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3,244,448

RECLINING CHAIR MECHANISM

Filed Nov. 30, 1964

3 Sheets-Sheet 1

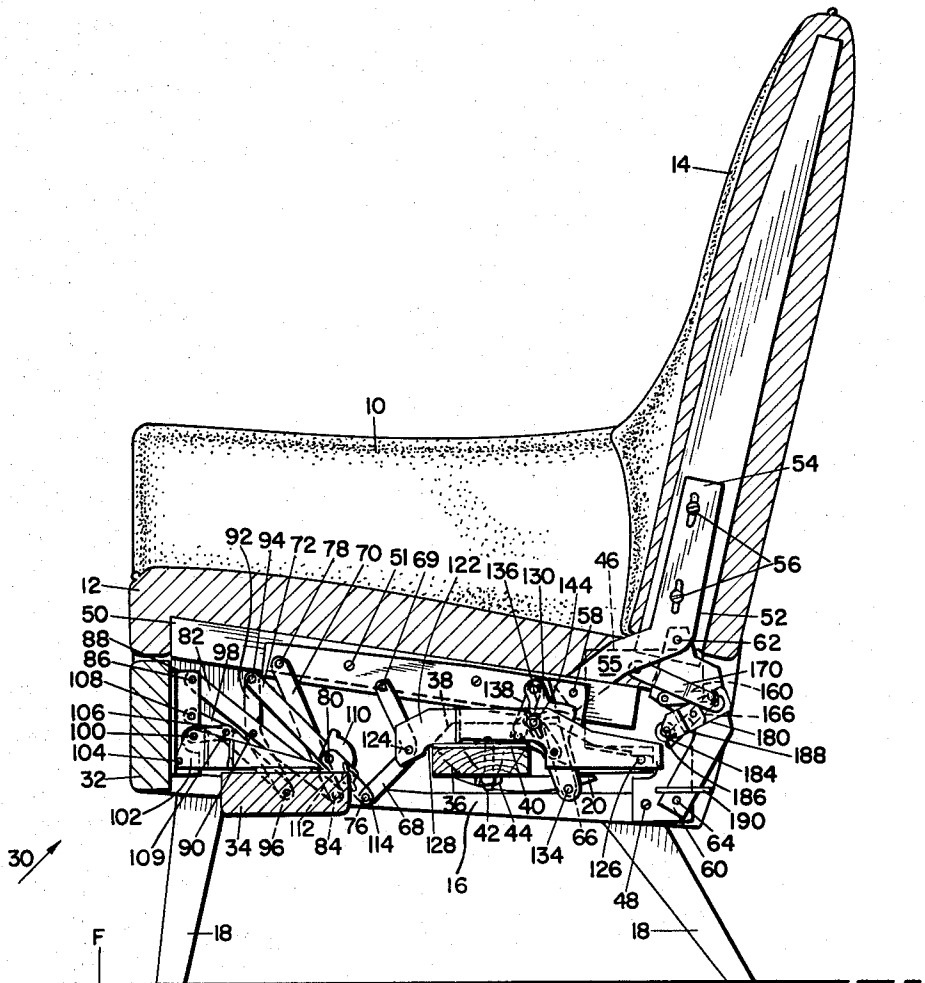


FIG. 1

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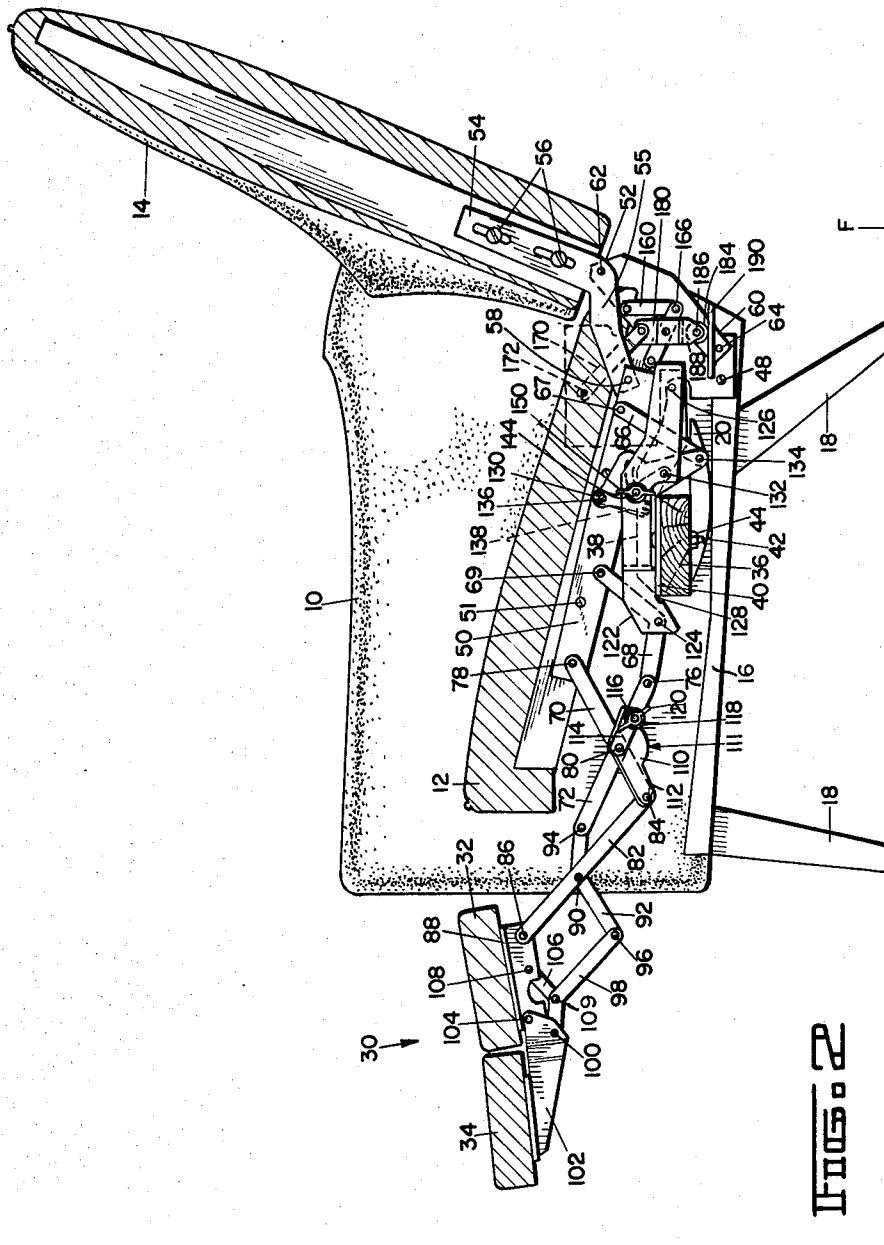
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3 Sheets-Sheet 2



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3 Sheets-Sheet 3

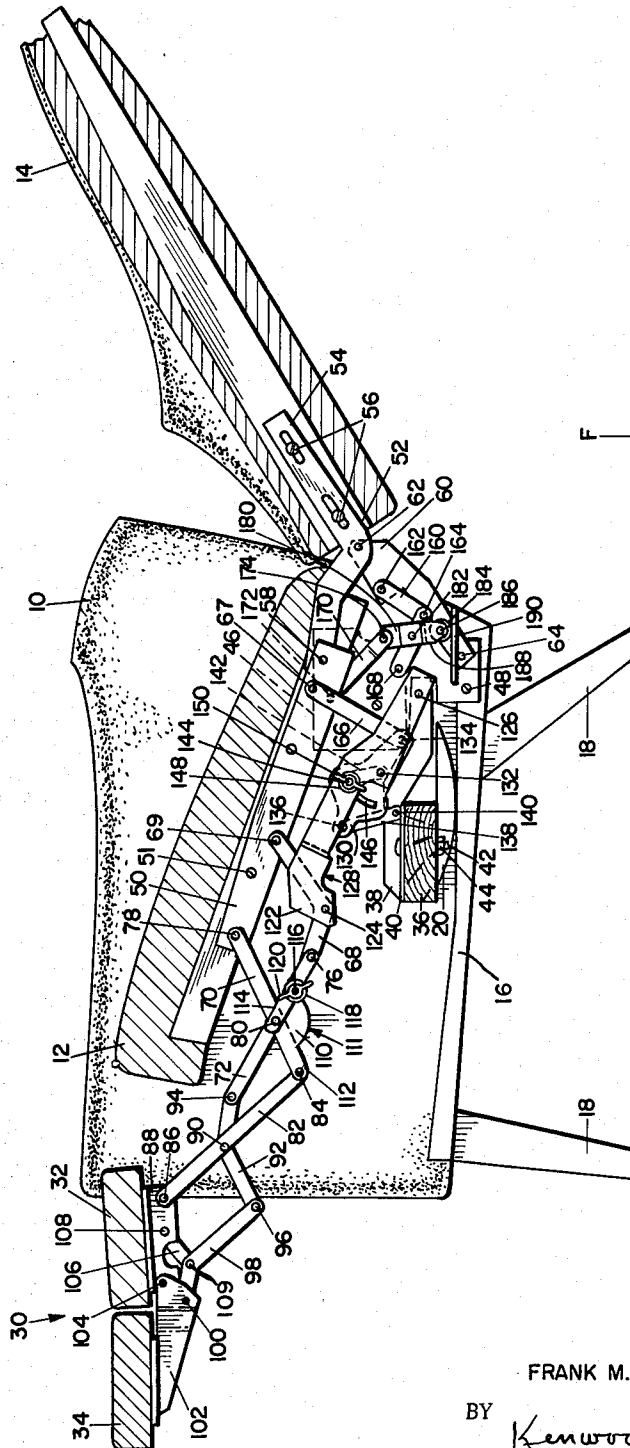


FIG. 3

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RECLINING CHAIR MECHANISM

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3 Claims. (Cl. 297-75)

This invention is directed to improvements in reclining-rocking chairs which make possible the avoidance of the heretofore known "box-like" designs and thereby permits the production of smaller chairs with better styling capabilities. That is, the seating elements of the chair are positioned higher upon from the floor so as to permit improved styling in the respect of allowing a chair with slimmer lines (i.e. thinner arms and a thinner seat) which, being higher off the floor, achieves a more graceful appearance in silhouette.

It is a chief object of the invention to provide a reclining-rocking chair of the high-leg type which lends itself to manifold styling so as to be compatible with a wide variety of furniture designs.

Additionally, the concept provides the chassis of a reclining chair rockably mounted upon a rocker base in such manner that it may be rockable relative thereto, when in upright-sitting position.

As a primary feature of the invention, it incorporates a rocker stop feature which allows a smoother transition in reclining movement from the so-called TV-position to the fully-reclined position and comprehends a one-part or two-part leg supporting unit extendible forwardly as the chair is reclined. In the instance of a two-part extendable leg supporting unit, one part may be arranged so as to be compactly supported beneath the seat when the chair is in normal sitting position, thereby to aid in accomplishing a reduction in frame depth from the seat level and contributing to the aforementioned streamlined design.

The invention additionally envisions incorporating means for precluding rocking motion when the chair disposed in any of its myriad reclined positions.

In the drawings:

FIG. 1 is a view, in longitudinal section, of a chair of the invention, the chair being shown in upright position;

FIG. 2 is a view, similar to FIG. 1, showing the chair in intermediate reclined or TV-position, and

FIG. 3 is a view similar to FIG. 1, showing the chair in fully-reclined or resting position.

With continued reference to the drawings, I have shown a combination recliner/rocking chair, comprising a rockable chassis 10, a body-supporting unit including a seat 12 and a back-rest 14 non-unitary therewith, and a rocker base 16 at either side of the seat supported upwardly of a floor or supporting surface F by elongated legs 18 positioned in known manner at opposite chair sides.

At either side of the seat, an arcuate rocker 20 is fixed to the adjacent side wall of rockable chassis 10 in manner to be rockable upon and relative to the upper planar surface of the adjacent rocker base 16. Each rocker 20 is interassociated with the respective rocker base by a conventional rocker spring mechanism (not shown) in normal platform-rocker manner.

Seat 12 is constituted by a pair of parallel side rails, interjoined at forward and rearwardmost ends by forward and rearward cross rails respectively, and interjoined further in some instances by intermediate cross rails to allow suitable support of the usual cooperant springs, padding, and covering components.

Similarly, backrest 14 is constituted by a pair of parallel side rails, interjoined by a plurality of strategically-located cross rails.

Seat 12 and back-rest 14 are pivotally related to each other by means of a pair of linkage mechanisms, there being one at each side of the body-supporting unit inwardly of the respective adjacent side of the rockable chassis so as to be concealed from view. Only one such linkage mechanism is herein defined, they being identical.

A leg supporting unit or foot stool 30 may be of the one-part type or the two-part type such as shown herein. The two-part type, as shown, is constituted by a large foot stool 32 and a small foot stool 34 pivotally interconnected. The foot stool, whichever its type, is mounted, by means of said linkage mechanism, relative to the forward area of seat 12, 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/or intermediate positions therebetween.

With the chair fully upright, the foot stool is in the fully retracted position. Then the large foot stool 32 is positioned substantially flush with or in the vertical plane of the forward cross rail of seat 12, while the cooperant pivotally connected small foot stool 34 extends rearwardly from adjacent the lower extremity of the large foot stool wherefore it is concealed from view below the seat and rearwardly of the large foot stool.

When large foot stool 32 is elevated and advanced to an extended position, cooperant small foot stool 34 is moved therewith accordingly. When the large foot stool is in a fully-extended position, the small foot stool is in an axially-aligned position forwardly thereof, as in FIGS. 2 and 3.

The linkage mechanism is stationarily mounted on a cross rail 36 extending transversely relative to and between and fixed to the inner faces of the opposite side walls of rockable chassis 10.

A generally horizontally-disposed base plate 38, extending along the front-to-rear chair axis, is stationarily fixed, adjacent its forwardmost extremity, by means of a unitary offset 40 to the upper planar surface of cross rail 36 as by a bolt 42 and nut 44, and adjacent its rearwardmost extremity, to a mounting plate 46 secured to the adjacent portion of the coplanar-disposed side walls of rockable chassis 10 by means of screws 48 or other suitable securing devices.

A seat plate 50, similarly extending along the front-to-rear chair axis, is stationarily secured to the adjacent side rail of seat 12 as by screws 51 or the like.

A back link 52, connecting between the seat and back-rest, includes an upper arm 54, stationarily secured to the adjacent side rail of the back-rest as by screws 56, and a lower forwardly-extending arm 55, pivotally secured adjacent its forward extremity to seat plate 50 as by a pivot pin 58, in manner whereby articulated movements of the seat and back-rest relative to each other are allowed, said seat and back-rest being pivotally supported for such articulated movements relative to the rockable chassis 10 by virtue of a rear operating link 60 pivotally connected to the approximate mid-section of back link 52 as by a pivot pin 62 and to a mounting plate 46 by a pivot pin 64. In such indirect manner, I achieve a pivotal relationship between the rockable chassis and the seat and back-rest components.

The seat and back-rest are additionally pivotally supported relative to the rockable chassis through the means of a rear pivot link 66 pivoted to seat plate 50 by a pivot pin 67, and by means of a V-link 68 pivoted to the seat plate by a pivot pin 69.

Leg-supporting unit 30 is suspended relative to seat 12 by means of V-link 68 cooperantly with a pair of links, namely a seat plate link 70 and a stop link 72, with the V-link being pivoted to the lowermost rearwardly-facing extremity of stop link 72 as a pivot pin 76, and with the

seat plate link being pivoted adjacent its upper extremity to the forward end of seat plate 50 by a pivot pin 78, being pivoted at its midsection to the midsection of stop link 72 by a pivot pin 80, and being also pivoted to a large foot stool link 82 by a pivot pin 84.

By means of a pivot pin 86, large foot stool link 82 is pivoted adjacent its forward extremity to a large foot stool support plate 88, extending outwardly from the rearward face of large foot stool 32. Large foot stool link 82 is also pivoted, at its approximate midsection, by a pivot pin 90 to the approximate midsection of a dog-leg link 92, which link is pivoted at its upper extremity by a pivot pin 94 to the upper or forward extremity of stop link 72 and is pivoted at its lower extremity by a pivot pin 96 to the lower extremity of a small foot stool link 98 which in turn is pivoted by a pivot pin 100 to a small foot stool support plate 102 suitably secured to the rearward or inner face of small foot stool 34.

Foot stool support plates 88 and 102 are interlinked by a pivot pin 104 to allow articulated movement between large foot stool 32 and small foot stool 34.

A control link 105 is pivoted adjacent one of its ends by a pivot pin 108 to large foot stool support plate 88 and is pivoted adjacent its opposite end by a pivot pin 109 to small foot stool link 98.

A braking device, in the form of an adjusting fan 110 includes a projecting tail portion 112, secured relative to seat plate link 70 by pivot pins 80 and 84, and a main body portion having an arcuate edge 111.

An adjusting strap 114 is superposed upon the outwardly facing face of adjusting fan 110, is pivotally connected at its forwardmost end to the adjusting fan by pivot pin 80, and is secured relative to stop link 72 at its rearwardmost end by a bolt 166 extendible through the stop link and through an aligned opening in the adjusting strap, said bolt having a cooperant spring washer 118 and nut 120 received thereupon.

Rotation of nut 120 serves to vary the pressure exerted by adjusting strap 114 upon adjusting fan 110, all where-with the movement of leg-supporting unit 30, in leg-rest extending direction, may be variably controlled to accommodate the weights of individual chair occupants.

A rise bar 122 interconnects the leg-rest subassembly of the linkage mechanism to rockable chassis 10 by means of V-link 68, which V-link is provided to a forward portion of the rise bar as by a pivot pin 124. Said rise bar rotates on a pivot pin 126, located adjacent the rearward extremity of the rise bar, by which means the rise bar is interconnected to base plate 38 so as to be rotatable relative thereto.

The lower edge or face of the rise bar 122 is provided with a recess 128 adapted to seat upon offset web 40 of base plate 38 as by an abutting relationship so as to preclude downward movement, beyond a predetermined limit, of the rise bar, and of the entire linkage mechanism as well.

A brake fan 130 is pivoted first, to the rise bar by a pivot pin 132, second, to the lower end of rear pivot link 66 by a pivot pin 134, and third to base plate 38 by a connecting link 138 pivoted at one end to the brake fan by a pivot pin 136 and pivoted at its opposite end to the base plate by pivot pin 140. A brake strap 142, disposed rearwardly of the brake fan, bears in a frictionally-engaging manner against the rearwardly-facing planar face of the brake fan. This brake strap is connected at its lowermost end to brake fan 130 by pivot pin 132 and is fixed, at its opposite or uppermost end, to rise bar 122, as by a bolt 144 extendible through an arcuate slot 146 in brake fan 130, said bolt having a cooperant spring washer 148 and nut 150 received thereupon in manner whereby the spring washer bears against the forward vertical face of the rise bar.

Nut 150, tightened against washer 148, serves to draw brake strap 142 inwardly to increase the frictional engage-

ment between the brake fan and rise bar. Conversely, nut 150 may be loosened, wherefore such frictional engagement is decreased. Nut 150 and washer 148, cooperantly with brake strap 142, constitute an adjustable braking mechanism wherewith the force or weight required to move the body-supporting unit to one of the plurality of allowed reclining positions may be varied, in accordance with the specific desires or comfort requirements of a particular occupant.

Any rocking movement of rockable chassis 10 relative to rocker base 16, while the chair is in the reclining positions of FIG. 2 or 3, or positions therebetween, is precluded by a means including a push link 160 which is pivoted at 162 to rear operating link 60, and at 164 to the rearward end of a master link 166, which master link in turn is pivoted at 168 to mounting plate 46. A control link 170 is pivoted at 172 to mounting plate 46, and is pivoted at 174 to the upper end of a roller support link 180, the roller support link in turn being pivoted at 182 to master link 166, and carrying a roller 184. The roller is rotatably mounted on a roller pin 186 extending outwardly from the roller support link and journaled at its outer end in a retaining bracket 188 fixed to the roller support link by pivot pin 182.

A bearing plate 190 may be provided so as to rest on top of the platform provided by rocker base 16 and along the upper surface of which roller 184 may ride. Such bearing plate is not required and the roller may ride directly upon the rocker base.

In the FIG. 1 chair position, roller 184 is in a raised or retracted position, wherefore it does not contact bearing plate 190 on rocker base 16 during rocking movements of the rockable chassis 10 relative to the rocker base. As the body-supporting unit is reclined, rear operating link 60 rotates upon pivot pin 64, whereby push link 160 rotates on pivot pin 162 and simultaneously causes master link 166 to rotate on pivot pin 168, whereupon roller support link 180 is moved downwardly toward rocker base 16 and bearing plate 190 as the master link rotates. Roller support link 180 is caused to rotate upon pivot pin 182 by the swinging movement of control link 170 which exerts a similar force upon the roller support link through pivot pin 174, causing roller 184 to swing in an arc as it moves downwardly toward rocker base 16.

As reclining movement of the body-supporting unit continues, roller support link 180 continues to swing, being guided by control link 170, until roller 184 contacts the upper surface of bearing plate 190 on rocker base 16 upon which bearing plate said roller 184 rides. Contact of roller 184 with bearing plate 190 on rocker base 16 precludes rocking of rockable chassis 10 relative to the rocker base when the body-supporting unit is in the intermediate or fully-reclining positions or positions therebetween.

As the chair is moved between an intermediate-reclining position (FIG. 2) and fully-reclined position (FIG. 3), roller 184 rolls along and relative to bearing plate 190 on rocker base 16, effectively precluding the rocking of rockable chassis 10.

In fully-upright position, with leg-supporting unit 30 retracted, large foot stool 32 is positioned flush with the forward face of seat 12 and small foot stool 34 is disposed rearwardly thereof, rise bar 122 is resting on offset web 40 of base plate 38, and bolt 144 is disposed at the lower end of arcuate slot 146 in brake 130. From this position, the chair occupant may move to an intermediate reclining or TV-position merely by pressing rearwardly upon back-rest 14 in a manner to cause the seat and back-rest to move in substantially rearward directions relative to cross rail 36 by the coordinated swinging movements of rear operating link 60 and rear pivot link 66 and V-link 68, each upon its respective pivot pin. In the course of any movement from upright to a reclining position, wherein the leg-supporting unit is extended, this trio of links pivots unisonly (in clockwise direction, as viewed in

FIG. 1) concomitantly with the movement of seat plate 50 and the body supporting unit.

Rotation of V-link 68 urges stop link 72 forwardly and upwardly, so as simultaneously to urge seat plate link 70 forwardly and upwardly and thereby to cause a corresponding movement of large foot stool link 82, all whereby large foot stool support plate 88 and large foot stool 32 are motivated into an extended generally-horizontally disposed position.

Similarly, rotation of stop link 72 imparts a corresponding rotation to dog-leg link 92 whereby small foot stool link 98 and control link 106 are moved forwardly and outwardly to urge small foot stool support plate 102 to pivot on pivot pin 104 relative to large foot stool support plate 88.

A smooth swinging motion of small foot stool support plate 102 is assured by a constraining action of control link 106 on forward movement of small foot stool link 98 as it motivates the small foot stool support plate into axial alignment with the large foot stool support plate, all wherewith the small and large foot stools are disposed in axial alignment as to each other when the chair is in the FIG. 2 semi-reclined or TV-position, or in the FIG. 3 fully-reclined or rest position.

In any such leg-rest extending movement sequence, rise bar 122 will not change its generally-horizontal position and will continue to rest on web 40 of base plate 38, even though leg-supporting unit 30 is motivated into extended position. Roller 184 on roller support link 180 now contacts bearing plate 190 on rocker base 16 to preclude chassis rocking relative to the rocker base.

The occupant may position the body-supporting unit in any position of reclination between the positions of FIGS. 1 and 2, with a concomitant partial extension of the leg-rest, ample leg support being provided by large foot stool 32.

The chair would function as well with the large foot stool only. In such event, a connecting link would be used instead of support plate 102.

To reach a fully-reclined or rest position from a semi-reclining or TV-position, the occupant need bring only slight additional rearward pressure to bear upon back-rest 14 whereupon the forward end of rise bar 122 is urged upwardly by V-link 68 through pivot pin 124 causing the rise bar to swing on its pivot pin 126. During such movement, roller 184 continues to ride on bearing plate 190 on rocker base 16 so as to preclude rocking of chassis 10. As back-rest 14 is further angularized, seat 12 and seat plate 50 are urged generally upwardly by lower arm 55 of back link 52 through pivot pin 58, and the lower end of brake fan 130 is pulled upwardly by rear pivot link 66 through pivot pin 134, whereupon the upper end of the brake fan moves downwardly, with fixed bolt 144 riding in arcuate slot 146 in the brake fan, and with rotation of the fan being stopped upon contact of bolt 144 with the upper extremity of the arcuate slot.

Brake strap 142 controls the ease of rotation of brake fan 130 depending upon the tension set up by the adjustment of nut 150 relative to its bolt and washer.

The occupant may return from fully-reclined position to semi-reclined position, with the leg-rest remaining extended, by exerting a slight downward pressure upon seat 12, or merely by bringing his shoulders away from the chair back-rest so as to cause rise bar 122 to move downwardly into contact with web 40 of base link 38 and to cause the lower end of brake fan 130 to be urged downwardly by rear pivot link 66, whereupon the upper end of the brake fan is moved upwardly, with bolt 144 once

again riding in arcuate slot 146 and with surface 128 of rise bar 122 contacting the offset web 40 of base plate 38.

On returning to the FIG. 2 intermediate reclined or TV-position or to the FIG. 1 upright or rocking position, roller 184 is swung upwardly away from bearing plate 190 and rocker base 16 to its retracted position, whereupon rocking movement of rockable chassis 10 relative to rocker base 16 once again becomes possible.

The chair occupant may move the body-supporting unit directly from the fully-reclined or rest position to the fully-upright position by exerting a slight downward pressure of the heels upon leg-supporting unit 30 to retract the latter as rise bar 122 moves downwardly into contact with offset web 40 of base plate 38, going through the intermediate positions in the sequence.

Various changes coming within the spirit of the invention may suggest themselves to those skilled in the art. I do not wish to be limited to the specific embodiment shown and described, and intend the same to be merely exemplary, the scope of the invention being limited only by the following appended claims.

I claim:

1. In a combination reclining-rocking chair, a rocker base disposed substantially above a supporting surface, a chassis rockably mounted on said rocker base, a body-supporting unit pivotally mounted for tilting movement relative to said chassis, a leg-supporting unit, a linkage system supported on said chassis for moving said leg-supporting unit between a stored position beneath said body-supporting unit and positions forwardly thereof, and means cooperatively linked to said linkage system for selectively locking said chassis in seating position and against rocking motion relative to said rocker base including a push link pivotally connected to said body-supporting unit, a master link pivoted to said push link and to said chassis, a roller support link pivoted to said master link, a control link pivoted to said chassis and to said roller support link, a roller on said roller support link and a bearing plate on said rocker base, said push link and master link causing said roller link to swing relative to said chassis and said control link causing said roller link to swing relative to said master link to move said roller into and out of contacting relationship with said bearing plate on said rocker base as said body-supporting unit is moved relative to said chassis.

2. In a combination reclining-rocking chair as set forth in claim 1, wherein said means cooperatively linked to said linkage system for selectively locking said chassis against rocking motion is operative only when said body-supporting unit is tilted.

3. In a combination reclining-rocking chair as set forth in claim 1, wherein said leg-supporting unit comprises a multi-part fold-away foot stool.

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