Jan. 26, 1960 A. J. BELISLE 2,922,464

RECLINING CHAIR

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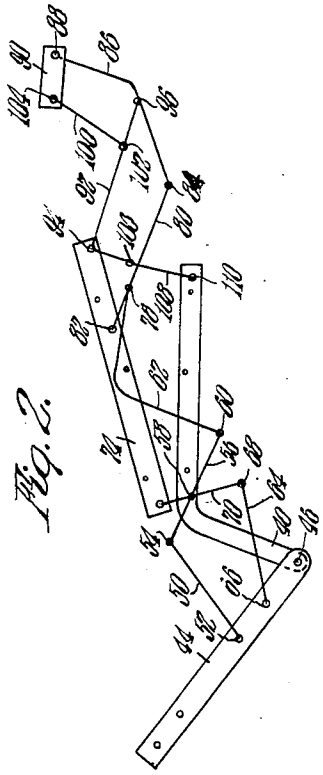


Fig. 2.

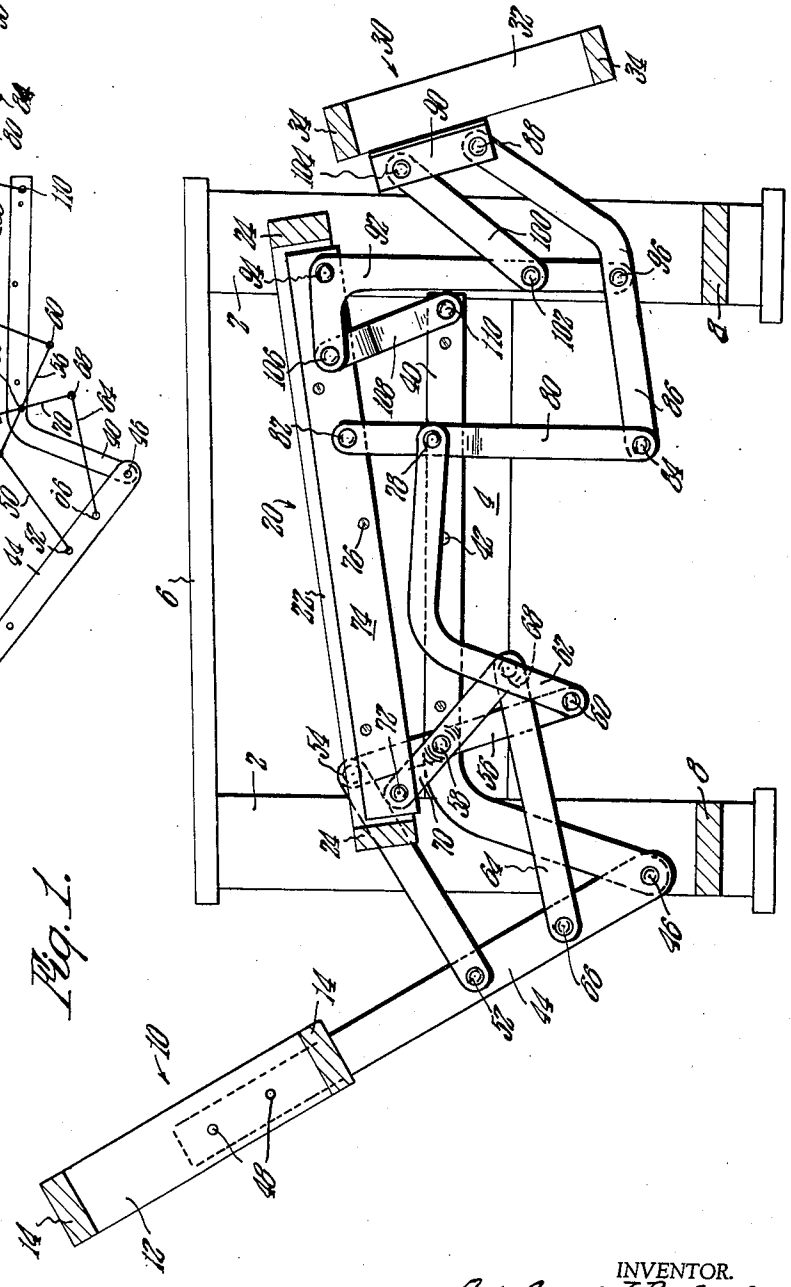


Fig. 1.

INVENTOR.
Adelard J. Belisle.
BY Pous & Pous, Attys.

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RECLINING CHAIR

Adelard J. Belisle, South Hadley Falls, Mass.

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1 Claim. (Cl. 155—106)

This invention is directed to a reclinable chair and it is particularly concerned with a chair having a seat and a back which are swingable and a leg-rest which is shiftable in coordinated movements relative to a base or chassis or support. This is accomplished by means of a mechanism which assists in the assumption of the components in a multiplicity of positions relative to the base and to each other between a full sitting position and a full reclining position. Thereby the seat is elevatable substantially vertically both at its rearward and forward ends and is propellable substantially horizontally and forwardly and is inclinable rearwardly and downwardly, all relative to the base, as the back shifts into the reclining position.

Herein I provide a chair having a leg-rest, which is shiftable upon and by the actuation of the seat and back so that, as the back is moved to its fully reclined position, the leg-rest is raised to a substantially horizontally-disposed and elevated position, all to more properly and comfortably support the legs and feet of the occupant forwardly of and distantly from the seat.

When the chair is in its normal upright or sitting position, the leg-rest is in an inoperative, generally vertically-disposed, position immediately adjacent the forward or front face of the chair where said leg-rest appears to be a part of the base and is not noticeable.

The principal improvement of the invention is directed to a chair of the reclinable type wherein the unitary linkage mechanism interconnecting the base, seat, back and leg-rest permits the shifting of the leg-rest forwardly away from and relative to the seat and the separation of the seat and back away from each other upon the combined elevation and inclination of the seat and the reclination of the back.

The chair structure illustrated herein is of the type in which the seat and back are so pivotally supported on the base and so counterbalanced that by leaning back in the chair a user may move the back downwardly and backwardly into a reclining position and the seat forwardly and upwardly into an elevated and inclining position. By sitting up in the seat, the user can return the chair to its upright sitting position. The chair is so balanced and the components so poised that it will not move from its sitting to reclining position unless the user applies a reasonable pressure with the upper portion of his back against the chair back, adjacent the upper portion thereof, thereby permitting the chair to be used as an ordinary chair, if and as desired.

The mechanism hereof offers the advantage that the chair back may be of such design and configuration that, in the normal sitting position, it need not extend upwardly above the uppermost plane of the seat member for any greater height than is reasonable, all to the end that, appearancewise, a low backed chair is attained.

It is an object hereof to provide a chair of the aforementioned type having a leg-rest or foot-rest adjacent the front edge of the seat, which is actuatable with the seat and back so that when the chair is moved to its reclining position the leg-rest will be raised to a substantially horizontal position at least as high as or above the top of the chair seat cushion, all so as to provide a chair which will properly support the entire human body in a generally reclining position.

It is a still further object hereof to provide, on each side of a chair or centrally of the chair, a fixutre for supporting a seat, back, and leg-rest, on a chair base, so that rearward tilting of the back will cause rapid actuation and raising of the leg-rest to properly support the legs of the user even when the seat is not fully reclined.

It is another object hereof to provide a fixture of the aforementioned type which will permit the chair to be reclined when desired but will maintain the chair in a normal sitting position unless it is desired so to recline the same.

It is a still further object hereof to provide a chair of the aforementioned type in which the seat, back, and leg-rest are supported by a plurality of interconnected pivotal links which will advance the seat forwardly and upwardly as the back swings downwardly and rearwardly, and will swing the leg-rest upwardly to provide a contoured seat arrangement with the leg-rest disposed above the chair seat.

It is another further object of this invention to provide a chair of the aforementioned type in which the fixtures are disposed laterally outwardly of the chair seat construction, for supporting the seat, back and leg-rest on the chair base or frame, which fixtures will not interfere with the proper upholstering of the chair components and are substantially concealed in said chair components when they are upholstered.

It is a still further object to provide a structure connecting the leg-rest with the seat and back actuating mechanism, so that the leg-rest will move outwardly or forwardly, as it moves upwardly, when the chair is reclined.

It is a still further object of this invention to provide, in a chair of the aforementioned type, a novel connection between the leg-rest and its actuating mechanism, so that, when the chair is reclined, the leg-rest will move forwardly or outwardly relative to its actuating mechanism, to thereby still further extend the leg-rest relative to the seat in order to more properly support the legs of relatively tall people.

It is a still further object of this invention to provide a chair of the aforementioned type which is rugged in its construction, relatively inexpensive in its manufacture, and attractive in its appearance.

The invention envisions a reclinable chair wherein the seat and back are each pivotally supported on and are separately swingable relative to the base, also wherein the leg-rest is in no way directly connected to the seat so as to permit extended movements thereof away from the seat and further wherein a pair of linkage mechanisms coact to effect the raising and the inclining of the seat and the simultaneous shifting of the leg-rest upon the reclination of the back relative to the base.

Stated otherwise, the reclination of the back relative to the base accomplishes the inclination or angularization of the seat relative to the base and, simultaneous therewith, the shifting of the leg-rest from a normal, non-operative, position adjacent the seat to a leg-supporting, operative, position away from and forwardly of the seat.

The unitary linkage mechanisms or fixtures hereof, two of same preferably being used as a pair with a chair structure, may be readily employed with reclining chairs made of various materials.

Especially worthy of mention is the fact that herein are provided a pair of unitary linkage mechanisms of the

aforementioned type which, when the chair is reclined, will move the leg-rest outwardly a distance away from the seat in a manner so as to properly engage the occupant's legs well below his knees whereby his feet are properly accommodated throughout the cycle of travel between the non-operative and operative positions, all with a minimum of exertion on the part of the occupant being necessitated in both the reclining and declining directions of travel.

The seat, back and leg-rest components hereof are held in continuous poised balanced relationship with the base throughout its cycle of movement whereby easy maneuverability of the seat and back and leg-rest is attained.

In the drawing, I have shown a complete example of a chair mechanism illustrating the fundamental principle of the invention although it is entirely conceivable that modifications could be made to such example which would employ the basic inventive concept hereof and still remain within the spirit and letter of the claims hereto appended.

In the drawing:

Fig. 1 is a side elevational view of the chair structure taken on the inside of one of the side plates of the base, showing one of the forms of the invention in the partially inclined position of the components thereof; and

Fig. 2 is a schematic view showing the relationship of the components in the fully extended or reclining position of the components of the chair.

Referring now to the drawing more in detail, the chair structure disclosed in Fig. 1 will first be described, it being appreciated that the embodiment shows what appears to be a conventional arm chair.

The proportions and dimensions of the chair are those common to articles of this nature. They may be varied within the ranges well known to those in the business of making furniture, and obviously there is a wide variety of styles which may be drawn upon.

In said figure, I have shown a relatively fixed stationary base or support or chassis comprising on each side thereof a pair of transversely spaced vertically-extending posts **2** connected together by a side plate member **4** and by an arm member **6**.

The posts **2** and side plate **4** and arm member **6** on each side of the base are connected together by a plurality of transverse stretchers or cross rails such as **8**, all as is conventional and well known.

The components are suitably shaped to give the base any desired contour.

Obviously, if desired, the side panel on each side of the base could be a unitary panel.

In the illustrated embodiment, a back, generally designated by **10**, comprises a pair of transversely-spaced, generally vertically-extending, side members **12** connected together by stretchers or cross rails **14**, and a seat, generally designated by **20**, comprises a pair of transversely-spaced, generally vertically-extending, side members **22** connected together by stretchers or cross rails **24**. A leg-rest, generally designated by **30**, comprises a pair of transversely-spaced, generally vertically-extending, side members **32** connected together by stretchers or cross rails **34**.

The back, seat and leg-rest may be suitably upholstered, padded or otherwise covered, all as is conventional and well known.

Having thus described the various structural parts of the chair, attention will now be directed to the system by means of which such structural parts are held in their cooperative and coacting relationships.

In the views and throughout the disclosure of the specification, wherever the linkage systems are referred to, only one linkage mechanism for each chair structure so shown and described will be mentioned. However, it will be understood that two such mechanisms, operating in unison as a pair, constitute a linkage system, there being one such mechanism on each opposite side of the chair structure concerned, all as is well known to those versed in the art.

If desired, a single such mechanism, located centrally of the chair, could be employed.

The linkage mechanism of Fig. 1 will now be described.

A base link **40** is fixed to the side plate member **4** of the base as by screws or the like.

A back link **44** is pivotally connected at its lower end to the rear end or dog-leg portion of the base link **40** by means of a pivotal connection **46** and is fixed at its upper end to the adjacent side member **12** of the back **10** by means of screws **48** or the like.

The base link being fixed to the base, it will be appreciated that the position of the pivotal connection **46** remains fixed, and that the back, fixed to the back link **44**, assumes its various positions by turning on said pivotal connection. Thus, the back will be observed to pivot towards and away from the base.

A primary back separator **50** is pivoted to the back link **44** at **52**, and is pulled rearwardly as the back reclines.

Said primary back separator is pivotally connected at its forward end at **54** to a secondary back separator **56** which is pivotally connected intermediate its ends at **58** to the base link **40**.

The lower extremity of the secondary back separator **56** is pivotally connected at **60** to the rearward extremity of a primary actuator **62**.

A primary seat propeller-elevator **64** has a rear extremity pivoted at **66** to the back link **44** and a forward extremity pivoted at **68** to the lower extremity of a secondary seat propeller-elevator **70**.

Said propeller-elevator **70** is pivoted at its midsection to the aforesaid pivotal connection **58** between members **40** and **56** and at its upper extremity it is pivotally connected at **72** to the rearward extremity of a seat link **74**.

The seat link **74** may be fixed to the side frame **22** of the seat **20** as by screws **76** or the like.

As the back reclines, the primary seat propeller-elevator **64** is pulled rearwardly so as to rotate the secondary seat propeller-elevator **70** on its fixed pivot **58** thereby urging the upper extremity thereof forwardly and upwardly whereby the seat link **74** and the seat **20** which it carries are simultaneously urged forwardly and upwardly.

Further as the back reclines, the primary back separator **50** pivoted to the back link **44** is also pulled rearwardly so as to rotate the secondary back separator **56** on the same fixed pivot **58** thereby urging the lower extremity thereof forwardly and upwardly so as to urge the primary actuator **62** forwardly and upwardly.

The forward extremity of the primary actuator **62** is pivoted at **78** to an intermediate section of a primary leg-rest actuator **80** which has an upper extremity pivoted at **82** to the seat link **74** and which has a lower extremity pivoted at **84** to the rearward extremity of a secondary leg-rest actuator **86**.

The opposite forward extremity of the secondary leg-rest actuator is pivoted at **88** to a leg-rest link **90** fixed to the leg-rest **30**.

A downwardly depending tertiary seat propeller-elevator **92** is shaped as a bell crank pivoted at **94** to the seat link **74**.

The outer extremity of the long link of the tertiary seat propeller-elevator **92** is pivotally connected at **96** to a midsection of the secondary leg-rest actuator **86**.

Intermediate the length of the long link of the tertiary seat propeller-elevator **92**, a tertiary leg-rest actuator **100** has a rearward extremity pivoted at **102**.

The forward extremity of the tertiary leg-rest actuator **100** is pivoted at **104** to the leg-rest link **90**.

The outer extremity of the short limb of the tertiary seat propeller-elevator **92** is pivotally connected at **106**

to the upper extremity of a quadrary seat propeller-elevator 108, which member 108 has a lower extremity pivoted at 110 to the base link 40.

In operation, the pivotally interconnected primary and secondary back separators coact, with the secondary back separator being rotatable on the base link, and the pivotally interconnected primary and secondary seat propeller elevators coact, with the secondary seat propeller elevator being rotatable on the base link, coact simultaneous therewith as the back reclines rearwardly so as to effect a forward projection and elevation of the seat.

Further in operation, the primary actuator assists in the forward and upward projection of the seat as the primary actuator is projected forwardly and upwardly by the rotation of the secondary back separator on its pivotal connection with the base link.

Further in operation, pivotally interconnected primary and secondary leg-rest actuators are projected forwardly and upwardly by the forward and upward movement of the primary actuator so as to elevate the leg-rest.

One advantage in having the seat raise upwardly as the back reclines is that it assists the user in moving into the reclining position and keeps him from falling back. In effect, it applies a brake to the reclining motion and effects a maintenance of balance between the components.

What I claims is:

In a mechanism for supporting a chair seat and a chair back and a leg rest in sitting and reclining positions relative to a chair base comprising in combination, a base link fixed to the base, a back link fixed to the back, a seat link fixed to the seat, a primary back separator pivotally connected to said back link, a secondary back separator rotatably connected to said base link, said primary and secondary back separators being pivotally interconnected, a primary seat propeller pivotally connected to said back link, a secondary seat propeller pivotally connected to said seat link and being rotatable on said base link, said primary and secondary seat propellers being pivotally interconnected whereby the back is reclinable rearwardly away from the seat as the seat is elevated forwardly by the rotation of said secondary seat propeller on its pivotal connection with said base link, a primary actuator pivotally connected to said secondary back separator and driven forwardly thereby upon reclination of the seat, a primary leg rest actuator pivotally connected to the seat, a tertiary seat-propeller elevator pivotally connected to the seat, said primary actuator and tertiary seat-propeller elevator being pivotally interconnected by a pair of leg rest links extending rearwardly from pivotal connections with the leg rest and by a quadrary seat propeller elevator interconnecting said tertiary seat-propeller elevator and the base.

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