ROCKING-RECLINING CHAIR MECHANISM


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3 Claims. (Cl. 297—89)

This invention relates to a rocker-reclining chair incorporating an operating mechanism coacting with a base and a rockable body-supporting unit and an extendable leg-rest.

One object of the invention is to provide a linkage system for interconnecting the base and body-supporting unit and leg-rest so as to allow the relative positioning of these parts and to preclude any rocking motion of the chair in certain preselected positions of reclination, whereby the user may employ the chair as a rocker, when the leg-rest is retracted, and may recline the body-supporting unit and extend the leg-rest to various positions.

Another object is to provide a novel four-way stop for precluding movement of certain of the chair components relative to each other in predetermined chair positions.

In the drawings:

FIG. 1 is a view in side elevation of a rocking-reclining chair in the upright or sitting leg-rest retracted position, with portions of the supporting framework having been omitted for clarity;

FIG. 2 is a view in side elevation of the linkage mechanism in the intermediate-reclined position, the chair components having been omitted for clarity; and

FIG. 3 is a view in side elevation, similar to FIG. 2, in the fully-reclined position.

The linkage mechanism shown will be understood to be one of a pair, there being one positioned at each side of the chair.

The chair, constituting the disclosed embodiment of the invention, comprises a fixed chassis 10, a body-supporting unit 12 generically indicated by 12 and comprising a unitary seat 14 and back-rest 16, and a rocker base 18.

At either side of the chair, an arcuate rocker 20 is secured to the arms of the chair and is rockable upon the upper planar surface of the adjacent rail of rocker base 18.

Each rocker 20 is interconnected with rocker base 18 by a double compression spring mechanism, generally designated by 22, in the normal platform-rocker manner.

Body-supporting unit 12 will be understood to have a pivotal and rockable relationship to rocker base 18.

A linkage mechanism, provided at each side of body-supporting unit 12 inwardly of the respective adjacent side of the chassis, is stationarily mounted on a cross bar 24 which is extendable transversely relatively to and between the inner faces of rockers 20. The linkage mechanism, understandably, could be mounted upon the arms of chassis 10.

A generally horizontally-disposed mounting plate 26 extends along the front-to-rear dimension of the chair and is stationarily fixed by means of an offset flange 28 to a top planar surface of cross bar 24 by screws 29. Understandably, it could be mounted upon the arms of chassis 10.

A seat plate 30, also extending in a front-to-rear dimension of the chair, is stationarily secured to the lower edge of the adjacent side rail of seat 14 by screws 32.

Before proceeding with further recitation of the linkage mechanism, it is to be explained that a two-part, foldaway leg-supporting unit or leg-rest, generally indicated by 34 is comprised of a major leg-rest element 36 and a minor leg-rest element 38 pivotally interengaged.

Leg-rest 34 is mounted, by means of the linkage mechanism, relative to the forward end of seat 14 for movements between a fully-retracted position, as viewed in FIG. 1, and a fully-extended position, as viewed in FIGS. 2 and 3, and intermediate positions between the positions of FIG. 1 and of FIG. 2.

In said fully-retracted position, which is the fully-upright or sitting and/or rocking position of the chair, major leg-rest element 34 will be positioned substantially flush with the forwardly-facing vertical front rail of seat 14, while the cooperant minor leg-rest element 38 will be positioned so as to extend rearwardly from adjacent the lower end of the major leg-rest element and concealed from view beneath the seat and behind the major leg-rest element.

As will appear, when major leg-rest element 36 is elevated and advanced to any extended position, cooperant minor leg-rest element 38 is moved accordingly therewith, being pivoted interconnection thereto, as aforesaid. When the major leg-rest element is in fully-extended position, the minor leg-rest element will have moved to a position forwardly of and in axial alignment with the major leg-rest element, as best observed in FIGS. 2 and 3.

Leg-rest 34 is suspended relative to seat 14, by means of a linkage system including a pivot link 40 and a control plate 42.

Pivot link 40 is pivoted at its upper end to seat plate 30 by a pivotal connection 44, and at its lower end to a first long link 46 at the lower rearwardly-facing end thereof, by a pivotal connection 48.

First long link 46 is pivoted at its opposite upper end to the upper end of a lifter link 50 by a pivotal connection 52.

Control plate 42 is pivoted at its upper end to seat plate 30 by a pivotal connection 54 disposed forwardly of the pivotal connection 44 and is pivoted at its approximate midsection to the approximate midsection of first long link 46 by a pivotal connection 56, and further has a link-like extension 58 at its lower end pivoted to the lower end of a second long link 60 by a pivotal connection 62.

Second long link 60 is pivoted at its approximate midsection by a pivotal connection 64 to the approximate midsection of lifter link 50 and is pivoted at its upper end by a pivotal connection 66 to a major leg-rest element support plate 68 fixed to and extending rearwardly outwardly from the rearward face of major leg-rest element 36 by screws 70.

Lifter link 50 is pivoted at its lower extremity by a pivotal connection 72 to the lower extremity of a primary control link 74, said primary control link in turn being pivoted at its forward extremity by a pivotal connection 81 with a secondary control link 76 to a minor leg-rest element support plate 78 which is fixed to the rearward or inner face of minor leg-rest element 38 by screws 80.

Major and minor leg-rest element support plates 68 and 78 respectively are articulately interlinked by a pivotal connection 84, whereby corresponding articulating movement between the major and minor leg-rest elements is allowed.

A secondary control link 82 is pivoted at one of its ends by a pivotal connection 84 to major leg-rest element support plate 68 and is pivoted at its opposite end by a pivotal connection 86 to a primary control link 74.

A retaining device in the form of a tension spring 90 has one end fixed to a pin 92 provided adjacent the forward end of seat plate 30, and its opposite or lower end fixed to a pin 94 provided on control plate 42.

Therein, movement of the leg-rest, in extending direction, is controlled and positive as required and inasmuch as the spring additionally ensuring against any dropping of the leg-rest when fully extended or when fully retracted.

A stop surface 96 on control plate 42, upon contact with a stop pin 98 on first long link 46, precludes exten-
sion of the leg-rest beyond the desired fully-extended horizontally-disposed position.

A riser link 100 interlinks the leg-rest portion of the linkage mechanism to the body-supporting unit by means of pivot link 40 which is pivoted at its midsection to a forward portion of the riser link by a pivotal connection 102. Riser link 100 rotates on a pivotal connection 104 by means of which the riser link is interconnected to mounting plate 56 and is rotatable relative thereto.

Any rocking movement of body-supporting unit 12 relative to base 18, while the chair is in the Figs. 2 or 3 positions, or positions therebetween, is precluded by means now to be described.

A generally L-shaped stop link 106 is pivoted at its upper end to the rearward extremity of seat plate 56 by a pivotal connection 108 and is pivoted at its approximate midsection to the rearward extremity of mounting plate 26 by a pivotal connection 110.

Stop link 106 is bifurcated at its lower end, and carries a roller 112 rotatably mounted on a pin 114 extending transversely between the bifurcations.

In chair upright position of Fig. 1, roller 112 is in a retracted or raised position wherefore it does not preclude rocking movements of body-supporting unit 12.

As the body-supporting unit is reclined, seat plate 56 is moved rearwardly thereby causing the upper end of stop link 106 rearwardly therewith to cause the stop link to pivot relative to mounting plate 26 thereby causing the lower end of the stop link and roller 112 to swing downwardly until the roller contacts the flat upper surface of rocker base 18.

Contact of roller 112 with the rocker base precludes rocking of body-supporting unit 12 relative to the base when in the intermediate or fully-reclined positions or positions therebetween.

As the chair is moved between the intermediate reclining Fig. 2 position and the fully-reclined Fig. 3 position, roller 112 maintains contact with the upper surface of the roller base effectually precluding rocking of the body-supporting unit.

Riser link 100, in addition to connecting the leg-rest unit to the base, also serves as a stop means to: (1) preclude retraction of the leg-rest when the chair is in the fully-reclined position; (2) limit the range of movement of the body-supporting unit as dictated by the fully-reclined position of the chair; (3) limit the range of movement of the body-supporting unit as dictated by the fully upright or sitting position of the chair; and (4) preclude retraction of the body-supporting unit when the leg-rest is retracted.

These functions are fulfilled by primary, secondary, tertiary and quaternary stop surfaces on the riser link.

The rearwardmost edge of riser link 100 is designated as the primary stop surface and is numbered 120. This stop surface, in the fully-reclined position of the chair, abuts a stop pin 122 provided on stop link 106 to effectively lock the leg-rest against retraction.

A bottom edge portion located adjacent the rearward end of riser link 100 is designated as the secondary stop surface and is numbered 124. This stop surface, in the fully-reclined position of the chair, abuts offset flange 28 of mounting plate 26 to preclude reclamation of the body-supporting unit beyond the said fully-reclined position.

The forwardmost bottom edge portion of riser link 100 is designated as the tertiary stop surface and is numbered 126. This stop surface, in the fully-upright or sitting position of the chair, abuts offset flange 28 of mounting plate 26 to preclude movement of the body-supporting unit beyond the said fully-upright or sitting position.

The rearwardmost bottom edge portion of riser link 100 is designated as the quaternary stop surface and is numbered 128. This stop surface, in the fully-upright or sitting position of the chair, abuts stop pin 122 on stop link 106 to preclude reclining movement of the body-supporting unit with the leg-rest retracted.

When the chair is in fully-upright or sitting position with leg-rest 34 retracted, major leg-rest element 36 being positioned flush with the flat upper surface of seat 14 and minor leg-rest element 38 being disposed properly thereof, tertiary stop portion 126 of riser link 100 will be observed to rest on offset flange 28 and quaternary stop portion 128 to abut stop pin 122 on stop link 106. From this position, it is possible for the chair occupant to move to an intermediate reclined position, by causing a rearwardly-directed component of force to bear upon backrest 16 in manner to cause the body-supporting unit to move in a substantially rearward direction causing stop link 106 to pivot relative to mounting plate to move stop pin 122 out of abutment with quaternary stop portion 128 permitting the leg-rest to be extended, with lifter link 40 and control plate 42 swinging upward their respective pivots to set up concomitant swinging movement of first and second long links 46 and 60 all whereby major leg-rest element support plate 68 and major leg-rest element 36 are motivated into the extended generally-horizontally-disposed position.

Similarly, rotation of the first and second long links imparts a corresponding rotation to lifter link 59 whereby primary and secondary control links 74 and 82 are moved forwardly and outwardly to urge minor leg-rest element support plate 78 to pivot relative to major leg-rest element support plate 68.

A smooth swinging motion of the minor leg-rest element support plate is assured by the constraining action of secondary control link 82 on forward movement of primary control link 74 as it urges the minor leg-rest element support plate into axial alignment with the major leg-rest element support plate, all wherewith the major and minor leg-rest elements are disposed in axial alignment to each other each when the chair is in a semi-reclined position, as in Fig. 2, or is in a fully-reclined position, as in Fig. 3.

In such leg-rest extending movement sequence, riser link 100 has not changed its generally-horizontal position and tertiary stop surface 126 continues to rest on offset flange 28 even though leg-rest 34 is now fully-extended, with stop surface 96 of control plate 42 abutting stop 98 on first long link 46 to preclude further leg-rest extension, and roller 112 on stop link 106 now contacting the flat upper surface of rocker base 18 to preclude rocking of the body-supporting unit relative to said rocker base.

To reach fully-reclined position from a semi-reclined position, the chair occupant need but once again bring additional rearward pressure to bear upon backrest 16 whereupon the forward end of riser link 100 will be urged upwardly by pivot link 40 through the pivotal connection 102 to cause the riser link to swing on its pivotal connection 104 with mounting plate 26.

Such movement of riser link 100 brings secondary stop surface 124 into contact with the offset flange 28 of the mounting plate to stop further reclining movement of the body-supporting unit and brings primary stop surface 120 into contact with stop pin 122 to preclude retraction of the leg-rest while the body-supporting unit is in the fully-reclined position.

In addition, roller 112 continues to abut the flat upper surface of rocker base 18 to preclude rocking of the body-supporting unit.

The occupant may return the chair from fully-reclined to semi-reclined position or intermediate position, with the leg-rest remaining extended, by exerting a slight downward pressure upon seat 14, or simply by bringing the shoulders away from the back-rest of the chair, causing riser link 100 to swing upon the pivotal connection 104 whereupon tertiary stop portion 126 thereof moves into abutment with offset flange 28 of mounting plate 26 and primary stop portion 128 thereof moves out of abutment.
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with stop pin 122 permitting retraction of the leg-rest if desired.

On returning to the intermediate reclining position of FIG. 2 from the fully-reclined position of FIG. 3, roller 112 maintains its substantially downwardly extended position, wherefore the body-supporting unit has maintained a fixed relationship to the rocker base.

On return from the FIG. 2 position to the upright or rocking position of FIG. 1, roller 112 rolls along the base 18 and then is swung upwardly away from the rocker base to its retracted position rearwardly of rocker 20 whereupon rocking movement of the body-supporting unit relative to the rocker base once again becomes possible.

I claim:

1. In a rocker-recliner chair inclusive of a rocker base and a chassis mounted thereupon and a body-supporting unit including a back-rest and a seat rockable relative to the base and shiftable relative to the chassis between a primary upright sitting position and a multiplicity of secondary reclining positions, the improvement in position-attaining means comprising: a leg-supporting means, a linkage system for supporting the body-supporting unit in its shifting movements and for mounting said leg-supporting means relative to the body-supporting unit and for moving said leg-supporting means between retracted position adjacent the seat of the body-supporting unit and projected position forwardly thereof and distantly therefrom coordinately with the shifting movements of the body-supporting unit and including a riser link pivotally interconnecting said leg-supporting means and the base and the body-supporting unit, means cooperator with said body-supporting unit and including a stop link responsive to movement of said body-supporting unit and a roller carried by said stop link and rollable into bearing contact upon the rocker base as the body-supporting unit is shifted relative to the chassis for effecting preclusion of the rocking of the chassis in any secondary position of the body-supporting sub-assembly, and a plurality of stop portions on said riser link selectively engageable with the rocker base and with the stop link for controlling movement of the leg-supporting means and for limiting movement of the body-supporting unit.

2. In a rocker-recliner chair according to claim 1, wherein the stop portions on said riser link comprise a first pair of stop portions thereon selectively engageable with the base for limiting movement of the body-supporting unit and a second pair of stop portions thereon selectively engageable with the stop link for controlling movement of the leg-supporting means.

3. In a rocker-recliner chair according to claim 1, including control means operatively connected to said linkage system and to the body-supporting unit for controlling the ease of movement of the leg-supporting means.

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