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LEG-REST AND LEG-REST CONTROL MEANS FOR RECLINING CHAIR

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FIG. 1.

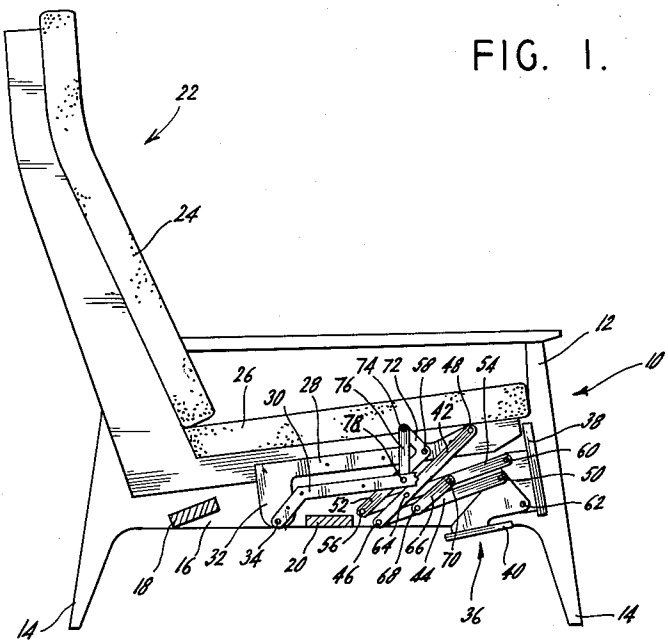
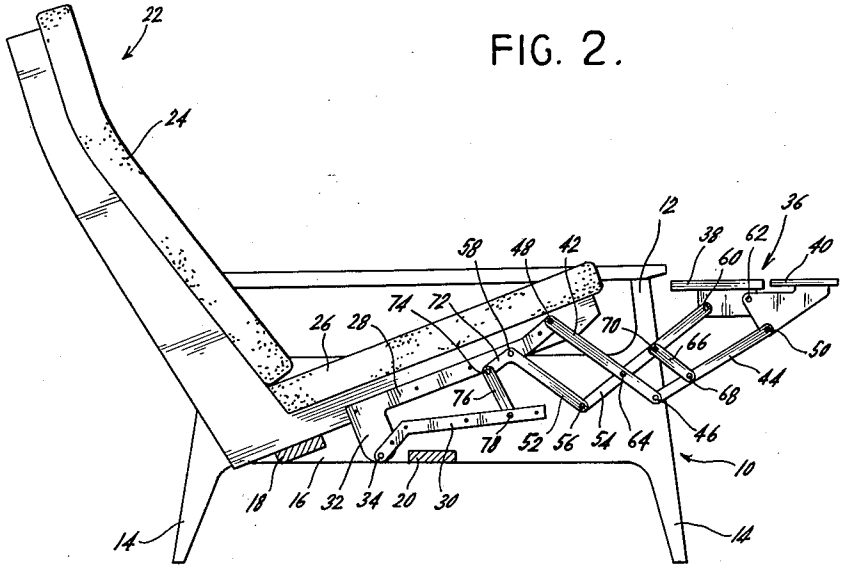


FIG. 2.



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LEG-REST AND LEG-REST CONTROL MEANS FOR RECLINING CHAIR

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6 Claims. (Cl. 155—106)

The present invention relates to improvements in reclining chairs, and in particular to a novel and improved leg-rest structure for reclining chairs.

An important feature of reclining chairs is the provision of a leg-rest which will support the outstretched legs of the occupant while his body is supported in a in a reclining position. The leg-rest is controlled by a linkage connected to the body-supporting means for coordinated movement therewith in such a manner that when the body-supporting unit is moved from a sitting to a reclining position, the leg-rest is moved from a retracted position beneath the seat to an extended leg-supporting position spaced forwardly of the seat and substantially at the level thereof.

In accordance with modern styling it has become customary to provide reclining chairs with relatively high legs, and with large, open, visible space below the seat. Since the leg-rest must be made of sufficient length to support the feet and a considerable calf portion of the occupant's legs, the leg-rest would extend almost to the floor surface if it were disposed in a vertical position as is customary. This would defeat the styling of the high-leg chair and therefore in chairs of this type, it is the usual practice to provide an underslung type of leg-rest arrangement. In such underslung leg-rest arrangement, the retracted leg-rest is disposed in a substantially horizontal position, closely spaced from the under surface of the seat and located above the legs of the chair so that the space beneath the seat is clear and unobstructed.

In accordance with the present invention there is provided in a chair of the high-leg type, a split leg-rest formed of a main leg-rest portion which, when retracted, is disposed in a vertical position and an auxiliary portion which is disposed in a horizontal or underslung retracted position. A leg-rest control linkage is also provided to move the leg-rest portions to an extended position in which they are in planar alignment forwardly of the seat and together form a completed leg-rest of the proper size to support the legs of the occupant.

It is an object of the invention to provide a leg-rest control linkage of the character described which is arranged and constructed to move the main leg-rest portion through an angle of substantially 90° from its retracted to its extended position, while at the same time moving the leg-rest extension through an angle of 180°.

Another object of the invention is the provision of a leg-rest and control arrangement of the character described in which a split, hinged leg-rest is provided, the separate leg-rest portions being angularly disposed in the retracted position and being brought into alignment in the extended position.

Additional objects and advantages of the invention will become apparent during the course of the following specification 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 improved leg-rest and control linkage of the invention, the chair being shown in its upright sitting position; and

Fig. 2 is a side elevational view similar to Fig. 1, but showing the chair in its reclining position and the leg-rest extended.

Referring in detail to the drawings, the invention is shown incorporated in a reclining chair of the "high-leg" type. The chair comprises a support frame, designated generally by the reference numeral **10**, which includes open side frames **12** mounted on high legs **14** and having side panels **16**. The side frames **12** are spaced from each other and are joined by cross bars on braces **18** and **20** which connect the side panels **16**.

The chair also includes a body-supporting unit, designated generally as **22**, which comprises a back-rest **24** and a seat **26** formed rigidly with each other to constitute the rigid unit **22**. The body-supporting unit **22** is mounted on the support frame **10** for tilting movement between the upright sitting position shown in Fig. 1 and the reclining position shown in Fig. 2. For this purpose, each side of the seat **26** carries a fixed metal bar **28**, and a metal bracket **30** is similarly affixed to each side panel **16** of the support frame **10**. Each bar **28** has a depending extension **32** at its rear end which is mounted on the adjacent bracket **30** by a pivot **34**.

The chair also includes a leg-rest, designated generally by the reference numeral **36**, which is made of two hinged parts **38** and **40**. The portion **38** constitutes the main leg-rest section, while the portion **40** constitutes an auxiliary leg-rest section or front extension. The leg-rest **36** mounted by a control linkage on the forward end portion of the seat **26** for movement between a retracted position, shown in Fig. 1, and an extended position shown in Fig. 2. The control linkage is formed in two identical sections located on opposite sides of the seat, although only one linkage section is shown in the drawings and, for convenience, only one of the identical sections will be described.

The leg-rest control linkage includes a first pair of links constituting a first link **42** and a second link **44** interconnected at their ends by a pivot **46**. The first link **42** is mounted by pivot **48** on the forward end of bar **28**, which is affixed to the seat **26**. The second link **44** is connected by pivot **50** to the auxiliary section **40** of the leg-rest **36**.

The leg-rest control linkage also includes a second pair of links constituting a third link **52** and a fourth link **54**, interconnected at their ends by a pivot **56**. The free end of the third link **52** is mounted by pivot **58** on the seat bar **28** at a point spaced rearwardly of the pivot **48**. The free end of the fourth link **54** is connected by pivot **60** to the main leg-rest section **38**.

The leg-rest sections **38** and **40** are connected together by a pivot **62** which joins the forward end of the main section **38** with the rear end of the auxiliary section **40**.

The first link **42** crosses over the fourth link **54** and these links are pivotally interconnected at their crossing over points by a pivot **64**. The second and fourth links **44** and **54** are joined at intermediate points by a control link **66**. One end of this control link **66** is connected by pivot **68** to the link **44**, while the other end of control link **66** is connected by pivot **70** to the link **54**.

It will thus be observed that the leg-rest control linkage is formed by a pair of links **42**, **52** carried by the seat, and a pair of links **44**, **54** carrying the leg-rest **36**. These links, together with control link **66** form two joined quadrilateral linkages. One of these quadrilateral linkages is formed by link **52**, the portion of link **42** between pivots **48** and **64**, the portion of link **54** between pivots **56** and **64**, and the portion of the seat **26** and its bar **28** between pivots **48** and **58**. The other quadrilateral linkage is formed by link **66**, the portion of link **54** be-

tween pivots 64 and 70, the portion of link 42 between pivots 46 and 64, and the portion of link 44 between pivots 46 and 68. The ends of links 44 and 54 are extensions of this latter quadrilateral linkage, connected to the leg-rest 36.

Means are provided to actuate the leg-rest control linkage and thereby move the leg-rest 36 between its retracted and extended positions. Such actuating means includes an angular extension 72 of the link 52, which extension projects beyod the pivotal mount 58 of link 52 on the seat 26. The extension 72 is connected by pivot 74 to one end of an actuating link 76, the other end of which is mounted by pivot 78 on the bracket 30 which is a fixed part of support frame 10.

In the upright sitting position of the chair shown in Fig. 1, the actuating link 76 extends substantially vertically upward from its pivotal mount 78 on the support frame, and the link extension 72 is upwardly and rearwardly inclined. The pair of seat links 42 and 52 are closely spaced from each other and extend in a rearward and downward direction from the seat 26, and the pair of leg-rest links 44 and 54 are also closely spaced from each other. The ends of said links 44 and 54 carrying the pivots 50 and 60 are proximate to each other and the leg-rest 36 is held in the retracted position of Fig. 1. In this retracted position, the main leg-rest section 38 extends downwardly in a substantially vertical posi ion from the front end of the seat 26, while the auxiliary section 40 is disposed perpendicularly to the main section 38 and in a substantially horizontal position spaced beneath the seat 26. The leg-rest auxiliary section 40 is thus effectively concealed by the frame side panels 16, and the main section 38 extends downwardly between the front edge of the seat and the auxiliary section 40, concealing the linkage structure from the front of the chair. The open space, defined by the high legs 14 beneath the side panels 16, is clear and unobstructed by the leg-rest and its control linkage.

When the occupant of the chair in the sitting position of Fig. 1 wishes to assume a more relaxed position, he need merely shift his weight rearwardly against the backrest 24, causing the body-supporting unit 22 to tilt rearwardly about its pivotal mount 34. The body-supporting unit 22 thus tilts to the reclining position of Fig. 2 which is determined by engagement of the rear under surface of seat 26 with the frame cross bar 18.

During the rearward tilting movement of the body-supporting unit 22, the forward end of the seat moves upwardly, carrying with it the pairs of links 42 and 52. The extension 72 of link 52 is, however, restrained from upward movement by the actuating link 76 which is mounted on the support frame. In effect, therefore, the actuating link 76 pulls downwardly on the connected end of the extension 72, causing said extension and its integral link 52 to turn about the pivotal mount 58 on the seat. The leg-rest control linkage is therefore actuated, and moves upwardly and forwardly to carry the leg-rest 36 to its extended position of Fig. 2.

During extension of the leg-rest, the control link 66 constrains the movement of the pair of leg-rest links 44, 54, which is necessary because the ends of said links 44, 54 are flexibly coupled to each other by the hinged leg-rest sections 38 and 40. The control link 66 moves from an angular disposition between the links 44 and 54 (shown in Fig. 1) to a position substantially perpendicular to both links 44 and 54, as shown in Fig. 2. The ends of the links 44 and 54 connected to the leg-rest sections are therefore spread apart until, in the extended position of Fig. 2, they are relatively widely spaced from each other.

The link 54 moves upwardly and forwardly, carrying the main leg-rest section 38 to its extended position in which it is horizontally disposed and spaced forwardly of the leading edge of seat 26. The link 44 also carries the auxiliary leg-rest section 40 upwardly in the same manner, but the action of the control link 66 in spreading apart the ends of links 44, 64, further causes a rapid turning movement of the auxiliary section 40 about the pivot 62. Thus, while the main section 38 is turned through an angle of approximately 90° from its vertical position of Fig. 1 to the extended horizontal position of Fig. 2, the auxiliary section 40 is turned through an angle of approximately 180° from its inverted, horizontal underslung position of Fig. 1 to its extended position of Fig. 2. In the extended position, the two leg-rest sections 38 and 40 are in planar alignment, and together make up the completed leg-rest 36, which is of sufficient length to provide adequate support for the occupant's legs.

The action of the control link 66 may produce a toggle effect on the two leg-rest sections 38 and 40, inasmuch as said control link can cause the pivot 50 to turn in an arc of fixed radius about the pivot 60. The ends of the leg-rest links 44 and 54 carrying the pivots 50 and 60 are spread apart by the control link 66 until they are located in substantial alignment, and they are then held apart by said control link by a fixed distance. Thus, the leg-rest 36 has already been brought into an aligned, leg-supporting position during a large portion of the leg-rest movement toward its extended position.

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

What I claim is:

1. An improved leg-rest and control arrangement for use in a reclining chair having a support member and a body-supporting member including a seat and back-rest mounted on the support member for movement between an upright sitting position and a rearwardly-tilted position, said leg-rest and control arrangement comprising a leg-rest formed of a separate main section and auxiliary section hinged together for relative turning movement, and a control linkage for guiding the leg-rest from a retracted position beneath the seat to an extended position forwardly of the seat, said linkage including a pair of spaced links carrying said leg-rest and operatively mounted on one of said members, one of the links of said pair being pivotally connected to the main leg-rest section and the other link of said pair being pivotally connected to the auxiliary leg-rest section, means pivotally joining an intermediate portion of said pair of links and adapted to spread apart the ends of the links connected to the leg-rest, whereby to cause a wider turning movement of the auxiliary leg-rest section relative to the main section.

2. An improved leg-rest and control arrangement for use in a reclining chair having a support frame and a body-supporting unit including a rigidly-formed seat and back-rest mounted on the support frame for movement between an upright sitting position and a rearwardly-tilted position, said leg-rest and control arrangement comprising a leg-rest formed of a separate main section and auxiliary section hinged together for relative turning movement, a control linkage mounting the leg-rest on said seat and guiding the leg-rest from a retracted position beneath the seat to an extended position forwardly of the seat, and actuating means connected between the seat and support frame, and connected to the leg-rest control linkage for actuating said control linkage to move the leg-rest in response to movement of the body-supporting unit, said control linkage including a pair of spaced links carrying said leg-rest, one of the links of said pair of links being pivotally connected to the main leg-rest section and the other link of said pair being pivotally connected to the auxiliary leg-rest section, a control link pivotally joining an intermediate portion of the links of said pair, the pair of links being closely spaced in said retracted position to locate the main leg-rest section in a substantially vertical position beneath the seat and the

auxiliary leg-rest section in an inverted substantially horizontal position beneath the seat, the control link being adapted to spread apart said pair of links at their ends connected to the leg-rest, whereby to cause a wider turning movement of the auxiliary leg-rest section relative to the main section as the leg-rest is brought to its extended position, the auxiliary leg-rest section being turned to an upright horizontal position in planar alignment with the main leg-rest section.

3. An improved leg-rest and control arrangement for use in a reclining chair having a support member and a body-supporting member including a rigidly-formed seat and back-rest mounted on the support member for movement between an upright sitting position and a rearwardly-tilted position, said leg-rest and control arrangement comprising a leg-rest formed of a separate main section and auxiliary section hinged together for relative turning movement, and a control linkage for guiding the leg-rest from a retracted position beneath the seat to an extended position forwardly of the seat, said linkage including a first pair of links pivotally mounted at spaced points on one of said members, a second pair of links carrying said leg-rest, means connecting said pairs of links to coordinate the movement thereof, one of the links of said second pair of links being pivotally connected to the main leg-rest section and the other link of said second pair being pivotally connected to the auxiliary leg-rest section, a control link pivotally joining an intermediate portion of the links of said second pair and adapted to spread apart the second pair of links at their ends connected to the leg-rest, whereby to cause a wider turning movement of the auxiliary leg-rest section relative to the main section.

4. An improved leg-rest and control arrangement for use in a reclining chair having a support frame and a body-supporting unit including a rigidly-formed seat and back-rest mounted on the support frame for movement between an upright sitting position and a rearwardly-tilted position, said leg-rest and control arrangement comprising a leg-rest formed of a separate main section and auxiliary section hinged together for relative turning movement, a control linkage for guiding the leg-rest from a retracted position beneath the seat to an extended position forwardly of the seat, and means for actuating said control linkage to move said leg-rest in response to movement of said body-supporting unit, said control linkage including a first pair of links pivotally mounted at spaced points on said seat, a second pair of links carrying said leg-rest, means connecting said pairs of links to coordinate the movement thereof, one of the links of said second pair of links being pivotally connected to the main leg-rest section and the other link of said second pair being pivotally connected to the auxiliary leg-rest section, a control link pivotally joining an intermediate portion of the links of said second pair, said second pair of links being closely spaced in the retracted position of the leg-rest and holding the main leg-rest section in a substantially vertical retracted position beneath the seat and the auxiliary link in an inverted substantially horizontal position beneath the seat, the control link being adapted to spread apart the second pair of links at their ends connected to the leg-rest, whereby to cause a wider turning movement of the auxiliary leg-rest section relative to the main section as the leg-rest is brought to its extended position, the auxiliary leg-rest section being turned to an upright horizontal position in planar alignment with the main leg-rest section.

5. An improved leg-rest and control arrangement according to claim 4 in which said actuating means includes an extension of one of the first pair of links projecting beyond the pivotal mount of said one link on the seat, and an actuating link pivotally mounted on the support frame and connected to said extension.

6. An improved leg-rest and control arrangement according to claim 4 in which said control link is disposed at an acute angle between said second pair of links when said second pair are closely spaced in the retracted position of the leg-rest, the control link moving to a position in which it extends substantially at a right angle with said second pair of links in the extended position of the leg-rest, whereby to spread apart said second pair of links.

References Cited in the file of this patent

UNITED STATES PATENTS

1,111,685	Allison	Sept. 22, 1914
2,664,942	Spear	Jan. 5, 1954
2,693,845	Hoffman	Nov. 9, 1954
2,917,106	Belisle	Dec. 15, 1959
2,922,464	Belisle	Jan. 26, 1960

FOREIGN PATENTS

39,568	France	Nov. 30, 1931
149,468	Germany	Mar. 10, 1904