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(54) **SIDE MODULE FOR CHAIR, CHAIR AND ROW OF CHAIRS**

(57) The invention relates to a side module for a chair, comprising a side element (1) and at least one support element (2), which will support a seat and a back (4) and which is attached to the side element such as to pivot between a first position corresponding to a non-reclined position of the back and a second position corresponding to a reclined position of the back. The side module comprises a non-metallic elastic element (5) assembled so that it attracts the support element towards its first position.

The invention also relates to a chair and to a row of chairs.

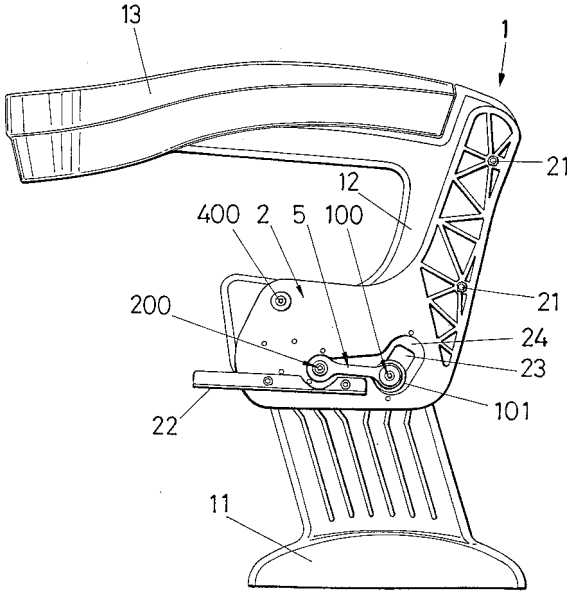

FIG.1

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Description

Technical Field of the Invention

[0001] The invention is comprised in the field of chairs designed for their use in places such as auditoriums, cinemas, theaters, etc.

Background of the Invention

[0002] The use of chairs provided with a tilting seat and back is usual in auditoriums, cinemas, theaters, etc. Unlike chairs for particular use, in cinema chairs and the like there are usually no means for retaining the chair in the "tilted" or "reclined" position of the back: these chairs are usually configured so that the back reclines due to the weight exerted by the user on the chair when he or she sits on the chair, and such that the back returns to its "non-reclined" position when the user gets up from the chair. This is due to safety reasons: the backs of the chairs are to be prevented from being reclined when the user gets up since this could make it difficult to evacuate the room in the event of an emergency.

[0003] Therefore, chairs of this type can be provided with means which allow tilting the back when a force is exerted thereon (for example, by means of the user's back) and which make the back recover its original (normally more vertical) position when this force is no longer exerted. These means usually comprise metallic springs.

[0004] A drawback with this type of element is that it tends to generate noise, a great drawback especially when the chair is intended for a cinema, for a theater, etc.

Description of the Invention

[0005] A first aspect of the invention relates to a side module for a chair, comprising a side element, for example, made of plastic or the like, formed by a molded single body or by several molded parts attached to one another in a conventional manner; WO-A-03/007758 and WO-A-2004/095985 reflect some known structures which could be useful as a base for the structure of the side element of the invention. The side element can comprise a base part intended to be secured to the floor of an establishment, for example, by means of screws or bolts or by means of other fixing elements, and an upper part attached to said base part, for example, forming part of one and the same molded general body; types without the base part, for example, can also be contemplated in the case of seats which are directly fastened on steps of a room or on other support structures; furthermore, the side element can comprise an armrest, for example, an armrest attached in a tilting or hinged manner with respect to the rest of the side element. According to the invention, the side module additionally comprises at least one support element attached to a side of the side element, said support element being provided with attachment means for attaching (for example, by means of screws) a seat and a back to the support element.

[0006] The support element is attached or fixed (for example, by means of a screw traversing a front part of the support element and which can pass through a bushing, through one or more washers, etc.) to the side of the side element (for example, to an upper part of the side element) such as to pivot between a first position corresponding to a non-reclined position of the back and a second position corresponding to a reclined position of the back (normally less vertical than the non-reclined position).

[0007] According to the invention, the support element is provided with a through hole through which a first fixing device or element (for example, the screw mentioned above) attached to said side of the side element extends. There is furthermore a second fixing device or element attached to the support element.

[0008] The fixing elements can be independent elements (for example, screws, bolts or the like, as has been suggested above) fixed to the side of the side element and to the support element, or they can be integrally formed with the side element and with the support element, respectively. The fixing elements can additionally comprise bushings, washers and/or other complementary elements conventionally used in this type of application.

[0009] The side module additionally comprises a non-metallic elastic element (for example, made of rubber or the like) attached to said fixing elements. This elastic element is assembled so that it attracts the support element towards it first position and so that the support element can be pivoted towards its second position against a force exerted by said elastic element.

[0010] The use of a non-metallic elastic element, for example, made of rubber or the like, reduces the risk of annoying noise generated during the use of the chair. Furthermore, with the claimed arrangement, the elastic element can be easily replaced in the event that it breaks or when it starts to deteriorate. Furthermore, the possibility can be provided of offering different types of elastic elements, for example, with different elongation or elasticity characteristics, so that, for example, a chair buyer can decide the degree of hardness of the reclining mechanism and, therefore, the force necessary to tilt the back. This facilitates adapting the basic structure to the needs or wishes of the user.

[0011] The through hole can have larger dimensions that the first fixing element (i.e., the first fixing element can pass "very easily" through the through hole) and can be configured so that the first position and the second position of the support element are determined by means of respective points of contact or "stop" between an inner surface or edge of the through hole and the first fixing element. The first fixing element is thus also useful to limit the pivoting of the back, so that it does not pass beyond said first and second position, respectively. For example, the central hole can have an oval or rectangular elongated shape and the points of contact or "stop" can

correspond to the "shorter sides" of the rectangle. In such case, the pivoting or tilting angle is determined by the length of the rectangle, or by the larger diameter of the oval. Other configurations are possible, for example, a curved elongated configuration, the width of which is adjusted to the dimensions of the first fixing element and the length of which corresponds to the pivoting angle.

[0012] The first fixing element can be provided with a stop element (for example, a washer) adjoined at least partially on a face of the support element farthest from the side element in correspondence with the through hole, so that it prevents the support element from separating from the side element in correspondence with the through hole. The first fixing element thus establishes a second point of "anchoring" between the support element and the side element.

[0013] The support element can have, on the face farthest from the side element, a recessed area in correspondence with the through hole, said second fixing element being located in said recessed area and said elastic element extending between said first fixing element and said second fixing element, in said recessed area. According to the depth of the recessed area (limited by the total thickness of the side part of the support element), the fixing elements and the elastic element may or may not project with respect to the inner face of the support element, i.e., with respect to the face farthest from the side element.

[0014] The recessed area can have two broader sub-areas connected by a narrower sub-area, the elastic element extending through said narrower sub-area. In any case, it is convenient for the narrower sub-area to be broader than the elastic element in its passage through said narrower sub-area to facilitate the pivoting.

[0015] The elastic element can comprise an elongated element made of elastic material configured to exert an attractive force between the first fixing element and the second fixing element, at least when the support element is not in the first position.

[0016] The elastic element can have two thicker or wider ends (in the plane of the face of the support element) connected by a less thick or wide (i.e., narrower) elongated central part, a first one of said ends being traversed by at least one part of the first fixing element, and a second one of said ends being traversed by at least one part of said second fixing element. The configuration of the narrower part of the elastic element substantially determines the force that it will exert on the fixing elements.

[0017] The first fixing element and/or the second fixing element can comprise a screw (and, for example, additional element such as a bushing traversed by the screw, etc.), the elastic element being traversed by at least said screw or screws.

[0018] The side module can comprise two substantially identical support elements assembled in a substantially identical way, one on each side of the side element, so that the side module is suitable for forming an (inner) part of a row of chairs, i.e., for being shared by two chairs.

[0019] The attachment means for attaching a seat to the support element can include a bent plate (for example, with through holes which allow supporting a non-folding seat on said bent plate and then screwing the seat to the bent plate by means of screws passing through said through holes) or a "ball joint" element which can comprise a groove for receiving a pivot shaft of a folding seat.

[0020] Another aspect of the invention relates to a chair comprising two side modules according to what has been described above, with their respective support elements, and a seat and a back attached to said support elements.

[0021] Another aspect of the invention relates to a row of chairs comprising a number N of side modules according to what has been described above, as well as a number M of seats and a number M of backs, M=N-1.

Description of the Drawings

[0022] To complement the description and with the aim of aiding to better understand the features of the invention according to a preferred practical embodiment thereof, a set of drawings is attached as an integral part of the description, in which the following has been shown with an illustrative and non-limiting character:

Figures 1 and 2 show two side elevational views of a side module according to a preferred embodiment of the invention, with the support element in two end pivoting positions.

Figure 3 shows a view of the support element in which the general configuration of the recessed area in the support element, with the through hole, is seen.

Figure 4 shows a perspective view of the elastic element and of the screws and bushings forming the fixing elements for fixing the elastic element.

Figures 4A and 4B show two schematic cross-section views of the elastic element and of the screws and other fixing elements.

Figure 5 shows a schematic front view of a side element with two support elements.

Figure 6 shows a schematic view of a row of seats with three seats, with side elements, backs and seats.

Figure 7 shows a side elevational view of a side element, without the support element.

Figure 8 shows a perspective view of the side element with the support element.

Figure 9 shows a view similar to that of Figure 1, but with attachment means configured for a folding seat.

Figure 10 shows a perspective view of an example of a ball joint for a folding seat.

Preferred Embodiment of the Invention

[0023] As can be seen in Figures 1 and 2, the side module according to the invention can, according to a preferred embodiment of the invention, comprise a side

element 1 which can have a conventional general configuration, for example, with a base part 11 with holes (not shown in Figures 1 and 2) to be attached to the floor, for example, by means of bolts, screws or the like. An upper part 12 is attached to the base part 11 by means of a narrower transition section, which upper part has two substantially planar faces, although it can have holes, reinforcement ribs, etc. An elevational view of the side element 1 can be observed in Figure 7. A fixed or lowerable armrest 13 configured in any suitable manner can be coupled to the upper part.

[0024] Attached to the upper part 12 of the side element 1 by means of a screw 400 and its corresponding bushing there is a support element which can tilt or pivot around the screw 400 and bushing, between a first position corresponding to a "non-reclined" position of the back (illustrated in Figure 1) and a second "reclined" position of the back (illustrated in Figure 2). This support element 2, which is shown in a perspective view in Figure 8, has fixing means 21 (in the form of threaded rods) for fixing a back to the support element at one side of the back, and fixing means 22 (which can include a type of bent plate with through holes, screwed to the support element 2) for fixing a seat to the support element on one side of the seat.

[0025] The support element 2 has a substantially planar general configuration and a bent general shape, with a part extending in correspondence with the seat and with another part extending substantially parallel to the extension of the back. The support element 2 can be partially hollow and provided with reinforcement ribs, etc., in a conventional way.

[0026] In addition, the support element 2 has a recessed area 24 in the face farthest from the side element 1. This recessed area has two broader sub-areas 24A, 24B connected by a narrower sub-area 24C (see Figure 3). In one of the broader sub-areas 24A there is a through hole 23 through which a fixing element 100 attached to the upper part 12 of the side element 1 extends (and which therefore traverses the support element through the through hole). Another fixing element is located in the other broader sub-area 24B.

[0027] In addition, the assembly comprises an elastic element made of rubber, with two broader or thicker ends 5A and 5B, traversed by the respective fixing elements 100 and 200, so that one of said thicker ends 5A is attached to the upper part 11 of the side element 1 (through the through hole), and so that the other thicker end 5B is attached to the support element 2, in the recessed area 24. In this preferred embodiment of the invention, the two thicker ends 5A and 5B are connected by a narrower central section 5C, with dimensions chosen according to the characteristics of the rubber and the desired "elasticity".

[0028] A washer 101 has been provided in correspondence with the first fixing element 100, which prevents the support element from separating from the side element in the area of the through hole.

[0029] The substantially rectangular configuration and the dimensions of the through hole 23 are such that the support element 2 can tilt between the mentioned first position (Figure 1) and second position (Figure 2), the end positions being defined by respective positions of contact or stop between the first fixing element 100 and the inner surface of the through hole 23, specifically, in correspondence with the shorter sides of the rectangle. When the support element moves towards its second position (Figure 2), the elastic element exerts an attractive force which pulls said support element 2 towards its first position, i.e., towards the "non-reclined" position illustrated in Figure 1. This force depends on the characteristics of the material and on the dimensions of the elastic element, therefore it is easy to modify the "reclining resistance" characteristics of a chair, replacing one elastic element with another one having different characteristics.

[0030] Figure 4 schematically illustrates how each of the first fixing element 100 and the second fixing element 200 comprises a screw 300, 310 traversing a bushing 301 and 311.

[0031] Figure 4A schematically illustrates how the second fixing element 200 comprises a screw 300 traversing a washer 302 and a bushing 301, and with an end screwed into a nut 303 located in a corresponding recess in the opposite face of the support element 2. In addition, Figure 4B illustrates how the first fixing element comprises a screw 310 traversing a washer 312 to be screwed into a metallic socket 313 with an inner thread, traversing a bushing 311 and another washer 101. This metallic socket 313 is located in the side element 1 and further traverses the bushing 311, the washer 101 and the end 5A of the elastic element, one end being supported against the washer 312, as can be seen in Figure 4B.

[0032] Figure 5 schematically illustrates a side module in which two support elements are attached to the side element.

[0033] Figure 9 shows an alternative embodiment, useful for chairs with a folding seat. In such case, instead of the bent plate 22 with through holes of the embodiment illustrated in Figure 1 (which can correspond to an embodiment with a non-folding seat, i.e., with the seat fixedly attached to the bent plate 22), the structure incorporates a ball joint 22A screwed to the support element 2, as illustrated in Figure 9. The seat can thus be coupled in said ball joint so that it can pivot about a shaft housed in a groove 22B in the ball joint, whereby the seat can be folded. Figure 10 shows a possible embodiment of the ball joint 22A with the groove 22B in which the pivot shaft of the folding seat will be located, and a strip 22C which serves to retain said shaft in the groove.

[0034] Figure 6 shows a row of seats, with their backs 4 and seats 3 screwed to the support elements (not shown in the figure).

[0035] In this text, the word "comprises" and its variants (such as "comprising", etc.) should not be interpreted in an excluding manner, i.e., they do not exclude the pos-

sibility that what has been described may include other elements, steps, etc.

[0036] In addition, the invention is not limited to the specific embodiments which have been described but rather it also covers, for example, the variants which may be carried out by a person skilled in the art (for example, in relation to the choice of materials, dimensions, components, configuration, etc.), within what is deduced from the claims.

Claims

1. A side module for a chair, comprising a side element (1);
   characterized in that it further comprises
   at least one support element (2) attached to a side of said side element (1), said support element (2) being provided with attachment means (21, 22; 22A) for attaching a seat (3) and a back (4) to the support element (2);
   the support element (2) being attached to the side element (1) such as to pivot between a first position corresponding to a non-reclined position of the back and a second position corresponding to a reclined position of the back;
   the support element (2) comprising a through hole (23) through which a first fixing element (100) attached to said side of the upper part (12) of the side element extends;
   the side module comprising a second fixing element (200) attached to the support element (2);
   the side module additionally comprising a non-metallic elastic element (5) attached to said fixing elements (100, 200), the elastic element (5) being assembled so that it attracts the support element towards its first position and so that the support element can be pivoted towards its second position against a force exerted by said elastic element (5).

2. Side module according to claim 1, **characterized in that** the through hole (23) has larger dimensions than the first fixing element (100) and is configured so that the first position and the second position of the support element (2) are determined by means of respective points of contact between an edge of the through hole (23) and the first fixing element (100).

3. Side module according to claim 1 or 2, **characterized in that** the first fixing element (100) is provided with a stop element (101) adjoined at least partially on a face of the support element (2) farthest from the side element (1), in correspondence with the through hole, so that it prevents the support element (2) from separating from the side element (1) in correspondence with the through hole (23).

4. Side module according to any of the previous claims, **characterized in that** the support element (2) has, in a face farthest from the side element (1), a recessed area (24) in correspondence with the through hole (23), said second fixing element (200) being located in said recessed area (24) and said elastic element (5) extending between said first fixing element (100) and said second fixing element (200), in said recessed area (24).

5. Side module according to claim 4, **characterized in that** said recessed area (24) has two broader sub-areas (24A, 24B) connected by a narrower sub-area (24C), the elastic element (5) extending through said narrower sub-area (24C).

6. Side module according to any of the previous claims, **characterized in that** the elastic element (5) comprises an elongated element made of elastic material configured to exert an attractive force between the first fixing element (100) and the second fixing element (200), at least when the support element is not in the first position.

7. Side module according to claim 6, **characterized in that** the elastic element has two wider ends (5A, 5B) connected by a narrower elongated central part (5C), a first one (5A) of said ends being traversed by at least one part of the first fixing element (100), and a second one (5B) of said ends being traversed by at least one part of said second fixing element (200).

8. Side module according to any of the previous claims, **characterized in that** the first fixing element and/or the second fixing element comprises a screw (300, 310) and a bushing (301, 311) traversed by the screw, the elastic element (5) being traversed by at least said screw (300, 310).

9. Side module according to any of the previous claims, **characterized in that** the elastic element is made of rubber.

10. Side module according to any of the previous claims, **characterized in that** it comprises two substantially identical support elements (2) assembled in a substantially identical way, one on each side of the side element (1), so that the side module is suitable for forming part of a row of chairs.

11. Side module according to any of the previous claims, **characterized in that** the side element (1) further comprises an armrest (13).

12. Side module according to any of the previous claims, **characterized in that** the side element (1) comprises at least one base part (11) intended for being secured to the floor of an establishment, and an upper part (12) attached to said base part (11), the support

element (2) being attached to said upper part (12).

13. Side module according to any of the previous claims, **characterized in that** the attachment means (21, 22) for attaching a seat to the support element include a bent plate (22).

14. Side module according to any of claims 1-12, **characterized in that** the attachment means (21, 22A) for attaching a seat to the support element include an element (22A) comprising a groove (22B) for receiving a pivot shaft of a folding seat.

15. Chair, **characterized in that** it comprises two side modules according to any one of the previous claims, with their respective support elements (2), and a seat (3) and a back (4) attached to said support elements.

16. Row of chairs, **characterized in that** it comprises a number N of side modules according to any of claims 1-14, as well as a number M of seats (3) and a number M of backs (4), M=N-1.

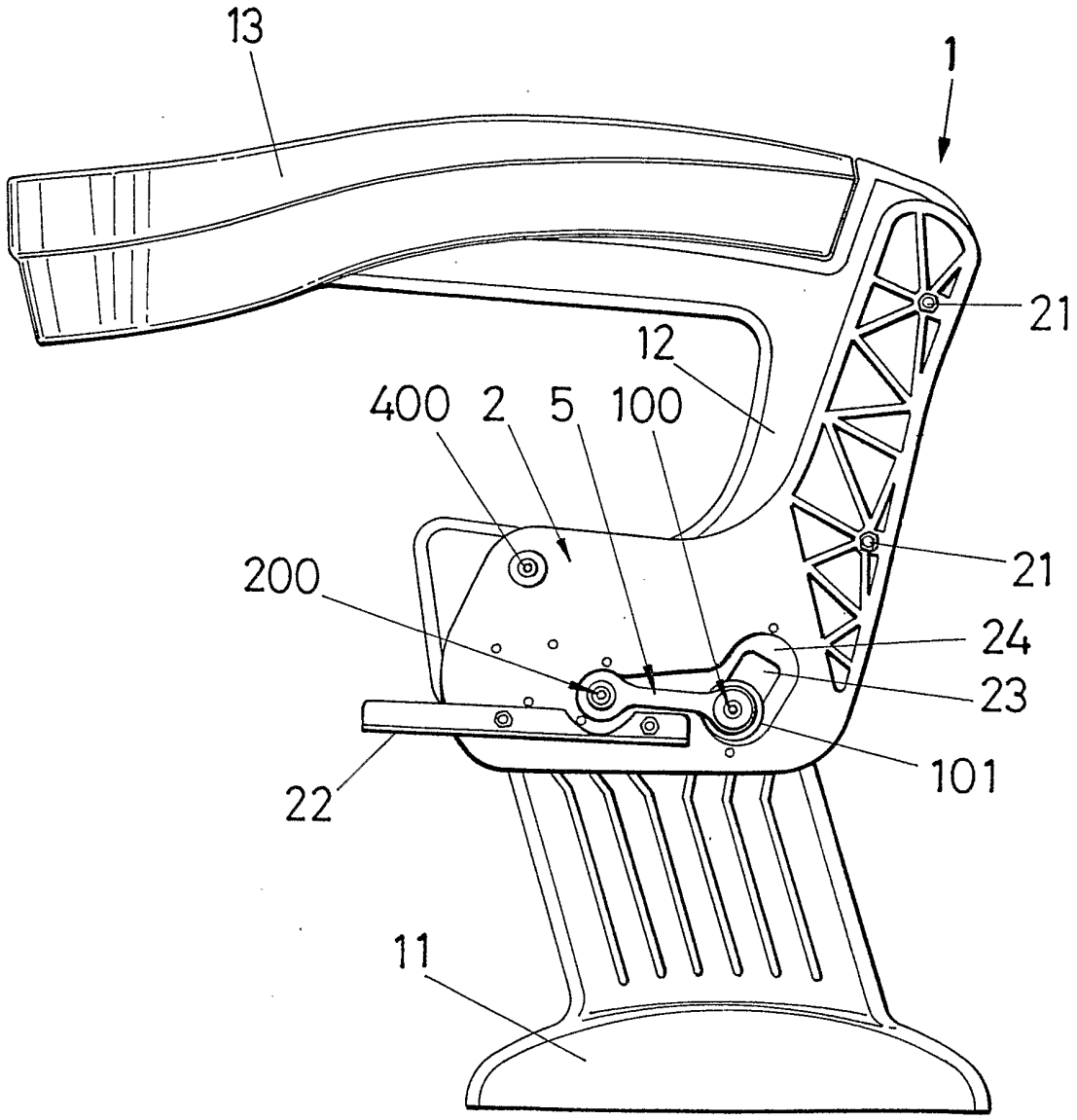

FIG.1

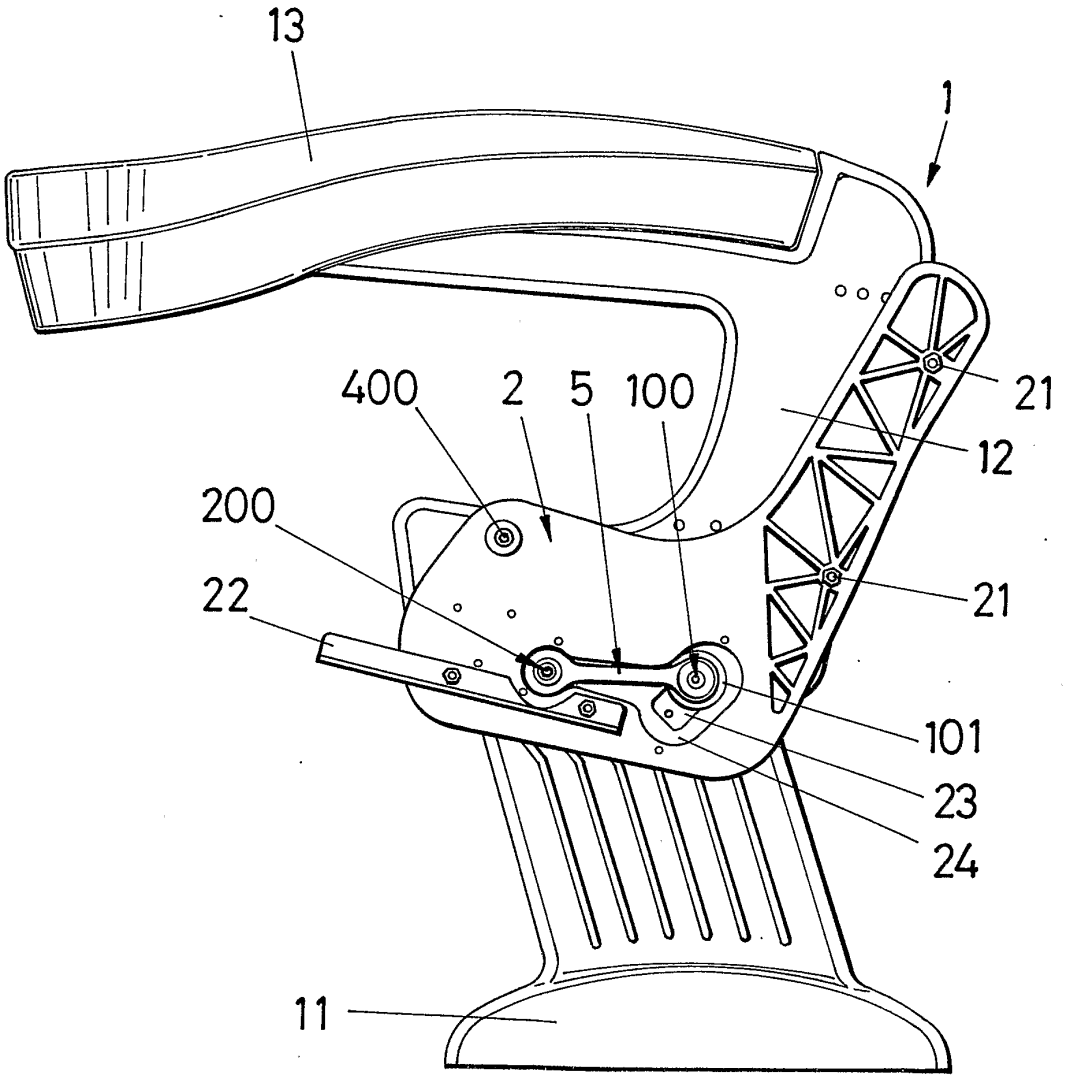

FIG. 2

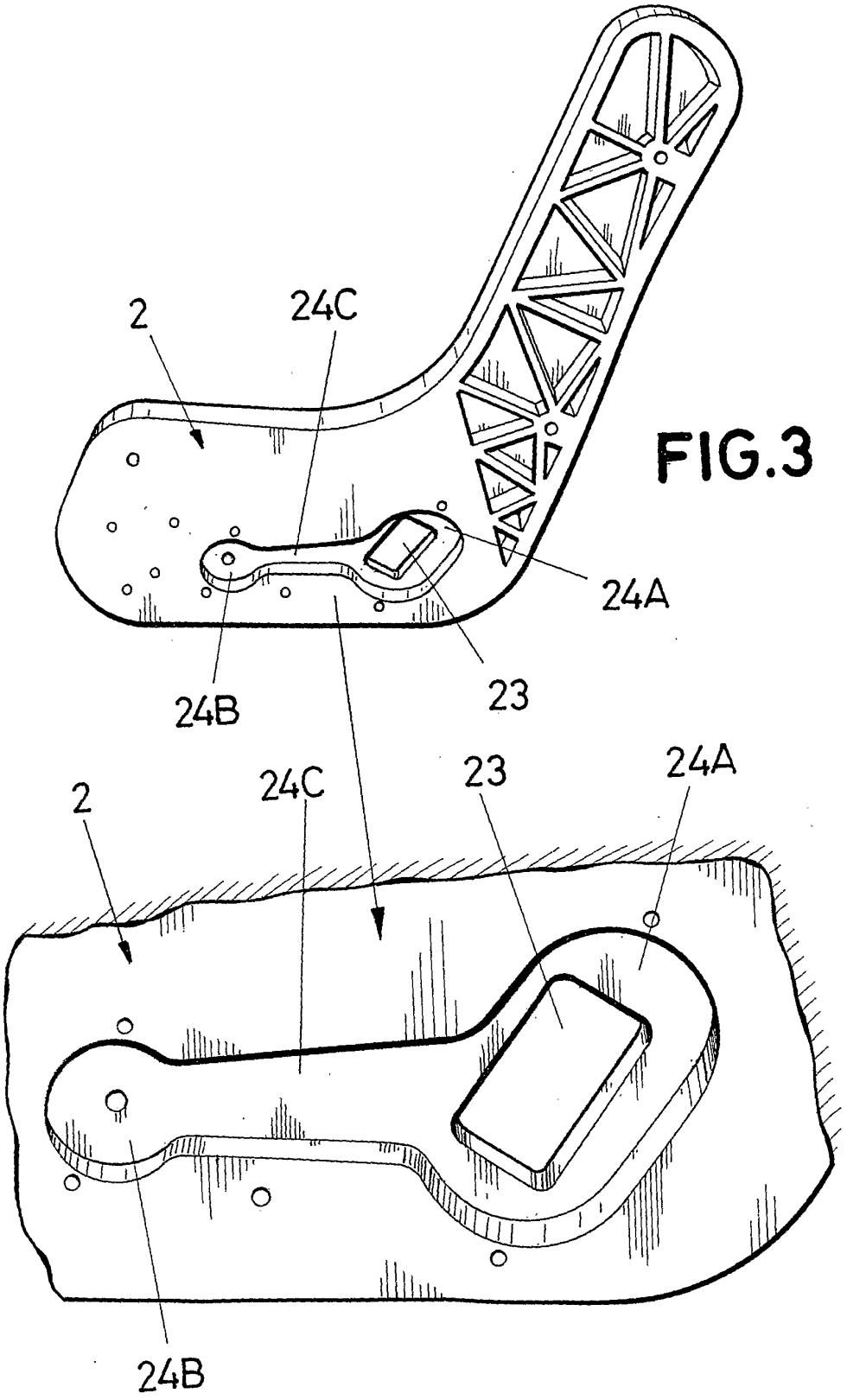

FIG.3

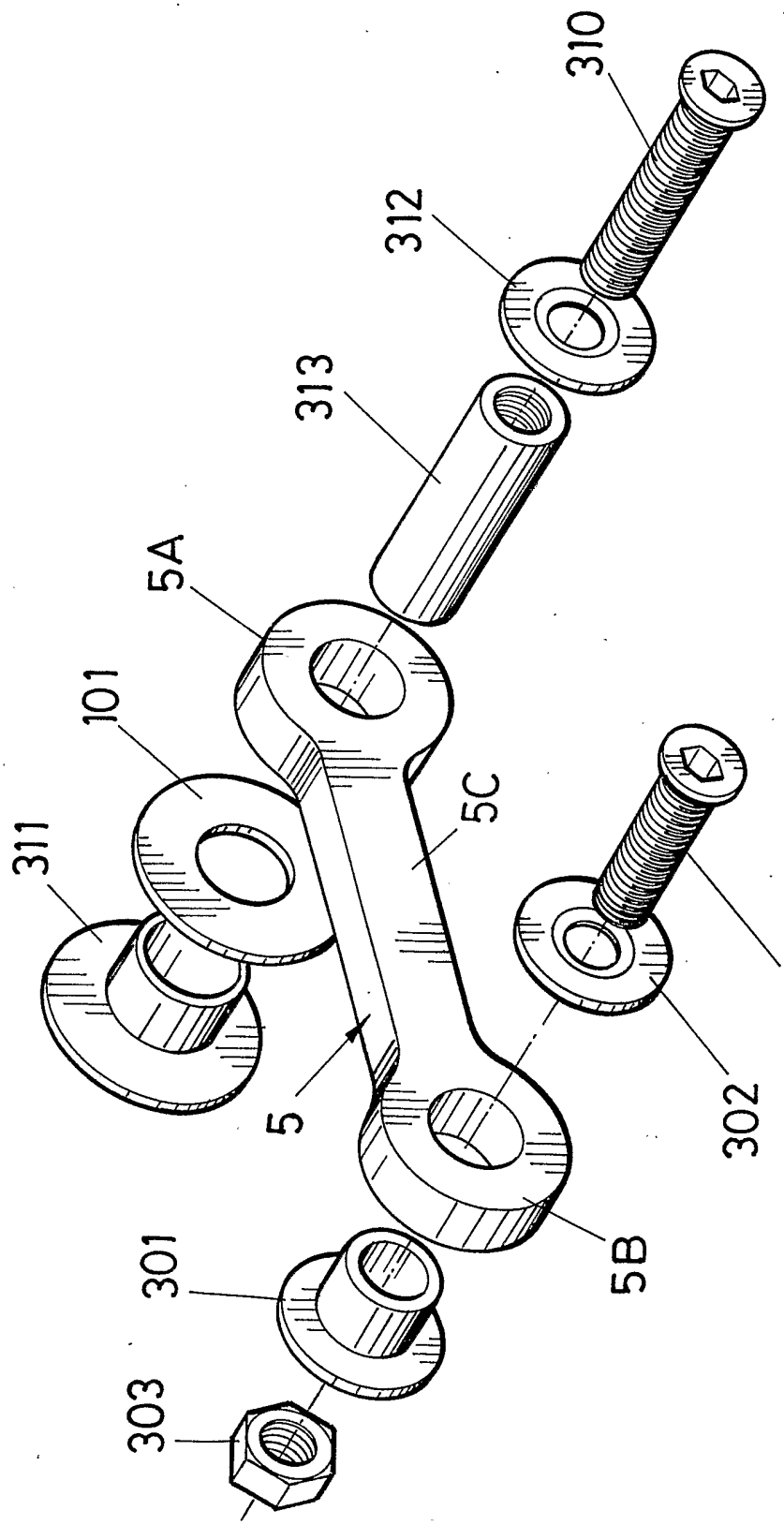

FIG.4

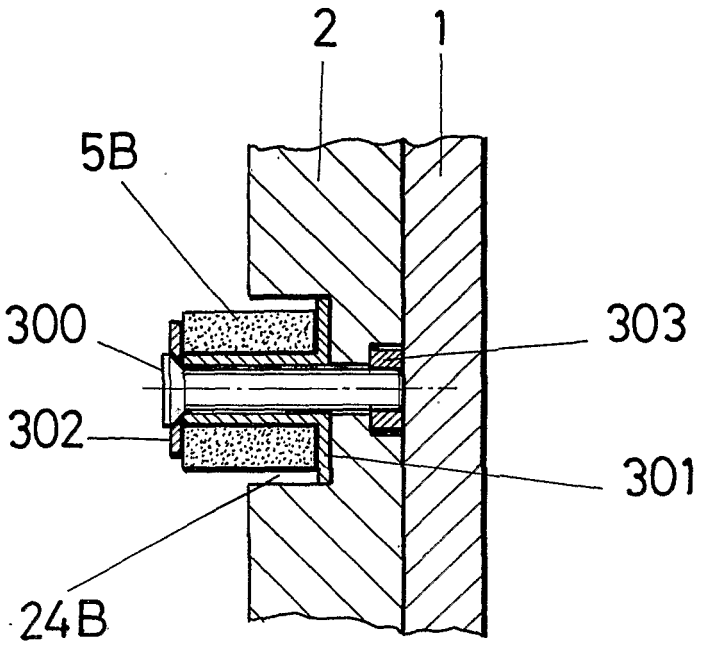

FIG.4A

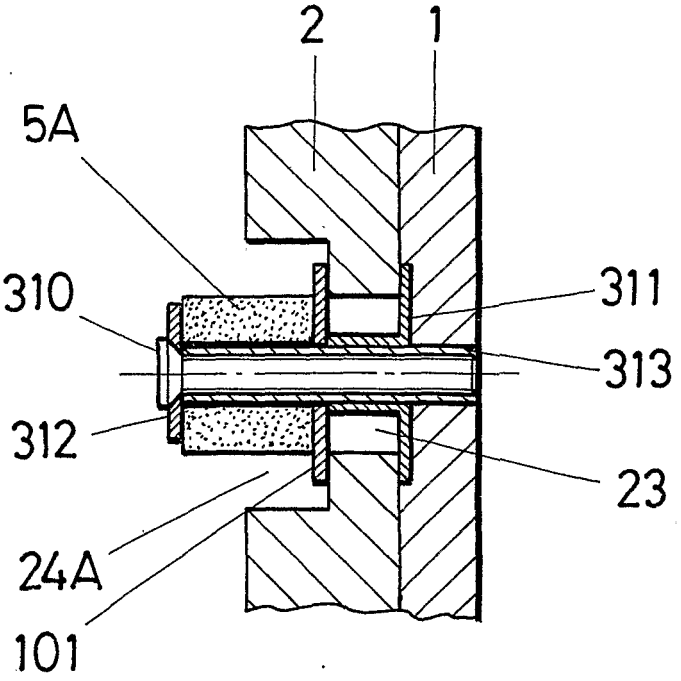

FIG.4B

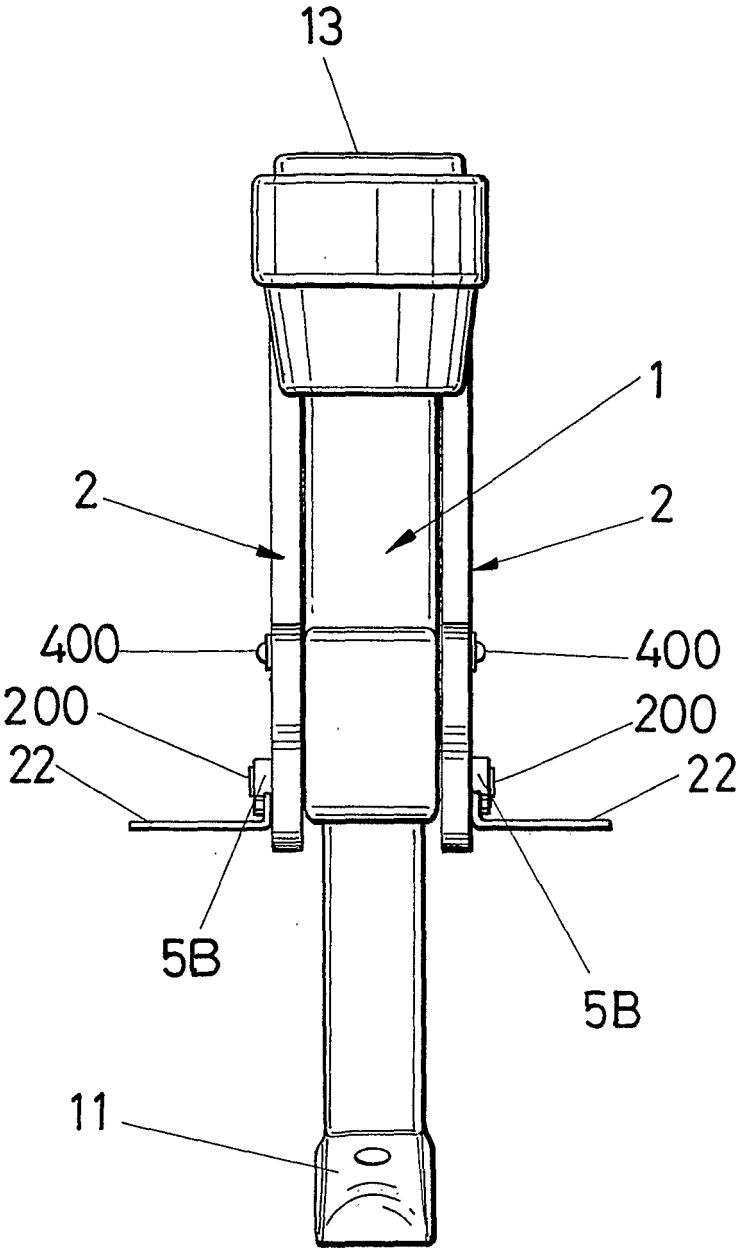

FIG. 5

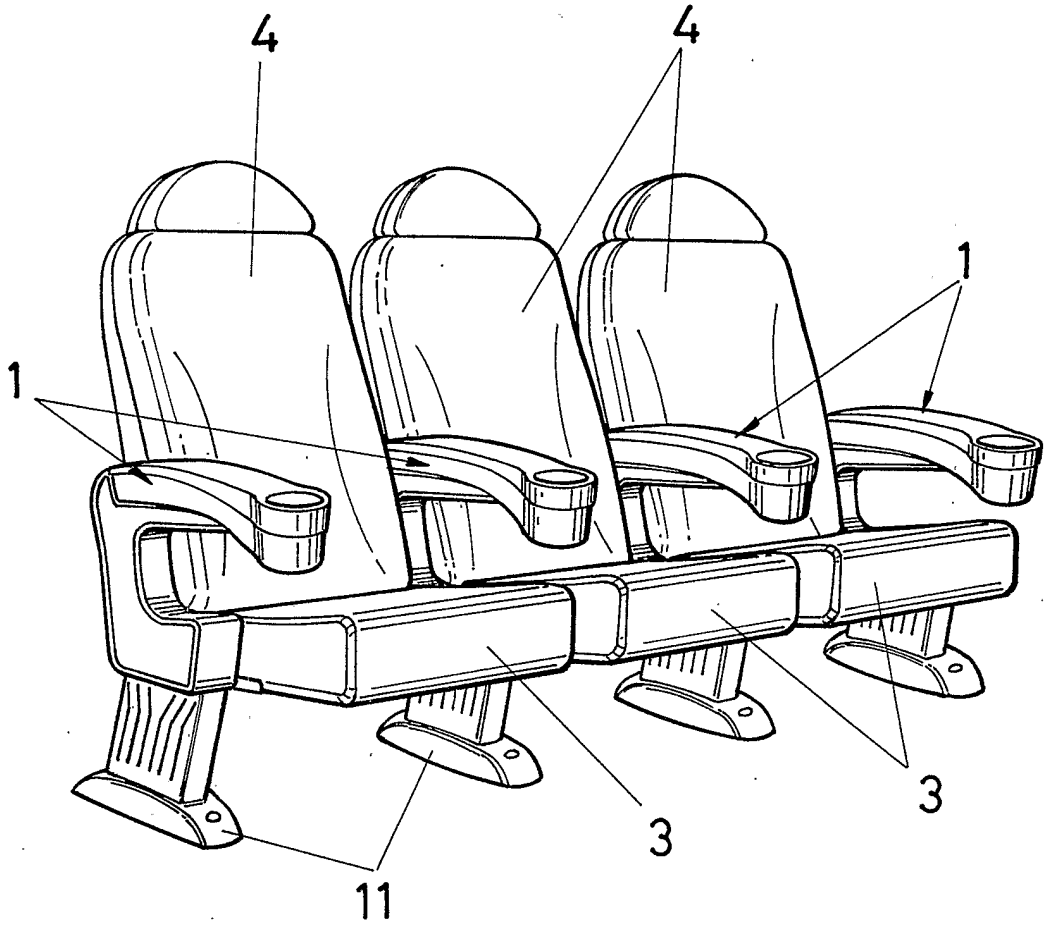

FIG.6

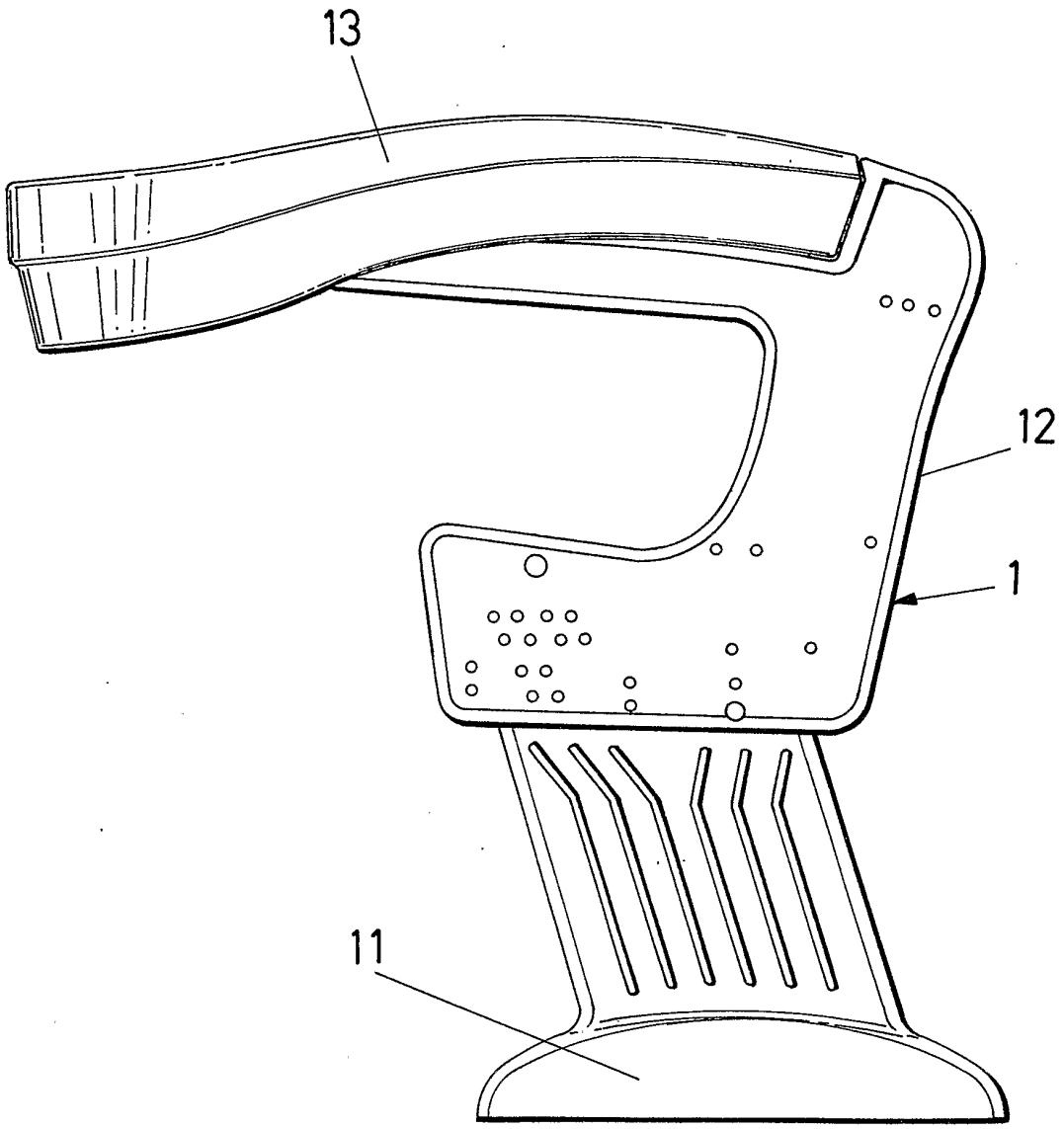

FIG.7

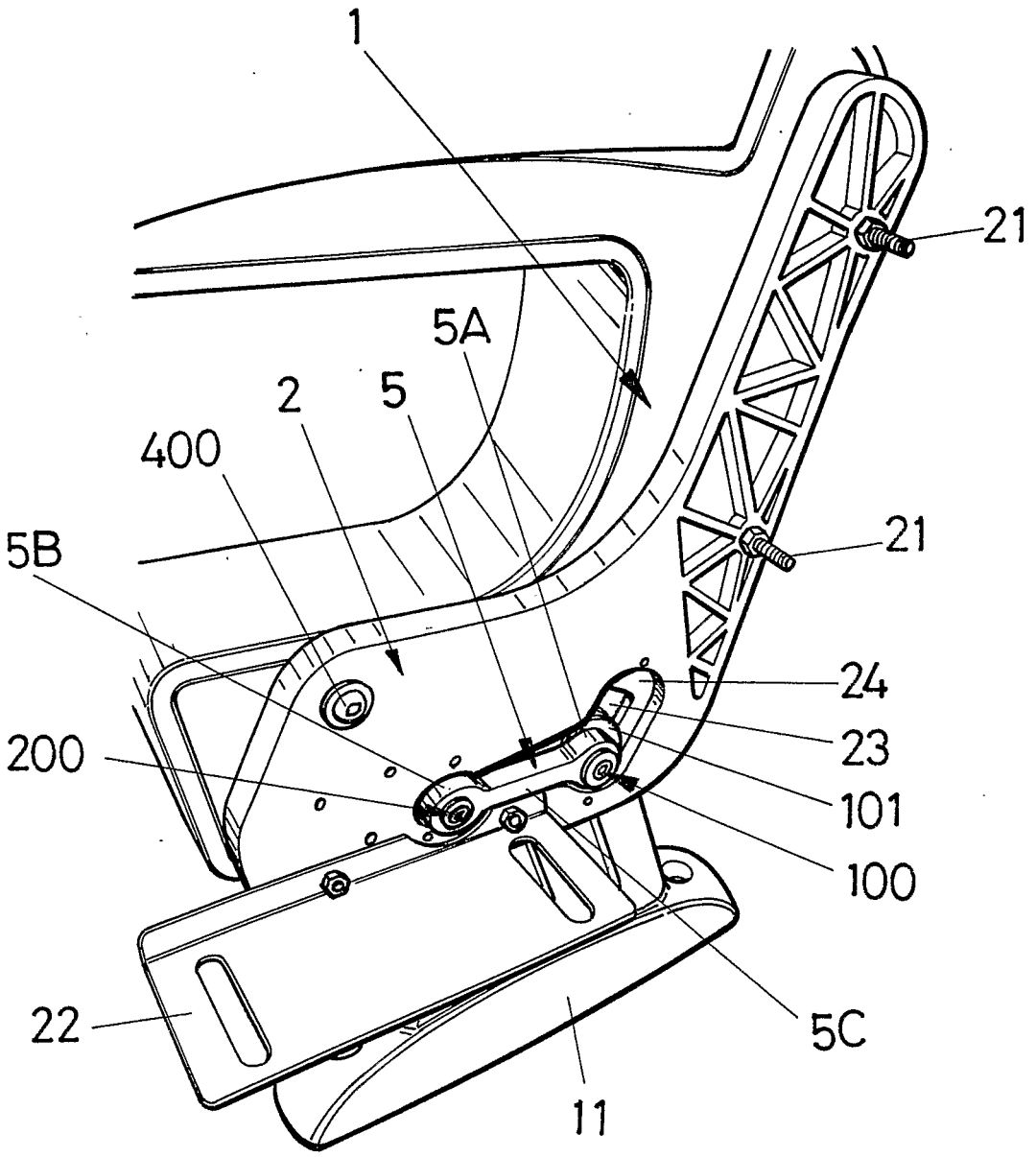

FIG.8

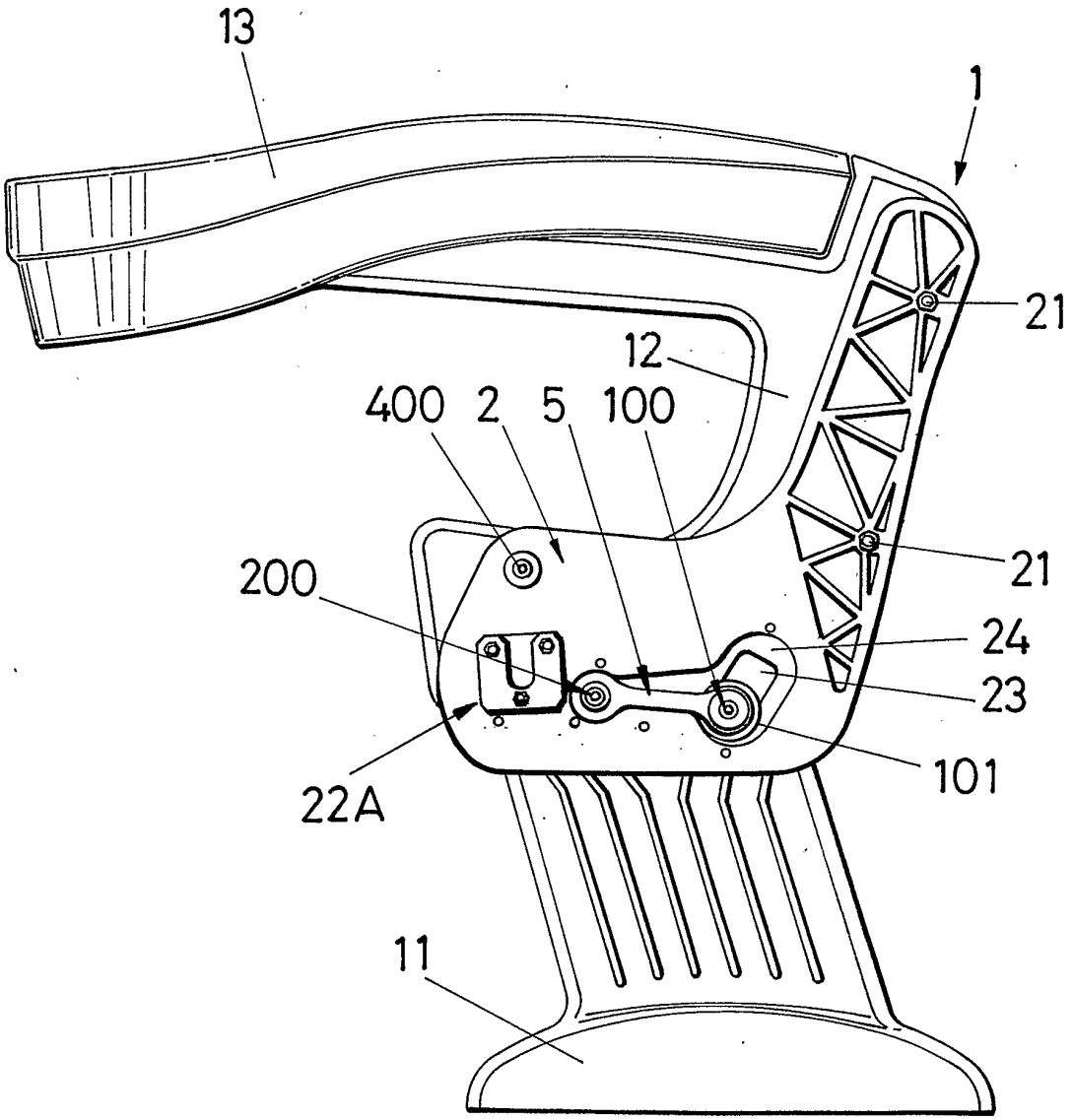

FIG.9

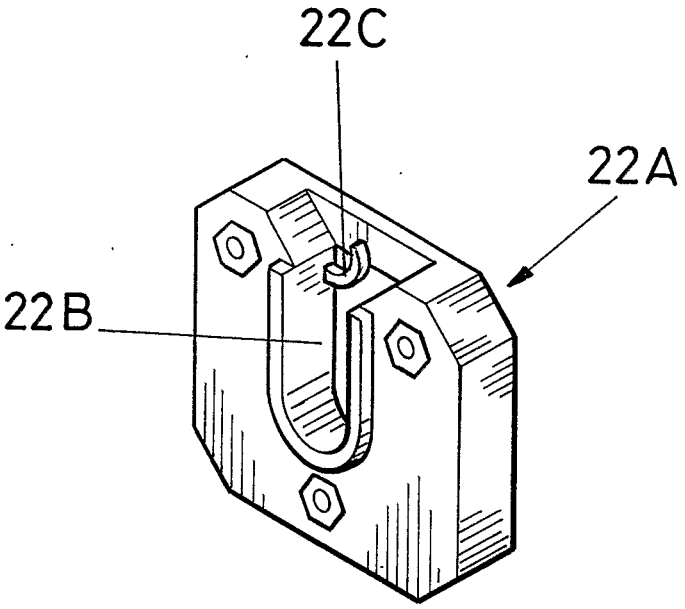

FIG.10

INTERNATIONAL SEARCH REPORT

International application No.
PCT/ ES 2006/000341

A. CLASSIFICATION OF SUBJECT MATTER

see extra sheet
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)

CIBEPAT,EPODOC,WPI,PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2530625 A (NORDMARK et al.) 21.11.1950, column 1, line 49 - column 4, line 20; figures.	1-16
A	US 5681085 A (NAHOUL et al.) 28.10.1997, column 2, lines 6-43; abstract; figures.	1-16
A	GB 2309379 A (HOOPER ROBERT JOHN) 30.07.1997, the whole document.	
A	WO 2006059404 A1 (JOHNSON CONTROLS TECH CO ; PARK GILSAM) 08.06.2006, the whole document.	
A	US 2239929 A (NORDMARK et al.) 29.04.1941, the whole document.	

☐ 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
29 November 2006 (29.11.2006)	(11-01-2007)
Name and mailing address of the ISA/ O.E.P.M. Paseo de la Castellana, 75 28071 Madrid, España. Facsimile No. 34 91 3495304	Authorized officer Mª Cinta Gutiérrez Pla Telephone No. +34 91 349 55 84

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Information on patent family members

International application No.
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A47C 7/56 (2006.01)
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REFERENCES CITED IN THE DESCRIPTION

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