Jan. 27, 1959 J. LUCKHARDT 2,870,821

RECLINING ARTICLE OF REPOSE FOR SUPPORTING THE BODY OF A PERSON

Filed Oct. 21, 1954

4 Sheets-Sheet 1

Fig. 1.

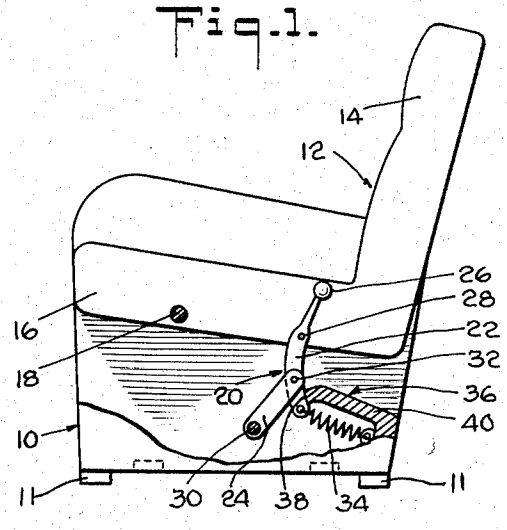
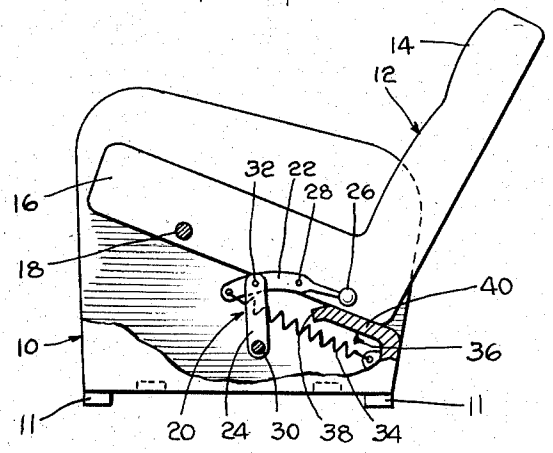


Fig. 2.



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Fig. 3.

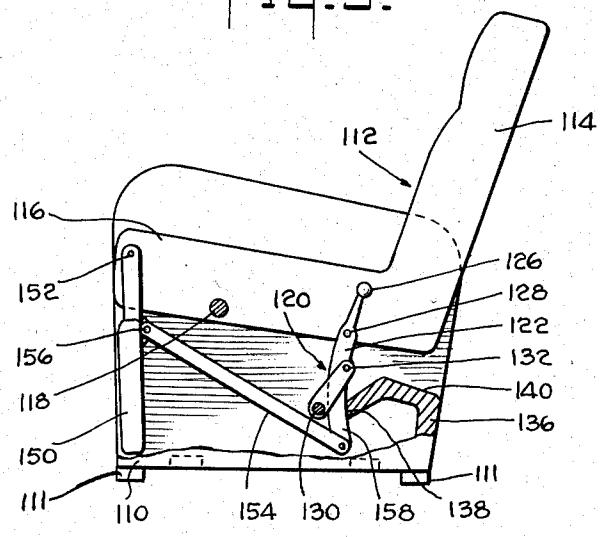
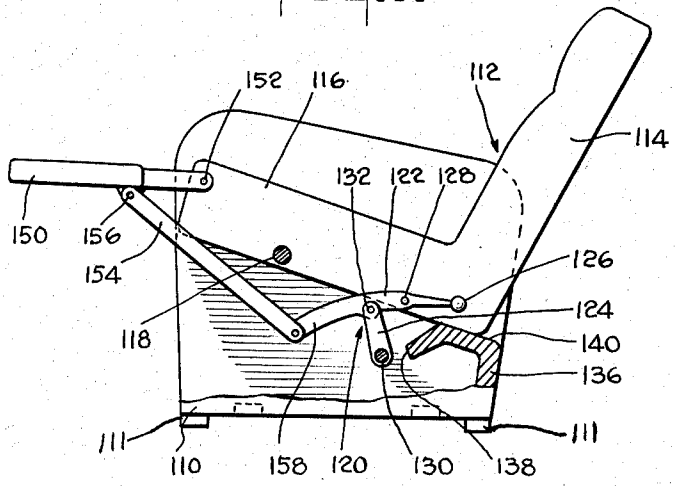


Fig. 4.



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Fig. 5.

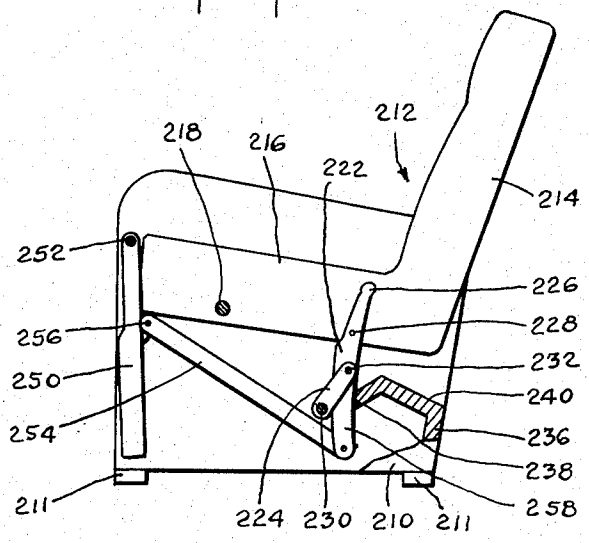
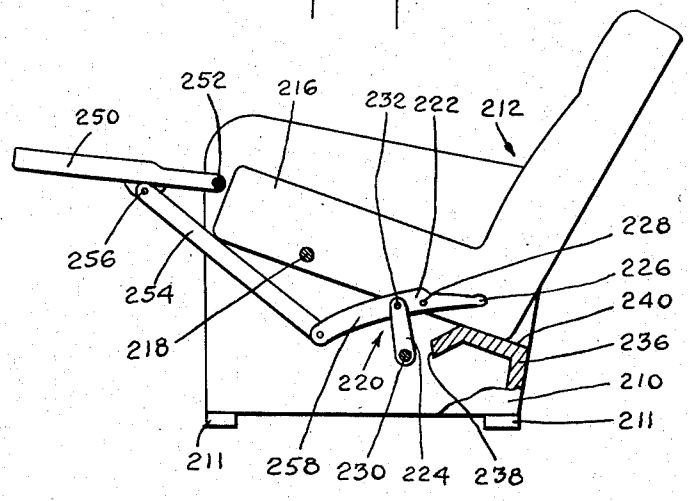


Fig. 6.



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Fig. 7.

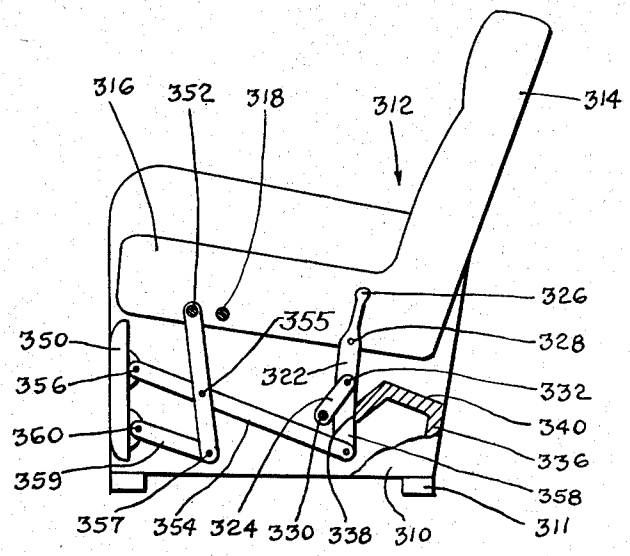
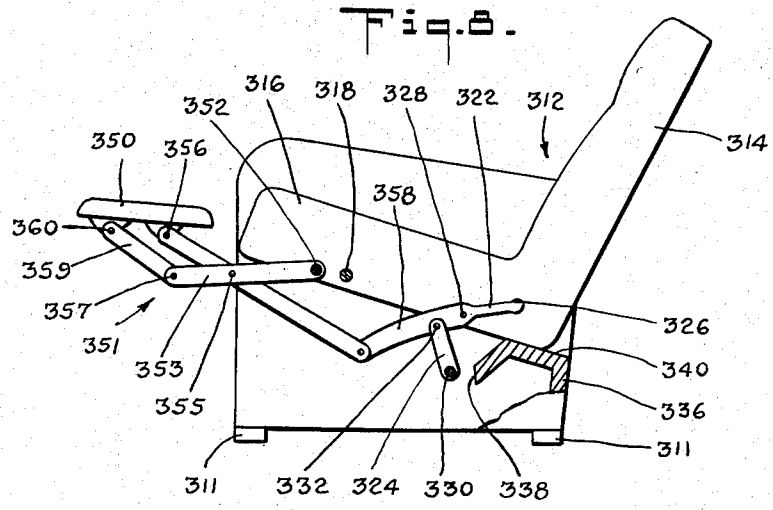


Fig. 8.



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United States Patent Office 2,870,821 Patented Jan. 27, 1959

2,870,821

RECLINING ARTICLE OF REPOSE FOR SUPPORTING THE BODY OF A PERSON

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Application October 21, 1954, Serial No. 463,656

5 Claims. (Cl. 155—106)

This invention relates to articles of repose and more particularly to an article of furniture for supporting the body of a person in reclining and upright positions.

An object of the present invention is to provide an article of furniture which is adapted to support the body of a person between upright and reclining positions in a seat and back-rest unit.

Still a further object of the invention is to equip a reclining article of furniture of the above described type with a control mechanism for controlling the movements of the seat and back-rest unit between upright and reclining positions.

A further object of the present invention is to provide a convenient controlling mechanism for a seat and back-rest unit and a leg-rest swingably mounted on a seat of a reclining article of furniture of the above described type, by means of which the angle between the leg-rest and the seat and back-rest unit is automatically altered when the seat and back-rest unit is brought from a certain position, for example the normal upright sitting position, into another position, for example a reclining position, and vice versa.

A further object of the present invention is to improve upon the construction of reclining articles of furniture as they are now customarily made.

With the above and other objects of the invention in view, the invention consists in the careful construction, arrangement and convenience of various devices, elements and parts as set forth in the claims hereof, certain embodiments of the same as described in the specification being illustrated in the enclosed drawings forming part of the specification wherein;

In the drawings:

Fig. 1 is a side elevational view of an armchair according to the invention wherein the seat and back-rest unit is in a normal upright sitting position,

Fig. 2 is a side elevational view of the armchair shown in Fig. 1 in a reclining position,

Fig. 3 is a side elevational view of another embodiment of an armchair according to the invention,

Fig. 4 is a side elevational view of the armchair shown in Fig. 3, wherein, however, the seat and back-rest unit is in a reclined position,

Fig. 5 is a side elevational view of still another embodiment of an armchair according to the invention,

Fig. 6 is a side elevational view of the armchair shown in Fig. 5, with the seat and back-rest unit of the same in the reclining position,

Fig. 7 is a side elevational view of a further embodiment of an armchair constructed according to the principles of the invention, and

Fig. 8 is a side elevational view of the armchair shown in Fig. 7 in a reclining position.

Referring now to Figs. 1 and 2, the numeral 10 generally indicates the support including legs 11 for an armchair having a unit 12. The unit 12 includes an integral and unitary construction of a back-rest 14 rigidly interconnected with a seat 16. Unit 12 is rockably mounted

on a support 10 about the rocking axis 18, positioned intermediate the ends of the seat 16.

The unit 12 is controlled in its rocking movement about its mounting 18 by guiding means generally identified by the numeral 20. The guiding mean comprises two guide members or guiding links 22 and 24 which are pivotally connected for relative movement. The first guiding link 22 is pivotally connected to the seat 16 of the unit 12 at 28 intermediate the rocking axis 18 and the rear end of the seat.

A handle grip 26 is rigid with the first guiding link 22.

The second guiding member 24 comprises a second guiding link which is connected at its lower end 30 to the support 10 for pivoting movement relative thereto and its other end to the first guiding link 22 at 32. Guiding means 20, including the guide members or links 22 and 24, form a toggle-control linkage which is movable through a path having a dead center position, not shown. Handle 26, provided at the upper end of the link 22, may be employed to move the guiding means 20 through a portion of the path of movement, from the right to slightly to the left of the dead center position.

Connected to the first guiding link 22 at its lower end is a biasing means 34. The biasing means shown in Figs. 1 and 2 consists of a spring or other resilient means which is connected at its one end to the support 10 and at its other end to the link 22 to urge the link constantly toward one side of the dead center position in the path of movement which the guiding means 20 is caused to follow.

A stop generally indicated by 36 is supported or mounted on the support 10 either as an individual member or formed as part of the support. The stop 36 is provided with a blocking means or stop surface 38 which is more clearly seen in Fig. 2. Stop surface 38 cooperates with the link 22 at the lower end thereof to limit, at one end, the extent of the path of movement of the guiding means 20 to the right of its dead center position.

Along the top of the stop member 36 there is provided a second stop surface 40, better seen in Fig. 1. Stop surface 40 cooperates with the bottom rear portion of the seat 16 to limit the extent of the rocking movement of the seat and back-rest unit 12 and, in turn, limits the other end of the path of movement of the guiding means 20.

In the operation of the instant invention, if the occupant of the unit 12 desires to rock the same from the upright position as shown in Fig. 1 to a reclining position, either as shown in Fig. 2, or approximating that shown in Fig. 2, the hand grip 26 is grasped in the palm of the hand and pushed downwardly in a clockwise direction. The handle 26 is manually moved clockwise just sufficiently to remove the link 22 from engagement with the stop surface 38 and to move the pivot connection 32 from the right hand side of its dead center position through the dead center position, and thence slightly to the left of the dead center position in the path of movement of the toggle control linkage of the guiding means 20. As the handle 26 is moved in a clockwise direction the restraining force or resistance against movement applied to the link 22 by the biasing spring 34 is overpowered.

Movement of the pivot 32 slightly to the left of the dead center position releases the toggle linkage of the guiding means 20 from its locking position. Thereafter continued movement of the handle 26 is no longer necessary. The unit 12 is then substantially in a balanced condition, balanced by the biasing means 34. The occupant of the unit then needs only to weight heavily or bounce lightly on the rear of the seat 16 to cause the pivot 32 to move through the portion of the path of movement of the guiding means 20 which is to the left of the dead

center position and to move the unit 12 to a lower reclining position. As the unit 12 assumes the reclining position shown in Fig. 2, the rear of the seat 16 comes into engagement with the stop surface 40 and is there blocked in its lowest reclining position.

When the members 22 and 24 of the guiding means 20 have been moved beyond and to the left of their dead center position, the biasing means 34 functions in the manner of a counter-balance to offset the weight of the occupant of the unit 12. Hence the unit 12 may be rocked to an infinite number of reclining positions intermediate the normal upright position and the lowest reclining position as seen in Fig. 2, there to be blocked by the stop surface 40.

A restraining force is constantly applied to the lower portion of the first guiding link 22 by the biasing means 34 in any position of the lever, even when the guiding means 20, which includes the link 22 and the link 24, is beyond and to the left of the dead center position shown in Fig. 1. Hence, in any position of the pivot point 32 of the guiding means 20 a force will be exerted by the biasing means 34 on the link 22 to move the same against the stop 38 to return the chair unit 12 to its upright position.

To return the unit 12 to the upright position it is only necessary for the occupant thereof to lift himself off the unit or to shift his weight to the forward end of the seat 16 to let the balancing biasing means 34 return the guiding means 20 to its straightened position so that the pivot point 32 will approach and pass through the dead center position and to the right thereof. As the pivot 32 is moved through the dead center position and slightly to the right thereof by the biasing means 34, the unit 12 will automatically be returned to its normal upright position and the link 22 brought against the stop 38.

When the unit 12 is in the sitting position shown in Fig. 1 it cannot move by itself into a reclined position reclined as the guiding means 20 is beyond its dead center position and the spring 34 urges the link 22 against the stop 38. Furthermore, the arrangement of the guiding means 20 beyond its dead center position and the abutting engagement of the link 22 with the stop 38 prevents the unit 12 from an undesired and sudden tilting into a reclined position when a person sits on the chair.

The biasing means may also be a counter-balancing weight instead of a spring or other resilient urging means as shown. Or, within the contemplation of the invention, a motion resisting or restraining device (not shown) may be placed between the link 22 and the link 24 in the area of their pivot connection 32 to resist their relative movements. Such a restraining device could be in the nature of a friction brake.

When using a brake or other similar biasing means the handle 26 may be eliminated along with its initial unlocking function namely, that of initially unlocking the guiding means 20 to move the pivot 32 from the right to slightly to the left of the dead center position. When the handle 26 and its function is eliminated, the path of movement of the toggle control linkage of the guiding means 20 is modified to eliminate the dead center position. This is done by positioning the link 22 and the link 24 with respect to the stop 38 so that the links 22 and 24 can never be straightened and so that the pivot 32 will be stopped slightly short of the dead center position by the stop 38.

Thus, the unit 12 may be rocked about the axis 18, from an upright to a reclining position, by bouncing lightly on, or by the occupant shifting his weight heavily to the rear of the seat 16. By so doing, the restraining action of the brake biasing means is overcome to let the unit move to its reclining position. On the other hand, to return the unit 12 to its upright position from the reclining position, the occupant thereof merely shifts his weight to the front end of the seat 16 to overcome the restraining force of the brake biasing means and to move the seat to the upright position.

In the modified embodiment of a reclining armchair as shown in Figs. 3 and 4 a leg-rest 150 is swingably mounted at 152 to the front portion of the seat 116 of the unit 112, corresponding to the structure shown in Fig. 1, for movement relative thereto. A controlling member 154, controlling the movements of the leg-rest 150 from the guiding means 120, is connected at its one end 156 to the upper portion of the leg-rest and at its other end to an extension 158 of the first guiding link 122. Thus the control member 154 linkingly controls the movements of the leg-rest 150 with the guide means 120.

Again a handle grip 126 is rigid with the first guiding link 122.

In the modified embodiment the guide members or links 122 and 124 of the guide means 120 and the chair unit 112 respectively correspond to similarly disposed structures of the embodiment shown in Figs. 1 and 2.

As will be noted in Figs. 3 and 4 there is no resilient biasing means shown since the function of the biasing means is supplanted by the leg-rest 150, the controlling link 154 and the extension 158. The weight of the structure making up the leg-rest 150, the controlling link 154 and the extension 158 may be predetermined so as to effect the same function as that of the biasing means 34 of Figs. 1 and 2.

The modified embodiment operates substantially in the same manner as that shown in Figs. 1 and 2. To rock the unit 112 from its normal upright position to a reclining position, the handle 126 rigid with the first guiding link 122 is manually moved clockwise to cause the guiding means 120 to follow through its initial path of movement namely, from the right locked side to slightly to the left unlocked side of its dead center position.

Once the guiding means 120 is moved from its locked position to its unlocked position by the operation of the handle 126 the extent to which the unit 112 will be continued to be rocked and the degree to which the leg-rest 150 will be extended will of course depend upon the occupant. By weighing heavily or bouncing lightly on the rear of the seat 116 the occupant will cause the guiding means 120 to move through its path of movement to the left of the dead center position. The extent of the reclining position of the unit 112 therefore depends upon the extent to which the guiding means 120 is caused to move by the occupant of the unit 112.

The biasing counterbalancing structure comprising the members 150, 154 and 158 constantly tends to return the unit 112 to the right of its dead center position against the stop 138. When the guiding means 120 is to the left of the dead center position, it compensates for and counterbalances the weight of the occupant of the unit 112.

The unit 112 is returned to its normal upright position and the leg-rest 150 to its inactive position (see Fig. 3) by the counterbalancing biasing structure 150, 154 and 158 which exerts a force about the pivot 132 to move the guiding means 120 through the dead center position and the extension 158 into abutment with the stop surface 138. Thus, when the occupant of the unit 112 moves his weight to the forward end of the seat 116 the biasing structure forces the guiding means to assume the position shown in Fig. 3, moving the unit to the upright position.

It will be realized that the stop surface 138 cooperates with the extension 158 to limit one end of the path of movement of the guiding means 120 thereby to limit the extent of the rocking movement of the unit 112 into its upright position. On the other hand, the stop surface 140 cooperates with the bottom rear portion of the seat 116 to limit the extent of the reclining movement of the unit 112 and consequently to limit the extent of the other end of the path of movement of the guid-

ing means 120 and also the extended position of the leg-rest 150.

At times it may be desirable to add a further biasing means such as the spring 34, as disclosed in the embodiment shown in Figs. 1 and 2, or an additional counterbalancing weight. The additional biasing means may be attached to the extension 158 very much in the same manner as described in the embodiment shown in Figs. 1 and 2.

The embodiment shown in Figs. 5 and 6 is substantially the same as that which is shown in Figs. 3 and 4 and wherein corresponding elements are identified by the prefix numeral "2." The present embodiment shown in Figs. 5 and 6 differs, however, from that shown in Figs. 3 and 4 in that the pivot 252 for the leg-rest 250 is positioned on the support 210 rather than on the end of the seat.

By pivoting the leg-rest 250 on the support 210 the leg-rest may in a sense, be said to be movable independently of the seat 216. That is to say that when the seat and back-rest unit 212 rocks about the axis 218 the leg-rest 250 will swing about the pivot 252. Because the leg-rest is not swingable about the end of the seat 216 it will not rock with the seat about the axis 218. The leg-rest 250 will swing on the support 210 about the pivot 252 to the extended leg-rest position when the unit 212 is rocked to the reclining position.

By the present construction therefore, it will be noted that as the unit 212 rocks to the reclining position, the pivot point 252 of the leg-rest 250 remains fixed on the support 210. Thus the leg-rest will have an extended position with respect to the end of the seat 216 which is greater in extent than the leg-rest 250 which is connected to the seat 216 in Figs. 3 and 4, so that the reclining unit may be readily used by tall persons.

The operation of the embodiment shown in Figs. 5 and 6, is substantially the same as that which is shown in Figs. 3 and 4. When the unit 212 is rocked to assume its reclining position the leg-rest 250 is, in turn, actuated by the first guiding link 222 and by the controlling link 254 to swing to its leg-resting or its extended position. When on the other hand the unit 212 is rocked to its upright or sitting position, the leg-rest 250, the link 254 and the extension 258 serve as biasing means to return the guiding means 220 to its normal upright position in which the extension 258 abuts and is stopped by the limiting surface 238.

The stop surfaces 238 and 240 perform the same functions in the present embodiment as they do in the embodiment shown in Figs. 1 and 2 and in Figs. 3 and 4.

In the embodiment shown in Figs. 7 and 8, the corresponding elements are identified by corresponding numerals with the exception, however, that the prefix numeral "3" has been employed. In this embodiment it will be seen that a link system generally identified by the numeral 351, projects the leg-rest 350 to a position for supporting the legs of a person in a reclining position. It will also be noted that the leg-rest 350 does not have a fixed pivot about which it may swing relative to either the support 21 or the seat 316 as it is shown in Figs. 3 and 4 or in Figs. 5 and 6, respectively. In the present embodiment the leg-rest 350 is supported by and projected into its leg supporting position by the system 351.

The operation of the unit 312 and of the leg-rest 350 is substantially the same as that disclosed in the prior embodiments. However, in the present embodiment, when the unit 312 is rocked about the axis 318 to assume a reclining position, the control link 354 which is pivotally connected to the leg-rest 350 at the connection 356, is also pivotally connected intermediate its ends to a first link 353 of the link system 351. The first link 353 is connected at its one end 352 to pivot relative to the support 310, intermediate its ends at 355 to

the control link 354 and at its farthest end 357 to a second link 359 of the link system 351 which is in turn connected at 360 to the leg-rest 350.

When the unit 312 is rocked about the axis 318, the controlling link 354 moves the first link 353 so that the same will swing about the connection 352. This in turn will cause a relative scissor movement to take place between the two links 354 and 353 to cause a pivoting movement at the connection 357 whereby the second link 359, which is connected to the leg-rest 350, will move the leg-rest as a unit up to a leg-supporting position. This may be seen more clearly in Fig. 8. Naturally the height and extension of the leg-rest 350 relative to the seat 316 will depend upon the extent to which the unit 312 is reclined.

It will be noted by comparing the instant embodiment with that shown in Figs. 3 and 4 that the leg-rest 350 is moved to an extended position relative to the seat 316 and therebeyond to support to the full extent, the legs of a person who is reclining in the unit 312. This movement is independent of the seat 316 in that it is not directly connected therewith.

The leg-rest 350, the controlling linkage system 351 and 354 and the extension 358 constitute the biasing means which aid in returning the extension 359 into abutment with the stop surface 338 in the same manner as was described with respect to the prior embodiment. The limiting surface 340 cooperates with the unit 312 to limit its reclining movement also in the same manner as previously described.

The term "biasing means" as employed in the disclosure is not intended to be limited solely to devices or apparatus which exert a moving force, such as the spring 34, but it is also intended to include such devices or apparatus which exert a restraint or resistance against relative movement, such as the brake described above.

I have described preferred embodiments of my invention, but it is understood that this disclosure is for the purpose of illustration, and that various omissions or changes in shape, proportion and arrangement of parts, as well as the substitution of equivalent elements for those herein shown and described may be made without departing from the spirit and scope of the invention as set forth in the appended claims.

What I claim is:

1. A reclining article of repose for supporting the body of a person, comprising: a support, a unit including a seat and a back-rest rigid with each other, a portion of said unit being tiltably connected with said support, toggle guiding means including a first guiding link and a second guiding link pivotally connected with each other at adjoining portions, said first guiding link being pivoted to said unit at a point to the rear of the tilting connection between said unit and said support, and having a lower extension portion extending beyond the pivotal connection between the first and second guiding links, said second guiding link being pivoted to said support, blocking means arranged on a member of the article for abutting engagement with at least one of said guiding links so as to hold the guiding links of said toggle guiding means in a position slightly to the rear of the dead center position when the unit is in its sitting position, and biasing means for urging said guiding link into abutting engagement with said blocking means, said biasing means including a leg-rest movable relative to said seat, and controlling means operatively connected with said leg-rest and the lower extension portion of said first guiding link for controlling the movements of said leg-rest in dependence upon movements of said guiding means, said guiding links being arranged for passing through and forwardly of their dead center position during a tilting movement of the unit from the sitting position into a reclined position.

2. A reclining article of repose according to claim 1 in

which said leg-rest is swingably mounted on the seat and said controlling means comprises a controlling link pivoted to said leg-rest and the lower extension portion of said first guiding link.

3. A reclining article of repose according to claim 1 in which said leg-rest is swingably mounted on said support and said controlling means comprises a controlling link pivoted to said leg-rest and the lower extension portion of said first guiding link.

4. A reclining article of repose according to claim 1 in which said controlling means comprises a pair of links including a first link and a second link pivotally connected with each other at adjoining portions, said first link being pivoted to said support, said second link being pivoted to said leg-rest, and a controlling link, said controlling link being pivoted to the extension portion of said first guiding link and to said leg-rest at a point spaced from the pivotal connection between said leg-rest and said second link, and an intermediate point of said controlling link being pivoted to an intermediate point of said first link.

5. A reclining chair comprising: a support, a unit including a seat and back-rest rigid with each other, the forward portion of said seat being pivotally mounted on said support, toggle guiding means for moving said unit on said support between an upright erect position and a rearwardly-tilted position, said toggle guiding means including a first guiding link and a second guiding link, a first pivot connecting the first guiding link to the rear portion of said seat, a second pivot connecting the second guiding link to said support at a point below and forwardly of said first pivot, and a third pivot connecting the

second guiding link to the first guiding link, said first guiding link having a handle portion extending above the first pivot and an extension portion depending below said third pivot, said third pivot being located rearwardly of the line between said first and second pivots when the chair is in its upright position with the second link rearwardly inclined and the first link in a substantially vertical position, said handle being manually movable rearwardly and downwardly about said first pivot to move said third pivot forwardly of the line between said first and second pivots and to move the extension portion of said first link forwardly and upwardly, a leg-rest mounted at the forward end of the chair for movement between a retracted position beneath said seat and an extended position forwardly of and substantially at the level of said seat, and a controlling link for moving said leg rest, said controlling link being connected to said leg rest and to the extension portion of said first link, whereby forward and upward movement of said extension portion raises said leg rest to its extended position.

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