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(54) OSCILLATING DAMPING SYSTEM FOR THE BACKREST OF AN ITEM OF SEATING FURNITURE

(57) The present invention comprises a spring element (5), a base structure (3) attached to the seat (1b) and a support structure (4) attached to the backrest (1a); wherein the support structure (4) is coupled to the base structure (3) by means of an articulated connection. The oscillating damping system (2) is configured such that in a first direction of rotation (20), the backrest (1a) tilts against the resistance of the spring element (5), and in a second direction of rotation (21), opposite to the first direction of rotation (20), the backrest (1a) tilts driven by the mechanical tension accumulated in the spring element (5) towards the resting position; the seat (1b) being maintained in a static position.

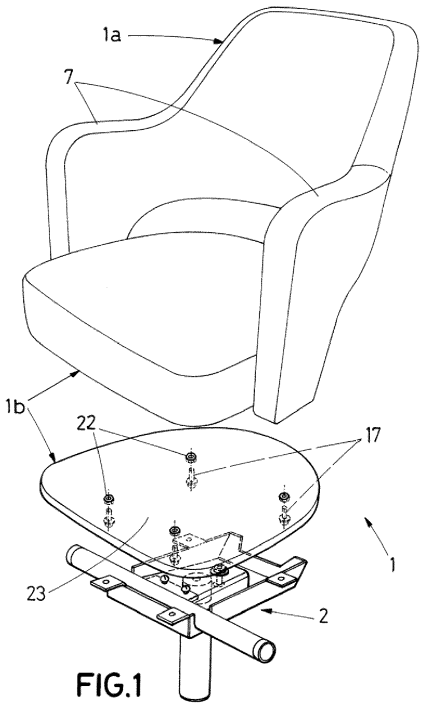

FIG.1

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Description

Object of the invention

[0001] The present invention relates to an oscillating damping system for the backrest of an item of seating furniture that is applicable to an item of raised seating furniture with a footrest, an item of stool furniture, an armchair, a chair, etc.; wherein in all cases the oscillating damping system allows an independent movement of the backrest with respect to the seat, facilitating the postural change that greatly influences the ergonomics and comfort in a seated position of a user when using the item of seating furniture of the invention.

Background of the invention

[0002] At present, different items of seating furniture are known, among which it is worth highlighting the item of seating furniture that includes a seat and a backrest, and among these the item of seating furniture with a damping system for the backrest, wherein the seated user can recline the backrest backwards by pushing with their back against the resistance of the damping system, such that when the pushing stops, the backrest returns to its resting position.

[0003] Different damping systems for backrests are known, such that in all cases they include complex mechanisms that make the final product more expensive, and said damping systems also eventually break prematurely, causing a malfunction, which in some cases it is not worth fixing the item of seating furniture.

[0004] These conventional damping systems join the seat and the backrest with one piece, normally located in the rear part of the seat near the start of the backrest, with an opening angle; or laterally coming out of the seat upwards and wrapping around or holding the backrest. The freedom of movement of the seat and backrest is carried out by means of a plate mechanism with a 'synchro' type handle located at the base of the seat.

Description of the invention

[0005] In order to achieve the objectives and avoid the drawbacks mentioned in the previous sections, the invention proposes an oscillating damping system for the backrest of an item of seating furniture, wherein said furniture initially includes a seat and a backrest.

[0006] The oscillating damping system comprises a spring element, a base structure attached to the seat, and a support structure attached to the backrest; wherein the support structure is coupled to the base structure by means of an articulated connection.

[0007] The support structure comprises a transverse shaft and an intermediate body; wherein said transverse shaft articulates in the base structure; wherein end parts of the transverse shaft are attached to armrests that form part of the backrest; and wherein the intermediate body extends in a direction perpendicular to the transverse shaft.

[0008] The spring element is inserted between the intermediate body and the base structure, the mechanical tension of which spring element tends to push the intermediate body with the tendency to tilt the backrest towards a resting position; wherein the opposite ends of the spring element are in contact with the intermediate body and the base structure.

[0009] The oscillating damping system is configured such that, in a first direction of rotation, the backrest tilts against the resistance of the spring element, and in a second direction of rotation, opposite to the first direction of rotation, the backrest tilts driven by the mechanical stress accumulated in the spring element towards the resting position.

[0010] In one embodiment of the invention, the spring element comprises an elastomer cylindrical body with a coaxial opening in which an appendage attached to the base structure is fitted; wherein the opposite bases of said cylindrical body are in contact with the base structure and with the intermediate body of the support structure.

[0011] In one embodiment of the invention, the base structure comprises a box configuration including a bottom, two first opposed side walls, and two second opposed side walls; wherein end regions of the first side walls include two recesses aligned in the vicinity of and parallel to one of the other two second side walls; and wherein the transverse shaft of the support structure fits and articulates in said recesses.

[0012] The transverse shaft includes opposite end sections curved upwards to which plates are attached that are fastened to the armrests of the backrest through fastening means.

[0013] In one embodiment of the invention, the intermediate body of the support structure comprises a base and two opposing collateral wings, all of them attached to the transverse shaft that forms part of the support structure; wherein the spring element is hidden in a space delimited by the base structure, the base and the two collateral wings of the support structure.

[0014] The seat is joined to the base structure by means of screws that are inserted through holes located in wings attached to the base structure; wherein said screws thread into nut elements fastened to a base body that forms part of the seat.

[0015] In the embodiment of the invention wherein the base structure comprises the box configuration, the wings on which the seat is fastened are attached to edges of the first and second side walls of the base structure; wherein said base structure is hidden under said seat, as well as a portion of the support structure. There is also the possibility that said wings are only attached to the edges of the two second side walls of the base structure.

[0016] In one embodiment of the invention, the oscillating damping system comprises a securing device that is configured to secure the intermediate body of the support structure to the base structure, enabling the tilting

mobility of said support structure due to its articulated connection.

[0017] The securing device comprises a threaded extension attached to the base structure and a nut that threads onto an end section of said threaded extension; wherein the intermediate body includes a groove in which the threaded extension is fitted; and wherein the intermediate body includes two opposite faces: a first face that is in contact with one of the ends of the spring element and a second face that is in contact with the nut when the backrest is in the resting position.

[0018] The groove in the intermediate body of the support structure is located at the base thereof, which rests on one of the ends of the spring element on one of the two opposite faces thereof, and the nut is in contact with the other paired face of said base.

[0019] When the securing device is not included, an end part of the base that forms part of the intermediate body abuts on the lower face of the base body of the seat in the resting position due to the action of the spring element.

[0020] The oscillating damping system is a non-rigid system that allows the backrest to tilt backwards depending on the effort applied by the user with their back on said backrest.

[0021] The force exerted on the backrest by the user with their back uses a mechanism similar to the lever mechanism, where during the backward tilting of the backrest of the item of seating furniture, the intermediate body is a radial extension of the transverse pivot shaft configured to press on the elastomer spring element, which is compressed depending on the effort made by the user on the backrest. It also of note that the oscillating damping system of the invention is more sensitive to effort than traditional systems.

[0022] The system of the invention is a more sensitive system in the initial section of the tilting of the backrest, which facilitates the user's change in posture, progressively increasing afterwards, which gives a feeling of security.

[0023] Lastly, it should be noted that with the oscillating tilting system, it is possible to adjust the tension of the elastomer spring element by acting on the securing device by means of the nut coupled to the threaded extension attached to the base structure.

[0024] To help better understand this specification, and as an integral part thereof, a series of figures is attached, in which the object of the invention is depicted in an illustrative and non-limiting manner.

Brief description of the figures

[0025]

Figure 1 shows a perspective view of an item of seating furniture with the oscillating damping system for the backrest, object of the invention. It includes a securing device in order to be able to regulate the tilting of the backrest of the item of seating furniture.

Figure 2 shows a perspective view of the oscillating damping system that is integrated into an internal space of the assembly of the item of seating furniture of the invention.

Figure 3 shows a cross-sectional view according to section A-B of figure 2.

Figure 4 shows a perspective view of an item of seating furniture similar to that shown in figure 1, without the securing device.

Figure 5 shows a perspective view of the oscillating damping system similar to that shown in figure 2, without the securing device.

Figure 6 shows a cross-sectional view according to section C-D of figure 5.

Description of an exemplary embodiment of the invention

[0026] Figures 1, 2 and 3 show an item of seating furniture 1 with a backrest 1a that includes the oscillating damping system 2 of said backrest 1a; wherein the item of furniture 1 comprises a seat 1b and the backrest 1a; and wherein these two elements 1a, 1b are linked by means of the oscillating damping system 2 that includes a base structure 3 attached to the seat 1b and a tilting pivot support structure 4 that is firmly joined to the backrest 1a.

[0027] The support structure 4 is coupled to the base structure 3 by means of an articulated connection with the possibility of tilting a certain angular space the backrest 1a by means of rotation in both directions.

[0028] In a first direction of rotation 20, the backrest 1a can tilt against the resistance of an elastomer spring element 5 compressing it, when a user seated on the item of furniture pushes said backrest 1a backwards with their back; wherein said spring element 5 forms part of the tilting oscillating system 2; and wherein said spring element 5 works under compression.

[0029] Conversely, in a second direction of rotation 21 the backrest 1a tilts driven by the mechanical energy accumulated in the compressed spring element 5 as a consequence of having previously tilted the backrest 1a in the first direction of rotation, such that when it tilts in the second direction of rotation, the backrest 1a tends to recover a stable resting position due to the action of the spring element 5.

[0030] In the embodiment of the invention shown in the figures, the base structure 3 has a box configuration including a bottom 3a, two first opposed side walls 3b and two second opposed side walls 3c; wherein end regions of the first side walls 3b include two recesses 6 aligned in proximity to one of the other two second side walls 3c.

[0031] The support structure 4 comprises a transverse shaft 4a and an intermediate body 4b equidistant from the ends of said transverse shaft 4a, such that the transverse shaft 4a articulates in the two recesses 6 of the base structure 3 to be able to carry out the folding of the

assembly of the backrest 1a.

[0032] The backrest 1a includes armrests 7, by means of which said backrest 1a is fastened to the support structure 4. For this, the transverse shaft 4a includes opposite end sections curved upwards to which plates 8 are attached that are fastened to the armrests 7 of the backrest 1a with the help of fastening elements (not shown in the figures) that are inserted through openings 9 of the plates 8.

[0033] The intermediate body 4b of the support structure 4 is fixed to the bottom 3a of the base structure 3 by means of a securing device with the possibility of rotating the backrest 1a through the articulated connection of the support structure 4, while the spring element 5 is inserted between the intermediate body 4b and said bottom 3a, the tension of which spring element tends to push the intermediate body 4b upwards and with the tendency to tilt the backrest 1a in the second direction of rotation towards the resting position thereof.

[0034] Said securing device comprises a threaded extension 10 attached to the bottom 3a of the base structure 3 and a nut 11 that threads onto an end section of said threaded extension 10; wherein the intermediate body 4b includes a groove 12 in which the threaded extension 10 is fitted with clearance; and wherein the intermediate body 4b includes two opposite faces: a first face that is in contact with the spring element 5 and a second face that is in contact with the nut 11 when the backrest 1a is in the resting position. As shown in the figures, in one embodiment of the invention, it is possible to insert a washer 13 between the nut 11 and the second face of the intermediate body 4b of the support structure 4.

[0035] The spring element 5 is a cylindrical body with a coaxial opening in which an appendage 14 is fitted, attached to the bottom 3a of the base structure 3; wherein the opposite bases of said cylindrical body are in contact with said bottom 3a and with the intermediate body 4b of the support structure 4.

[0036] In one embodiment of the invention, the intermediate body 4b of the support structure 4 comprises a base 15 and two opposing collateral wings 16, all of them 15, 16 attached to the transverse shaft 4a that forms part of the support structure 4; wherein the spring element 5 is hidden in a space delimited by the bottom 3a of the base structure 3, the base 15 and the two collateral wings 16 of the support structure 4.

[0037] In the embodiment of the invention described in the preceding paragraph, the groove 12 is located in the aforementioned base 15, while said base 15 rests on one of the ends of the spring element 5 on one of the two opposite faces thereof, and the nut 11 or the washer 13 are in contact with the other paired face of said base 15.

[0038] Furthermore, the aforementioned securing device allows the tension of the oscillating damping system to be regulated, by simply screwing the nut 11 to a greater or lesser depth on the threaded extension 10.

[0039] The seat 1b is joined to the base structure 3 by means of screws 17 that are inserted from below through holes 19 located in wings 18 attached to the base structure 3; wherein said screws 17 thread into nut elements 22 fastened to a base body 23 that forms part of the seat 1b. Said wings 18 are attached to the edges of the first 3b and second 3c side walls of the base structure 3, which is hidden below said seat 1b, as is the case with a part of the transverse shaft 4a and the intermediate body 4b of the support structure 4.

[0040] Furthermore, figures 4, 5 and 6 show another embodiment of the invention different from that described above, with the difference that said embodiment of the invention dispenses with the securing device comprising at least the threaded extension 10, nut 11 and groove 12. The washer 13 associated with the nut 11 is also dispensed with. The oscillating damping system of the embodiment shown in said figures 4, 5 and 6 is a simplified and simpler system with a minimum number of elements and high effectiveness.

[0041] In the embodiment of the invention shown in figures 4, 5 and 6, the intermediate body 4b has a somewhat different size and configuration than that of the intermediate body 4b of the embodiment shown in figures 1, 2 and 3.

[0042] In addition, in the embodiment shown in figures 4, 5 and 6, an end part of the base 15 that forms part of the intermediate body 4b, abuts on the lower face of the base body 23 of the seat 1b in the resting position due to the action of the spring element 5.

Claims

1. An oscillating damping system for the backrest of an item of seating furniture, wherein the item of furniture includes a seat (1b) and the backrest (1a); **characterised in that** the oscillating damping comprises:

   - a spring element (5), a base structure (3) attached to the seat (1b) and a support structure (4) attached to the backrest (1a); wherein the support structure (4) is coupled to the base structure (3) by means of an articulated connection;
   - the support structure (4) comprises a transverse shaft (4a) and an intermediate body (4b); wherein said transverse shaft (4a) articulates in the base structure (3); wherein end parts of the transverse shaft (4a) are attached to armrests (7) that form part of the backrest (1a); and wherein the intermediate body (4b) extends in a direction perpendicular to the transverse shaft (4a);
   - the spring element (5) is inserted between the intermediate body (4b) and the base structure (3), the mechanical tension of which spring element (5) is configured to push the intermediate body (4b) with the tendency to tilt the backrest (1a) towards a resting position; wherein the opposite ends of the spring element (5) are in con-

tact with the intermediate body (4b) and the base structure (3);

wherein the oscillating damping system (2) is configured such that, in a first direction of rotation (20), the backrest (1a) tilts against the resistance of the spring element (5), and in a second direction of rotation (21), opposite to the first direction of rotation (20), the backrest (1a) tilts driven by the mechanical stress accumulated in the spring element (5) towards the resting position.

2. The oscillating damping system for the backrest of an item of seating furniture, according to claim 1, wherein the spring element (5) comprises an elastomer cylindrical body with a coaxial opening in which an appendage (14) is fitted attached to the base structure (3); wherein the opposite bases of said cylindrical body are in contact with the base structure (3a) and with the intermediate body (4b) of the support structure (4).

3. The oscillating damping system for the backrest of an item of seating furniture, according to any one of the preceding claims, wherein the base structure (3) comprises a box configuration that includes a bottom (3a), two first opposite side walls (3b) and two second opposite side walls (3c); wherein end regions of the first side walls (3b) include two recesses (6) aligned in proximity and parallel to one of the other two second side walls (3c); wherein the transverse shaft (4a) of the support structure (4) fits and articulates in said recesses (6).

4. The oscillating damping system for the backrest of an item of seating furniture, according to any one of the preceding claims, wherein the transverse shaft (4a) includes opposite end sections curved upwards to which plates (8) are attached that are fastened to the armrests (7) of the backrest (1a) through fastening means.

5. The oscillating damping system for the backrest of an item of seating furniture, according to any one of the preceding claims, wherein the intermediate body (4b) of the support structure (4) comprises a base (15) and two opposing collateral wings (16), all of them attached to the transverse shaft (4a) that forms part of the support structure (4); wherein the spring element (5) is hidden in a space delimited by the base structure (3), the base (15) and the two collateral wings (16) of the support structure (4).

6. The oscillating damping system for the backrest of an item of seating furniture, according to any one of the preceding claims, wherein the seat (1b) is joined to the base structure (3) by means of screws (17) that are inserted through holes (19) located in wings (18) attached to the base structure (3); wherein said screws (17) thread into nut elements (22) fastened to a base body (23) that forms part of the seat (1b).

7. The oscillating damping system for the backrest of an item of seating furniture, according to claims 3 and 6, wherein the wings (18) on which the seat (1b) is fastened, are attached to some edges of the second side walls (3c) of the base structure (3) with the box-shaped configuration; wherein said base structure (3) is hidden below said seat (1b), as is the case with a part of the support structure (4).

8. The oscillating damping system for the backrest of an item of seating furniture, according to claims 3 and 6, wherein the wings (18) on which the seat (1b) is fastened, are attached to edges of one of the first (3b) and second (3c) side walls of the base structure (3) with the box-shaped configuration; wherein said base structure (3) is hidden below said seat (1b), as is the case with a part of the support structure (4).

9. The oscillating damping system for the backrest of an item of seating furniture, according to any one of the claims 6 to 8, wherein an end part of the base (15) that forms part of the intermediate body (4b) abuts on the lower face of the base body (23) of the seat (1b) in the resting position due to the action of the spring element (5).

10. The oscillating damping system for the backrest of an item of seating furniture, according to any one of the claims 1 to 8, wherein it comprises a securing device that is configured to secure the intermediate body (4b) of the support structure (4) to the base structure (3).

11. The oscillating damping system for the backrest of an item of seating furniture, according to claim 10, wherein the securing device comprises a threaded extension (10) attached to the base structure (3) and a nut (11) that threads onto an end section of said threaded extension (10); wherein the intermediate body (4b) includes a groove (12) in which the threaded extension (10) is fitted; and wherein the intermediate body (4b) includes two opposite faces: a first face that is in contact with one of the ends of the spring element (5) and a second face that is in contact with the nut (11) when the backrest (1a) is in the resting position.

12. The oscillating damping system for the backrest of an item of seating furniture, according to claims 5 and 11, wherein the groove (12) of the intermediate body (4b) of the support structure (4) is located at the base (15) thereof, which rests on one of the ends of the spring element (5) on one of the two opposite faces thereof, and the nut (11) is in contact with the

other paired face of said base (15).

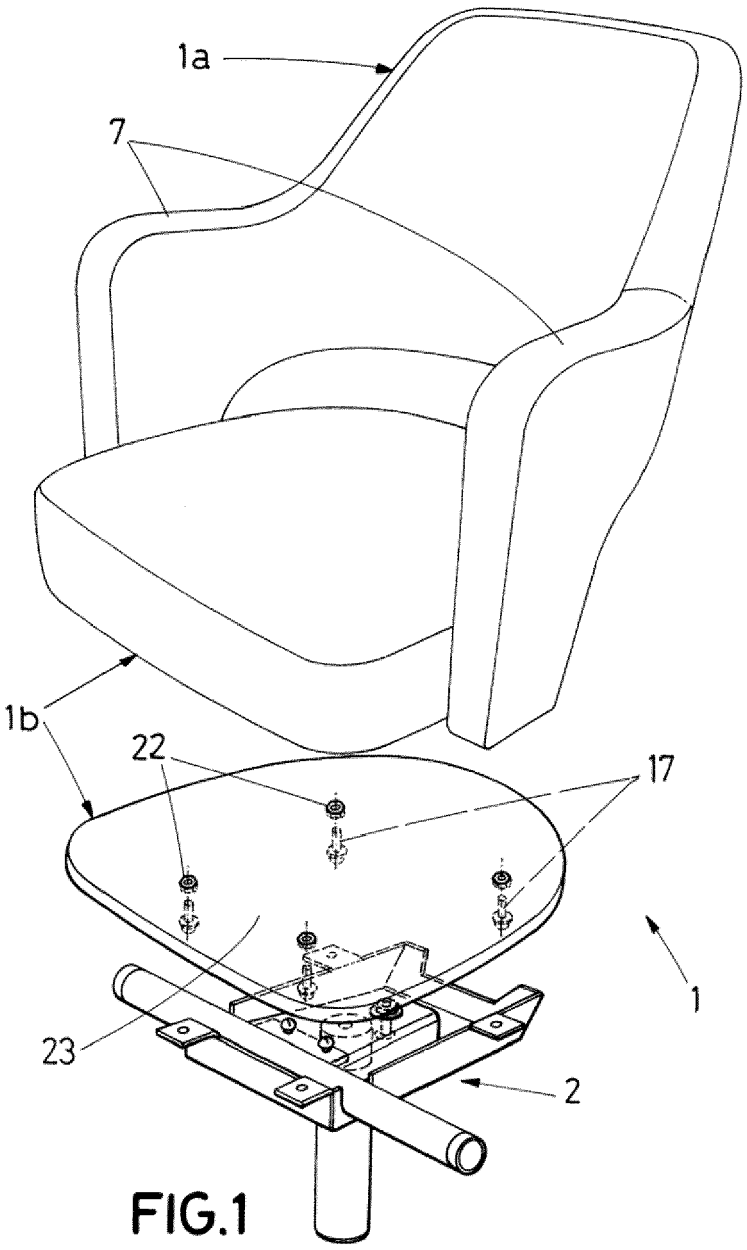
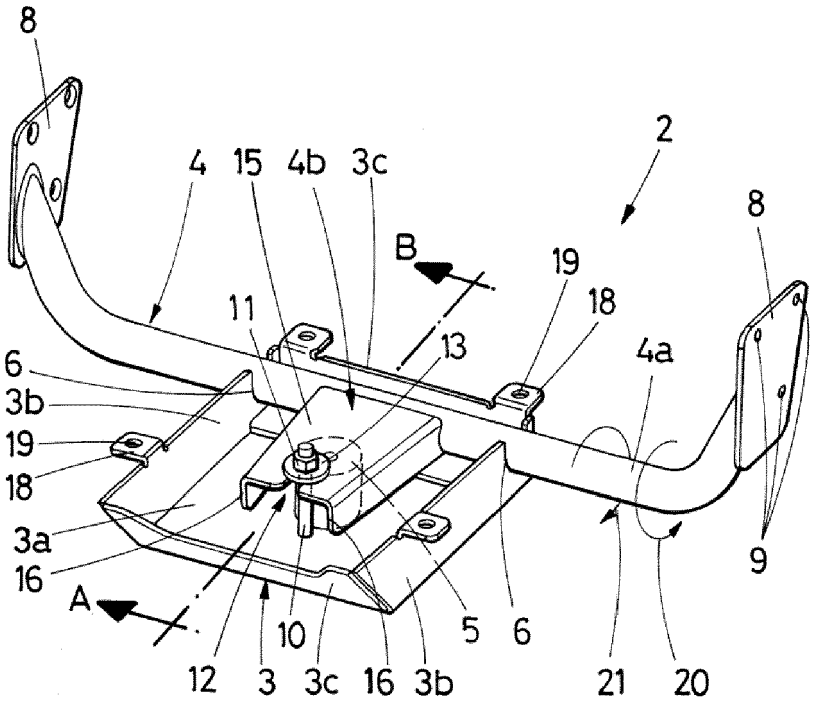


FIG.1


8
4
15
4b
3c
2
8
B
19
18
11
13
4a
6
3b
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18
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9
10
5
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12
3
3c
16
3b
21
20

FIG. 2

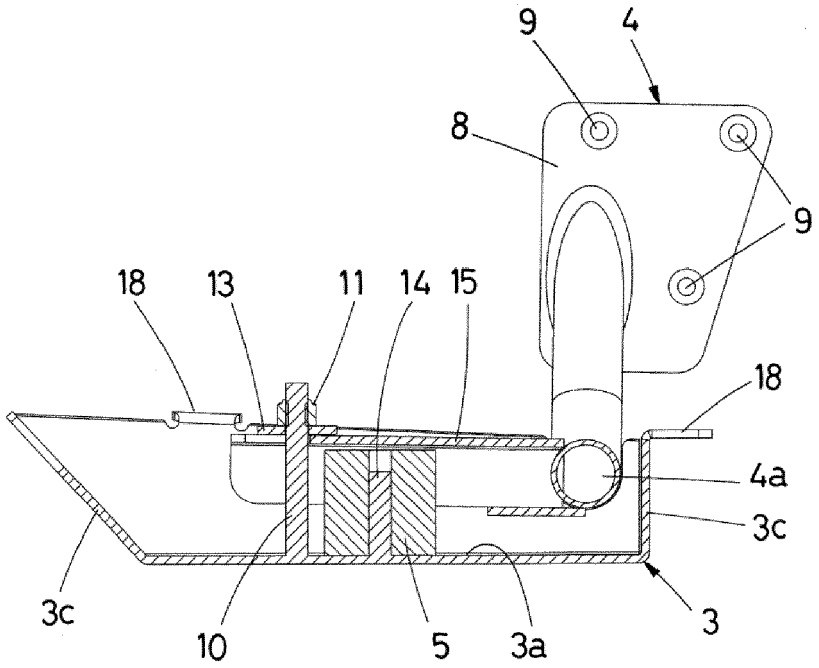

FIG. 3
A-B

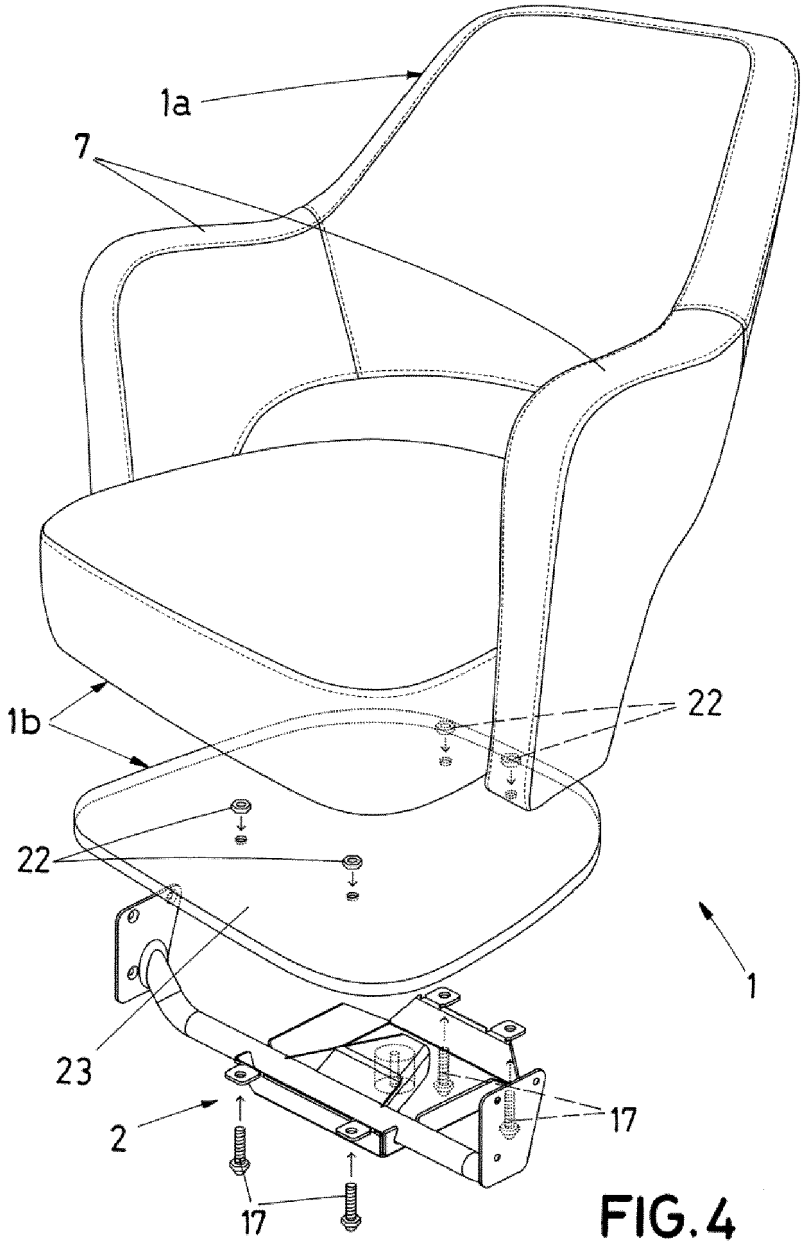

FIG. 4

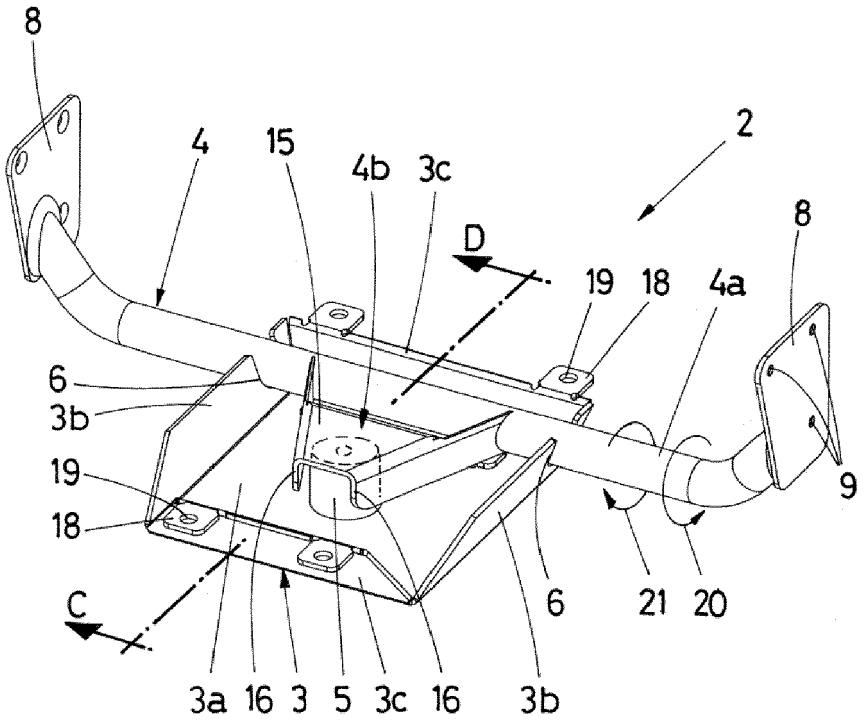

FIG.5

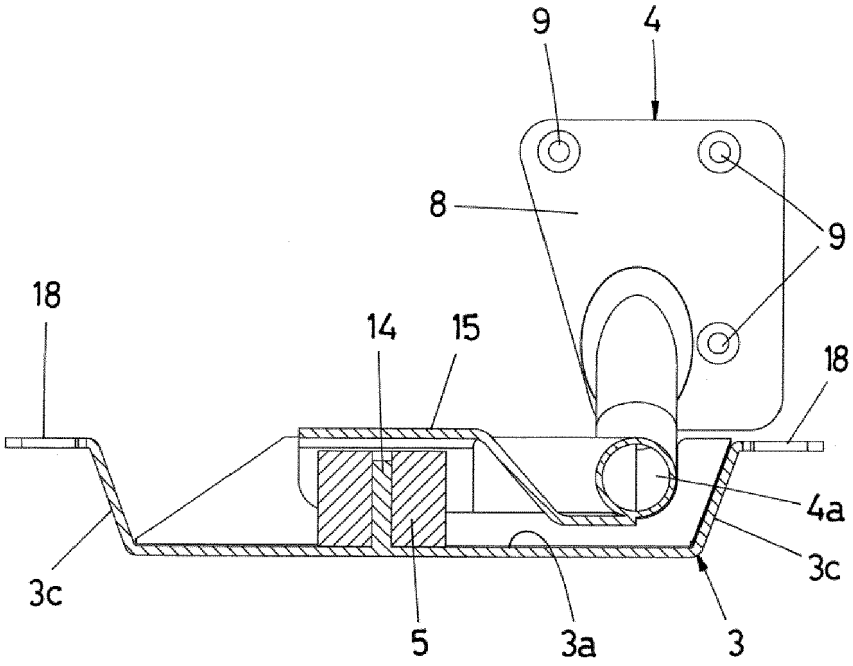

FIG.6
C-D

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EUROPEAN SEARCH REPORT

Application Number
EP 23 16 9502

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	KR 2014 0003922 A (HAN UI KYOUNG [KR]) 10 January 2014 (2014-01-10)	1-10	INV. A47C7/44
Y	* paragraph [0023] - paragraph [0120]; figures 1-11 *	2	A47C3/026
Y	DE 20 2014 004814 U1 (NOWY STYL GMBH [DE]) 28 July 2014 (2014-07-28) * paragraph [0018] - paragraph [0024]; figures 1-4 *	2	

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	26 October 2023	Kus, Slawomir

CATEGORY OF CITED DOCUMENTS

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
KR 20140003922 A	10-01-2014	NONE	
DE 202014004814 U1	28-07-2014	NONE	

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