Dec. 18, 1962 F. F. SCHLIEPHACKE 3,069,200

MULTIPLE POSITION RECLINING CHAIR

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FIG. 1.

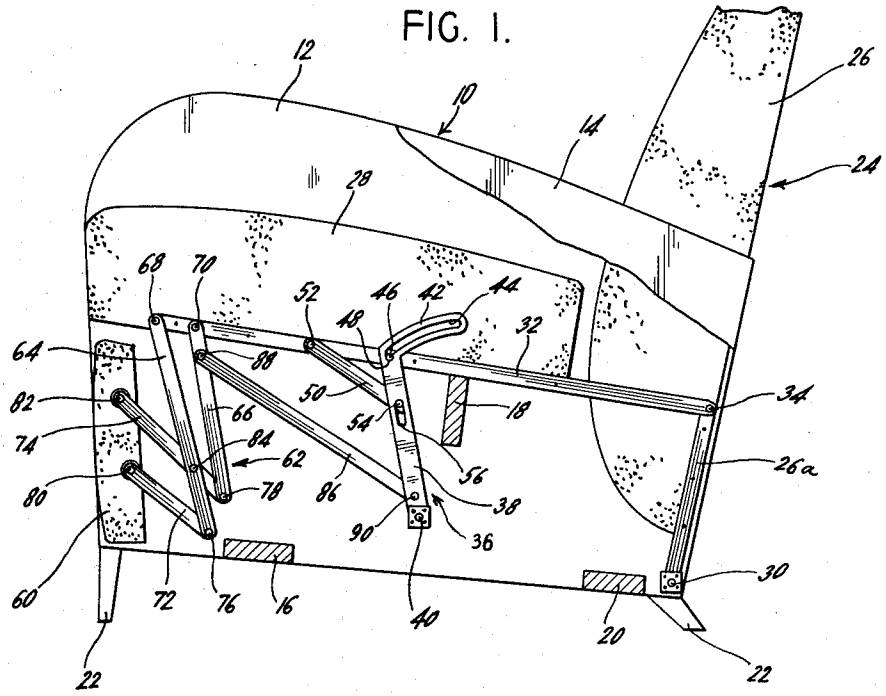
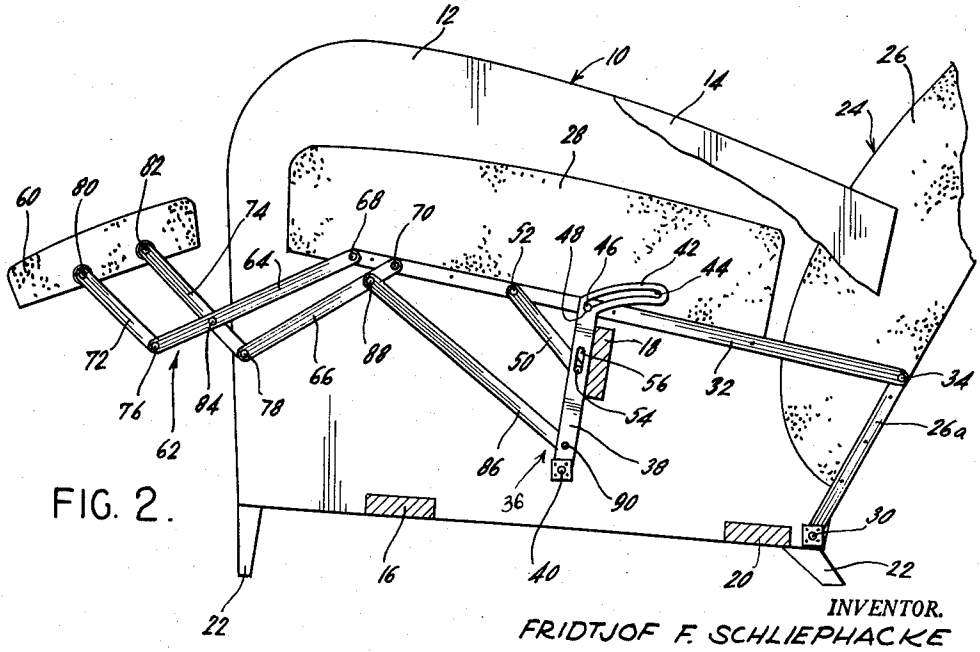


FIG. 2.



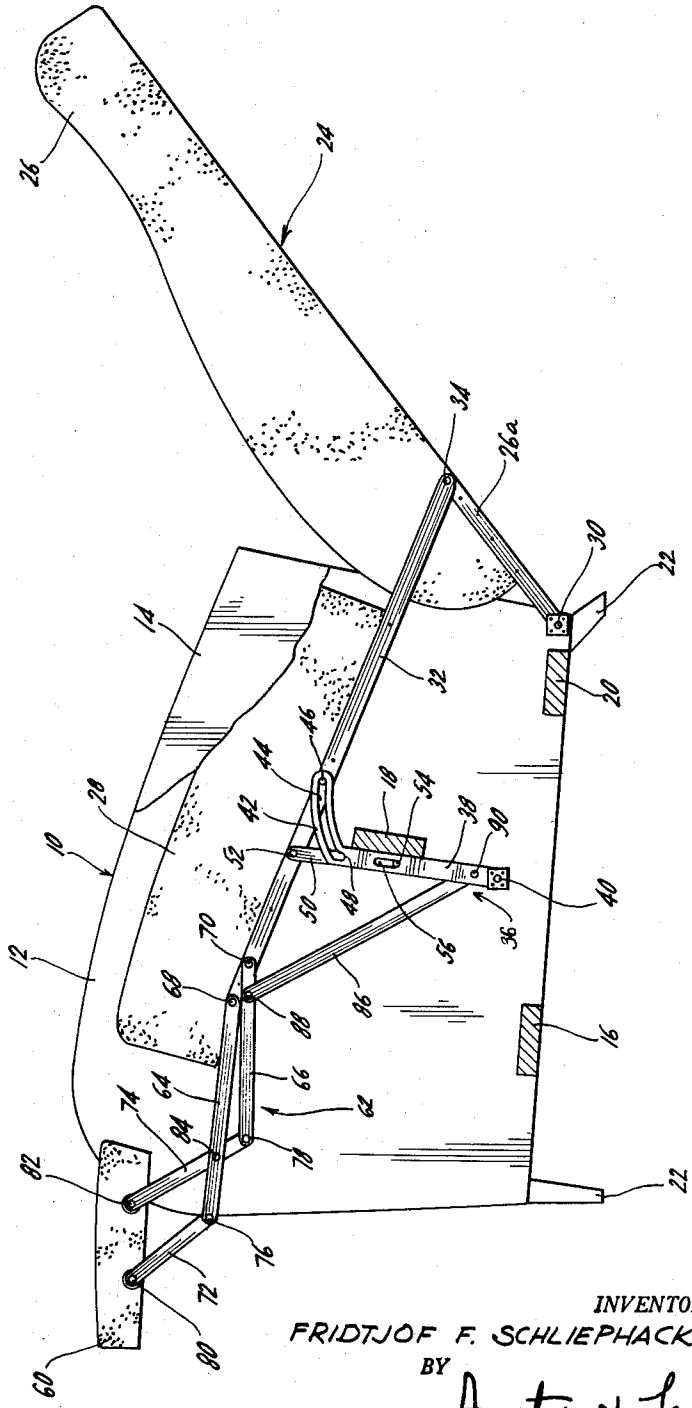
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FIG. 3.



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MULTIPLE POSITION RECLINING CHAIR

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The present invention relates to multiple position reclining chairs, and in particular to a novel and improved seat control structure for a chair of this type.

The seat control structure of the present invention is particularly designated for use in a "double movement" type of adjustable reclining chair wherein the seat and back-rest are mounted for independent inclining and reclining movement, and in which the angle therebetween varies during the reclining movement. In chairs of this type, the seat and back-rest are adapted to be moved rearwardly to an intermediate position through a first phase of motion, and are then adapted to be moved further rearwardly to a fully-reclined position through a second motion phase. A leg-rest is also provided and is actuated by control means in such a manner that the leg-rest is raised to an extended leg-supporting position forwardly of the seat during the first motion phase, and is retained in proper leg-supporting position during the second motion phase.

It is an object of the present invention to provide improved seat control means for double movement chairs which is simple in construction, requiring a minimum of parts, and is therefore economical in manufacture.

Another object of the invention is the provision of leg-rest control means which coacts with the seat control means to raise the leg-rest to extended position during the first motion phase and to maintain it in leg-supporting position during the second motion phase.

A further object of the invention is to provide a reclining chair in which a back-rest is pivotally mounted on the support frame and connected to a seat for moving the latter rearwardly, and which a control linkage is provided to incline the seat as the same is moved rearwardly.

In accordance with the invention herein, the seat control means includes a guiding member pivotally mounted on the support and having a connection with the seat, the guiding member turning rearwardly on its pivotal mount during the first motion phase to incline the seat as the latter is drawn rearwardly with the back-rest. A seat link is mounted on the guiding member and turns thereon during a second motion phase wherein the guiding member is blocked from further rearward movement, the seat being further inclined by movement of the seat link during the second motion phase. The connection of the guiding member with the seat is a lost motion coupling which permits the seat to be moved rearwardly relative to the stationary guiding member during the second motion phase. A leg-rest actuating link is also mounted on the guiding link and connected to a control linkage carrying the leg-rest for actuation of the latter.

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, with parts broken away and shown in section, of a reclining chair made in accordance with the invention and shown in an upright sitting position with the leg-rest retracted;

FIG. 2 is a side elevational view similar to FIG. 1, but showing the chair parts in an intermediate, semi-reclined position, with the leg-rest in extended, leg-supporting position; and

FIG. 3 is a side elevational view similar to FIGS. 1 and 2, but illustrating the chair parts in their fully-reclined position.

Referring now specifically to the drawings, and in particular to FIG. 1, the chair is shown to include a support frame, generally indicated by the reference numeral 10, having side walls 12 and 14 rigidly interconnected by cross bars or braces 16, 18 and 20. The support frame 10 is supported by the usual legs 22.

The chair also includes a body-supporting structure, indicated generally by reference numeral 24, and including a back-rest 26 and a seat 28. The back-rest 26 has a depending extension bar 26*a* rigidly connected thereto and mounted by pivot 30 on the support frame 10 for rearward turning movement about said fixed pivotal mount 30. A bar 32 is affixed to the lower end of the seat 28 and projects rearwardly thereof, the rear end of said bar 32 being connected by pivot 34 to the back-rest rigid extension bar 26*a*. It will thus be appreciated that when the back-rest 26 is turned rearwardly about its pivotal mount 30, the seat 28 is drawn rearwardly therewith through the seat bar 32.

Seat control means, designated generally by reference numeral 36, are provided to incline the seat 28 as the latter is drawn rearwardly with the back-rest 26. This seat control 36 is in the nature of a linkage arrangement and includes a guiding member 38 pivotally mounted at its lower end on the support frame 10 by pivot 40, and disposed in an upright and slightly forwardly inclined position in the sitting position of the chair shown in FIG. 1. At its upper end, the guiding member 38 has an integral extension portion 42 which is angularly arranged with relation to the longitudinal axis of said guiding member and extends upwardly and rearwardly therefrom. The extension portion 42 has an arcuate slot 44 therein, said slot 44 receiving a pin 46 formed rigidly with the seat 28. In the sitting position of the chair shown in FIG. 1, the pin 46 is seated in a notch or indentation 48 (best seen in FIG. 3) in the forward end of the slot 46.

A seat link 50 is also connected to the seat 28 by a pivot 52 located forwardly of the pin 46. The lower end of link 50 carries a pin 54 which is slidably received in a longitudinal slot 56 in an intermediate portion of the guiding member 38. In the sitting position of FIG. 1, the pin 54 is located at the top of slot 56, and the seat link 50 extends upwardly and forwardly therefrom to its pivotal connection 52 with the seat.

In the upright sitting position of FIG. 1, the seat 28 rests upon and is supported by the cross-bar 18, being disposed in a substantially horizontal position with the back-rest 26 extending substantially vertically. The seat 28 is effectively mounted on the support frame 10 through the guiding member 38, because of the location of pin 46 within the notch 48 of slot 44. The pin 46 therefore provides a fixed, but releasable, pivotal connection between the guiding member 38 and seat 28.

When the occupant of the chair wishes to assume a more comfortable position, he leans rearwardly upon the back-rest 26. The back-rest then turns about its pivotal mount 30 on the support frame 10 and draws the seat 28 rearwardly with it through the seat bar 32. As the seat begins to move rearwardly, the engagement of pin 46 in the notch 48 of slot 44 causes the upper end of guiding member 38 to move rearwardly with the seat, the guiding member turning about its pivotal mount 40 on the support frame 10. Because of the forward inclination of the guiding member 38 in the upright sitting position, when said guiding member turns about its pivotal mount 40, its upper end travels in an upward and rearward arc, raising the forward portion of the seat 28, inclining said seat and also lifting it free of the cross-bar 18.

The chair parts continue to move through the first motion phase as described above, until the body-supporting structure reaches the semi-reclined or intermedi-

ate tilted sitting position shown in FIG. 2. At this point, the rear edge of the guiding member 38 comes in flush abutment with the cross-bar 18, and further rearward movement of the guiding member 38 is blocked to end the first motion phase.

As the seat is inclined during the first motion phase, the angular relationship between the guiding member 38 and the seat link 50 varies somewhat, causing the pin 54 to travel downwardly within the slot 56. Thus, in the semi-reclined position of FIG. 2, the pin 54 is located at the lower portion of said slot 56. The seat forward portion is wholly guided by the guiding member 38, however, and is caused to follow a compound movement in which its rear end is lowered slightly by the back-rest 24 and its forward end is raised by the guiding member 38.

The chair also includes a leg-rest 60 controlled and guided by a leg-rest control linkage, designated generally by reference numeral 62. This control linkage 62 comprises a first pair of links 64 and 66 depending from the forward portion of the seat 28 and connected at spaced points thereon by respective pivots 68 and 70, and a second pair of links 72 and 74 connected to spaced points on the leg-rest 60 by respective pivots 80 and 82. The free end of link 64 is connected by pivot 76 to the free end of link 72, while the links 66 and 74 are connected end-to-end by pivot 78. The link 64 crosses over the link 74 and is connected thereto at the crossing-over point by a pivot 84 so that movement of the link pairs is coordinated.

The leg-rest control linkage 62 is driven by an actuating link 86, the forward end of which is connected by pivot 88 to the upper portion of link 66. The rear end of actuating link 86 is connected by pivot 90 to the lower end portion of guiding member 38 at a point proximate to the fixed pivotal mount 40. As an alternative, the rear end of link 86 may be mounted directly on the support frame 10.

When the seat 28 is moved rearwardly during the first motion phase, the leg-rest control linkage 62 is drawn rearwardly with the seat through the pivots 68 and 70. The actuating link 86, however, has very little rearward motion because its mounting pivot 90 is located close to the pivotal mount 40. The actuating link 86 therefore pushes forwardly on the rearwardly-moving link 66 and causes the links 64 and 66 to turn forwardly about pivots 68 and 70 to expand the leg-rest control linkage and carry the leg-rest 60 to the extended position shown in FIG. 2, in which said leg-rest is located substantially at the level of the forward end of the seat and in position to receive and support the outstretched legs of the chair occupant.

It will be observed that in the intermediate, semi-reclined position of FIG. 2, the back-rest 26 is slightly reclined and the seat 28 is slightly inclined, so that while the occupant's body is more relaxed, it is still in a forwardly-facing, substantially upright attitude suitable for reading, talking, viewing television or the like. The leg-rest 60, however, is extended to a leg-supporting position.

When the occupant of the chair wishes to assume a fully-reclined position for complete relaxation, he need only apply further rearward pressure against the back-rest 26. The back-rest will continue to turn rearwardly about its fixed pivotal mount 30, drawing the seat further rearwardly with it. The guiding member 38 can no longer move rearwardly, however, because of its blocked engagement with cross-bar 18, and the seat link 50 thereupon takes over to guide the seat forward portion during a second motion phase.

During the second motion phase, the stationary guiding member 38 is in effect a fixed part of the support frame 10, and the seat link 50 turns about the pivot pin 54 within the slot 56. As the upper end of the seat link 50 travels through an upward and rearward arc, it further raises the forward portion of the seat, lifting the seat pin 46 out of the notch 48 of the arcuate slot 44 and permitting the pin 46 to travel rearwardly through said arcuate slot 44. The pin-and-slot coupling 44, 46 thus serves as lost motion means which is effective to permit the seat 28 to move rearwardly relative to the stationary guiding member 38 during the second motion phase. For this purpose, the arc described by the slot 44 is so arranged to conform to the movement of the seat at point 46, and as guided by the seat link 50.

During the second motion phase, the pivotal mount 90 of the leg-rest actuating link is immovable, and as the leg-rest control linkage 62 is drawn rearwardly and upwardly with the seat, the actuating link 86 pivots upwardly but still exerts a pushing force on the rearwardly-moving link 66, causing the leg-rest 60 to be raised slightly to the fully-extended position shown in FIG. 3. The leg-rest 60 is again at the level of the forward end of the seat and is properly aligned with the body-supporting plane provided by the reclined back-rest and inclined seat.

The fully-reclined position of FIG. 3 is determined by engagement of the seat pin 46 with the rearward end of the arcuate slot 44. It will be observed that in this position, the seat link has assumed a substantially vertical disposition, and that the pin 54 carried thereby has turned about the lower end of the slot 56.

To bring the chair parts back to the sitting position, the occupant merely shifts his weight forwardly and applies downward pressure on the extended leg-rest, the parts then moving through the intermediate position and the action of the control means being reversed to bring the body-supporting structure back to the upright sitting position of FIG. 1.

While a preferred embodiment of the invention has been shown and described herein, it is obvious that numerous omissions, changes and additions may be in such embodiment without departing from the spirit and scope of the invention.

What I claim is:

1. A reclining chair comprising a support frame, a back-rest and a seat movably mounted on the support frame for movement through a first motion phase from a sitting position to an intermediate position and for further movement through a second motion phase to a fully-reclined position, and seat control means for inclining said seat relative to said back-rest in both of said motion phases, said seat control means including a guiding member movably mounted on said support frame, coupling means releasably connecting said guiding member to said seat in the sitting and intermediate positions, a seat link pivotally connected to said seat at a point spaced forwardly of said coupling means, lost motion means pivotally mounting the seat link on said guiding member for a lost motion movement of the seat link relative to the seat during the first motion phase, the guiding member pivoting upwardly and rearwardly about its pivotal mount on the support frame during said first motion phase to raise the forward portion of the seat through said coupling means, blocking means to halt further rearward movement of the guiding member at the intermediate position, the seat link thereafter turning rearwardly on the stationary guiding member to further raise the forward portion of the seat and said coupling means releasing the seat from said guiding member during the second motion phase.

2. A reclining chair comprising a support frame, a back-rest and a seat movably mounted on the support frame for movement through a first motion phase from a sitting position to an intermediate position and for further movement through a second motion phase to a fully-reclined position, and seat control means for inclining said seat relative to said back-rest in both of said motion phases, said seat control means including a guiding member movably mounted on said support frame, coupling means connecting said guiding member to said seat, a seat link pivotally mounted on the guiding member and

pivotally connected to said seat at a point spaced forwardly of said coupling means, the guiding member pivoting upwardly and rearwardly about its pivotal mount on the support frame during said first motion phase to raise the forward portion of the seat through said coupling means, and blocking means to halt further rearward movement of the guiding member at the intermediate position, the seat link thereafter turning rearwardly about its pivotal mount on the stationary guiding member to further raise the forward portion of the seat during the second motion phase, said coupling means comprising a pin carried by the seat and an arcuate slot at the upper end of said guiding link slidably receiving said pin, said coupling means providing a lost motion movement effective to permit the seat to move rearwardly relative to the stationary guiding member during the second motion phase.

3. A reclining chair comprising a support frame, a back-rest pivotally mounted on the support frame, a seat pivotally connected to the back-rest for rearward movement when the back-rest is pivoted rearwardly through a first motion phase from a sitting position to an intermediate position and for further movement through a second motion phase to a fully-reclined position, and seat control means for inclining said seat relative to said back-rest in both of said motion phases, said seat control means including a guiding member movably mounted on said support frame, a first pin-and-slot coupling connecting said guiding member to said seat, a seat link, a second pin-and-slot coupling mounting said seat link on the guiding member, said seat link being pivotally connected to said seat at a point spaced forwardly of said coupling means, the guiding member pivoting upwardly and rearwardly about its pivotal mount on the support frame during said first motion phase to raise the forward portion of the seat through said first pin-and-slot coupling, the second pin-and-slot coupling operating during first motion phase to permit the angular relationship between the seat link and guiding member to vary as the forward portion of the seat is raised, and blocking means to halt further rearward movement of the guiding member at the intermediate position, the seat link thereafter pivoting rearwardly about the second pin-and-slot coupling relative to the stationary guiding member to further raise the forward portion of the seat during the second motion phase, said first pin-and-slot coupling providing a lost motion connection between the seat and guiding link effective to permit the seat to move rearwardly relative to the stationary guiding member during the second motion phase.

4. A reclining chair according to claim 3 in which said first pin-and-slot coupling comprises an arcuate slot at the upper end of said guiding member and a pin rigidly mounted on the seat and slidably received in said slot, the pin being located at the forward end of the slot during the first motion phase and sliding rearwardly in the slot during the second motion phase.

5. A reclining chair according to claim 4 in which the slot has a notch at its forward end, the pin being seated in said notch during the first motion phase and being raised out of said slot as the seat forward portion is raised by the seat link during said second motion phase.

6. A reclining chair according to claim 3 in which the second pin-and-slot coupling comprises a pin carried by the lower end of said seat link and a longitudinal slot in an intermediate portion of the guiding member slidably receiving said pin.

7. A reclining chair according to claim 3 which also includes a leg-rest, a leg-rest control linkage mounting the leg-rest on the forward portion of the seat for movement between a retracted position beneath the seat to an extended position forwardly of the seat, and an actuating link pivotally mounted on a relatively immovable portion of the chair and connected to the leg-rest control linkage, the actuating link pushing said control linkage upwardly and forwardly as the seat is moved rearwardly relative thereto and raising the leg-rest to its extended position during the first motion phase.

8. A reclining chair according to claim 7 in which the actuating link is mounted on the lower end portion of the guiding member.

9. A reclining chair comprising a support frame, body-supporting means including a back-rest and a seat movably mounted on the support frame for movement through a first motion phase from a sitting position to an intermediate position and for further movement through a second motion phase to a fully-reclined position, and control means for moving said body-supporting means relative to said support frame in both of said motion phases, said control means including at least a front guiding member movably mounted on said support frame, coupling means releasably connecting said front guiding member to said seat in the sitting and intermediate positions, a seat link pivotally connected to said seat at a point spaced forwardly of said coupling means, lost motion means pivotally mounting said seat link on said front guiding member for a lost motion movement of said seat link relative to said seat during the first motion phase, said front guiding member pivoting upwardly and rearwardly about its pivotal mount on said support frame during said first motion phase to raise the forward portion of said seat through said coupling means, blocking means to halt further rearward movement of said front guiding member at the intermediate position, said seat link thereafter turning rearwardly on the stationary guiding member to further raise the forward portion of said seat and said coupling means releasing said seat from said front guiding member during the second motion phase.

10. A reclining chair according to claim 9, wherein said control means includes a rear guiding member movably mounted on said support frame and operatively connected to said body-supporting means.

References Cited in the file of this patent

UNITED STATES PATENTS

2,615,497	Luckhardt	Oct. 28, 1952
2,746,521	Lorenz	May 22, 1956
2,918,109	Schliephacke	Dec. 22, 1959
2,918,113	Lorenz	Dec. 22, 1959
2,940,509	Fletcher	June 14, 1960
2,940,510	Schliephacke	June 14, 1960