July 18, 1944. A. LORENZ ET AL 2,353,838

ADJUSTABLE RECLINING CHAIR

Filed Oct. 3, 1941 2 Sheets-Sheet 1

Fig. 1.

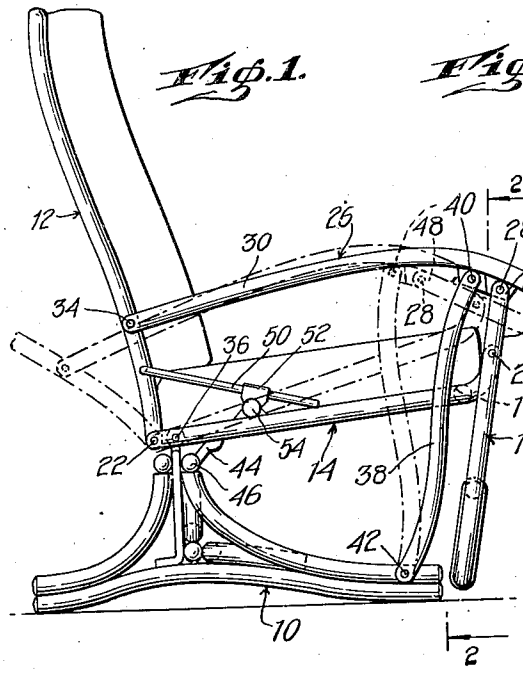


Fig. 2.

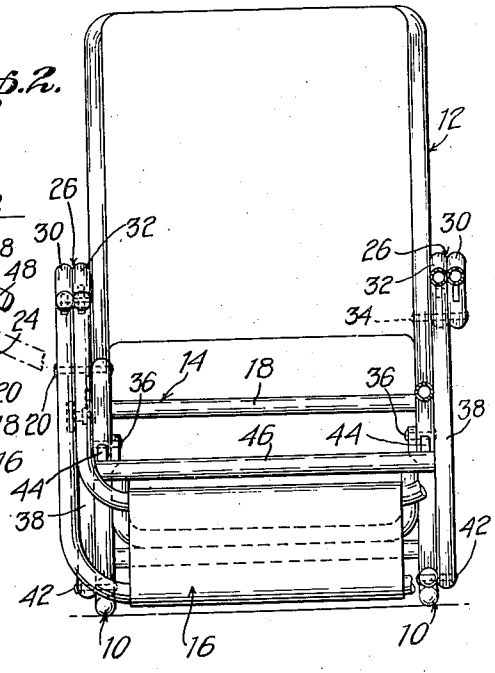


Fig. 3.

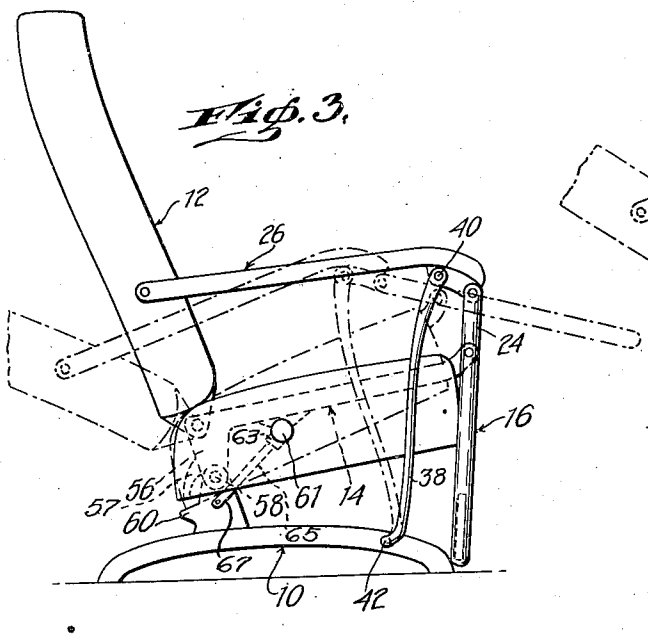
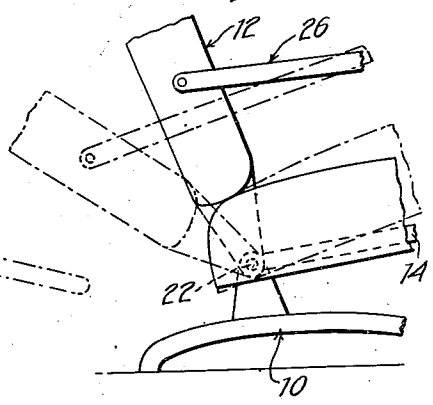


Fig. 4.



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Filed Oct. 3, 1941 2 Sheets-Sheet 2

Fig. 5.

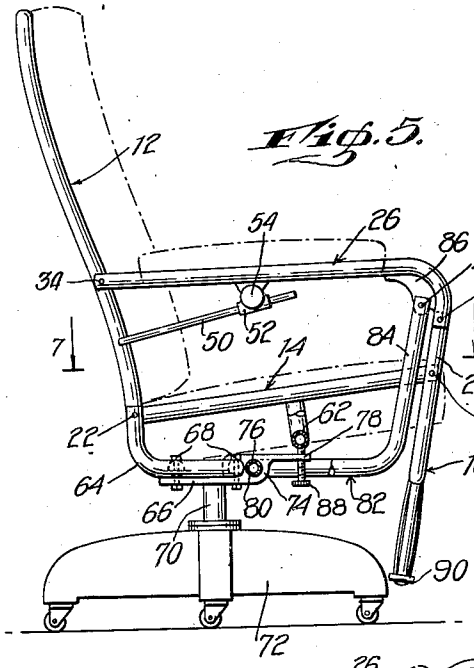


Fig. 8.

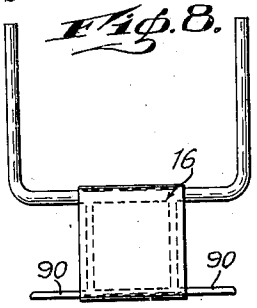


Fig. 9.

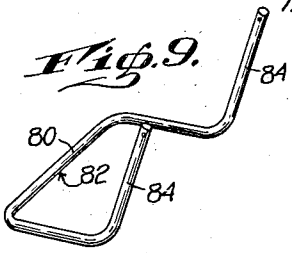
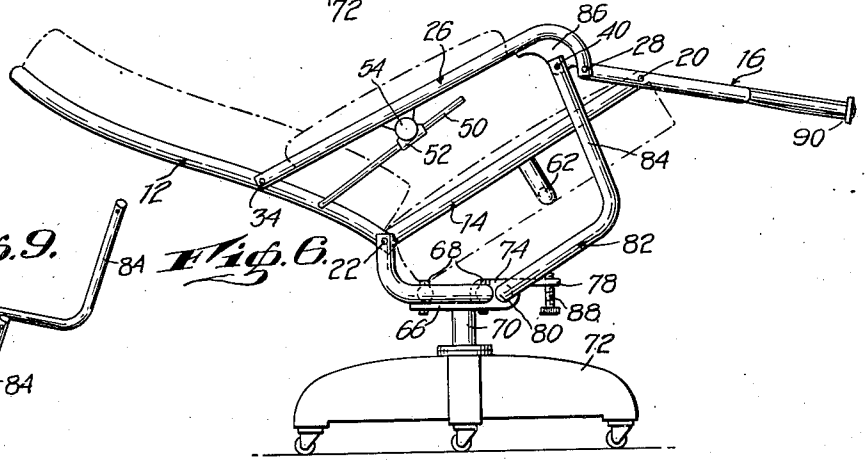


Fig. 6.



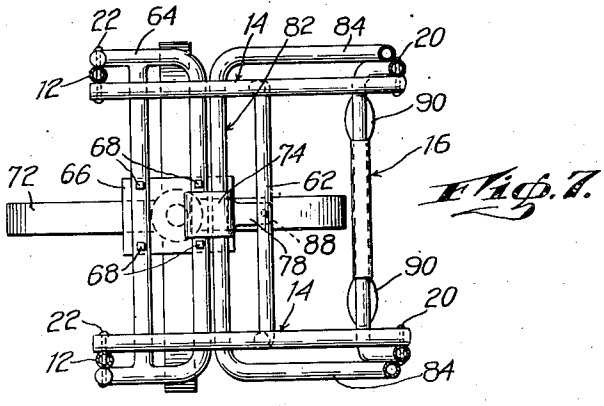


Fig. 7.

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ADJUSTABLE RECLINING CHAIR

Anton Lorenz, Chicago, Ill., and Hans Luckhardt, Berlin, Germany

Application October 3, 1941, Serial No. 413,398

15 Claims. (Cl. 155—106)

Our invention relates to an adjustable reclining chair, and more particularly to an adjustable reclining chair or the like with a polygonal structure formed by a back-rest a seat and connecting link-means pivotally interconnected with each other, wherein one point of the polygonal structure is pivoted to a support and at least one guiding link having its ends pivoted to the support and the polygonal structure respectively is provided for controlling the movements of the members of the polygonal structure during the adjustment of the reclining chair from one position into another one.

One object of our invention is to provide a reclining chair of above described type wherein the movable elements are arranged in such a way, that they are not moved or shifted immediately from the sitting position into a reclining position, when the user of the chair lets himself down on the chair rather heavily or suddenly.

Another object of our invention is to provide a reclining chair of above described type wherein the guiding links are substantially parallel to the leg-rest when the movable elements of the reclining chair are in the sitting position.

In order to carry out our invention into practice we provide a reclining chair or the like comprising: a support, a back-rest, a seat, a leg-rest, said seat extending between said back-rest and said leg-rest and being pivoted thereto, connecting link-means, one connecting link-means being arranged on each side of the chair, each of said connecting link-means including a short extension of the leg-rest and a long link hingedly connected with each other, the free end of said long link being pivoted to an intermediate point of the back-rest above the pivot point between the back-rest and the seat, said back-rest, said seat and said connecting link-means forming a polygonal structure having unequal sides, one point of said polygonal structure being pivoted to said support, and at least one guiding link, one end of said guiding link being pivoted to said support at a point below the seat, the other end of said guiding link being pivoted to said long link.

The above mentioned objects and advantages as well as other objects and advantages will be more fully disclosed in the following specification reference being had to the accompanying drawings forming part of this specification, wherein:

Fig. 1 is a side elevational view of a reclining chair according to our invention,

Fig. 2 is partly a front elevational view of the reclining chair and partly a sectional view of the reclining chair taken on line 2—2 of Fig. 1,

Fig. 3 is a side elevational view of a different embodiment of a reclining chair,

Fig. 4 is a fragmentary side elevational view of another embodiment of a reclining chair,

Fig. 5 is a side elevational view of a swivel chair according to our invention, the movable elements of the chair being in the sitting position,

Fig. 6 is a side elevational view of the swivel chair similar to that shown in Fig. 5, the movable elements of the chair, however, being in the reclining position,

Fig. 7 is a sectional view of the swivel chair taken on line 7—7 of Fig. 5,

Fig. 8 is a front view of the leg-rest of the swivel chair shown in Fig. 5, and

Fig. 9 is a perspective view of the guiding link of the swivel chair shown in Fig. 5.

Referring now to Figs. 1 and 2, 10 generally indicates the support of the reclining chair composed of a plurality of tubular elements arranged and connected with each other in a suitable manner. 12 generally indicates the back-rest, 14 generally indicates the seat, and 16 generally indicates the leg-rest.

The seat 14 extends between the back-rest 12 and the leg-rest 16 and is reinforced by a transverse rod 18. The front end of the seat is bent upwardly and is pivoted to the upper end of the leg-rest at 20. The rear end of the seat is pivoted to the back-rest at 22. Connecting link-means comprising a pair of a short extension 24 of the leg-rest 16 and a long link 26 hingedly connected with each other at 28 are arranged on either side of the chair. The short extension 24 forms an integral part of the leg-rest 16; if desired, however, the short extension could be made of a separate piece rigidly connected to the leg-rest. Each long link 26 comprises two tubular rods 30 and 32 arranged next to each other and forms an arm-rest of the chair. The front end of the long link 26 hinged to the extension of the leg-rest 16 is bent downwardly, and the rear end of the long link is pivoted to an intermediate point 34 of the back-rest 12. The back-rest 12, the seat 14 and the connecting link-means 24, 26 form a polygonal structure having unequal sides, the shortest side being the short extension 24 of the leg-rest forming a part of the connecting link-means.

One point of the polygonal structure 12, 14, 24, 26 is pivoted to the support 10 at an intermediate point 36 of the seat. If desired, however, the pivot point connecting the polygonal

structure with the support may be positioned in the back-rest instead of in the seat.

In order to obtain the various positions of the members of the polygonal structure swingably mounted at 36, the movement of the members of said polygonal structure must be controlled. For this purpose we provide a guiding link 38 on each side of the chair. One end of said guiding link 38 is pivoted to the long link 26 at 40 near the hinge connection 28 between the long link and the extension 24 of the leg-rest. The other end of said guiding link 38 is pivoted to the support 10 at the point 42 below the seat near the front end of the support, so that the guiding link is substantially parallel to the leg-rest when the movable elements of the chair are in the sitting position shown in full lines in Fig. 1. When the user of the chair moves the back-rest to the left (as seen in Fig. 1), the polygonal structure swings about the pivot point 36. During this swinging movement, the guiding link 38 controls the movement of the long link 26 and the members of the polygonal structure connected therewith. The guiding link 38 swings about the pivot 42 and guides the pivot point 40 of the long link 26 along a circular path. Thus, the leg-rest 16 is lifted and rotated about the pivot 20 and at the same time the front end of the seat 14 is lifted when the back-rest 12 is swung about the pivot 22 and is lowered. The dash and dot lines illustrate the extreme reclining position of the polygonal structure. The sitting position of the polygonal structure is limited by the stops 44 arranged on a transverse rod 46 of the support 10 for engagement with the seat, while the extreme reclining position of the polygonal structure is limited by the edge 48 in the front portion of the arm-rest 26, against which the extension 24 of the leg-rest may abut as shown in dash and dot lines.

The arrangement of the guiding links 38 as described above and the pivotal connection 42 thereof with the support 10 at a point below the seat 14 prevents an undesired movement of the polygonal structure from the sitting position into a reclining position, when the user of the chair lets himself down on the chair rather heavily.

In order to secure the sitting position or the reclining position or any intermediate position of the polygonal structure, a locking means is arranged on the chair. According to Figs. 1 and 2, for example, the locking means comprises a rod 50, a gripping sleeve 52 and a clamping screw 54. One end of the rod 50 passing through the gripping sleeve 52 is pivotally mounted on the back-rest 12. The gripping sleeve is swingably mounted on the seat and may be clamped on the rod 50 by means of the clamping screw 54 for holding the polygonal structure in a selected position. If desired, any other suitable locking means for locking selected positions of the polygonal structure may be used.

According to the embodiment of the chair shown in Fig. 3, the seat 14 has a lug 56, and the pivot point 58 between the polygonal structure 12, 14, 24, 26 and the support 10 is arranged on said lug 56. Like the embodiment of the chair shown in Fig. 1, one end of the guiding link 38 of the chair shown in Fig. 3 is pivoted to the front end of the arm rest 26 at 40 and the other end of the guiding link is pivoted to the support 10 at a point 42 below the seat. The sitting position of a polygonal structure, however, is limited by the contact of the leg-rest 16 with the support 10, and the extreme reclining position of the polygonal structure is limited by a stop 60 arranged on the support 10 for engagement with a nose 57 projecting from the lug 56. 61 indicates a clamping screw cooperating with a gripping sleeve 63, which is in engagement with a rod 65 pivoted to the support 10 at 67. Said clamping screw 61 may be used in the same way as the clamping screw 54 described above in connection with Fig. 1 for securing a selected position of the polygonal structure.

Fig. 4 illustrates another embodiment of the reclining chair, according to which the pivot point between the polygonal structure and the support 10 is coaxial with the pivot point 22 between the back-rest 12 and the seat 14.

Figs. 5–9 illustrate a swivel chair according to our invention. The polygonal structure comprises the back-rest 12, the seat 14, the short extension 24 of the leg-rest 16 and the long link or arm-rest 26 pivotally interconnected with each other at 22, 20, 28 and 34. The front end of the arm-rest is bent downwardly, the front end of the seat, however, is straight. The seat 14 is reinforced by a U-shaped member 62. The pivotal connection of the polygonal structure 12, 14, 24, 26 with the support 64 is coaxial with the pivot point 22 between the back-rest 12 and the seat 14. The support 64 of tubular material is secured to a plate 66 by means of screws 68. The plate 66 in turn is secured to a shaft 70 rotatably mounted on a stand or base 72. Furthermore, the plate 66 carries a body 74 with a bore 76 and an extension 78. The base 80 of a substantially U-shaped member generally indicated by 82 is swingably arranged in said bore 76 of the body 74. The legs 84 of said U-shaped member 82 form the guiding links on each side of the chair and have their free ends pivoted to a lug 86 on the arm-rests 26 at 40. Thus, each guiding link is pivotally connected with the arm-rest 26 and a point 76 on the supporting means 64, 66, 74 below the seat 14, so that the operation of the movable elements of the chair is similar to that shown in above described embodiments.

A set screw 88 arranged on the extension 78 of the body 74 serves to form an adjustable stop for the sitting position of the polygonal structure by engagement with the member 62 of the seat. The extreme reclining position of the polygonal structure is limited by the construction of the joint 28 preventing a rotation of the extension 24 of the leg-rest 16 beyond the position shown in Fig. 6.

Locking means 50, 52, 54 similar to that shown in Fig. 1 serve to hold the members of the polygonal structure in any adjusted position.

As best shown in Figs. 7 and 8, the leg-rest 16 is provided with a lateral projection 90 on each side of the chair, against which the user of the chair may set his feet firmly, if desired.

The dash and dot lines in Figs. 5 and 6 indicate the upholstery as it may be arranged on the chair.

According to the embodiments shown in Figs. 1–3 and 5–7, the upper end of the guiding link is pivoted to the arm-rest at a point near the hinge connection between the arm-rest and the short extension of the leg-rest. If desired, however, the guiding link could be pivoted to a suitable different point of the arm-rest, which may be spaced from the pivot point between the arm-rest and the extension of the leg-rest or may coincide with the latter.

Instead of the supports shown in the drawings, supports of the foldable type may be used, if

desired, so that the chair may be used as a deck-chair or garden chair, for example.

While we have shown only chairs, we do not wish that the invention be limited to chairs only. The polygonal structure and its pivotal connections to the support may also be arranged in other articles of furniture, such as couches or the like.

We have described preferred embodiments of our invention, but it is clear that numerous changes and omissions may be made without departing from the spirit of our invention.

What we claim is:

1. An adjustable reclining chair comprising: a support, a back-rest, a seat, a leg-rest, said seat extending between said back-rest and said leg-rest and being pivoted thereto, connecting link-means, one connecting link-means being arranged on each side of the chair, each of said connecting link-means including a short extension of the leg-rest and a long link hingedly connected with each other, the free end of said long link being pivoted to an intermediate point of the back-rest above the pivot point between the back-rest and the seat, said back-rest, said seat and said connecting link-means forming a polygonal structure having unequal sides, one point of said polygonal structure being pivoted to said support, and at least one guiding link, one end of said guiding link being pivoted to said support at a point below the seat, the other end of said guiding link being pivoted to said long link.

2. An adjustable reclining chair comprising: a support, a back-rest, a seat, a leg-rest, said seat extending between said back-rest and said leg-rest and being pivoted thereto, connecting link-means, one connecting link-means being arranged on each side of the chair, each of said connecting link-means including a short extension of the leg-rest and a long link hingedly connected with each other, the free end of said long link being pivoted to an intermediate point of the back-rest above the pivot point between the back-rest and the seat, said back-rest, said seat and said connecting link-means forming a polygonal structure having unequal sides, one point of said polygonal structure being pivoted to said support, and at least one guiding link, one end of said guiding link being pivoted to said support at a point below the seat, the other end of said guiding link being pivoted to said long link at a point near the hinge connection between the long link and the extension of the leg-rest.

3. An adjustable reclining chair comprising: a support, a back-rest, a seat, a leg-rest, said seat extending between said back-rest and said leg-rest and being pivoted thereto, connecting link-means, one connecting link-means being arranged on each side of the chair, each of said connecting link-means including a short extension of the leg-rest and a long link hingedly connected with each other, the free end of said long link being pivoted to an intermediate point of the back-rest above the pivot point between the back-rest and the seat, said back-rest, said seat and said connecting link-means forming a polygonal structure having unequal sides, one point of said polygonal structure being pivoted to said support, and at least one guiding link, one end of said guiding link being pivoted to said support at a point below the seat near the front end of the support, the other end of said guiding link being pivoted to said long link at the front end of the latter.

4. An adjustable reclining chair comprising: a support, a back-rest, a seat, a leg-rest, said seat extending between said back-rest and said leg-rest and being pivoted thereto, connecting link-means, one connecting link-means being arranged on each side of the chair, each of said connecting link-means including a short extension of the leg-rest and a long link hingedly connected with each other, the long link forming the arm-rest of the chair, the free end of said arm-rest being pivoted to an intermediate point of the back-rest above the pivot point between the back-rest and the seat, said back-rest, said seat and said connecting link-means forming a polygonal structure having unequal sides, one point of said polygonal structure being pivoted to said support, and at least one guiding link being pivoted to said support at a point below the seat near the front end of the support, the other end of said guiding link being pivoted to said arm-rest at the front end of the latter.

5. An adjustable reclining chair comprising: a stand, a support, said support being rotatably mounted on said stand, a back-rest, a seat, a leg-rest, said seat extending between said back-rest and said leg-rest and being pivoted thereto, connecting link-means, one connecting link-means being arranged on each side of the chair, each of said connecting link-means including a short extension of the leg-rest and a long link hingedly connected with each other, the free end of said long link being pivoted to an intermediate point of the back-rest above the pivot point between the back-rest and the seat, said back-rest, said seat and said connecting link-means forming a polygonal structure having unequal sides, one point of said polygonal structure being pivoted to said support, and at least one guiding link, one end of said guiding link being pivoted to said support at a point below the seat, the other end of said guiding link being pivoted to said polygonal structure.

6. An adjustable reclining chair comprising: a stand, a support, said support being rotatably mounted on said stand, a back-rest, a seat, a leg-rest, said seat extending between said back-rest and said leg-rest and being pivoted thereto, connecting link-means, one connecting link-means being arranged on each side of the chair, each of said connecting link-means including a short extension of the leg-rest and a long link hingedly connected with each other, the free end of said long link being pivoted to an intermediate point of the back-rest above the pivot point between the back-rest and the seat, said back-rest, said seat and said connecting link-means forming a polygonal structure having unequal sides, one point of said polygonal structure being pivoted to said support, and a substantially U-shaped member, the legs of said U-shaped member forming guiding links on each side of the chair, the free end of each guiding link being pivoted to said polygonal structure, and the base of said U-shaped member being hinged to said support at a point below the seat.

7. An adjustable reclining chair comprising: a stand, a support, said support being rotatably mounted on said stand, a back-rest, a seat, a leg-rest, said seat extending between said back-rest and said leg-rest and being pivoted thereto, connecting link-means, one connecting link-means being arranged on each side of the chair, each of said connecting link-means including a short extension of the leg-rest and a long link hingedly connected with each other, the free end of said long link being pivoted to an intermediate point of the back-rest above the pivot point between

the back-rest and the seat, said back-rest, said seat and said connecting link-means forming a polygonal structure having unequal sides, one point of said polygonal structure being pivoted to said support, and a substantially U-shaped member, the legs of said U-shaped member forming guiding links on each side of the chair, the free end of each guiding link being pivoted to said long link at the front end of the latter, and the base of said U-shaped member being hinged to said support at a point below the seat.

8. An adjustable reclining chair comprising: a stand, a support, said support being rotatably mounted on said stand, a back-rest, a seat, a leg-rest, said seat extending between said back-rest and said leg-rest and being pivoted thereto, connecting link-means, one connecting link-means being arranged on each side of the chair, each of said connecting link-means including a short extension of the leg-rest and a long link hingedly connected with each other, the free end of said long link being pivoted to an intermediate point of the back-rest above the pivot point between the back-rest and the seat, said back-rest, said seat and said connecting link-means forming a polygonal structure having unequal sides, one point of said polygonal structure being pivoted to said support, and a substantially U-shaped member, the legs of said U-shaped member forming guiding links on each side of the chair, the free end of each guiding link being pivoted to said long link, and the base of said U-shaped member being hinged to said support at a point below the seat.

9. An adjustable reclining chair as claimed in claim 1, said seat having a lug, and said lug being pivoted to the support.

10. An adjustable reclining chair as claimed in claim 1, wherein the seat is pivoted to the support at an intermediate point of the seat.

11. An adjustable reclining chair as claimed in claim 1, wherein the seat is pivoted to the support at the intersection of the seat and the back-rest.

12. An adjustable reclining chair as claimed in claim 1, wherein the long links of said connecting link-means form the arm-rests of the chair.

13. An adjustable reclining chair comprising: a support, a back-rest, a seat, a leg-rest, said seat extending between said back-rest and said leg-rest and being pivoted thereto, connecting link-means, one connecting link means being arranged on each side of the chair, each of said connecting link-means including a short extension of the leg-rest and a long link hingedly connected with each other, the free end of said long link being pivoted to an intermediate point of the back-rest above the pivot point between the back-rest and the seat, said back-rest, said seat and said connecting link-means forming a polygonal structure having unequal sides, one point of said polygonal structure being pivoted to said support, and at least one guiding link, one end of said guiding link being pivoted to said support at a point below the seat adjacent the level of the seat, the other end of said guiding link being pivoted to said long link.

14. An adjustable reclining chair comprising: a support, a back-rest, a seat, a leg-rest, said seat extending between said back-rest and said leg-rest and being pivoted thereto, connecting link-means, one connecting link-means being arranged on each side of the chair, each of said connecting link-means including a short extension of the leg-rest and a long link hingedly connected with each other, the free end of said long link being pivoted to an intermediate point of the back-rest above the pivot point between the back-rest and the seat, said back-rest, said seat and said connecting link-means forming a polygonal structure having unequal sides, one point of said polygonal structure being pivoted to said support, and at least one guiding link, one end of said guiding link being pivoted to said support at a point below the seat, the other end of said guiding link being pivoted to said long link at the front end of the latter.

15. An adjustable reclining chair comprising: a stand, a support, said support being rotatably mounted on said stand, a back-rest, a seat, a leg-rest, said seat extending between said back-rest and said leg-rest and being pivoted thereto, connecting link-means, one connecting link-means being arranged on each side of the chair, each of said connecting link-means including a short extension of the leg-rest and a long link hingedly connected with each other, the free end of said long link being pivoted to an intermediate point of the back-rest above the pivot point between the back-rest and the seat, said back-rest, said seat and said connecting link-means forming a polygonal structure having unequal sides, one point of said polygonal structure being pivoted to said support, and at least one guiding link, one end of said guiding link being pivoted to said support at a point below the seat, the other end of said guiding link being pivoted to said long link.

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