Feb. 16, 1965 P. S. FLETCHER 3,169,794

RECLINING CHAIR OF THE MULTIPLE MOVEMENT TYPE

Original Filed Aug. 27, 1959 6 Sheets-Sheet 1

FIG. 1.

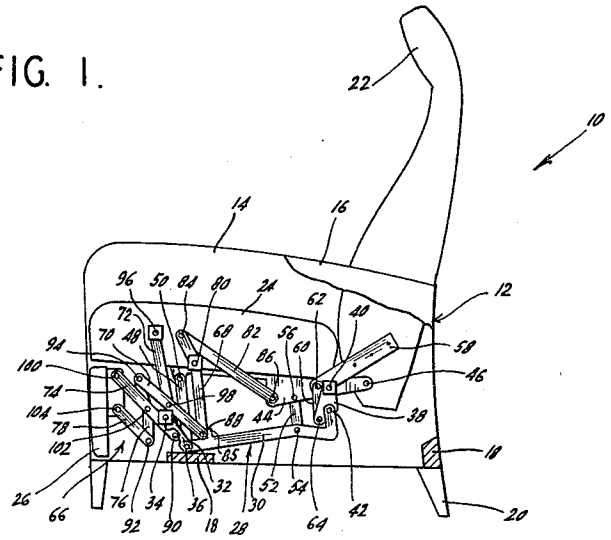

FIG. 2.

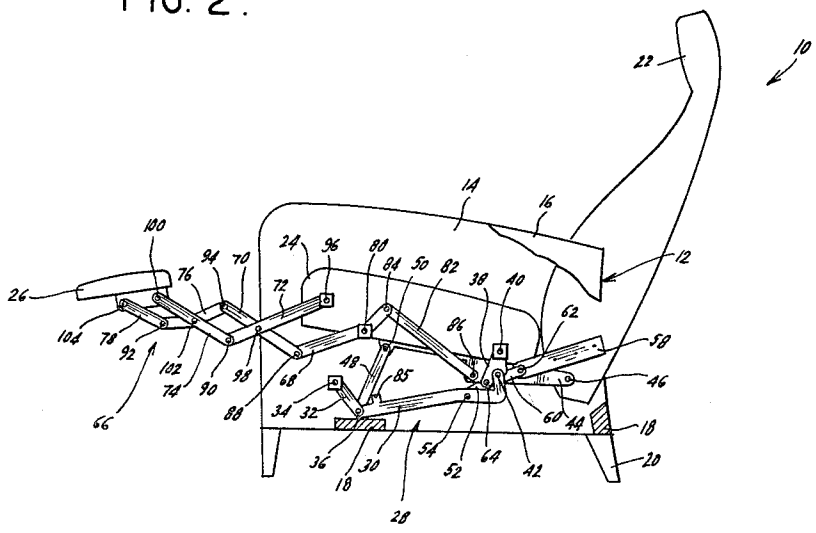

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FIG. 3.

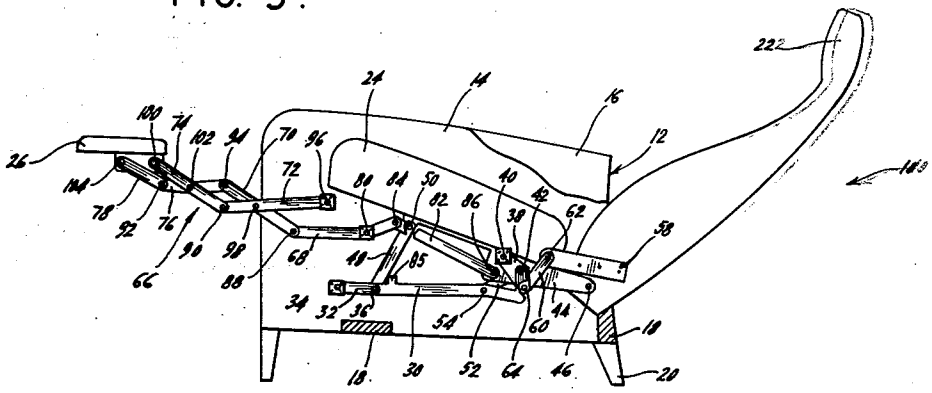

FIG. 4.

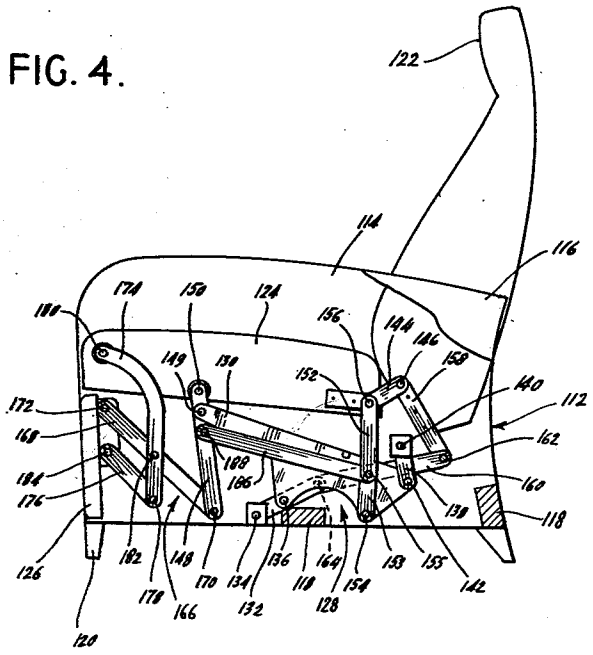

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FIG. 5.

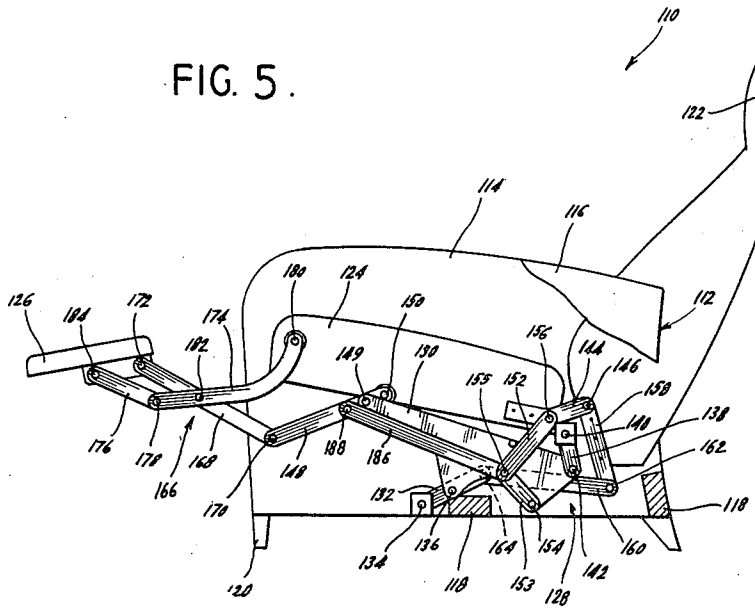
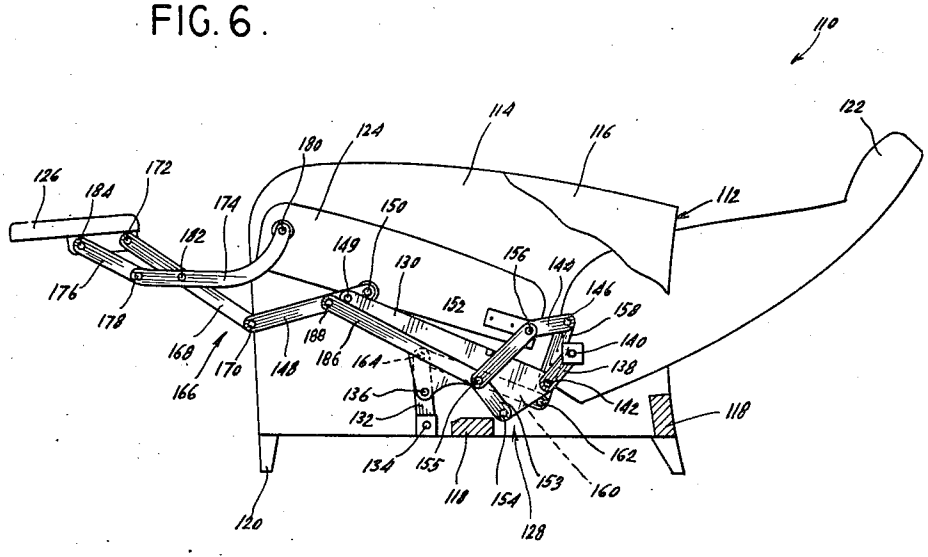


FIG. 6.



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RECLINING CHAIR OF THE MULTIPLE MOVEMENT TYPE

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FIG. 7.

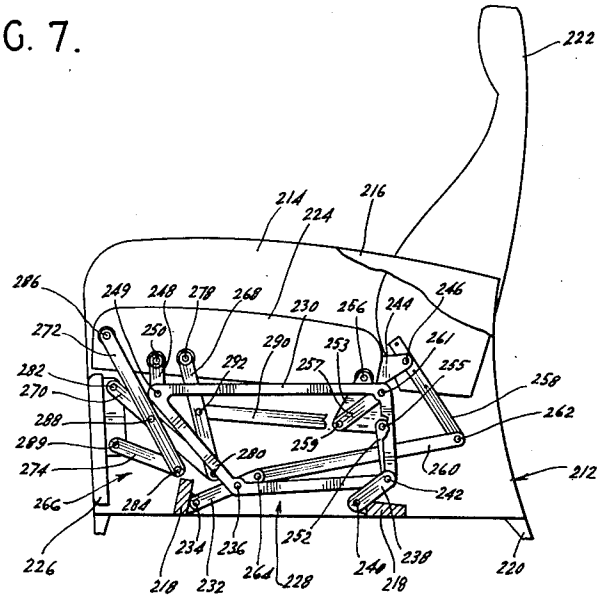

FIG. 8.

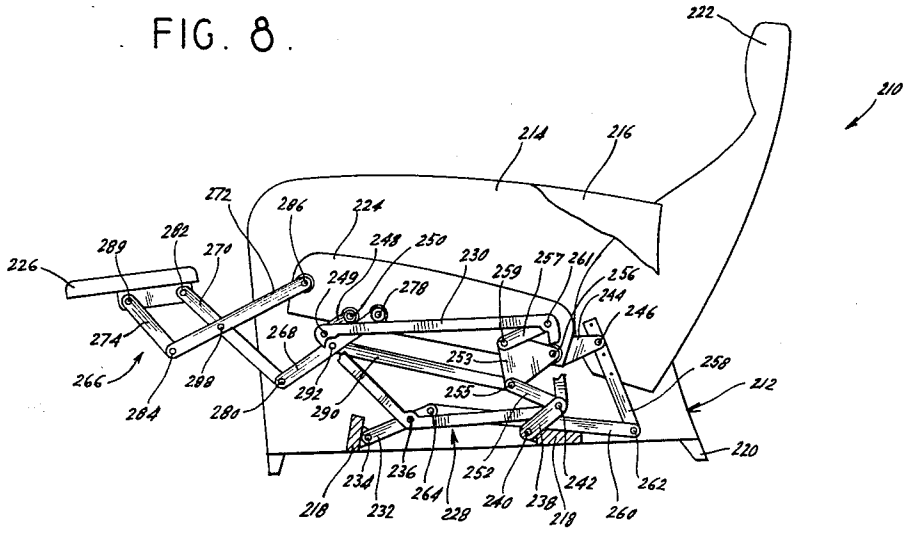

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FIG. 9.

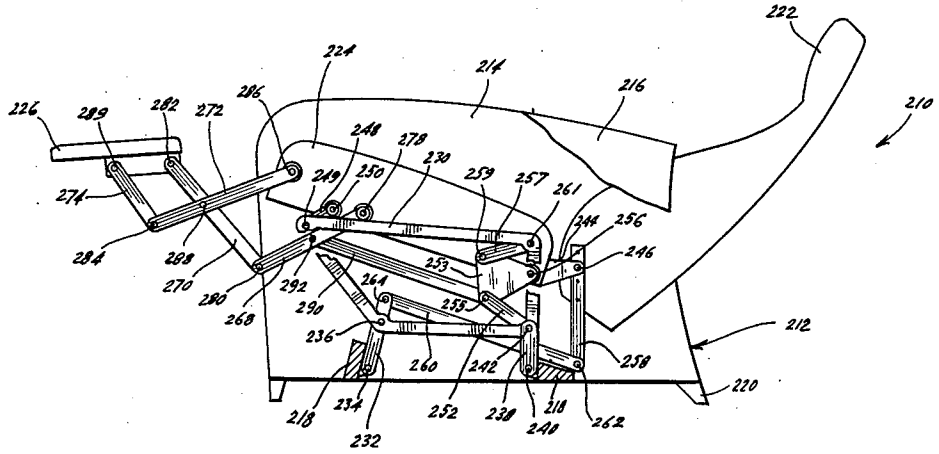

FIG. 10.

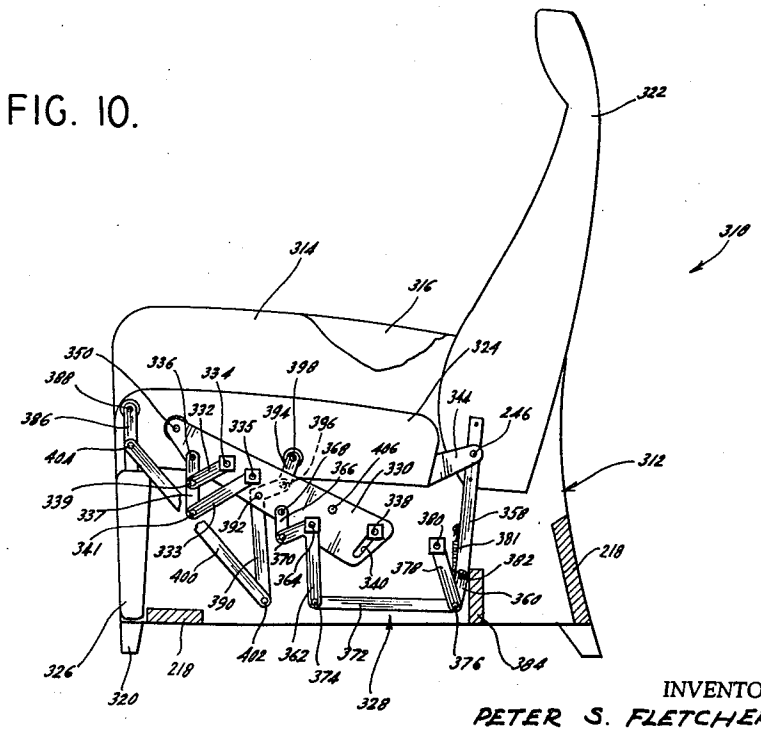

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FIG. 11.

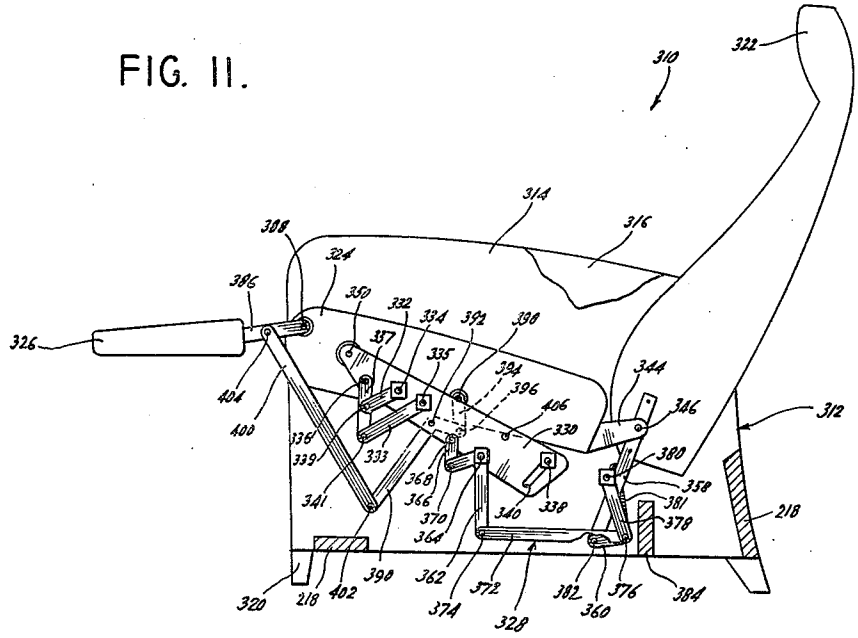
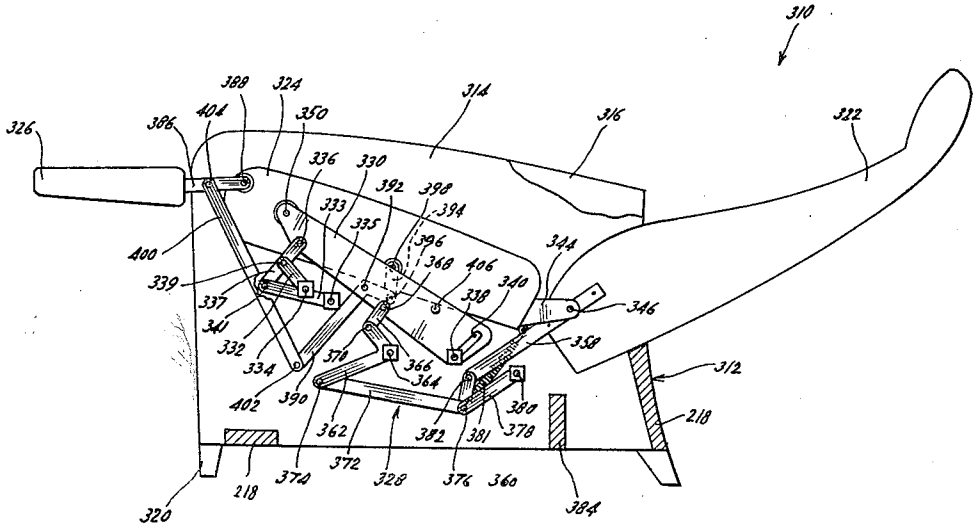


FIG. 12.



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United States Patent Office 3,169,794
Patented Feb. 16, 1965

3,169,794

RECLINING CHAIR OF THE MULTIPLE MOVEMENT TYPE

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Continuation of application Ser. No. 836,410, Aug. 27, 1959. This application Oct. 22, 1962, Ser. No. 233,182
8 Claims. (Cl. 297—85)

This is a continuation of my earlier filed application Serial No. 836,410 filed August 27, 1959, entitled Reclining Chair of the Multiple Movement Type, now abandoned, which was a continuation in part of my application Serial No. 676,044 filed August 2, 1957, entitled Reclining Chairs, now abandoned.

The present invention relates to reclining chairs, and in particular to an improved reclining chair of the type including body-supporting means having a movable back-rest and movable seat which are coordinated with each other to include at least two distinct phases of chair movement.

The well known reclining chair comprises a support, body-supporting means including a back-rest and seat movably mounted on the support, and a leg-rest mounted beneath the seat and movable into various elevated leg-supporting positions, with appropriate means coordinating the back-rest, seat and leg-rest for the requisite chair movement. Heretofore, there have been two distinct types of reclining chairs, those constructed with a rigid body-supporting unit including a unitary back-rest and seat mounted on the support for movement into various tilted positions and those constructed with a movable back-rest and movable seat mounted on the support for reclining and inclining movement respectively. Chairs of the type incorporating a rigid or unitary seat and back-rest unit were found to be most suitable for accommodating the chair occupant in a tilted-back position, but in a sitting attitude, with the occupant's legs supported on the elevated leg-rest. Such chairs are particularly suitable for accommodating the chair occupant in an attitude appropriate for television viewing, reading, sewing and like activities. Chairs of the type incorporating a movable back-rest and movable seat are suitable for complete and full relaxation in that the angle between the back-rest and seat increases in response to reclining movement of the chair to comfortably accommodate the chair occupant in a stretched out or fully reclined attitude.

Broadly, it is an object of the present invention to provide an improved reclining chair which exhibits attributes of both types of chairs which have been heretofore sold, to wit, those suitable for accommodating the chair occupant in a tilted-back sitting attitude and those suitable for accommodating the chair occupant in a fully reclined or complete relaxation attitude.

Specifically, it is within the contemplation of the present invention to provide an improved reclining chair wherein in a first movement phase from a sitting position to an intermediate, tilted sitting position, during which there is substantially no angular displacement between the back-rest and seat, the leg-rest is moved to an elevated leg-supporting position to establish the intermediate, tilted sitting position; and in a second movement phase from the intermediate, tilted sitting position to a fully reclined position, the angle between the seat and back-rest opens up, with the leg-rest remaining elevated, to establish a complete relaxation or fully reclined attitude. Advantageously, with this type of chair, the functional attributes of chairs having a rigid seat and back-rest and chairs having a movable seat and movable back-rest may be realized in a single construction, with the occupant having the added facility to move first to an intermediate, tilted sitting position and then through successive reclined positions to a fully reclined position.

It is a further object of the present invention to provide a chair of the double movement type having good balancing and sequencing characteristics.

In accordance with an illustrative embodiment demonstrating objects and features of the present invention there is provided a reclining chair of the double movement type which comprises a support, body-supporting means including a back-rest and seat adapted to be mounted on the support for reclining and inclining movement respectively, the body-supporting means being movably mounted on the support for a first movement phase from a sitting position to an intermediate, tilted sitting position and for a second movement phase from the intermediate, tilted sitting position to a reclining position. The mounting means includes a first linkage for guiding the body-supporting means for movement from the sitting position to the intermediate, tilted sitting position and a second linkage for guiding the body-supporting means for movement from the intermediate, tilted sitting position to the reclining position. The second linkage includes the support as the stationary link thereof, a carrier link as a movable link thereof, and second connecting means movably mounting the carrier link on the support. The first linkage is mounted on the second linkage which serves as a stationary support therefor during the first movement phase and includes the seat as a movable link thereof and first connecting means movably mounting the seat on the second linkage. The back-rest is pivotally mounted on the seat and means are provided for operatively connecting the back-rest to one of the movable links of the second linkage.

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 several presently preferred illustrative embodiments in accordance with the present invention when taken in conjunction with the accompanying drawings, wherein:

FIG. 1 is a side elevational view, with parts broken away and sectioned, showing a reclining chair of the double movement type embodying features of the present invention with the chair in the upright sitting position;

FIG. 2 is a side elevational view, similar to FIG. 1, but showing the reclining chair in an intermediate, tilted sitting position, with the leg-rest moved to an elevated leg-supporting position;

FIG. 3 is a side elevational view similar to FIG. 2, but showing the reclining chair in a fully reclined position wherein the back-rest and seat have been angularly displaced relative to each other to establish a complete relaxation position for the chair occupant, with the leg-rest being disposed in an elevated leg-supporting position;

FIG. 4 is a side elevational view, with parts broken away and sectioned showing a further embodiment of a reclining chair of the double movement type and embodying further features of the present invention with the chair in the upright sitting position;

FIG. 5 is a side elevational view, similar to FIG. 1, but showing the reclining chair in an intermediate, tilted sitting position, with the leg-rest moved to an elevated leg-supporting position;

FIG. 6 is a side elevational view similar to FIG. 2, but showing the reclining chair in a fully reclined position wherein the back-rest and seat have been angularly displaced relative to each other to establish a complete relaxation position for the chair occupant, with the leg-rest being disposed in an elevated leg-supporting position;

FIG. 7 is a side elevational view, with parts broken away and sectioned, showing a still further embodiment of a reclining chair of the double movement type and em-

bodying further features of the present invention, with the chair in the upright sitting position;

FIG. 8 is a side elevational view, similar to FIG. 1, but showing the reclining chair in an intermediate, tilted sitting position, with the leg-rest moved to an elevated leg-supporting position;

FIG. 9 is a side elevational view similar to FIG. 2, but showing the reclining chair in a fully reclined position wherein the back-rest and seat have been angularly displaced relative to each other to establish a complete relaxation position for the chair occupant, with the leg-rest being disposed in an elevated leg-supporting position;

FIG. 10 is a side elevational view, with parts broken away and sectioned, showing a still further embodiment of a reclining chair of the double movement type and embodying further features of the present invention with the chair in the upright sitting position;

FIG. 11 is a side elevational view, similar to FIG. 1, but showing the reclining chair in an intermediate, tilted sitting position, with the leg-rest moved to an elevated leg-supporting position; and

FIG. 12 is a side elevational view similar to FIG. 2, but showing the reclining chair in a fully reclined position wherein the back-rest and seat have been angularly displaced relative to each other to establish a complete relaxation position for the chair occupant, with the leg-rest being disposed in an elevated leg-supporting position.

Referring now specifically to FIGS. 1 to 3 of the drawings, there is shown a first embodiment of a reclining chair demonstrating features of the present invention, generally designated by the reference numeral **10**, which includes a support or frame **12** having opposite side walls **14**, **16** interconnected by suitable cross braces **18** and supported on depending legs **20**.

Body-supporting means including a back-rest **22** and a seat **24** are movably mounted on the support for reclining and inclining movement respectively for a first movement phase from the sitting position illustrated in FIG. 1 to the intermediate, tilted sitting position illustraed in FIG. 2 and for a second movement phase from the intermediate, tilted sitting position illustrated in FIG. 2 through a series of reclining positions to a fully reclined or complete relaxation position illustrated in FIG. 3.

Disposed beneath the forward end of the seat **24** is the leg-rest **26** which is mounted for movement from a stored or retracted position, as shown in FIG. 1, to a first elevated leg-supporting position as shown in FIG. 2 and to a further elevated leg-supporting position as shown in FIG. 3. As will be described, the leg-rest **26** is coordinated to the back-rest **22** and the seat **24** for movement into the elevated leg-supporting position in response to the first movement phase of the chair, with the leg-rest **26** remaining substantially in the elevated leg-supporting position as the chair moves from the intermediate, tilted sitting position of FIG. 2 to the fully reclined or complete relaxation position of FIG. 3.

A mounting arrangement, generally designated by the reference numeral **28**, is provided for guiding the back-rest **22** and the seat **24** during the first and second movement phases. The mounting arrangement includes a first linkage for guiding the body-supporting means from the sitting position to the intermediate, tilted sitting position and a second linkage for guiding the body-supporting means for movement from the intermediate, tilted sitting position to the reclining position. Since the first linkage which is operative during the first movement phase is built onto the second linkage in the mounting arrangement **28**, it will facilitate the understanding of the invention if the second linkage is described first.

Specifically the second linkage includes a carrier link **30** which is movably mounted on the support **12**, the carrier link **30** remaining relatively stationary during the first movement phase, as may be appreciated by progressively inspecting FIGS. 1 and 2, and moving during the second movement phase, as may be appreciated by progressively inspecting FIGS. 2 and 3. At its front end, carrier link **30** is movably mounted on the support by a front guiding link **32** which is disposed in an upwardly inclined attitude and has a pivotal mount **34** at its upper end on the support and a pivotal connection **36** at its lower end to the front end of the carrier link **30**. At its rearward end the carrier link **30** is movably mounted on the support **12** by a rear guiding link **38** having a pivotal mount **40** on the support and a piovtal connection **42** at a point spaced above its lower end to the rearward end of the carrier link **30**. The links **30**, **32** and **38** will be recognized as providing a four-bar second movement linkage wherein the stationary link thereof is the portion of the support **12** intermediate the front and rear pivotal mounts **34**, **40**, and the movable links thereof are the front guiding link **32** intermediate the pivots **34**, **36** the carrier link **30** and the rear guiding link **38** intermediate the pivots **40**, **42**. Effectively, the front and rear guiding links **32**, **38** movably mount the carrier link **30** on the support **12**.

Built onto the second linkage, is the first linkage the second linkage serving as a stationary support for the first linkage during the first movement phase. Specifically, the seat **24** is carried by a mounting link or plate **44** which extends fore and aft of the chair. The seat **24** and the rigid mounting link or plate **44** serve as a movable link of the first linkage and together are movably mounted on the carrier link **30** by a front guiding link **48** which has a pivotal mount on the forward end of the carrier link **30** coaxially with the pivotal connection **36** and a pivotal connection **50** to the mounting link or plate **44**. Further, there is provided a rear guiding link **52** which has a pivotal mount **54** on the carrier link **30** at a point spaced from the rearward end thereof and a pivotal connection **56** to the mounting link **44** of the seat **24** at a point spaced rearwardly of the pivotal connection **50**. During the first movement phase, the first movement links **48** and **52**, and **44** will be recognized as providing the movable links of a four-bar linkage wherein the essentially stationary carrier link **30** intermediate the pivotal mounts **36**, **54** serves as the stationary link thereof during the first movement phase. Selected links of the first linkage, namely the front and rear guiding links **48**, **52**, serve to movably mount the seat **24** on the carrier link **30**.

The back-rest **22** is mounted on the rearward end of the seat mounting link **44** at a back-rest pivot **46**. Provision is made for coupling the back-rest **22** which is mounted on the movable link **44** of the first movement phase linkage to one movable link of the second movement phase linkage. Specifically, a forwardly projecting bracket **58** is secured to the lower end of the back-rest **22**. The back-rest **22** via the bracket **58** is coupled to the rear guiding link **38** (see FIG. 1) of the second linkage by a back-rest link **60** having a pivotal connection **62** at one end to the bracket **58** and a pivotal connection **64** at the other end to the lower end of the rear guiding link **38**.

For purposes of clarity and increased understanding, it will be appreciated that the invention incorporated in the chair **10** may be described as follows: The chair **10** has its support **12** and body-supporting means including the seat **24** and back-rest **22** which are movably mounted by the mounting means **28** on the support **12** for movement from the upright sitting position to the intermediate, tilted sitting position and then to the fully reclined position. The mounting means of the chair **10** includes a first linkage, including links **48**, **24** and **52**, for the first movement phase, and a second linkage including links **32**, **38**, **30** and **12**, for the second movement phase. The first linkage is mounted on the second linkage which serves as a stationary support therefor. The second linkage includes the support **12** as a stationary link thereof, the carrier link **30** and pivotally interconnected movable links including second linkage connecting means (links **32** and **38**) movably mounting the carrier link **30** on the support **12**. The first linkage is mounted on the second linkage

by the interconnection of link 32 with the carrier link 30 at 36 and the interconnection of the link 38 with the carrier link 30 at 42, the carrier link 30 serving as a stationary support for the first linkage during the first movement phase. The first linkage includes pivotally interconnected movable links including the seat 24 (i.e. the mounting link 44) and first connecting means comprising links 40 and 52 serving as the rear guiding means movably mounting the seat 24 on the second linkage. Means are also provided in the chair 10, including the back-rest link 60, pivotally connecting the back-rest 22 to movable link 38 of the second linkage for guiding the back-rest during movement of the body-supporting unit within the frame 12.

In this illustrative embodiment, the leg-rest 26 is mounted for movement into the several elevated leg-supporting positions by a leg-rest mounting linkage, generally designated by the reference numeral 66, which includes three link pairs, respectively designated by the numeral 68, 70, 72, 74 and 76, 78. The link 68 of the first link pair has a pivotal mount 80 on the support intermediate its ends such that the link 68 serves as a double-arm lever. The upper arm of the double-arm lever 68 is connected to the mounting link or plate 44 which moves rearwardly relative to the support during the first movement phases by a pull-type actuating link 82 which has a pivotal connection 84 at its forward end to the upper end of the double arm lever 68 and a pivotal connection 86 at its rearward end to the mounting link 44. The lower arm of the double-arm lever 68 is coupled to the link 70 by a pivotal connection 88 between the adjacent ends thereof. The links 72, 74 of the second link pair have their adjacent ends pivotally interconnected at the pivotal connection 90. The links 76, 78 of the third link pair have their adjacent ends pivotally interconnected at the pivotal connection 92. The link 70 of the first link pair 67, 70 is coupled to the link 76 of the third link pair 76, 78 at the pivotal connection 94. The link 72 of the second link pair, 72, 74 has a pivotal mount 96 on the support at a point spaced forwardly of the pivotal mount 80 and has a pivotal connection 98 to the link 70 of the first link pair. The link 74 of the second link pair has a pivotal connection 100 at its forward end to the leg-rest 26 and a pivotal connection 102 intermediate its end to the link 76 of the third link pair. Finally, the link 78 of the third link pair has a pivotal connection 104 to the leg-rest at a point spaced from the pivotal connection 100. The pivotally interconnected link pairs 68, 70, 72, 74 and 76, 78 will be recognized as providing a lazy-tong type of mounting linkage 66 which is effective to extend and elevate the leg-rest in response to turning movement of the double-arm lever 68 on the pivotal mount 80 upon application of a rearwardly directed pulling force to the upper arm thereof via the pull link 82 coupled to the seat 24.

Appropriate stops may be provided to establish the intermediate, tilted position of FIG. 2 and the fully reclined position of FIG. 3. As seen in FIG. 2, the rearward side of the link 48 of the first movement phase linkage contiguous to the pivot 36 abuts a stop 85 on the carrier link 30 in the intermediate, tilted sitting position and serves as an effective means for blocking the movement of the movable links of the first linkage relative to the carrier link 30 which serves as the stationary link thereof. As seen in FIG. 3, the rear cross-brace 18 of the chair support or frame 12 abuts the lower rearward end of the back-rest 22 to establish the fully reclined position for the chair. It will be appreciated however, that other types of stops may be employed in accordance with techniques which are generally understood.

For a better understanding of this embodiment of the present invention, reference will be made to a typical sequence of operations:

When the chair occupant is seated in the chair 10 and leans against the back-rest 22, the seat 24 is displaced rearwardly relative to the support. During the first movement phase, the seat 24 is guided relative to the support by the first linkage mounted on the carrier link 30 serving as a stationary support therefor the movable links thereof including the front guiding link 48, the mounting link 44 intermediate the connections 50, 56 and the rear guiding link 52. The back-rest 22 is mainatined in substantially the same angular relationship to the seat 24 by the arrangement of the back-rest link 60 which is seen to extend substantially parallel with the rear guiding link 52. The rearward displacement of the seat 24 and the back-rest 22 continues with substantially no angular displacement therebetween until the intermediate, tilted sitting position of FIG. 2 is reached, which position is established by contact of the rearward side of the link 48 in the region of the pivot 36 against the carrier link 30. During such rearward displacement of the seat 24 and back-rest 22, a rearwardly directed pulling force is applied to the leg-rest mounting linkage 66 via the link 82 which tends to turn the upper arm of the double-arm lever 68 in the clockwise direction about the pivotal mount 80 thereby moving the leg-rest to the extended and elevated leg-supporting position, as shown in FIG. 2.

During the second movement phase, the links 48, 52 and the mounting link 44 and seat 24 become a unitary assembly with the carrier link 30 for all intents and purposes. However the back-rest 22 is capable of turning about the back-rest pivot 46 on the mounting link 44 during the movement of the second movement phase linkage. Specifically, as the chair occupant places weight against the back-rest 22, there is a tendency for the back-rest 22 to pivot rearwardly about the back-rest pivot 46 which applies a rearwardly directed pulling force to the back-rest link 60 which force is transmitted to the rear guiding link 38 of the second movement phase linkage. This tends to turn the front and rear guiding links 32, 38 in the counter-clockwise direction about their respective pivotal mounts 34, 40, as may be appreciated by progressively inspecting FIGS. 2 and 3. The second movement phase continues until such time as the back-rest 22 is blocked against further rearward movement which occurs in this illustrative embodiment when the back-rest abuts the rear brace 18 of the chair frame or support 12. During such second movement phase there is a continued rearward displacement of the seat 24 with the carrier link 30 which applies a further turning movement to the double-arm lever 68 thereby further extending and elevating the leg-rest 26 to a further leg-supporting position forwardly of the seat 24.

When the chair occupant desires to restore the chair to the upright sitting position illustrated in FIG. 1, the occupant leans forwardly such that the back-rest, seat and leg-rest move through the reverse sequence of movements, with the chair first moving into the intermediate, tilted sitting position of FIG. 2 and then being returned to the upright or sitting position of FIG. 1.

Referring now specifically to FIGS. 4 to 6 of the drawings, there is shown a further embodiment of a reclining chair demonstrating features of the present invention, generally designated by the reference numeral 110, which includes a support or frame 112 having opposite side walls 114, 116 interconnected by suitable cross braces 118 and supported on depending legs 120.

Body-supporting means including a back-rest 122 and seat 124 are movably mounted on the support for reclining and inclining movement respectively for a first movement phase from the sitting position illustrated in FIG. 4 to the intermediate, tilted sitting position illustrated in FIG. 5 and for a second movement phase from the intermediate, tilted sitting position illustrated in FIG. 5 through a series of reclining positions to a fully reclined or complete relaxation position illustrated in FIG. 6.

Disposed beneath the forward end of the seat 124 is the leg-rest 126 which is mounted for movement from a stored or retracted position, as shown in FIG. 4, to a first elevated leg-supporting position shown in FIG. 5

and to a further elevated leg-supporting position as shown in FIG. 6. As will be described, the leg-rest **126** is coordinated to the back-rest **122** and the seat **124** for movement into the elevated leg-supporting position in response to the first movement phase of the chair, with the leg-rest **126** remaining substantially in the elevated leg-supporting position as the chair moves from the intermediate, tilted sitting position of FIG. 5 to the fully reclined or complete relaxation position of FIG. 6.

A mounting arrangement, generally designated by the reference numeral **128**, is provided for guiding the back-rest **122** and the seat **124** during the first and second movement phases. The mounting arrangement includes a first linkage for guiding the body-supporting movement from the sitting position to the intermediate, tilted sitting position and a second linkage for guiding the body-supporting means for movement from the intermediate, tilted sitting position to the reclining position. Since the first linkage which is operative during the first movement phase is built onto the second linkage in the mounting arrangement **128**, it will facilitate the understanding of the invention if the second linkage is described first.

Specifically, the second linkage includes a carrier link **130** which is movably mounted on the support **112**, the carrier link **130** remaining stationary during the first movement phase, as may be appreciated by progressively inspecting FIGS. 4 and 5, and moving during the second movement phase, as may be appreciated by progressively inspecting FIGS. 5 and 6. At its front end, the carrier link **130** is mounted on the support by a front guiding link **132** which is disposed in an upwardly and rearwardly inclined attitude and has a pivotal mount **134** at its lower end on the support **112** and a pivotal connection **136** at a point intermediate its ends to the carrier link **130**. At its rearward end, the carrier link **130** is movably mounted on the support **112** by a rear guiding link **138** having a pivotal mount **140** at its upper end on the support and a pivotal connection **142** at its lower end to its rearward end of the carrier link **130**. The links **130**, **132** and **138** will be recognized as providing a four-bar second movement linkage wherein the stationary link thereof is the portion of the support **112** intermediate the front and rear pivotal mounts **134**, **140**, and the movable links thereof are the front guiding link **132** intermediate the pivots **134**, **136**, the carrier link **130** intermediate the pivots **136**, **142**, and the rear guiding link **138**. Effectively, the front and rear guiding links **132**, **138** movably mount the carrier link **130** on the support **112**.

Built onto the second linkage is the first linkage, the second linkage provided a stationary support for the first linkage during the first movement phase. The seat **124** serves as a movable link of the first linkage and is movably mounted on the carrier link **130** of the second linkage by a front guiding link **148** which has a pivotal mount **149** intermediate its ends on the forward end of the carrier link **130** and a pivotal connection **150** to the seat **124**. Further, there is provided a rear guiding link pair **152**, **153** which has a pivotal mount **154** on the carrier link **130** at a point spaced from the rearward end thereof and a pivotal connection **156** to the hanger **144** on the seat **124** at a point spaced rearwardly of the pivotal connection **150**. The rear guiding links **152**, **153** are connected at a knee pivot **155** and will be recognized as providing a toggle linkage mechanism, which upon movement of the knee pivot **155** out of alignment with the pivots **154**, **156**, causes a rapid lowering of the rearward portion of the body-supporting means. The knee pivot **155** of the rear guiding toggle linkage mechanism **152**, **153** is moved forwardly out of alignment with the pivots **154**, **156** by the provision of a pull type actuating link **186** which has a pivotal connection at its rearward end to the rear guiding links **152**, **153** coaxially with the knee pivot **155** and a pivotal connection **188** at its forward end to the front guiding link **148** at a point spaced below the pivotal mount **149**. Accordingly when the seat **124** moves rearwardly during the first movement phase, the lower arm of link or lever **148** swings through a forward arc which actuates the toggle linkage mechanism as may be appreciated by comparing FIGS. 4 and 5.

During the first movement phase, the links **148**, **152**, **153**, **186** and the seat **124** of the first movement linkage will be recognized as providing movable links of a six-bar linkage wherein the carrier link **130** of the second movement linkage intermediate the pivotal mounts **149**, **154** serves as the stationary support therefor. The seat **124** carries a rearwardly directed hanger **144** and the back-rest **122** is mounted on the rearward end of the hanger **144** at a back-rest pivot **146**.

Provision is made for coupling the back-rest **122** to one of the movable links of the second movement phase linkage. Specifically, a depending bracket **158** is secured to the lower end of the backrest **122** which is coupled to the front guiding link **132** of the second linkage by a back-rest link **160** having a pivotal connection **162** at one end to the bracket **158** and a pivotal connection **164** at the other end to the upper end of the front guiding link **132** at a point spaced from the pivotal connection **136**.

In this illustrative embodiment, the leg-rest **126** is mounted for movement into the several elevated leg-supporting positions by a leg-rest mounting linkage, generally designated by the reference numeral **166**, which includes two link pairs. The front guiding link **148** of the first linkage serves as one link of the first link pair, with the pivotal mount **149** on the carrier link **130** intermediate its ends effectively providing a double-arm lever. The upper arm of the double-arm lever **148** is connected to the seat **124** at the pivotal connection **150** which moves rearwardly relative to the support during the first movement phase. The lower arm of the double-arm lever **148** is coupled to the rearward end of a conecting link **168** at a pivotal connection **170** which connecting link has a pivotal connection **172** at its forward end to the leg-rest **126**. The leg-rest mounting linkage **166** is completed by a second link pair **174**, **176** and have their adjacent ends pivotally interconnected at the pivotal connection **178**. The link **174** of the second link pair has a pivotal mount **180** on the seat **124** at a point spaced forwardly of the pivotal mount **149** and has a pivotal connection **182** to the link **168** of the first link pair. Finally, the link **176** of the second link pair has a pivotal connection **184** at its forward end to the leg-rest **126** at a point spaced from the pivotal connection **172**. The pivotally interconnected link pairs **148**, **168** and **174**, **176** will be recognized as providing a lazy tong type of mounting linkage **166** which is effective to extend and elevate the leg-rest in response to turning movement of the double-arm lever **148** about the pivotal mount **149** in response to a rearwardly directed pulling force being applied to the upper arm thereof incident to rearward displacement of the seat **124**.

Appropriate stops may be provided to establish the intermediate, tilted sitting position of FIG. 5 and the fully reclined position of FIG. 6. As seen in FIG. 5 the pivotal connection **150** of the front guiding link **148** abuts the carrier link **130** in the intermediate, tilted position and serves as an effective means for blocking the movement of the links of the first linkage relative to each other and to the carrier link **130**. As seen in FIG. 6 the rear end of the carrier link **130** will abut the pivotal connection **162** to establish the fully reclined position for the chair. It will be appreciated however, that other types of stops may be applied in accordance with techniques which are generally understood.

For a better understanding of the present invention reference will be made to a typical sequence of operations;

When the chair occupant is seated in the chair **110** and leans against the back-rest **122**, the seat **124** is displaced rearwardly relative to the support. During such first movement phase, the seat **124** is guided relative to the support by the movable first movement links which are supported by the second linkage serving as a stationary

support therefor, the movable links including the front guiding link **148**, the seat **124** intermediate the connections **150**, **156**, the rear guiding links **152**, **153** and the actuating link **186**. The back-rest **122** is maintained in substantially the same angular relationship to the seat **124** by the arrangement of the back-rest link **160** which is seen to extend substantially parallel to the seat **124**. The tilting movement of the seat **124** and the back-rest **122** continues with substantially no angular displacement therebetween until the intermediate, tilted position of FIG. 5 is reached, which position is established by contact of the pivotal connection **150** against the carrier link **130**. During such tilting movement of the seat **124** and back-rest **122** a rearwardly directed pulling force is applied to the upper arm of the lever **148** of the leg-rest mounting linkage **166** from the seat **124** which tends to turn the upper arm of the lever **148** in the clockwise direction about the pivotal mount **149** on the stationary carrier link **130** thereby moving the leg-rest to the extended and elevated leg-supporting position shown in FIG. 5.

During the second movement phase, the links **148**, **152**, **153**, **186** and the seat **124** become a unitary assembly with the carrier link **130** for all intents and purposes, with the back-rest **122** being capable of turning about the back-rest pivot **146** during the movement of the second movement linkage. Specifically, as the chair occupant places weight against the back-rest **122** there is a tendency for the back-rest **122** to pivot rearwardly about the back-rest pivot **146** which applies a forwardly directed pushing force to the back-rest link **160** which pushing force is transmitted to the front guiding link **132** of the second movement phase linkage, tending to turn the front and rear guiding links **132**, **138** about their respective pivotal mounts **134**, **140** in opposite directions, as may be appreciated by progressively inspecting FIGS. 5 and 6. The second movement phase continues until such time as the back-rest **122** is blocked against further rearward movement. During such second movement phase there is no relative displacement between the seat **124** and the carrier link **130** and accordingly the leg-rest **126** and seat remain in the same position relative to each other.

Referring now specifically to FIGS. 7 to 9 of the drawings there is shown a further embodiment of a reclining chair demonstrating features of the present invention, generally designated by the reference numeral **210**, which includes a support or frame **212** having opposite side walls **214**, **216** interconnected by suitable cross braces **218** and supported on depending legs **220**.

Body-supporting means including a back-rest **222** and a seat **224** are movably mounted on the support for reclining and inclining movement respectively for a first movement phase from the sitting position illustrated in FIG. 7 to the intermediate, tilted sitting position illustrated in FIG. 8 and for a second movement phase from the intermediate, tilted sitting position illustrated in FIG. 8 through a series of reclining positions to a fully reclined or complete relaxation position illustrated in FIG. 9.

Disposed beneath the forward end of the seat **224** is the leg-rest **226** which is mounted for movement from a stored or retracted position, as shown in FIG. 7, to a first elevated leg-supporting position shown in FIG. 8 and to a further elevated leg-supporting position as shown in FIG. 9. As will be described, the leg-rest **226** is coordinated to the back-rest **222** and the seat **224** for movement into the elevated leg-supporting position in response to the first movement phase of the chair, with the leg-rest **226** remaining substantially in the elevated leg-supporting position as the chair moves from the intermediate, tilted sitting position of FIG. 8 to the fully reclined or completely relaxation position of FIG. 9.

A mounting arrangement, generally designated by the reference numeral **228**, is provided for guiding the back-rest **222** and the seat **224** during the first and second movement phases. The mounting arrangement includes a first linkage for guiding the body-supporting movement from the sitting position to the intermediate, tilted sitting position and a second linkage for guiding the body-supporting means for movement from the intermediate, tilted sitting position to the reclining position. Since the first linkage which is operative during the first movement phase is built onto the second linkage in the mounting arrangement **228**, it will facilitate the understanding of the invention if the second linkage is described first.

Specifically, the second linkage includes a carrier link or plate **230** which is movably mounted on the support **212**, the carrier link **230** remaining stationary during the first movement phase, as may be appreciated by progressively inspecting FIGS. 7 and 8, and moving during the second movement phase, as may be appreciated by progressively inspecting FIGS. 8 and 9. At its front end, the carrier link **230** is mounted on the support by a front guiding link **232** which is disposed in an upwardly and rearwardly inclined attitude and has a pivotal mount **234** at its lower end on the support **212** and a pivotal connection **236** at a point intermediate its ends to the carrier link **230**. At its rearward end, the carrier link **230** is movably mounted on the support **212** by a rear guiding link **238** having a pivotal mount **240** at its lower end on the support and a pivotal connection **242** at its upper end to its rearward end of the carrier link **230**. The links **230**, **232** and **238** will be recognized as providing a four-bar linkage wherein the stationary link thereof is the portion of the support **212** intermediate the front and rear pivotal mounts **234**, **240**, and the movable links thereof are the front guiding link **232** intermediate the pivots **234**, **236**, the carrier link **230** intermediate the pivots **236**, **242**, and the rear guiding link **238**.

Built onto the second linkage is the first linkage, the second linkage providing a stationary support for the first movement linkage during the first movement phase. The seat **224** serves as a movable link of the first linkage and is movably mounted on the carrier link **230** by a front guiding link **248** which has a pivotal mount **249** at its lower end on the forward end of the carrier link **230** and a pivotal connection **250** at its upper end to the seat **224**. Further, there is provided a rear guiding link pair **252**, **253** which has a pivotal mount on the carrier link **230** coaxially with the pivotal connection **242** and a pivotal connection **256** to the seat **224** at a point spaced rearwardly of the pivotal connection **250**. The rear guiding links **252**, **253** are connected at a pivot **255**. A constraining or thrust link **257** is provided having a pivotal connection **259** at its forward end to the link **253** and a pivotal mount **261** at its rearward end on the support **212**. The links **252**, **253** and **257** will be recognized as providing a straight line linkage mechanism, which upon movement of the pivot **255** out of alignment with the pivots **242**, **256**, causes a rapid lowering of the rearward portion of the body-supporting means. During the first movement phase, the links **248**, **252**, **253**, **257** and the seat **224** will be recognized as providing the movable links of a six-bar linkage wherein the carrier link **230** intermediate the pivotal mounts **249**, **254** serves as the stationary support therefor. The seat **224** carries a rearwardly directed hanger **244** and the back-rest **222** is mounted on the rearward end of the hanger **244** at a back-rest pivot **246**.

Provision is made for coupling the back-rest **222** which is mounted on the seat **224** to one of the movable links of the second movement phase linkage. Specifically, a depending bracket **258** is secured to the lower end of the back-rest **222** which is coupled to the front guiding link **232** of the second linkage by a back-rest link **260** having a pivotal connection **262** at one end to the bracket **258** and a pivotal connection **264** at the other end to the upper end of the front guiding link **232** at a point spaced from the pivotal connection **236**.

In this illustrative embodiment, the leg-rest **226** is mounted for movement into the several elevated leg-supporting positions by a leg-rest mounting linkage, generally designated by the reference numeral **266**, which

includes two link pairs 268, 270, and 272, 274. The upper end of the link 268 of the first link pair is connected to the seat 224 at a pivotal connection 278 which moves rearwardly relative to the support during the first movement phase. The lower end of the link 268 is coupled to the rearward end of the link 270 at a pivotal connection 280 which link has a pivotal connection 282 at its forward end to the leg-rest 226. The leg-rest mounting linkage 266 is completed by the second link pair 272, 274 having their adjacent ends pivotally interconnected at the pivotal connection 284. The link 272 of the second link pair has a pivotal mount 286 on the seat 224 at a point spaced forwardly of the pivotal mount 278 and has a pivotal connection 288 to the link 270 of the first link pair. Finally the link 274 of the second link pair has a pivotal connection 289 at its forward end to the leg-rest 226 at a point spaced from the pivotal connection 282. The pivotally interconnected link pairs 268, 270, and 272, 274 will be recognized as providing a lazy tong type of mounting linkage 266 which is effective to extend and elevate the leg-rest in response to turning movement of the links 268, 272 about their respective pivotal mounts 278, 286 in response to rearward displacement of the seat 224.

The pivot 255 of the rear guiding straight line linkage mechanism 252, 253 is moved forwardly out of alignment with the pivots 242, 256 incident to the rearward displacement of the seat and is coupled via connecting link 290 to the leg-rest mounting linkage 266. The connecting link has a pivotal connection at its rearward end to the rear guiding links 252, 253 coaxially with the pivot 255 and a pivotal connection 292 at its forward end to the link 268 at a point spaced below the pivotal mount 278. Accordingly when the seat 224 moves rearwardly during the first movement phase, the link 268 swings through a forward arc which actuates the leg-rest mounting linkage 266, as may be appreciated by comparing FIGS. 7 and 8.

Appropriate stops may be provided to establish the intermediate, tilted sitting position of FIG. 8 and the fully reclined position of FIG. 9. As seen in FIG. 8 the pivotal connection 250 of the front guiding link 248 abuts the carrier link 230 in the intermediate, tilted position and serves as a means for blocking the movement of the movable links of the first linkage relative to the carrier link 230. As seen in FIG. 9 the front guiding link 232 will abut the adjacent cross brace 218 to establish the fully reclined position for the chair. It will be appreciated however, that other types of stops may be applied in accordance with techniques which are generally understood.

For a better understanding of the present invention reference will be made to a typical sequence of operations.

When the chair occupant is seated in the chair 210 and leans against the back-rest 222, the seat 224 is displaced rearwardly relative to the support. During such first movement phase, the seat 224 is guided relative to the support by the guiding linkage mounted on the second movement linkage serving as a stationary support therefor and including as movable links thereof the front guiding link 248, the seat 224 intermediate the connections 250, 256 the rear guiding links 252, 253, and the link 257. The back-rest 222 is maintained in substantially the same angular relationship to the seat 224 through its connection to the seat and by the arrangement of the back-rest link 260 which is seen to extend substantially parallel to the seat 224, the rear of the seat moving in a short rearward and then downward path. The rearward displacement of the seat 224 and the back-rest 222 continues with substantially no angular displacement therebetween until the intermediate, tilted sitting position of FIG. 8 is reached, which position is established by contact of the pivotal connection 250 against the carrier link 230. During such rearward displacement of the seat 224 and back-rest 222 a forwardly directed thrust is applied to the link 268 of the leg-rest mounting linkage 266 from the connecting link 290 which moves the leg-rest to the extended and elevated leg-supporting position shown in FIG. 8.

During the second movement phase, the links 248, 252, 253, 257 and the seat 224 become a unitary assembly with the carrier link 230 for all intents and purposes, with the back-rest 222 being capable of turning about the back-rest pivot 246 during the movement of the second movement phase linkage. Specifically, as the chair occupant places weight against the back-rest 222 there is a tendency for the back-rest 222 to pivot rearwardly about the back-rest pivot 246 which applies a forwardly directed pushing force to the back-rest link 260 which pushing force is transmitted to the front guiding link 232 of the second movement phase linkage, tending to turn the front and rear guiding links 232, 238 about their respective pivotal mounts 234, 240 in the same directions, as may be appreciated by progressively inspecting FIGS. 8 and 9. The second movement phase continues until such time as the back-rest 222 is blocked against further rearward movement. During such second movement phase there is no relative displacement between the seat 224 and the carrier link 230 and accordingly the leg-rest 226 and seat remain in the same relative position.

Referring now specifically to FIGS. 10 to 12 of the drawings, there is shown a further embodiment of reclining chair demonstrating features of the present invention, generally designated by the reference numeral 310, which includes a support or frame 312 having opposite side walls 314, 316 interconnected by suitable cross braces 318 and supported on depending legs 320.

Body-supporting means including a back-rest 322 and a seat 324 are movably mounted on the support for reclining and inclining movement respectively for a first movement phase from the sitting position illustrated in FIG. 10 to the intermediate, tilted sitting position illustrated in FIG. 11 and for a second movement phase from the intermediate, tilted sitting position illustrated in FIG. 11 through a series of reclining positions to a fully reclined or complete relaxation position illustrated in FIG. 12.

Disposed beneath the forward end of the seat 324 is the leg-rest 326 which is mounted for movement from a stored or retracted position, as shown in FIG. 10, to a first elevated leg-supporting position shown in FIG. 11 and to a further elevated leg-supporting position as shown in FIG. 12. As will be described, the leg-rest 326 is coordinated to the back-rest 322 and the seat 324 for movement into the elevated leg-supporting position in response to the first movement phase of the chair, with the leg-rest 326 remaining substantially in the elevated leg-supporting position as the chair moves from the intermediate, tilted sitting position of FIG. 11 to the fully reclined or completely relaxation position of FIG. 12.

A mounting arrangement, generally designated by the reference numeral 328, is provided for guiding the back-rest 322 and the seat 324 during the first and second movement phases, which arrangement includes a first linkage for guiding the body-supporting means for movement from the sitting position to the intermediate, tilted sitting position and a second linkage for guiding the body-supporting means for movement from the intermediate, tilted sitting position to the reclining position.

The second linkage includes a carrier link or plate 330 which is movably mounted on the support 312. The carrier link remains stationary during the first movement phase as may be appreciated by progressively inspecting FIGS. 10 and 11, and moves relative to the support during the second movement phase as may be appreciated by inspecting FIGS. 11 and 12. At its front end, the carrier link 330 is mounted on the support 312 by a front guiding linkage which includes first and second guiding links 332, 333 which are arranged substantially parallel and a connecting link 337 which extends across one end of the front

guiding links 332, 333. The front guiding links 332, 333 have respective pivotal mounts 334, 335 on the support 312 with pivotal connections 339, 341 to the connecting link 337. The front guiding links 332, 333 and the connecting link 337 intermediate the pivotal connections 339, 341 provide a four-bar front guiding linkage for the carrier link or plate 330. The connecting link 337 has a pivotal connection 336 at its upper end to the carrier link or plate 330. The second linkage further includes a pin and slot interconnection intermediate the rearward end of the carrier link or plate 330 and the support. Specifically a stationary pin 338 is mounted on the support and is confined within an elongated slot 340 provided in a carrier link 330, with the stationary pin 338 normally being seated at the upper end of the slot 340. During the second movement phase, the carrier link 330 is displaced relative to the support such that the slot 340 translates relative to the pin 338 and at the end of the second movement phase the stationary pin 338 is seated at the lower end of the slot, as shown in FIG. 12. It will of course be appreciated that the pin and slot interconnection 338, 340 can be replaced by an equivalent rear guiding link.

The seat 324 carries a rearwardly directed hanger 344 upon which the back-rest 322 is pivotally mounted at a back-rest pivot 346. The back-rest carries a depending bracket or extension 358 which is coupled via a back-rest link 360 to one of the movable links of the second movement phase linkage. Specifically the second movement phase linkage includes an actuating linkage having a front guiding double arm lever 362 having a pivotal mount 364 intermediate its ends on the support with one arm thereof being connected to the carrier link 330 via a connecting link 366 having a pivotal connection 368 at one end thereof to the carrier link 330 and a pivotal connection 370 at the other end thereof to the double arm lever 362. The other arm of the double arm lever 362 is coupled via a further connecting link 372 which has a pivotal connection 374 at the forward end thereof to the arm of the double-arm lever 362 and a pivotal connection 376 at the rearward end thereof to a rear guiding link 378 having a pivotal mount 380 on the support. The back-rest link 360 has a pivotal connection 382 at one end thereof to the depending bracket or extension 358 of the back-rest and a pivotal connection 376 at the other end thereof to the rear guiding link 378 and the connecting link 372. The back-rest link 360 serves during the second movement phase to transmit motion from the back-rest via the second movement actuating links 362, 372, 378 to the rest of the second movement phase linkage, as will subsequently be described.

Built onto the second linkage is the first linkage, the second linkage serving as a stationary support therefor in the first movement phase. The seat 324 is included as a movable link of the first movement linkage and is pivotally mounted at the front end on the plate 330 at the pivot 350.

As is seen in FIG. 10 the depending extension 358 and the back-rest link 360 are arranged to provide a toggle linkage mechanism serving as a rear guide means for the first movement phase linkage. The rear guiding toggle linkage mechanism is actuated in response to a small reclining movement of the back-rest 322 about the back-rest pivot 346 which small reclining movement causes the pivot 382 serving as a knee pivot between the toggle links 358, 360 to move through a forward arc out of the position of alignment with the back-rest pivot 346 and the pivotal connection 376, as may be appreciated by progressively inspecting FIGS. 10 and 11. A stop 384 is provided to preclude movement of the toggle linkage in the reverse direction out of the position illustrated in FIG. 10. A spring 381 is connected to the toggle linkage to normally hold the back-rest in the upright position shown in FIG. 10.

In this illustrative embodiment the leg-rest 326 is mounted directly on the seat 324 by a leg-rest hanger 386 rigid therewith and having a pivotal mount 388 at its upper end on the seat 324. The leg-rest 326 is actuated by the provision of a double-arm actuating lever 390 which is pivoted on the carrier link 330 at the pivotal mount 392. The short arm of the double-arm lever 390 is coupled to the seat 324 by a connecting link 394 which has a pivotal connection 396 at its lower end to the double-arm lever 390 and a pivotal connection 398 at its upper end to the seat 324. The longer arm of the double-arm lever 390 is coupled to the leg-rest by a further connecting link 400 which has a pivotal connection 402 at its rearward end to the double-arm lever 390 and a pivotal connection 404 at its forward end to the hanger arm 386 for the leg-rest 326.

Appropriate stops are provided to establish the intermediate, tilted sitting position of FIG. 11 and the fully reclined position of FIG. 12. As seen in FIG. 2 a stop 406 is mounted on the carrier link 330 to abut the undersurface of the seat when the toggle linkage 358, 360 has collapsed to lower the rearward portion of the body-supporting means to thereby establish the intermediate, tilted sitting position. The fully reclined position in turn is established by the rear cross brace of the frame coming into contact with the back-rest as shown in FIG. 12.

For a better understanding of this embodiment of the invention reference will be made to a typical sequence of operations:

When the chair occupant is seated in the chair 310 and leans against the back-rest 322 the knee pivot 382 of the toggle linkage mechanism 358, 360 which serves as a rear guide means for the first movement phase linkage moves through a forward arc which causes the toggle linkage to rapidly lower the rearward portion of the body-supporting means, with the seat 324 turning about its pivotal mount 350 on the carrier link 330. Incident to such turning movement of the seat 324 about its relatively stationary pivotal connection 350 to the carrier link 330, the connecting link 394 tends to turn the arm 390 of the double-arm lever intermediate the pivots 392, 394 in a clock-wise direction, causing the arm of the double-arm lever 390 intermediate the pivots 392, 402 to swing through an upward and forward arc moving the leg-rest to the elevated leg-supporting position. Such movement continues until the seat 324 contacts the stop 406 on the carrier link whereupon the seat becomes a unitary assembly with the carrier link 330 for all intents and purposes.

To initiate the second movement phase the chair occupant leans further against the back-rest which causes the back-rest 322 to turn about the back-rest pivot 346 whereupon the links 362, 378 are turned in the clockwise direction about their respective pivotal connections 364, 380 as may be appreciated by progressively inspecting FIGS. 11 and 12. Such movement is coupled to the carrier link 330 via the connecting link 366 which causes the carrier link to move relative to the support, with the carrier link being guided in its movement by the four-bar guiding linkage provided at the forward end thereof and the pin and slot interconnection 338, 340 provided at the rearward end thereof. Such movement continues until such time as the slot 340 translates to a position wherein the pin 338 is seated at the lower end thereof.

From the foregoing it will be appreciated that there is provided in accordance with the present invention reclining chairs suitable for accommodating a chair occupant in a tilted-back position in a sitting attitude with the occupant's leg supported on an elevated leg-rest and for further accommodating the chair occupant in a full and complete relaxation position wherein the angle between the seat and back-rest is increased to comfortably accommodate the occupant in a stretched out or fully reclined attitude.

A latitude of modification, change and substitution is intended in the foregoing disclosure and in some in-

stances 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 comprising a support, body-supporting means including a back-rest and seat adapted to be mounted on said support for reclining and inclining movement respectively, and means movably mounting body-supporting means on said support for a first movement phase from a sitting position to an intermediate, tilted sitting position during which there is no appreciable relative angular displacement between said back-rest and seat and for a second movement phase from said intermediate, tilted sitting position to a reclining position during which said back-rest is angularly displaced relative to said seat, the mounting means including a first linkage for guiding said body-supporting means for movement from said sitting position to said intermediate, tilted sitting position and a second linkage for guiding said body-supporting means for movement from said intermediate, tilted sitting position to said reclining position, said first linkage being mounted on said second linkage, said second linkage including said support as a stationary link thereof, a carrier link, and pivotally interconnected movable links including second linkage connecting means movably mounting said carrier link on said support, said first linkage being mounted on said second linkage with said carrier link serving as a relatively stationary support therefor during said first movement phase, said first linkage including pivotally interconnected movable links including said seat and first linkage connecting means serving as front and rear guiding means movably mounting said seat on said second linkage, and means including a back-rest link pivotally connecting said back-rest to one of said movable links of said second linkage.

2. A reclining chair according to claim 1 wherein said second linkage connecting means includes a front guiding link having a front pivotal mount on said support and a rear guiding link having a rear pivotal mount on said support.

3. A reclining chair according to claim 1 wherein said second linkage connecting means includes a guiding linkage including said support as a stationary link thereof.

4. A reclining chair according to claim 1 wherein said first linkage connecting means includes a front guiding link pivotally connected between said seat and said carrier link and a rear guiding link pivotally connected between said seat and said carrier link.

5. A reclining chair according to claim 1 wherein said first linkage connecting means includes front guiding means and a toggle linkage serving as a rear guide means.

6. A reclining chair according to claim 1 wherein said first linkage connecting means includes front guide means and a straight line linkage mechanism serving as a rear guide means.

7. A reclining chair according to claim 1 wherein said first linkage connecting means includes means pivotally mounting said seat on said carrier link at a front pivotal mount and a toggle linkage mechanism including said back-rest as one toggle link and a back-rest link pivotally connected to said back-rest and one movable link of said second linkage as the other toggle link thereof.

8. A reclining chair comprising a support, body-supporting means including a back-rest and seat adapted to be mounted on said support for reclining and inclining movement respectively, and means movably mounting body-supporting means on said support for a first movement phase from a sitting position to an intermediate, tilted sitting position during which there is no appreciable relative angular displacement between said back-rest and seat and for a second movement phase from said intermediate, tilted sitting position to a reclining position during which said back-rest is angularly displaced relative to said seat, the mounting means including a first linkage for guiding said body-supporting means for movement from said sitting position to said intermediate, tilted sitting position and a second linkage for guiding said body-supporting means for movement from said intermediate, tilted sitting position to said reclining position, said first linkage mounted on said second linkage, said second linkage including said support as a stationary link thereof, a carrier link, and pivotally interconnected movable links including second linkage connecting links movably mounting said carrier link on said support, said first linkage being mounted on said second linkage with said carrier link serving as a relatively stationary support therefor during said first movement phase said first linkage including pivotally interconnected movable links including said seat, and first linkage connecting links serving as front and rear guiding means movably mounting said seat on said carrier link, means including a back-rest link pivotally connecting said back-rest to one of said movable links of said second linkage, a leg-rest, and means operatively connected to said leg-rest and said body-supporting means for moving said leg-rest to an elevated leg-supporting position in response to movement of said body-supporting means into said intermediate, tilted sitting position.

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