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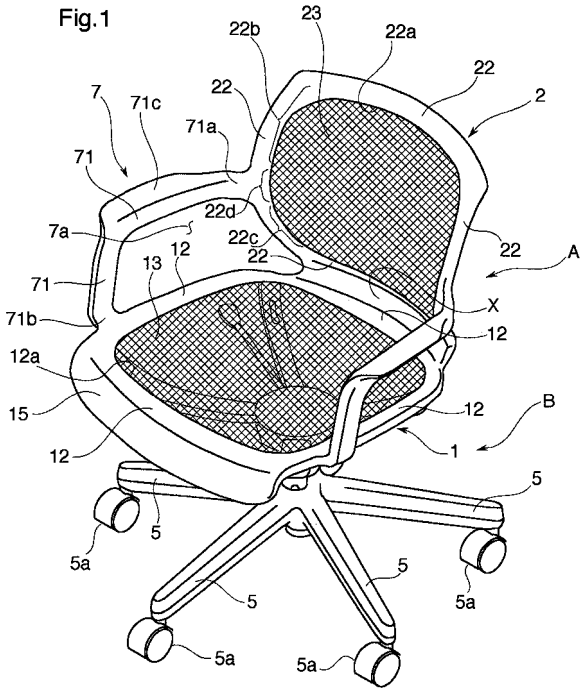
(54) **Chair**

(57) The present claimed invention intends to newly provide a convenient chair that is structurally easy to arrange an operating lever (62) and that is easy for a seated person to see a position of the operating lever (62).

The chair is so arranged that multiple seat support frames (41) extend from a center portion of a leg support post (3) toward a direction to be directed away gradually, undersurfaces of edge portions of a seat (1) are supported by distal end portions of the seat support frames (41), a portion locating both below the seat (1) and between the seat support frames (41), lying next to each other is left open so that the portion can be used as a function adjusting space (A1) through (A3) where an operating part (62) is arranged.

Fig.1



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Description

BACKGROUND OF THE INVENTION AND RELATED ART STATEMENT

[0001] This invention relates to a chair preferably used in an office or a home.

[0002] Generally a chair of a type wherein a seat is supported by a leg support post has an arrangement wherein a seat support by the use of a block or a link is formed at an upper end of a leg support post and a seat is supported directly above the seat support, for example as shown in the patent document 1.

(Patent document 1) Japan patent laid open number 8-10085

[0003] However, if a bulky seat support using a block or a link locates under the seat, there is a problem that it is difficult to secure a space to arrange an operating lever to be mounted on the seat support. In addition, since this chair is so arranged that a shell or a frame covers most part of a bottom of the seat and an operating lever is completely covered by the seat when seated, there is a problem that it is difficult to see a position of the operating lever.

[0004] The present claimed invention intends to solve these problems and an object of the present claimed invention is to provide a new and convenient chair that is structurally easy to arrange the operating lever and that is easy for a seated person to see a position of the operating lever.

SUMMARY OF THE INVENTION

[0005] In order to attain the above object, the present claimed invention takes a following means.

[0006] More specifically, a chair of this invention is characterized by that multiple seat support frames extend from a center portion of a leg support post toward a direction to be directed away gradually, undersurfaces of edge portions of a seat are supported by distal end portions of the seat support frames, a portion locating both below the seat and between the seat support frames lying next to each other is left open so that the portion can be used as a function adjusting space where an operating part is arranged.

[0007] With this arrangement, since the seat is substantially supported by its edge portions and there is no need of arranging a seat support structure in close contact with a bottom face of a center portion of the seat, a mechanical component to adjust a function can be easily incorporated under the seat. In addition, since a transverse section of the seat support frame can be made small, it is possible to obtain sufficient function adjusting spaces around the leg support post and to secure an environment where operation can be easily conducted. Furthermore, this structure can be made stronger against an eccentric load compared with a case of supporting the center of the seat, in addition to weight saving.

[0008] As a concrete arrangement of this embodiment represented is that the seat support frames extend radially and support corner portions of the seat, and at least the front below of the seat and the right and left below of the seat are left open.

[0009] Especially, it is suitable that undersurfaces of corner portions of the seat frame are supported by the four seat support frames.

[0010] As another arrangement of the chair with an armrest in accordance with this invention represented is a chair wherein a chair body with an armrest is supported by a seat support structure, the seat support structure is so arranged that multiple seat support frames extend from a center portion of a leg support post toward four corners of a seat and an undersurface of the seat is supported by distal end portions of the seat support frames, an operating part is mounted on a portion near an extending end of at least either one of the two seat support frames locating at the front so that a space surrounding the seat support frame can be used as a function adjusting space.

[0011] With this arrangement, since the seat support frame existing at the right and left, and front below of the seat can be used as an effective place on which the operating part is mounted, the operating part can be easily operated without being disturbed by the armrest and just by bending a body of a seated person forward a little.

[0012] As a further different arrangement of the chair with an armrest in accordance with this invention represented is a chair wherein a chair body with an armrest is supported by a seat support structure, the armrest is connected to a back with a rear end part of the armrest extending inward in a plain view, the seat support structure is so arranged that multiple seat support frames extend from a center portion of a leg support post toward four corners of a seat and an undersurface of the seat is supported by distal end portions of the seat support frames, an operating part is mounted on a portion locating both below the rear end part of the armrest and at least either one of the two seat support frames locating at the rear so that a space surrounding the seat support frame can be used as a function adjusting space.

[0013] With this arrangement, since the seat support frame existing at the right and left, and back below of the seat can be used as an effective place on which the operating part is mounted, the operating part can be easily operated without being disturbed by the armrest and just by bending a body of the seated person right or left with his or her shoulder drooping a little.

[0014] In order to improve operationality of the operating part, it is preferable that at least a part of the seat is transparent or translucent so that a position of the operating part arranged in the function adjusting space is visible from the above.

[0015] In order to make it possible to see a layout of the operating part, it is preferable that at least a part of the seat is transparent or translucent so that each position of all of the operating parts arranged in the function ad-

justing space is visible from the above.

[0016] Especially preferably, if also a general picture of a function of the operating part arranged in the function adjusting space is visible from the above, convenience will be further improved.

[0017] In order to make it possible to see the operating part further completely, it is preferable that the seat has an opening at an inner side of the seat frame and generally whole of the function adjusting space including the operating part is visible through the opening.

[0018] This arrangement is effective in a case that at least a part of the operating part is arranged at a portion which is invisible without taking a look at from below on the condition that the seat is opaque.

[0019] In order to prevent the function adjusting space from being visible unnecessarily clearly, it is preferable that the seat is translucent with a mesh member set up inside the seat frame.

[0020] Since the present claimed invention has the above-mentioned arrangement, it is possible to provide a chair that can effectively secure the function adjusting space to arrange the operating lever under the seat with a function to support the seat kept appropriately and that can easily adopt a structure that enables a seated person to see a operational position of the operating lever.

BRIEF DESCRIPTION OF THE DRAWINGS

[0021]

Fig. 1 is a perspective view showing a chair in accordance with one embodiment of this invention.
Fig. 2 is a front view thereof.
Fig. 3 is a left side view thereof.
Fig. 4 is a longitudinal cross-sectional view thereof.
Fig. 5 is a perspective view showing an internal structure of a diameter expanding base part in accordance with this embodiment.
Fig. 6 is a plain view of the chair in accordance with this embodiment in a state that a mesh member is omitted to show and an upper end cover of a leg support post is removed.
Fig. 7 is a bottom view of the chair in accordance with this embodiment.
Fig. 8 is an exploded view of Fig. 4.
Fig. 9 is an exploded perspective view of the chair in accordance with this embodiment.
Fig. 10 is a cross-sectional view showing a state that the mesh member is fitted into an opening of the back frame.
Fig. 11 is a cross-sectional view showing a state that the mesh member is fitted into an opening of the seat frame.
Fig. 12 is a plain view of the chair in accordance with this embodiment.
Fig. 13 is a bottom view showing another embodiment in accordance with this invention.
Fig. 14 is a right side view thereof.
Fig. 15 is a longitudinal cross-sectional view thereof.
Fig. 16 is a left side view thereof.
Fig. 17 is a plain view thereof.
Fig. 18 is a view showing a modified form of this invention.
Fig. 19 is a view showing a modified form of this invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0022] One embodiment in accordance with the present claimed invention will be described with reference to the accompanying drawings.

[0023] As shown in Fig. 1 through Fig. 3, a chair of this embodiment has an arrangement wherein a chair body A comprising a seat 1, a back 2 and an armrest 7 is supported by a seat support structure 4 rising from a leg body B.

[0024] More specifically, the leg body B is so arranged that a leg support post 3 is rotatably supported by a center part of equiangularly radiating five blades 5 each of which has a caster 5a at its distal end. The leg support post 3 comprises a support body 31 and a diameter expanding base part 32 arranged at an upper end of the support body 31, and an elevating mechanism 6 of a gas spring as shown in Fig. 4 is incorporated into a part ranging from the support body 31 to the diameter expanding base part 32. The diameter expanding base part 32 comprises, as shown in Fig. 4 and Fig. 5, a cover 32a, a bowl-shaped void 32b that opens upward when the cover 32a is removed, a bottom wall 32c and a rib 32d that radially extends upward from a center of the bottom wall 32c, and an inner space is formed above the rib 32d so that a finger or a hand can be inserted into the void 32b. A working portion 61 that locks or unlocks the elevating mechanism 6 with a projecting or retrojecting movement is accommodated at a center of the diameter expanding base part 32, an operating lever 62 as being an operating part is projected toward a radial direction at a position where the working portion 61 makes an up and down movement through a cutout 32x arranged at a part of the diameter expanding base part 32 and mounted in a pivoted manner on a supporting axis m so as to make an up and down movement around the supporting axis m. The cover 32a covers the void 32b including the working portion 61 in a state wherein the cover 32a does not interfere with the operating lever 62. An operation of lifting the operating lever 62 makes the working portion 61 retroject, which frees the elevating mechanism 6 and an operation of releasing the operation of lifting makes the working portion 61 project, which locks the elevating mechanism 6.

[0025] Four seat support frames 41 constituting the seat support structure 4 extend upward from the leg support post 3 and each distal end of the seat support frames 41 supports the seat 1. The seat support frame 41 comprises a horizontal part 41a and a vertical part 41b each

of which is integrally formed, wherein a proximal end of the horizontal part 41a is connected to a side face of the diameter expanding base part 32 and the proximal end of the horizontal part 41a extends toward a side direction to be separated from a center part of the leg support post 3 with gradually bending upward, in other words, extends radially from the leg support post 3 as shown in Fig. 6 viewed on a plain view. A load from the above on the seat 1 applies to the rear of the center of the seat 1. Since the leg support post 3 locates in compliance with this, two front seat support frames 41(x) of four seat support frames 41 extending from the leg support post 3 to four corners of the seat 1 are set to be longer than two rear seat support frames 41(y). The vertical part 41b is, as shown in Fig. 4, smoothly connected to the horizontal part 41a and a distal end of the vertical part 41b supports an edge part of the seat 1, more concretely, each of undersurfaces 1a, 1b at the four corners of the seat 1 as shown in Fig. 7. A screw inserting part 41c is arranged at an inner portion of the vertical part 41b along a vertical direction as shown in Fig. 8, and the screw inserting part 41c opens downward at a portion where the horizontal part 41a crosses the vertical part 41b. A cross-sectional view of the seat support frame 41 is of a flat oval shape whose size is so far forth as an adult with an average build can just grasp at an arbitrary position along the extending direction.

[0026] As mentioned above, since the seat support frames 41 radially extend to the four corners of the seat 1, portions locating both below the seat 1 and between each of the mutually adjacent seat support frames 41, 41, more concretely, areas A1, A2, A2, A3 of a general triangle shape viewed from the bottom, each of which locates at a front of below the seat 1, right and left sides of below the seat 1, and a back of below the seat 1 respectively are open spaces where no frame exists. In this embodiment, the areas are set to be function adjusting spaces where the operating part is arranged (hereinafter the same codes A1, A2, A2, A3 as those of the above-mentioned areas are given to the function adjusting spaces) and the operating lever 62 is arranged in the function adjusting space A2 locating at the right side of below the seat 1 viewed from a seated position.

[0027] The chair body A comprises, as shown in Fig. 1, Fig. 3 and Fig. 9, the seat 1, the back 2 and the arm rest 7, and supported by the seat support structure 4 without using a back support rod, wherein a screw fastening part 11 into which a nut member is inserted as shown in Fig. 7 and Fig. 8 is arranged to hang at a position corresponding to each seat support frames 41 on the undersurface of the seat 1. The seat 1 is mounted on the seat support frames 41 by placing the seat 1 on each of the upper ends of the seat support frames 41 and then fastening a screw V1 inserted upward from beneath into the screw inserting part 41c of the seat support frame 41 until the screw V1 reaches the screw fastening part 11 arranged on the seat 1.

[0028] More specifically, this chair has an arrangement wherein each of the distal end parts of the seat support frames 41 constituting the seat support structure 4 is connected by each side of the seat frame 12 so as to form a frame structure three-dimensionally closed by the seat support frames 41 and the seat frame 12. This arrangement makes it possible to secure the strength of the chair as a whole so as not to be transformed due to impact or weight at a time of being seated even though the seat support frames 41 and the seat frame 12 are formed relatively thin.

[0029] As shown in Fig. 1 and Fig. 9, the seat 1 is so arranged that an opening 12a of inside the seat frame 12 is covered with tension by a mesh member 13 and the back 2 is so arranged that an opening 22a of inside the back frame 22 is covered with tension by a mesh member 23. A longitudinal rib arranged at a position to reinforce between the seat frame 12 and the back frame 22 is formed to extend toward a side direction significantly so that it can be used as the arm frame 71 so as to be the arm rest 7. Then the seat frame 12, the back frame 22 and the arm frame 71 are made of resin and integrally formed three-dimensionally.

[0030] More concretely, as shown in Fig. 1 and Fig. 2, the valid supporting part 22b that warps upward from a lumbar corresponding part 22d most projecting forward of the back frame 22 and the seat frame 12 are set to have generally the same width, a hip corresponding part 22c locating at a portion recessed along downward is gradually narrowed along downward, and a width of a boundary part X between the seat 1 and the back 2 is set to be smaller than a width of the valid supporting part 22b of the back frame 22 and a width of the seat frame 12. A rear end 71a of the arm frame 71 is formed to extend to a front side direction from the back frame 22 and a front end 71b of the arm frame 71 is formed to extend to an upper side direction from the seat frame 12, and then a peripheral border of an opening 7a formed by the arm frame 71, the seat frame 12 and the back frame 22 is formed in a curved shape not two-dimensionally but three-dimensionally, and whole of the arm frame, the seat frame and the back frame is integrally made of resin. More specifically, the opening 7a can be seen from not only a side view of Fig. 3 but also a front view of Fig. 2, a plain view of Fig. 6 and a bottom view of Fig. 7. The boundary part X between the seat 1 and the back 2 is, as shown in Fig. 8, of a continuous three-dimensional shape with a shape of a U-character whose opening faces forward in a longitudinal sectional view and its longitudinal sectional view forming a concave shape whose opening faces forward in a plain view and curving gently along a hip of a seated person. In addition, a front hanging part 15 is arranged at a front end of the seat 1. The front hanging part 15 is continuously arranged to the seat 1 to form a general reverse L-character in a longitudinal sectional shape as shown in Fig. 4 and its longitudinal sectional view forms a continuous three-dimensional shape with curving gently and projecting toward the front in a bottom view.

[0031] As shown in Fig. 1 and Fig. 2, the rear end 71a of the arm frame 7 is placed at generally the same height as that of the lumbar corresponding part 22d so that the rear end 71a is continuous to an end of the back frame 22, the back 2 is curved to form a concave shape facing the front in a plain view and the end of the back frame 22 faces the front side direction. Then the rear end 71a of the arm frame 7 also is formed to extend forward with making a gentle curve after extending toward the front side direction from the back frame 22. In addition, the front end 71b of the arm frame 71 is placed to be continuous to an end of the seat frame 12, the seat frame 12 is of a concave shape facing upward slightly in a front view and an end of the seat frame 12 faces toward upward and side direction slightly from a horizontal line. Then the front end 71b of the arm frame 71 also is formed to rise upward with making a gentle curve after extending from the seat frame 12 toward upward and side direction slightly from the horizontal line. Both a portion that extends to a front side direction from the back frame 22 and a portion that rises from the seat frame 12 are continuous to each of the upper ends of the arm frame 71 that horizontally extends back and forth. These arm frames 71 serve as a longitudinal rib for both the seat frame 12 and the back frame 22 from a viewpoint of a rib. And a horizontal part 71c is smoothly folded to be continuous to the upper end of the arm frame 71. A direction to break a master block in forming the chair body A is set as a direction of 45 degrees as being a general intermediate angle between the back and forth direction and the up and down direction (an arrow Z in Fig. 3).

[0032] As shown in Fig. 1 and Fig. 9, the mesh member 13, 23 as being another member to form a seating face is fitted into the opening 12a, 22a each of which exists inside the seat frame 12 or inside the back frame 22 through a mounting frame 110 or 120.

[0033] As shown in Fig. 9 and Fig. 10, at an opening edge of the back frame 22 arranged is a frame member mounting part 122. At a front face of the frame member mounting part 122 provided is a frame member mounting face 122a and at its back face provided is a groove 122b into which a plate shaped body is fitted. The mounting frame 120 in which the mesh member 23 is entangled is fitted into the front face of the frame member mounting part 122, and the mounting frame 120 is fastened with a screw V2 that is inserted into the frame member mounting part 122 of the back frame 22 from its back face, and then a decorative frame 121 is fitted into a position to cover the screw V2. On the mounting frame 120 formed is a supporting face 120a that bows toward a direction to gradually narrow its opening width with the mesh member 23 receiving a load.

[0034] In addition, as shown in Fig. 9 and Fig. 11, a frame member mounting part 112 having a frame member mounting face 112a at its upper face is arranged at an opening edge of the seat frame 12, the mounting frame 110 in which the mesh member 13 is entangled is fitted into an upper face of the frame member mounting part 112, and a screw V3 that is inserted into the seat frame 12 from its bottom face is fastened with the mounting frame 110. On the mounting frame 110 formed is a supporting face 110a that bows toward a direction to gradually narrow its opening width with the mesh member 13 receiving a load.

[0035] As mentioned above, this embodiment forms the chair shown in Fig. 1 and a three-dimensional space S is formed at least between the upper end of the leg support post 3 and the seat 1 wherein a dimension d is a sum of a length of the vertical part 41b of the seat support frame 41 and a length of the screw fastening part 11 that hangs from the seat frame 12 as shown in Fig. 4 and Fig. 8, which allows the seat 1 to sink into the space S with bowing as shown by a broken line in Fig. 4 due to the load applied to the seat 1 from the above. A size of the space S is so set that an operator can mount or dismount the cover 32a by inserting his or her hand and fingers and a tool, if necessary, at least at a time when no one sits on this chair, and the seat support structure 4 is a frame structure comprising the seat support frames 41. As a result, it is possible to mount or dismount the cover 32a by accessing the hand and fingers from any direction of both the back and front, and the right and left to the space S and to conduct maintenance of the internal working portion 61.

[0036] In addition, this chair has an arrangement that the seat support structure 4 locating below the seat 1 has multiple seat support frames 41, the working portion 61 is arranged at the center of the seat support structure 4 and the seat 1 is placed on the seat support frames 41 and fixed to the seat support frames 41 by means of the screws V1 only. As a result, maintenance of the working portion 61 can be conducted, if necessary, by exposing the working portion 61 with procedures of separating the seat 1 from the seat support structure 4 by unfastening the screws V1 as shown in Fig. 8 and of dismounting the cover 32a. Since the seat 1 is fixed to each of the seat support frames 41 at four points with the screws V1 as shown in Fig. 7, the seat 1 can be swirled horizontally to the seat support structure 4 with its distal end of each seat support frame 41 kept at generally the same height as shown in Fig. 4 and Fig. 8, at a time when the three screws V1 are unfastened, which also enables to expose the working portion 61. In this case, since the seat 1 is horizontally held by an appropriate seat support frame 41 of the seat support structure 4 at a position after the seat 1 is swirled, maintenance of the working portion 61 can be conducted without holding the seat 1 by hand.

[0037] If this chair is viewed from a visual point of view, the mesh member 13 set up with tension inside the seat frame 12 forms a translucent area with neither a seat frame of a block shape nor a shell arranged under the mesh member 13, and a silhouette of the seat support frames 41 constituting the seat support structure 4 and the blades 5 equiangularly radiating from the proximal portion of the seat support frames 41 can be seen on the seating face as shown in Fig. 12.

[0038] As mentioned above, if the inside of the seat frame 12 is the translucent area, not only a position of the operating part and a number thereof but also a general picture of its function can be visible from the above shown in Fig. 12 in case the operating part is arranged in the function adjusting space A1 through A3 in Fig. 7. In this embodiment, the operating lever 62 of the elevating mechanism 6 alone is arranged in the function adjusting space A2 locating at a lower right position when seated. As a result, it is easily visible that the operating lever 62 is arranged at one position alone, the operating lever 62 locates at the lower right position when seated and the operating lever 62 extends radially from the upper end of the leg support post 3 and is to operate the elevating mechanism 6 of a gas spring type. In addition, if an operating part locates in the other function adjusting space A1, A3 shown in Fig. 7, this operating part also can be visible from the above in Fig. 12. This arrangement makes it possible to easily visualize a number of the operating parts, a position thereof, a kind of function thereof or a way to operate the operating parts by making use of its silhouette.

[0039] As mentioned above, in accordance with this embodiment the chair A is so arranged that multiple seat support frames 41 extend from a center portion of a leg support post 3 toward a direction to be directed away gradually, undersurfaces of edge portions of a seat 1 are supported by distal end portions of the seat support frames 41, a portion locating both below the seat 1 and between the seat support frames 41, 41 lying next to each other is left open so that the portion can be used as a function adjusting space A1 through A3 where an operating part is arranged.

[0040] More specifically, since a conventional chair has an arrangement that a seat support of a block shape locates under a seat and the seat support occupies large space under the seat, there is a problem that it is difficult to secure a space to arrange an operating lever for mounting the operating lever on the seat support. On the other hand, in accordance with this embodiment, since the seat 1 is substantially supported by its edge portions and there is no need of arranging a seat support structure in close contact with a bottom face of a center portion of the seat 1, a mechanical component to adjust a function can be easily incorporated under the seat 1. In addition, since a transverse section of the seat support frame 41 can be made small, it is possible to obtain sufficient function adjusting spaces A1 through A3 around the leg support post 3 and to secure an environment where operation can be easily conducted. Furthermore, this structure can be made stronger against an eccentric load compared with a case of supporting the center of the seat 1, in addition to weight saving.

[0041] Especially, since the seat support frames 41 extend radially and support corners 1a, 1a, 1b, 1b of the seat 1 and at least the front below of the seat 1 and the right and left below of the seat 1 are left open, a choice of an area to arrange the operating part in the function adjusting space A1 through A3 can be widened. In addition, since undersurfaces of the corner portions of the seat frame 12 are supported by the four seat support frames 41, it is possible both to provide a stable supporting structure of the seat 1 and to secure the function adjusting spaces A1 through A3.

[0042] Furthermore, since the mesh member 13 of the seat 1 is translucent so that the position of the operating part arranged in the function adjusting space A1 through A3 is visible from the above and unlike the conventional arrangement most of the underside of the seat 1 is not covered with a shell or a frame, there is no problem that it is difficult to confirm a position of the operating lever 62 because the operating lever 62 is completely concealed by the seat 1 when seated. As a result, the position of the operating lever 62 is casually come into sight from the above and there is no need of groping for the operating lever 62 in a seated state.

[0043] Especially in this embodiment, since all of the operating part is visible no matter where the operating part is arranged in the function adjusting space A1 through A3 and only the operating lever 62 is visible from the above, it is possible to assure that the operating part is arranged at one portion and the position where the operating part is arranged.

[0044] In this case, since a distal end of the operating lever 62 arranged in the function adjusting space A2 locates at the upper end of the leg support post 3 and it is relatively easy for a seated person to understand that the operating lever 62 is a lever for the elevating mechanism 6, there is little chance for the seated person being embarrassed by the operation of the operating lever 62.

[0045] Especially in this embodiment, since the seat 1 has the opening 12a at the inner side of the seat frame 12 and generally whole of the function adjusting space A1 through A3 including the operating lever 62 is visible through the opening 12a, it is possible to confirm there is no other operating part existing and to easily figure out how to operate the operating lever 62 and to which direction the operating lever 62 should be operated.

[0046] Especially, since the seat 1 is translucent with a mesh member 13 set up inside the seat frame 12 and under the seat 1 is visible in a silhouette, it is possible to effectively prevent the function adjusting space A1 through A3 and the operating lever 62 from being visible unnecessarily clearly.

[0047] Concrete arrangement of each component is not limited to the above-mentioned embodiment.

[0048] For example, as shown in Fig. 13 through Fig. 16, three seat support frames 41, 41, 141 may extend from the leg support post 3 in a shape of a Y-character. With this arrangement, it is possible to effectively secure the function adjusting space at the front below of the seat and the right and left below of the seat.

[0049] The chair having this arrangement comprises the two front seat support frames 41(x) that extend radially toward a diagonal front direction in a plain view, and the seat support frame 141 that extends straight to the

rearward and supports the undersurface of the center part along a direction of the width at the rear of the seat frame 12, wherein the seat support frame 141 also serves as a reactive force mechanism of a rocking movement.

[0050] More specifically, the seat 1 of this chair is so arranged that the undersurfaces of the two front corners are axially mounted on the two front seat support frames 41(x) through a front axis p, and the undersurface of the rear center is axially mounted on the seat support frame 141 through a rear axis q. With this arrangement, when a seated person reclines against the back 2, the seat 1 rotates around the axis p and a backside of the seat 1 sinks.

[0051] Then the seat support frame 141 that supports the seat 1 comprises a gas spring 141a and a rocking spring 141b that is arranged around an axle center of the gas spring 141a and that is compressed in conjunction with a compression movement of the gas spring 141a, wherein an end of the gas spring 141a is inserted into the diameter expanding base part 32 and supported by a retainer 141c together with the rocking spring 141b as shown in Fig. 15. A working portion 140x of the gas spring 141a is arranged at a position penetrating the retainer 141c and usually a suppressing member 162a arranged at an inner end of the operating lever 162 rotates from a position shown in Fig. 15 to a position where the suppressing member 162a can press a working portion 140x and then is held so as to hold the gas spring 141a in an open state. Next, the suppressing member 162a is distanced from the working portion 140x, as shown in Fig. 15, by rotating the operation lever 162 so as to fix the suppressing member 162a at a predetermined position. Like the operating lever 62 in the above-mentioned embodiment, an operation of lifting the operating lever 162 makes the working portion 140x retroject, which frees the elevating mechanism 6 and an operation of releasing the operation of lifting makes the working portion 140x project, which locks the elevating mechanism 6.

[0052] In addition, this chair is provided with a reactive force adjusting mechanism for a rocking movement. An operating rod 262 shown in Fig. 13 and Fig. 14 is an operating part to adjust a reactive force by making use of a rotational movement. A wedge member, not shown in drawings, arranged in the diameter expanding base part 32 is screw-fed toward a paper-based vertical direction in Fig. 15 by operating the operating rod 262 to make a rotational movement, which moves the retainer 141c to a compression direction or an extensional direction of the spring 141b so as to increase or decrease the reactive force.

[0053] With this arrangement, it is possible to effectively arrange the operating lever 162 that functions as both adjusting the elevating mechanism 6 and fixing/releasing a rocking movement in the function adjusting space A2 locating at the right below of the seat 1 when seated and to effectively arrange the operating rod 262 to adjust the rocking reactive force in the function adjusting space A2 locating at the left below of the seat 1 when seated.

[0054] In addition, in case that the back 2 is provided with a lumbar support adjusting mechanism, it is possible to arrange an operating part in the function adjusting space A3 locating at the rear below of the seat 1 or it is possible to arrange an appropriate operating part in the function adjusting space A1 locating at the front below of the seat 1, thereby enabling various modes of utilization.

[0055] Since a general complete shape of the operating part is visible through the mesh member 13 arranged on the seat 1 as shown in Fig. 17, it is possible for a person to understand a position and a number of the operating part, a way to operate the operating part without a special conscious before seated, thereby to improve user-friendliness of the chair.

[0056] Since the chair of this embodiment comprises a visible function, the same effect can be obtained as that of the above-mentioned embodiment although the operating part is arranged at a portion which is invisible without taking a look at from below on the condition that the seat 1 is opaque.

[0057] Other arrangement may be variously modified without departing from the spirit of the invention.

[0058] For example, in the above-mentioned embodiment in order to support a chair body A by a seat support structure 4, with the view that a front end part 7b of the armrest 7 is connected to the seat 1 and a front edge of the seat 1 extends front from the front end part 7b, the seat support structure 4 is so arranged that multiple seat support frames 41 extend from a center portion of the leg support post 31 toward four corners of the seat 1 and an undersurface of the seat 1 is supported by the distal end portions of the seat support frames 41, and specially the front two seat support frames 41(x) locate at a position front of the front end part 7b of the armrest 7. As a result, an appropriate operating part K1 can be mounted on a portion near an extending end of at least either one of the two seat support frames 41(x) locating at the front. The operating part K1 can be operated without being disturbed by the armrest 7 and just with a body of the seated person bent forward a little and is visible from the above through the seat 1, thereby to improve operationality.

[0059] In accordance with the above-mentioned embodiment, since the armrest 7 is connected to the back 2 with the rear end part of the armrest 7 extending inward in a plain view, the seat support structure 4 is so arranged that multiple seat support frames 41(X), 41(Y) extend from the center portion of the leg support post 31 toward four corners of the seat 1 and an undersurface of the seat 1 is supported by the distal end portions of the seat support frames 41(X), 41(Y), an appropriate operating part K2 can be mounted on a portion locating both below a rear end part 7a of the armrest 7 and at least either one of the two rear seat support frames 41(Y) locating at the rear as shown in Fig. 18. The operating part K2 can be operated without being disturbed by the armrest 7 and

just by bending a body of the seated person right or left with his or her shoulder drooping a little and is visible from the above through the seat 1, thereby to improve operationality.

[0060] As the operating part K1, K2 represented is that an opening 410a is arranged on a wall face near an extending end of the seat support frame 41 and a lever 410b that can oscillate up and down as being the operating part is exposed from inside of the seat support frame 41 through the opening 410a as shown in Fig. 19(a) so as to be operated, or that a lever 411a that can make a sliding movement up and down as being the operating part is fittingly inserted over the seat support frame 41 as shown in Fig. 19(b). If a wire is connected to these levers 410b, 411a, it is possible to effectively telecontrol various members that provide the chair with various functions, starting with a gas spring.

[0061] Furthermore, the seating face may be transparent or translucent made of acrylic material in stead of the mesh member. This arrangement produces the same effect visually as that of the above-mentioned embodiment.

[0062] The present claimed invention intends to newly provide a convenient chair that is structurally easy to arrange an operating lever and that is easy for a seated person to see a position of the operating lever.

[0063] The chair is so arranged that multiple seat support frames 41 extend from a center portion of a leg support post 3 toward a direction to be directed away gradually, undersurfaces of edge portions of a seat 1 are supported by distal end portions of the seat support frames 41, a portion locating both below the seat 1 and between the seat support frames 41, 41 lying next to each other is left open so that the portion can be used as a function adjusting space A1 through A3 where an operating part is arranged.

Claims

1. A chair wherein
multiple seat support frames extend from a center portion of a leg support post toward a direction to be directed away gradually, undersurfaces of edge portions of a seat are supported by distal end portions of the seat support frames, a portion locating both below the seat and between the seat support frames lying next to each other is left open so that the portion can be used as a function adjusting space where an operating part is arranged.

2. The chair described in claim 1, wherein the seat support frames extend radially and support corner portions of the seat, and at least the front below of the seat and the right and left below of the seat are left open.

3. The chair described in claim 2, wherein undersurfaces of corner portions of the seat frame are supported by the four seat support frames.

4. A chair wherein
a chair body with an armrest is supported by a seat support structure, the seat support structure is so arranged that multiple seat support frames extend from a center portion of a leg support post toward four corners of a seat and an undersurface of the seat is supported by distal end portions of the seat support frames, an operating part is mounted on a portion near an extending end of at least either one of the two seat support frames locating at the front so that a space surrounding the seat support frame can be used as a function adjusting space.

5. A chair wherein
a chair body with an armrest is supported by a seat support structure, the armrest is connected to a back with a rear end part of the armrest extending inward in a plain view, the seat support structure is so arranged that multiple seat support frames extend from a center portion of a leg support post toward four corners of a seat and an undersurface of the seat is supported by distal end portions of the seat support frames, an operating part is mounted on a portion locating both below the rear end part of the armrest and at least either one of the two seat support frames locating at the rear so that a space surrounding the seat support frame can be used as a function adjusting space.

6. The chair described in either one of claim 1, claim 2, claim 3, claim 4 and claim 5, wherein at least a part of a seat is transparent or translucent so that a position of the operating part arranged in the function adjusting space is visible from the above.

7. The chair described in either one of claim 1, claim 2, claim 3, claim 4 and claim 5, wherein at least a part of a seat is transparent or translucent so that each position of all of the operating parts arranged in the function adjusting space is visible from the above.

8. The chair described in either one of claim 6 and claim 7, wherein also a general picture of a function of the operating part arranged in the function adjusting space is visible from the above.

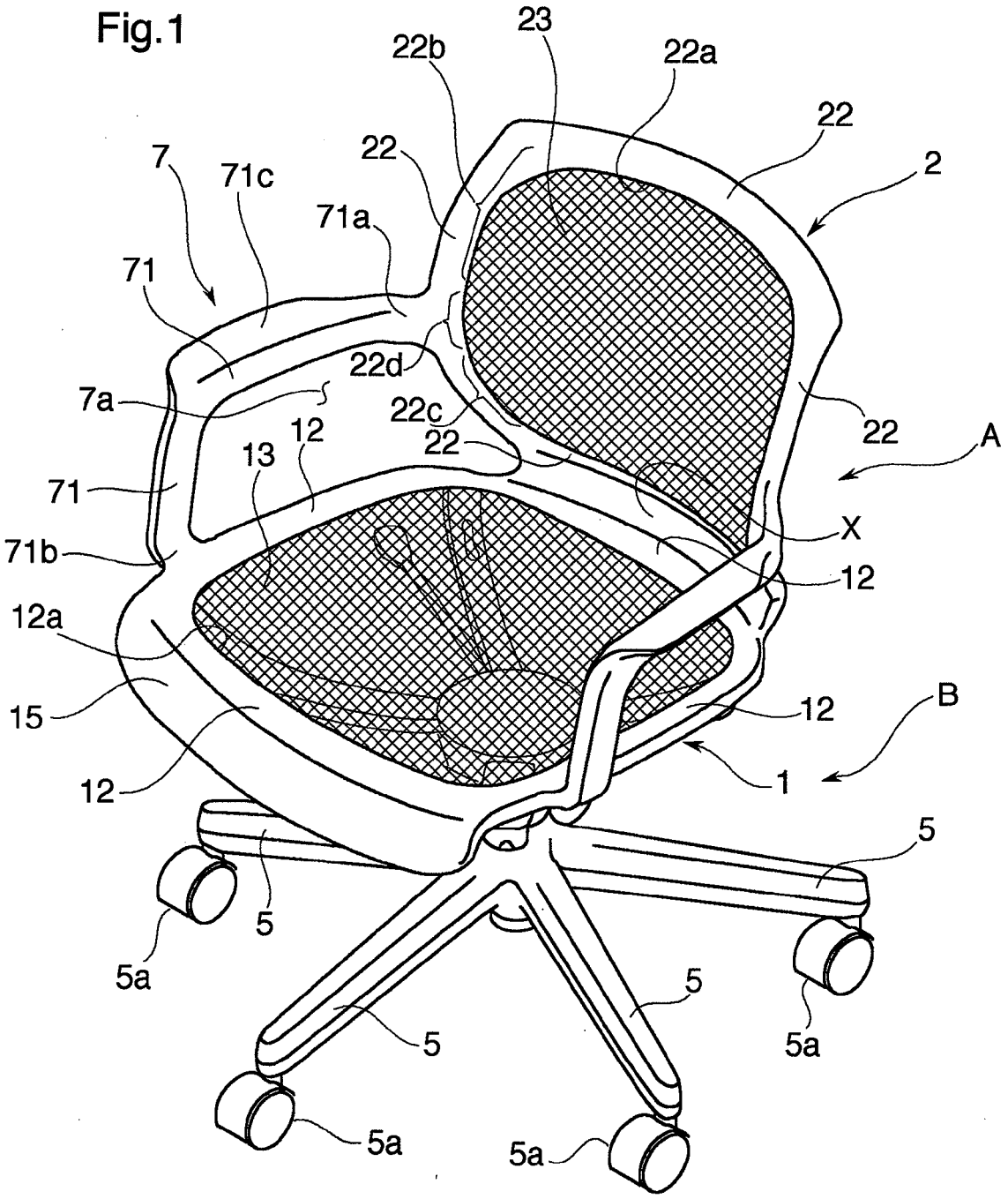
9. The chair described in either one of claim 6, claim 7 and claim 8, wherein the seat has an opening at an inner side of the seat frame and generally whole of the function adjusting space including the operating part is visible through the opening.

10. The chair described in either one of claim 6, claim 7 and claim 8, wherein at least a part of the operating part is arranged at a portion which is invisible without

taking a look at from below on the condition that the seat is opaque, and the operating part is visible through the seat that is transparent or translucent.

11. The chair described in either one of claim 6, claim 7, claim 8, claim 9 and claim 10, wherein
the seat is translucent with a mesh member set up inside the seat frame.

Fig.1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B
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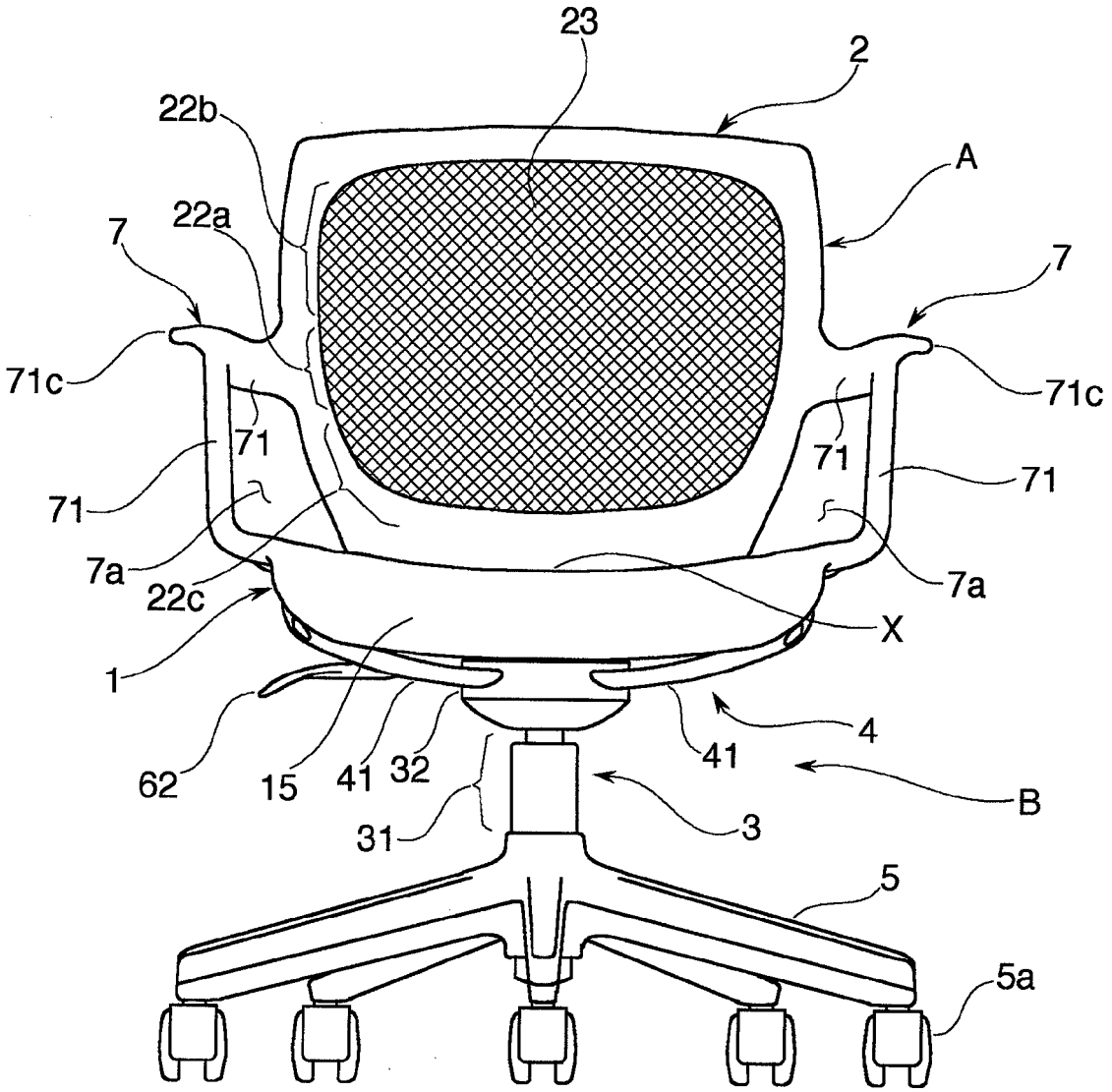
5a
5a
5a

Fig.2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5a

Fig.3

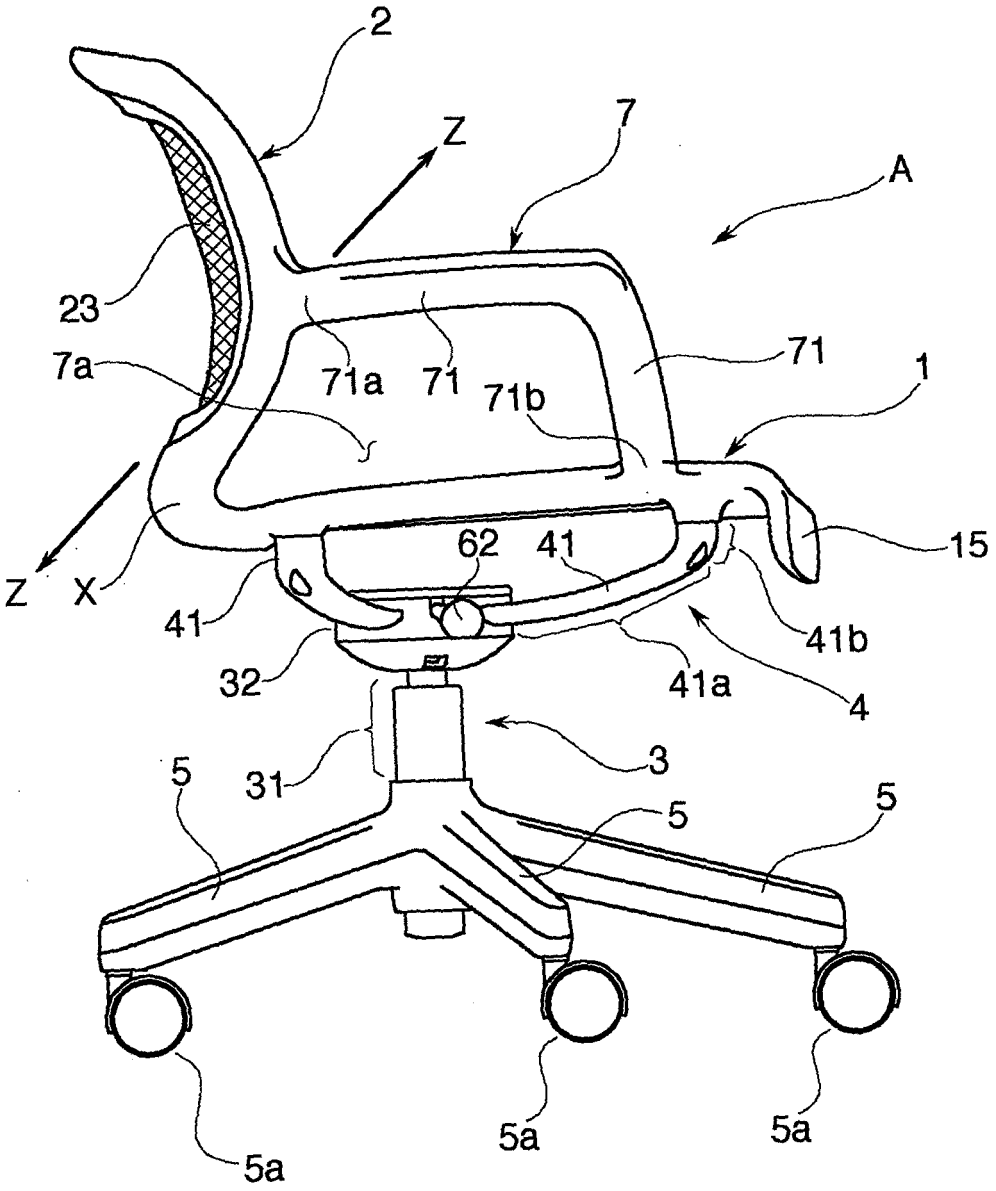
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Fig.4

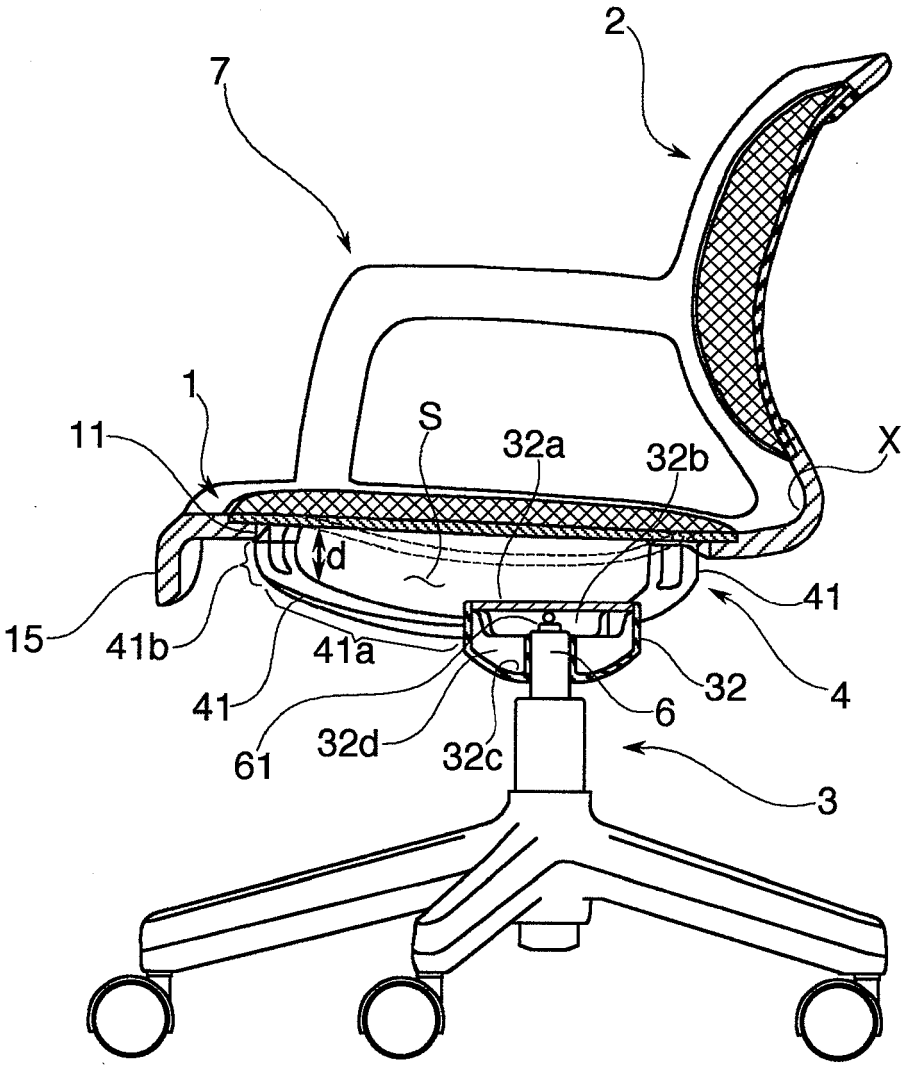


Fig.5

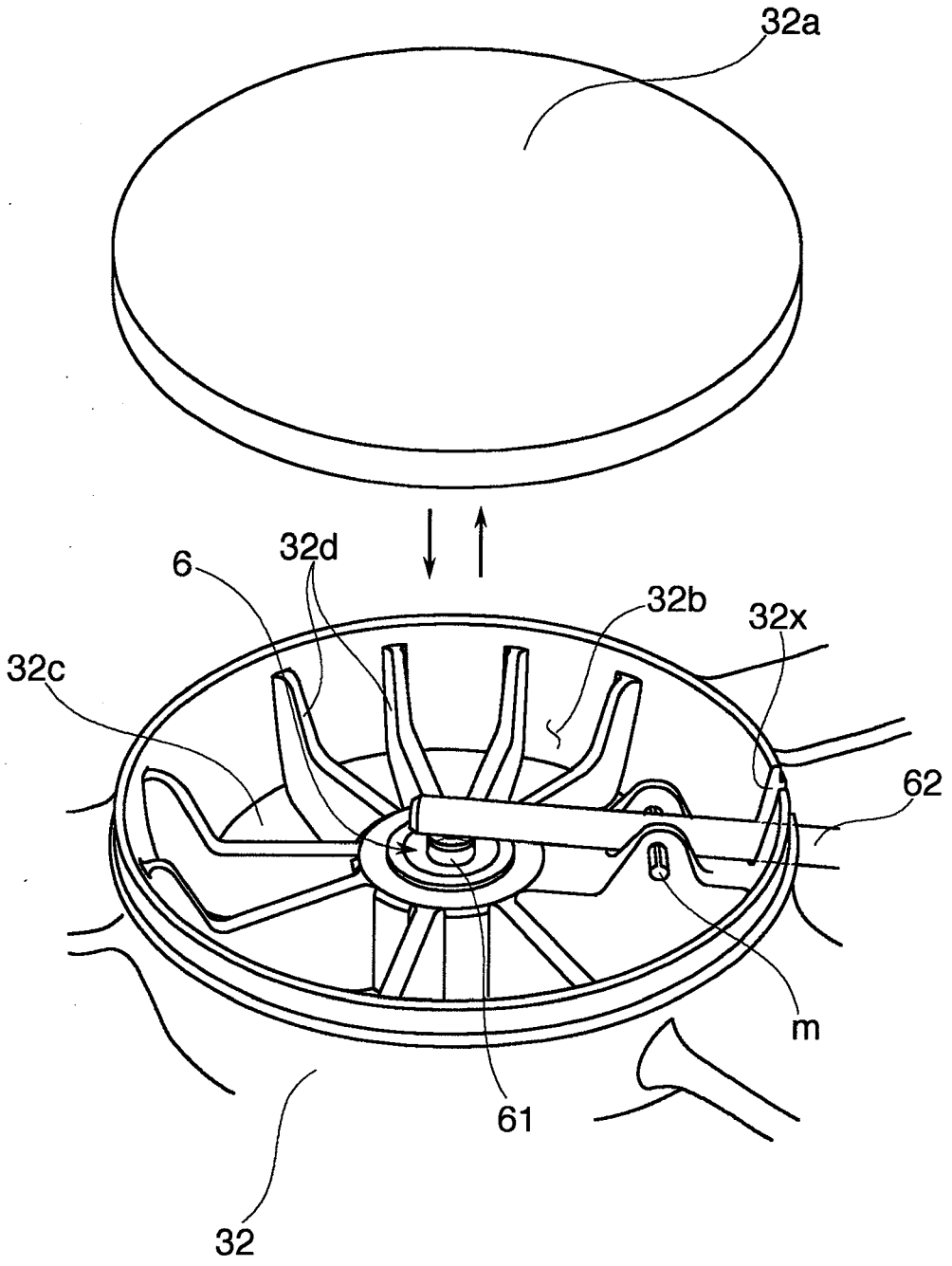
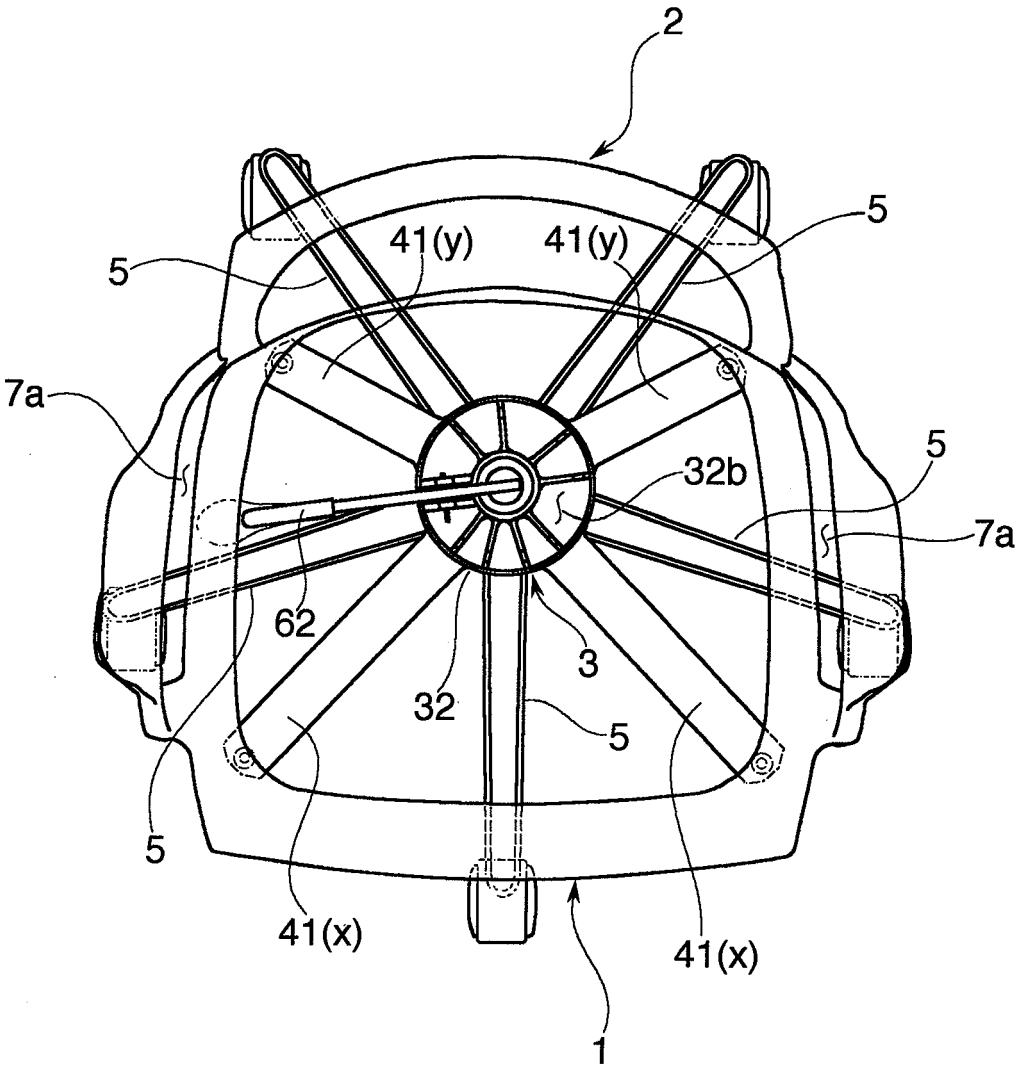


Fig.6



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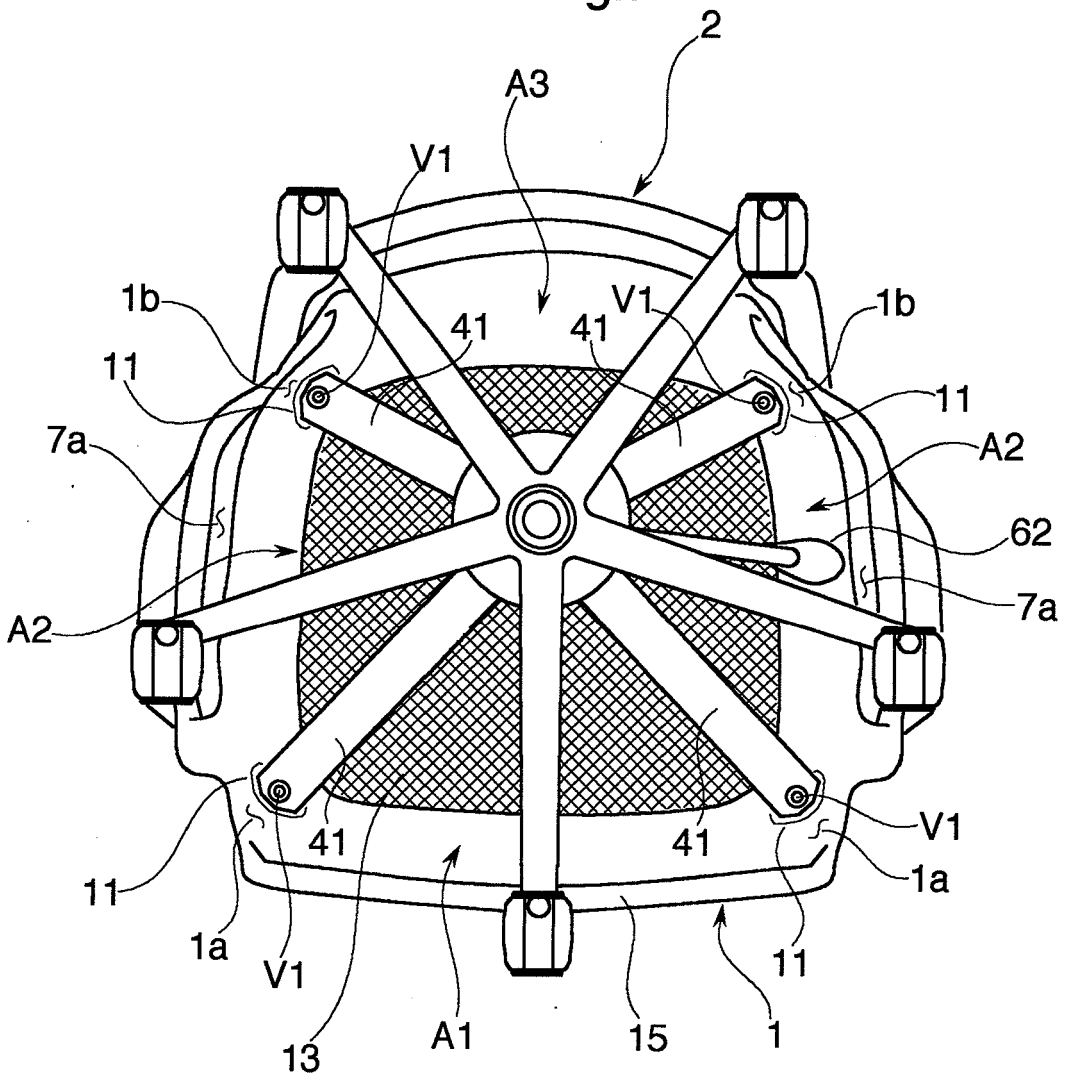
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A1
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Fig.8

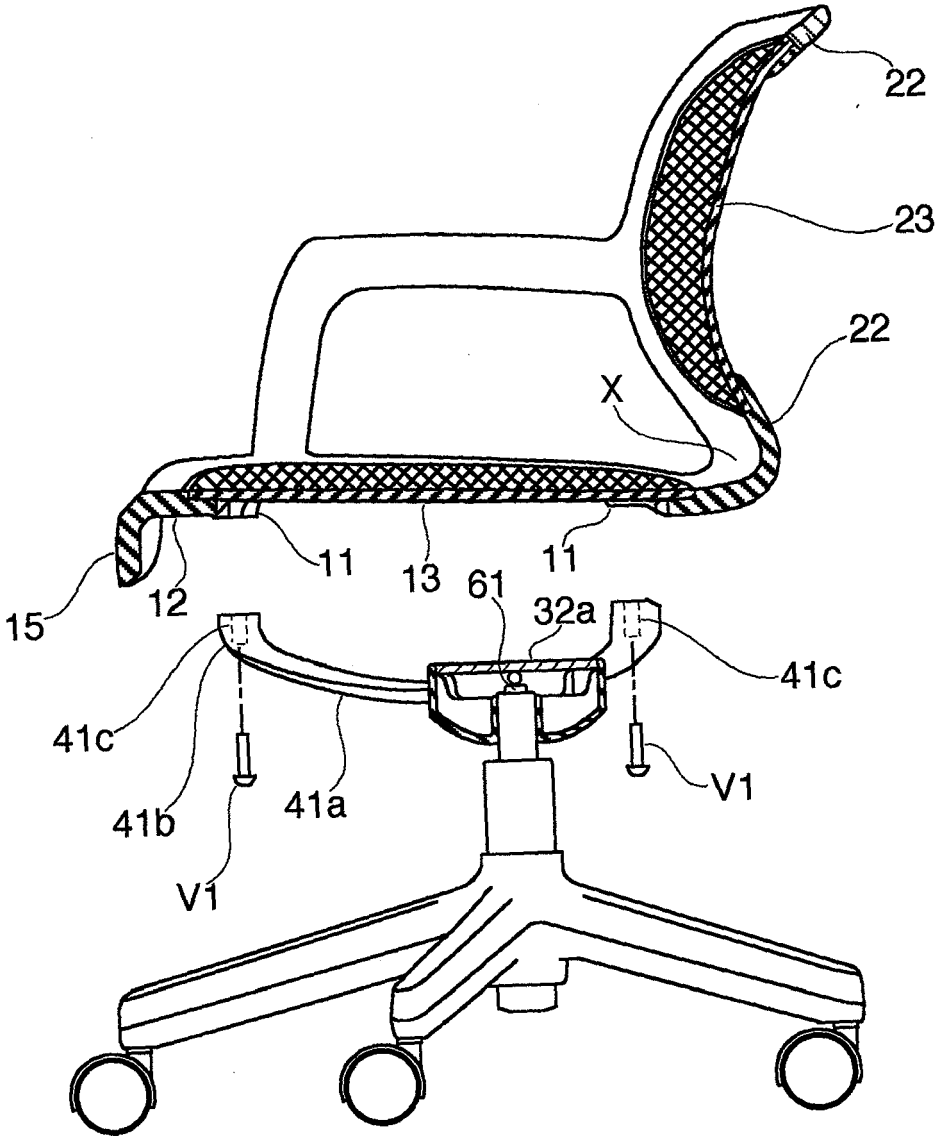

Fig.9

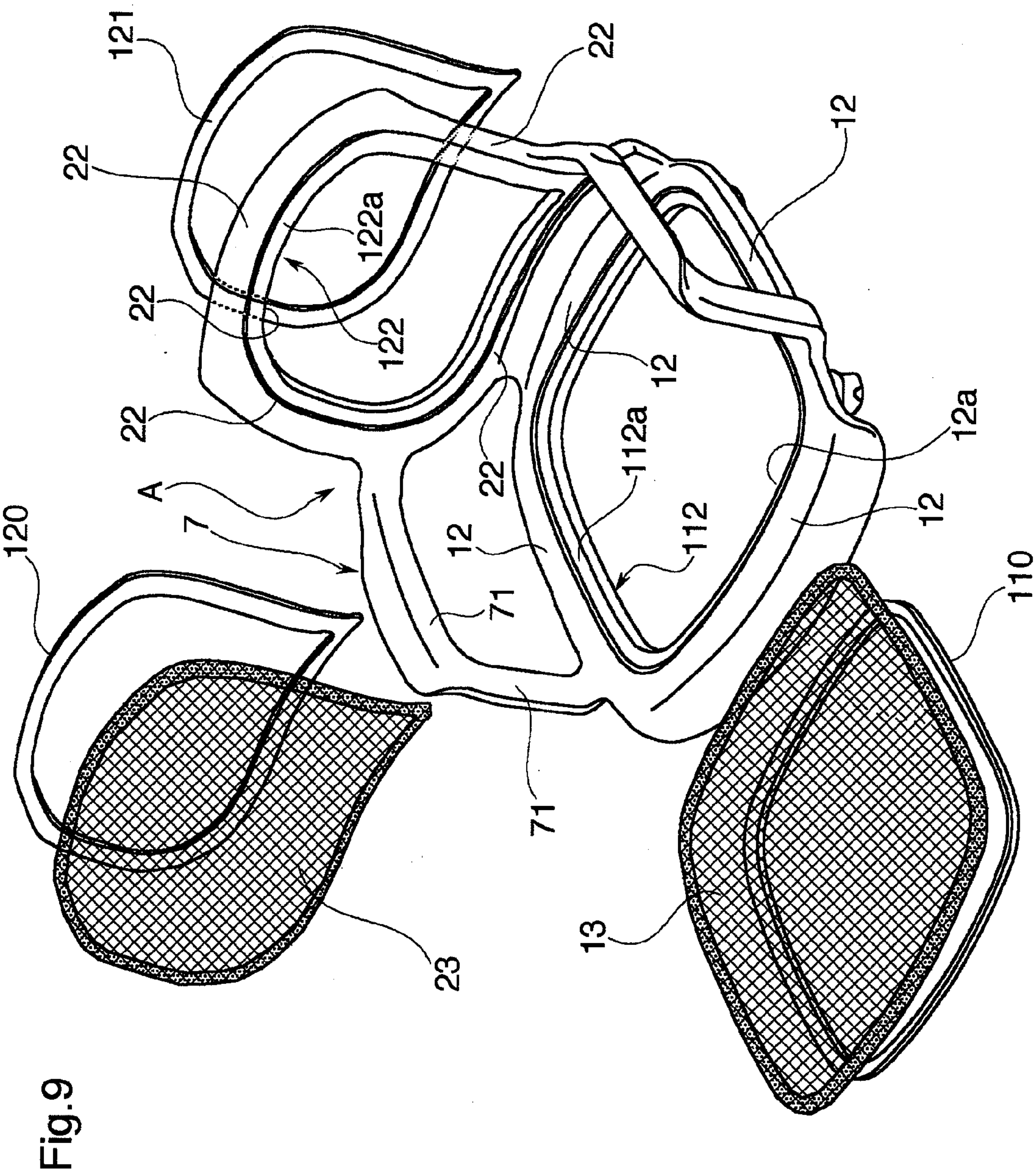
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Fig.10

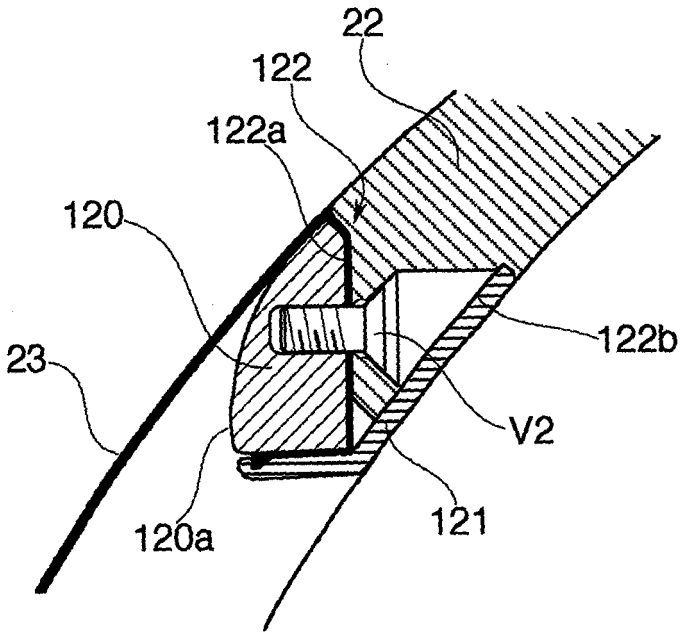


Fig.11

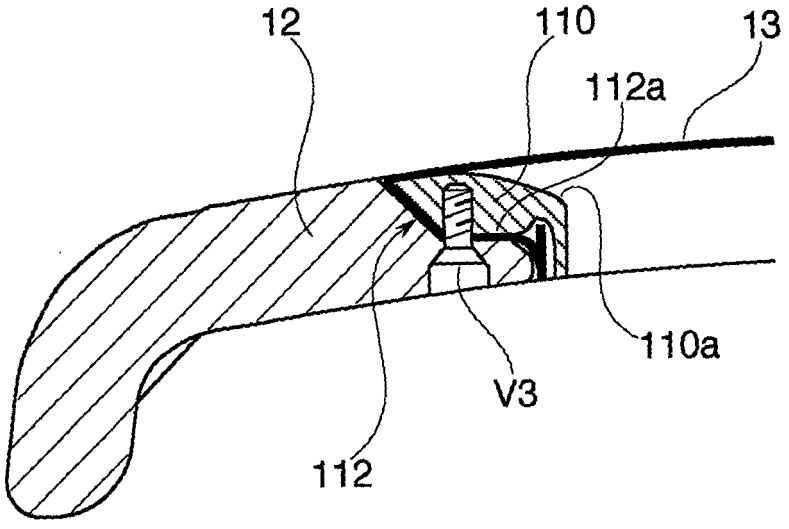


Fig.12

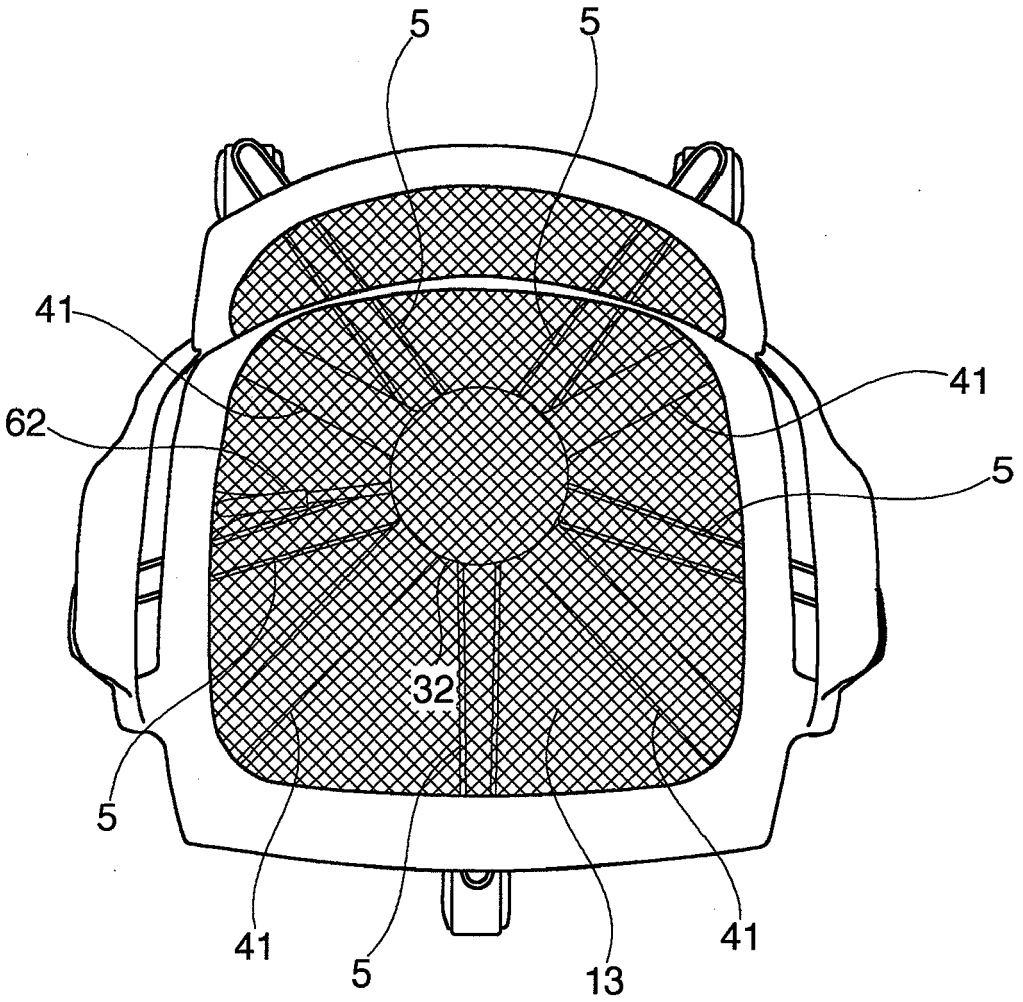


Fig.13

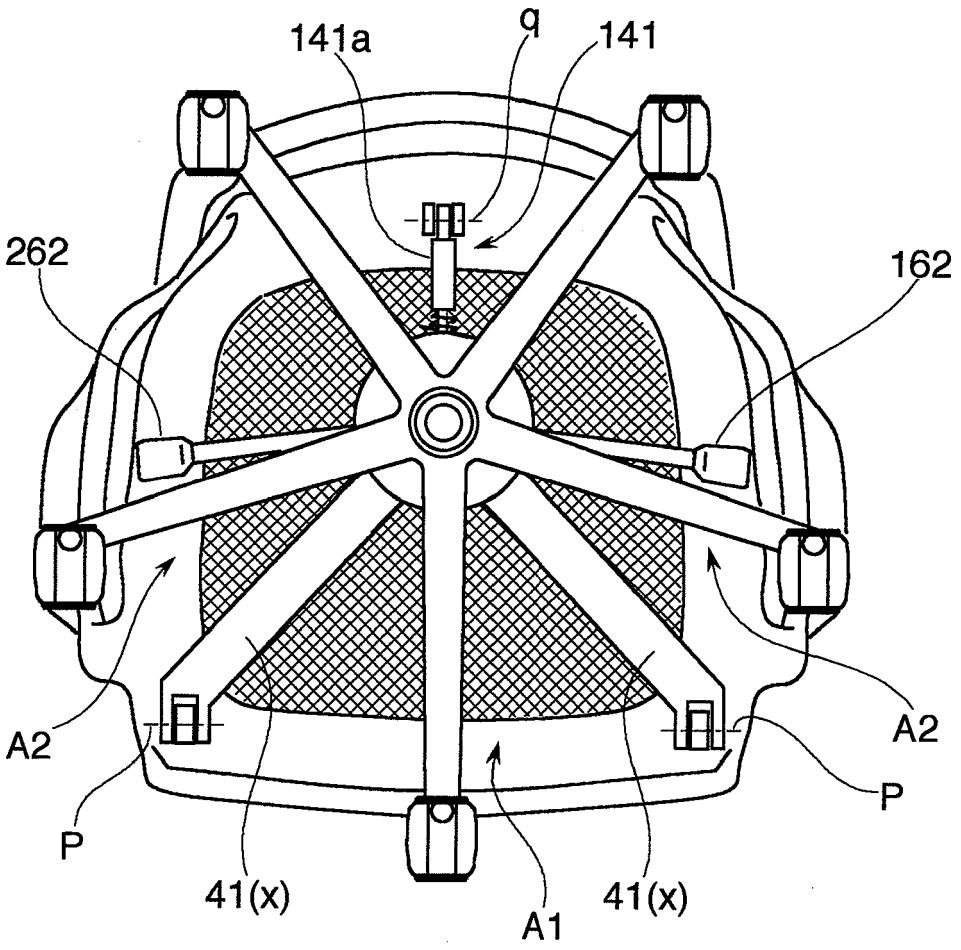


Fig.14

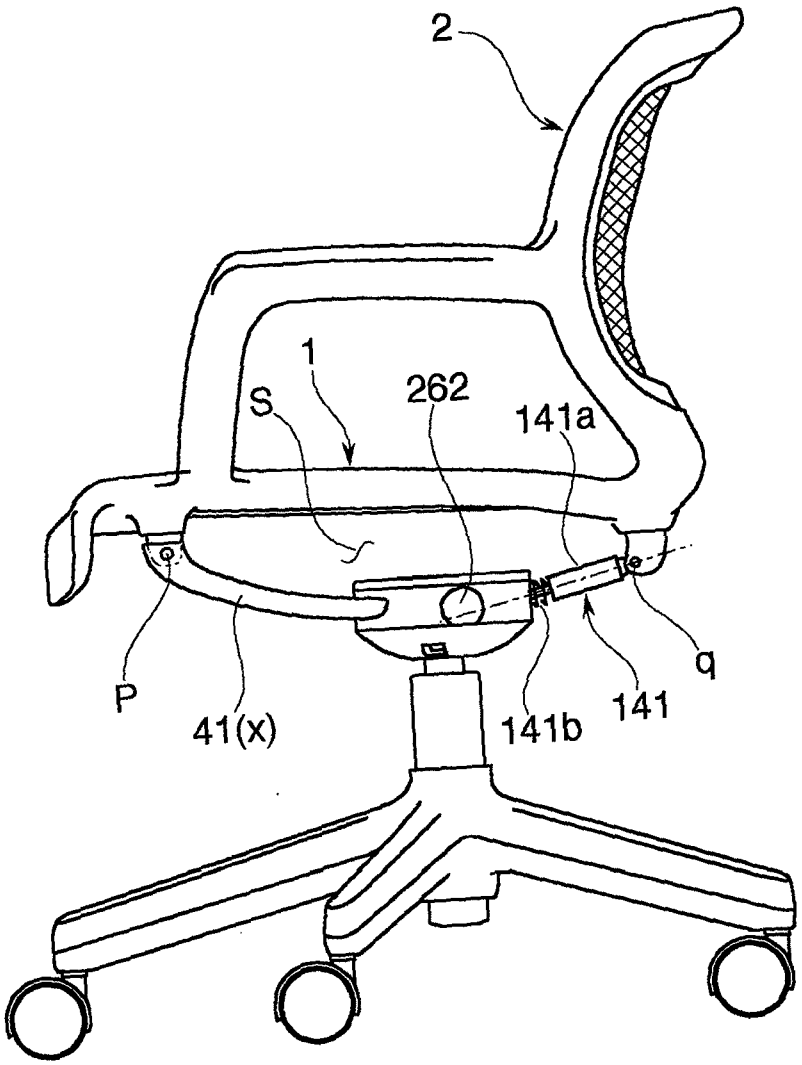


Fig.15

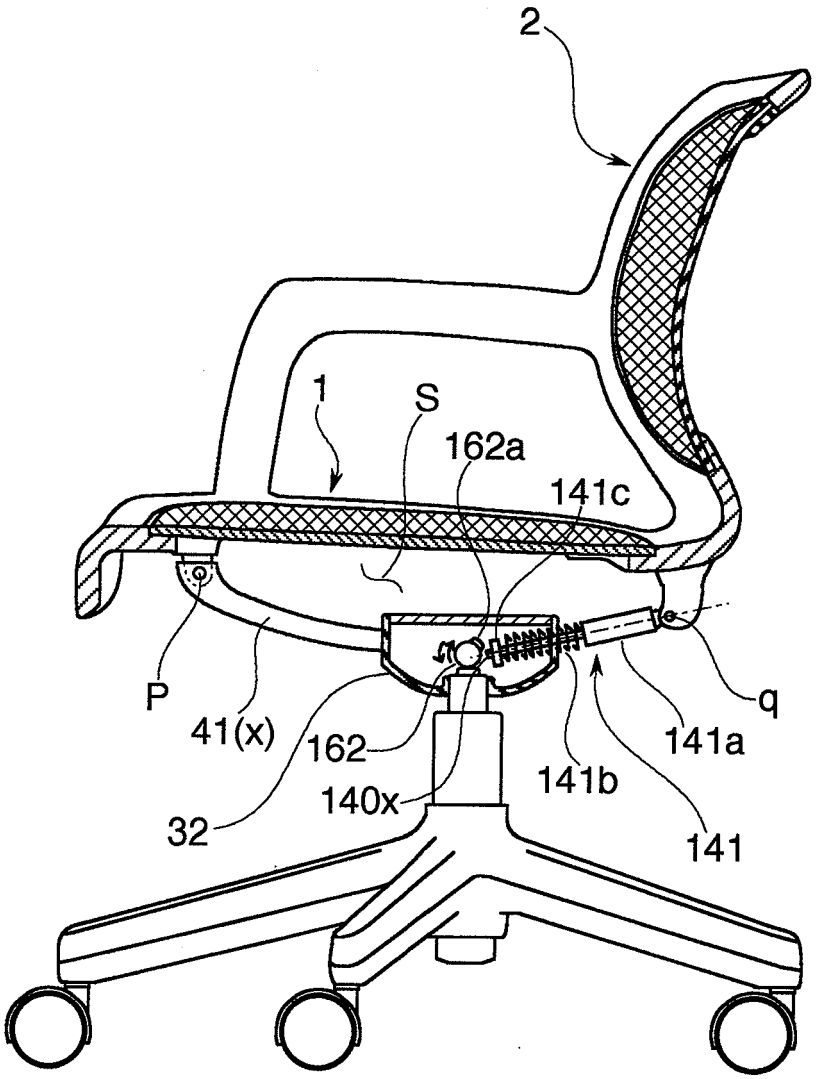


Fig.16

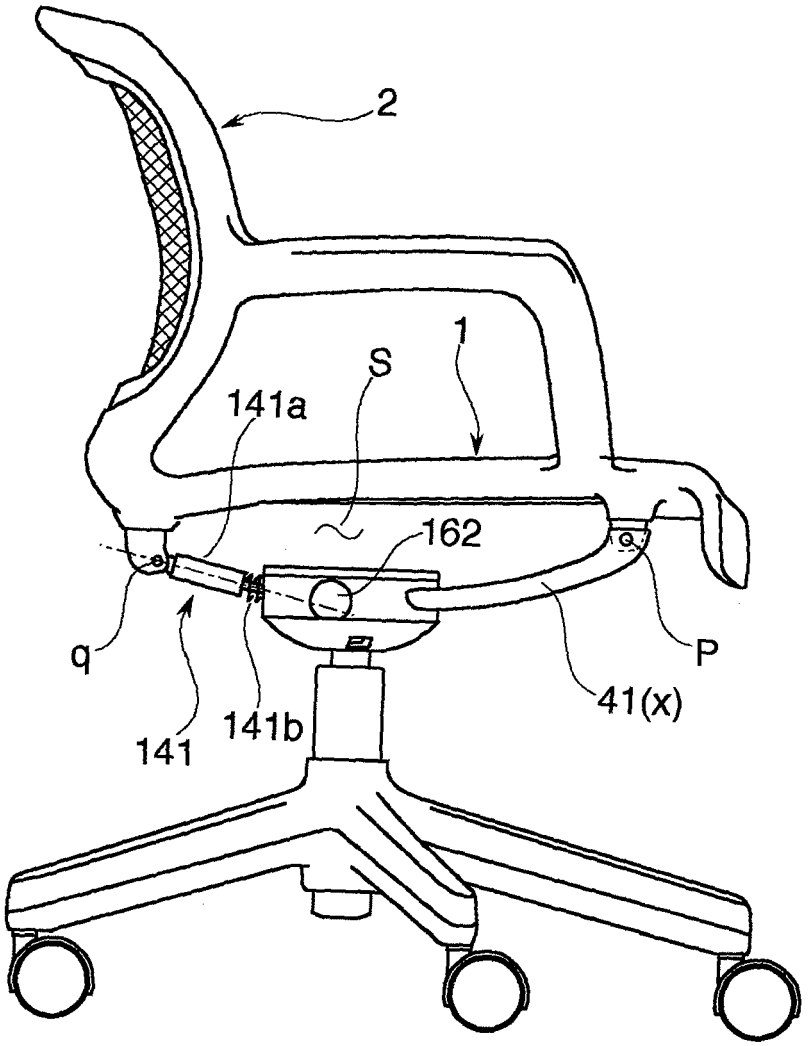


Fig.17

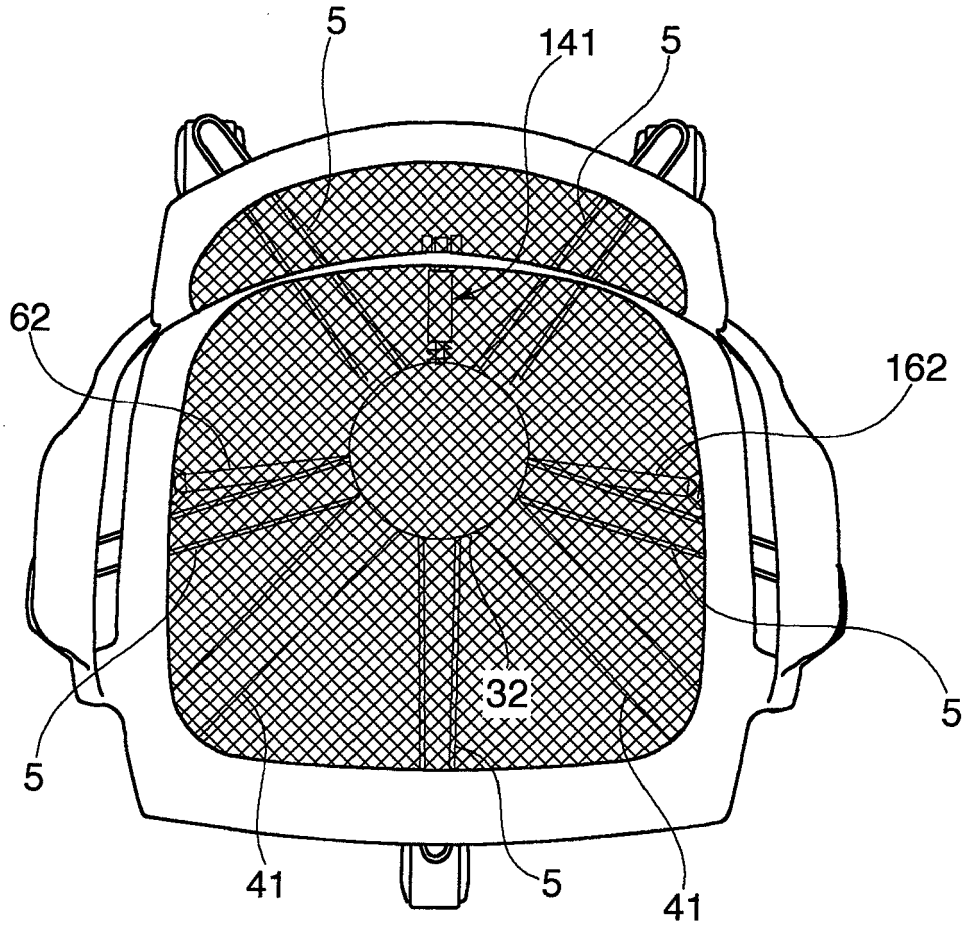


Fig.18

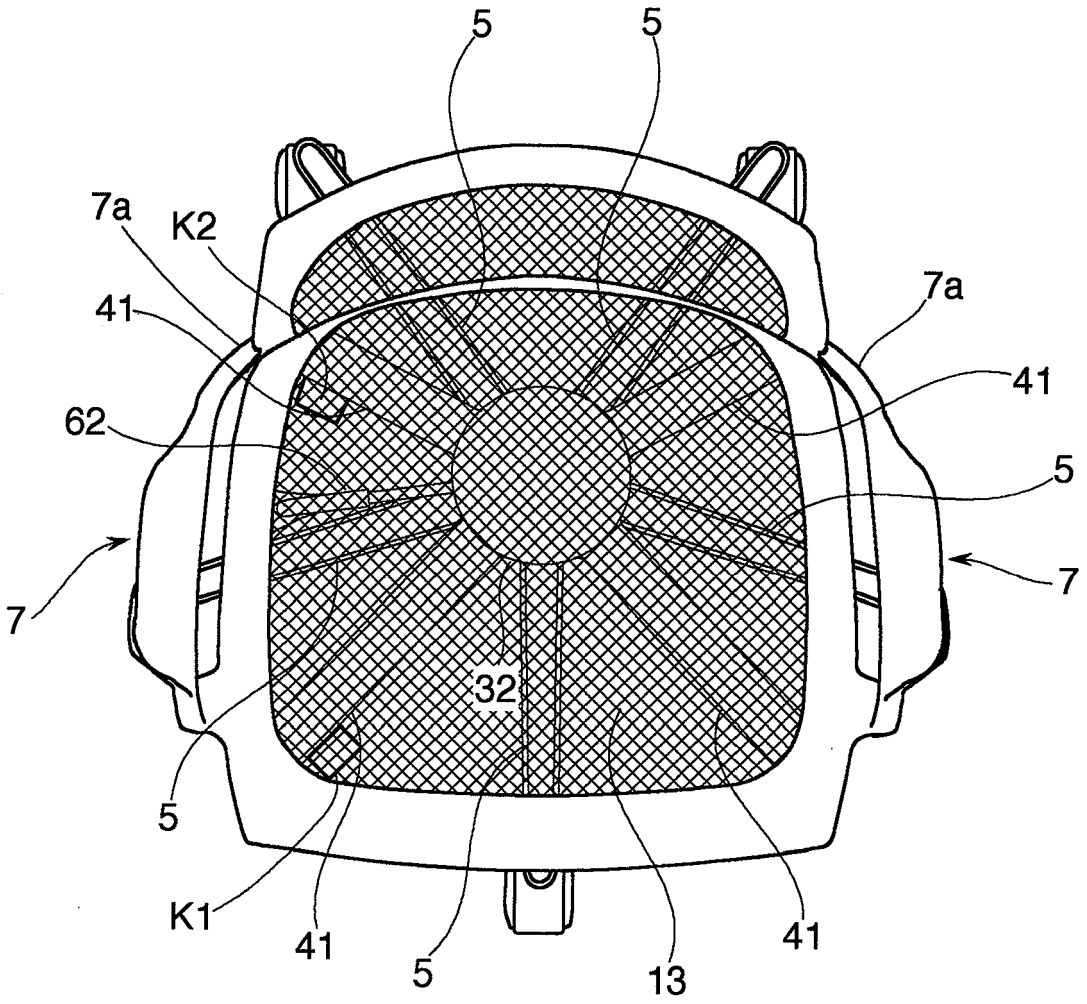
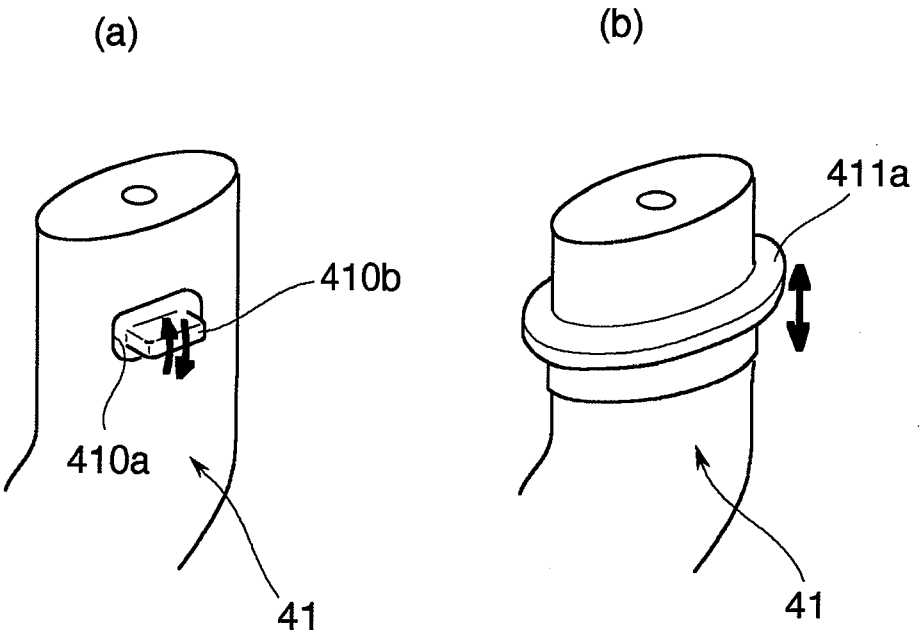


Fig.19



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EUROPEAN SEARCH REPORT

Application Number
EP 07 10 4033

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X Y	US 2 447 283 A (SHELDRICK HENRY W) 17 August 1948 (1948-08-17) * column 2, line 32 - column 4, line 11; figures 1-3 *	1-4 5-9,11	INV. A47C1/032
Y	US 2002/003368 A1 (VANDERIET DOUGLAS M [US] ET AL) 10 January 2002 (2002-01-10) * paragraph [0139]; figures 1-53 *	5-9,11	
P,A	EP 1 719 435 A (JSJ SEATING COMPANY TEXAS L P [US]) 8 November 2006 (2006-11-08) * column 2, lines 7-12; figures 1-55 *	5-11	
A	GB 599 194 A (AUTOMATIC PRODUCTS COMPANY) 8 March 1948 (1948-03-08) * page 4, columns 51-84; figures 1-4 *	4,5	

TECHNICAL FIELDS SEARCHED (IPC)

A47C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	13 August 2007	Vollering, Johannes

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13-08-2007

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