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(11) **EP 1 252 839 A2**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
30.10.2002 Bulletin 2002/44

(51) Int Cl.7: **A47C 7/40**

(21) Application number: **02009546.9**

(22) Date of filing: **26.04.2002**

(84) Designated Contracting States:
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE TR**
Designated Extension States:
AL LT LV MK RO SI

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(30) Priority: **27.04.2001 IT VI20010091**

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(54) **Chair with adjustable back**

(57) A chair (1, 30, 40) is disclosed comprising a seat (11, 41) resting on a bearing structure (12) arranged leaning on the ground and a back (13, 33, 43) connected to an upright element (14, 34, 44) belonging to the seat (11, 41) of the bearing structure (12). The

back (13, 33, 43) and the upright element (14, 34, 44) are connected to each other through joint means (15, 35) removably snap coupled by elastic deformation of the back (13, 33, 43) and/or the upright element (14, 34, 44).

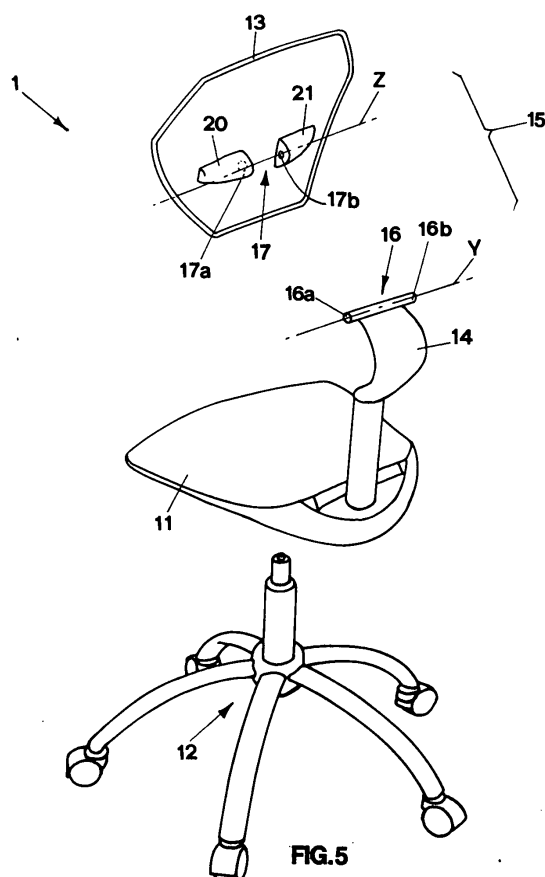


FIG.5

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Description

[0001] The present invention relates to a chair with back adjustable as to height and orientation.

[0002] Chairs and arm-chairs, particularly for office use, have been known, comprising a seat resting on a bearing structure leaning on the ground and a back which can be adjusted as to height and orientation, connected to an upright element fixed either to the seat or to its bearing structure.

[0003] Seat and back generally have ergonomic shapes for a comfortable sitting.

[0004] The possibility to adjust the back as to height is obtained by making the upright element telescopic, while the orientation possibility is obtained by connecting the back to the upright element through pivoting pins.

[0005] The prior art provides for constructional designs of the kind shown in Figs. 1 to 3 where the upright element generally indicated with numeral 1, comprises a sheath 2 in which a rod 3 supporting at its end the back 4 is telescopically sliding.

[0006] The connection of rod 3 to the back 4 is obtained through a flange 5 which, as shown more particularly in Figs. 2 and 3, is provided with holes 6 for screws 6a connecting to the back 4 and slots 7 pivotally receiving pins 8 provided at the end of rod 3.

[0007] Coupling of pins 8 in the corresponding slots 7 is a nip free coupling so that the back 4 may be rotated along both directions indicated by arrow 9 around the longitudinal axis X defined by pins 8.

[0008] The known chairs and arm-chairs of the above mentioned kind having the back adjustable as to height and orientation, have however some drawbacks.

[0009] A first drawback consists in that to obtain orientation of the back it is necessary to use the flange connecting the upright element to the back and this involves an increase of the manufacturing costs of the chair.

[0010] Another drawback consists in that application of the flange to fix the back to the upright element is obtained by screws and this also causes an increase of the assembling costs.

[0011] A further drawback consists in that to obtain also the height adjustment of the back, the upright element comprises an outer shell and a telescopically sliding inner rod with a further increase of the manufacturing cost.

[0012] Finally working of the sheaths and the sliding rod, their coupling and installation of the members blocking them to stop the back in the intended position, involve constructional difficulties with consequent further manufacturing and assembling costs.

[0013] The present invention aims at overcoming the above mentioned drawbacks.

[0014] More particularly a first object of the invention is to provide a chair with movable back adjustable as to height and orientation, having a lower number of components in comparison with equivalent chairs of the prior

art.

[0015] Another object of the invention is to provide a chair allowing the height adjustment of the back using an upright element made of a single piece.

[0016] A further object of the invention is to provide a chair easier to be carried out in comparison with equivalent chairs of the prior art.

[0017] A last but not least object of the invention is to provide a chair easier to be assembled in comparison with the known chairs.

[0018] Said objects are attained by making a chair with movable back that according to the main claim comprises:

- a seat resting on a bearing structure leaning on the ground;
- a back connected to an upright element belonging to said seat and/or said bearing structure and is characterised in that said back and said upright element are mutually connected through joint means removably snap coupled by elastic deformation of said back and/or said upright element.

[0019] According to the preferred embodiment hereinafter described, the possibility of orienting the back relative to the upright element is obtained by coupling of pins made in the upright pivotally coupled in corresponding slots made in the back, wherein coupling of the pins in the corresponding slots is obtained by elastic deformation of the back.

[0020] Preferably but not necessarily the back is therefore made of elastically yielding material such as plastic material or flexible metal sheet.

[0021] As to the possibility to move vertically the back, this is obtained by a hole in the seat slidingly receiving the upright element supporting the back.

[0022] Finally the upright is made as a single piece.

[0023] Blocking means allow to fix the upright element and consequently the back supported thereby in the desired adjustment position.

[0024] Advantageously the chair of the invention is of easier and cheaper construction.

[0025] Still advantageously its assembly is quicker and may be carried out even by the purchaser without any tool.

[0026] This gives the further advantage that the chair may be sold disassembled and packed in assembling kits.

[0027] The chair of the invention is now described with reference to the accompanying drawings in which:

- Figs. 1 to 3 show the detail of the back of a chair or arm-chair belonging to the prior art;
- Fig. 4 is an isometric back view of the chair of the invention;
- Fig. 5 is an exploded view of the chair of Fig. 4;
- Figs. 6 to 8 show the assembling operations of the back to the upright element;

- Fig. 9 is a constructional variation of the chair of the invention;
- Fig. 10 is an isometric back view of another constructional variation of the chair of the invention; and
- Fig. 11 is a partial longitudinal sectional view of the constructional variation of the chair of the invention shown in Fig. 10.

[0028] The chair of the invention is shown in Figs. 4 and 5 where it is generally indicated with reference numeral 10.

[0029] One can see that the chair comprises a seat 11 resting on a bearing structure 12 leaning on the ground and a back 13 which is connected to an upright element 14 associated to the seat 11.

[0030] In a different constructional embodiment the upright element 14 may belong to the bearing structure 12 instead of the seat 11.

[0031] According to the invention said back 13 and said upright element 14 are mutually connected through joint means generally indicated with numeral 15, that can be removably snap coupled by elastic deformation of the said back 13.

[0032] Said joint means 15 as shown more particularly in Fig. 5, comprise projecting elements 16 belonging to the upright 14 and slots 17 belonging to the back 13. More particularly as shown in Figs. 6 to 8, the projecting elements 16 comprise a couple of pins 16a, 16b mutually coaxial along a longitudinal axis Y defined thereby and protruding from opposite parts of the upright element 14 of which they are part.

[0033] Said pins are inserted in the corresponding slots 17 consisting of holes 17a, 17b also mutually coaxial along a longitudinal axis Z and made in corresponding bulges 20, 21 made in the back 13.

[0034] Said bulges 20, 21 are spaced from each other by a dimension 22 at least equal to the width 23 of the upright element 14 that is housed between the bulges 20, 21 when the pins 16a, 16b are coupled in the corresponding holes 17, 17b.

[0035] The back 13 is made of yielding material, for instance plastic material or steel sheet, so that coupling to the upright 14 as already stated, occurs by elastic deformation of the back 13 allowing to insert the pins 16a, 16b in the corresponding holes 17a, 17b.

[0036] As shown in Fig. 7, when mutually converging forces F1, F2 are applied to the ends of the back 13, said back 13 starting from the configuration of Fig. 6 is being deformed by widening the distance between the holes 17a, 17b of the corresponding bulges 21, 21 from the dimension 22 to the dimension 22a so as to allow insertion of pins 16a, 16b.

[0037] After insertion, the elastic recovery of the material with which the back 13 is made, allows to return it in the starting configuration shown in Fig. 8.

[0038] Coupling between the back 13 and upright 14 is removable because it is sufficient to apply again forces F1, F2 to the ends of the back 13 to allow separation

from the corresponding upright with movements opposite to those above described.

[0039] A variation neither illustrated nor described may provide that the pins instead of being made in the upright element, are made in the back and therefore the corresponding holes into which they are inserted are made in the upright element instead of the back. In this case, obviously, the pins and/or the upright will be made of elastic and yielding material.

[0040] Another constructional variation of the chair of the invention generally indicated with numeral 30 is shown in Fig. 9 where one can see that it is different from the previously described embodiment for a different implementation of the joint means generally indicated with numeral 35 of the back 33 to the upright 34.

[0041] One can see that the joint means 35 comprise:

- a projecting element 36 belonging to the upright 34 and consisting of a protruding finger 36a and
- a slot 37 belonging to the back 33 consisting of a recess 37a in which the finger 36a is received.

[0042] Also in this constructional variation the connection between the back 33 and upright 34 is a snap connection exploiting the elasticity either of the upright 34 in connection with finger 36a or the back 33 in connection with recesses 37a or both.

[0043] Another constructional variation of the chair of the invention is shown in Figs. 10 and 11 wherein the chair generally indicated with numeral 40 is different from the previously described embodiments because the upright element 44 supporting the back 43, is inserted passing through a hole 42 made in the seat 41 where it can be blocked through fastening means 50.

[0044] Said fastening means 50 comprise a slot 45 made in the upright 44 receiving a screw 46 having an end 46a coupled to a nut screw 47 fixed to the seat 41 and the opposite end 46b provided with a handle 48 accessible by the user to actuate the screw 46 to fix the upright 44 once the back 43 is arranged at the desired height.

[0045] Further variations may provide for different constructional forms of the chair different from those shown in the accompanying sheets of drawings.

[0046] Finally the upright element may be connected to the bearing structure arranged resting on the ground instead of being connected to the seat.

[0047] The foregoing variations and any other modification neither cited nor described, when falling within the scope of the appended claims, are to be considered all protected by the present patent.

Claims

1. A chair (1, 30, 40) comprising:

- a seat (11, 41) resting on a bearing structure

- (12) arranged leaning on the ground;
- a back (13, 33, 43) connected to an upright element (14, 34, 44) belonging to said seat (11, 41) and/or said bearing structure (12),

characterised in that said back (13, 33, 43) and said upright element (14, 34, 44) are mutually connected through joint means (15, 35) removably snap coupled by elastic deformation of said back (14, 33, 43) and/or said upright element (14, 34, 44).

2. The chair (1, 30, 40) according to claim 1 **characterised in that** said joint means (15, 35) comprise one or more projecting elements (16, 36) belonging to said back (13, 33, 43) and/or said upright element (14, 34, 44) and one or more slots (17, 47) belonging to said upright element (14, 34, 44) and/or said back (13, 33, 43), wherein coupling of said projecting elements (16, 36) in the corresponding slots (17, 37) is a snap connection by elastic deformation of said back (13, 33, 43) and/or said upright element (14, 34, 44).
3. The chair (1, 30, 40) according to claim 2 **characterised in that** said joint means (15,35) comprise projecting elements (16, 36) belonging to said upright element (14, 34, 44) and corresponding slots (17, 37) belonging to said back (13, 33, 43).
4. The chair (1, 40) according to claim 3 **characterised in that** said projecting elements (16) consist of two pins (16a, 16b) mutually coaxial along a longitudinal axis (Y) defined thereby and protruding from opposite parts of said upright element (14, 44).
5. The chair (1, 30) according to claim 3 **characterised in that** said projecting elements (36) consist of a finger (36a) made in said upright (34).
6. The chair (1, 40) according to claim 3 **characterised in that** said slots (17) consist of two holes (17a, 17b) mutually coaxial along a longitudinal axis (Z) defined thereby, made in the body of said back (13, 43) and spaced from each other by a dimension (22) at least equal to the width (23) of said upright element (14, 44).
7. The chair (30) according to claim 3 **characterised in that** said slots (37) consist of a recess (37a) made in said back (33).
8. The chair (1,40) according to claim 6 **characterised in that** said holes (17a, 17b) are made in corresponding bulges provided in the body of said back (13, 43).
9. The chair (40) according to claim 1 **characterised in that** said upright element (44) is slidingly inserted

in a through hole (42) made in said seat (41), fastening means (50) being provided to block said upright element (44) in said through hole (42).

- 5 10. The chair (40) according to claim 9 **characterised in that** said fastening means (50) comprise a screw (46) inserted into a through slot (45) made in said upright element (44), said through screw (46) having an end (46a) coupled in a nut screw (47) integral with said seat (41) and the opposite end (47b) provided with an actuation handle (48) accessible by the chair user.

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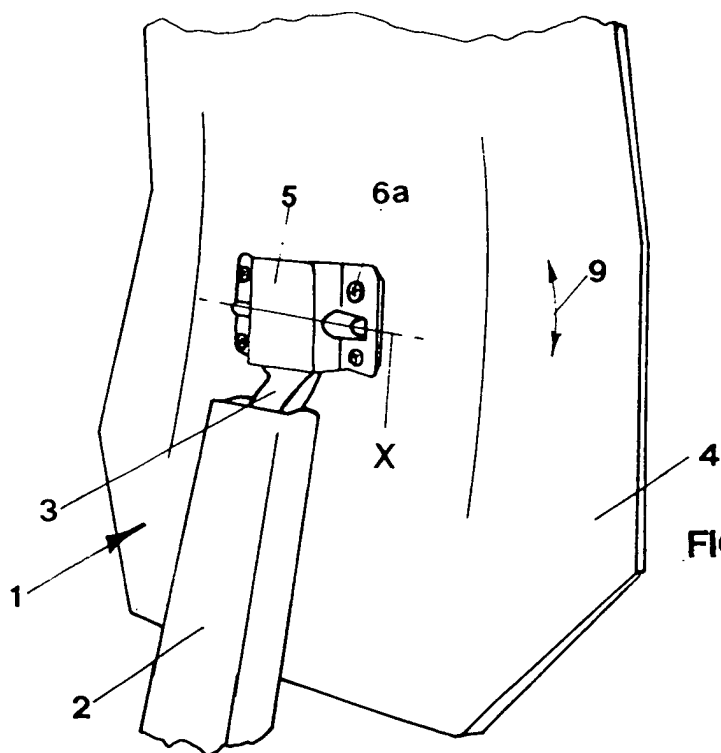


FIG.1 PRIOR ART

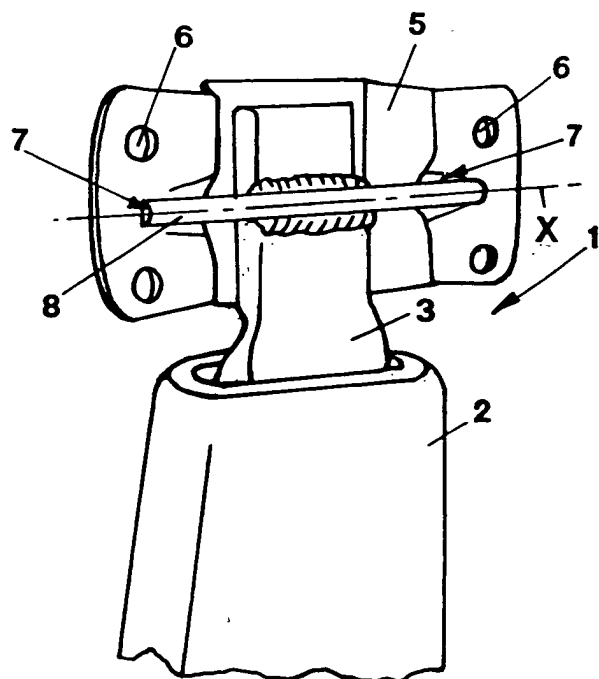


FIG.3 PRIOR ART

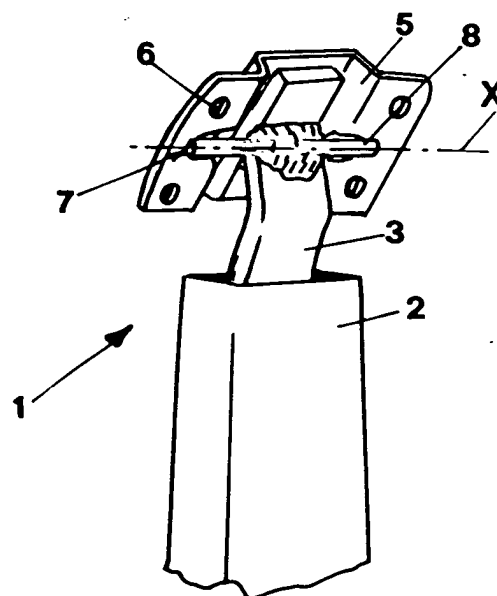
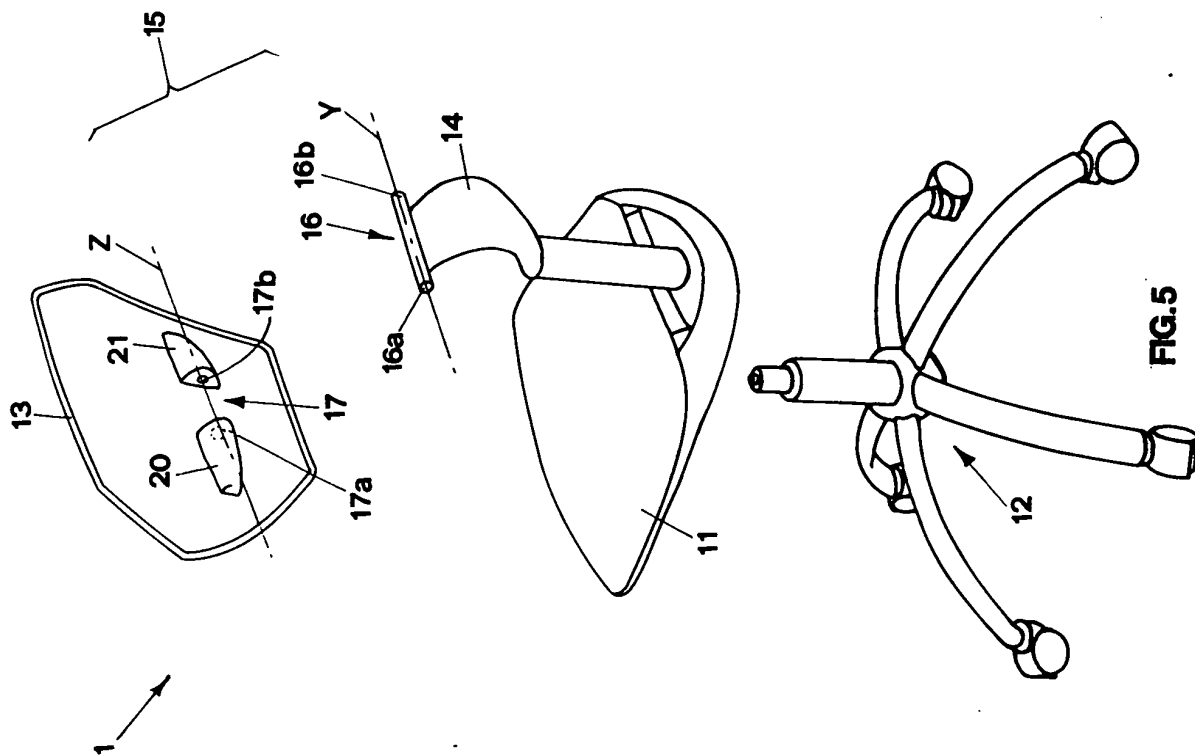
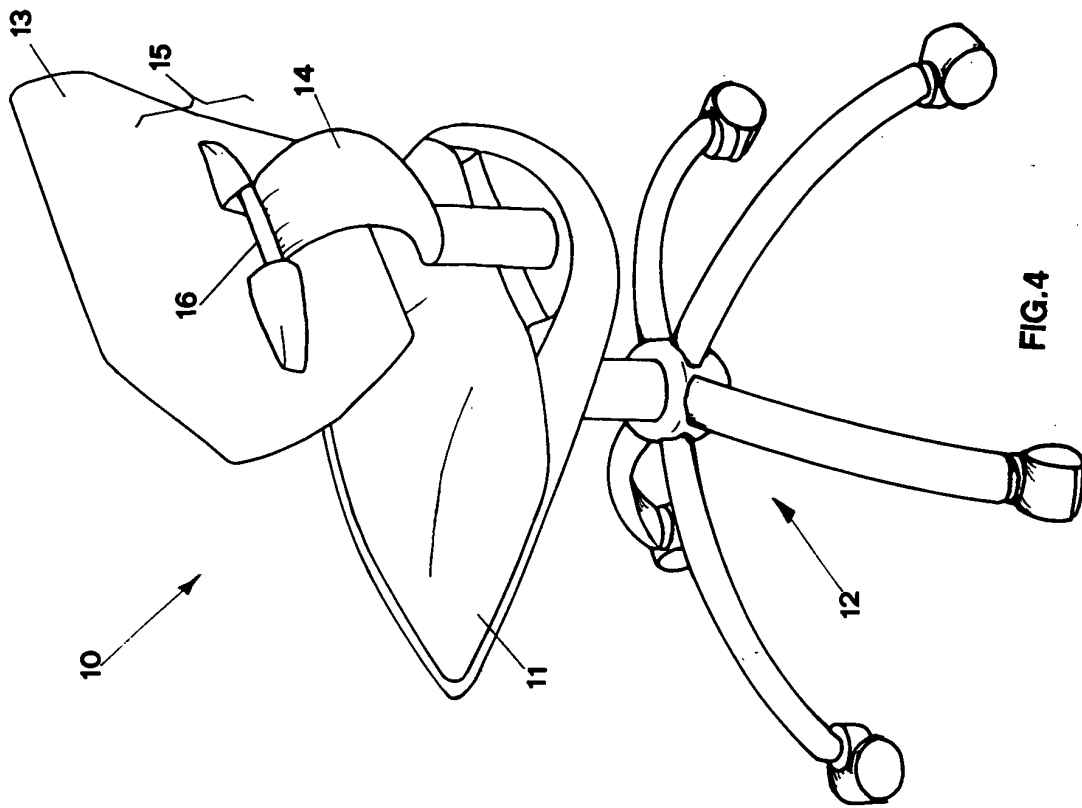


FIG.2 PRIOR ART



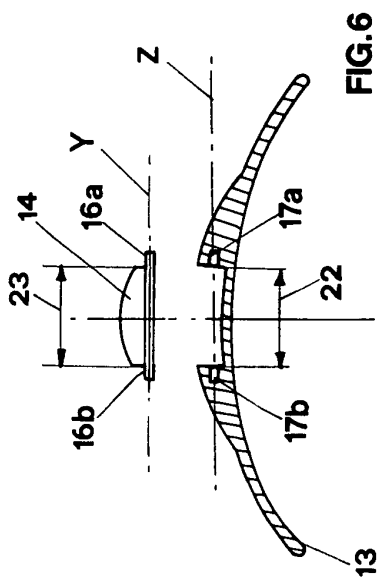


FIG. 6

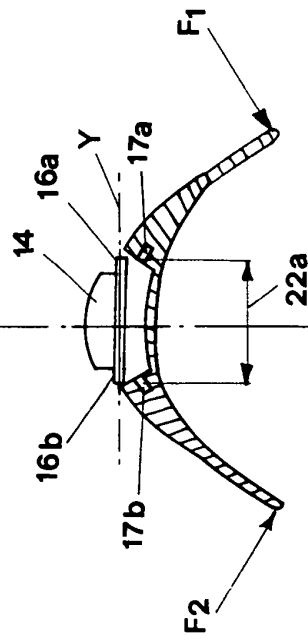


FIG. 7

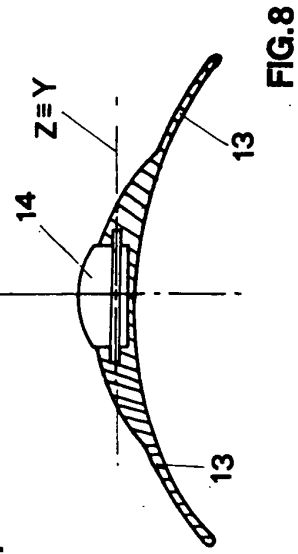


FIG. 8

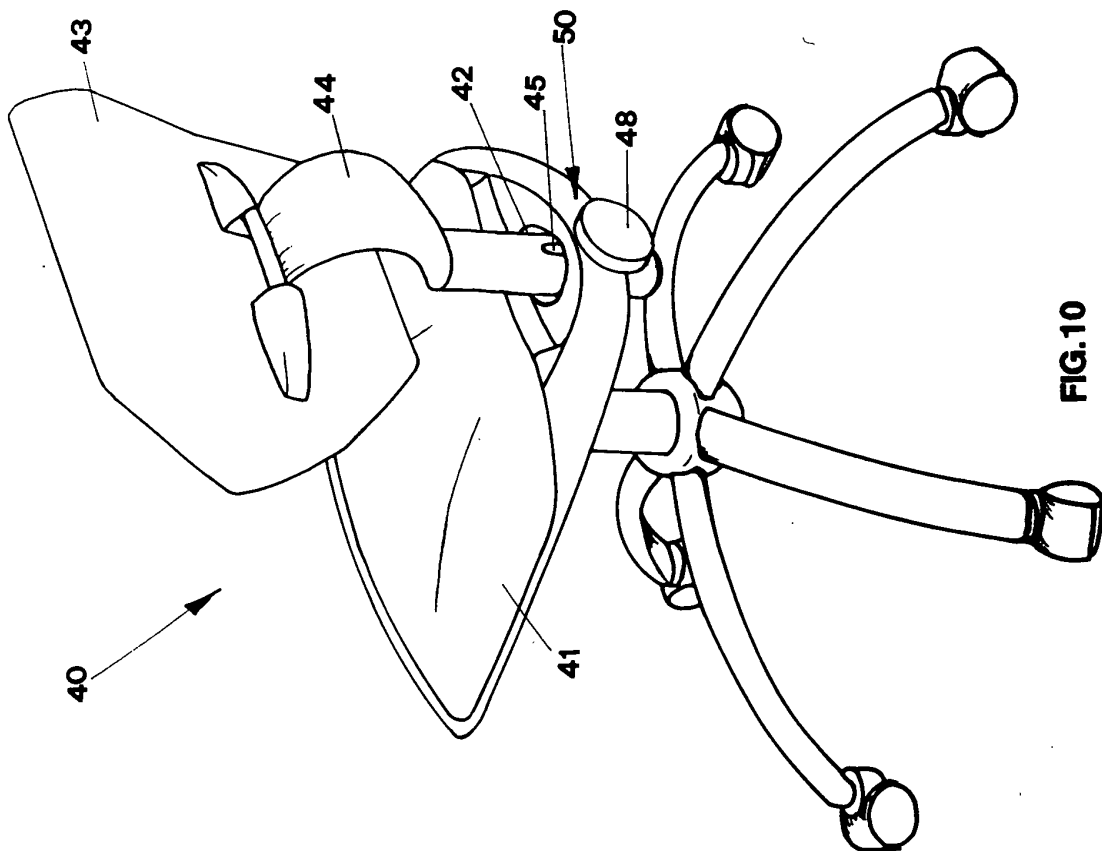


FIG. 10

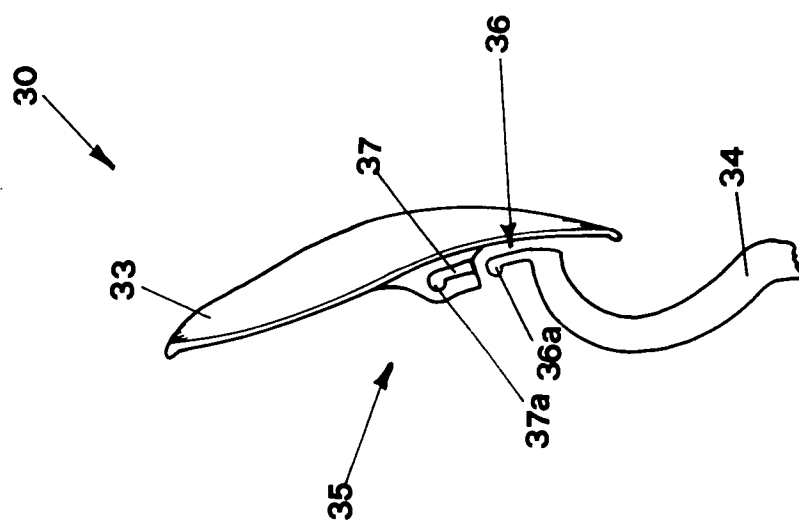


FIG. 9

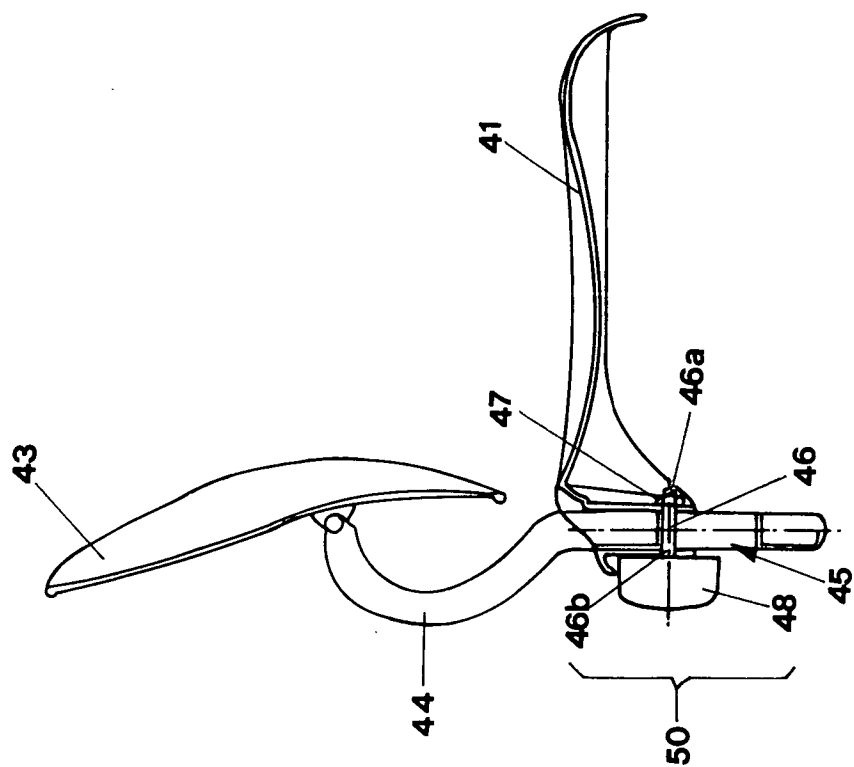


FIG. 11