

March 12, 1963

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3,081,128

MULTIPLE POSITION RECLINING CHAIR

Filed Oct. 28, 1958

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FIG. 1.

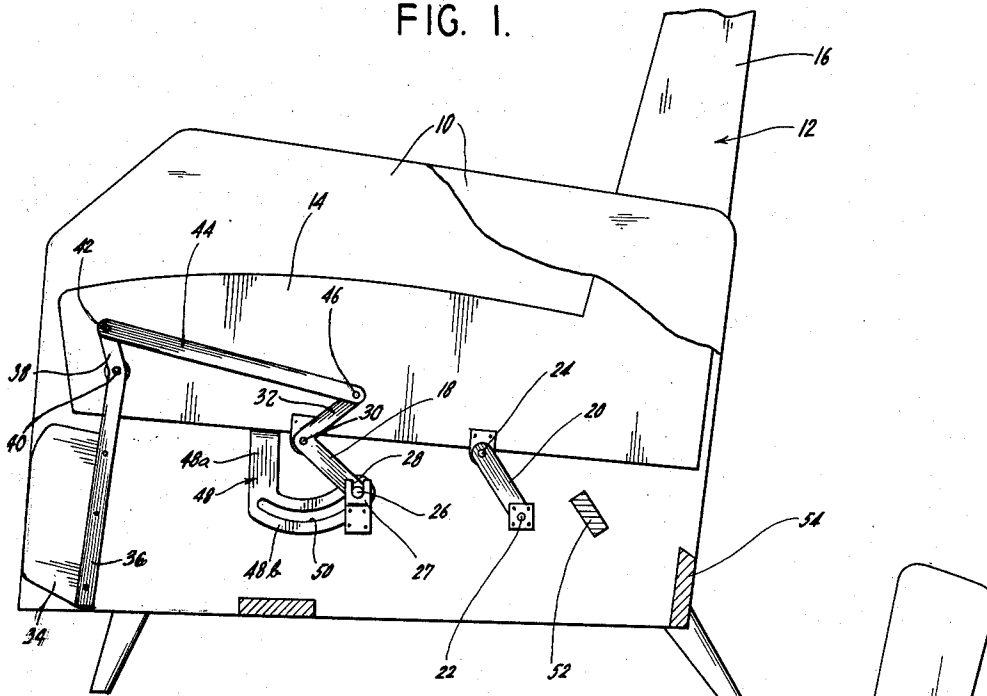
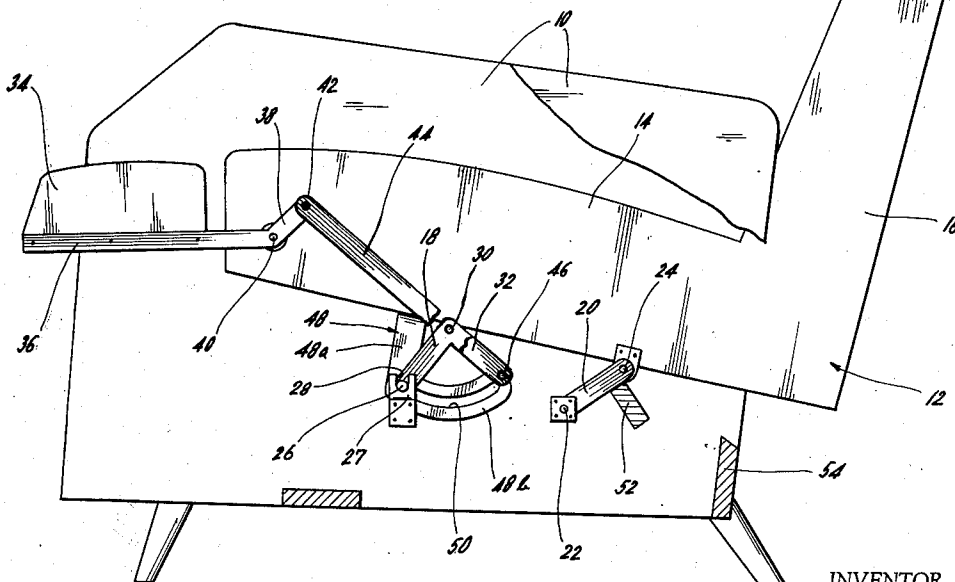


FIG. 2.

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FIG. 5.

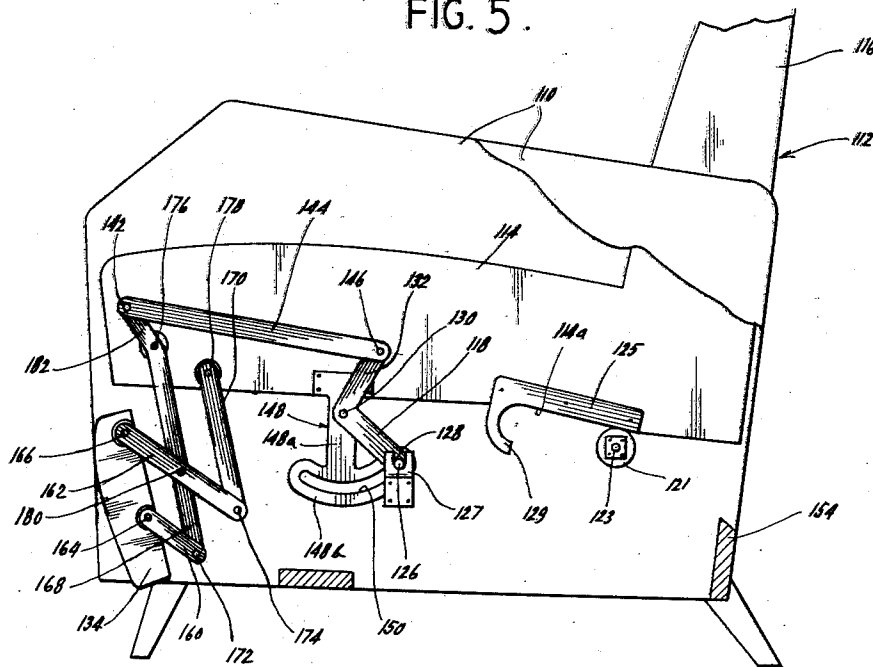
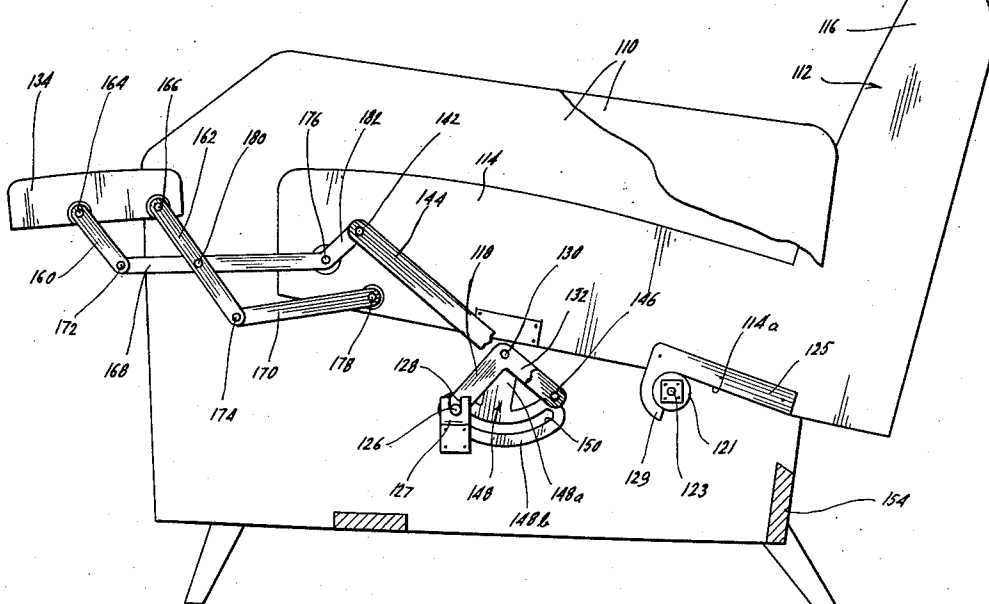


FIG. 6.

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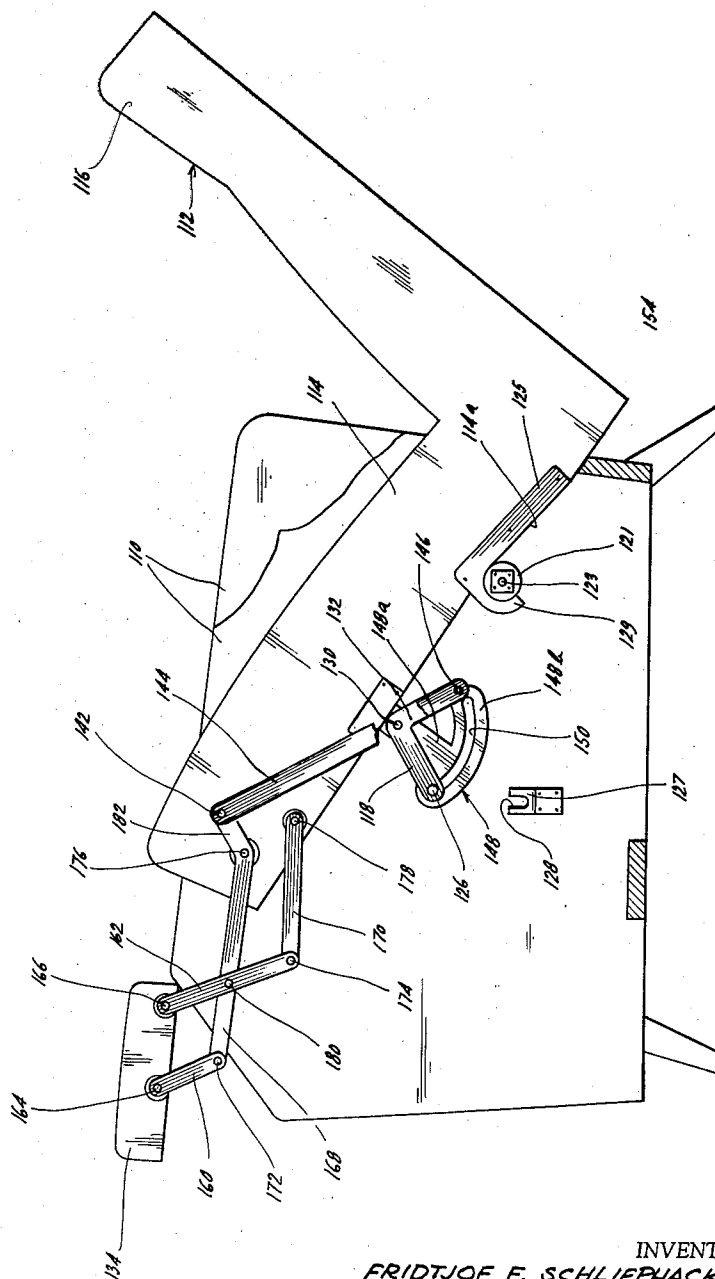
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FIG. 7.



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MULTIPLE POSITION RECLINING CHAIR

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10 Claims. (Cl. 297-88)

The present invention relates to improvements in reclining chairs of the type which includes a movable body-supporting unit comprising a seat and back-rest and a movable leg-rest mounted at the forward end of the chair for coordinated movement with the body-supporting unit. In particular, this invention relates to a reclining chair in which the seat and back-rest are formed as a rigid unit which is mounted on the support for movement between a normal sitting position, an intermediate semi-reclined or tilted position, and a fully-reclined position.

The well-known reclining chair presently on the market comprises generally a seat and back-rest unit in which the seat and back-rest may be rigid with each other and pivoted as a unit on the support, or in which the seat and back-rest may be independently pivoted on the support for movement relative to each other. A leg-rest is normally connected through a linkage to the seat and back-rest unit and/or to the support in such a manner as to be provided with coordinated movement in response to movement of the seat and back-rest unit. The usual reclining chair has been designed to permit the body-supporting unit to move from a normal upright sitting position in which the leg-rest is in a retracted position beneath the seat, to a reclined position in which both seat and back-rest are rearwardly reclined and the leg-rest is in an extended position.

A recent development in reclining chairs has been the so-called "double movement" chair in which the seat and back-rest are independently mounted on the support for movement relative to each other and in which such mounting means are provided as to permit the seat and back-rest unit to move to two distinct positions of repose. The first position of repose is an intermediate semi-reclined position in which the user's body is still substantially upright with the user in position to read, view television or the like, and the leg-rest is fully extended to a leg-supporting position. The second position of repose is a fully-reclined position in which both the seat and back-rest are inclined rearwardly at a greater angle and the body is supported in a completely relaxed reclining position, with the leg-rest maintained in its extended, leg-supporting position. Such a "double-movement" reclining chair is disclosed, for example, in my co-pending United States patent application, Serial No. 740,215, filed June 6, 1958, now issued as United States Patent No. 3,014,758.

According to the present invention I provide a reclining chair which may be designed as a "two-position" chair and which differs from the aforementioned "double-movement" chair in that the seat and back-rest, instead of being movable relative to each other, are formed integrally with each other or are rigidly and immovably connected to each other to provide a rigid body-supporting unit. This "two-position" chair is mounted on the support by mounting means so constructed as to permit the unit to be moved rearwardly through a first movement phase to an intermediate semi-reclined or tilted position in which the body is still substantially upright, and then through a second movement phase to a full-reclined position in which the rigid body-supporting unit is rearwardly reclined at a greater angle and the body is supported in a position of maximum relaxation. The chair is provided with a movable leg-rest mounted on a linkage which is responsive to movement of the body-supporting unit to move to an extended leg-supporting position when the unit is brought to its intermediate tilted position and to

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remain in this extended position when the unit is moved further rearwardly through various transitory positions to its fully-reclined position.

It is an object of the present invention to provide an improved mounting means for movably mounting the body-supporting unit on the support and an improved leg-rest control means which is so co-related to the mounting means that the body-supporting unit is caused to follow a designated path of movement in reaching its intermediate tilted position, is then caused to follow a different path of movement in reaching its fully-reclined position, and the leg-rest is brought to its extended position in the intermediate tilted position of the unit and is locked in this position by a self-locking action of the leg-rest control means whereby it is fixed in this extended position during further movement of the unit to its fully-reclined position.

In the illustrated embodiments demonstrating the present invention, the above object is achieved by mounting the body-supporting unit on the support through a pair of spaced guiding members, the forward one of which is in the nature of a link removably seated in a pivot bearing of the support. The leg-rest is mounted on a linkage connected to the forward guiding link for movement with the latter. The forward guiding link is pivoted rearwardly during the movement of the body-supporting unit to its intermediate tilted position, thereby raising the leg-rest to its extended position. During further movement of the body-supporting unit to its fully-reclined position, the unit is pivoted rearwardly solely upon the rear guiding member and the front guiding link is raised from the support bearing and entirely disconnected from the support, the front guiding link and the leg-rest linkage being carried solely by the seat of the body-supporting unit.

Another object of the invention is the provision of a reclining chair of the character described in which the leg-rest is locked in its extended position in the fully-reclined position of the body-supporting unit by a self-locking positioning of the leg-rest linkage pivots in a straight line, thereby affording an effective and yet extremely economical locking means.

Additional objects and advantages of the invention will become apparent during the course of the following specification when taken in connection with the accompanying drawings, in which:

FIG. 1 is a side elevational view of a reclining chair made in accordance with the invention, showing the body-supporting unit in its upright or sitting position, parts of the chair being broken away to reveal internal construction;

FIG. 2 is an elevation similar to FIG. 1 but showing the body-supporting unit in its intermediate semi-reclined or tilted position with the leg-rest extended;

FIG. 3 is an elevation similar to FIG. 2 but showing the body-supporting unit in its fully reclined position;

FIG. 4 is an enlarged elevational view of the front guiding link, its guide slot, and the socket mounting it on the support frame;

FIG. 5 is a side elevational view of another embodiment of reclining chair made in accordance with the invention and having a modified type of guiding means for the body-supporting unit and a modified leg-rest linkage, the body-supporting unit being shown in its upright sitting position;

FIG. 6 is a similar elevational view of the chair of FIG. 5, but showing the body-supporting unit in its intermediate tilted position with the leg-rest extended; and

FIG. 7 is an elevational view of the chair of FIGS. 5 and 6, with the body-supporting unit shown in its fully reclined position.

Referring in detail to the drawings, there is shown a chair including a support frame or base structure 10 upon

which is movably mounted a body-supporting unit designated generally by the reference numeral 12. The latter comprises a seat 14 and a back-rest 16 which are formed integrally with each other to provide a rigid unit. The body-supporting unit 12 is mounted for rearward tilting movement relative to the support frame 10 by a linkage arrangement located at the sides of the seat 14. One half portion of this linkage arrangement is shown in the drawings, namely the linkage at the right-hand side of the seat 14 as viewed from the front of the chair, and for convenience only this half will be described herein. It is understood, however, that such description will also apply to the linkage section at the left-hand side of the seat, which is identical.

The linkage arrangement includes a pair of spaced guiding links 18 and 20 which mount the seat 14 on the support 10 for rocking movement between a normal sitting position shown in FIG. 1 and a rearwardly tilted position shown in FIG. 2. The rear guiding link 20 is mounted at its lower end on the support 10 by a pivot 22 and at its upper end is connected to the lower end of the seat 14 by a pivot 24.

At its lower end, the front guiding link 18 is connected to one end of a pivot rod 26 which extends transversely across the chair and is connected at its other end to the front guiding link at the left-hand side of the seat. The pivot rod 26 is normally seated in a slot or groove 28 formed in the support 10, or in a plate 27 fixedly secured to the support, the slot 28 serving as a bearing for turning movement of the pivot rod 26. The slot 28 is open at its top end so that the pivot rod 26 may be lifted free thereof during certain movements of the unit 12, as will be presently described in greater detail.

The upper end of the front guiding link 18 is pivotally connected to the seat by a pivot 30. At its top end, the front guiding link 18 has an integral extension member 32 which extends upwardly substantially perpendicularly to the longitudinal axis of the front guiding link 18. As shown in FIG. 1, the pivot 30 is located at the junction of the extension member 32 with the guiding link 18.

The chair also includes a leg-rest 34 carried by a support rod 36. The support rod 36 has a bent terminal portion 38 which is inclined forwardly from the axis of the support rod 36, as viewed in FIG. 1. At the junction of the support rod with its terminal portion 38, the support rod 36 is pivotally mounted on the forward end of the seat 14 by a pivot 40. The free end of the terminal portion 38 is connected by a pivot 42 to one end of an actuating link 44. The actuating link 44, in the position of FIG. 1, extends rearwardly and is connected at its other end to the upper end of the front guiding link extension member 32 by a pivot 46.

The body-supporting unit also carries a depending plate 48 which is rigidly mounted on the bottom of the seat at the central portion thereof. The plate 48 may be of any desired shape so long as it does not interfere with movement of the linkage and seat, but for convenience is illustrated herein as being formed with a depending arm 48a having at its bottom end an integral rearwardly-extending arm 48b. The arm 48b is provided with an arcuate slot 50 through which extends the pivot rod 26. In the normal sitting position, the pivot rod 26 is located at the rear end of the slot 50, as shown in FIG. 1, the engagement of the end of slot 50 with the pivot rod 26 preventing forward movement of the seat 14 and therefore preventing the seat from collapsing in the position of FIG. 1. In the initial rearward movement of the body-supporting unit 12 from its normal sitting position of FIG. 1 to the tilted position of FIG. 2, the seat 14 moves rearwardly relative to the pivot rod 26 which is seated in the support slot 28. This rearward movement of the seat carries the fixed plate 48 rearwardly, and the slot 50 is so shaped as to permit this rearward movement, the slot 50 moving rearwardly relative to the pivot rod 26 so that

in the position of FIG. 2, said pivot rod is located at the forward end of the slot 50.

The chair also includes a pair of stop members 52 and 54 which are rigidly and immovably formed on the support frame. The stop member 52 is positioned to engage the rear guiding link 20 when the chair is brought to its tilted position of FIG. 2, and thereby stop further rearward pivoting movement of said rear guiding link. The stop member 54 is positioned to engage the lower surface of the seat 14 when the body-supporting unit 12 is brought to its fully reclined position, as will be presently explained.

In operation, when the person sitting in the chair desires to assume a more comfortable position of repose, by leaning rearwardly against the back-rest 16, he can cause the body-supporting unit to pivot rearwardly to the tilted position of FIG. 2, and at the same time cause the leg-rest 34 to be lifted to a leg-supporting position. This tilted position of FIG. 2 represents an intermediate tilted position in which the body-supporting unit 12 is only slightly inclined rearwardly, and the user's body is still in a substantially upright position in which the user may read, knit, watch television, or the like.

Such rearward pressure on the back-rest 16 causes the guiding links 18 and 20 to pivot rearwardly about their respective fixed pivots 26 and 22, thereby causing the upper ends of the links 18 and 20 to describe rearward and downward circular arcs and thus causing the corresponding connected portions of the seat to travel in the same arcuate paths. It will be observed that the front guiding link 18, while being of substantially the same length as the rear guiding link 20, is disposed at a more forwardly inclined position than is the rear guiding link, in the sitting position of FIG. 1. Consequently, upon rearward movement of the seat, the front guiding link 18 will describe a substantially horizontal arc in which the greatest component of movement will be in a horizontal direction without appreciable downward movement. On the other hand, the arcuate path described by the rear guiding link 20 will be initially horizontal and will then be in a downward direction. As a result, the rear portion of the seat will be lowered relative to the front portion thereof, so that the body-supporting unit 12 is inclined slightly downwardly and rearwardly in its intermediate tilted position, as shown in FIG. 2.

As the body-supporting unit 12 moves rearwardly to its tilted position, the front guiding link 18 pivots rearwardly about the pivot rod 26 which is maintained seated in the support slot 28. This rearward pivoting movement of the front guiding link 18 turns its extension member 32 rearwardly and downwardly to the position shown in FIG. 2, the extension member 32 turning about the seat pivot 30. During such turning movement, the end of the extension member 32 pulls downwardly and rearwardly upon the actuating link 44, causing said actuating link to exert a rearward pulling force upon the bent terminal portion 38 of the leg-rest support rod 36. The terminal portion 38 is thus drawn rearwardly, causing the leg-rest support rod 36 to pivot upwardly and forwardly about the pivot 42, and raising the leg-rest 34 to its extended leg-supporting position of FIG. 2 in which it is located forwardly of and substantially at the level of the forward end of the seat 14.

At the end of the movement of the body-supporting means to its tilted position of FIG. 2, the depending plate 48 moves rearwardly with the seat 14 until the pivot rod 26 is located at the forward end of the slot 50. In addition, the rear guiding link 20 pivots rearwardly until it engages the stop member 52 and is limited from further rearward movement. The stop member 20 thus holds the body-supporting unit 12 in its intermediate tilted position until the user's weight is shifted further rearwardly to bring the body-supporting unit to a fully reclined position.

It will be noted that in the tilted position of FIG. 2, the leg-rest 34 is located in such a position that the pivots 30, 42 and 46 are located substantially on a common

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straight line. This is of importance when the unit is moved to its fully-reclined position as will be presently explained.

If the user desires to return to the normal upright sitting position, it is merely required that he exert slight downward pressure with his legs upon the leg-rest 34. This downward pressure will cause the leg-rest to move downwardly, causing the leg-rest support rod to pivot rearwardly about pivot 40 and the bent terminal portion 38 to move forwardly carrying the actuating link 44 forwardly with it. The actuating link 44 will then draw the extension member 32 upwardly and forwardly, causing the front guiding link to pivot forwardly about pivot rod 26 and thereby moving the body-supporting unit back to its normal sitting position of FIG. 1.

If the user in the tilted position of FIG. 2 wishes to repose in a more comfortable position, he may, by leaning further backward upon the back-rest 16, cause the body-supporting unit 12 to move to the fully reclined position of FIG. 3. In this position the unit 12 is inclined rearwardly at a more severe angle so that the user's body is in a reclined, rather than a tilted position.

Since the rear guiding link 20 is in contact with the stop member 52, in the intermediate position of FIG. 2, the rear guiding link is held immovably relative to the support and serves as a rigid extension thereof. Any further movement of the body supporting unit 12 will therefore be a pivoting movement about the pivot 24, which now becomes a fixed pivot.

Thus, if the user in the intermediate tilted position of FIG. 2, leans rearwardly against the back-rest, the body supporting unit will pivot rearwardly about the single fixed pivot point 24. During this pivoting movement, the front end of the seat is raised, and the pivot rod 26 is lifted free of the open-ended slot 28, as shown in FIG. 3. Thus, while the initial movement of the body supporting unit from its sitting position to the intermediate tilted position was a compound movement rearwardly as determined by both guiding links 18 and 20, the further movement of the unit from the intermediate tilted position to the fully-reclined position of FIG. 3 is a simple pivoting movement about the fixedly-held pivot 24.

In the fully-reclined position of FIG. 3, the rear end portion of the unit 12 behind the pivot 24 engages the stop member 54 of the support, and the unit 12 is therefore stopped from any further rearward pivoting movement. In this position, the pivot rod 26 is located well above the slot 28, and the leg rest linkage is supported solely by the seat 14, having no connection to the support. It is important that in this position the leg-rest be locked in its extended position so that the weight of the feet upon the leg-rest does not cause the latter to collapse to its retracted position. For this purpose, the location of the pivot rod 26 in the forward end of the arcuate slot 50 prevents the pivot rod 26 from moving forwardly, and consequently prevents the front guiding link extension member 32 from pivoting in a clockwise direction about pivot 30. At the same time, the location of the pivots 30, 42 and 46 on a common straight line prevents the extension member 32 from pivoting in a counter-clockwise direction about the pivot 30. It will be observed that the weight of the leg-rest or the weight of the user's feet supported by the leg-rest will cause the leg-rest support rod extension member 38 to exert a pulling force upon the actuating link 44, which force is directed along the axis of said link 44. Because of the straight line linear relationship of the pivots 30, 42 and 46, the actuating link exerts a pulling force upon the extension member 32 at the pivot 46, which force is directed substantially along the axis of the extension member 32, that is to say in a radial direction toward the pivot 30. Since the force acting upon the free end of extension member 32 is radial, rather than circumferential, the extension member 32 will not turn about its pivot 30. As a result the leg-rest 34 and its linkage 36, 38, and 44, is locked from movement

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in the fully-reclined position of the unit and is retained in its extended position.

When the user wishes to return from the fully-reclined position to the intermediate tilted position or the normal sitting position, he shifts his weight forwardly from the back-rest and applies downward pressure on the leg-rest. The body-supporting unit 12 then pivots forwardly about the fixed pivot 24, lowering the forward end of the seat until the pivot rod 26 reenters and becomes seated within the slot 28. The unit is now in the intermediate tilted position of FIG. 2, and a further shift of the user's weight forwardly together with a downward pressure on the leg-rest will cause the unit to move forwardly and the guiding links 18 and 20 to pivot forwardly, retracting the leg-rest and retaining the unit to its normal sitting position, in the manner previously described.

The embodiment shown in FIGS. 5 to 7 is similar to that of FIGS. 1 to 4 previously described, except that its structure is somewhat modified in employing a rear guide member in the form of a roller, and a different type of leg-rest control means. In FIGS. 5-7, like parts are given the same reference numerals, except that these reference numerals are part of a "100" series.

The body-supporting unit 112, including a rigid seat 114 and back-rest 116, is again mounted on a support frame 110 by front and rear guiding means. The front guiding means again comprises a front guiding link 118 connected at its lower end to a pivot rod 126, and mounted at its upper end on the seat 114 by a pivot 130. The pivot rod 126 is normally seated in a slot 128 formed in a plate 127 affixed to the support frame 110, the slot 128 serving as a bearing for the pivot rod 126 and being open at its top end to permit the pivot rod 126 to be lifted therefrom.

At its top end, the front guiding link 118 has an integral, angularly-projecting extension member 132 connected at its free end to a leg-rest actuating link 144 by a pivot 146.

The rear guiding means in this embodiment comprises a roller 121 mounted on an axle 123 which is fixed to the support frame 110, the rear bottom portion of the body-supporting unit 112 resting upon the roller 121 and sliding along the latter when the unit is moved from its upright sitting position of FIG. 5 to its intermediate tilted position of FIG. 6. The bottom surface of the body-supporting unit 112 is shaped to provide a downwardly and rearwardly-inclined cam surface 114a which engages the roller 121.

A stop member 125 is rigidly secured to the seat 114 and has an arcuately-shaped end portion 129 depending from the seat at the forward end of the cam surface 114a. The end portion 129 has a diameter which conforms to the diameter of the roller 121, and is positioned to engage and retain said roller 121 when the body-supporting unit 112 is moved rearwardly to its intermediate tilted position of FIG. 6.

The chair of FIGS. 5-7 also includes a leg-rest 134 and control and actuating means for moving it between its retracted and extended position. The control means includes a pair of rearwardly-extending links 160 and 162 connected at spaced points on the leg-rest 134 by respective pivots 164 and 166. The links 160 and 162 are connected at their rear ends to the lower ends of respective depending links 168 and 170 by respective pivots 172 and 174. The upper ends of the depending links 168 and 170 are pivotally mounted at spaced points 176 and 178 on the seat 114. The rearwardly-extending link 162 crosses over the front depending link 168 and is connected thereto by pivot 180 at its crossing-over point.

The front depending link 168 has a bent top terminal extension 182 which is inclined forwardly from the axis of said link 168, as viewed in FIG. 5. The free end of this terminal extension 182 is connected by a pivot 142 to the forward end of the actuating link 144.

The body-supporting unit also carries a depending plate 148 which is rigidly mounted on the bottom of the seat 114. The plate 148 has a depending arm 148a which terminates at its bottom end in an integral rearwardly-extending arm 148b. The arm 148b is provided with an arcuate slot 150 through which extends the pivot rod 126. In the upright sitting position of FIG. 5, the pivot rod 126 is located at the rear end of the slot 150, the engagement of the end of slot 150 with the pivot rod 126 preventing forward movement of the seat 114.

When the occupant of the chair in the upright sitting position of FIG. 5 wishes to move to a more relaxed position, he applies rearward pressure upon the back-rest 116, causing the rear portion of the body-supporting unit 112 to slide rearwardly along the roller 121, and simultaneously causing the front guide link 118 to pivot rearwardly upon the pivot rod 126. The forward inclination of the front guide link 118 causes the forward portion of the seat 114 to be slightly raised during this movement, while the rear portion of the seat is slightly lowered because of the rearward and downward inclination of the seat cam surface 114a which traverses the roller 121. In the intermediate position of FIG. 6, therefore, the body-supporting unit 112 is slightly inclined to the rear.

The intermediate tilted position is determined by engagement of the arcuately-shaped end portion 129 of the stop member 125 with the roller 121, preventing the rear portion of the seat 114 from moving further rearwardly relative to the support frame 110. In addition, the depending plate 148 has moved rearwardly with the seat 114 so that the forward end of the slot 150 is now in engagement with the pivot rod 126, and since the pivot rod 126 is still seated in the fixed bearing 128, this engagement also prevents further rearward movement of the seat 114.

As the body-supporting unit 112 moves rearwardly to its intermediate tilted position of FIG. 6, the front guiding link 118 pivots rearwardly about the pivot rod 126 which is maintained seated in the open-ended slot or bearing 128. This rearward pivoting movement of the front guiding link 118 turns its extension member 132 rearwardly and downwardly about the seat pivot 130 to the position shown in FIG. 6, and the end of the extension member 132 pulls downwardly and rearwardly upon actuating link 144. The actuating link 144 in turn exerts a rearward pulling force upon the bent terminal portion 182 of the front depending link 168, drawing the same rearwardly, and pivoting the front depending link 168 upwardly about its seat pivot 176. The leg-rest control linkage is thus actuated, and the links 160, 162, 168 and 170 cooperate to guide the leg-rest 134 to its extended position of FIG. 6, forwardly of and substantially at the level of the forward end of the seat 114.

It will be appreciated that the leg-rest control structure of FIGS. 5-7 constitutes a double four-bar linkage between the leg-rest and the seat. Such structure provides a greater extension of the leg-rest forwardly of the seat than in the structure of FIGS. 1-3 wherein the leg-rest is pivotally connected directly to the seat.

When the occupant's weight is shifted further rearwardly to move the body-supporting unit 112 from the intermediate tilted position of FIG. 6 to the fully-reclined position of FIG. 7, the body supporting unit 112 can no longer be moved rearwardly by the cooperative action of the front guiding link 118 and the rear roller 121, and its further rearward motion is therefore limited to a simple pivoting movement about the axle 123 of roller 121. This movement continues until the rear end of the unit engages a stop member 154 rigidly secured to the support frame 110 to determine the fully-reclined position of FIG. 7.

During the rearward pivoting movement of the body-supporting unit 112 about the roller axle 123, the front portion of the seat 114 is raised and the pivot rod 126 is lifted from the open-ended slot 128, the depending plate

148, pivot rod 126, front guiding link 118, actuating link 144, leg-rest control linkage and leg-rest 134 rising as a unit with the seat 114, and having no direct connection with the support frame 110. The leg-rest 134 is locked in its extended position forwardly of the front end of the seat by the location of the pivot rod 126 at the forward end of the slot 150, and also by the location of pivots 130, 142 and 146 on a substantially straight line, as previously explained in detail in connection with FIGS. 1-3.

The weight of the occupant's legs upon the leg-rest 134 will thus not cause the leg-rest linkage to collapse. To bring the leg-rest to its retracted position and the body-supporting unit to its upright sitting position, the occupant must shift his body weight forwardly, causing the unit 112 to pivot downwardly to the intermediate position and then to the upright sitting position.

A latitude of modification, substitution and change is intended in the foregoing disclosure. In some instances, some features of the method and apparatus disclosed herein will be used without a corresponding use of other features. Accordingly, it is appropriate that the claims be construed broadly in a manner consistent with the spirit and scope of the invention.

I claim:

1. A reclining chair comprising a support, a rigid seat and back-rest unit, and means movably mounting said unit on said support for movement from an upright sitting position through a first motion phase to an intermediate tilted position and then for further movement through a second motion phase from the intermediate tilted position to a fully-reclined position, said mounting means including front and rear guiding members engaging spaced points on the seat, a fixed pivot in cooperation with said rear guiding member mounting said seat on the support, the front guiding member comprising a link pivotally connected to the forward portion of the seat, a pivot journaled at the lower end of the front guiding link, and an open-ended pivot bearing on the support providing a releasable pivot mount for the front guiding link on the support, the seat and back-rest unit being guided rearwardly relative to the support by both front and rear guiding members during said first motion phase to the intermediate tilted position, stop means engageable with the rear guiding member at the end of said first motion phase to retard further rearward movement of the seat and back-rest unit between said fixed pivot and the rear guiding member, the unit being then movable to said fully-tilted position through said second motion phase constituting a pivotal movement of said seat about the interconnected fixed pivot and said rear guiding member, said front guiding link being lifted with the forward portion of the seat away from the open-ended pivot bearing on the support during said second motion phase, and means locking the front guide member in position during the second motion phase whereby the pivot at the lower end of said front guide member is in position to reenter the open-ended pivot bearing when the unit is returned from the fully-reclined position to the intermediate tilted position.

2. A reclining chair according to claim 1 which also includes a leg-rest, wherein said locking means for the front guide member comprises a control linkage mounting the leg-rest on the seat for movement from a retracted position beneath the seat to an extended position forwardly of and substantially at the level of said seat, and actuating means for the control linkage, said actuating means including a rigid extension of said front guiding link extending beyond the pivotal connection of said front guiding link with the seat, and means connecting said extension to said leg-rest control linkage, the front guiding link, the leg-rest and the leg-rest control linkage being raised with the forward portion of the seat during the second motion phase to maintain the leg-rest in extended position at the fully-reclined position of the seat and back-rest unit, said rigid extension of said front guiding link and

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said connecting means assuming an in-line relationship during said second motion phase and in said intermediate tilted position and said fully reclined position for locking said front guiding means in position during the second motion phase.

3. A reclining chair according to claim 2 in which the leg-rest control linkage comprises a support link rigidly connected to the leg-rest and pivotally mounted at the front portion of the seat.

4. A reclining chair according to claim 2 in which the leg-rest control linkage comprises a pair of depending links pivotally mounted at spaced points on the forward portion of the seat, a pair of rearwardly-extending links pivotally connected at spaced points to the leg-rest and pivot means interconnecting said pairs of links to provide a double four-bar linkage structure coupling the leg-rest to the seat.

5. A reclining chair comprising a support, a body-supporting unit comprising a seat and back-rest rigid with each other, means mounting the body-supporting unit on the support for movement between an upright sitting position, an intermediate rearwardly-inclined position, and a fully-tilted position, a leg-rest, and control means mounting the leg-rest on the seat for movement from a retracted position beneath the seat to an extended position forwardly of and substantially at the level of said seat, said mounting means including a front guiding link and rear guiding means respectively supporting the front and rear portions of the seat, said rear guiding means being mounted on the support, releasable pivot means mounting the lower end of the front guiding link on the support in the upright sitting position of the unit, the front guiding link and rear guiding means guiding the unit rearwardly through a first motion phase to the intermediate position, and stop means engaging the rear guiding means to halt the first motion phase when the unit reaches its intermediate rearwardly-inclined position, said leg-rest control means comprising link means connecting said leg-rest to the forward end of the seat, and including a lever pivotally mounted on the seat and operatively connected to the leg-rest, the lever having an extension projecting beyond the pivotal mount of the lever on the seat, a rigid extension of said front guiding link extending beyond the pivotal connection of said front guiding link with the seat, and means connecting said front guiding link extension to said lever extension, the front guiding links and rear guiding means pivoting rearwardly to move said body-supporting unit through the first motion phase and to actuate said leg-rest link means through said extensions and move said leg-rest from its retracted to its extended position, the unit pivoting only on said rear guiding means when the unit is moved through a second motion phase from its intermediate tilted position to its fully-reclined position, and the front portion of said seat, the front guiding link, the leg-rest and the leg-rest control linkage being raised away from said releasable pivot means, whereby to prevent further movement of the leg-rest relative to the seat, said rigid extension of said front guiding link and said connecting means assuming an in-line relationship in said intermediate rearwardly-inclined position and through said second motion phase such that said releasable pivot means between said front guiding link and said support engage when said seat is moved from said fully tilted position to said intermediate rearwardly-inclined position.

6. A reclining chair comprising a support, a rigid seat and back-rest unit, mounting means movably mounting said unit on said support for rearward movement from an upright sitting position, a leg-rest and control means movably mounting the leg-rest on the seat, said mounting means including front and rear guiding links respectively pivoted at their upper ends to spaced points on the seat, a fixed pivot mounting the lower end of said rear guiding

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link on the support, releasable pivot means mounting the lower end of said front guiding link on the support at a point spaced forwardly of said fixed pivot, said guiding links being forwardly inclined in the upright sitting position of said unit and pivoting rearwardly on their pivotal mounts on the support to guide the unit rearwardly through a first motion phase, stop means on the support engaging said rear guiding link at the end of said first motion phase and limiting further pivoting movement of said rear guiding link about its pivotal mount on the support, the unit being further movable after engagement with said stop means through a second motion phase constituting a rearward pivotal movement of said unit about the pivotal connection of said rear guiding link with the seat, said front guiding link being lifted by the seat away from said releasable pivot means during said second motion phase, said leg-rest control means including a support rod pivotally mounting the leg-rest on the forward portion of the seat for movement between an extended and a retracted position, a rigid extension on said front guiding link extending beyond the pivotal connection of the front guiding link to the seat, and an actuating link connecting said support rod with said front link extension, the rearward pivoting movement of said front guiding link during said first motion phase actuating said support rod to raise said leg-rest to its extended position through said extension and said actuating link, and stop means for limiting rearward pivoting movement of said front guiding link to a position in which said extension is aligned with said actuating link in a dead-center position, whereby the leg-rest is retained in an extended position when said first guiding link is raised from said releasable pivot means during said second motion phase.

7. A reclining chair according to claim 6 in which said rigid extension is substantially perpendicular to the axis of said front guiding link.

8. A reclining chair according to claim 7 in which said support rod is a double-armed lever, one arm of which carries the leg-rest and the other arm of which is pivotally connected to one end of said actuating link, the other end of said actuating link being pivotally connected to the free end of said rigid extension.

9. A reclining chair according to claim 8 in which the rigid extension extends upwardly and rearwardly in the upright sitting position of the unit and is moved to a downwardly and rearwardly-extending position when the front guiding link pivots rearwardly during said first motion phase, the rigid extension being substantially in axial alignment with said actuating link at the end of said first motion phase.

10. A reclining chair according to claim 9 in which the stop means for limiting pivoting movement of said front guiding link comprises a slot carried by said seat and receiving a pivot pin carried by the lower end of said front guiding link.

References Cited in the file of this patent

UNITED STATES PATENTS

60	947,298	Deimel	Jan. 25, 1910
	1,274,532	Gilda	Aug. 6, 1918
	1,519,674	Dyke	Dec. 16, 1924
	2,767,772	Forry	Oct. 23, 1956
	2,873,791	Schliephacke	Feb. 17, 1959
65	2,892,485	Schliephacke	June 30, 1959
	2,918,110	Schliephacke	Dec. 22, 1959
	2,918,113	Lorenz	Dec. 22, 1959
	2,940,510	Schliephacke	June 14, 1960

FOREIGN PATENTS

70	736,782	France	Sept. 26, 1932
	42,408	France	Apr. 25, 1933
		(1st Addition to No. 714,601)	
	492,375	Canada	Apr. 28, 1953