

DESCRIPTION
CHAIR

Technical Field

[0001]

The present invention relates to a chair.

Background Art

5 [0002]

Conventionally, as illustrated in Figs. 18 to 20, a chair 110 provided with a back frame 102 rotatably to a front-and-rear direction of the chair by a support shaft 101 fixed to a rear part of the chair, in which a lower end of the back frame 102 and a rear end of a seat frame 103 are connected rotatably to the front-and-rear direction by a rotation shaft 108, a back cushion material, a skin material and the like are attached to the back frame 102 so as to form a backrest 104, a seat cushion material, the skin material and the like are attached to the seat frame 103 so as to form a seat 105, and the backrest 104 is provided reclinably/straightenably around the support shaft 101 is known (See Patent Literatures 1 and 2, for example).

Citation List

15 Patent Literature

[0003]

Patent Literature 1: JP-B2-3618443

Patent Literature 2: JP-B2-3914020

Summary of Invention

20 Technical Problem

[0004]

In the prior-art chair 110, as illustrated in Fig. 18, an upper-face rear portion 111 of the seat 105 and a front-face lower portion 112 of the backrest 104 are in contact with each other at a contact point G in a state where the backrest 104 is upright.

25 [0005]

However, since the seat cushion material is provided on the upper part of the seat frame 103 so as to form the seat 105 and the back cushion material is provided on the front

surface of the back frame 102 so as to form the backrest 104, the contact point G is located on the front upper part considerably away from the center of the rotation shaft 108 of the seat frame 103 and the back frame 102.

[0006]

5 Thus, if the backrest 104 is gradually reclined rearward as illustrated in Figs. 19 and 20 from a state where the backrest 104 is upright in Fig. 18, the upper-face rear portion 111 of the seat 105 and the front-face lower portion 112 of the backrest 104 gradually separate from each other, and a gap between them gradually increases.

[0007]

10 As a result, if a seated person 121 is seated on the chair 110 in the state where the backrest 104 is upright and reclines the backrest 104 in a state leaning on the backrest 104, the upper-face rear portion 111 of the seat 105 and the front-face lower portion 112 of the backrest 104 gradually separate from each other. As a result, the head of the seated person 121 located at a position indicated by a dotted line in Fig. 20 in the state where the backrest 104 is upright
15 moves to a position indicated by a chain line in Fig. 20 in a state where the backrest 104 is reclined. Since the upper body of the seated person 121 moves downward with respect to the backrest 104 when the backrest 104 is reclined as above, there is a problem that outer clothes of the seated person 121 are pulled up.

[0008]

20 Moreover, when the backrest 104 is reclined/raised, it is concerned that rubbing between the clothes of the seated person 121 and the skin of the backrest 104 might damage the skin of the backrest 104.

[0009]

25 Thus, the present invention has an object to provide a chair which solves the above-described problems.

Solution to Problem

[0010]

30 In order to solve the above-described problems, a chair according to the present invention in which a seat frame is rotatably connected to a back frame provided reclinably/straightenably so that as the back frame reclines, the seat frame moves forward, while as the back frame rises, the seat frame moves rearward is characterized in that,

the back frame has a pair of side frames, a slide frame movable along the side frames is provided, a back cushion material is provided on the slide frame, and a seat cushion

material is provided on the seat frame;

as the back frame reclines, the slide frame moves in a seat direction in relation to the back frame, while as the back frame rises, the slide frame moves in a direction opposite to the seat in relation to the back frame; and

5 a gap between the back cushion material and the seat cushion material becomes smaller as the back frame reclines and becomes larger as the back frame rises.

[0011]

In the present invention, the back frame may be provided rotatably in the front-and-rear direction of the chair by the support shaft fixed to the rear part of the chair frame.

10 [0012]

In the present invention, the slide frame may be moved in relation to the back frame by a link.

Advantageous Effects of Invention

[0013]

15 The present invention is configured such that as the back frame reclines, the seat frame moves forward, while as the back frame rises, the seat frame moves rearward, and, a slide frame movable along the side frames of the back frame is provided, a back cushion material is provided on the slide frame, and a seat cushion material is provided on the seat frame, and, the slide frame moves in the seat direction in relation to the back frame as the back frame reclines
20 and the slide frame moves in the direction opposite to the seat in relation to the back frame as the back frame rises, and thus, oppositely to the prior-art chair 110 in which as the backrest 104 is reclined, the upper-face rear portion 111 of the seat 105 and the front-face lower portion 112 of the backrest 104 are separated from each other, the gap between the back cushion material and the seat cushion material becomes smaller as the back frame reclines and becomes larger as the
25 back frame rises.

[0014]

As a result, even if a user reclines/rises the backrest in a state leaning on the backrest of the chair of the present invention, the clothes are prevented from moving by the backrest, there is no need to fix the clothes or to be seated again, and the chair can be used
30 comfortably.

Brief Description of Drawings

[0015]

[Fig. 1] Fig. 1 is a perspective view illustrating a state where a backrest of a chair according to Embodiment 1 of the present invention is upright and illustrates frame portions, while a cushion material and a skin material are omitted for convenience of explanation.

[Fig. 2] Fig. 2 is a right side view of Fig. 1.

5 [Fig. 3] Fig. 3 is a front view of Fig. 1.

[Fig. 4] Fig. 4 is a top view of Fig. 1.

[Fig. 5] Fig. 5 is a sectional side view taken along an E-E line in Fig. 4.

[Fig. 6] Fig. 6 is a side sectional view of a state where a back frame is reclined from the state in Fig. 5.

10 [Fig. 7] Fig. 7 is a side sectional view of a state where the back frame further reclines from the state in Fig. 6.

[Fig. 8] Fig. 8 is a sectional view taken along an F-F line in Fig. 5.

[Fig. 9] Fig. 9 illustrates a relationship between the back cushion material and the seat cushion material of the chair in Embodiment 1 of the present invention and is a side sectional view taken
15 along the E-E line in the state in Fig. 5.

[Fig. 10] Fig. 10 is a side sectional view taken along the E-E line of a state where the backrest is reclined from the state in Fig. 9, in which a headrest is fixed to the state in Fig. 9 in illustration.

[Fig. 11] Fig. 11 is a side sectional view taken along the E-E line of a state where the backrest is further reclined from the state in Fig. 10, in which the headrest is fixed to the state in Fig. 9 in
20 illustration.

[Fig. 12] Fig. 12 is a side view illustrating a state where a backrest according to a chair in Embodiment 2 of the present invention is upright and illustrates frame portions, while a cushion material and a skin material are omitted for convenience of explanation.

[Fig. 13] Fig. 13 is a side view of a state where the backrest reclines from the state in Fig. 12.

25 [Fig. 14] Fig. 14 is a side view of a state where the backrest further reclines from the state in Fig. 13.

[Fig. 15] Fig. 15 is a side view illustrating a state where a backrest according to a chair in Embodiment 3 of the present invention is upright, and illustrates frame portions, while a cushion material and a skin material are omitted for convenience of explanation.

30 [Fig. 16] Fig. 16 is a side view of a state where the backrest reclines from the state in Fig. 15.

[Fig. 17] Fig. 17 is a side view of a state where the backrest further reclines from the state in Fig. 16.

[Fig. 18] Fig. 18 is a side view illustrating a relationship between a backrest and a seat in a prior-art chair.

[Fig. 19] Fig. 19 is a side view of a state where the backrest reclines from the state in Fig. 18.

[Fig. 20] Fig. 20 is a side view of a state where the backrest further reclines from the state in Fig. 19.

Description of Embodiments

5 [0016]

Modes for carrying out the present invention will be described on the basis of Embodiments shown in Figs. 1 to 17.

Embodiment 1

[0017]

10 Figs. 1 to 11 illustrate Embodiment 1.

A chair 1 in Embodiment 1 according to the present invention has a base 2 as illustrated in Figs. 1 to 4. On the base 2, a rotating base 3 is provided rotatably in relation to the base 2 by using its vertical direction (perpendicular direction) as a rotation axis. On the rotating base 3, a chair frame 4 is fixed. In the following explanation, a seating side of the chair 1, that is, a side opposite to a backrest 28 is referred to a front A, the backrest 28 side as a rear B, the left side in Fig. 3 as a left C, and the right side as a right D.

[0018]

The chair frame 4 has, as illustrated in Figs. 1 to 4, both side frames 4a and 4b and a lower frame 4c extended between lower ends of the both side frames 4a and 4b. The both side frames 4a and 4b and the lower frame 4c are integrally formed. At the center in the lower part of the lower frame 4c, the rotating base 3 is fixed, and the rotating base 3 is, as illustrated in Fig. 2, formed so as to incline downward as the base goes from the front A toward the rear B. On a rear part of the rotating base 3, a cylindrical base portion 3a provided upright in the vertical direction (perpendicular direction) is provided. The base portion 3a is rotatably connected to the base 2.

[0019]

On the upper end portions of the both side frames 4a and 4b, members constituting elbow portions or plate-shaped elbow frames 5 and 5 in this Embodiment are fixed in a front-and-rear (A-B) direction of the chair 1.

30 [0020]

On the rear in the upper parts of the both side frames 4a and 4b, as illustrated in Figs. 5 to 7, support shafts 7 and 7 protruding horizontally (in a C-D direction) in an inward

direction from the inner faces thereof are fixed. On the support shaft 7, a back frame 8 is provided rotatably to the front and rear around this support shaft 7 as a center axis.

[0021]

This back frame 8 has, as illustrated in Figs. 1 and 3, a pair of right and left side frames (hereinafter referred to as back side frames) 8a and 8b, and in this Embodiment 1, the back side frames 8a and 8b are constituted of hollow cylindrical metal pipes, respectively. The both back side frames 8a and 8b are provided so that the axial direction thereof is orthogonal to a left-and-right (C-D) direction of the chair 1. Moreover, in the axial intermediate portion of each of the back side frames 8a and 8b, the support shafts 7 and 7 are inserted, respectively, and the back side frames 8a and 8b are provided rotatably to the front and rear around the support shafts 7 and 7. Between the upper parts of the both back side frames 8a and 8b, a connecting bar 8c is extended.

[0022]

To the lower end portions of the both back side frames 8a and 8b, as illustrated in Fig. 1, a seat frame 10 is connected rotatably in the front-and-rear (A-B) direction. The seat frame 10 has a pair of right and left side frames (hereinafter referred to as seat side frames) 10a and 10b, and in this Embodiment 1, the seat side frames 10a and 10b are constituted of hollow cylindrical metal pipes, respectively. These seat side frames 10a and 10b are provided so that the axial directions thereof are located in the front-and-rear (A-B) direction of the chair 1. Between the front end portions of the both seat side frames 10a and 10b, a seat front frame 10c is extended, and between the rear end portions of the both seat side frames 10a and 10b, a seat rear frame 10d is extended. On the both side portions of the seat rear frame 10d, as illustrated in Fig. 1, connecting pieces 10e and 10e protruding in the rear B direction from the seat rear frame 10d are provided, and the lower end portions of the both back side frames 8a and 8b are connected to each of the connecting pieces 10e and 10e rotatably to the front and rear around a connection shaft 10f provided horizontally in the right-and-left (C-D) direction.

[0023]

On inner faces of the both side frames 4a and 4b of the chair frame 4, as illustrated in Figs. 1 and 5 to 7, seat guide members 11 and 11 are provided, and the seat guide members 11 are formed, as illustrated in Figs. 5 to 7, each having a curved shape gently lowering as it goes from the front A to the rear B. On the seat guide members 11 and 11, guide receiving members 12 and 12 movable along the seat guide members 11 and 11 are provided. Inside the guide receiving members 12 and 12, axial intermediate portions of the both seat side frames 10a and 10b are connected by a seat shaft 12a provided horizontally in the right-and-left (C-D)

direction, and the seat side frames 10a and 10b are provided rotatably to the front and rear around the seat shaft 12a. As a result, the seat frame 10 can rotate around the seat shaft 12a and also can move to the front and rear along the guide members 11.

[0024]

5 On the upper end portions of the both back side frames 8a and 8b, head guide members 14 and 14 are provided, respectively. Each of the head guide members 14 and 14 has plate-shaped members 14a and 14a, respectively, and one end portions (lower end portions) in the longitudinal direction of the plate-shaped members 14a and 14a are fixed to the both back side frames 8a and 8b, respectively, while on the other end portions (upper end portions) in the longitudinal direction of the plate-shaped members 14a and 14a, pins 14b and 14b are provided. The pin 14b is provided, as illustrated in Figs. 3 and 4, so as to protrude outward in the right-and-left (C-D) direction from an outer face of the plate-shaped member 14a.

[0025]

15 On the both back side frames 8a and 8b, a slide frame 15 is provided slidably in the axial directions of the back side frames 8a and 8b. The slide frame 15 is, as illustrated in Figs. 1 and 5 to 7, arranged closer to the front A side than the back frame 8. The slide frame 15 has, as illustrated in Figs. 1 and 3, a pair of right and left slide side frames 15a and 15b and a connecting member 20. The slide side frames 15a and 15b are, in this Embodiment 1, constituted of hollow cylindrical metal pipes. These slide side frames 15a and 15b are provided with the axial directions thereof substantially in parallel with the back side frames 8a and 8b.

[0026]

25 A connecting bar 17 is extended between upper rear sides of the both slide side frames 15a and 15b, and a connecting bar 18 is extended between lower rear sides of the both slide side frames 15a and 15b. Moreover, on the upper and lower parts on the rear B side (back frame 8 side) of the right slide side frame 15a, as illustrated in Figs. 5 to 7, connecting members 20 and 20 are fixed by a fixing member 20a. Moreover, on the upper and lower parts on the rear B side (back frame 8 side) of the left slide side frame 15b, too, as illustrated in Figs. 5 to 7, the connecting members 20 and 20 are fixed by the fixing member 20a. The right-side connecting members 20 and 20 are loosely fitted slidably in the axial direction thereof, that is, in the vertical axis direction of the back frame 8 in relation to the right back side frame 8a. Moreover, the left-side connecting members 20 and 20 are also loosely fitted slidably in the axial direction thereof in relation to the left back side frame 8b, and the slide frame 15 is provided slidably in the axial directions of the both back side frames 8a and 8b. That is, the slide frame 15 is movable in the axial directions of the back side frames 8a and 8b.

[0027]

As the connecting member 20, arbitrary materials can be used as long as the material is in a solid state and can be molded, such as plastic, metal or wood, and in this Embodiment, polyacetal (POM) is used.

5 [0028]

On the rear B side of the connecting member 20, as illustrated in Figs. 5 to 8, a back back panel 21 is fixed, and the slide frame 15 and the back back panel 21 are integrally movable in the axial directions of the back side frames 8a and 8b.

[0029]

10 The back back panel 21 is composed of a back plate 21a and both side plates 21b and 21b provided on the both sides of the back plate 21a. The right side plate 21b is provided between the right slide side frame 15a and the right side frame 4a of the chair frame 4, while the left side plate 21b is provided between the left slide side frame 15b and the left side frame 4b of the chair frame 4. In the both side plates 21b and 21b, a slotted hole 21c penetrating from the
15 front to the back thereof is formed so as to have its longitudinal direction in the axial directions of the back side frames 8a and 8b, and in the slotted hole 21c, the support shaft 7 is penetrated.

[0030]

On the upper end portions of the both slide side frames 15a and 15b, as illustrated in Figs. 5 to 7, a head frame 22 is provided. The head frame 22 has a pair of head cams 22a and
20 22a on the right and left, and head shafts 22b and 22b provided on their lower parts horizontally in the right-and-left (C-D) direction are rotatably connected to the upper end portions of the slide side frames 15a and 15b, and the head frame 22 is provided rotatably to the front and rear. The head cam 22a is formed having a plate shape, and inside thereof, a guide groove 23 opened at least in the inner face thereof is formed. The guide groove 23 may be formed as a through hole
25 penetrating to an outer side face of the head cam 22a or may be formed as a bottomed groove not opened in the outer side face of the head cam 22a. On the rear part of the head cam 22a, a head back panel 25 is provided.

[0031]

The guide groove 23 is formed, in this Embodiment 1, as illustrated in Figs. 5 to
30 7, having a dogleg shape in which a first guide groove 23a inclined to the rear B side as it goes upward from the lower part of the head cam 22a, an arc groove 23b formed having an arc shape on the upper part of the first guide groove 23a, and a second guide groove 23c inclined to the front A side as it goes upward from the lower part of the head cam 22a on the upper part of the arc groove 23b continue from each other.

[0032]

In the guide groove 23, the pin 14b of the back frame 8 is loosely fitted movably along the guide groove 23.

[0033]

5 As illustrated in Figs. 1 and 5 to 7, one end portion (lower end portion) of a link 27 is connected to the lower end portions of the both slide side frames 15a and 15b rotatably to the front and rear around a rotation shaft 27a provided horizontally in the right-and-left (C-D) direction. The other end portion (upper end portion) of the link 27 is connected to inner faces of the upper rear B sides of the both side frames 4a and 4b of the chair frame 4 rotatably to the front and rear around a rotation shaft 27b provided horizontally in the right-and-left (C-D) direction. The link 27 is provided so that the other-end side rotation shaft 27b is located closer to the upper part of the front A than the one-end side rotation shaft 27a in a state where the back frame 8 is upright as illustrated in Figs. 5 and 9.

[0034]

15 The link 27 is formed having a plate shape, its side face shape being formed to be an arc, and is provided so that the center side of the arc is located on the front side A. The side face shape of the link 27 may be an arbitrary shape such as a linear shape other than the above-described arc shape.

[0035]

20 Between the both slide side frames 15a and 15b and between the both head cams 22a and 22a, a first cloth spring (not shown) is provided, and the both sides thereof are attached to the slide side frames 15a and 15b and the head cams 22a and 22a through biasing means (not shown). The upper end of the first cloth spring is fixed to a connecting bar (not shown) provided between the upper end portions of the head cams 22a and 22a, and the lower end of the first cloth spring is fixed to a lower connecting bar 18 of the slide frame 15. The both sides of the first cloth spring are biased by the biasing means in a direction of the slide side frame 15a (15b). As the biasing means, a spring is used in this Embodiment.

[0036]

30 On the front surface of the first cloth spring provided between the slide side frames 15a and 15b, a back urethane material 28a is fixed by an adhesive or the like, and on the front surface of the first cloth spring between the head cams 22a and 22a, a head urethane material 30a is fixed by an adhesive or the like.

[0037]

A first skin material (not shown) is provided so as to cover the entire outer

peripheral portions of the slide frame 15, the back frame 8, the first cloth spring, the back urethane material 28a, the head urethane material 30a, the back back panel 21, and the head back panel 25. The first skin material may be fixed to any one of the slide frame 15, the back frame 8, the first cloth spring, the back urethane material 28a, the head urethane material 30a, the back back panel 21, and the head back panel 25 or does not have to be fixed to any of them.
[0038]

The first cloth spring provided between the slide side frames 15a and 15b and the back urethane material 28a constitute the back cushion material 28b, but as the back cushion material 28b, an arbitrary cushion material other than the cloth spring and the urethane material can be used. Moreover, the slide frame 15, the back frame 8, the back cushion material 28b, the back back panel 21, and the first skin material constitute the backrest 28.
[0039]

The first cloth spring provided between the head cams 22a and 22a and the head urethane material 30a constitute the head cushion material 30b, but as the head cushion material 30b, an arbitrary cushion material other than the cloth spring and the urethane material can be used. Moreover, the head frame 22, the head cushion material 30b, the head back panel 25, and the first skin material constitute a headrest 30.
[0040]

Moreover, on the seat frame 10, a second cloth spring (not shown) is provided, and the both sides thereof are fixed to the seat side frames 10a and 10b, respectively, and the front end of the second cloth spring is fixed to the seat front frame 10c. Moreover, the rear end portion of the second cloth spring is fixed to the seat rear frame 10d through biasing means (not shown), and the rear end portion of the second cloth spring is biased by the biasing means in a rear side direction of the seat frame 10. As this biasing means, a spring is used in this Embodiment.
[0041]

On the upper part of the second cloth spring, a seat urethane material 29a is fixed by an adhesive or the like. The second cloth spring and the seat urethane material 29a constitute the seat cushion material 29b, but as the seat cushion material 29b, an arbitrary cushion material other than the cloth spring and the urethane can be used.
[0042]

A second skin material (not shown) is provided so as to cover the entire outer peripheral portions of the seat frame 10 and the seat cushion material 29b. The second skin material may be fixed to any one of the seat frame 10, the second cloth spring, and the seat

urethane 29a or does not have to be fixed to any of them. The seat frame 10, the seat cushion material 29b, and the second skin material constitute a seat 29.

[0043]

Subsequently, movement of the chair 1 will be described.

5 As illustrated in Figs. 5 and 9, in a state where the back frame 8 (backrest 28) of the chair 1 is upright, the lower end of the back cushion material 28b and the rear-portion upper face of the seat cushion material 29b separate from each other, and a gap is formed therebetween. If the back frame 8 is gradually reclined to the rear B around the support shaft 7 from the state where the back frame 8 of the chair 1 is upright, as illustrated in Figs. 6 and 10, the link 27
10 rotationally moves forward on the slide frame 15 side around the rotation shaft 27b on the chair frame 4 side, and the slide frame 15 connected to the rotation shaft 27a moves in the lower side direction (seat 29 direction) along the back side frames 8a and 8b.

[0044]

In Figs. 9 to 11, in order to avoid complication of the illustration, the back
15 cushion material 28b, the seat urethane 29a, and the head cushion material 30b are not hatched. Moreover, in order to illustrate a relative relationship in reclining of the backrest 28 between the back cushion material 28b as well as the seat urethane 29a and the seated person 40, in Figs. 9 to 11, the head frame 22 is not reclined/straightened in the front-and-rear direction but illustrated as being fixed to the upright state in Fig. 9.

20 [0045]

As described above, with the movement of the slide frame 15, the back cushion material 28b and the first skin material also gradually move in the direction of the seat cushion material 29b of the seat 29, and the gap between the back cushion material 28b and the seat cushion material 29b gradually narrows.

25 [0046]

Moreover, the seat frame 10 is pushed by the lower end portion of the back frame 8 toward the front as the back frame 8 gradually reclines and moves gradually to the upper front portion along the seat guide member 11.

[0047]

30 Moreover, since the head frame 22 is rotatably connected to the upper end of the slide frame 15, as illustrated in Fig. 6, the head frame 22 moves to the lower side (in the seat 29 direction) together with the slide frame 15. At this time, the head guide member 14 moves relatively upward (in the direction opposite to the seat 29) in relation to the head cam 22a (guide groove 23). That is, the pin 14b gradually moves upward in the first guide groove 23a inclined

to the rear B as it goes from the lower part to the upper part. As a result, an angle α formed by the axes of the back side frames 8a and 8b (the vertical axis of the back frame 8) and the front surface of the head frame 22 (head cam 22a) gradually increases, and the headrest 30 (head frame 22) gradually rises in relation to the backrest 28 (back frame 8).

5 [0048]

When the pin 14b is located at the center of the arc groove 23b, the angle α of the front surface of the head frame 22 (head cam 22a) in relation to the vertical axis of the back frame 8 (axes of the back side frames 8a and 8b) becomes the maximum (prescribed value).

[0049]

10 As illustrated in Fig. 7, if the back frame 8 is further reclined gradually, the slide frame 15 further moves in the lower side (seat 29) direction by means of the rotational movement of the link 27 and the pin 14b gradually moves upward in the second guide groove 23c inclined to the front A as it goes from the lower part to the upper part in the head cam 22a. As a result, the angle α between the axes of the back side frames 8a and 8b and the front surface
15 of the head cam 22a gradually decreases, the head frame 22 (headrest 30) gradually reclines rearward in relation to the back frame 8 (backrest 28), and as illustrated in Fig. 7, when the back frame 8 is reclined to the maximum, the angle α between the axes of the back side frames 8a and 8b and the front surface of the head cam 22a becomes substantially zero.

[0050]

20 Moreover, oppositely to the above-described action, as illustrated in Fig. 7, if the back frame 8 is gradually raised from the state where the backrest 28 (back frame 8) of the chair 1 is reclined, the slide frame 15 moves to the upper side direction (the direction opposite to the seat 29) along the back side frames 8a and 8b by means of the rotational movement of the link 27 in the direction opposite to the above. With that movement, the head frame 22 gradually rises
25 in relation to the back frame 8 as the back frame 8 rises, and after the angle α of the front surface of the head frame 22 in relation to the vertical axis of the back frame 8 reaches the prescribed value, if the back frame 8 is further raised, the head frame 22 gradually reclines rearward in relation to the back frame 8 as the back frame 8 rises and enters the state illustrated in Fig. 5.

[0051]

30 That is, until the back frame 8 enters the state where the angle α of the front surface of the head frame 22 in relation to the vertical axis of the back frame 8 reaches the maximum value from the upright position illustrated in Fig. 5, as the back frame 8 is reclined, the head frame 22 rises in relation to the back frame 8, and as the back frame 8 is raised, the head frame 22 reclines in relation to the back frame 8.

[0052]

Moreover, from the state where the angle α becomes the maximum value to the state where the back frame 8 is reclined as in Fig. 7, as the back frame 8 is reclined, the head frame 22 reclines in relation to the back frame 8, and as the back frame 8 is raised, the head frame 22 rises in relation to the back frame 8.

[0053]

With the configuration as above, the chair 1 in Embodiment 1 of the present invention has the following actions and effects.

[0054]

10 The present invention is configured such that, as the back frame 8 (backrest 28) is reclined, the slide frame 15, the back cushion material 28b and the first skin material provided on the slide frame move together in the seat 29 direction, and as the back frame 8 (backrest 28) is raised, the slide frame 15, the back cushion material 28b, and the first skin material move together in the direction opposite to the seat 29. As a result, in the reclining/raising operation of the backrest 28 at the upright position of the backrest 28 illustrated in Fig. 9 and at the reclined position of the backrest 28 illustrated in Fig. 11, as illustrated in Figs. 9 to 11, the interval (gap) between the back cushion material 28b and the seat cushion material 29b changes. Moreover, as the backrest 28 is reclined rearward, the seat 29 moves forward.

[0055]

20 As a result, even if the backrest 28 is reclined or raised in a state where the seated person 40 seats on the chair 1 with the raised backrest 28 in a state leaning on the backrest 28, as illustrated in Fig. 11, a movement amount of the seated person 40 drastically decreases as compared with Fig. 20 in the prior-art example. Fig. 11 illustrates a state where the person seats so that a joint portion between the femoral area and the pelvis of the seated person 40 does not move in relation to the seat 29 from the seated position of the seated person 40 in Fig. 9 and indicates a position of the head of the seated person 40 in a state where the backrest 28 is upright, illustrated in Fig. 9, by a dotted line. As is also obvious from Fig. 11, the positional relationship between the back of the seated person 40 and the backrest 28 is not largely shifted from that in Fig. 9, pulling-up or movement of the clothes by the backrest 28 can be suppressed, and even if the backrest 28 is reclined/raised, it is less necessary to fix the clothes or to be seated again, and the chair 1 can be used comfortably.

[0056]

Moreover, when the backrest 28 is reclined/raised, rubbing between the seated person 40 and the skin of the backrest 28 can be reduced, and damage on the skin of the backrest

28 can be reduced as compared with the prior-art chair 110.

[0057]

Moreover, it is configured such that, when the back frame 8 is gradually reclined from the upright position until the angle α of the front surface of the head frame 22 in relation to the vertical axis of the back frame 8 becomes the prescribed value, as the back frame 8 (backrest 28) is gradually reclined, the head frame 22 (headrest 30) is gradually raised in relation to the back frame 8 (backrest 28), and thus, if the seated person 40 slightly reclines the backrest 28 of the chair 1 so as to watch TV forward or the like, the headrest 30 rises in relation to the backrest 28 more than the state illustrated in Figs. 5 and 9, and the line of sight of the seated person 40 can be held forward easily.

[0058]

Moreover, it is configured such that, after the angle α of the front surface of the head frame 22 in relation to the vertical axis of the back frame 8 reaches the prescribed value, as the back frame 8 (backrest 28) is reclined, the head frame 22 (headrest 30) is gradually reclined in relation to the back frame 8 (backrest 28), and thus, if the seated person 40 significantly reclines the backrest 28 of the chair 1 and takes a sleeping posture or the like, the neck of the seated person 40 is not tired but the seated person can take a relaxed posture.

Embodiment 2

[0059]

20 Figs. 12 to 14 illustrate Embodiment 2.

In the above-described Embodiment 1, the lower end portions of the slide side frames 15a and 15b and the both side frames 4a and 4b of the chair frame 4 are connected by the single link 27, but in this Embodiment 2, an axial intermediate portions of the slide side frames 15a and 15b and the both side frames 4a and 4b of the chair frame 4 are connected by a link 31 formed of a plurality of components and configured such that as the backrest 28 (back frame 8) is reclined rearward, the slide frame 15 moves in the lower side (seat 29 side) direction, and the gap between the back cushion material 28b and the seat cushion material 29b narrows. Moreover, as the backrest 28 (back frame 8) is raised, the slide frame 15 moves in the upper side (side opposite to the seat 29) direction, and the gap between the back cushion material 28b and the seat cushion material 29b enlarges.

[0060]

The link 31 is, as illustrated in Figs. 12 to 14, composed of three links, that is, a first link 32, a second link 33, and a third link 34.

[0061]

On end (upper end) of the first link 32 is connected to the intermediate portion in the axial direction of the slide side frames 15a and 15b rotatably to the front and rear around a rotation shaft 32a provided horizontally in the right-and-left (C-D) direction, and the other end
 5 (lower end) of the first link 32 is connected to the one end (upper end) of the second link 33 rotatably to the front and rear around a rotation shaft 32b provided horizontally in the right-and-left (C-D) direction. A portion closer to the other end side of the axial intermediate portion of the second link 33 is connected to the back side frames 8a and 8b rotatably to the front and rear around a connection shaft 33a provided horizontally in the right-and-left (C-D) direction. The
 10 connection shaft 33a is provided so as to be located in the vicinity of the rear part of the support shaft 7.

[0062]

The other end (lower end) of the second link 33 is connected to one end (rear end) of the third link 34 rotatably to the front and rear around a rotation shaft 33b provided
 15 horizontally in the right-and-left (C-D) direction. The other end (front end) of the third link 34 is connected to the upper rear parts of the both side frames 4a and 4b of the chair frame 4 rotatably to the front and rear around a rotation shaft 34a provided horizontally in the right-and-left (C-D) direction.

[0063]

20 Since the other structures and configurations are the same as those in Embodiment 1, the explanation will be omitted.

Subsequently, the movement of the chair 1 of Embodiment 2 will be described.

[0064]

As illustrated in Fig. 12, as the back frame 8 is gradually reclined rearward from a
 25 state where the back frame 8 of the chair 1 is upright, the lower end side of the second link 33 rotationally moves in the upper rear direction around the connection shaft 33a in the vicinity of the support shaft 7 as illustrated in Figs. 13 and 14. Moreover, by means of the rotational movement of the second link 33, the other-end rotation shaft 32b of the first link 32 moves in a lower direction. As a result, as illustrated in Figs. 12 to 14, the slide side frames 15a and 15b
 30 connected to the one-end side rotation shaft 32a of the first link 32 move in the lower side (seat 29) direction along the back side frames 8a and 8b, and the gap between the back cushion material 28b and the seat cushion material 29b narrows.

[0065]

Moreover, oppositely to the above, as illustrated in Fig. 14, it is so configured that

if the back frame 8 of the chair 1 is raised from the reclined position oppositely to the above-described operation, the slide frame 15 moves in the direction opposite to the seat 29 along the back side frames 8a and 8b, and the gap between the back cushion material 28b and the seat cushion material 29b enlarges.

5 [0066]

Since the other movements are the same as those in the above-described Embodiment 1, the explanation will be omitted.

In this Embodiment 2, the same actions/effects as those in the above-described Embodiment 1 can be exerted.

10 Embodiment 3

[0067]

Figs. 15 to 17 illustrate Embodiment 3.

In the above-described Embodiment 1, the lower end portions of the slide side frames 15a and 15b and the both side frames 4a and 4b of the chair frame 4 are connected by the link 27, but in this Embodiment 3, the axial intermediate portions of the slide side frames 15a and 15b and the seat side frames 10a and 10b of the seat frame 10 are connected by a link 41 and it is configured such that as the backrest 28 (back frame 8) is reclined, the slide frame 15 moves in the seat 29 side direction, and the gap between the back cushion material 28b and the seat cushion material 29b enlarges, and moreover, as the backrest 28 (back frame 8) is raised, the slide frame 15 moves in the direction opposite to the seat 29, and the gap between the back cushion material 28b and the seat cushion material 29b enlarges.

[0068]

The link 41 is formed of a single link as illustrated in Figs. 15 to 17. Moreover, the link 41 is formed having a plate shape and provided so that the side face shape thereof is formed having an arc shape and the center side of the arc is located on the front side A. One end (upper end) of the link 41 is connected to the intermediate portions in the axial direction of the slide side frames 15a and 15b rotatably to the front and rear around a rotation shaft 41a provided horizontally in the right-and-left (C-D) direction, and the other end (lower end) of the link 41 is connected to the intermediate portions of the seat side frames 10a and 10b rotatably to the front and rear around a rotation shaft 41b provided horizontally in the right-and-left (C-D) direction. The side face shape of the link 41 may have an arbitrary shape such as a linear shape other than the above-described arc shape.

[0069]

Since the other structures and configurations are the same as those in Embodiment 1, the explanation will be omitted.

Subsequently, the movement of the chair 1 of this Embodiment 3 will be described.

5 [0070]

As the back frame 8 is gradually reclined rearward from a state where the back frame 8 of the chair 1 is upright as illustrated in Fig. 15, the seat frame 10 gradually moves to the upper front part along the seat guide member 11, as illustrated in Figs. 16 and 17. With that movement, the other-end rotation shaft 41b connected to the seat frame 10 moves to the upper front part, and the link 41 rotationally moves around its both rotation shafts 41a and 41b while this rotation shaft 41a moves in the lower side (seat 29) direction. With that movement, the slide frame 15 connected to the rotation shaft 41a of the link 41 moves in the seat 29 direction along the back side frames 8a and 8b.

[0071]

15 Moreover, oppositely to the above, if the back frame 8 is gradually raised from the state where the back frame 8 is reclined as illustrated in Fig. 17, the slide frame 15 moves in the direction opposite to the seat 29 along the back side frames 8a and 8b.

[0072]

20 Since the other movements are the same as those in the above-described Embodiment 1, the explanation will be omitted.

In this Embodiment 3, too, the same actions/effects as those in the above-described Embodiments 1 and 2 can be exerted.

Embodiment 4

[0073]

25 In the above-described Embodiments 1 to 3, the back frame 8 is rotationally moved around the support shaft 7, and the slide frame 15 is moved by the links 27, 31, and 41 in the axial direction of the back side frames 8a and 8b in accordance with reclining/rising of the back frame 8, but the above-described support shaft 7 is provided on the slide side frames 15a and 15b so that the back frame 8 moves upward (in a direction opposite to the seat 29) by the link as the slide frame 15 reclines rearward.

[0074]

The support shaft 7 fixed to the chair frame 4 is connected to the intermediate portion of the slide frame 15 and the slide frame 15 is provided rotatably to the front and rear

around the support shaft 7. Moreover, the slide frame 15 and the back frame 8 are connected through the connecting member 20 similarly to the above-described Embodiments 1 to 3, and the back frame 8 is provided slidably in the axial direction of the slide side frames 15a and 15b.

[0075]

5 Then, as the slide frame 15 reclines rearward around the support shaft 7, the back frame 8 moves upward (in a direction opposite to the seat 29) by the link along the axial direction of the slide side frame 15a, and with that movement, the seat frame 10 also moves rearward in relation to the lower end of the slide frame 15, the rear end of the seat frame 10 and the lower end of the slide frame gradually get close to each other, and the gap between the back
10 cushion material 28b and the seat cushion material 29b becomes smaller.

[0076]

Moreover, as the slide frame 15 rises forward around the support shaft, the back frame 8 moves downward (in the seat 29 direction) by the link along the axial direction of the slide side frame 15a, and with that movement, the seat frame 10 also moves forward in relation
15 to the lower end of the slide frame 15, and the rear end of the seat frame 10 and the lower end of the slide frame 15 gradually separate from each other.

That is, as the back frame 8 reclines, the slide frame 15 moves in the seat 29 direction in relation to the back frame 8. Moreover, as the back frame 8 rises, the slide frame 15 moves in the direction opposite to the seat 29 in relation to the back frame 8, and the gap
20 between the back cushion material 28b and the seat cushion material 29b enlarges.

[0077]

Since the other structures and configurations are the same as those in the above-described Embodiments 1 to 3, the explanation will be omitted.

Also in this Embodiment 4, the same actions/effects as those in the above-
25 described Embodiments 1 to 3 can be exerted.

Embodiment 5

[0078]

In the above-described Embodiments 1 to 4, although the slide frame 15 is provided at the position closer to the front A than that of the back frame 8, the slide frame 15
30 may be provided at a position closer to the rear B than that of the back frame 8.

[0079]

Since the other structures and configurations are the same as those in the above-described Embodiments 1 to 4, the explanation will be omitted.

Also in this Embodiment 5, the same actions/effects as those in the above-described Embodiments 1 to 4 can be exerted.

Reference Signs List

[0080]

1	chair
4	chair frame
7	support shaft
8	back frame
8a, 8b	back side frame
10	seat frame
15	slide frame
27, 31, 41	link
28b	back cushion material
29b	seat cushion material
32	first link
33	second link
34	third link
40	seated person
103	seat frame
104	backrest
105	seat
108	rotation shaft
110	chair
111	upper seat rear portion of the seat
112	front face lower portion of the backrest
121	seated person

CLAIMS

[Claim 1] A chair comprising:

a chair frame;

a back frame provided reclinably/straightenably with respect to said chair frame:

and

a seat frame rotatably connected to said back frame in forward and rearward

directions,

wherein as the back frame reclines, the seat frame moves forward, and as the back frame rises, the seat frame moves rearward, wherein

said back frame has a pair of side frames, a slide frame movable along said side frames is provided, a back cushion material is provided on said slide frame, and a seat cushion material is provided on said seat frame;

as said back frame reclines, said slide frame moves in a seat direction in relation to said back frame, while as said back frame rises, said slide frame moves in a direction opposite to said seat in relation to said back frame; and

a gap between said back cushion material and said seat cushion material becomes smaller as said back frame reclines and becomes larger as said back frame rises,

the chair further comprising a link formed of a single component or a plurality of components, one end of said link being rotatably connected to a lower portion of the slide frame in forward and rearward directions, and the other end of the link being rotatably connected to said chair frame in forward and rearward directions, and

said slide frame being moved in relation to said back frame by said link .

[Claim 2]

The chair according to claim 1, wherein when said back frame is reclined, the other end of the link is positioned upper and closer to a rear than the rotatably connecting portion of the seat frame and the back frame.

[Claim 3]

The chair according to claim 1 or 2, wherein

said back frame is provided rotatably in a front-and-rear direction of the chair by a support shaft provided on a rear part of the chair frame.