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MULTIPLE POSITION RECLINING CHAIR WITH EXTENDIBLE HEAD-REST

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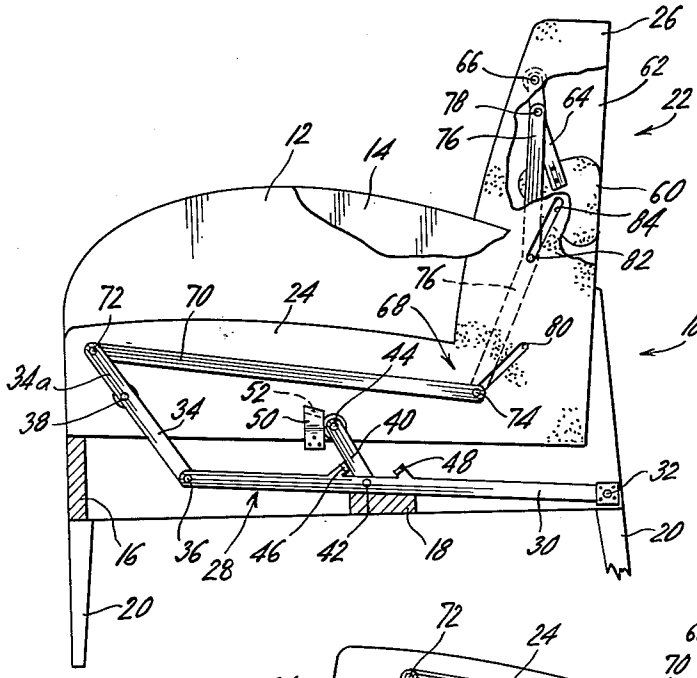

FIG. 1.

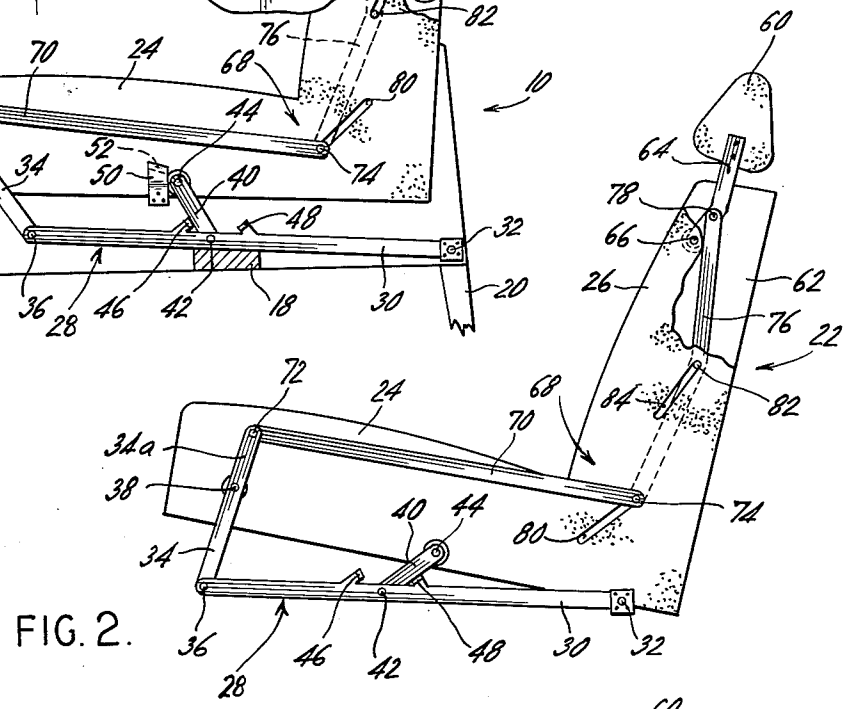

FIG. 2.

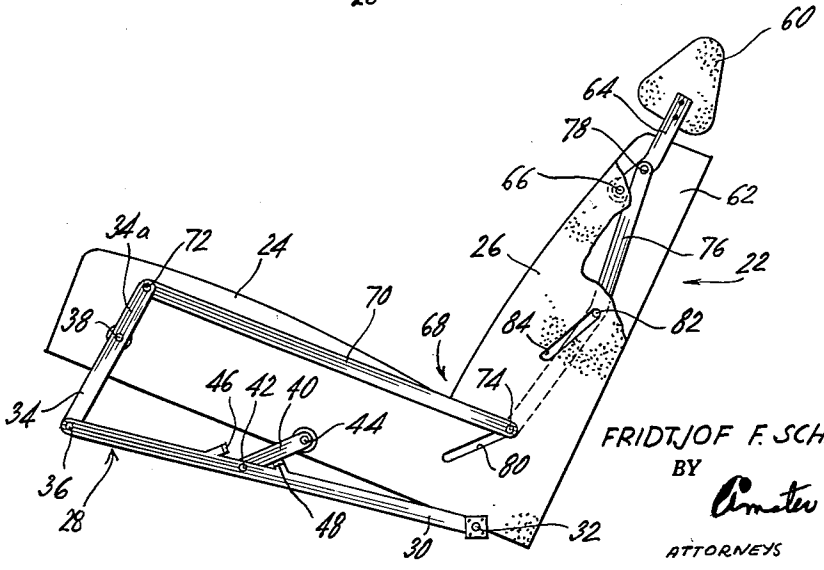

FIG. 3.

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This invention relates to improvements in reclining chairs and in particular relates to improved head-rest structure arrangement for reclining chairs of the multiple position type.

The usual multiple position reclining chair generally comprises a support frame and a body-supporting structure including a back-rest and seat mounted on the support frame for movement through a first motion phase from an upright sitting position to an intermediate position and then for further movement through a second motion phase to a fully tilted or reclining position. The means for mounting the body-supporting structure generally provides a pair of guide links mounted on the support frame or upon a member stationary relative to the support frame and connected to the front and rear portions of the seat, the guide links pivoting rearwardly during the first motion phase to carry the body-supporting structure to its intermediate position. Rearward movement of the guide links is then blocked at the intermediate position and the body-supporting structure turns about a fixed pivot during the second motion phase.

In multiple position chairs of this type, it is often necessary to provide a low back-rest because of styling requirements. At the same time, it is also required that the occupant's head be properly supported in the intermediate and fully tilted positions. For these reasons, it is advantageous to provide a separate head-rest which can extend upwardly above the top surface of the back-rest, acting as an extension of the back-rest to support the occupant's head in the tilted positions. The head-rest must be stored and concealed within the back-rest in the upright sitting position of the chair and means must be provided to operate in response to movement of the body-supporting structure to the intermediate position for raising the head-rest to an extended position. These means must be also capable of maintaining the head-rest in this extended position during the second motion phase when the body-supporting structure is brought to its fully tilted position.

It is an object of the present invention to provide a head-rest control arrangement of the type described which includes a minimum number of links so that it is extremely compact, inexpensive in manufacture and assembly, and can be incorporated within the relatively slim styling requirements of the chair parts.

Another object of the invention is to provide a head-rest control arrangement of the character described which is coupled with the guiding mechanism for the body-supporting structure so as to utilize the movement of such guiding mechanism in bringing the head-rest to its extended position during the first motion phase and maintaining the head-rest in the same extended position during the second motion phase.

In accordance with an illustrative embodiment demonstrating features and advantages of the present invention, there is provided a multiple-position reclining chair including a body-supporting structure mounted for movement upon the pair of guide links, the guide links turning rearwardly during the first motion phase to carry the body-supporting structure from an upright sitting position to an intermediate, tilted sitting position and then are blocked at the latter position so that further movement of the body-supporting structure is constrained to

turning movement about a pivot fixed relative to the support frame with the guide links maintaining a fixed relationship to the body-supporting structure during this second motion phase. The chair also includes a head-rest structure pivotally mounted on the back-rest for movement between a retracted and extended position and control means for moving the head-rest between these two positions. The control means comprises an extension of one of the guide links, and actuating link connected to said extension and extending rearwardly along the seat, a drive link connecting said actuating link to said head-rest structure, and means, preferably in the form of pin-and-slot couplings, for guiding the upward movement of the drive link in such a manner as to move the head-rest from its retracted to its extended position when the drive link is moved by said guide link extension through the actuating link during the first motion phase.

The above brief description, as well as additional objects, features and advantages of the present invention will be more fully appreciated by referring to the following detailed description of a preferred embodiment of the invention when taken in connection with the accompanying drawings in which:

FIG. 1 is a side elevational view with parts broken away and shown in section of a reclining chair incorporating the head-rest control arrangement of the present invention, the chair being shown in an upright sitting position with the head-rest in its retracted position;

FIG. 2 is a side elevational view similar to FIG. 1, but showing the chair in its intermediate, tilted sitting position with the head-rest in its extended head-supporting position and with the structure of the support frame omitted for convenience of illustration;

FIG. 3 is a side elevational view similar to FIG. 2 but showing the chair in a fully tilted or reclining position with the head-rest maintained in its extended head-supporting position.

Referring in detail to the drawings, there is shown a reclining chair of the multiple position type incorporating the head-rest actuating arrangement of the invention. The chair comprises a support frame designated generally by the numeral 10 and including a pair of spaced side frames 12 and 14 interconnected by cross-bars or braces such as the cross-bars 16 and 18. The frame 10 is supported above the floor level by legs 20.

The chair also includes a body-supporting unit generally designated by reference numeral 22 and comprising a rigidly-formed seat 24 and back-rest 26. The body-supporting unit 22 is movably mounted on the support frame 10 by a seat control linkage, generally designated by reference numeral 28, which guides the unit through a first motion phase to the intermediate, tilted sitting position shown in FIG. 2 and then through a second motion phase to the fully-tilted or reclining position shown in FIG. 3.

The seat control linkage 28 includes a carrier member 30 and a pair of guide links 34 and 40. The carrier member 30 is disposed below the seat 24 and is mounted at its rear end on the support frame 10 by pivot 32. The front guide link 34 is mounted by pivot 36 on the forward end of carrier member 30 and is connected by pivot 38 to the forward end portion of seat 24. The rear guide link 40 is mounted by pivot 42 on an intermediate portion of the carrier member 30, and at its upper end is connected to seat 24 by pivot 44 at a point on the seat spaced rearwardly of pivot 38.

In the upright sitting position of the chair shown in FIG. 1, the carrier member 30 extends forwardly and substantially horizontally from its pivotal mount 32, resting immovably upon the cross-bar 18, so that it in effect

constitutes a temporarily fixed portion of the support frame **10**. The front and rear guide links **34** and **40** extend forwardly and upwardly from their respective pivotal mounts **36** and **42** on the carrier member **30** to support the seat **24** in the upright sitting position of FIG. 1. The rear guide link **40** in this position rests upon an abutment provided by an extension **46** of the carrier member **30**, this extension **46** preventing the guide links from pivoting forwardly under weight of the chair occupant.

When the occupant of the chair wishes to assume a more relaxed position, he leans rearwardly against the body-supporting unit **22**, causing the guide links **34** and **40** to turn rearwardly about their respective pivotal mounts **36** and **42** on the stationary carrier member **30**. In this first motion phase, the body-supporting unit **22** is carried rearwardly by the guide links and is slightly tilted. The first motion phase terminates by engagement of the rear guide link **40** with a rigid projection **48** on the carrier member **30**, the body-supporting unit **22** being then disposed in the intermediate, tilted sitting position of FIG. 2.

When the occupant then wishes to assume a more reclined position for further relaxation, he applies further rearward pressure against the body-supporting unit **22**. The guide links **34** and **40** can no longer turn rearwardly relative to the carrier member **30** and further rearward movement of the unit is now provided by pivoting movement of said carrier member about its pivotal mount **32** on the support frame. The carrier member **30** thus turns upwardly and rearwardly about its pivotal mount **32**, rising from the cross-bar **18**, and carrying the body-supporting unit **22** through a second motion phase from the intermediate position of FIG. 2 to the fully-tilted or reclined position of FIG. 3. During this second motion phase, the body-supporting unit **22** is rigidly coupled to the carrier member **30** by engagement of the rear guide link **40** with the projection or stop **48**. The fully-tilted position is established by engagement of the carrier member **30** with the lateral flange **52** of a bracket **50** affixed to the support frame **10**.

The chair also includes a retractable head-rest **60** and an actuating linkage **68** for moving the head-rest from a retracted position to an extended, head-supporting position during the first motion phase, and for maintaining the head-rest in its extended position during the second motion phase.

The head-rest **60** is carried by a bar or arm **64**, the free end of which is mounted on the back-rest **26** by pivot **66**. In the upright sitting position of the chair shown in FIG. 1, the arm **64** depends from its pivotal mount **66** and the head-rest is contained within a hollow recess **62** in the rear upper central portion of the back-rest **26**. In this retracted position, the head-rest **60** is fully contained in said recess **62** and is concealed therein. The arm **64** is adapted to turn upwardly about the pivot **66** to raise the head-rest **60** through an angle of nearly 180° to the extended head-supporting position of FIGS. 2 and 3. In this position, the head-rest **60** is spaced above the top edge of the back-rest **26** and its forward surface is oriented with the forward surface of the back-rest to support the head of the occupant. To permit such pivoting movement, the top end of the back-rest **26** is provided with a slot communicating with recess **62** and of sufficient width to provide clearance for the arm **64** as it moves to its upright position.

The actuating linkage **68** includes a rigid extension **34***a* of the front guide link **34**, an actuating link **70** and a drive link **76**. The front guide link extension **34***a* projects upwardly beyond the pivotal connection **38** of the front guide link **34** with seat **24**. The upper or free end of extension **34***a* is connected by pivot **72** to the forward end of actuating link **70**. The latter extends rearwardly and substantially longitudinally of the seat, and at its rear end is connected by pivot **74** to the lower end of drive link **76**, the latter extending upwardly along the back-rest **26**. The upper end of drive link **76** is connected by pivot **78** to the arm **64** carrying head-rest **60** at an intermediate point closely spaced from the pivotal mount **66** of said arm **64**.

The pivot **74** is in the form of a pin or stud and extends slidably within a slot **80** in the body-supporting unit **22**. At an intermediate point thereon, the drive link **76** carries a second pin or stud **82** which extends slidably within a slot **84** in the back-rest **26**. The slots **80** and **84** are inclined upwardly and rearwardly to guide movement of the drive link **76** when the latter is moved by actuating link **70**, and to cause said drive link **76** to move upwardly or longitudinally along the back-rest **26**.

In the upright sitting position of FIG. 1, the pins or studs **74** and **82** are located at the bottom ends of the respective slots **80** and **84**, so that the drive link **76** is in its lowermost position. The head-rest **60** is in its retracted position within the back-rest recess **62**, and the arm **64** extends downwardly from its pivotal mount **66** and rearwardly of drive link **76**. The pivot **78** is located below and slightly to the rear of said pivotal mount **66**.

As the body-supporting unit **22** is moved rearwardly during the first motion phase, the front guide link **34** turns rearwardly about its pivotal mount **36** on the stationary carrier member **30** and its extension **34***a* turns rearwardly about pivot **38**, the extension **34***a* moving rearwardly a greater distance than the seat **24**. The extension **34***a* thus thrusts the actuating link **70** rearwardly along the seat **24** and the rear end of actuating link **70** is moved upwardly by the action of pin or stud **74** in slot **80**. The lower end of the drive link **76** is thus moved upwardly and slightly rearwardly, and the pin **82** also moves upwardly in the slot **84** to further guide the drive link **76**.

As the drive link **76** is moved during the first motion phase, it exerts an upward and rearward force upon the headrest arm **64** at pivot **78**, causing the arm **64** to turn about its pivotal mount **66**. At the intermediate position of FIG. 2, the pins **74** and **82** are located at the upper ends of the respective slots **80** and **84**, and the drive link **76** is in its uppermost position. The head-rest arm **64** has been turned through an angle of almost 180° and the head-rest **60** is located in its extended position spaced above the top edge of the back-rest **26**.

During the second motion phase, the front guide link **34** rises with the seat **24** and the carrier member **30** so that it does not turn about pivot **38**. Consequently, the front guide link extension **34***a* maintains a fixed position relative to the seat **24** as does carrier member **30**, actuating link **70**, drive link **76** and head-rest **60**. The head-rest **60** therefore remains in its extended position during the second motion phase so that in the fully-tilted position of FIG. 3 it is in the same position relative to the back-rest **26** as it was in the intermediate position of FIG. 2.

When the chair occupant desires to restore the chair to the upright or sitting position, it is merely necessary to urge his or her weight forwardly and press against the leg-rest (not shown), and the chair will move through the reverse sequence of operations, with the head-rest remaining relatively stationary throughout the second movement phase and until such time as the intermediate tilted sitting position is established. However, in response to the reverse movement through the first movement phase, the head-rest will swing rearwardly relative to the back-rest and be restored to the stored position illustrated in FIG. 1.

While a preferred embodiment of the invention has been shown and described herein, it is obvious that numerous omissions, changes, and additions may be made in such embodiment without departing from the spirit and scope of the invention.

What I claim is:

1. A head-rest control arrangement for a multiple position reclining chair including a support frame, a seat

and back-rest structure, a carrier member pivotally mounted on the support frame, a front and rear guide link pivotally mounted on the carrier member and pivotally connected to spaced points on the seat for movement of the seat and back-rest structure through a first motion phase in which both guide links turn rearwardly to bring the seat and back-rest structure from an upright sitting position to an intermediate tilted sitting position, and then through a second motion phase in which rearward turning movement of the front and rear guide links is blocked and the carrier member turns about its pivotal mount on the support frame to move the seat and back-rest structure to a fully tilted position, and a head-rest structure; said head-rest control arrangement comprising means pivotally mounting the head-rest structure on the upper end portion of the back-rest for movement from a retracted position within a recess in the rear surface of the back-rest to an extended position above the top edge of the back-rest and substantially aligned with the forward surface thereof, a drive link operatively connected to the head-rest structure and extending downwardly along the back-rest, an actuating link connected to the free end of the drive link, an extension of the front guide link projecting beyond the pivotal connection of the front guide link with the seat, said extension being connected to the free end of the actuating link and adapted to move said actuating link when said guide links turn during the first motion phase, and means for guiding the drive link in an upward and rearward direction for moving the head-rest structure to its extended position when the drive link is moved by said actuating link during the first motion phase, said guide link extension maintaining a fixed position relative to the body-supporting structure during the second motion phase, whereby the head-rest structure is maintained in its extended position.

2. A head-rest control arrangement according to claim 1 in which the head-rest structure includes an arm secured to said head-rest and projecting longitudinally therefrom and the means mounting the head-rest structure in the back-rest includes a pivot mounting said arm on the upper forward portion of the back-rest.

3. A head-rest control arrangement according to claim 2 in which said drive link is pivotally connected to said arm at a point proximate to the pivotal mount of the arm on the back-rest, said arm depending from said pivotal mount in the retracted position of the head-rest structure and extending upwardly from said pivotal mount in the extended position of the head-rest structure.

4. A head-rest control arrangement according to claim 1 in which the guide means for said drive link comprises at least one pin carried by said drive link and an upwardly and rearwardly-inclined slot in said back-rest slidably receiving said pin.

5. A head-rest control arrangement according to claim 1 in which the guide means for said drive link comprises a first pin at the pivotal connection between said drive link and said actuating link, a second pin at an intermediate point on said drive link and a pair of upwardly and rearwardly-inclined slots respectively receiving said pins for sliding movement therein.

6. A head-rest control arrangement for a multiple position reclining chair including a support member, a seat and back-rest structure, a carrier member pivotally mounted on the support member, a front guide link pivotally mounted on said carrier member and a rear guide link pivotally mounted on one of said members, said front and rear guide links being pivotally connected to spaced points on the seat for movement of the seat and back-rest structure through a first motion phase in which both guide links turn rearwardly to bring the seat and back-rest structure from an upright sitting position to an intermediate, tilted sitting position, and then through a second motion phase in which rearward turning movement of the front and rear guide links is blocked and the carrier member turns about its pivotal mount on the support frame to move the seat and back-rest structure to a fully tilted position, and a head-rest structure; said head-rest control arrangement comprising means pivotally mounting the head-rest structure on the upper end portion of the back-rest for movement from a retracted position within the back-rest to an extended position above the top edge of the backrest and substantially aligned with the forward surface thereof, a drive link operatively connected to the head-rest structure and extending downwardly along the back-rest, an actuating link connected to the free end of the drive link, an extension of one of the guide links projecting beyond the pivotal connection of said one guide link with the seat, said extension being connected to the free end of the actuating link and adapted to move said actuating link when said guide links turn during the first motion phase, and means for guiding the drive link in an upward and rearward direction for moving the head-rest structure to its extended position when the drive link is moved by said actuating link during the first motion phase, said guide link extension maintaining a fixed position relative to the body-supporting structure during the second motion phase, whereby the head-rest structure is maintained in its extended position.

7. A head-rest control arrangement for a multiple position reclining chair including a support member, a seat and back-rest structure, a carrier member pivotally mounted on the support member, a front guide link pivotally mounted on said carrier member and a rear guide link pivotally mounted on one of said members, said front and rear guide links being pivotally connected to spaced points on the seat for movement of the seat and back-rest structure through a first motion phase in which both guide links turn rearwardly to bring the seat and back-rest structure from an upright sitting position to an intermediate, tilted sitting position, and then through a second motion phase in which rearward turning movement of the front and rear guide links is blocked and the carrier member turns about its pivotal mount on the support frame to move the seat and back-rest structure to a fully tilted position, and a head-rest structure; said head-rest control arrangement comprising means pivotally mounting the head-rest structure on the upper end portion of the back-rest for movement from a retracted position within a recess in the rear surface of the back-rest to an extended position above the top edge of the back-rest and substantially aligned with the forward surface thereof, a drive link operatively connected to the head-rest structure and extending downwardly along the back-rest, an actuating link connected to the free end of the drive link, an extension of the front guide link projecting beyond the pivotal connection of the front guide link with the seat, said extension being connected to the free end of the actuating link and adapted to move said actuating link when said guide links turn during the first motion phase, and means for guiding the drive link in an upward and rearward direction for moving the head-rest structure to its extended position when the drive link is moved by said actuating link during the first motion phase, said guide link extension maintaining a fixed position relative to the body-supporting structure during the second motion phase, whereby the head-rest structure is maintained in its extended position.

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