(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
02 January 2020 (02.01.2020)

WIPO | PCT

(10) International Publication Number
WO 2020/003187 A1

(51) International Patent Classification:
A47C 7/46 (2006.01)

(21) International Application Number:
PCT/IB2019/055440

(22) International Filing Date:
27 June 2019 (27.06.2019)

(25) Filing Language: Italian

(26) Publication Language: English

(30) Priority Data:
102018000006788 28 June 2018 (28.06.2018) IT

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(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:
— *with international search report (Art. 21(3))*
— *in black and white; the international application as filed contained color or greyscale and is available for download from PATENTSCOPE*

(54) Title: CHAIR STRUCTURE

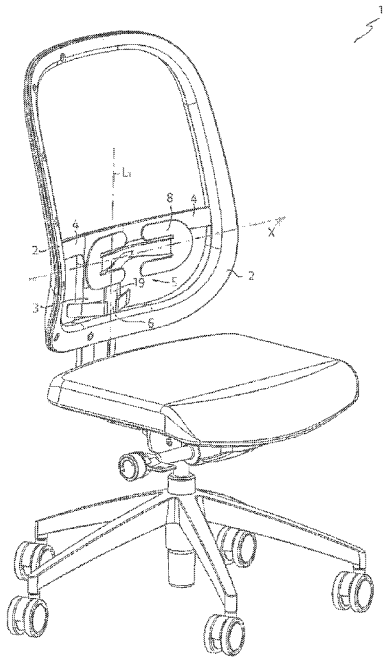

FIG. 1

(57) Abstract: The invention is a chair structure comprising a supporting frame (2), a flexible member (5), a movable member (15); the supporting frame (2) comprises at least one rigid member (3); the flexible member (5) can be anchored to said frame (2) in proximity to said at least one rigid member (3) and has at least one first end (7) suited to be anchored to the frame (2) and a second end (8) designed to support the lumbar area of the user's back; the movable member (15) is slidably mounted on the flexible member (5) and/or on said at least one rigid member (3) in order to promote a selective variation of the mechanical stiffness provided by the flexible member (5) for the user's back. The movable member (15) can be directly seized by the user in order to promote its selective sliding movement on the flexible member (5) and/or on said at least one rigid member (3); the movable member (15) has a first outer surface (17) designed to directly contact the outer surface (14) of the flexible member (5) and a second outer surface (18) designed to directly contact the outer surface (19) of the rigid member (3).

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CHAIR STRUCTURE

DESCRIPTION

Field of application of the invention

[001] The present invention concerns the technical sector of furniture and furnishings, and more specifically it concerns a chair structure configured to allow a user to comfortably seat thereon.

State of the art

[002] As is known, a peculiar characteristic of many chairs lies in that they contribute to supporting the user's spine, in such a way as to maintain a correct posture for long time periods.

[003] This is a need that is especially felt with regard to office chairs, which are used for very long times (even ten hours a day) and therefore must offer the user the best ergonomic features while he/she is seated.

[004] In particular, this type of chairs is provided with supports that are designed to contact the lumbar area of the user when the latter is seated with his/her back resting on the back of the chair.

[005] These supports serve the function of providing a counteracting force for the user's lumbar region, partially supporting its weight and allowing the spine and the functional muscles to assume a correct position.

[006] For example, US20140077548 and US201477541 describe a chair structure provided with a supporting element mounted on the rear part of the back and designed to become a lumbar support for the user. This support comprises a flexible body with an elongated portion extending therefrom, said elongated portion being provided with a plurality of passages that can be removably engaged with a projection that is integral with the back.

[007] Also, US6557939 concerns a mechanism for adjusting the back of a chair, comprising, among other things, also a flexible lumbar reinforcing element that can be removably fixed to the back through quick coupling means such as Velcro, tear-off means, etc.

[008] US2005062323 describes an office chair structure provided with a rigid back and a support for the lumbar area. This support is fixed to a substantially rigid bearing element through a vertical slot that allows its height to be adjusted between two end positions.

[009] US6189972 and CN2042738360 describe a chair structure with a back arranged at a fixed height from the upper surface of the seat and a lumbar support with adjustable height and depth.

[0010] Again, US4893872 and US8308240 describe a chair structure provided with a lumbar support with adjustable depth only.

[0011] JP2014079519 describes an office chair structure provided with a back having a supporting element for the lumbar area. This support is mounted directly on the upright of the back and can be adjusted in height, since it is provided with a fixing pin sliding within a slot that is also formed in the back upright. Even if the upright is designed to be a substantially rigid element, its partial flexibility generates the secondary effect of promoting a selective adjustment of the hinge arm of the lumbar support. The stiffness of the support varies slightly according to the locking point of the support itself.

[0012] The main drawback of these chair structures is represented by the fact that the stiffness of the support does not vary.

[0013] In other words, by lifting or lowering the support with respect to the upper surface of the seat, it is possible to vary only its height.

[0014] A further drawback is represented by the fact that, in some cases, the forward or backward movement of the support serves only to adjust its depth.

[0015] Consequently, each position assumed by the support is associated with the same constant and univocal mechanical stiffness value.

[0016] In order to overcome this drawback, special chair structures have been designed that are configured to allow a selective adjustment of the stiffness of the lumbar support, independently of the height of the latter with respect to the ground.

[0017] DE102008002974 describes a chair structure provided with a lumbar support whose stiffness can be selectively adjusted by the user by preloading a spring.

[0018] In particular, WO2006/094261 describes a chair structure where the chair is provided with a lumbar and pelvic support having also a lumbar support unit mounted on an adjusting assembly anchored to the back frame. The support comprises an arm whose elasticity can vary according to the position assumed by two corresponding hinge elements that can be selectively moved on said arm between two end positions and are arranged on the opposite side with respect to the middle plane of the elastic portion of the arm, in such a way as to promote an asymmetrical response of the support when the

same interacts with the user's back. The vertical position of the hinge elements can be autonomously adjusted by the user by selectively rotating a pair of levers.

[0019] This solution, though allowing the user to adjust the stiffness of the lumbar support at any moment, is not without drawbacks.

[0020] First of all, the configuration of the chair structure described above is rather complex, as it is made up of a large number of components.

[0021] Consequently, the production cost of this chair structure is rather high, and this does not allow it to be used for relatively economic types of office chairs.

[0022] A further drawback posed by this solution lies in that the assembly of the structure requires a rather long time.

[0023] Furthermore, the assembly of all the components must be carried out with special care, as a simple mistake in the assembly may affect the correct operation of the lumbar support mechanism.

[0024] Again, another, yet not the least drawback of this solution is represented by the fact that this chair structure has limited flexibility, since the presence of a mechanism designed to adjust the stiffness of the lumbar support requires a specific design of the entire back.

[0025] In this way, the installation of this component at a later moment, meaning that this additional element is applied at a later moment to a chair that originally is not provided with said component, is particularly difficult and can be carried out only on a few types of chairs.

[0026] US9,713,385 describes a chair structure having all the technical characteristics illustrated in the preamble of the main claim, however this solution, too, has all the drawbacks described above.

Description of the invention

[0027] The present invention intends to overcome the drawbacks described above by providing a chair structure that offers some important advantages.

[0028] First of all, the main object of the present invention is to provide a chair structure that is particularly simple to construct and is made up of a limited number of components.

[0029] It is a further object of the present invention to provide a chair structure that can be assembled in a particularly short time and does not require special operations during assembly.

[0030] It is another object of the present invention to provide a chair structure that is particularly simple and quick to install, which makes it suitable for a wide range of chair types.

[0031] It is another, yet not the least object of the present invention, to provide a chair structure made up of components or parts that can be easily installed as an additional element in a large number of the chair structures presently available on the market.

[0032] These objects, together with others that will be highlighted in greater detail below, are achieved by a chair structure of the type according to claim 1.

[0033] More specifically, the combination of technical characteristics specified in the main claim makes it possible to obtain a particularly resistant chair structure, easy to assemble and flexible to use.

[0034] Other objects that are described in greater detail below are achieved through a chair structure according to the invention, manufactured as specified in the dependent claims.

[0035] More specifically, the outer surface of the movable member is designed to directly contact the outer surface of the rigid member (also) when the second end of said flexible member interacts with the user's lumbar area.

[0036] This interaction makes it possible to determine a hinge area for the flexible member, so that the second end of the latter can feature variable stiffness according to the length of the arm, that is, of the stem portion projecting from the movable member.

[0037] The user can adjust the length of the arm by acting directly on the movable member, with no need to operate further levers or other complex kinematic mechanisms.

[0038] A further advantage of the present invention lies in that it is easy to install, since the frame can be provided with a slot for the removable insertion of the flexible member.

[0039] In addition to the above, snap-on locking means are provided, which are associated with the flexible member in order to promote the removable locking of the latter to the frame, once it has been inserted in said slot.

[0040] In this way, it will be possible to apply or remove the flexible member and the rigid member in a relatively simple and quick manner, according to the user's needs.

Brief description of the drawings

[0041] The advantages and characteristics of the present invention are clearly illustrated in the following detailed description of some preferred but non-limiting configurations of

a chair structure, with special reference to the following drawings, wherein:

- Figures from 1 to 3 show perspective views, respectively a front, a rear and a partial view of a chair structure according to the invention, in a first configuration;

- Figures 4A and 4B respectively show a front and a rear perspective view of a first detail of the chair structure shown in Figure 1;

- Figures 5A and 5B respectively show a front and a rear perspective view of a second detail of the chair structure shown in Figure 1;

- Figure 6 shows a sectional view of a detail of the chair structure shown in Figure 1;

- Figures 7A and 7B respectively show a rear and an exploded perspective view of a chair structure according to the invention, in a second configuration;

- Figures 8 and 9 show top views of two particular embodiments of the structure shown in Figure 1;

- Figures from 10A to 10C show perspective views of a chair structure according to the invention, with a different configuration compared to the chair structure shown in Figure 1;

- Figure 11 shows a perspective view of a chair structure according to the invention, in a further configuration;

- Figures from 12A to 13B show side sectional views of possible variants of the means for adjusting the depth of the lumbar support suited to be applied to the chair structures that are the subject of the present invention.

Detailed description of the invention

[0042] The subject of the present invention is a chair structure, indicated as a whole by the numeral **1**, specifically suitable for those types of chairs designed to be used for long periods of time such as, for example, office chairs or similar chairs.

[0043] The present chair structure **1** comprises a supporting frame **2** that is associated with at least one rigid member **3**.

[0044] As better illustrated in the configuration of the invention shown in **Figures** from **1** to **7B**, the frame **2** can be mainly constituted by a perimeter edge comprising a single rigid member **3** positioned in proximity to the back of the chair.

[0045] The frame **2** and the rigid member **3** can be made in a polymeric material through an injection moulding process.

[0046] In the chair structure illustrated in Figures from 1 to 6, the rigid member 3 is integral with the frame 2, more specifically the upper end of the rigid member 3 is connected to the frame through a pair of substantially horizontal crosspieces 4.

[0047] Alternatively, the rigid member 3 can be mounted on the frame 2 in a removable manner, as shown in the configuration of Figures 7A and 7B.

[0048] The structure 1 is also provided with a flexible member 5 designed to be anchored to the supporting frame 2 in proximity to the rigid member 3.

[0049] As better visible in Figures from 1 to 7B, the flexible member 5 has a first substantially rectilinear extension axis L_1 and is connected to the frame 2 in such a way as to maintain said axis L_1 in a vertical position.

[0050] More specifically, the flexible member 5 is anchored to the frame 2 before the rigid member 3 and is separated from the latter by a predetermined distance d_1.

[0051] The flexible member 5 can be provided with at least one substantially elongated stem 6 that extends parallel to the extension axis L_1.

[0052] Each stem 6 is provided with a first end 7 designed to be anchored to the frame 2 and a second end 8 designed to interact with the lumbar area of a user's back when the latter rests on the back of the chair.

[0053] The second end 8 of the stem 6 can have a widened shape developing along a direction X substantially orthogonal to the first extension axis L_1.

[0054] In this way, the second end 8 can interact with a large portion of the user's lumbar area.

[0055] Conveniently, the flexible member 5 can be made in a polymeric material through an injection moulding process.

[0056] In the chair structure illustrated in Figures from 1 to 10C, the flexible member 5 is provided with a single stem 6 having a first end 7 connected to the frame 2 in a removable manner.

[0057] Conveniently, the frame 2 can be provided with a slot 9, visible in Figure 3, designed to allow the removable insertion of the first end 7 of the stem 6.

[0058] Advantageously, snap-on locking means 10 can be provided, which are associated with the stem 6 and suited to promote the removable locking of the flexible member 5 to the frame 2 after the insertion of the first end 7 in the slot 9.

[0059] More specifically, as better illustrated in Figures 4A, 4B and 6, the locking means

10 may comprise a flexible tab 11 formed in proximity to the first end 7 of the stem 6.

[0060] Above the tab 11 there may be a projection 12 designed to abut the frame 2 during the insertion of the first end 7 in the slot 9.

[0061] The tab 11 has a free edge 13 that projects from the outer surface 14 of the stem 6 and is designed to contact the lower surface of the frame 2 following the insertion of the first end 7 in the slot 9, thus promoting the locking of the flexible member 5 in the position of installation.

[0062] The exertion of a predetermined pressure on the free edge 13 of the tab 11 and the successive extraction of the first end 7 of the stem 6 from the slot 9 will make it possible to release the flexible member 5 from the frame 2.

[0063] The slot 9 and the locking means 10 make the structure 1 particularly flexible, as they allow the flexible member 9 to be installed or removed in a particularly simple and quick manner.

[0064] The structure 1 is also provided with a movable member 15 designed to be slidably mounted on the flexible member 5 and/or on the rigid member 3.

[0065] The movable member 15 extends along a second rectilinear extension axis L_2 and in the configuration shown in Figures from 1 to 7B this component is mounted on the structure 1 in order to maintain this axis L_2 substantially perpendicular with respect to the first extension axis L_1 of the flexible member 5.

[0066] The movable member 15 is made of a polymeric material, too, and can slide on the flexible member 5 and/or on the rigid member 3 in order to promote a selective variation of the mechanical stiffness provided by the flexible member 5 for the user's back.

[0067] When the second end 8 of the flexible member 5 does not interact with the user's lumbar area, the movable member 15 can slide freely and with a limited effort on the flexible member 5 and/or on the rigid member 3.

[0068] However, when the user's lumbar area interacts with the second end 8 of the flexible member 5, the stem 6 of the latter is subjected to a movement that makes it approach the rigid member 3.

[0069] In this condition, the movable member 15 contacts both the flexible member 5 and the rigid member 3 and the pressure that is generated is such as to promote the relative locking of the rigid member 15 with respect to the flexible member 5.

[0070] In the condition in which it is "relatively locked", the movable member 15 can still slide with respect to the other members 3, 5 but to promote this movement it is necessary to exert more force than that exerted when the back of the user does not rest on the second end 8 of the flexible member 5.

[0071] In conditions of mutual locking, the movable member 15 defines a constraint element for the flexible member 5 and the only part that can oscillate with respect to the first extension axis L_1 is constituted by the portion of the member 5 that extends above the movable member 15 and comprises also the second end 8.

[0072] Further on in this description the term "*arm*" will be used to designate this portion of the flexible member 5, which is indicated by the numeral 16 in Figure 6.

[0073] In practice, by varying the position of the movable member 15 it will be possible to vary the length l_1 of the arm 16 and the stiffness provided by the second end 8.

[0074] In the conditions described above, the flexibility of the flexible member 5 can vary between a maximum value, when the movable member 15 is in the lower position, and a minimum value, when the movable member 15 is in the upper position.

[0075] In other words, the stiffness of the second end 8 of the flexible member 5 is maximum, respectively minimum, depending on whether the movable member 15 is in the upper or lower position.

[0076] According to a specific aspect of the invention, the movable member 15 can be directly seized by a user, who can thus make it slide selectively on the rigid member 3 and/or on the flexible member 5 to vary the length of the arm 16. Furthermore, the movable member 15 has a first outer surface 17 intended to directly contact the outer surface 14 of the flexible member 5, and a second outer surface 18 suited to directly contact the outer surface 19 of the rigid member 3.

[0077] During the movement of the movable member 15, the outer surfaces 14, 19 of the flexible member 5 and of the rigid member 3 and the outer surfaces 17, 18 of the movable member 15 slide directly on one another, since no further components interposed between them are provided.

[0078] The chair structure illustrated in Figures from 1 to 7B includes the use of a movable member 15 slidably mounted on the flexible member 5.

[0079] This movable member 15 is provided with at least one free end portion 20 that can be directly seized by the user (in the case illustrated in the figure, there is a pair of

these free ends 20).

[0080] As can be seen in Figures 5A and 5B, the free ends 20 of the movable member 15 can have a curved and tapered shape, in order to define an especially ergonomic geometry that makes it easier to seize and to operate for the user.

[0081] The free ends 20 are connected to each other by an intermediate portion 21 having substantially constant thickness and comprising the first outer surface 17 and the second outer surface 18 intended to contact the outer surface 14 of the stem 6 and the outer surface 19 of the rigid member 3.

[0082] More specifically, the first end surface 17 associated with the intermediate portion 21 defines a through seat 22 having a polygonal cross section substantially countershaped with respect to the cross section of the stem 6 of the flexible member 5.

[0083] In the case illustrated in the figures, the stem 6 has a substantially rectangular cross section with constant dimensions, consequently also the seat 22 has a rectangular cross section, slightly larger than the cross section of the stem 6, in order to allow the stem 6 to be easily inserted therein.

[0084] Furthermore, the seat 22 is open on its external side 23, which is only partially delimited by a pair of teeth 24 that are mutually aligned and parallel.

[0085] The stem 6 can be inserted in the through seat 22 before the first end 7 of the flexible member 5 is anchored to the frame 2.

[0086] The intermediate portion 21 can have a second outer surface 18 positioned on the opposite side with respect to the through seat 22.

[0087] The second outer surface 18 can be delimited by a pair of projecting sections 25 suited to define a corresponding track for the insertion of a vertical guide 26 formed on the rigid member 3.

[0088] In the alternative configurations of the structure illustrated in Figures 8 and 9, the second outer surface 18 is positioned in proximity to the through seat 22.

[0089] More specifically, the vertical guide 26 will be sized so that it can be inserted in the open external side 23 of the seat 22 and interact with the teeth 24 of the latter during the sliding movement of the movable member 15.

[0090] The movable member 15 shown in Figure 8 does not have the projecting sections (which, for example, are shown in Figure 5A) and in this case the second outer surface 18 is defined by the same teeth 24.

[0091] In the configuration shown in **Figure 9,** instead, there are two projecting sections **25** that extend from the ends of the teeth **24**, wherein these projecting sections **25** serve the double function of defining the track for the vertical guide **26** and the second outer surface **18** designed to contact the outer surface **19** of the rigid member **3**.

[0092] Preferably, as better illustrated in **Figures 4B** and **5B**, means **27** can be provided that are suited to promote the adjustment of the position of the movable member **15** with respect to the rigid member **3**.

[0093] These means **27,** for example, may include the formation of a plurality of shaped recesses **28** on the outer surface **14** of the stem **6** of the flexible member **5**.

[0094] The recesses **28** are distributed along the first extension axis L_1 and can be preferably spaced from each other with substantially constant pitch.

[0095] There is also a projection **29** formed on the movable member **15** and suited to be selectively inserted in a corresponding recess **28** during the sliding movement of said member.

[0096] The engagement of the projection **29** in the recesses **28** makes it possible to define a plurality of stable positions of the movable member **15** that are differentiated from one another due to the fact that the height of the latter with respect to the upper surface of the seat is different.

[0097] As can be seen in **Figure 5B,** the projection **29** can be located in proximity to the inner side of the seat **22** and the recesses **28** will thus be formed on the portion of the outer surface **14** of the stem **6** that is designed to face this side of the seat **22**.

[0098] In the alternative configuration of the structure visible in **Figures** from **10A** to **11**, the frame **2** comprises a pair of substantially parallel rigid members **3** provided with a pair of slots **30** aligned with each other.

[0099] In this case the movable member **15** has a pair of end portions **20** provided with the second outer surface **18** and suited to be inserted in said slots **30**.

[00100] The movable member **15** furthermore comprises at least one inner portion **31** designed to contact the stem **6** of the flexible member **5** and provided with the first outer surface **17**.

[00101] For example, in the structure illustrated in **Figures** from **10A** to **10C,** the flexible member **5** has only one stem **6** and the movable member **15** has only one inner portion **31**.

[00102] In the structure shown in Figure 11 the flexible member 5 has two stems 6 and therefore the movable member 15 has a pair of inner portions 31, each one of which is provided with a respective first outer surface 17.

[00103] In any case, the remaining parts of the movable member 15 (which do not need to be inserted in the slots 30 and do not define inner portions 31) are substantially free and can be seized by the user.

[00104] The structure 1 may comprise also means 32 for adjusting the depth of the second end 8 of the flexible member 5.

[00105] More specifically, said means 32 can promote the selective movement of the second end 8 along a direction Z that is substantially horizontal and parallel to the ground, as better visible in Figures 12A and 12B.

[00106] The depth adjusting means 32 can be defined by the outer surface 14 of the flexible member 5 and/or by the outer surface 19 of the rigid member 3. More specifically, the outer surface 14 of the flexible member 5 and/or the outer surface 19 of the rigid member 3 can be inclined or curved in order to promote the forward movement of the stem 6 during the translation of the movable member 15.

[00107] More specifically, the inclination of this surface 14, 19 can be selected in such a way as not to promote any translation of the second end 8 when the movable member 15 is in the lower position, and to promote the maximum translation of said end 8 when the movable member 15 is in the upper position.

[00108] In the structure illustrated in Figures 12A and 12B it is the outer surface 19 of the rigid member 3 that is inclined (or curved).

[00109] In an alternative solution illustrated in Figures 13A and 13B, instead, it is the outer surface 14 of the stem 6 that is inclined (or curved).

[00110] The present invention can be carried out in other variants, all of which fall within the scope of the inventive features claimed and described herein; these technical details can be replaced by different but technically equivalent components and materials; the invention can be carried out in any shapes and sizes, provided that they are compatible with its intended use.

[00111] The reference numerals and signs added in the claims and in the description are intended to make the text clearer to understand and must not be considered as elements intended to limit the technical scope of application of the objects or processes

they are meant to identify.

CLAIMS

1. A chair structure, comprising:
   - a supporting frame (2);
   - a flexible member (5);
   - a movable member (15);

   wherein said supporting frame (2) comprises at least one rigid member (3);

   wherein said flexible member (5) is designed to be anchored to said frame (2) in proximity to said at least one rigid member (3), said flexible member (5) having at least one first end (7) designed to be anchored to the frame (2) and a second end (8) designed to support the lumbar area of the user's back;

   wherein said movable member (15) is slidably mounted on said flexible member (5) and/or on said at least one rigid member (3) in order to promote the selective variation of the mechanical stiffness provided by said flexible member (5) for the user's back;

   and wherein said movable member (15) can be directly seized by a user to promote the selective sliding thereof on said flexible member (5) and/or on said at least one rigid member (3), said movable member (15) having a first outer surface (17) designed to directly contact the outer surface (14) of said flexible member (5) and a second outer surface (18) designed to directly contact the outer surface (19) of said rigid member (3);

   characterized in that said flexible member (5) has at least one elongated stem (6) comprising said first end (7).

2. Structure as claimed in claim 1, characterized in that said frame (2) comprises a single substantially vertical rigid member (3), said flexible member (5) being mounted before said rigid member (3) and being spaced therefrom by a predetermined distance (d_1).

3. Structure as claimed in claim 1 or 2, characterized in that said at least one elongated stem (6) has a polygonal cross section with substantially constant dimensions, said movable member (15) being mounted on said flexible member (5) and having a first outer surface (17) defining at least one through seat (22) in a shape that is substantially

countershaped with respect to the shape of said at least one stem (6), in order to allow the slidable insertion thereof into said seat (22).

4. Structure as claimed in claim 3, characterized in that said movable member (15) has at least one free end portion (20) that can be directly seized by the user.

5. Structure as claimed in claim 1, characterized in that said frame (2) comprises a pair of substantially parallel rigid members (3) having a pair of mutually aligned slots (30), said movable member (15) having respective end portions (20) designed to be slidably inserted into said slots (30) and provided with said second outer surface (18).

6. Structure as claimed in claim 5, characterized in that said movable member (15) comprises one or more inner portions designed to contact said at least one stem (6) and provided with said first outer surface (17).

7. Structure as claimed in one or more of the preceding claims, characterized in that it comprises means (32) for adjusting the depth of said second end (8) of said flexible member (5), said depth adjusting means (32) being associated with said flexible member (5) and/or with said rigid member (3) to promote the selective movement of said second end (8) along a substantially horizontal direction (Z) which is parallel to the ground.

8. Structure as claimed in claim 7, characterized in that the outer surface (14) of said stem (6) and/or the outer surface (19) of said rigid member (3) are sloped and/or curved.

9. Structure as claimed in one or more of the preceding claims, characterized in that it comprises means (27) for adjusting the position of said movable member (15) with respect to said flexible member (5).

10. Structure as claimed in claim 9, characterized in that said adjusting means (27) comprise a plurality of shaped recesses (28) distributed on the outer surface (14) of said flexible member (5) and a countershaped projection (29) formed on the first surface (17) of said movable member (15), said projection (29) being suited to be selectively engaged in the recesses (28) of said plurality in order to define respective stable positions for said movable member (15).

11. Structure as claimed in one or more of the preceding claims, characterized in that it comprises at least one slot (9) formed in said frame (2) to promote the removable insertion of a corresponding first end (7) of said flexible member (5).

12. Structure as claimed in claim 11, characterized in that it comprises snap-on locking means (10) associated with said at least one stem (6) to promote the removable locking thereof to said frame (2) once the first end (7) has been inserted into said slot (9).

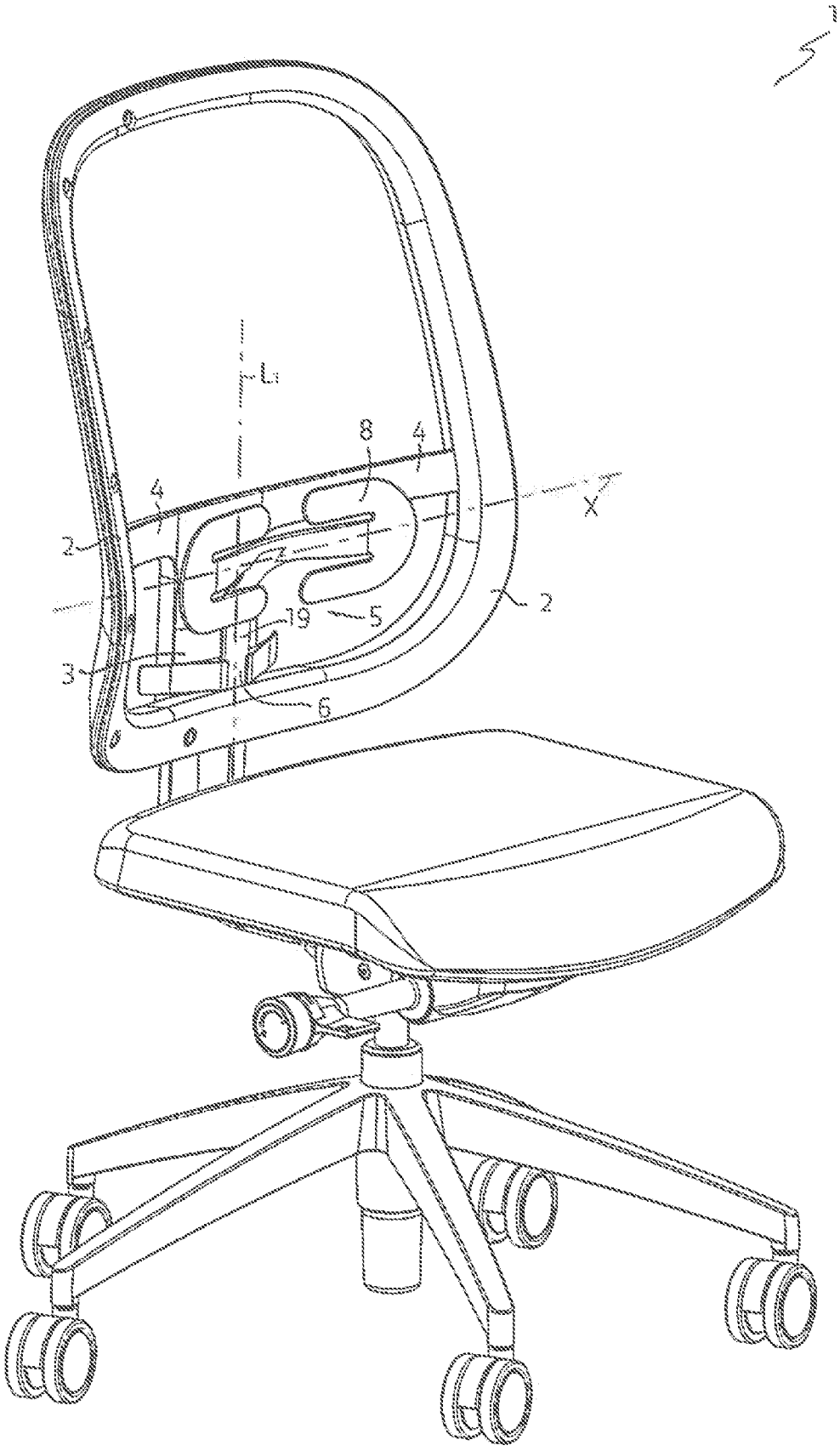

FIG. 1

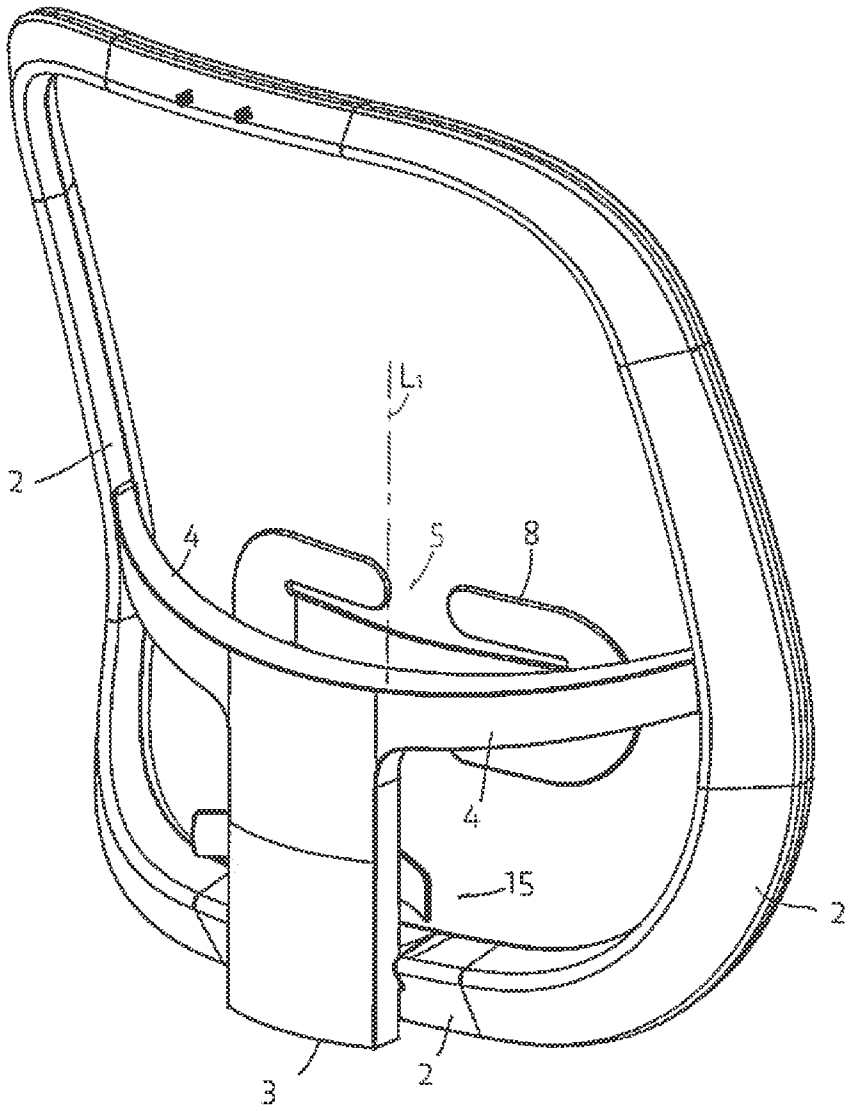

FIG. 2

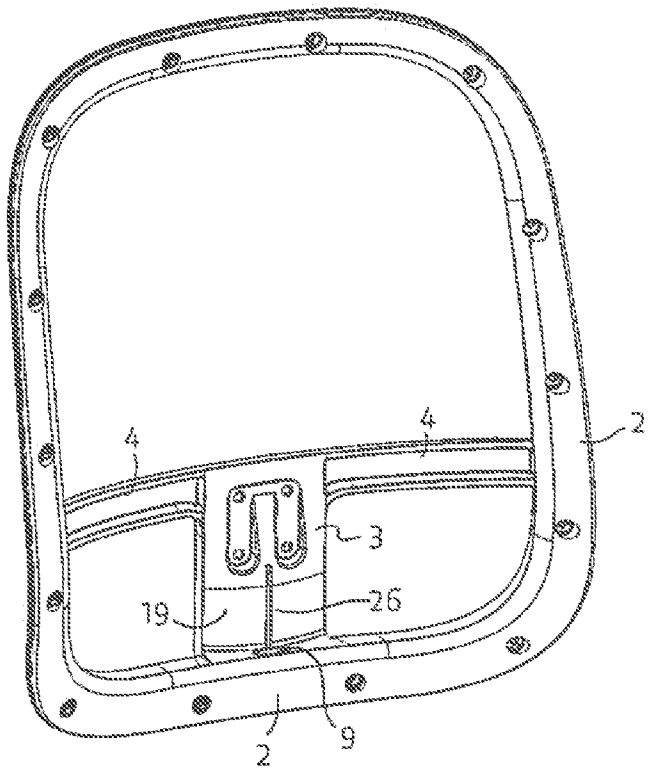

FIG. 3

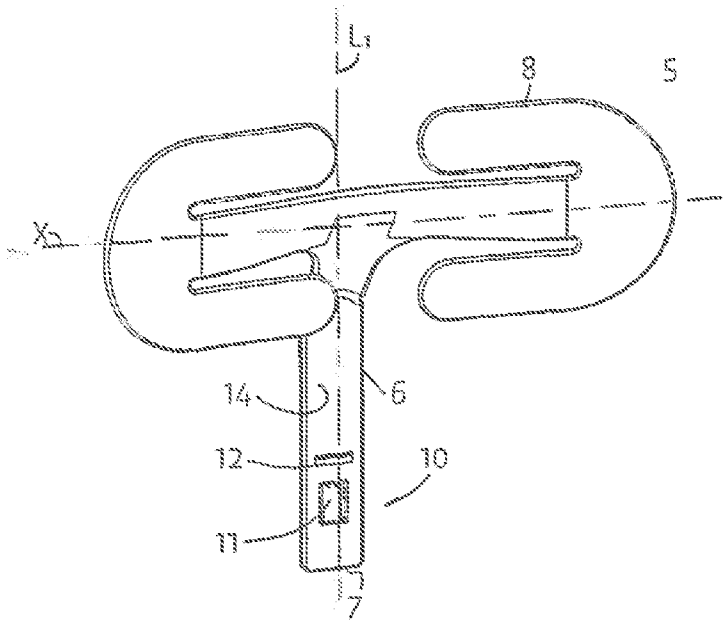

FIG. 4A

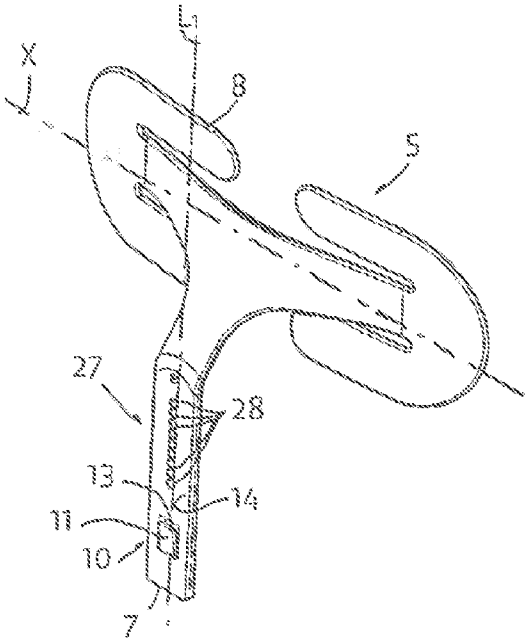

FIG. 4B

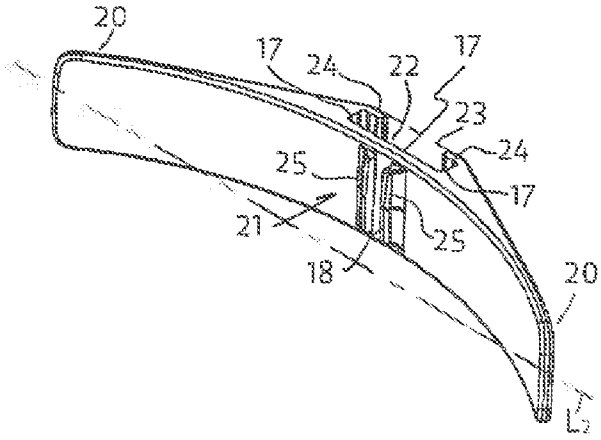

FIG. 5A

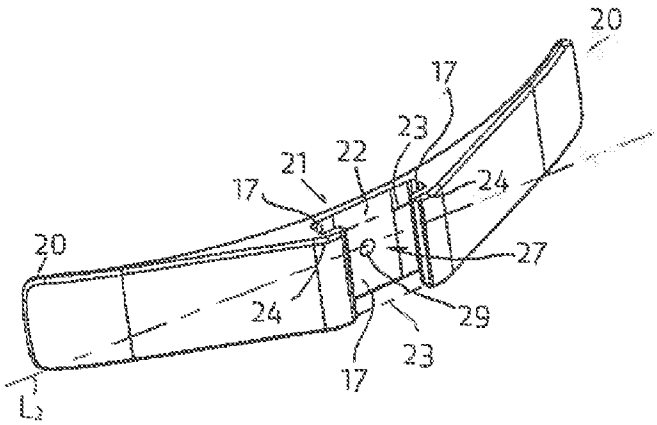

FIG. 5B

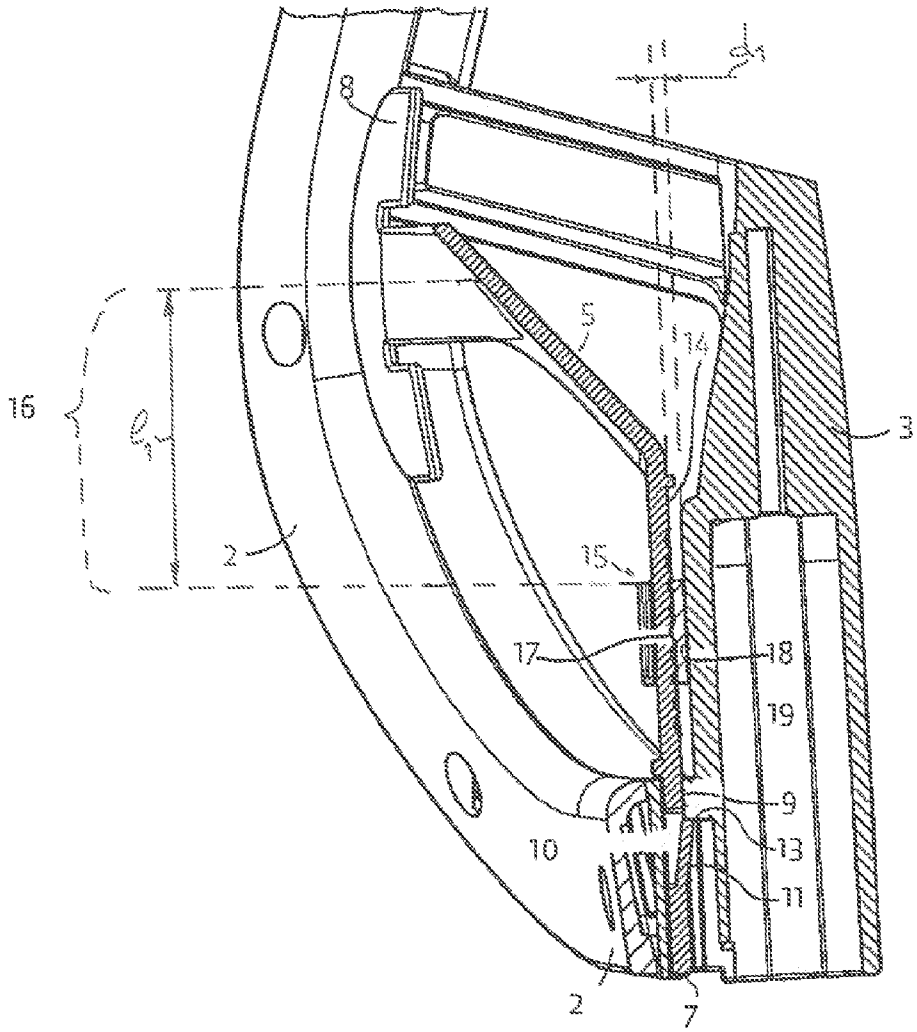

FIG. 6

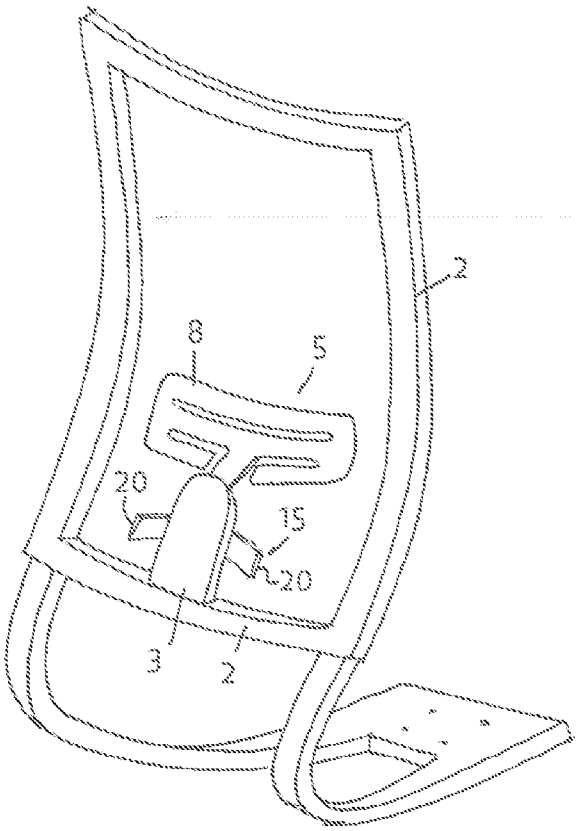

FIG. 7A

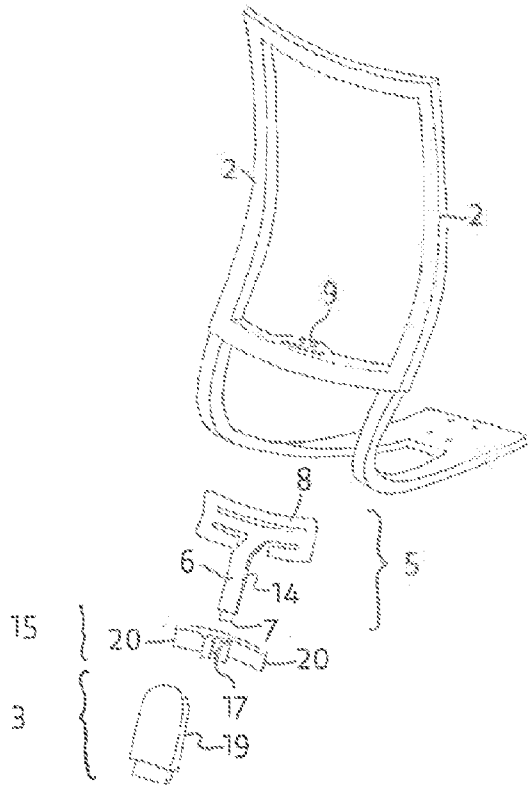

FIG. 7B

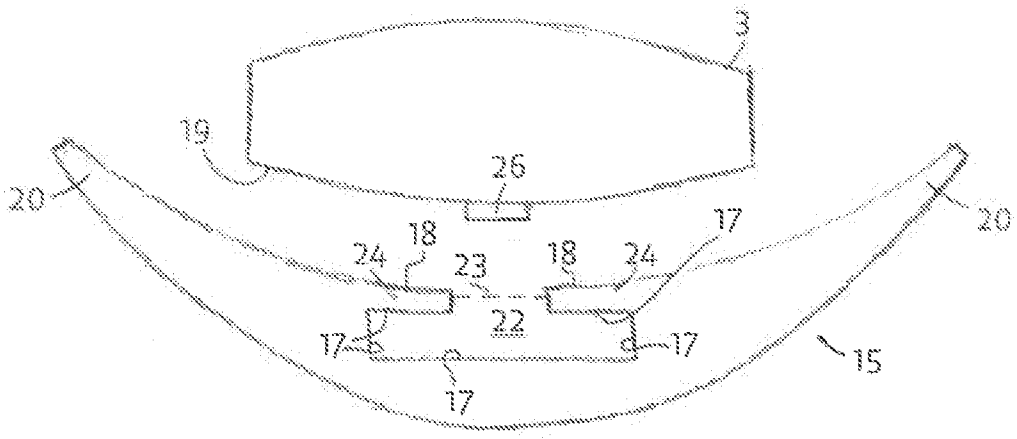
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FIG. 8

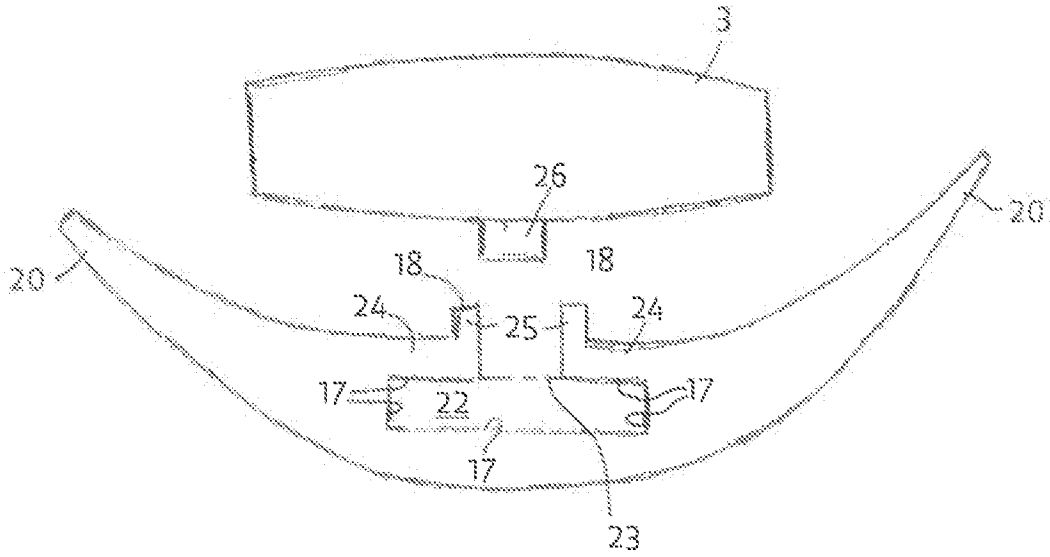
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FIG. 9

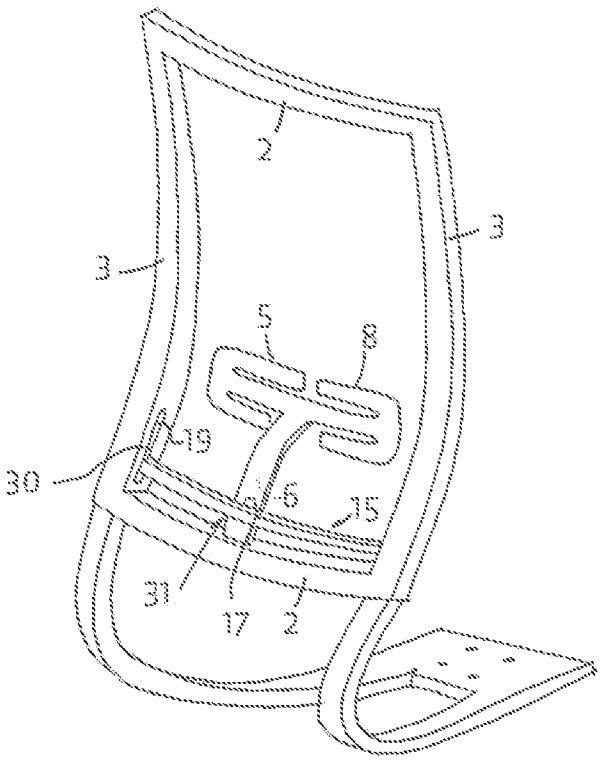

FIG. 10A

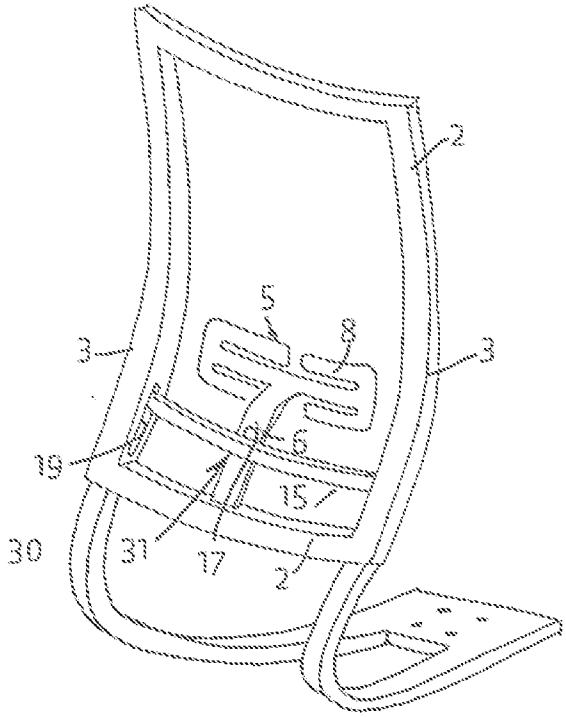

FIG. 10B

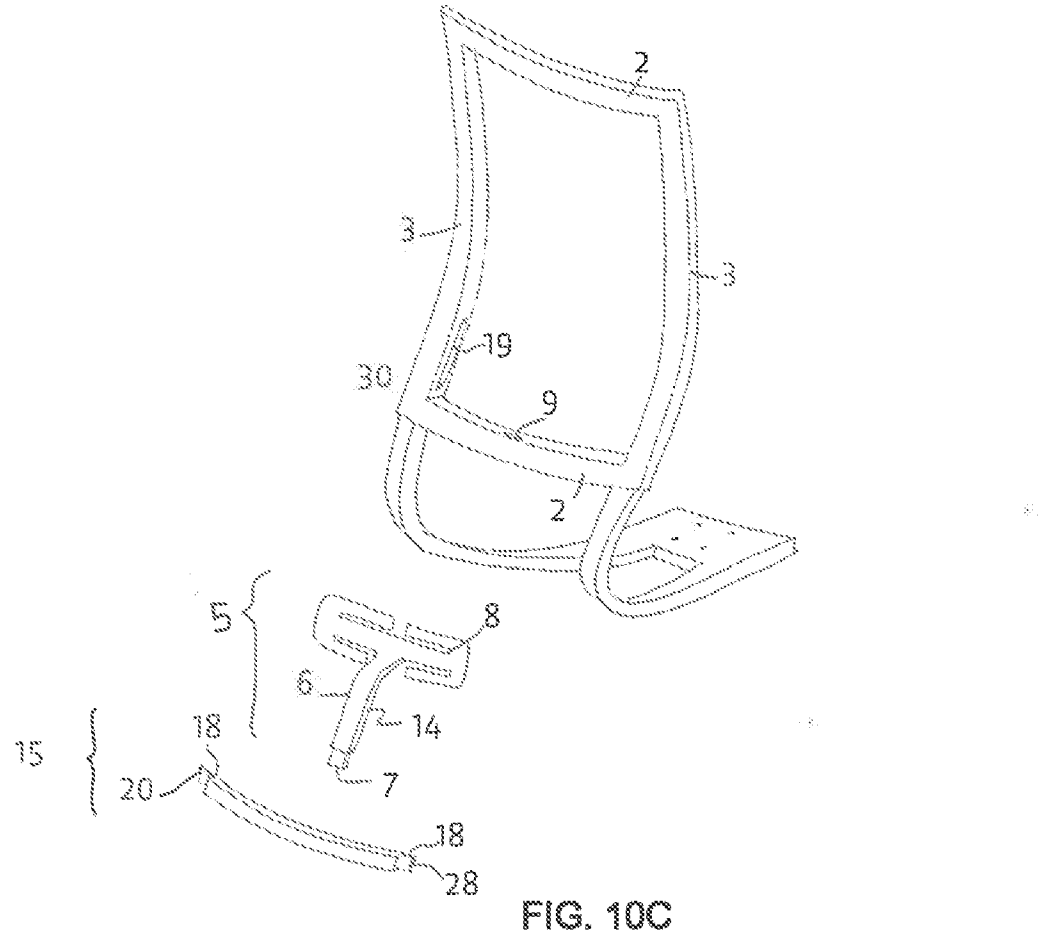

FIG. 10C

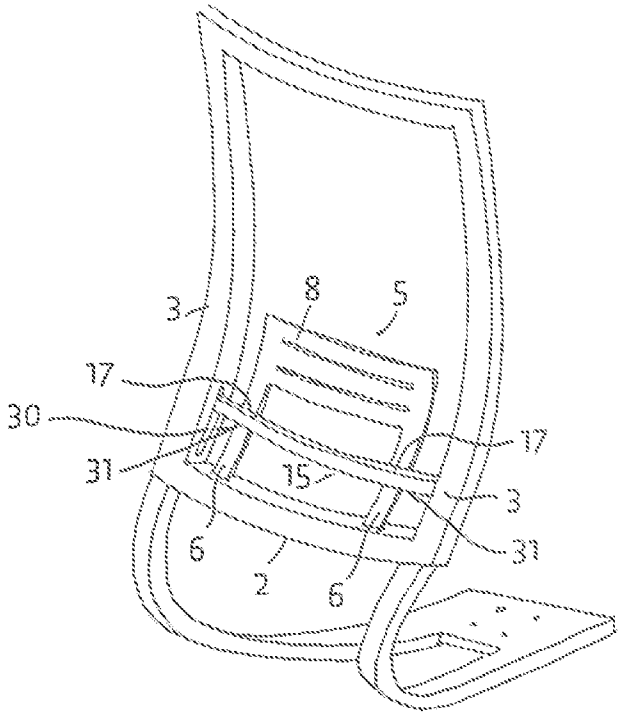

FIG. 11

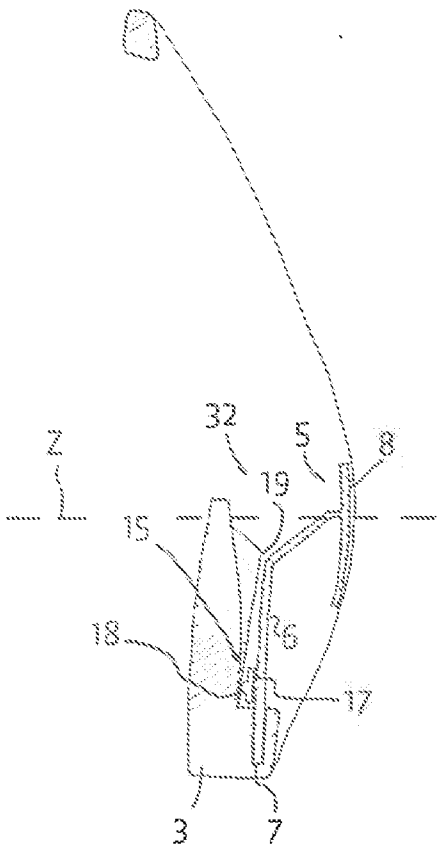

FIG. 12A

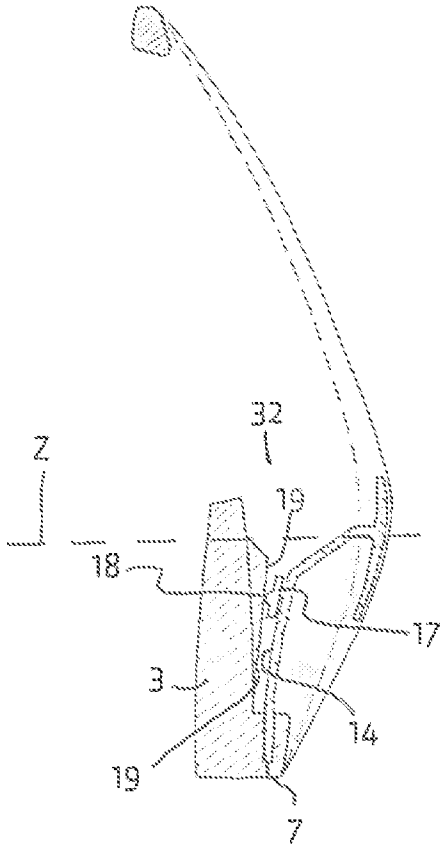

FIG. 12B

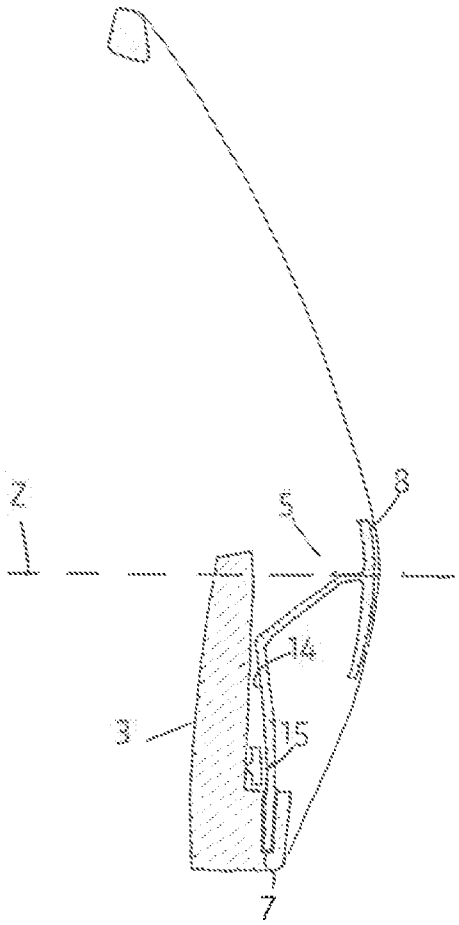

FIG. 13A

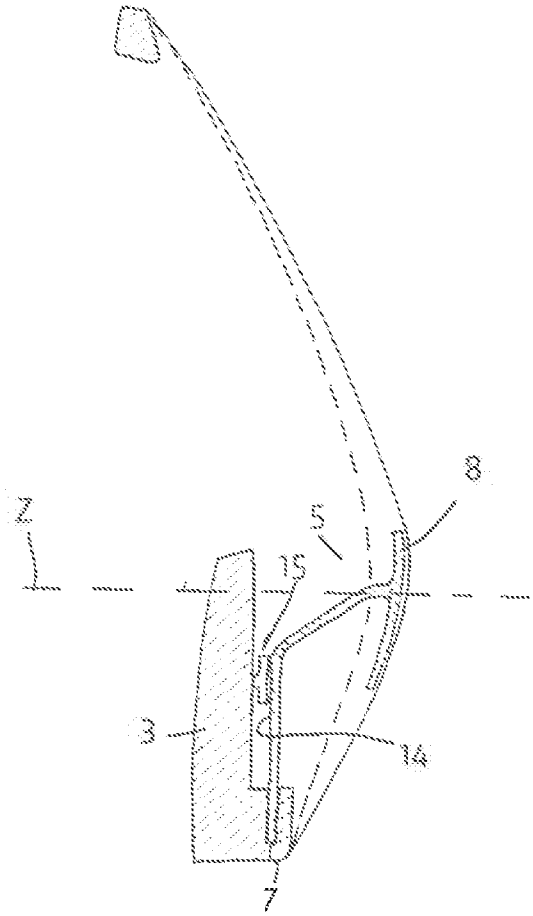

FIG. 13B

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2019/055440

A. CLASSIFICATION OF SUBJECT MATTER
INV. A47C7/46
ADD.

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)
A47C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 9 713 385 B1 (PAN TOUNG-CHUN [TW]) 25 July 2017 (2017-07-25) figures	1-12
A	DE 20 2011 107639 U1 (TOPSTAR GMBH [DE]) 26 November 2012 (2012-11-26) figures	1-12
A	US 6 557 939 B1 (BRAEUNING EGON [DE]) 6 May 2003 (2003-05-06) figures	1-12
A	WO 2006/094261 A2 (HAWORTH INC [US]; BEYER PETE J [US] ET AL.) 8 September 2006 (2006-09-08) figures	1-12

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
4 September 2019	10/09/2019

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Kis, Pál

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/IB2019/055440

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 9713385 B1	25-07-2017	TW 201733496 A	01-10-2017
		US 9713385 B1	25-07-2017
DE 202011107639 U1	26-11-2012	NONE	
US 6557939 B1	06-05-2003	AT 249772 T	15-10-2003
		DE 59809667 D1	23-10-2003
		EP 1039815 A1	04-10-2000
		JP 2002527175 A	27-08-2002
		US 6557939 B1	06-05-2003
		WO 0022960 A1	27-04-2000
WO 2006094261 A2	08-09-2006	CA 2600312 A1	08-09-2006
		CA 2829902 A1	08-09-2006
		CA 2850677 A1	08-09-2006
		CN 101208031 A	25-06-2008
		CN 103494465 A	08-01-2014
		CN 105832035 A	10-08-2016
		CN 105832036 A	10-08-2016
		EP 1855569 A2	21-11-2007
		JP 4987739 B2	25-07-2012
		JP 2008531224 A	14-08-2008
		MY 147453 A	14-12-2012
		US 2007057550 A1	15-03-2007
		US 2008179929 A1	31-07-2008
		US 2009256407 A1	15-10-2009
		US 2012274119 A1	01-11-2012
		US 2015015052 A1	15-01-2015
		WO 2006094261 A2	08-09-2006