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RECLINING CHAIR OF THE MULTIPLE POSITION TYPE

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FIG. 1

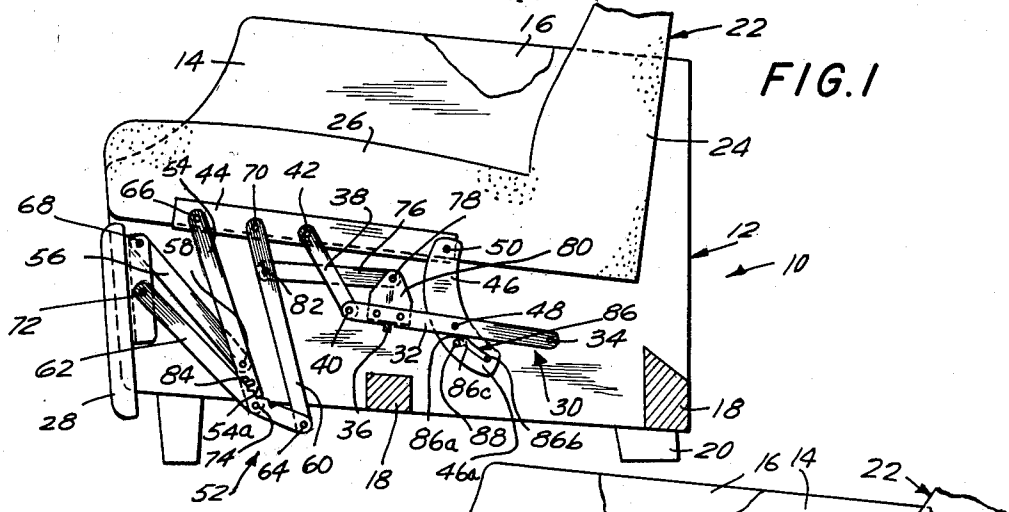


FIG. 2

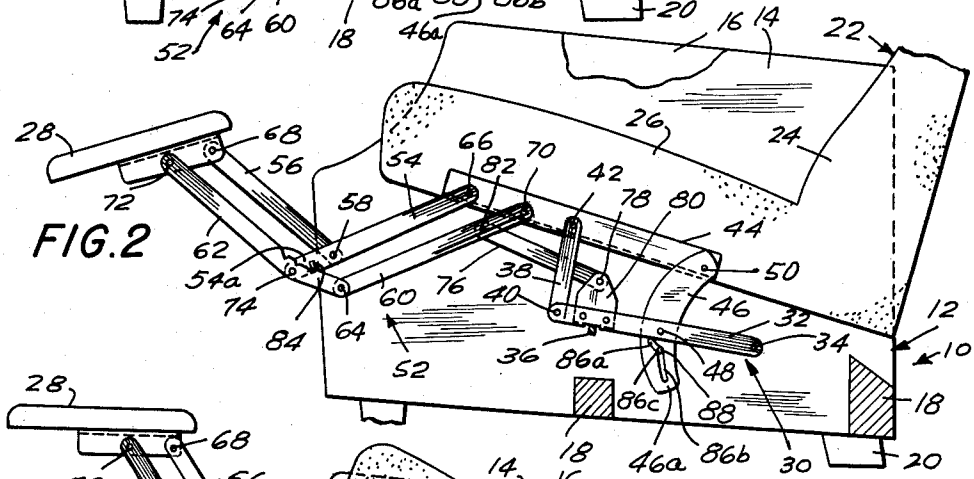
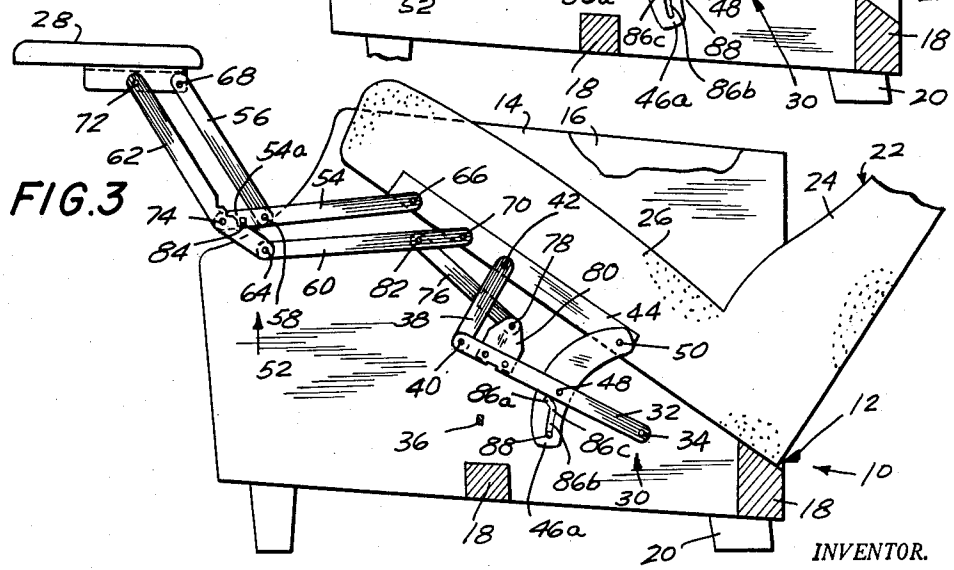


FIG. 3



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RECLINING CHAIR OF THE MULTIPLE POSITION TYPE

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The present invention relates generally to reclining chairs, and in particular to a reclining chair of the multiple movement type including a rigid or unitary body-supporting unit capable of movement from a sitting position to an intermediate tilted position and for further movement from said intermediate tilted position to a reclining position.

Of recent times there has been developed a reclining chair of the multiple movement type which comprises a support, a body-supporting unit including a seat and back-rest, and means mounting the body-supporting unit on the support for a first movement phase from a sitting position to an intermediate tilted position and for a second movement phase from the intermediate tilted position to a reclining position. The chair further includes a leg-rest mounted for movement from a stored position beneath the seat to an elevated leg-supporting position forwardly of the seat, with provision for actuating the leg-rest during the first movement phase to bring the leg-rest to the elevated leg-supporting position in the intermediate tilted position of the chair. The intermediate tilted position of the chair with the leg-rest elevated, is established to comfortably accommodate the chair occupant in an attitude appropriate for television viewing, reading, sewing and the like. The reclining position is established to comfortably accommodate the chair occupant in a further tilted back attitude, more appropriate for complete relaxation.

Broadly, it is an object of the present invention to provide an improved reclining chair of the aforesaid general type. Specifically, it is within the contemplation of the present invention to provide a positive, simple and reliable mechanism for attaining the desired movement in the proper sequence for a reclining chair of the two position type.

In accordance with an illustrative embodiment demonstrating features of the present invention, a reclining chair of the multiple position type comprises a support, a body-supporting unit including a seat and back-rest and means mounting the body-supporting unit on the support for a first movement phase from a sitting position to an intermediate tilted position and for a second movement phase from the intermediate tilted position to a reclining position. The mounting means according to the present invention includes a carrier member which is pivotally mounted on the support at a carrier pivot, with a stop being provided on the support to establish a stationary position for the carrier member for the first movement phase. A front guiding link is pivotally mounted on the carrier member at a front pivotal mount and pivotally connected to a body-supporting unit at a front pivotal connection. A rear guiding link is pivotally mounted on the carrier member at a rear pivotal mount and pivotally connected to the body-supporting unit at a rear pivotal connection. The front guiding link, the portion of the body-supporting unit intermediate the front and rear pivotal connections and the rear guiding links serve as movable links of a mounting linkage, with the portion of the carrier member intermediate the front and rear pivotal mounts serving as a stationary link of the mounting linkage. The mounting linkage is operative during the first movement phase to guide the body-supporting unit for rearward movement relative to the support. The carrier member turns about the carrier pivot during the second movement phase to guide the body-supporting unit for movement relative to the support. Disposed beneath the seat is a leg-rest which is mounted for movement to an elevated leg-supporting position. Constraining means are operatively connected to the carrier member and to the mounting means for the leg-rest and operable during the first movement phase and in response to the rearward movement of the body-supporting unit to move the leg-rest to the elevated leg-supporting position. Provision is made for blocking either the leg-rest mounting linkage or the mounting linkage for the body-supporting unit at the end of the first movement phase such that the body-supporting unit and the leg-rest move together about the carrier pivot during the second movement phase. In order to establish the sequence of operation for the chair, a sequencing means is interconnected between the body-supporting unit and the support for guiding the body-supporting unit along a first path during the first movement phase and for guiding the body-supporting unit along a second path during the second movement phase to thereby establish the sequence of operations for the chair.

The above brief description as well as further objects, features and advantages of the present invention will be more fully appreciated by reference to the following detailed description of an illustrative embodiment according to the present invention, when taken in conjunction with the accompanying drawings, wherein;

FIG. 1 is an elevational view, with the near side frame removed, of a reclining chair of the multiple position type embodying features of the present invention shown in the upright or sitting position;

FIG. 2 is an elevational view similar to FIG. 1, but showing the chair in the intermediate tilted position; and,

FIG. 3 is an elevational view similar to FIG. 2 but showing the chair in the reclining position.

Referring now specifically to the drawings, there in shown a reclining chair demonstrating features of the present invention, generally designated by the reference numeral **10**, which includes a support or frame **12** having side walls or frames **14**, **16** interconnected by suitable cross braces **18** and supported on depending legs **20**.

A body-supporting unit **22** including a back-rest **24** and a seat **26** rigid therewith is mounted on the support **12** for a first movement phase from the sitting position shown in FIG. 1 to an intermediate tilted position shown in FIG. 2 and for a second movement phase from the intermediate tilted position to a reclining position shown in FIG. 3.

Disposed beneath the forward end of the seat **26** is a leg-rest **28** which is mounted for movement from a stored or retracted position, shown in FIG. 1 to an elevated leg-supporting position relative to the seat as shown in FIGS. 2 and 3. As will be described, the leg-rest **28** is coordinated to the movement of the body-supporting unit **22**

such that in response to the first movement phase of the chair, the leg-rest moves to the elevated leg-supporting position shown in FIG. 2, with the leg-rest remaining substantially in a fixed elevated position relative to the body-supporting unit 22 during the second movement phase.

A mounting arrangement, generally designated by the reference numeral 30 is provided for guiding the body-supporting unit 22 during the first and second movement phases. The mounting arrangement includes an elongated carrier member or link 32 extending from front to rear of the chair and mounted at its rear end on the support at a carrier pivot 34. A stationary position is established for the carrier member 32 during the first movement phase by a stop 36 which is fixed to the support 12 (as by being secured to the adjacent side frame 16). The stop 36 precludes the counterclockwise turning movement of the carrier member 32 about the carrier pivot 34, but permits the clockwise turning movement thereof during the second movement phase, as may be appreciated by progressively inspecting FIGS. 2 and 3. Extending upwardly from the forward end of the carrier member or link 32 is a front guiding link 38 which has a front pivotal mount 40 on the carrier link 32 and a front pivotal connection 42 to a supporting rail 44 which is fixed to the seat 26 of the body-supporting unit 22. Extending upwardly from an intermediate point of the carrier member 32 is a rear guiding link 46 which is pivotally mounted on the carrier member 32 at a rear pivotal mount 48 and is pivotally connected to the body-supporting unit at a rear pivotal connection 50. The front guiding link 38, the portion of the seat 26 intermediate the front and rear pivotal connections 42, 50, and the rear guiding link 46 serve as movable links of a main mounting linkage, with the portion of the carrier member 32 intermediate the front and rear pivotal mounts 40, 48 serving as a stationary link thereof. The main mounting linkage is operative during the first movement phase to guide the body-supporting unit 22 for rearward tilted movement relative to the support. During the first movement phase the front guiding link 38 swings through an upward and rearward arc from its forwardly inclined position to a position slightly to the rear of dead center, while the rear guiding link 46 swings through a rearward arc to a position to the rear of dead center, with the links 38, 46 being effective to impart the requisite tilting to the body-supporting unit 22 to establish the desired intermediate position appropriate for television viewing and the like.

The leg-rest 28 is mounted for movement from the stored position to the extended and elevated leg-supporting position by a leg-rest mounting linkage, generally designated by the reference numeral 52, which includes a first pair of links 54, 56 having a pivotal connection 58 at their adjacent ends and a second pair of links 60, 62 having a pivotal connection 64 at their adjacent ends. The link 54 of the first link pair has a pivotal connection 66 to the mounting rail 44 adjacent the forward end thereof and the forward end of the seat 26, while the link 56 has a pivotal connection 68 to the leg-rest 28 adjacent the upper end thereof. The link 60 of the second link pair has a pivotal connection 70 to the mounting rail 44 and the seat 26 at a point spaced rearwardly of the pivotal connection 66, while the link 62 of the second link pair has a pivotal connection 72 to the leg-rest 28 at a point spaced below the pivotal connection 68. The first and second link pair 54, 56 and 60, 62 are coordinated by the provision of an integral extension 64*a* of the link 54 which has a coordinating pivotal connection 74 to the link 62.

Constraining means are operatively connected to the carrier member 32 and to the leg-rest mounting linkage 52 and are operable during the first movement phase and in response to the rearward movement of the body-supporting unit 22 to move the leg-rest 28 to the elevated leg-supporting position. The constraining means includes a constraining link 76 which has a pivotal mount 78 on a bracket 80 fixed to the carrier member 32 and a pivotal connection 82 to the link 60 at a point spaced below the pivotal connection 70. Thus, in response to the rearward tilting movement of the body-supporting unit during the first movement phase, there will be a tendency for the portion of the link 60 intermediate the pivotal connections 82, 70 to turn in the clockwise direction about the pivotal connection 82, with a corresponding upward and forward swinging movement of the portion of the link 60 intermediate the pivotal connection 64, 82 which is effective to extend and elevate the leg-rest 28.

Provision is made for blocking either the main mounting linkage 30 or the leg-rest mounting linkage 52 at the end of the first movement phase such that the body-supporting unit 22 and the leg-rest 28 move together about the carrier pivot 34 incident to the turning movement of the carrier member about the carrier pivot 34 during the second movement phase. In this illustrative embodiment the stop 84 is fixed to the link 54 which stop serves two functions. First, the stop 84 establishes the stored or retracted position for the leg-rest in that it abuts the link 62 at a location forwardly of the pivotal connection 74 and precludes further collapsing movement of the leg-rest mounting linkage 52; and second, in the extended and elevated position of the leg-rest shown in FIG. 2, the stop 84 abuts the link 62 at a location rearwardly of the pivotal connection 74 (due to the relative movement of the links of the leg-rest mounting linkage) to effectively block the leg-rest mounting linkage 52. Through the constraining link, the main mounting linkage built onto the carrier member 32 is also blocked such that the leg-rest remains in a fixed position relative to the body-supporting unit 22 which in turn remains in a relatively fixed position to the carrier member 32.

A sequencing arrangement is interconnected between the carrier member 32 and the support 12 to constrain the body-supporting unit 22 to move along a first path during the first movement phase and to constrain the body-supporting unit to move along a second path during the second movement phase. This establishes the sequence of operations for the chair to assure that the four-bar linkage built onto the carrier member 32 will first be operative to move the body-supporting unit 22 to the intermediate tilted position of FIG. 2, with the carrier member 32 thereafter turning about the carrier pivot 34 to establish the reclining position shown in FIG. 3. The sequencing arrangement is provided by an integral downward extension 46*a* of the rear guiding link 46 which is formed with a two-directional slot 86 which guidingly engages a pin 88 fixed to the support. The slot 86 includes first and second slot sections 86*a*, 86*b* extending from respective outer ends towards each other and merging at a junction 86*c* at their adjacent ends. The pin 88 is disposed at the outer end of the first slot section in the sitting position as shown in FIG. 1, moved to the junction 86*c* in the intermediate tilted position as shown in FIG. 2, and is at the outer end of the second slot section 86*b* in the fully reclined position of FIG. 3.

In order to facilitate a more thorough understanding of the present invention reference will now be made to a typical sequence of operation.

The chair occupant is initially seated in the chair in the upright or sitting position of FIG. 1 and, upon exertion of a rearward pressure, the body-supporting unit 22 will be rearwardly moved in relation to the support 12 to the intermediate tilted position shown in FIG. 2. The rearward movement of the pivotal connection 70 of the link 60 of the leg-rest mounting linkage 52 on the body-supporting unit 22 will cause the turning movement of the link 60 about the pivotal connection 82, with a corresponding movement of the leg-rest 28 to the elevated leg-supporting position shown in FIG. 2. The stop 84

is arranged to block the leg-rest mounting linkage **52** in the elevated leg-supporting position and at the same time the pin **88** of the pin and slot interconnection of the sequencing means is at the junction **86***c* of the slot section **86***a*, **86***b*. When the chair occupant desires to bring the chair to the reclining position of FIG. 3, further rearward pressure is exerted on the body-supporting unit, as by placing the hands on the arms of the chair frame and pushing rearwardly, whereupon the carrier member **32** will turn in the clockwise direction about the carrier pivot **34** which brings the body-supporting unit **22** and the leg-rest **28** to the fully reclined position shown in FIG. 3. This position is established when the lower portion of the body-supporting unit contacts the rear cross brace **18** serving as a stop. When the chair occupant desires to restore the chair to either the intermediate tilted position shown in FIG. 2 or the upright sitting position shown in FIG. 1, downward pressure is exerted against the leg-rest **28** which brings about the reverse sequence of operations.

A latitude of modification, change and substitution is intended in the foregoing disclosure and in some instances some features of the invention will be employed without a corresponding use of other features. Accordingly it is appropriate that the appended claims be construed broadly and in a manner consistent with the spirit and scope of the invention herein.

What I claim is:

1. A reclining chair of the multiple position type comprising a support, a body-supporting unit including a rigid seat and back-rest, means mounting said body-supporting unit on said support for a first movement phase from a sitting position to an intermediate tilted position and for a second movement phase from said intermediate tilted position to a reclining position, the mounting means including a carrier member, means pivotally mounting said carrier member on said support at a carrier pivot, a stop on said support establishing a stationary position for said carrier member during said first movement phase, a front guiding link pivotally mounted on said carrier member and pivotally connected to said body-supporting unit, a rear guiding link pivotally mounted on said carrier member and pivotally connected to said body-supporting unit, said front guiding link, a portion of said body-supporting unit, and said rear guiding link serving as movable links of a mounting linkage and a portion of said carrier member serving as a stationary link of said mounting linkage which is operative during said first movement phase to guide said body-supporting unit for rearward movement relative to said support, said carrier member turning about said carrier pivot during said second movement phase to guide said body-supporting unit for movement relative to said support, a leg-rest, means mounting said leg-rest on said seat for movement from a stored position beneath said seat to an elevated leg-supporting position, constraining means operatively connected to said carrier member and to the mounting means for said leg-rest and operable during said first movement phase and in response to said rearward movement of said body-supporting unit to move said leg-rest to said elevated leg-supporting position, and means for blocking one of said mounting means at the end of said first movement phase such that said body-supporting unit and leg-rest move together about said carrier pivot.

2. A reclining chair of the multiple position type comprising a support, a body-supporting unit including a seat and back-rest, means mounting said body-supporting unit on said support for a first movement phase from a sitting position to an intermediate tilted position and for a second movement phase from said intermediate tilted position to a reclining position, the mounting means including a carrier member, means pivotally mounting said carrier member on said support at a carrier pivot, a stop on said support establishing a stationary position for said carrier member during said first movement phase, a front guiding link pivotally mounted on said carrier member at a front pivotal mount and pivotally connected to said body-supporting unit at a front pivotal connection, a rear guiding link pivotally mounted on said carrier member at a rear pivotal mount and pivotally connected to said body-supporting unit at a rear pivotal connection, said front guiding link, the portion of said body-supporting unit intermediate said front and rear pivotal connections, and said rear guiding link serving as movable links of a mounting linkage and the portion of said carrier member intermediate said front and rear pivotal mounts serving as a stationary link of said mounting linkage which is operative during said first movement phase to guide said body-supporting unit for rearward movement relative to said support, said carrier member turning about said carrier pivot during said second movement phase to guide said body-supporting unit for movement relative to said support, a leg-rest, means mounting said leg-rest on said seat for movement from a stored position beneath said seat to an elevated leg-supporting position, a constraining link pivotally connected to said carrier member and to the mounting means for said leg-rest and operable during said first movement phase and in response to said rearward movement of said body-supporting unit to move said leg-rest to said elevated leg-supporting position, and means for blocking one of said mounting means at the end of said first movement phase such that said body-supporting unit and leg-rest move together about said carrier pivot.

3. A reclining chair of the multiple position type comprising a support, a body-supporting unit including a seat and back-rest, means mounting said body-supporting unit on said support for a first movement phase from a sitting position to an intermediate tilted position and for a second movement phase from said intermediate tilted position to a reclining position, the mounting means including an elongated carrier member having forward and rearward ends, means adjacent the rearward end of said carrier member pivotally mounting said carrier member on said support at a carrier pivot, means on said support establishing a stationary position for said carrier member during said first movement phase, a front guiding link pivotally mounted on said carrier member adjacent the forward end thereof and pivotally connected to said body-supporting unit, a rear guiding link pivotally mounted on said carrier member intermediate the ends thereof and pivotally connected to said body-supporting unit, said front and rear guiding links serving as movable links of a mounting linkage which is operative during said first movement phase to guide said body-supporting unit for rearward movement relative to said support, said carrier member turning about said carrier pivot during said second movement phase to guide said body-supporting unit for movement relative to said support, a leg-rest, means mounting said leg-rest on said seat for movement from a stored position beneath said seat to an elevated leg-supporting position, constraining means operatively connected to said carrier member and to the mounting means for said leg-rest and operable during said first movement phase and in response to said rearward movement of said body-supporting unit to move said leg-rest to said elevated leg-supporting position, and means for blocking one of said mounting means at the end of said first movement phase such that said body-supporting unit and leg-rest move together about said carrier pivot.

4. In a reclining chair of the multiple position type, a support, a body-supporting unit including a seat and back-rest, means mounting said body-supporting unit on said support for a first movement phase from a sitting position to an intermediate tilted position and for a second movement phase from said intermediate tilted position to a reclining position, the mounting means including a carrier member, means pivotally mounting said

carrier member on said support at a carrier pivot, a stop on said support establishing a stationary position for said carrier member during said first movement phase, a front guiding link pivotally mounted on said carrier member at a front pivotal mount and pivotally connected to said body-supporting unit at a front pivotal connection, a rear guiding link pivotally mounted on said carrier member at a rear pivotal mount and pivotally connected to said body-supporting unit at a rear pivotal connection, said front guiding link, the portion of said body-supporting unit intermediate said front and rear pivotal connections, and said rear guiding link serving as movable links of a mounting linkage and the portion of said carrier member intermediate said front and rear pivotal mounts serving as a stationary link of said mounting linkage which is operative during said first movement phase to guide said body-supporting unit for rearward movement relative to said support, said carrier member turning about said carrier pivot during said second movement phase to guide said body-supporting unit for movement relative to said support, and sequencing means interconnected between said body-supporting unit and said support for guiding said body-supporting unit along a first path during said first movement phase and for guiding said body-supporting means along a second path during said second movement phase for establishing the sequence of operation of said chair.

5. In a reclining chair of the multiple position type comprising a support, a body-supporting unit including a seat and back-rest, means mounting said body-supporting unit on said support for a first movement phase from a sitting position to an intermediate tilted position and for a second movement phase from said intermediate tilted position to a reclining position, the mounting means including a carrier member, means pivotally mounting said carrier member on said support at a carrier pivot, a stop on said support establishing a stationary position for said carrier member during said first movement phase, a front guiding link pivotally mounted on said carrier member at a front pivotal mount and pivotally connected to said body-supporting unit at a front pivotal connection, a rear guiding link pivotally mounted on said carrier member at a rear pivotal mount and pivotally connected to said body-supporting unit at a rear pivotal connection, said front guiding link, the portion of said body-supporting unit intermediate said front and rear pivotal connections, and said rear guiding link serving as movable links of a mounting linkage and the portion of said carrier member intermediate said front and rear pivotal mounts serving as a stationary link of said mounting linkage which is operative during said first movement phase to guide said body-supporting unit for rearward movement relative to said support, said carrier member turning about said carrier pivot during said second movement phase to guide said body-supporting unit for movement relative to said support, and sequencing means interconnected between one of said guiding links and said support for guiding said body-supporting unit along a first path during said first movement phase and for guiding said body-supporting means along a second path during said second movement phase for establishing the sequence of operation of said chair, said sequencing means including a pin and slot interconnection having first and second slot sections extending from respective outer ends toward each other and merging at adjacent ends, said pin being disposed at the outer end of said first slot section in said sitting position, at the adjacent ends of said slot sections in said tilted position and at the outer end of said second slot section in said reclining position.

6. A reclining chair of the multiple position type comprising a support, a body-supporting unit including a seat and back-rest, means mounting said body-supporting unit on said support for a first movement phase from a sitting position to an intermediate tilted position and for a second movement phase from said intermediate tilted position to a reclining position, the mounting means including a carrier member, means pivotally mounting said carrier member on said support at a carrier pivot, a stop on said support establishing a stationary position for said carrier member during said first movement phase, a front guiding link pivotally mounted on said carrier member at a front pivotal mount and pivotally connected to said body-supporting unit at a front pivotal connection, a rear guiding link pivotally mounted on said carrier member at a rear pivotal mount and pivotally connected to said body-supporting unit at a rear pivotal connection, said front guiding link, the portion of said body-supporting unit intermediate said front and rear pivotal connections, and said rear guiding link serving as movable links of a mounting linkage and the portion of said carrier member intermediate said front and rear pivotal mounts serving as a stationay link of said mounting linkage which is operative during said first movement phase to guide said body-supporting unit for rearward movement relative to said support, said carrier member turning about said carrier pivot during said second movement phase to guide said body-supporting unit for movement relative to said support, sequencing means interconnected between said body-supporting unit and said support for guiding said body-supporting unit along a first path during said first movement phase and for guiding said body-supporting means along a second path during said second movement phase for establishing the sequence of operation of said chair, a leg-rest, means mounting said leg-rest on said seat for movement from a stored position beneath said seat to an elevated leg-supporting position, constraining means operatively connected to said carrier member and to the mounting means for said leg-rest and operable during said first movement phase and in response to said rearward movement of said body-supporting unit to move said leg-rest to said elevated leg-supporting position, and means for blocking one of said mounting means at the end of said first movement phase such that said body-supporting unit and leg-rest move together about said carrier pivot.

7. A reclining chair of the multiple position type comprising a support, a body-supporting unit including a seat and back-rest, means mounting said body-supporting unit on said support for a first movement phase from a sitting position to an intermediate tilted position and for a second movement phase from said intermediate tilted position to a reclining position, the mounting means including a carrier member, means pivotally mounting said carrier member on said support at a carrier pivot, a stop on said support establishing a stationary position for said carrier member during said first movement phase, a front guiding link pivotally mounted on said carrier member at a front pivotal mount and pivotally connected to said body-supporting unit at a front pivotal connection, a rear guiding link pivotally mounted on said carrier member at a rear pivotal mount and pivotally connected to said body-supporting unit at a rear pivotal connection, said front guiding link, the portion of said body-supporting unit intermediate said front and rear pivotal connections, and said rear guiding link serving as movable links of a mounting linkage and the portion of said carrier member intermediate said front and rear pivotal mounts serving as a stationary link of said mounting linkage which is operative during said first movement phase to guide said body-supporting unit for rearward movement relative to said support, said carrier member turning about said carrier pivot during said second movement phase to guide said body-supporting unit for movement relative to said support, sequencing means interconnected between said body-supporting unit and said support for guiding said body-supporting unit along a first path during said first movement phase and for guiding said body-supporting means along a second path during said second movement phase for establishing the sequence of operation of said chair, said sequencing

means including a pin and slot interconnection having first and second slot sections extending from respective outer ends toward each other and merging at adjacent ends, said pin being disposed at the outer end of said first slot section in said sitting position, at the adjacent ends of said slot sections in said tilted position and at the outer end of said second slot section in said reclining position, a leg-rest, means mounting said leg-rest on said seat for movement from a stored position beneath said seat to an elevated leg-supporting position, constraining means operatively connected to said carrier member and to the mounting means for said leg-rest and operable during said first movement phase and in response to said rearward movement of said body-supporting unit to move said leg-rest to said elevated leg-supporting position, and means for blocking one of said mounting means at the end of said first movement phase such that said body-supporting unit and leg-rest move together about said carrier pivot.

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