

[54] **RECLINING CHAIR WITH TWO-PART BACKREST**

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[58] Field of Search 297/61, 112, 391, 353,
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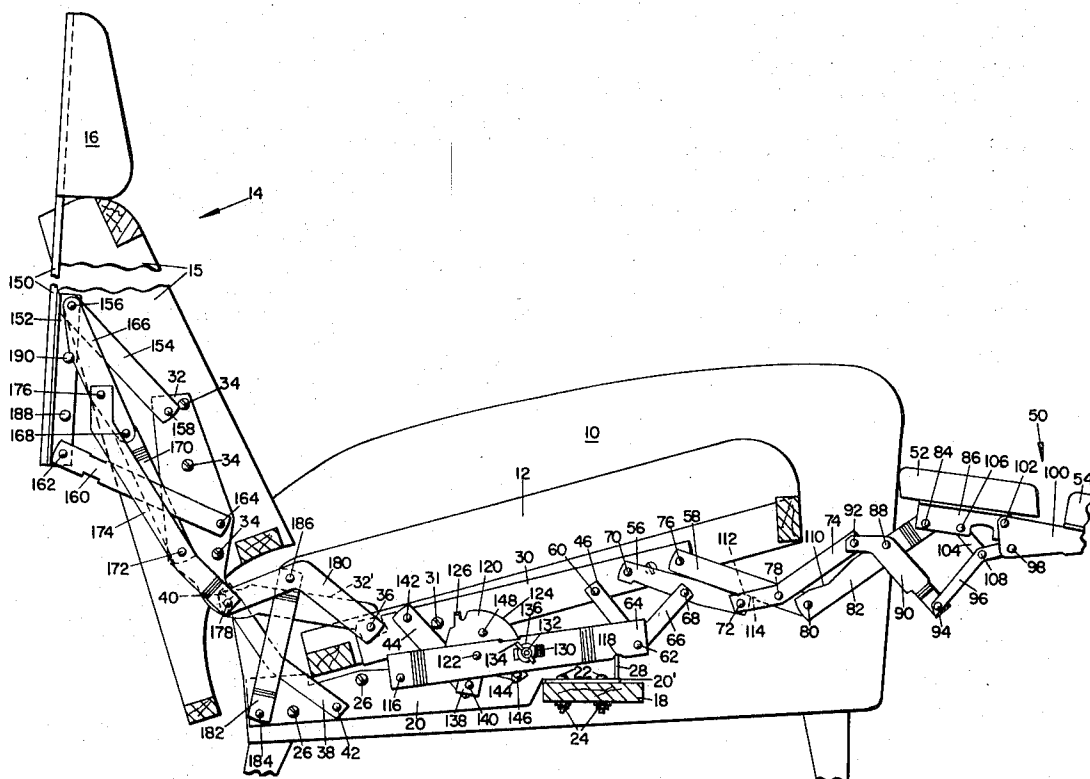
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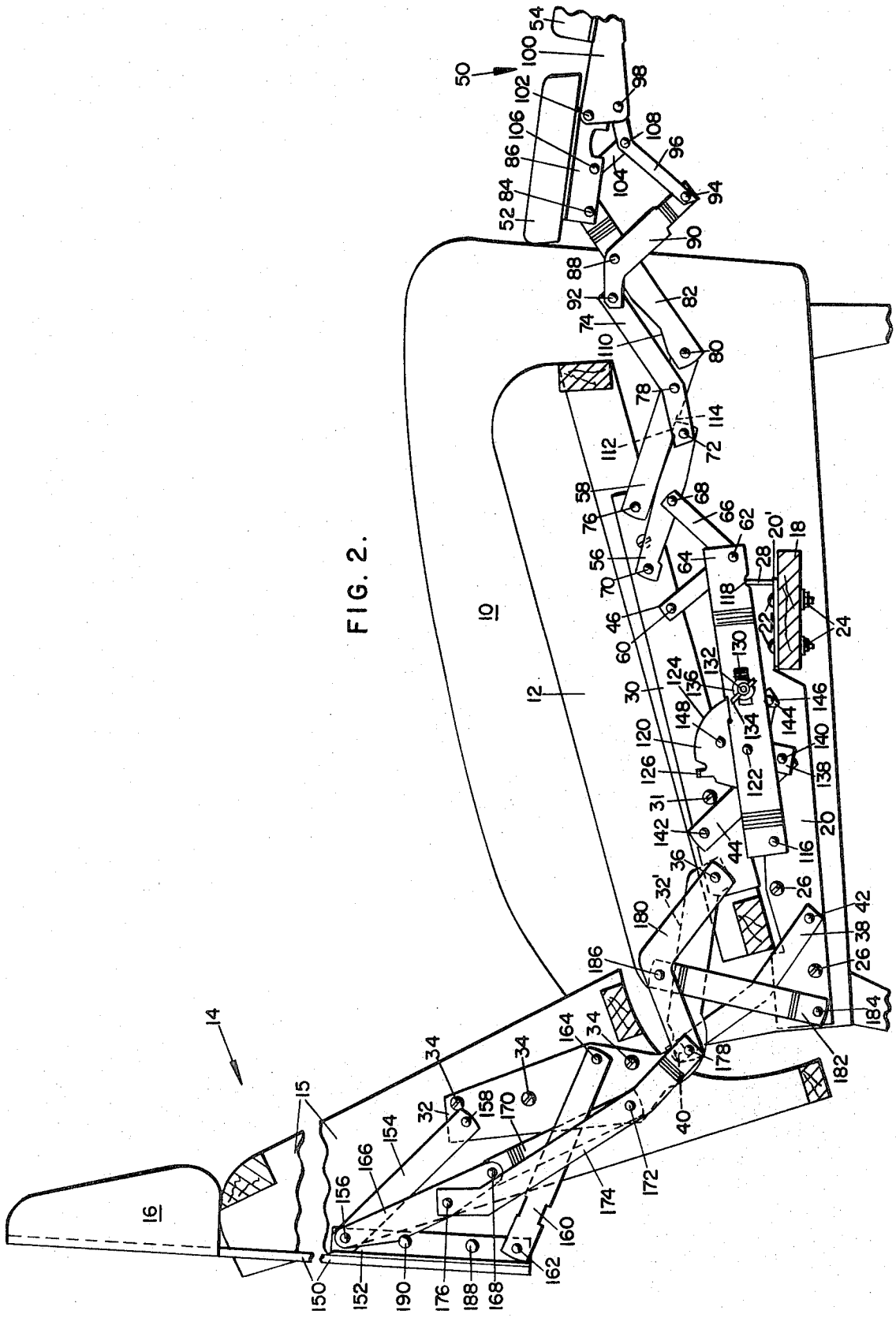
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[57] **ABSTRACT**

A reclining chair having a supporting framework, a body-supporting unit comprising a seat and a two-part backrest mounted for reclining movements relative to the supporting framework, a legrest shiftable between a retracted position and extended positions relative to the seat in concert with movements of the body-supporting unit, an upper part of the backrest being movable between a retracted position relative to a lower part of the backrest and extended, useful position relative to the lower part of the backrest in concert with movement of the body-supporting unit and legrest, and toggle means for locking the upper and lower backrest parts in said extended, useful position when the body-supporting unit is reclined.

2 Claims, 3 Drawing Figures





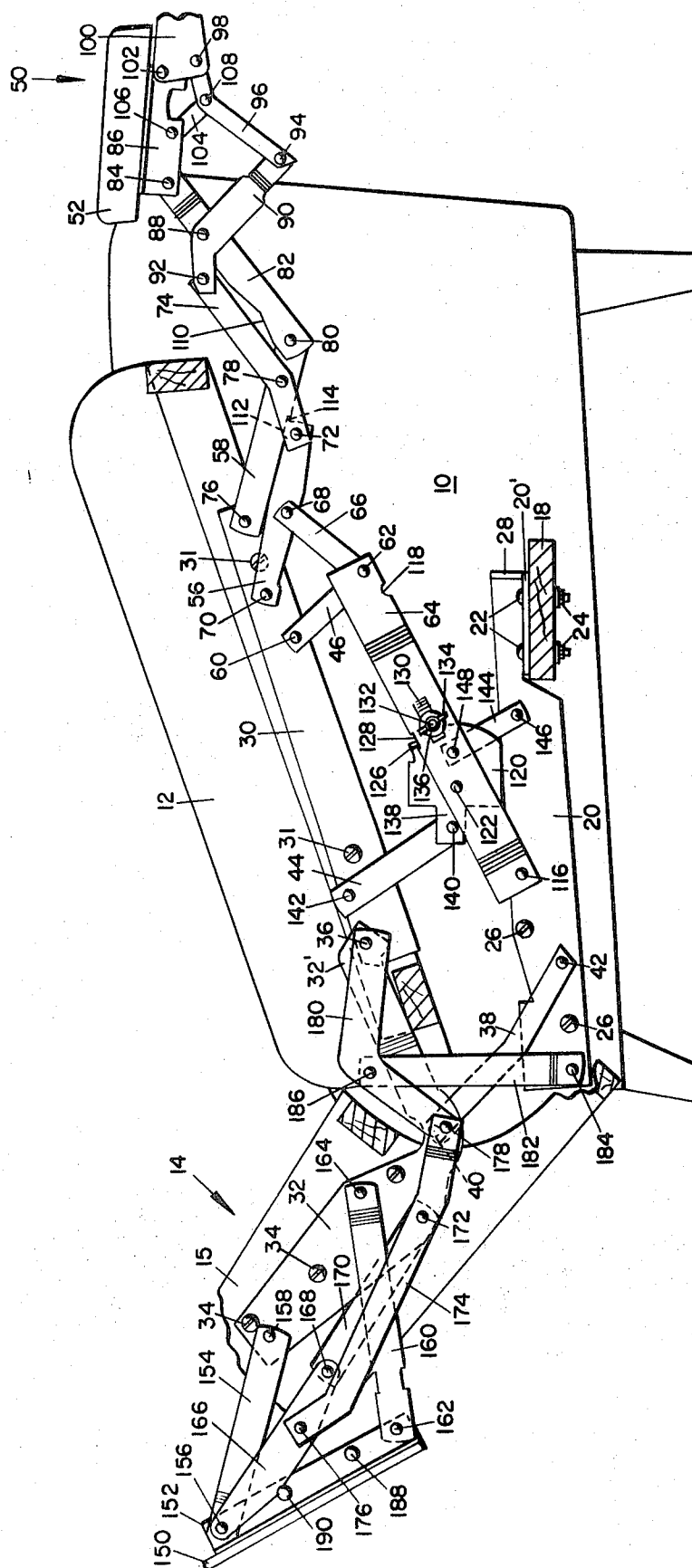


FIG. 3.

RECLINING CHAIR WITH TWO-PART BACKREST

A primary object of the invention is to provide a reclining chair having a two-part backrest, one part of which is retracted when the chair is in an upright or sitting position and is automatically movable into a position wherein it is disposed immediately above the other part of the backrest when the chair is reclined to support the neck and head of a chair occupant.

It is a main feature of the invention to provide a reclining chair of the type described wherein, upon movement of the body-supporting unit between intermediate and fully reclined positions, the upper backrest part of the two-part backrest is locked and toggled in place in an extended position relative to the lower backrest part whereby the two move together as a unit.

In the drawings:

FIG. 1 is a fragmentary side elevational view of a reclining chair incorporating the structure of the invention, the chair being shown in upright or sitting position;

FIG. 2 is a side elevational view of the linkage mechanism incorporated into the FIG. 1 chair, the mechanism being shown in intermediate reclining or TV position; and

FIG. 3 is a side elevational view of the FIG. 2 linkage mechanism, with the mechanism being shown in fully reclined position.

I have shown in FIG. 1 a reclining chair comprising a supporting framework 10, a seat 12, and a two-part backrest 14 having a lower part 15 and an upper part 16. The lower backrest part 15 is secured pivotally relative to the seat while the upper backrest part 16 is secured pivotally relative to the lower backrest part.

The seat and backrest form a body-supporting subassembly having a pivotal relationship to supporting framework 10.

The linkage mechanism is one of a pair thereof, one being located at each side of the chair between the supporting framework and the respective adjacent sides of seat and backrest.

The linkage mechanism may rest upon a cross brace 18 extendable transversely relative to and between the opposite sides of the supporting framework and secured to said sides.

A substantially horizontally-extending base bracket 20 is stationarily fixed at its forward end to cross brace 18 as by bolts 22 which extend through a flange 20' on the base bracket and through the cross brace and have nuts 24 threaded thereon.

Base bracket 20 is fixed at its opposite or rearward end to supporting framework 10 as by screws or bolts 26.

Of course, it will be understood that the linkage mechanism may be otherwise mounted to the supporting framework without departing from the invention.

Base bracket 20 extends lengthwise or in a front-to-rear dimension of the chair and a stop 28 which extends outwardly from the base bracket adjacent its forward end serves to limit downward movement of the linkage mechanism.

A seat bracket 30 is stationarily secured to the lower edge of seat 12 as by screws 31 or equivalent.

An L-link 32 is fixed to a side of lower backrest part 15 as by screws 34, and includes a lowermost forwardly-extending foot portion 32', the forwardly-facing end

of which is pivotally connected to seat bracket 30 as at 36.

The seat 12 and backrest 14 are pivotally supported for movement relative to the supporting framework by means of a primary pivot link 38 pivotally connected at 40 at its upper end to L-link 32 and thereby to backrest 14, and pivotally connected at 42 at its lower end to base bracket 20 and thereby to supporting framework 10.

Additionally, the seat and backrest are pivotally supported for movement relative to the supporting framework by means of secondary and tertiary pivot links 44 and 46 respectively, as will appear.

A fully-articulated, two-part legrest or leg-supporting unit, generally indicated by 50, is positioned at the forward end of the chair and includes a major legrest portion 52 and a minor legrest portion 54 pivoted thereto adjacent its lower end.

The legrest unit, which could be a one part unit in lieu of two-part, is mounted by means of a control linkage on the forward end of seat 12 for movements between a retracted position (FIG. 1), and an extended position (FIGS. 2 and 3) and a plurality of intermediate positions therebetween.

In the chair fully upright or sitting position (FIG. 1), major legrest portion 52 is disposed flush with the forward-facing vertical wall of seat 12, while cooperant minor legrest portion 54 extends rearwardly from the lower end of said major legrest portion so as to be hidden from view beneath seat 12.

When major legrest portion 52 is elevated and advanced, cooperant minor legrest portion 54 is moved to a position forwardly thereof and in axial alignment therewith.

The legrest unit is suspended from seat 12 by a means inclusive of tertiary pivot link 46, a primary actuator link 56, and a secondary actuator link 58.

Tertiary pivot link 46 is pivoted at 60 at its upper end to seat bracket 30 and is pivoted at 62 at its opposite lower end to the forward end of a rise bar 64, to be described.

An impeller link 66 is pivoted at the pivot 62 at its rearward end to rise bar 64 and is pivoted at 68 at its opposite forward end to the approximate midsection of primary actuator link 56.

Primary actuator link 56 is pivoted at 70 at its upper end to seat bracket 30 and at 72 at its opposite lower end to the lower end of a tertiary actuator link 74.

Secondary actuator link 58 is pivoted at 76 at its upper end to seat bracket 30 at 78 below its midsection to tertiary actuator link 74 and at 80 at its opposite lower end to the lowermost extremity of a primary lifter link 82.

Primary lifter link 82 is pivoted at 84 at its opposite forward end to a major legrest plate 86 which functions as a support for major legrest portion 52.

Primary lifter link 82 is pivoted at 88, upwardly of its midsection, to a secondary lifter link 90.

Secondary lifter link 90 is pivoted at 92 at its upper end to the upper end of tertiary actuator link 74 and is pivoted at 94 at its opposite lower end to the lower end of a primary control link 96.

Primary control link 96 is pivoted at 98 at its forward end to a minor legrest plate 100 which functions as a support for minor legrest portion 54.

Major and minor legrest plates, **86** and **100** respectively, are articulately interlinked by a pivotal connection **102**.

A secondary control link **104**, extending between major legrest plate **86** and primary control link **96**, is pivoted at **106** at one of its ends to the major legrest plate and is pivoted at **108**, (see FIGS. 2 and 3), at its opposite end to said primary control link.

In the upright position of the chair as seen in FIG. 1, with the legrest retracted, the forward edge of tertiary actuator link **74** abuts the rearward edge of primary lifter link **82** to limit the range of rearward motion of the legrest, the rearward edge of the primary lifter link being concaved as at **110**, (see FIGS. 2 and 3), so as nestably to receive the forward edge of the tertiary actuator link therein.

In the reclining positions of the chair, as seen in FIGS. 2 and 3, with the legrest extended, a toe portion **112** on the forward edge of primary actuator link **56** adjacent the lower end thereof is receivable in a notch **114** on the rearward edge of secondary actuator link **58** to limit the range of extension of the legrest.

Rise bar **64** interconnects the legrest linkage means to the supporting framework **10** by means of tertiary pivot link **46** which is pivoted at **62** to a forward portion of the rise bar.

Rise bar **64** rotates about a pivot **116** at its rearward portion relative to base bracket **20**.

The lower edge of the rise bar is provided adjacent its forward end with a recess **118**, which recess is adapted to abut stop **28** on base bracket **20** so as to preclude downward movement of the rise bar beyond the desired limits.

A friction plate **120** is pivoted at **122** to rise bar **64** and is provided with an arcuate forward edge **124** which terminates adjacent its upper extremity in an offset lip or flange **126** which functions as a stop in the fully-reclined position of the chair upon engagement in a notch **128** provided in the upper edge of rise bar **64**, as seen in FIG. 3.

A portion of rise bar **64** adjacent arcuate edge **124** of friction plate **120** is deformed to provide an offset friction finger **130**, the friction finger and rise bar being co-operant to allow insertion of a portion of friction plate **120** therebetween, with one planar face of the friction plate being flush with the inner planar face of rise bar **64**, and with the other planar face of the friction plate being flush with the inner planar face of friction finger **130**.

A bolt **132** extends laterally through friction finger **130** and has a wing nut **134** threadably engageable therewith and tightenable against a washer **136**, the washer being of appropriate size to bridge the opening in rise bar **64** created therein by the formation of friction finger **130**, so as to rest flush against the outer planar face of the rise bar.

Wing nut **134** may be tightened against washer **136** wherefore friction finger **130** is drawn inwardly to increase the frictional engagement between friction plate **120** and rise bar **64**, and conversely, by loosening wing nut **134**, the frictional engagement between friction plate **120** and rise bar **64** may be decreased, the whole functioning as an adjustable braking system whereby the force or weight required to move both the seat and backrest to one of a plurality of reclining positions may be varied, in accordance with the dictates of the chair occupant.

A cut-away lowermost portion of friction plate **120** forms a link portion **138** which is pivoted at **140** to the lower end of secondary pivot link **44**, with the secondary pivot link in turn being pivoted at **142** at its upper end to seat bracket **30**.

A control link **144** is pivoted at **146** at its lower end to base bracket **20** and at **148** at its opposite or upper end to friction plate **120**. Control link **14** functions to control elevation of the seat during angularization of the body-supporting unit to the fully-reclined chair position.

Upper backrest part **16** is operatively connected by means now to be described to the body-supporting unit, to the supporting framework and to the legrest for movement between a retracted position when the chair is upright and a position overlying the lower backrest part **15** when the chair is reclined, upper backrest part **16** and legrest **50** reaching their respective extended positions simultaneously.

Upper backrest part **16** is fixed to the upper ends of a pair of bars **150**, only one of which is shown in the drawings, each of which is fixed at its lower end to a support plate **152**. In lieu of bars **150**, a single support member or panel could be utilized.

The upper backrest part is movable between a retracted position, wherein it is disposed within the lower backrest part when the chair is in an upright position as in FIG. 1, and an extended position, wherein it is disposed above the upper end of the lower backrest part, when the chair is reclined, as in FIGS. 2 and 3.

A first pivot link **154** is pivoted at one end at **156** to the upper end of support plate **152** and at its opposite end at **158** to the upper end of L-link **32**.

A second pivot link **160** is pivoted at one end at **162** to the lower end of support plate **152** and at its opposite end at **164** to the approximate midsection of L-link **32**.

A first toggle link **166** is pivoted at one end to support plate **152** at the pivot **156** and is pivoted at its opposite upper end at **168** to one end of a second toggle link **170** which is pivoted at its opposite lower end at **172** to L-link **32**.

A connecting link **174** is pivoted at one end at **176** to the approximate midsection of first toggle link **166** and is pivoted at its opposite end at **178** to one end of a seat link **180** which is pivoted at its opposite forward end to seat plate **30** at the pivot **36**.

A drive link **182** is pivoted at one end at **184** to base bracket **20** and at its opposite end at **186** to the approximate midsection of seat link **180**.

A first stop **188** on support plate **152** is engageable by an edge of second pivot link **160** to preclude retraction of the upper backrest part **16** beyond a desired limit when the chair is upright.

A second stop **190** on support plate **152** is engageable by an edge of first toggle link **166** to preclude overtravel of said first toggle link **166** and second toggle link **170**, whereby those links assume a toggled or locked position to prevent movement of the upper backrest part **16** beyond a desired limit when the chair reaches the reclined position of FIG. 2.

In FIG. 1 illustrating the relative positions of the components of the linkage when the chair is in fully upright position, it will be observed that legrest unit **50** is retracted, with major legrest portion **52** positioned flush with the forward end of seat **12**, and with minor legrest portion **54** disposed rearwardly thereof beneath

seat 12, and upper headrest part 16 is retracted within lower backrest part 15. In such chair position, rise bar 64, in a generally-horizontal position, rests on stop 28 with friction finger 130 and bolt 132 being disposed adjacent the lower end of the arcuate edge of friction plate 120.

To reach the FIG. 2 intermediate reclining position from this upright position, the chair occupant may bring rearward pressure to bear upon lower backrest part 15, causing the seat and backrest structures to move in substantially rearward directions relative to chair brace 18 by the coordinated swinging movements of primary pivot link 38 and secondary pivot link 44 and tertiary pivot link 46, and impeller link 66 each upon its respective pivot points.

By so mounting the seat and backrest, the body-supporting unit is movable from the upright or sitting position of FIG. 1 to the positions of FIGS. 2 and 3 and/or to any position therebetween and, of course, also reversely.

In the course of movement from upright position to a reclining position and with the legrest unit being extended, the pivot links 38, 44 and 46, and impeller link 66, and the actuator links 56 and 58 pivot unisonly in a counter clockwise direction (as viewed in FIG. 1) concomitantly with the movement of seat bracket 30 and seat 12.

As tertiary pivot link 46 rotates, impeller link 66 also rotates to urge primary actuator link 56 forwardly and upwardly, which, in turn, urges tertiary actuator link 74 forwardly and upwardly, thereby to cause a corresponding movement of secondary actuator link 58 and primary lifter link 82, all whereby major legrest plate 86 and major legrest portion 52 are motivated toward a generally-horizontal position.

Similarly, as tertiary actuator link 74 rotates, rotation is imparted to secondary lifter link 90 whereby control links 96 and 104 are moved forwardly and outwardly to urge minor legrest plate 100 to pivot at 102 relative to major legrest plate 86.

A smoothly swinging motion of minor legrest plate 100 is assured by secondary control link 104 which acts to constrain the forward movement of primary control link 96 and to bring minor legrest plate 100 into axial alignment with major legrest plate 86, all wherewith major legrest portion 52 and minor legrest portion 54 are placed in axial alignment as to each other to form a unit when the chair is in an intermediate reclining position such as is illustrated in FIG. 2, or in a fully-reclining position such as is illustrated in FIG. 3.

In FIG. 2, it will be appreciated that by the sequence of movements just described, rise bar 64 will not have changed its generally horizontal position relative to base bracket 20 and will continue to rest on stop 28, even though the legrest unit is now fully extended so that major legrest plate 86 and minor legrest plate 100 are axially-aligned.

It is to be here noted that, had he so desired, the chair occupant might have positioned the body-supporting unit at any position of reclination between the positions of FIGS. 1 and 2, with a concomitant partial extension of legrest unit 50 with ample leg support being provided by major legrest portion 52.

To reach the fully-reclining position of FIG. 3 from the reclining position of FIG. 2, the chair occupant may once again bring additional rearward pressure to bear upon lower backrest 15 by pushing with the hands upon

the arms 10 of the chair, whereupon the forward end of rise bar 64 will be urged upwardly by tertiary pivot link 46 through pivotal connection 62 to cause the rise bar to swing at its rearward end on its pivot 116.

As lower backrest 15 is further angularized, seat 12 and seat bracket 30 are urged rearwardly and upwardly by toe portion 32' of L-link 32 through its pivotal connection 36.

As seat bracket 30 moves rearwardly and upwardly, the lower end of link portion 138 of friction plate 120 will be pulled upwardly by secondary pivot link 44 through its pivotal connection 140 whereupon friction plate 120 will pivot relative to rise bar 64 on its pivot point 122 until flange 126 of the friction plate becomes engaged in notch 128 in the upper edge of the rise bar whereupon further rotation of friction plate 120 is precluded, the chair now having arrived at the fully reclined position.

In the course of movement from upright position to a reclining position wherein upper backrest part 16 is extended, seat link 180 is rotated in a clockwise direction, as viewed in the drawings, by chassis link 182, the seat link in turn urging first connecting link 166 to pivot in a clockwise direction, thereby to urge the support plate 152 to move rearwardly and upwardly, swinging by means of pivot links 154 and 160 relative to L-link 32.

Such swinging movement of support plate 152 continues as the chair is reclined to move the upper backrest part 16 upwardly to a desired position wherein, upon reaching the intermediate reclining position of FIG. 2, the lower edge of the upper backrest part is disposed immediately above the upper edge of the lower backrest part 15.

Upon attainment of the intermediate reclining position, second stop 190 on support plate 152 is engageable by an edge of first toggle link 166 to preclude overtravel of first toggle link 166 and second toggle link 170 whereby those links assume a toggled or locked position to prevent movement of upper backrest part 16 beyond a desired limit when the chair reaches the reclined position of FIG. 2.

Upon movement of the chair from the intermediate position to the fully reclined position, the upper backrest part remains in an extended position upwardly of the lower backrest part as a locked or toggled-in-place unit, simply swinging with L-link 32 as the body-supporting unit is reclined, being so held by toggle links 166 and 170, said toggle being limited by stop 190.

Similarly, upon movement of the chair from the fully reclined position to the intermediate reclined position the lower backrest part remains extended, again as a locked, toggled-in-place unit by the toggle links 166 and 170, said toggle being limited by stop 190.

Upon movement of the chair from the intermediate position to the upright position, the support plate 152 is swung downwardly in the reverse direction to return the upper backrest part to a retracted position within the lower backrest part.

It is to be understood that while I have shown the two-part backrest and its actuating means as operating in conjunction with a specific linkage for effecting reclination of the chair and extension of the legrest, any suitable mechanism for effecting such reclination and legrest extension may be substituted.

I claim:

1. A reclining chair comprising:

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a stationary frame and a body-supporting unit including a seat and a two-part backrest, the body-supporting unit being mounted on the stationary frame for disposition between an upright sitting position and an intermediate reclined position and a fully reclined position, and reclined positions therebetween, 5
the two-part backrest comprising operatively connected upper and lower backrest parts,
a legrest mounted on the body-supporting unit for movement between retracted and extended positions, 10
means for moving the legrest in concert with movement of the body-supporting unit,
means for projecting the upper backrest part from a retracted position within the lower backrest part to an extended position overlying said lower backrest part upon movement of the body-supporting unit from upright sitting position to said intermediate reclined position and for retaining said upper backrest part in extended position during movement of the body-supporting unit between said intermediate and fully-reclined positions and reclined positions therebetween, and for returning the upper backrest part to said retracted position upon movement from said intermediate reclined position to upright sitting position, 25
the means for moving the upper backrest part com-

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prising a pair of parallel pivot links pivotally connecting between the upper and lower backrest parts, first and second toggle links, and first toggle link being pivoted to the upper backrest part, the second toggle link being pivoted to the first toggle link and to the lower backrest part, a stop on the upper backrest part engageable by the first toggle link for precluding overtravel of said first and second toggle links whereby these links assume a toggled or locked position on movement to reclined positions, a connecting link, a seat link and a drive link, the connecting link being pivoted to the first toggle link and to the seat link, the seat link being pivoted to the seat, the drive link being pivoted to the stationary frame and to the seat link, 30
all for guiding the upper backrest part in a generally curvilinear direction in its movement relative to the lower backrest part, with the toggle links locking the upper and lower backrest parts against movement relative to each other during movement of the body-supporting unit between said intermediate and fully reclined positions. 35

2. A reclining chair according to claim 1, including a second stop on the upper backrest part engageable by one of the pivot links for precluding retraction of the upper backrest part beyond a desired limit when the chair is upright. 40

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