

[54] **RECLINING CHAIR**

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[58] Field of Search 297/73, 83-85,
297/316, 318, 320, 322, 342

[56] **References Cited**

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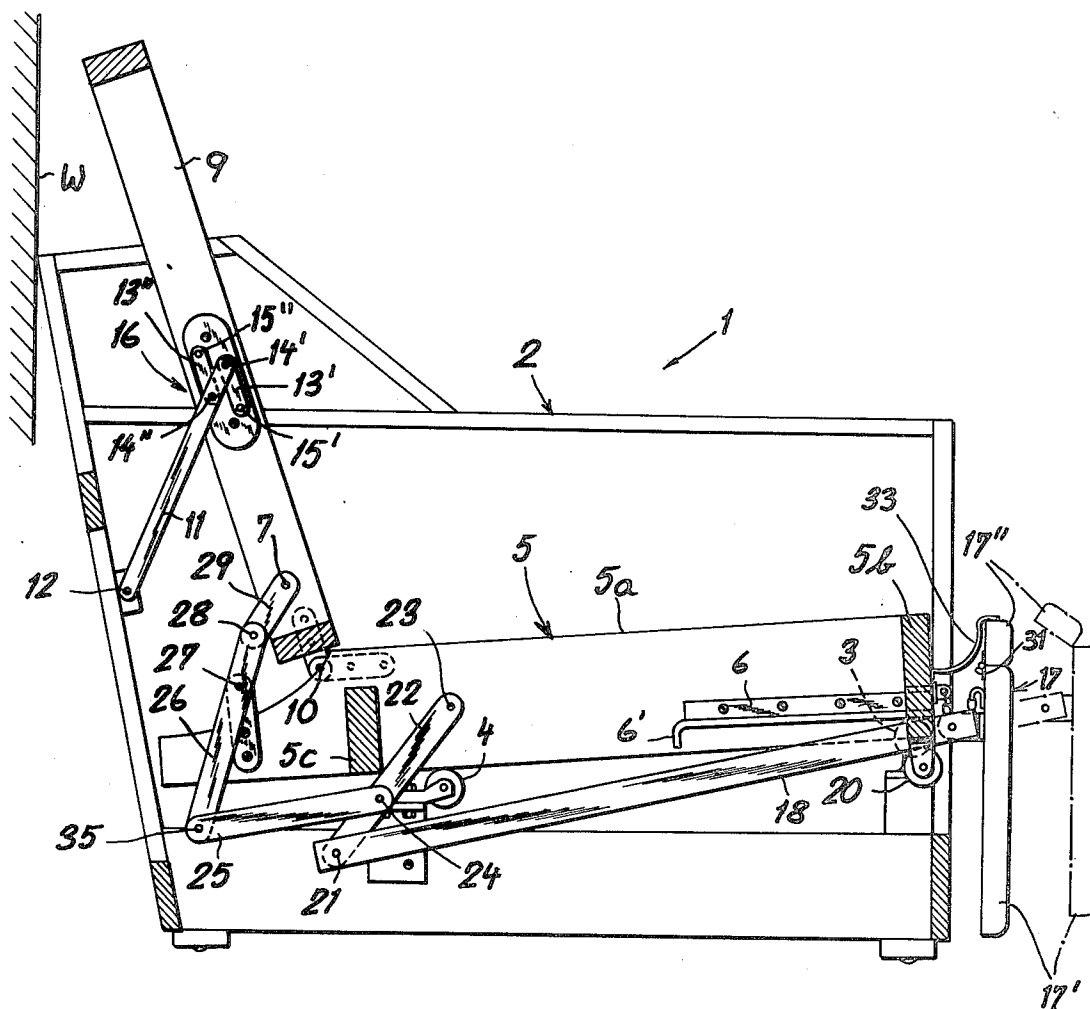
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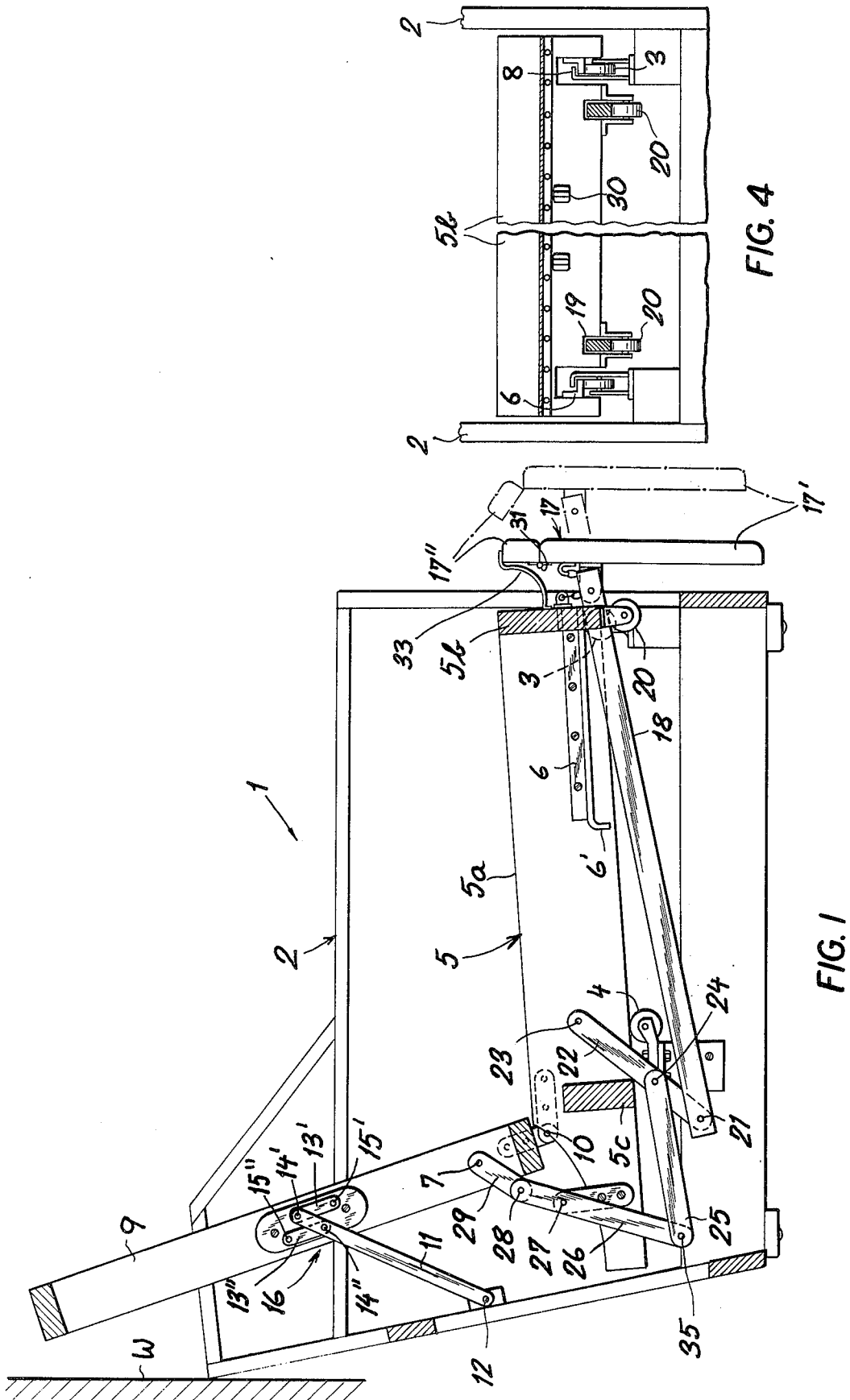
[57] **ABSTRACT**

A slidable chair seat is pivotally connected with a back rest which, at an intermediate point, is joined to a seat-supporting frame through an articulated linkage allowing the back rest to move forward with the seat while swinging from a nearly upright retracted to an inclined advanced position as its upper edge descends substantially vertically so as to stay clear of a wall against which the frame may be pushed. A foot rest forwardly of the seat hangs down in the retracted position but, through another linkage articulated to the seat and the back rest, is extended substantially into line with the seat upon forward movement of the latter.

10 Claims, 4 Drawing Figures



SHEET 1 OF 2



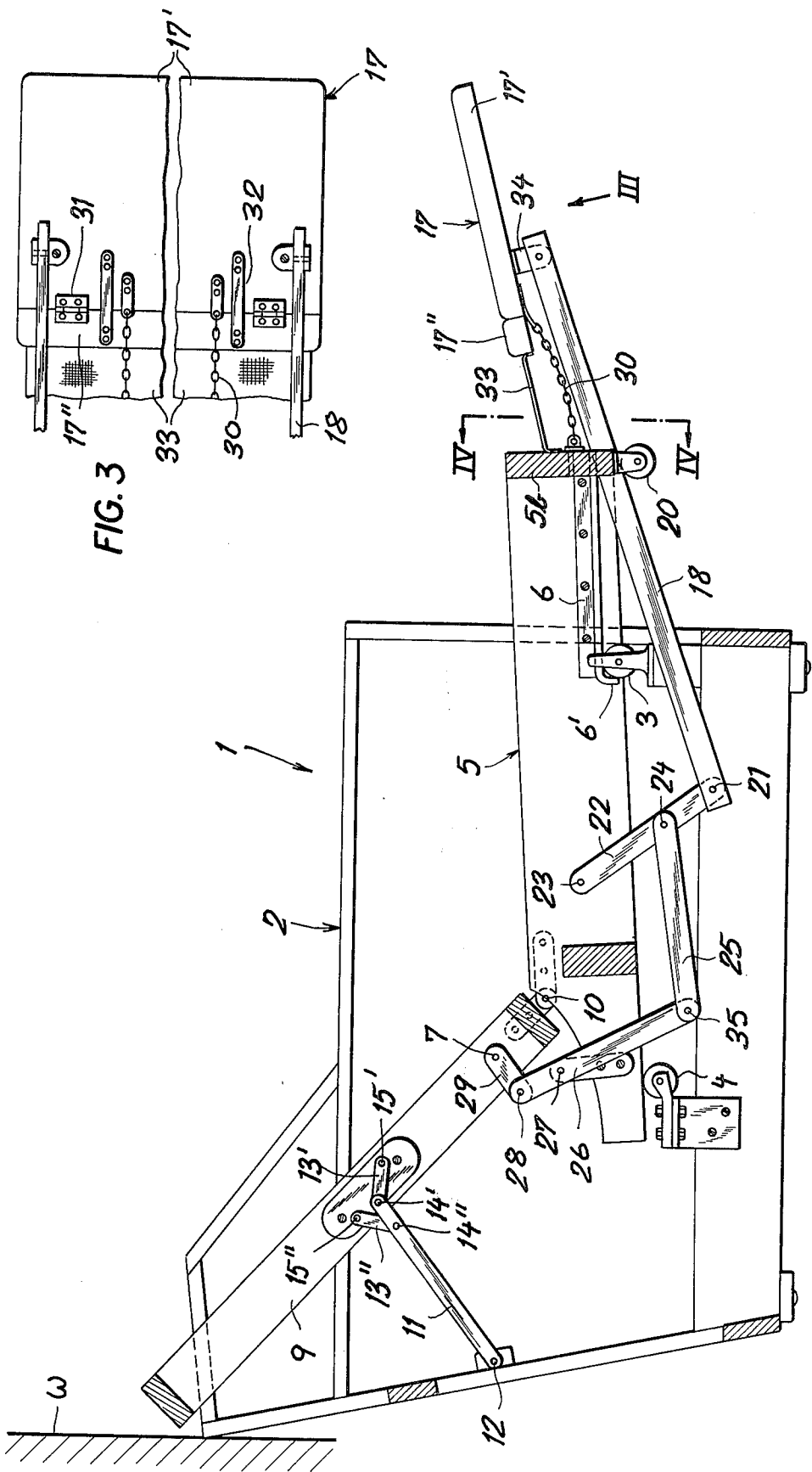


FIG. 2

FIG. 3

RECLINING CHAIR

FIELD OF THE INVENTION

My present invention relates to a reclining chair wherein a back rest is inclinable as a seat moves forward to let the user shift from a sitting to a recumbent position.

BACKGROUND OF THE INVENTION

In a simple construction of this type, the back rest is swingable about a fixed horizontal axis whereas the seat is independently slidable between a retracted and an advanced position. In that case, however, the top edge of the back rest moves backward during a swing from a nearly upright attitude to a sharply inclined attitude (e.g. at an angle of about 45° to the horizontal) so that the pivot of the back rest must be located well forwardly of the rear end of the frame in order to avoid that this top edge strikes a wall against which the frame may have been pushed. Also, the independent movements of the seat and the back rest makes their position inherently unstable and creates discontinuities in the body-supporting surfaces of these components.

OBJECTS OF THE INVENTION

An important object of my present invention is to provide a reclining chair of the general character referred to in which the seat and the back rest move as a unit so that their position remains stable in conformity with the attitude assumed by the body of the user.

Another object is to provide a chair of this description which is of compact construction, with the top edge of the back rest lying close to the rear end of the chair frame and moving substantially vertically as the back rest changes its attitude, thereby enabling the chair to be moved as close as desired to a wall without risking that the back rest — or possibly the user's head — strikes that wall upon a swing into a reclining position.

A further object of my invention is to provide, in such a chair, a movable foot rest which is automatically extended into substantial alignment with the seat upon an advance of the latter with assumption of the inclined attitude by the back rest.

SUMMARY OF THE INVENTION

In accordance with my present invention, a seat movable along a guide track of a chair frame between a retracted and an advanced position has its rear end pivotally connected to the lower edge of an associated back rest. An intermediate portion of that back rest is connected, with two degrees of freedom, to a point on the frame rearwardly thereof by an articulated linkage which allows the back rest to swing between a nearly upright attitude in the retracted seat position and a sharply inclined attitude in the advanced seat position, the upper edge of the back rest descending substantially vertically upon passage from the former attitude to the latter.

According to a more particular feature of my invention, the articulated linkage comprises a lever fulcrumed on the frame and a pair of arms, shorter than that lever, articulated to its free end at spaced-apart locations; the two arms are joined to the aforementioned intermediate portion of the back rest, which preferably lies about midway of its length, by respective pivots whose spacing is less than the sum of the effective

lengths of these arms. With proper choice of the level of the point at which the lever is fulcrumed on the frame, this lever will be generally perpendicular to the back rest in the advanced seat position in which the weight of the user bears heavily upon same.

Pursuant to a further feature of my invention, a foot rest forwardly of the seat is joined thereto through a flexible connection and is articulated to a thrust mechanism, such as a pair of parallel rods, which is guided on the seat for generally horizontal motion relative thereto and is provided with link means engaging the back rest whereby the foot rest can be forwardly extended, with reference to the seat, upon movement of the back rest from its nearly upright to its sharply inclined attitude.

Advantageously, the foot rest is split into a main part and an extension hinged thereto, this extension coming up to about the upper level of the seat so as to contact the thighs of a user in the sitting position in which the main part hangs down. As the main part is thrust forward, its extension may be temporarily held back by the user's legs against a weak spring force to provide a comfortable interim support. The main part and its extension lie substantially horizontally in a straight line with each other and with the seat in the advanced position thereof to let the user stretch his legs while reclining.

BRIEF DESCRIPTION OF THE DRAWING

The above and other features of the present invention will become more readily apparent from the following detailed description of a preferred embodiment, reference being made to the accompanying drawing in which:

FIG. 1 is a lateral sectional view of a reclining chair according to my invention shown in a retracted position;

FIG. 2 is a sectional view similar to FIG. 1, showing the chair in an advanced position;

FIG. 3 is a fragmentary bottom view as seen in the direction of arrow III in FIG. 2; and

FIG. 4 is a cross-sectional view taken on the line IV — IV of FIG. 2.

SPECIFIC DESCRIPTION

In the drawing I have shown the skeleton of a reclining chair 1 stripped of all cushioning and upholstery for the sake of clarity.

A frame 2 is provided on opposite sides with front rollers 3 and rear rollers 4 which movably support a generally rectangular seat 5 comprising a pair of parallel side members 5a, a transverse front member 5b and a transverse rear member 5c. Seat 5 can slide linearly and nearly horizontally between a retracted position, shown in FIG. 1, and an extended position, shown in FIG. 2. The rollers 3 support two short rails 6 secured to confronting inner surfaces of side members 5a, the rails 6 being positively guided between the rollers 3 and overhanging lips 8 formed by the roller mountings. The rear rollers 4 support the seat 5 along the bottom edges of side members 5a. Thus, the two roller pairs 3, 4 form a guide track for the seat 5.

A generally rectangular back rest 9 is articulated to seat 5 at 10 and to frame 2 by a linkage 16 which includes a lever 11 swingable about a fixed fulcrum 12 on the frame, the lever being pivotally joined to the back rest via a pair of relatively short arms 13', 13'' which

are connected to the lever by respective pins 14', 14'' and to the back rest by respective pins 15', 15''. The effective length of each arm 13', 13'' somewhat exceeds half the distance of their pivot pins 15', 15'' whereby the orbits of pivot pins 14', 14'' about pins 15', 15'' intersect, allowing a continuous displacement of back rest 9 from a nearly upright position (FIG. 1) to a reclining position with an angle of inclination of roughly 45° (FIG. 2) as the lever 11 swings clockwise about fulcrum 12. This clockwise swing insures that the back rest 9 bodily moves forward, together with seat 5, so that the top of the back rest stays clear of a wall W against which the frame 2 may have been pushed.

An extendable foot rest 17, of generally rectangular outline, is provided at the forward end of seat 5. The foot rest 17 has a main part 17' and a narrow extension 17'' hinged to part 17' at 31, the part 17' carrying brackets 34 pivotally connected to the front ends of a pair of thrust rods 18 which pass through notches 19 formed in the front member 5b. The rods 18 rest on rollers 20 which are mounted on member 5b just below the downwardly open notches 19, as best seen in FIG. 4.

The rear end of each rod 18 is joined to both the seat 5 and the back rest 9 through an articulated linkage consisting, on each side of frame 2, of a lever 22, an arm 25, a lever 26 generally parallel to lever 22, and another arm 29. Lever 22, having a fixed fulcrum 23 on seat member 5a, is pivotally connected by a pin 24 with arm 25 which in turn is similarly joined, by a pin 35, to lever 26 also having a fixed fulcrum 27 on member 5a. The upper end of lever 26 is connected by a pivot pin 28 with the much shorter arm 29 fulcrumed at 7 on back rest 9. The free end of lever 22 is pivotally connected to rod 18 by a pin 21.

When the seat 5 moves forward, the relative swing of back rest 9 about its pivotal axis extends the rods 18 and, with them, the foot rest 17 whose advance relative to the seat, however, is limited by a flexible strip 33 of fabric or leather, anchored to the front member 5b and the part 17'', and by a pair of chains 30 linking the part 17' with member 5b. Thus, the advancing rods 18 swing the foot rest 17 into a nearly horizontal position in line with seat 5, as shown in FIG. 2, with strip 33 serving the esthetic and protective function of bridging the gap between member 5b and part 17''. Chains 30, concealed from view by the strip 33, prevent overstressing of the strip by being tautened simultaneously therewith as the seat 5 reaches the limit of its forward stroke determined by the engagement of rollers 3 with a pair of lugs 6' depending from rails 6.

The hinges 31 are designed to permit a limited relative swinging of parts 17' and 17'' against the force of two weak leaf springs 32 aligned with each other in either a vertical position (FIG. 1) or nearly horizontally with a slight rise in the forward direction (FIG. 2). As the thrust rods 18 advance from the retracted position of FIG. 1, the main part 17' moves forward but its extension 17'' lags and tilts under body pressure, i.e., when restrained by the legs of a user sitting in the chair, as indicated in phantom lines in FIG. 1. The user's legs are thereby temporarily supported by the upholstered front face and rounded upper edge of part 17'' until the similarly upholstered part 17' reaches its supporting position seen in FIG. 2.

The articulation of the back rest 9 to the rear of the frame 2 through the linkage 16 affords that back rest

two degrees of freedom, i.e., rotatability relative to lever 11 and swingability together with this lever about its fulcrum 12. With the lower edge of the back rest moving generally horizontally forward, from the position of FIG. 1 to that of FIG. 2, its upper edge moves almost vertically along wall W. A similar mobility could also be realized with a simpler linkage, using only one link such as lever 11 pivoted to the back rest about midway of its height, yet in that case the fixed fulcrum 12 of that lever would have to be located farther down, approximately at the seat level, with considerably reduced stability. In the preferred embodiment of my invention disclosed herein, the lever 11 (which of course is duplicated on opposite sides of the frame 2) is perpendicular to the back rest in a sharply inclined position close to that illustrated in FIG. 2 so as effectively to absorb the weight of the user leaning thereon; the linkage 16 engages the back rest 9 about midway of its length, near the region of the shoulders of the user where the contact pressure is greatest.

I claim:

1. A reclining chair comprising:

a frame forming a generally horizontal guide track; a seat on said frame movable along said guide track between a retracted position and an advanced position;

a back rest having a lower edge pivotally connected to the rear end of said seat; and

an articulated linkage connecting an intermediate portion of said back rest with two degrees of freedom to a point on said frame rearwardly of said back rest and above the level of said seat for allowing said back rest to swing between a nearly upright attitude in said retracted position and a sharply inclined attitude in said advanced position, said back rest having an upper edge descending substantially vertically upon passage from said nearly upright attitude to said sharply inclined attitude;

said linkage comprising a lever fulcrumed on said frame at said point, and a pair of arms shorter than said lever articulated to a free end thereof at spaced-apart locations, said arms being joined to said intermediate portion on opposite sides of said lever by respective pivots whose spacing is less than the sum of the effective lengths of said arms.

2. A reclining chair as defined in claim 1 wherein said intermediate portion lies about midway along said back rest at a level with reference to said point making said lever generally perpendicular to said back rest in said advanced position.

3. A reclining chair as defined in claim 1, further comprising a foot rest forwardly of said seat, a flexible connection between said foot rest and said seat, and thrust means articulated to said foot rest and guided on said seat for generally horizontal motion relative thereto, said thrust means being provided with link means engaging said back rest for extending said foot rest forwardly with reference to said seat upon movement of said back rest from said nearly upright attitude to said sharply inclined attitude.

4. A reclining chair as defined in claim 3 wherein said link means comprises a first lever pivoted to said thrust means and fulcrumed on said seat, a second lever generally parallel to said first lever fulcrumed to said seat and articulatedly linked with said back rest, and an arm articulatedly interconnecting said first and second levers.

5

5. A reclining chair as defined in claim 3 wherein said foot rest comprises a first part spaced from a front edge of said seat and articulated to said thrust means, and a second part hinged to said first part and inserted between said front edge and said first part, said flexible connection extending between said front edge and said second part.

6. A reclining chair as defined in claim 5 wherein said foot rest is provided with spring means tending to hold said second part aligned with said first part, said thrust means maintaining said first part substantially vertical with said second part rising thereabove to substantially the upper level of said seat in said retracted position, said spring means being sufficiently yieldable to let said second part be held back and tilt upwardly under body pressure upon forward movement of said first part.

7. A reclining chair comprising:

a frame forming a generally horizontal guide track;
a seat on said frame movable along said guide track between a retracted position and an advanced position;

a back rest having a lower edge pivotally connected to the rear end of said seat;

an articulated linkage connecting an intermediate portion of said back rest with two degrees of freedom to a point on said frame rearwardly of said back rest for allowing said back rest to swing between a nearly upright attitude in said retracted position and a sharply inclined attitude in said advanced position, said back rest having an upper edge descending substantially vertically upon passage from said nearly upright attitude to said sharply inclined attitude;

a foot rest forwardly of said seat including a first part

6

spaced from a front edge of said seat and a second part hinged to said first part and inserted between said front edge and said first part;

a flexible connection extending between said front edge and said second part;

thrust means articulated to said first part and guided on said seat for generally horizontal motion relative thereto, said thrust means being provided with link means engaging said back rest for extending said foot rest forwardly with reference to said seat upon movement of said back rest from said nearly upright attitude to said sharply inclined attitude while maintaining said first part substantially vertical with said second part rising thereabove to substantially the upper level of said seat in said retracted position; and

spring means tending to hold said second part aligned with said first part, said spring means being sufficiently yieldable to let said second part be held back and tilt upwardly under body pressure upon forward movement of said first part.

8. A reclining chair as defined in claim 7 wherein said thrust means is displaceable far enough to realign said parts substantially horizontally with each other in said advanced position while stretching said flexible connection to limit the forward movement of said second part.

9. A reclining chair as defined in claim 8 wherein said flexible connection comprises a strip of sheet material.

10. A reclining chair as defined in claim 9, further comprising a chain anchored to said seat and to said first part underneath said strip for tautening simultaneously therewith in said advanced position.

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