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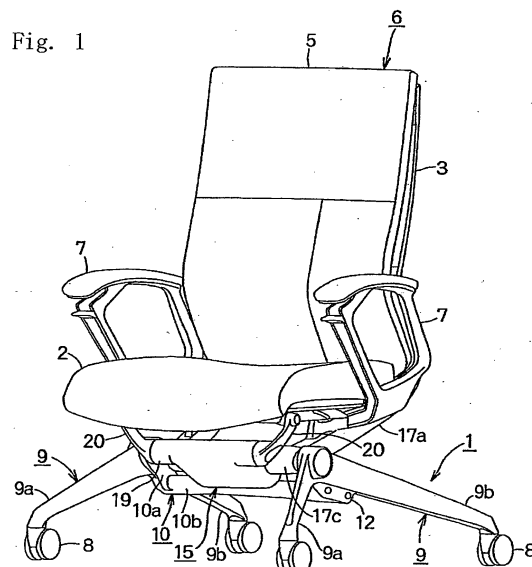
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(54) **CHAIR**

(57) A chair in which a backrest can be largely tilted rearward within a small rotation angle range without increasing the heights of a leg body and a seat body. The leg body (1) includes a pair of left and right side-legs (9) of angular shape in side view, each having a front leg

(9a) tilting forward and downward and a rear leg (9b) tilting backward and downward. The lower end of a backrest support frame (3) is so pivotally mounted on the leg body (1) at an appropriate position under the seat body (2) as to be capable of tilting rearward between the left and right side-legs (9).



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Description

TECHNICAL FIELD

[0001] The present invention relates to a chair in which the backrest is pivotally mounted to a pair of legs, a seat being supported by a support base on the side legs.

BACKGROUND OF THE INVENTION

[0002] JP2002-282077A, JP2004-16516A, JP2004-33449A and JP2005-177180A disclose such a chair.

[0003] In the chair in JP2002-282077A and JP2004-16516A, the lower end of the backrest which can be tilted rearward is pivotally mounted to legs close to the rear end of the seat at approximately equal height. A radius of rotation from a pivot to the upper end of the backrest is limited.

[0004] This increases a rotation angle when the backrest is tilted rearward. In order to tilt the backrest greatly, it will be necessary to raise the leg and seat.

[0005] In JP2002-282077A, the lower end of the backrest is pivotally mounted to the legs at the rear end of the seat. When the backrest is tilted rearward, the chair becomes longer and requires a large space for the chair.

[0006] In JP2004-16516A, in order that the backrest may be tilted greatly, it is tilted after it is elevated by a linking mechanism. The structure is complicated and the number of parts and accessories increases.

[0007] In the documents, the right and left legs that support the seat are parallel with each other in a plan view and a front view. The seat is supported between the legs while it is close to or is in contact with the inner side surface of the legs, which makes the chair lack in lateral stability.

[0008] In JP2004-33449A and JP2005-177180A, the seat is supported by the support base at the upper end of the legs, and the lower end of the backrest is pivotally mounted. Even if the legs are lowered by elevating means to the lower limit, it will not be possible to go down the support base or seat supported by the support base. It will not be possible to provide a lower and large-tilted angle chair on which a person can sit in comfort posture.

[0009] The support base for supporting the seat is provided at the top of the legs. Even if four or five legs are mounted radially at the lower end, the chair will become unstable depending on one's posture.

[0010] In view of the disadvantages, it is an object of the present invention to provide a chair in which legs and a seat are in a low position and a large-tilted angle to make the chair more stable.

It is another object of the invention to provide a chair in which the backrest is tilted rearward greatly at a small angle of rotation, the chair reducing a rearward projecting distance and achieving comfortable sitting posture.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011]

Fig. 1 is a front perspective view of a chair according to the present invention.

Fig. 2 is a front elevational view thereof.

Fig. 3 is a side elevational view thereof.

Fig. 4 is a side elevational view thereof when the backrest is tilted.

Fig. 5 is a rear elevational view thereof.

Fig. 6 is a perspective view of a leg unit.

Fig. 7 is a top plan view thereof.

[0012] DETAILED DESCRIPTION OF PREFERRED EMBODIMENT

The chair 1 comprises a leg unit 1; a seat 2 supported by the leg unit 1; a backrest support frame 3 pivotally mounted at the lower front end to the leg unit 1; a backrest 6 comprising a mesh-like backrest plate 4 and a cushion 5; and a pair of rhombus-like armrests 7 at the lower part of the backrest support frame 3.

In Figs. 6 and 7, the leg unit 2 comprises a pair of side legs 9,9 each comprising a front leg portion 9a having a caster 8 at the front end and a rear leg portion 9b having a caster 8 at the rear end, the rear leg portion being longer than the front leg portion 9a; and a stretcher 10 between the side legs 9 and 9 at the upper ends.

The reason that the rear leg portion 9b is longer than the front leg portion 9a is to keep the chair more stable when the backrest 6 is tilted rearward.

The distance between the front leg portions 9a and 9a of the side legs 9 gradually becomes greater forward, and the distance between the rear leg portions 9b and 9b gradually becomes greater rearward thereby making the leg unit 1 more stable.

A shorter shaft 11 is integrally formed with the upper end of each of the side legs 9. A mounting piece 12 projects downward from the inner side surface of the front end of the rear leg portion 9b in Fig. 3.

The upper ends of a pair of vertical portions 10a,10a of the stretcher 10 are engaged with the shorter shafts 11 with a bolt 13. A lateral rod 10b disposed behind the vertical portion 10a is engaged with the mounting piece 12 with a bolt 13.

A head of the bolt 13 disposed in the shorter shaft 11 is covered with a circular cap 14 (not shown in Fig. 5) mounted in a groove of the side of the shorter shaft 11.

A support base 15 for supporting the seat 2 is fixed at the rear end to a projection 10c in the middle of the lateral rod 10b of the stretcher 10 with a bolt 16 so that the front end of the support base 15 projects ahead of the lateral rod 10b.

The vertical portion 10a of the U-shaped stretcher 10 is fixed at the upper end to the top of the side leg 9, and the lateral rod 10b is fixed to the mounting

piece 12 of the rear leg portion 9b, such that the upper end of the support base 15 is slightly higher than the top of the side leg 9.

[0021] In Figs. 3 and 5, the backrest support frame 3 stands at the rear end of the seat; and comprises a pair of side frames 17,17 each having an arm 17a at the lower end which slants diagonally backward and an arc-like top frame 18 connecting the upper ends of the side frames 17,17 to each other.

[0022] The distance between the right and left side frames 17 and 17 is shorter than that between the right and left rear leg portions 9b and 9b of the pair of side legs 9. When the backrest support frame 3 is tilted rearward, the arms 17a,17a do not engage with the rear leg portions 9b and 9b.

[0023] In Fig. 6, at the front end of each of the arms 17a, there is formed a rounded portion 17b nearly coaxial with the shorter shaft 11 at the top of the side leg 9. The rounded portion 17b is pivotally coupled to a torsion shaft (not shown) such as a known rubber torsion unit of a reclining mechanism in the support base 15 while it is forced counterclockwise anytime. Thus, the backrest support frame 3 and backrest 6 mounted thereto are tilted rearward around the support base 15 when the backrest 6 is pushed rearward by a sitting person.

[0024] In Figs. 3 and 6, a pair of seat-support links 20,20 is pivotally mounted to a cylindrical support 19 projecting transversely from the support base 15, with a pivot shaft 21.

[0025] Seat-support pieces 22,22 project upward from the front end of the arm 17a of the backrest support frame 3. A rectangular armrest mounting portion 23 projects with the seat-support piece 22 on the upper surface of the arm 17a.

[0026] A seat frame 24 mounted on the lower surface of the seat 2 is pivotally mounted at the front end to the upper end of the seat support link 20, and is pivotally mounted at the rear end to the upper end of the seat-support piece 22 with a pivot shaft 26 as shown in Fig. 3.

[0027] Thus, the front part of the seat 2 is supported by the support base 15 coupled with the leg unit 1 with the seat support link 20, and the middle part of the seat 2 by the arms 17a of the backrest support frame 3 with the seat support piece 22.

[0028] Accordingly, in Fig. 4, when the backrest support frame 3 is tilted rearward with the backrest 6, the seat 2 is tilted rearward together. After the seat 2 is assembled, the rear part of the front leg portion 9a and the front part of the rear leg portion 9b are positioned inside the side edges of the seat 2, so that the side legs 9 of the leg unit 1 do not project sideward as shown in Fig. 2.

[0029] As described above, in the embodiment of a chair according to the present invention, the backrest support frame 3 is pivotally mounted at the front lower end to the support base 15 coupled to the leg unit 1 increasing a rotation radius from the pivot to the upper ends of the backrest support frame 3 and backrest 6. Thus, the backrest 6 can be tilted more extensively at a small

rotation angle, and a rearward projection can be minimized.

[0030] The chair can be inclined rearward extensively without increasing heights of the leg unit 1 and seat 2 thereby providing a low and backward-tilting chair with sitting comfort.

In the embodiment, the front ends of the backrest support frame 3 and seat 2 are pivotally mounted to the support base 15 on the lateral rod 10b of the stretcher 10. The support base 15 is as high as the top of the side leg 9 reducing one's sitting height and improving sitting comfort.

[0031] The arm 17a of the backrest support frame 3 is relatively long and tilted upward and rearward below the seat 2. The arm 17a is pivotally mounted at a position which is almost as high as the top of the side leg 9 increasing a rotation angle of the arm 17a and avoiding the rear end of the arm 17a from getting in touch with the floor.

[0032] The distances between the front leg portions 9a and 9a and between the rear leg portions 9b and 9b become greater forward and rearward respectively, and the rear leg portions 9b are longer than the front leg portions 9a thereby keeping the chair more stable when the backrest 6 is tilted rearward.

Since the distance between the front leg portions 9a and 9a becomes greater forward, a lower limb of the sitting person is unlikely to hit the front leg portion 9a.

[0033] In the foregoing embodiment, the arm 17a of the backrest support frame 3 is pivotally mounted to the support base 15, but may be pivotally mounted to the tops of side legs or inner side surfaces of the short shafts.

[0034] In the foregoing embodiment, the seat 2 is tilted together with the backrest support frame 3, but the seat 2 may be fixed to the top of a leg unit including a support base.

Claims

1. A chair in which a backrest support frame having the backrest on the front surface is pivotally mounted to a leg unit supporting a seat so that the support frame can be tilted rearward from an upright position behind the seat, **characterized in that:**

said leg unit comprises a pair of side legs each having a forward-tilted front leg portion and a rearward-tilted rear leg portion, the lower end of said backrest support frame being pivotally mounted to the leg unit under the seat such that the lower end of said backrest support frame is tilted rearward between the right and left side legs.

2. The chair of claim 1 wherein a pair of arms is provided at the lower end of the backrest support frame, the front end of the arm being pivotally mounted to the

leg unit at a position having approximately equal height to the top of the side leg.

3. A chair in which a seat is supported by a support base on a leg unit, **characterized in that:**

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the chair comprises a pair of projected side legs comprising a forward-tilted front leg portion and a rearward-tilted rear leg portion; a stretcher connecting the tops of the side legs; and a support base on the upper surface of the middle of the stretcher.

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4. The chair of claim 3 wherein the stretcher comprises a U-shape having an upright piece at the side end of a lateral rod, a support base being provided on the upper surface of the lateral rod, the upper end of the upright piece being fixed to an opposing surface of the top of the side legs.

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5. The chair of claim 4 wherein the upright piece extends forward and upward so that the lateral rod is positioned near the rear leg portion from the top of the side leg.

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6. The chair of any one of claims 3 to 5 wherein the front ends of pair of arms of the lower parts of the backrest support frames having the backrest on the front surface is pivotally mounted to the sides of the support base so that the backrest support frame can be tilted rearward.

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7. The chair of claim 6 wherein the front part of the support base projects forward from the top of the side legs, the lower surfaces of the right and left sides of the front end of the seat being pivotally mounted to the right and left sides of the front end thereof with a lateral pivot shaft, the lower surfaces of the sides near the rear part of the seat being pivotally mounted to the arms of the backrest support frame with a lateral pivot shaft.

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8. The chair of any one of claims 1 to 7 wherein a distance between the rear leg portions of the side legs gradually becomes greater.

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9. The chair of any one of claims 1 to 8 wherein a distance between the front leg portions of the side legs gradually becomes greater.

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10. The chair of any one of claims 1 to 9 wherein the side legs are bent while the rear leg portions are longer than the front leg portions.

11. The chair of any one of claims 1 to 10 wherein the rear part of the front leg portion and the front part of the rear leg portion are positioned under the seat within the sides of the side legs,

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12. The chair of any one of claims 1 to 11 wherein a caster is provided on the front end of the front leg portion and the rear end of the rear leg portion of the side leg.

Fig. 1

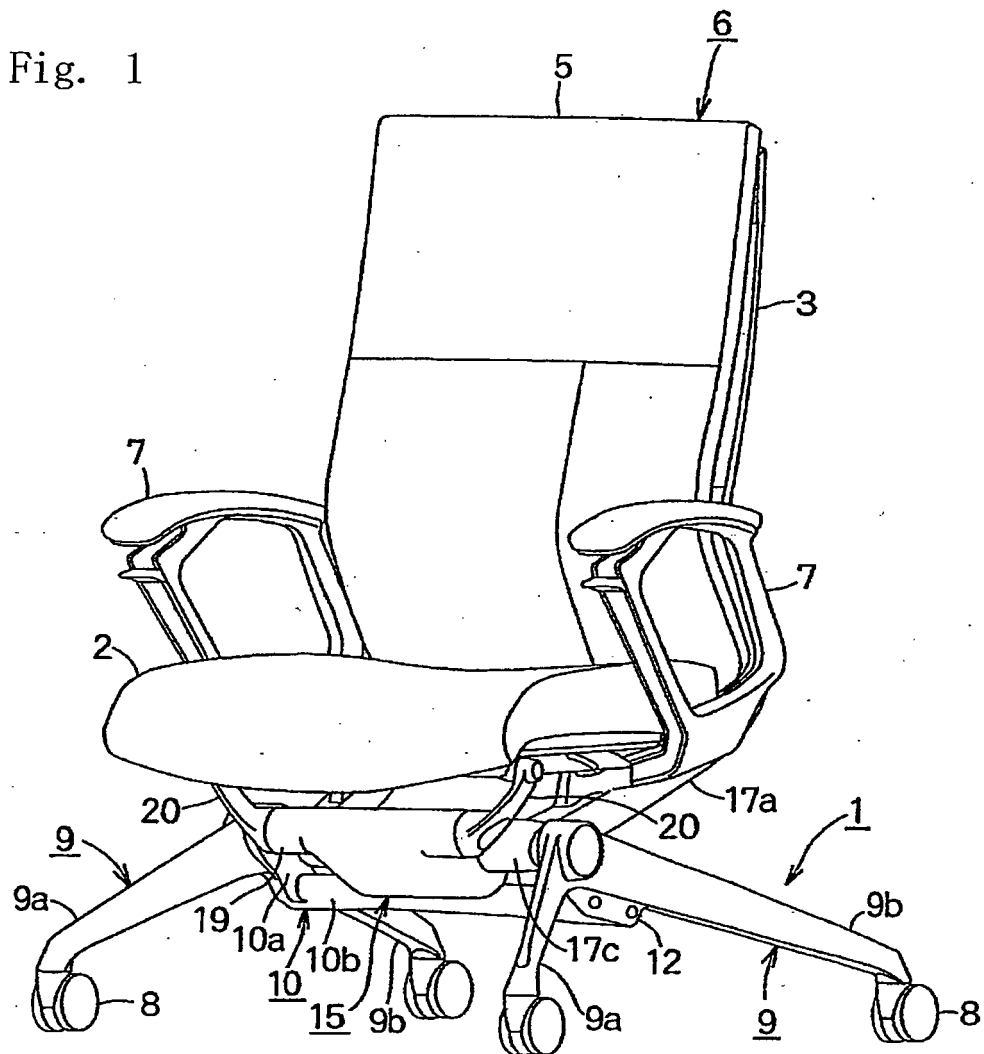


Fig. 2

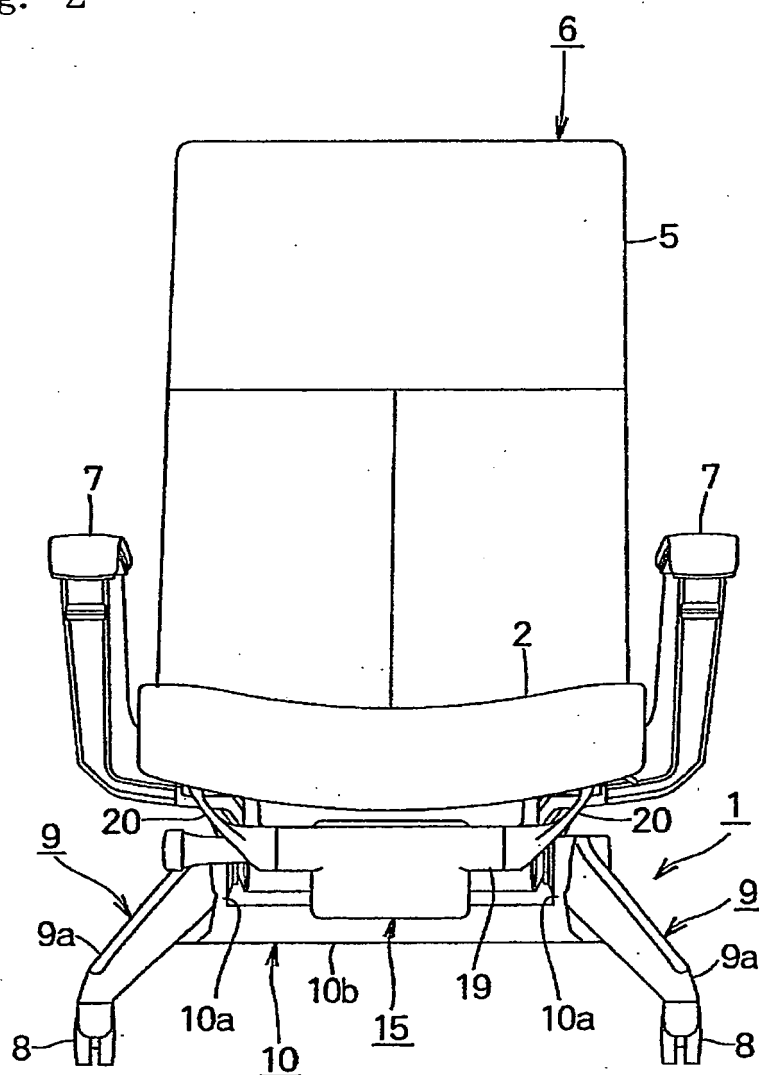


Fig. 3

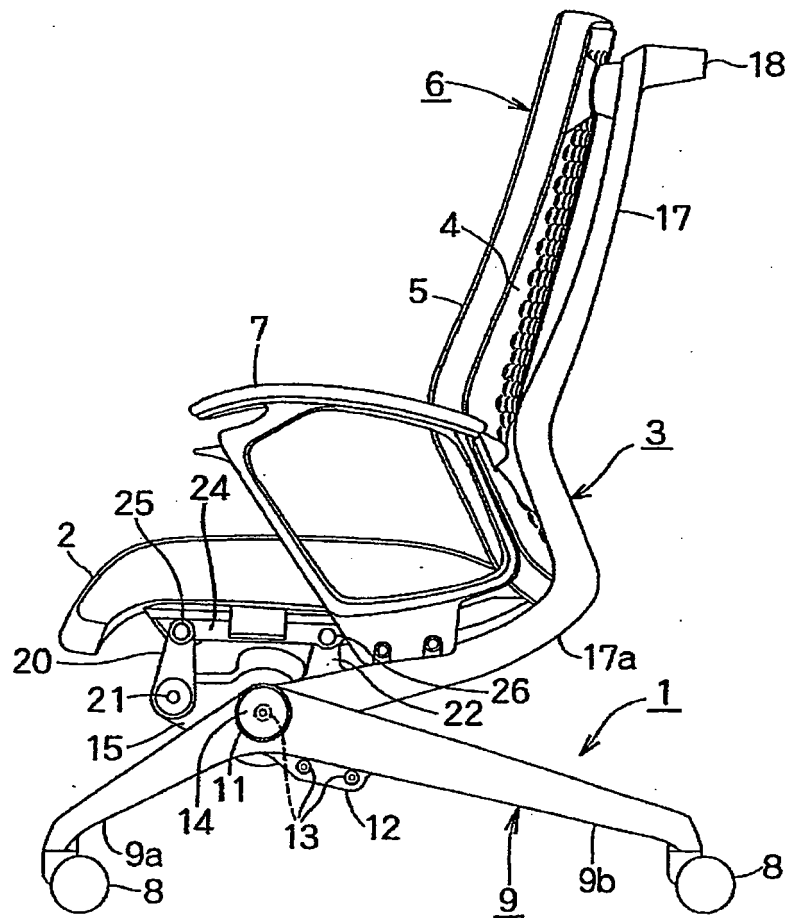


Fig. 4

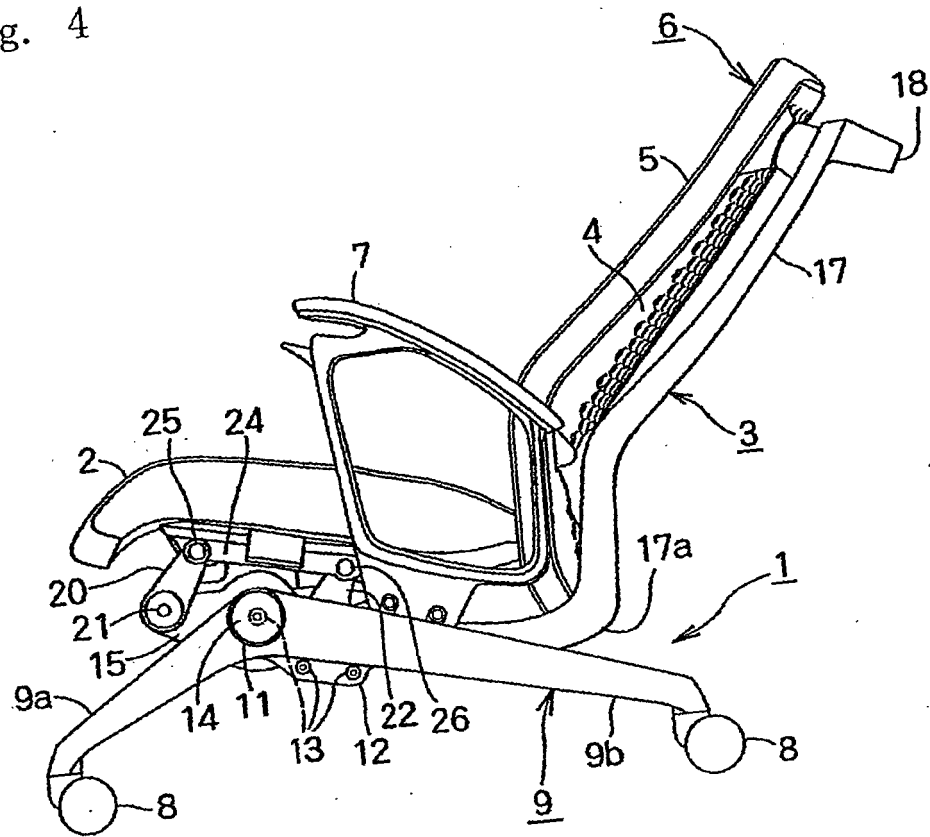


Fig. 5

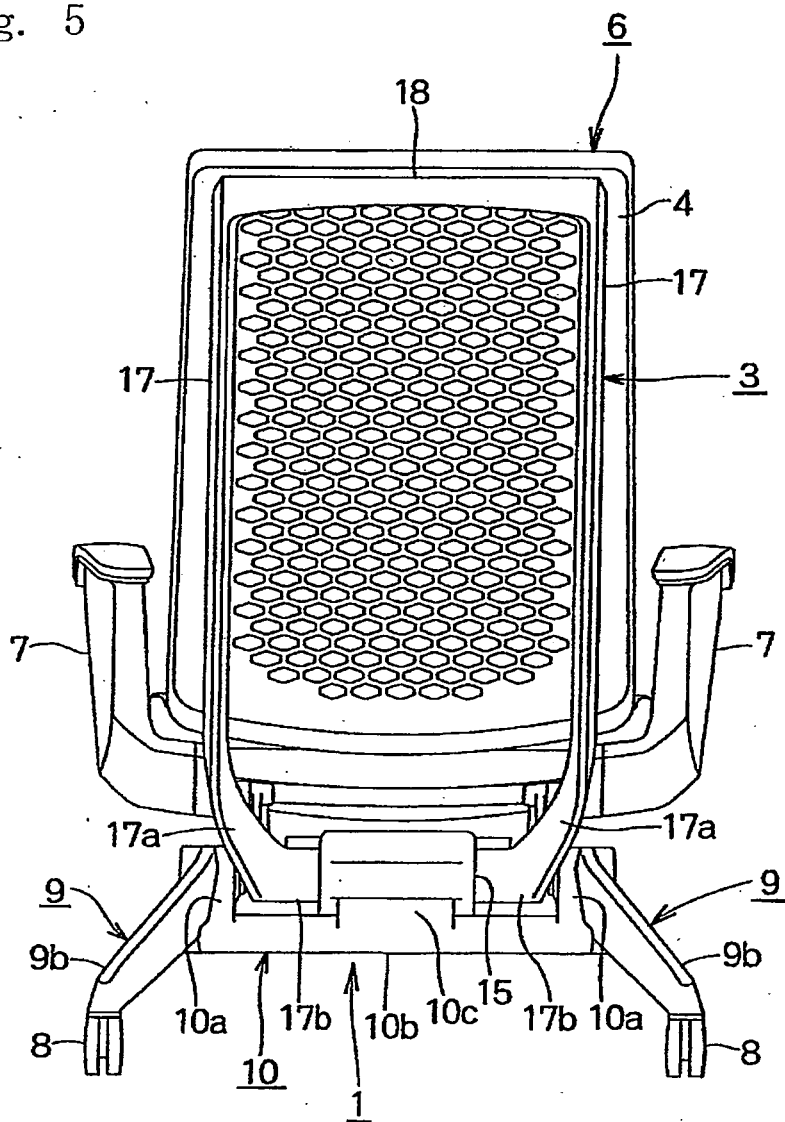


Fig. 6

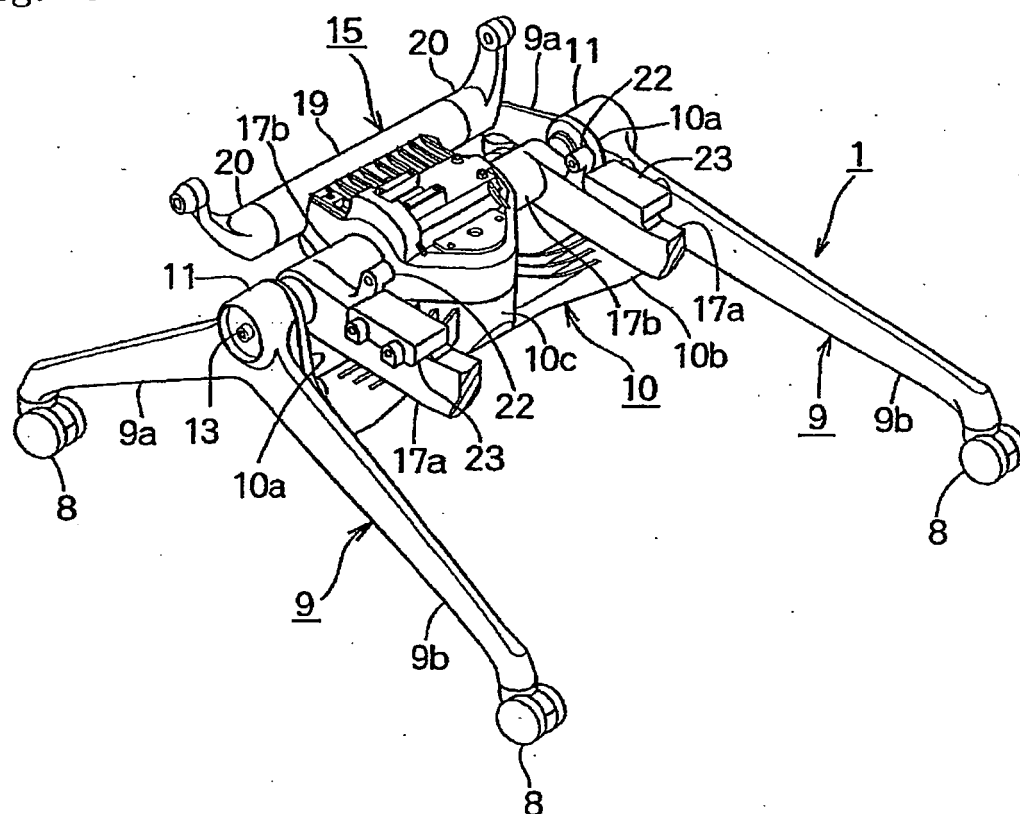
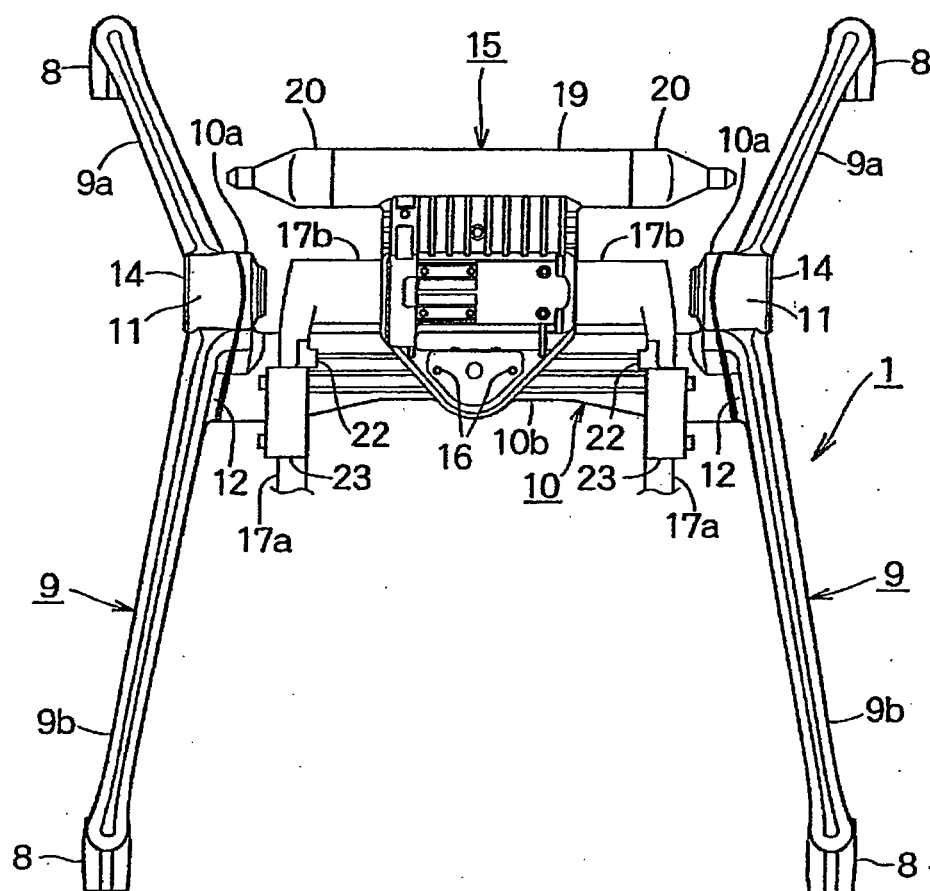


Fig. 7



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2007/061739

A. CLASSIFICATION OF SUBJECT MATTER A47C1/024(2006.01) i, A47C3/02(2006.01) i		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) A47C1/024, A47C3/02		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2007 Kokai Jitsuyo Shinan Koho 1971-2007 Toroku Jitsuyo Shinan Koho 1994-2007		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 8239/1983 (Laid-open No. 114051/1984) (Okamura Corp.), 01 August, 1984 (01.08.84), Full text; all drawings (Family: none)	1-7, 11 8, 9, 10, 12
Y	JP 2004-33449 A (Kokuyo Co., Ltd.), 05 February, 2004 (05.02.04), Figs. 1 to 2 (Family: none)	8, 9, 12
☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.		
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search 28 June, 2007 (28.06.07)		Date of mailing of the international search report 10 July, 2007 (10.07.07)
Name and mailing address of the ISA/ Japanese Patent Office		Authorized officer
Facsimile No.		Telephone No.

Form PCT/ISA/210 (second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2007/061739

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP 2004-16516 A (Matsushita Electric Works, Ltd.), 22 January, 2004 (22.01.04), Figs. 1 to 2 (Family: none)	10

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- JP 2004033449 A [0002] [0008]
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