FIG. 1 but with portions of the frame removed in the interest of clarity, the head-rest being shown in its extended head-supporting position and the chair being shown in an intermediate tilted sitting position;

FIG. 3 is a side elevational view similar to FIG. 2 showing the head-rest remaining in its extended head-supporting position, the chair having moved through the second motion phase into a fully reclined position;

FIG. 4 is a side elevational view of a modified form of multiple movement rester type chair incorporating an improved head-rest and mounting and control arrangement somewhat modified from the form of the invention shown in FIG. 1, the head-rest being shown in its retracted or stored position and the chair being shown in its sitting position;

FIG. 5 is a side elevational view of the embodiment shown in FIG. 1 but with portions of the frame removed in the interest of clarity, the head-rest being shown in its fully extended head-supporting position while the chair is being shown in an intermediate tilted sitting position; and

FIG. 6 is a side elevational view, similar to FIG. 5, after the chair has been moved into a fully reclined position.

Referring now specifically to the drawings and particularly to FIGS. 1 through 3, there is shown a reclining chair generally designated at 10 which embodies an improved head-rest and control arrangement in accordance with the present invention. The chair 10 includes a chair frame or support 12 having opposite side walls 14, 16 interconnected by appropriate cross braces 18, 19 and supported on legs 20. A body supporting unit including a back-rest 22 and a seat 24 are mounted on the support 12 for reclining and inclining movement respectively through a first motion phase from an upright or sitting position illustrated in FIG. 1 to an intermediate tilted

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sitting position illustrated in FIG. 2 and for a second motion phase from the intermediate tilted position illustrated in FIG. 2 through a series of reclining positions to the fully reclined position illustrated in FIG. 3. It is noted that the back-rest is shown as fixed to the seat and thus the body-supporting means may be of a unitary construction. In the interest of simplicity and clarity there is no showing of the leg-rest and its mounting arrangement which is conventionally provided in multiple movement chairs of this type.

A carrier member 26 is provided and has pivoted thereto as at 28 a front guide link 30 which is pivoted as at 32 to the seat 24. The front guide link 30 and the carrier member 26 rests on the cross brace 18 in the sitting position of the chair as illustrated in FIG. 1. The carrier member 26 is secured to the frame for turning movement about a pivot 34 at its rearmost point and is further adapted to rest on the cross brace 18. The carrier member 26 is provided with an arcuate slot 36 therein which terminates in a relief slot 38 for a purpose to be hereinafter explained.

A rear guide link 40 is pivoted as at 42 to the frame 12, and is pivoted at 56 to the seat 24. The rear guide link 40 carries sequencing means in the form of a pin or roller 46 which is adapted to ride in the arcuate slot 36 and in the relief slot 38 during the operation of the chair.

The cross brace 18 serves as a stop for holding and supporting the carrier member 26. The cross brace 19 serves as a limit stop for the seat 24 in the position illustrated in FIG. 3.

A follower link 48 is pivoted as at 50 to the carrier member 26 and in turn has pivoted thereto at 52 one end of a connecting link 54, the other end being pivoted as at 56 to the rear guide link 40.

As can be readily understood, when it is desired to tilt the chair from the sitting position shown in FIG. 1 to the intermediate tilted sitting position as shown in FIG. 2, the occupant of the chair presses backwardly thus causing pivotal movement of the guide links 30 and 40 and causes the pin 46 to ride in the slot 36 until it reaches the lost motion or relief slot 38.

Disposed within the upper end of the back-rest 22 which is of a suitable hollow construction is a head-rest 70 which is mounted on the back-rest 22 for movement from a stored position illustrated in FIG. 1 to a fully extended head-supporting position shown in FIGS. 2 and 3. The mounting arrangement for the head-rest 70 which is generally indicated by reference numeral 72 includes a first mounting link 74 which is pivotally mounted as at 76 to the back-rest 22 and is pivotally connected at 78 to the head-rest 70. The mounting arrangement 72 further includes second and third mounting links 80, 82 having an intermediate pivotal connection 84 therebetween. The second mounting link 80 has a pivotal mount 86 on the back-rest 22 while the third mounting link 82 is pivoted to the head-rest 70 at a point 88 below the pivot connection 84 between the first mounting link 74 and the head-rest 70. It is to be noted that the pivotal mount 86 is below the pivotal mount 76. By appropriate arrangement and dimensioning of the several mounting links 74, 80, 82 it is possible to establish a path of movement for the head-rest 70 relative to the back-rest 22 such that the head-rest may be brought to a clearance position relative to the back-rest and then to the desired attitude in an extended position relative to the back-rest for the head-supporting function.

Actuating means are operatively connected to the mounting arrangement or linkage 72, to the body-supporting means 22, 24 and to the support 12 for moving the head-rest 70 from the stored position illustrated in FIG. 1 to the fully extended head-supporting position illustrated in FIGS. 2 and 3. The actuating means or mechanisms include a suitable lever 90 which is pivoted as at 92 to the back-rest 22 and which has a connecting

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rod 94 pivoted to the other end thereof and indicated at 96. The upper end of the connecting rod 94 is pivoted as at 98 to the first mounting link 74 and has a pin 91 below its upper end which rides within a slot 93 formed in the second mounting link 80. Inwardly to the pivotal connection 96 between the connecting rod 94 and the lever 90 is a pivotal connection 95 between a driver link 97 and the double arm lever 90. The driver link 97 is pivoted as at 99 to the end of the follower link 48 outwardly of the pivotal connection 52 of the connecting link 54 with the follower link 48.

In order to provide a more thorough understanding of the operation of improved head-rest and mounting and control arrangement illustrated in FIGS. 1 through 3, a typical sequence of operation of the head-rest will now be described.

When the chair occupant is seated in the body-supporting means 22, 24 and urges his or her weight rearwardly, the chair moves in the first motion phase, from a sitting position illustrated in FIG. 1 to the intermediate tilted sitting position illustrated in FIG. 2 during which the displaceable pivot 46 and the head-rest actuating mechanisms move relative to the carrier member 26 which remains stationary during the first movement phase and does not move about its fixed pivotal mount 34. Incident to the moving of the displaceable pivot 46 in the slot 36 there is a concurrent counterclockwise movement of the follower link 48 which in turn causes the driving link 97 to move upwardly driving the double-arm lever 90 clockwise thus raising the connecting link 94. The movement of the connecting link 94 upwardly is imparted to the mounting arrangement or linkage 72 to turn the mounting links 74, 80, 82 upwardly and forwardly about their respective pivotal mounts 76, 86 on the back-rest 22, such upward movement of the mounting links turning in the counterclockwise direction; brings the head-rest 70 to the extended head-supporting position at the end of the first motion phase; as in FIG. 2. In such an extended head-supporting position, the displaceable pivot 46 enters the relief slot 38 which is of a curvature on a radius about the pivot mount 34. With the displaceable pivot 46 within the relief slot 38, there will no longer be any relative movement of the follower link 48 with respect to the carrier member 26 and the follower link 48 will move with the carrier member 26 in an arc about the pivotal mount 34. There is substantially no tendency for the double-arm lever 90 to turn about its pivot 92 during the second motion phase as may be appreciated by progressively inspecting the position of the lever 90 in the limit positions of FIGS. 2 and 3. This is because the pin 46 has a lost motion travel in the relief slot 38 and there is no relative motion of the lever 48 with respect to the carrier member 26 and hence the pivot point 99 moves about the pivot 34 so that there is no relative motion of the driver link 97 with respect to the back-rest 22. Accordingly, there is no turning movement imparted to the linkage 72 and the head-rest 70 remains in the desired head-supporting position throughout the second motion phase.

Referring now to the embodiment of the invention as is shown in FIGS. 4 through 6, it will be seen that herein there is disclosed a chair generally indicated at 110 which includes a chair frame or support 112 having opposite side walls 114 and 116 interconnected by a cross brace 118. The chair is supported on a plurality of depending legs 120. A body-supporting unit includes a back-rest 122 and a seat 124 integrally formed with the back-rest which are mounted on the support 112 for reclining and inclining movement respectively through a first motion phase from an upright or sitting position illustrated in FIG. 4 to the intermediate tilted sitting position illustrated in FIG. 5 and thence to a fully tilted or reclined position illustrated in FIG. 6. The multiple movement chair 110 is of the retractor type and includes a carrier member 126 having a front guide link 128 pivoted thereto as at 130

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and pivoted at its upper end to the seat 124 at pivot 136 and having limit positions which may be controlled by cross brace 118 in the position of FIG. 4 and by stop 134 in the position illustrated in FIG. 5. The stop 134 is preferably formed on, and integral with, the carrier member 126. Pivoted as at 136 to the front guide link 128 is a follower link 138 which in turn is pivoted as at 149 to the longer arm 142 of a bell crank lever 144 provided with a shorter arm 146. The bell crank lever 144 has pivoted thereto as at 148 the rear guide link 150 which is pivoted as at 152 to the seat 124. The lower end of rear guide link 150 is pivoted at 148 to the carrier member 126. The carrier member 126 itself is pivoted by means of a pivotal mount 154 to the support frame 112 and normally rests on cross brace 118 when the chair is in the sitting position of FIG. 4, or in the intermediate position as shown in FIG. 5. When in the fully tilted position, as shown in FIG. 6, the carrier member 166 has pivoted about the pivotal mount 154 and the carrier member 126 is raised off of the cross brace 118. In the fully tilted position, the carrier member 126 engages the limit stop 155 secured to the frame 112.

Mounted within the back-rest 122 is the head-rest 170. A control linkage 172 is provided for enabling the head-rest 170 to be raised upwardly out of the confines of the back-rest 122 to the head-supporting position as shown in FIG. 5. The control linkage 172 includes a first mounting link 174 which is pivoted as at 176 to the back-rest 122 and pivoted as at 178 to the head-rest 170. Below the pivotal connection 176, a second mounting link 180 is pivoted as at 182 to the back-rest 122. A third mounting link 184 is pivoted as at 186 to the second mounting link 180 and is pivoted as at 188 to the head-rest 170.

A double-arm lever 190 is pivoted as at 192 to the back-rest 122 and has a connecting link 194 pivoted thereto as at 195. The connecting link 194 is pivoted as at 198 to the first mounting link 174 which may be in the shape of a bell crank. The connecting link 194 carries a pin 191 which rides in a slot 193 in the second connecting link 180.

Pivotaly connected as at 195 to the shorter arm 146 of the bell crank lever 144 is a driver link 197 which is pivoted as at 199 to the double-arm lever 190 between the pivots 196 and 192.

In order to facilitate a more thorough understanding of the environment for the head-rest and control arrangement according to the present invention a typical sequence of operation for the retractor type of chair as illustrated in FIGS. 4 and 5 is set forth as follows:

When the chair occupant is seated in the body-supporting means 122, 124 and urges his or her weight rearwardly the chair moves through the first motion phase from the sitting position as shown in FIG. 4 to the intermediate tilted position as shown in FIG. 5. During this operation, the seat 124 is slightly tilted and moves backwardly with the carrier member 126 remaining stationary. The front guide link 128 and the rear guide link 150 pivot in a clockwise direction and the follower link 138 causing the bell crank lever 144 to rotate about its pivot 148 thereby rotating the short arm 146 upwardly and thus causing driver link 197 to drive the double-arm lever 190 in the clockwise direction. This in turn causes the connecting link 194 to move upwardly. Motion of the connecting link 194 is imparted to the mounting arrangement or linkage 172 to turn the mounting links 174, 180 upwardly and forwardly about their respective pivotal mounts 176 and 182 on the back-rest 122. Such upward movements of the mounting links turning in the counterclockwise direction bring the head-rest 170 to the extended head-supporting position at the end of the first movement phase as shown in FIG. 5. In such extended position there is no further rotation of the bell crank lever 144 and no movement of the driver link 197 relative to the carrier member 126 so that the head-rest 170, back-rest 122, and the seat 124 pivot as a unit about the pivotal mount 154,

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with no relative movement of the head-rest 170 with respect to the back-rest 122.

A latitude of modification, change and substitution is intended in the foregoing disclosure and in some instances some features of this invention will be employed without a corresponding use of the other features. Further, it is contemplated that this invention may be used in a recliner type of multiple movement chair wherein the back-rest is movable relative to the seat. Accordingly, it is appropriate that the appended claims be construed broadly and in a manner consistent with the spirit and scope of the invention herein.

What I claim is:

1. A multiple type position reclining chair comprising a support frame, a body-supporting unit including a seat and back-rest, means movably securing said body-supporting unit on said support frame for movement through a first motion phase from an upright sitting position to an intermediate tilted position and then through a second motion phase from said intermediate tilted position to a fully tilted position, said mounting means including a carrier member, a pivotal mount pivotally securing said carrier member on said support frame, a front guide link pivotally mounted on said carrier member and pivotally connected to said seat, a rear guide link pivoted to said seat and to said support frame, a head-rest, means mounting said head-rest on said back-rest for movement from a stored position to an extended head-supporting position during said first motion phase, actuating means operatively connected to said mounting means and said carrier member for moving said head-rest to said extended head-supporting position and including a pivot connected to said rear guide link movable relative to said pivotal mount during said first movement phase, the relative movement of said pivot causing movement of said head-rest to said extended head-supporting position said carrier member having an arcuate slot therein, said pivotal mount including a pin, said pin riding in said slot.

2. A multiple position reclining chair comprising a support frame, a body-supporting unit including a seat and back-rest, means movably securing said body-supporting unit on said support frame for movement through a first motion phase from an upright sitting position to an intermediate tilted position and then through a second motion phase from said intermediate tilted position to a fully tilted position, said mounting means including a carrier member, a pivotal mount pivotally securing said carrier member on said support frame, a front guide link pivotally mounted on said carrier member and pivotally connected to said seat, a rear guide link pivoted to said seat, a head-rest, means mounting said head-rest on said back-rest for movement from a stored position to an extended head-supporting position during said first motion phase, actuating means operatively connected to said mounting means and said carrier member for moving said head-rest to said extended head-supporting position and including a displaceable pivot connected to said rear guide link movable relative to said pivotal mount during said first movement phase, the relative movement of said displaceable pivot causing movement of said head-rest to said extended head-supporting position, said actuating means further including a bell crank lever pivoted to said rear guide link, said bell crank lever having a long arm and a relatively short arm, said displaceable pivot being mounted on said short arm, and a follower pivotally connected to said long arm and said front guide link to rotate said bell crank lever about its pivotal connection with said rear guide link during said first motion phase.

3. A multiple position reclining chair comprising a support frame, a body-supporting unit including a seat and back-rest, means movably securing said body-supporting unit on said support frame for movement through a first motion phase from an upright sitting position to an intermediate tilted position and then through a second motion phase from said intermediate tilted position to a fully

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tilted position, said mounting means including a carrier member, a pivotal mount pivotally securing said carrier member on said support frame, a front guide link pivotally mounted on said carrier member and pivotally connected to said seat, a rear guide link pivoted to said seat, a head-rest, head-rest mounting means mounting said head-rest on said back-rest for movement from a stored position to an extended head-supporting position during said first motion phase, said head-rest mounting means including a first mounting link, means pivotally connecting said first mounting link to said head-rest and said back-rest, a mounting link pair including second and third mounting links pivotally interconnected, means pivotally mounting said second mounting link on said back-rest, means pivotally connecting said third mounting link to said head-rest, actuating means operatively connected to said mounting means and said carrier member for moving said head-rest to said extended head-supporting position and including a displaceable pivot connected to said rear guide link movable relative to said pivotal mount during said first movement phase, and movable in an arc about said pivotal mount during said second movement phase, the relative movement of said displaceable pivot causing movement of said head-rest to said extended head-supporting position and said arcuate movement of said displaceable pivot maintaining said head-rest substantially in said head-supporting position.

4. A multiple position reclining chair comprising a support frame, a body-supporting unit including a seat and back-rest, means movably securing said body-supporting unit on said support frame for movement through a first motion phase from an upright sitting position to an intermediate tilted position and then through a second motion phase from said intermediate tilted position to a fully tilted position, said mounting means including a carrier member, a pivotal mount pivotally securing said carrier member on said support frame, a front guide link pivotally mounted on said carrier member and pivotally connected to said seat, a rear guide link pivoted to said seat, a head-rest, head-rest mounting means mounting said head-rest on said back-rest for movement from a stored position to an extended head-supporting position during said first motion phase, said head-rest mounting means including a first mounting link, means pivotally connecting said first mounting link to said head-rest and said back-rest, a mounting link pair including second and third mounting links pivotally interconnected, means pivotally mounting said second mounting link on said back-rest, means pivotally connecting said third mounting link to said head-rest, actuating means operatively connected to said mounting means and said carrier member for moving said head-rest to said extended head-supporting position and including a pivot connected to said rear guide link movable relative to said pivotal mount during said first movement phase, the relative movement of said pivot causing movement of said head-rest to said extended head-supporting position, said carrier member having an arcuate slot therein, said pivotal mount including a pin, said pin riding in said slot during said first motion phase, said carrier member having a relief slot therein communicating with said arcuate slot, said pin riding in said relief slot during said second movement phase so that said head-rest is maintained in said head-supporting position.

5. A multiple position reclining chair comprising a support frame, a body-supporting unit including a seat and back-rest, means movably securing said body-supporting unit on said support frame for movement through a first motion phase from an upright sitting position to an intermediate tilted position and then through a second motion phase from said intermediate tilted position to a fully tilted position, said mounting means including a carrier member, a pivotal mount pivotally securing said carrier member on said support frame, a front guide link pivotally mounted on said carrier member and pivotally connected to said seat, a rear guide link pivoted to said

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seat, a head-rest, head-rest mounting means mounting said head-rest on said back-rest for movement from a stored position to an extended head-supporting position during said first motion phase, said head-rest mounting means including a first mounting link, means pivotally connecting said first mounting link to said head-rest and said back-rest, a mounting link pair including second and third mounting links pivotally interconnected, means pivotally mounting said second mounting link on said back-rest, means pivotally connecting said third mounting link to said head-rest, actuating means operatively connected to said mounting means and said carrier member for moving said head-rest to said extended head-supporting position and including a pivot connected to said rear guide link movable relative to said pivotal mount during said first movement phase, the relative movement of said displaceable pivot causing movement of said head-rest to said extended head-supporting position, said actuating means further including a bell crank lever pivoted to said rear guide link, said bell crank lever having a long arm and a relatively short arm, said pivot being mounted on said short arm, and a follower pivotally connected to said long arm and said front guide link to rotate said bell crank lever about its pivotal connection with said rear guide link during said first motion phase.

6. A multiple position reclining chair comprising a support frame, a body-supporting unit including a seat and back-rest, means movably securing said body-supporting unit on said support frame for movement through a first motion phase from an upright sitting position to an intermediate tilted position and then through a second motion phase from said intermediate tilted position to a fully tilted position, said mounting means including a carrier member, a pivotal mount pivotally securing said carrier member on said support frame, a front guide link pivotally mounted on said carrier member and pivotally connected to said seat, a rear guide link pivoted to said seat, a head-rest, head-rest mounting means mounting said head-rest on said back-rest for movement from a stored position to an extended head-supporting position during said first motion phase, said head-rest mounting means including a first mounting link, means pivotally connecting said first mounting link to said head-rest and said back-rest, a mounting link pair including second and third mounting links pivotally interconnected, means pivotally mounting said second mounting link on said back-rest, means pivotally connecting said third mounting link to said head-rest, actuating means operatively connected to said mounting means and said carrier member for moving said head-rest to said extended head-supporting position and including a pivot connected to said rear guide link movable relative to said pivotal mount during said first movement phase, the relative movement of said displaceable pivot causing movement of said head-rest to said extended head-supporting position, said actuating means further including a bell crank lever pivoted to said rear guide link, said bell crank lever having a long arm and a relatively short arm, said pivot being mounted on said short arm, and a follower pivotally connected to said long arm and said front guide link to rotate said bell crank lever about its pivotal connection with said rear guide link during said first motion phase, a driver link pivoted to said bell crank lever at said displaceable pivot, a double arm lever pivoted at one end to said back-rest, said driver link being pivoted to said double arm lever, and a connecting link pivoted to the other end of said double arm lever and said first mounting link.

7. A multiple position reclining chair comprising a support frame, a body-supporting unit including a seat and back-rest, means movably securing said body-supporting unit on said support frame for movement through a first motion phase from an upright sitting position to an intermediate tilted position and then through a second motion phase from said intermediate tilted position to a fully tilted position, said mounting means including a carrier

member, a pivotal mount pivotally securing said carrier member on said support frame, a front guide link pivotally mounted on said carrier member and pivotally connected to said seat, a rear guide link pivoted to said seat, a head-rest, head-rest mounting means mounting said head-rest on said back-rest for movement from a stored position to an extended head-supporting position during said first motion phase, said head-rest mounting means including a first mounting link, means pivotally connecting said first mounting link to said head-rest and said back-rest, a mounting link pair including second and third mounting links pivotally interconnected, means pivotally mounting said second mounting link on said back-rest, means pivotally connecting said third mounting link to said head-rest, actuating means operatively connected to said mounting means and said carrier member for moving said head-rest to said extended head-supporting position and including a pivot connected to said rear guide link and movable relative to said pivotal mount during said first movement phase, the relative movement of said displaceable pivot causing movement of said head-rest to said extended head-supporting position, a follower link pivoted to said carrier member, a driver link pivoted to said follower link, a double arm lever pivoted at one end to said back-rest, said driver link being pivoted to said double arm lever, and a connecting link pivoted to the other end of said double arm lever and said first mounting link.

8. A multiple position reclining chair comprising a support frame, a body-supporting unit including a seat and back-rest, means movably securing said body-supporting unit on said support frame for movement through a first motion phase from an upright sitting position to an intermediate tilted position and then through a second motion phase from said intermediate tilted position to a fully tilted position, said mounting means including a carrier member, a pivotal mount pivotally securing said carrier member on said support frame, a front guide link pivotally mounted on said carrier member and pivotally connected to said seat, a rear guide link pivoted to said seat, a head-rest, head-rest mounting means mounting said head-rest on said back-rest for movement from a stored position to an extended head-supporting position during said first motion phase, said head rest mounting means including a first mounting link, means pivotally connecting said first mounting link to said head-rest and said back-rest, a mounting link pair including second and third mounting links pivotally interconnected, means pivotally mounting said second mounting link on said back-rest, means pivotally connecting said third mounting link to said head-rest, actuating means operatively connected to said mounting means and said carrier member for moving said head-rest to said extended head-supporting position and including a pivot connected to said rear guide link movable relative to said pivotal mount during said first movement phase, the relative movement of said displaceable pivot causing movement of said head-rest to said extended head-supporting position, said carrier member having an arcuate slot therein, said pivotal mount including a pin, said pin riding in said slot during said first motion phase, said carrier member having a relief slot therein communicating with said arcuate slot, said pin riding in said relief slot during said second movement phase so that said head rest is maintained in said head-supporting position, a follower link pivoted to said carrier member, a driver link pivoted to said follower link, a double arm lever pivoted at one end to said back-rest, said driver link being pivoted to said double arm lever, and a connecting link pivoted to the other end of said double arm lever and said first mounting link.

9. A reclining chair of the multiple position type comprising a support, body-supporting means including a seat and back-rest, means movably mounting said body-supporting means on said support for movement through a first motion phase from a sitting position to an inter-

mediate tilted sitting position and then through a second motion phase from said intermediate tilted sitting position to a fully reclined position, said mounting means including a carrier member, means movably mounting said carrier member on said support for movement relative thereto during said second motion phase to guide said body-supporting means relative to said support and respective front and rear guiding means operatively connected to said body-supporting means and to said carrier member and said support and movable during said first motion phase to guide said body-supporting means relative to said support, a head-rest, means mounting said head-rest on said back-rest for movement from a stored position to an extended head-supporting position in response to movement of said body-supporting means through said first motion phase, actuating means operatively connected to said mounting means and to one of said front and rear guiding means for moving said head-rest to said extended head-supporting position, said actuating means including a driving member pivotally mounted on said carrier member and coupling means connecting said driving member to said one of said front and rear guiding means for turning said driving member relative to said carrier member during said first motion phase, said turning movement of said driving member being effective to move said head-rest to said extended head-supporting position, and means for blocking the movement of said one of said front and rear guiding means relative to said support at the end of said first movement phase such that said driving member is blocked against turning movement relative to said carrier member, movement of said carrier member and the driving member during said second motion phase being effective to maintain said head-rest substantially in said head-supporting position.

10. A reclining chair of the multiple position type comprising a support, body-supporting means including a seat and back-rest, means movably mounting said body-supporting means on said support for movement through a first motion phase from a sitting position to an intermediate tilted sitting position and then through a second motion phase from said intermediate tilted sitting position to a fully reclined position, said mounting means including a carrier member, means movably mounting said carrier member on said support for movement relative thereto during said second motion phase to guide said body-supporting means relative to said support and respective front and rear guiding means operatively connected to said body-supporting means and to said carrier member and said support and movable during said first motion phase to guide said body-supporting means relative to said support, a head-rest, means mounting said head-rest on said back-rest for movement from a stored position to an extended head-supporting position in response to movement of said body-supporting means through said first motion phase, actuating means operatively connected to said mounting means and said rear guiding means for moving said head-rest to said extended head-supporting position, said actuating means including a bell crank lever pivoted to said rear guiding means, said bell crank lever being pivotally mounted on said carrier member, and coupling means connecting said bell crank lever to said front guiding means for turning said bell crank lever relative to said carrier member during said first motion phase, said turning movement of said bell crank lever being effective to move said head-rest to said extended head-supporting position, and means for blocking the movement of said one of said front and rear guiding means relative to said support at the end of said first movement phase such that said bell crank lever is blocked against turning movement relative to said carrier member, movement of said carrier member and the bell crank lever during said second motion phase being effective to maintain said head-rest substantially in said head-supporting position.

11. A reclining chair of the multiple position type com-

prising a support, body-supporting means including a seat and back-rest, means movably mounting said body-supporting means on said support for movement through a first motion phase from a sitting position to an intermediate tilted sitting position, and then through a second motion phase from said intermediate tilted sitting position to a fully reclined position, said mounting means including a carrier member, means movably mounting said carrier member on said support for movement relative thereto during said second motion phase to guide said body-supporting means relative to said support, and respective front and rear guiding means operatively connected to said body-supporting means and to said carrier member and said support and movable during said first motion phase to guide said body-supporting means relative to said support, a head-rest, head-rest mounting means mounting said head-rest on said back-rest for movement from a stored position to an extended head-supporting position in response to movement of said body-supporting means through said first motion phase, said head-rest mounting means including a first mounting link, means pivotally connecting said first mounting link to said head-rest and said back-rest, a mounting link pair including second and third mounting links pivotally interconnected, means pivotally mounting said second mounting link and said back-rest, means pivotally connecting said third mounting link to said head-rest, actuating means opera-

tively connected to said mounting means and to one of said front and rear guiding means for moving said head-rest to said extended head-supporting position, said actuating means including a driving member pivotally mounted on said carrier member and coupling means connecting said driving member to said one of said front and rear guiding means for turning said driving member relative to said carrier member during said first motion phase, said turning movement of said driving member being effective to move said head-rest to said extended head-supporting position, and means for blocking the movement of said one of said front and rear guiding means relative to said support at the end of said first movement phase such that said driving member is blocked against turning movement relative to said carrier member, movement of said carrier member and the driving member during said second motion phase being effective to maintain said head-rest substantially in said head-supporting position.

References Cited in the file of this patent

UNITED STATES PATENTS

2,947,352	Schliephacke	Aug. 2, 1960
2,952,303	Spound et al.	Sept. 13, 1960
2,958,374	Martin et al.	Nov. 1, 1960
2,965,158	Fletcher	Dec. 20, 1960