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(54) **Tip-up seat**

(57) It is provided a tip-up seat (1) comprising a bearing structure (2) adapted to absorb stresses acting on the tip-up seat (1) and including at least one first columnar element (6a) having a first extension direction (6b); a base seat (3) substantially defining a lower supporting surface (3a); a back (4) substantially defining a rear supporting surface (4a); at least one armrest (5) substantially defining an arm supporting surface (5a); the first colum-

nar element (6a) and the armrest (5) being disposed in lateral side by side relationship with the base seat (3) and the back (4); and comprising a kinematic mechanism (8) adapted to determine a closed configuration in which the lower supporting (3a), rear supporting (4a) and arm supporting (5a) surfaces as well as the first columnar element (6a) define planes substantially parallel to each other.

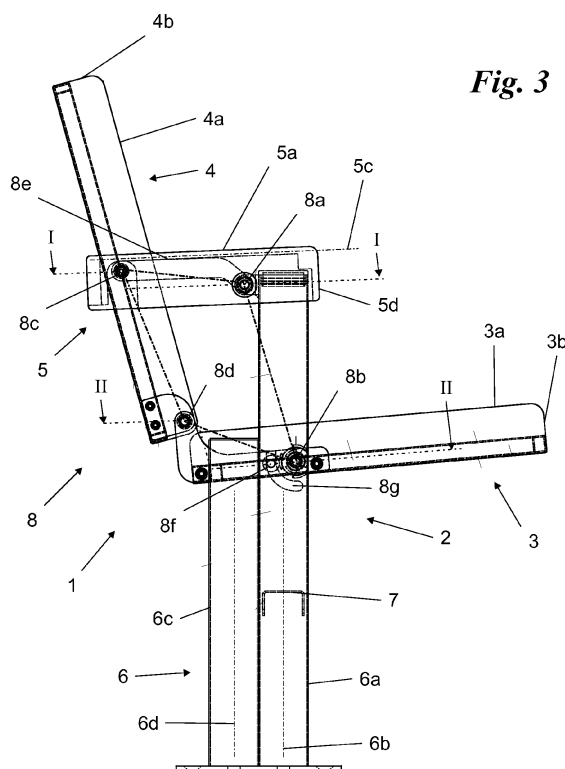


Fig. 3

Description

[0001] The present invention relates to a tip-up seat of the type pointed out in the preamble of the first claim.

[0002] In particular, the invention consists of a tip-up seat to be used in installations for manifestations, i.e. buildings/structures designed to be used for theatre performance, film shows and sport manifestations, such as stadiums, theatres, cinemas, conference rooms, etc.

[0003] It is known that one of the most important components of an installation for manifestations is surely represented by the seat, i.e. the chair/armchair in which the user sits for attending the manifestation over the whole duration of same and therefore said seat must ensure comfort, correct sitting position and practical use. Up to now suitable armchairs or other similar elements have been manufactured in which it is possible to identify a series of base components: a bearing structure adapted to absorb the stresses acting on the seat, a base seat defining the horizontal rest surface, a back constituting the rest surface for the bust, and the armrests delimiting the lateral seat ends and on which the arms rest.

[0004] An important feature of these seats is represented by the possibility of mutually moving the base seat and back in order to reduce the overall dimensions. In detail, by moving said components it is possible to close the seat upon itself so that its bulkiness is reduced and people's passage between two adjacent rows is improved.

[0005] In particular, two configurations are provided: a closed one in which the base seat and back are disposed close to each other so as to reduce bulkiness as much as possible; and an open one in which the base seat and back are perpendicular or inclined to each other so as to enable the user to have a comfortable sitting position. To this aim seats that when opened have an inclined and not a vertical back are important.

[0006] Some seats, in an attempt to further reduce bulkiness in the closed configuration, are also provided, in addition to movable base seat and back, with movable armrests that can therefore pass from an almost horizontal position belonging to a seat in the open configuration, to an oblique/vertical position typical of a seat in the closed configuration.

[0007] Some examples of these tip-up seats can be found in the Japanese patents JP 11225845 of 1999 and JP 10155587 of 1998 or in the international patent application WO 2007034007.

[0008] In particular, in the international patent application WO 2007034007 the back and base seat are suitably connected and their movements can be governed simultaneously, while the armrests are independent of the remaining part of the structure and can be moved by themselves.

[0009] In the two other patents mentioned above the three components (armrests, base seat and back) are kinematically linked to each other and therefore can be moved simultaneously when passing from the closed

configuration to the open one and vice versa.

[0010] The known art mentioned above has some important drawbacks.

[0011] In particular, the most comfortable seats provided with base seat, back and armrest that are all movable between the open and closed configurations are not provided with an optimal closed configuration which in addition is not very steady. Another problem connected with the imperfect closed configuration is represented by the tip-up seat bulkiness in the closed position, i.e. the non optimal arrangement of the different seat components. Therefore, there is an important increase in the forwarding and handling costs for the seat and an increase in the required space for storage.

[0012] Under this situation, the technical task underlying the present invention is to conceive a tip-up seat provided with movable base seat, back and armrest which is capable of substantially obviating the mentioned drawbacks.

[0013] Within the scope of this technical task it is an important aim of the invention to manufacture a tip-up seat of the aforesaid type that is particularly steady in the closed configuration.

[0014] In particular, the present invention aims at obtaining a tip-up seat the transport and replacement of which are particularly easy.

[0015] Another important aim of the invention is to obtain a seat with reduced bulkiness as compared with those presently on the market and therefore having particularly reduced costs for handling and storage.

[0016] The technical task mentioned and the aims specified are achieved by a tip-up seat as claimed in the appended claim 1.

[0017] Preferred embodiments are highlighted in the sub-claims.

[0018] The features and advantages of the invention are hereinafter clarified by the detailed description of a preferred embodiment of the invention, with reference to the accompanying drawings, in which:

Fig. 1 is a scale view of the tip-up seat represented in an open configuration;

Fig. 2 shows a second configuration in which the tip-up seat of the invention is completely closed;

Fig. 3 is a side view of the seat when it is in the configuration seen in Fig. 1;

Fig. 4 shows a side view of the tip-up seat when it is in the second configuration seen in Fig. 2;

Fig. 5 shows a section of a portion of the seat taken along line I-I; and

Fig. 6 reproduces a section of a second portion of the seat taken along line II-II.

[0019] With reference to the drawings, the tip-up seat according to the invention is generally identified by reference numeral **1**.

[0020] It briefly comprises a bearing structure **2** adapted to absorb stresses acting on said tip-up seat **1**, a base

seat **3** and a back **4** substantially defining the lower supporting surface **3a** and rear supporting surface **4a** and at least one armrest **5** substantially defining a supporting surface for the arms **5a** acting as a support for the user's arms. The base seat **3** and back **4** can comprise, in known manner, a padding so as to make use of seat **1** more comfortable. Likewise, anatomic cavities and similar conformations can be provided.

[0021] The bearing structure **2** has at least one supporting leg **6** suitably fastened to the ground so as to keep the seat **1** steady during its use. Preferably, structure **2** comprises two supporting legs **6**, one on each side of seat **1** and a horizontal section member **7** or other similar element can be provided between the two legs, for connecting the two legs **6** and steadily joining them.

[0022] Each leg **6** is adapted to support almost the whole of the stresses acting on the tip-up seat **1** and comprises at least one first columnar element **6a** which extends along a first preferred extension direction **6b** passing through the centre of gravity of the columnar element itself.

[0023] In the example shown in Figs. 1-6, each leg **6** comprises in addition to said first columnar element **6a**, a second columnar element **6c** rigidly connected to the first one and extending along a second preferred extension direction **6d** substantially parallel to the first preferred extension direction **6b**, over a length shorter than that of the first columnar element **6a**.

[0024] The columnar elements **6a** and **6c** are of one piece construction and suitably shaped or, preferably, consist of two section members suitably fastened to each other through joint means such as screws and/or welding, for example.

[0025] In detail, the first columnar element **6a** is at the front portion of the tip-up seat **1**, i.e. that portion where the user's lower limbs are when he/she is sitting in seat **1**, while the second columnar element **6c** is at the rear portion, i.e. where the chair back is. Preferably, the mutual positioning of the two columnar elements **6a** and **6c** places the extension directions **6b** and **6d** in a plane almost perpendicular to the rear supporting surface **4a** and, more preferably, to all supporting surfaces **3a**, **4a** and **5a**.

[0026] The armrest **5** further comprises at least one lateral side portion **5b** suitably shaped so as to define together with said arm supporting surface **5a**, an open cavity, i.e. shown a suitable opening adapted to enable partial introduction of the supporting leg **6** into said open cavity, as better explained in the following. Preferably, the portion of lateral side **5b** defines an L-shapes section with the arm supporting surface **5a** or, more preferably, two lateral side portions **5b** are provided which define with the arm supporting surface **5a**, a C-shaped configuration extending along a major extension direction **5c** substantially parallel to the arm supporting surface **5a**.

[0027] Practically, the armrest **5** is preferably a substantially box-shaped element or an element with an open section member.

[0028] The armrest **5**, in order to avoid cuts to the user,

may comprise a plate or other similar element frontally closing said cavity and defining the front edge **5d**, and a projecting portion substantially having the same section as that of portion **5b** and extending in the vicinity of the front edge **5d**, in a direction perpendicular to the extension direction **5c**.

[0029] The tip-up seat in addition to the aforesaid elements comprises a kinematic mechanism **8** adapted to enable the base seat **3**, back **4** and armrest **5** to be mutually moved thus defining a closed configuration in which seat **1** is closed upon itself and has a minimum bulkiness, and an open configuration of the tip-up seat **1** in which the seat is opened and is ready for use.

[0030] In the open configuration (Figs. 1 and 3) the tip-up seat is opened and made ready for use and the lower supporting surface **3a** and rear supporting surface **4a** define an opening angle preferably included between 90° and 120° and more preferably the opening angle is almost equal to 100°. In detail, in this configuration the armrest **5** encloses the upper portion of the first columnar element **6a** inside it, i.e. the portion of the first columnar element **6a** placed at the face spaced apart the greatest distance from the ground.

[0031] In the closed configuration (Figs. 2 and 4), the lower supporting surface **3a**, rear supporting surface **4a** and arm supporting surface **5a** are substantially parallel to each other. In detail, in this closed configuration said supporting surfaces **3a**, **4a** and **5a** are substantially parallel to the first preferred extension direction **6b** and preferably the base seat **3** and back **4** are almost adjacent, i.e. the lower supporting surface **3a** and rear supporting surface **4a** are substantially in contact with each other.

[0032] In addition, in said closed configuration, as shown in Fig. 4, in the tip-up seat **1** the surfaces constituting the columnar element of the seat itself are substantially in mutual alignment.

[0033] In detail, the upper face **4b**, i.e. the back surface placed to a greater distance from the ground, and the front surface **3b**, i.e. the surface of the base seat **3** placed to a greater distance from the back **4** in the closed configuration, almost lie in the same upper plane, as shown in Fig. 4. In addition, the front edge **5d** lies in the same plane as the upper face **4b** and the front surface **3b**.

[0034] Preferably, the upper face **4b**, front surface **3b**, front edge **5d** and upper section of the first columnar element **6a** define a single plane that is substantially perpendicular to the first preferred extension direction **6b** and, more preferably, the upper face **4b**, front surface **3b** and front edge **5d** as well as said upper section define a single plane substantially perpendicular to the first extension direction **6b**. At the same time, at the front, the outer front face of the first columnar element **6a** and the surface of the base seat **3** opposite to the lower supporting surface **3a** define a single front plane of seat **1**, while at the rear, the face of the second columnar element **6b** and the surface of the back **4** opposite to the supporting surface **4a** belong to the same plane and therefore define a single rear plane. In detail, the front and rear planes

are parallel to the first preferred extension direction 6a and, therefore, perpendicular to said upper plane.

[0035] In the closed configuration, the armrest 5 is therefore placed with its major extension direction 5d substantially parallel to the second preferred extension direction 6d and, more preferably, these directions 5d and 6d are almost coincident.

[0036] In addition, in this configuration, the armrest 5 encloses at least the end portion of the second columnar element 6c. Alternatively, it encloses at least part of the portion of the first columnar element 6a extending beyond the second columnar element 6c. Preferably, the armrest 5, in the closed configuration, encloses both said portion of the second columnar element 6c and said portion of the first columnar element 6a.

[0037] In order to obtain the above described particular closed configuration, the kinematic mechanism 8 advantageously consists of an articulated quadrilateral, as shown in Fig. 3 where it is highlighted by a chain line.

[0038] Therefore it constitutes a mechanism made up of four members (base seat 3, back 4, armrest 5 and first columnar element 6a) connected with each other so as to admit of motion by four turning pairs consisting for example of hinges, pivots, articulated joints or other similar elements adapted to enable a rotation motion between two adjacent members.

[0039] Mechanism 8 is adapted to enable the user to manually and simultaneously move the base seat 3, back 4, armrest 5 relative to the columnar element 6a and then relative to leg 6, from the above described positions taken during the closed configuration to those of the open configuration and vice versa. In detail, the base seat 3 and armrest 5 carry out a mere rotation relative to the first columnar element 6a, while the back 4 carries out both a mere rotation relative to the base seat 3 and armrest 5 and a rotation-translation relative to the first columnar element 6a.

[0040] Mechanism 8 has two fixed articulated joints or turning pairs **8a** and **8b**, i.e. that do not translate during rotation, in engagement with the first columnar element 6a, and two movable turning pairs **8c** and **8d** in engagement with the back 4, which also translate during rotation.

[0041] In detail, the first and second turning pairs 8a and 8b are respectively adapted to link the armrest 5 and base seat 3 to the first columnar element in a motion-admitting manner; while the first and second fixed turning pairs 8c and 8d link the armrest 5 and base seat 3 to the back 4 in a motion-admitting manner. In more detail, said linkages can be made either directly, i.e. without interposition of any element, or indirectly, i.e. with interposition of plates or other similar elements.

[0042] The fixed turning pairs 8a and 8b when the tip-up seat 1 is in the closed configuration (Fig. 4) are placed to different minimum distances relative to the arm supporting surface 5a substantially disposed vertically. By "minimum distance" it is intended the distance of the axis of each fixed turning pair from the surface 5a measured along the segment starting from said axis and orthogo-

nally intersecting the arm supporting surface 5a. Therefore, the two fixed turning pairs 8a and 8b, as better described hereinafter, are advantageously disposed in such a manner that the two relative-rotation axes, defined by said pairs, lie in a plane that is not parallel to the supporting surface 5a when the seat is in the closed configuration.

[0043] In detail, it is possible to distinguish a first fixed turning pair 8a placed to a shorter distance from the arm supporting surface 5a and a second fixed turning pair 8b placed to a greater distance from said supporting surface 5a.

[0044] The first fixed turning pair 8a is then placed to a greater distance from the ground relative to the second fixed turning pair 8b and the armrest 5 is pivotally mounted thereon, while the base seat 3 is engaged on the second fixed turning pair 8b. Preferably the first and second fixed turning pairs 8a and 8b are placed on the opposite side relative to the first preferred extension direction 6b. In detail, the first and second fixed turning pairs 8a and 8b relative to the first direction 6b are respectively located in the rear part and front part of the tip-up seat 1 and, in more detail, the first turning pair 8a is placed, relative to said first direction 6b, to a greater minimum distance than the second pair 8b.

[0045] The second fixed turning pair 8b mainly extends from the face of the first columnar element 6a facing the base seat 3 and is linked through screws, welding, fittings or other similar solutions, directly to the first columnar element 6a, i.e. it has not intermediate elements interposed between the pair or joint 8b and the first columnar element 6a (Fig. 6).

[0046] On the contrary, the first turning pair 8a is preferably linked at a spaced position and projecting from the first columnar element 6a, i.e. it is linked to said element 6a indirectly, a plate or other similar element being interposed between the two components (Fig. 5).

[0047] The fixed turning pairs 8a and 8b rigidly connected to the back 4, are advantageously disposed in such a manner that the two relative-rotation axes defined thereby are at different minimum distances from the rear supporting surface 4a and therefore lie in a plane that is not parallel to such a surface 4a. Then, in detail, the movable turning pairs consist of a first movable turning pair **8c** placed to a greater distance from said supporting surface 4a and a second movable turning pair **8d** that is closer to said surface 4a. The first movable turning pair 8c is located to a greater distance from the ground than the second one 8d.

[0048] Provided in the kinematic mechanism 8 are two suitable connections adapted to rigidly connect the first turning pairs 8a and 8c and the second turning pairs 8b and 8d with each other.

[0049] This connection is suitably obtained by means of two levers **8e** each of them consisting of a shaped plate which enables the first and second turning pairs to be linked to each other. This lever 8e is preferably an L-shaped lever.

[0050] In detail, in the mechanism 8 it is provided that, in place of lever 8e alone, connection between the first turning pairs 8a and 8c be carried out through the armrest 5 or the armrest 5 and lever 8e.

[0051] The distances between the axes defined between the first pairs 8a and 8c and those between the two fixed turning pairs 8a and 8b are suitably included between 75 mm and 225 mm and between 150 mm and 300 mm, respectively. Preferably, said two distances are included between 125 mm and 175 mm and between 200 mm and 250 mm.

[0052] In detail, the first ratio, i.e. that between the distance of the axes defined by the first pairs 8a and 8c and the distance between the axes of the second pairs 8b and 8d and the second ratio, i.e. between the distance of the axes defined by the fixed pairs 8a and 8b and the distance of the movable pairs 8c and 8d are both included between 0.8 and 1.3. Preferably the first ratio is included between 1.0 and 1.1, while the second ratio is included between 1.1 and 1.2.

[0053] Finally, the mechanism 8 can be provided with a control apparatus adapted to enable the seat to be locked in a steady and safe manner in both the closed and open configurations.

[0054] This apparatus can be for example positioned at lever 8e connecting the two turning pairs 8b and 8d, and can consist of a pin 8f or other similar element adapted to be fitted in a suitable slit 8g formed in the supporting leg 6 and, more specifically, in the first columnar element 6a (see Fig. 3). In detail, during movement of the back, the base seat and the armrest, pin 8f slides in said slit 8g during passage between the open or closed configurations and, through abutment against the ends of slit 8g, allows the seat to be locked in one of said configurations.

[0055] Slit 8g has the shape of an annulus portion having an angular extension included between 135° and 45° and preferably between 85° and 125°.

[0056] Finally, an actuating apparatus, not shown in the figures, can be provided for the tip-up seat 1 between the supporting leg 6 and the ground, for moving the tip-up seat 1 preferably through a rotation, thereby defining a use position in which the first direction 6b is substantially perpendicular to the ground and a rest position in which this first direction 6b is substantially parallel to the ground. In detail, the rotation apparatus consists of a pivot adapted to enable said rotation about an axis parallel to the ground; a locking system consisting for example of springs is also present for maintaining seat 1 in its use position.

[0057] The invention enables important advantages to be achieved.

[0058] In fact, the tip-up seat 1 is characterised by a high handling ease. This advantage is obtained due to the particular closed configuration characterising the tip-up seat 1.

[0059] In fact, in this configuration, the parallelism between the different supporting surfaces 3a, 4a and 5a and in particular the fact that the back 4 and base seat

3 are adjacent ensure a minimum bulkiness to the seats.

[0060] Easy handling of the seat is also obtained due to the advantageous arrangement of the various elements thereof when it is in the closed configuration. In fact, in this position the seat 1 is delimited by three planes (an upper plane, a front plane and a rear plane parallel to the front one and perpendicular to the upper one) defining the shape of a rectangular parallelepiped that can be easily grasped and handled both manually during positioning of the seat for example, and automatically such as during manufacture of said seat 1.

[0061] Another advantage is represented by the high transport simplicity and safety, both due to the above mentioned geometry of the closed seat, and to the armrest 5 that, being partly fitted in the columnar elements 6a and 6c, in this configuration locks the seat avoiding undesirable opening of same.

[0062] Another advantage is the reduced cost of the seat in terms both of manufacture and storage, due to the reduced space taken up by the closed seat 1. In fact, the lower storage cost is obtained by virtue of the particular closed configuration that ensures a reduced bulkiness to the innovative seat 1 as compared with those presently used, the sizes and bulkiness of the components and the seat in an open configuration being the same.

[0063] The invention is susceptible of variations all falling within the scope of the invention idea. All of the details can be replaced by equivalent elements and the materials, shapes and sizes can be of any nature and magnitude.

Claims

1. A tip-up seat (1) comprising: a bearing structure (2) adapted to absorb stresses acting on said tip-up seat (1) and including at least one first columnar element (6a) having a first extension direction (6b); a base seat (3) substantially defining a lower supporting surface (3a); a back (4) substantially defining a rear supporting surface (4a); at least one armrest (5) substantially defining an arm supporting surface (5a); said first columnar element (6a) and said armrest (5) being disposed in lateral side by side relationship with said base seat (3) and back (4); and a kinematic mechanism (8) adapted to move said seat (3), back (4) and armrest (5) relative to said columnar element (6a) so as to define a closed configuration in which said tip-up seat (1) has a minimum bulkiness and an open configuration in which said lower supporting surface (3a) and rear supporting surface (4a) form an opening angle substantially included between 90° and 120°, characterised in that said kinematic mechanism (8) is an articulated quadrilateral and has two fixed turning pairs (8a, 8b) in engagement with said first columnar element (6a) and including a first fixed turning pair (8a) hinged on said armrest (5) and

- a second fixed turning pair (8b) hinged on said base seat (3); and two movable turning pairs (8c, 8d) in engagement with said back (4) and including a first movable turning pair (8c) hinged on said armrest (5) and a second movable turning pair (8b) hinged on said base seat (3); **and in that** said first fixed turning pair (8a) is located at an upper end of said first columnar element (6a) and, when said seat (1) is in said open configuration, is in a position projecting therefrom in the direction of said first movable turning pair (8c), to enable said armrest (5) to rotate from a position transversely overlying said first columnar element (6a) to a position disposed in side by side relationship with and parallel to said first columnar element (6a);
in said closed configuration said lower supporting (3a), rear supporting (4a) and arm supporting (5a) surfaces as well as said first extension direction (6b) of said first columnar element (6a) being substantially parallel to each other.
2. A tip-up seat (1) as claimed in claim 1, wherein in said closed configuration said first fixed turning pair (8a) has a smaller distance from said arm supporting surface (5a) than said second fixed turning pair (8b).
 3. A tip-up seat (1) as claimed in one or more of the preceding claims, wherein said base seat (3) and back (4) have thicknesses similar to said first columnar element (6a) and armrest (5), respectively.
 4. A tip-up seat (1) as claimed in one or more of the preceding claims, wherein in said closed configuration it has an upper face (4b) of said back (4) and a front surface (3b) of said base seat (3) lying in the same plane.
 5. A tip-up seat (1) as claimed in the preceding claim, wherein in said closed configuration said armrest (5) and first columnar element (6a) respectively have an upper edge (5b) and an upper section lying in the same plane as said upper surface (4b) of said back (4) and front surface (3b) of said base seat (3).
 6. A tip-up seat (1) as claimed in one or more of the preceding claims, wherein said bearing structure (2) comprises a second columnar element (6c) integral with and adjacent to said first columnar element (6a) and extending along a second preferred extension direction (6d) parallel to said first preferred extension direction (6b) and having a smaller extension than said first columnar element (6a).
 7. A tip-up seat (1) as claimed in one or more of the preceding claims, wherein said second columnar element (6c) has sizes in section that are substantially equal to those of said first columnar element (6a) and said armrest (5), and wherein in said closed configuration said armrest is in alignment with said second columnar element (6c).
 8. A tip-up seat (1) as claimed in the preceding claim, wherein said first columnar element (6a) and second columnar element (6b) constitute a front portion and a rear portion respectively of said bearing structure (2) and wherein said preferred extension directions (6b, 6d) lie in a plane transverse to said rear supporting surface (4a).
 9. A tip-up seat (1) as claimed in one or more of the preceding claims, wherein said armrest (5) has an open cavity adapted to enable introduction in said open cavity of the upper portion of said first columnar element (6a).
 10. A tip-up seat (1) as claimed in one or more of the preceding claims, wherein in said closed configuration, said lower supporting surface (3a) and rear supporting surface (4a) are substantially in contact with each other.

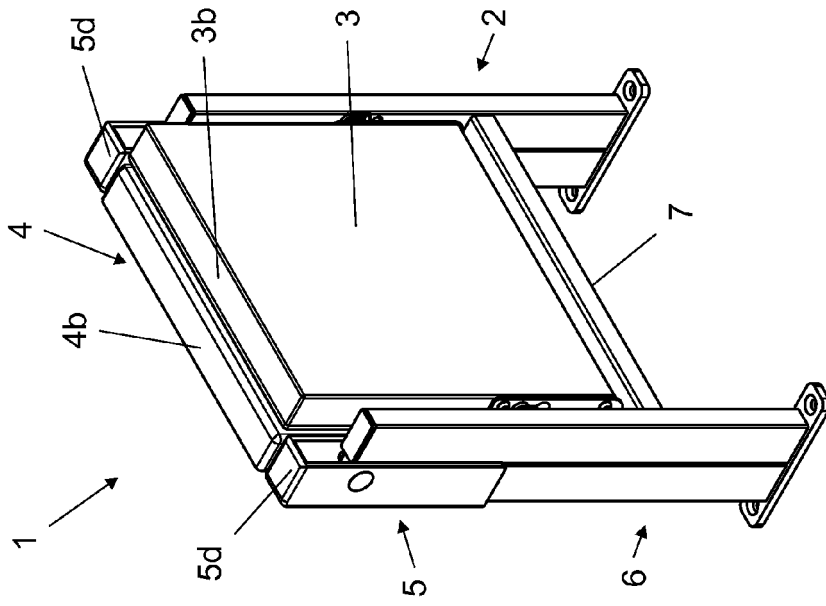


Fig. 2

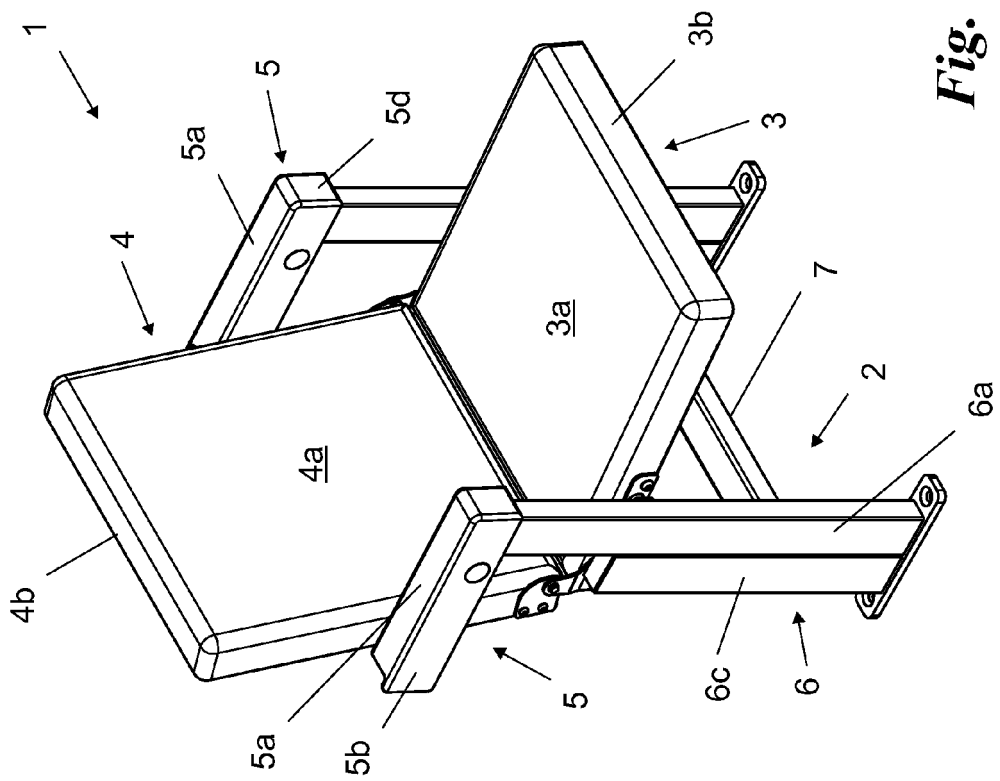
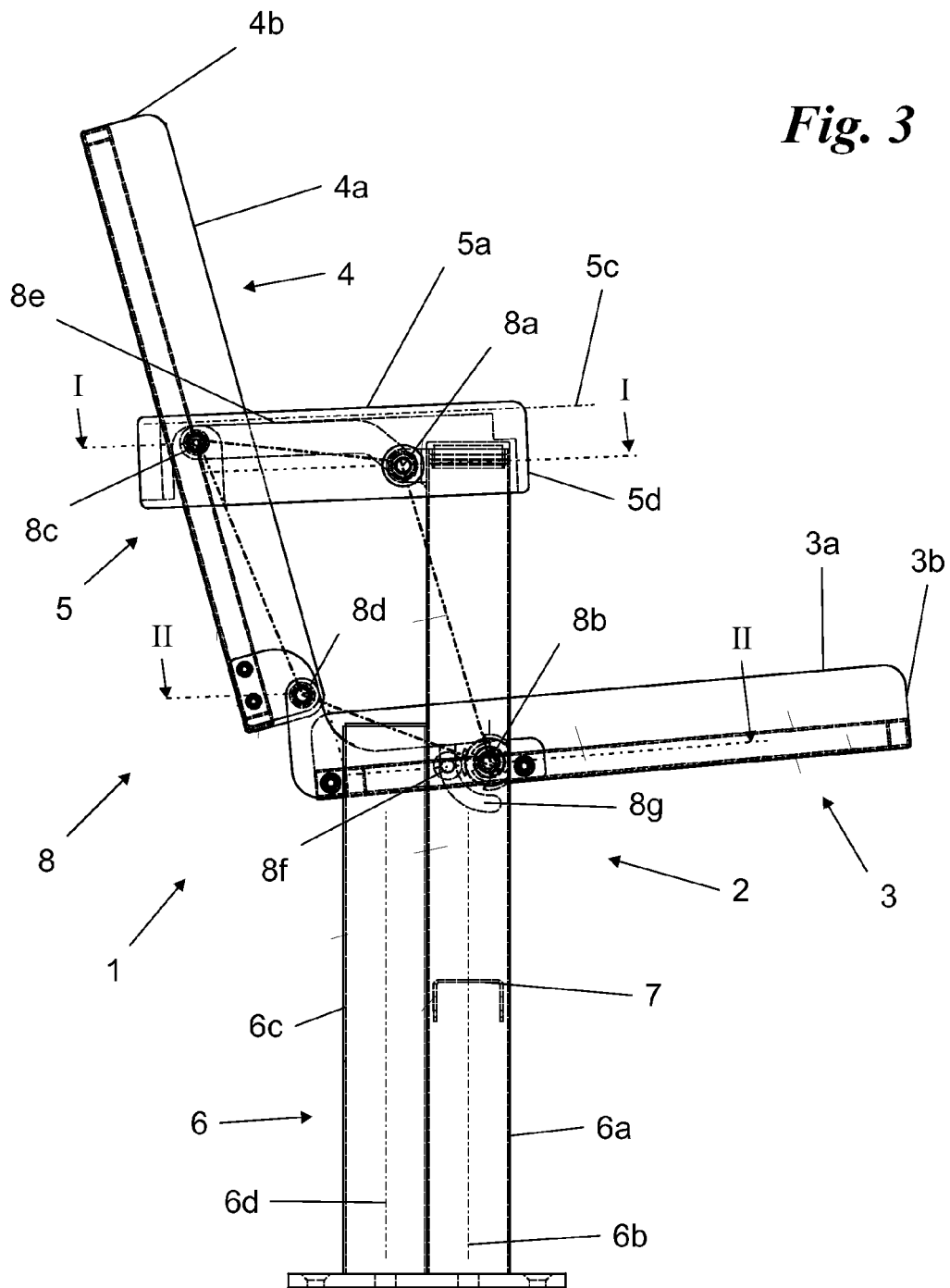


Fig. 1

Fig. 3



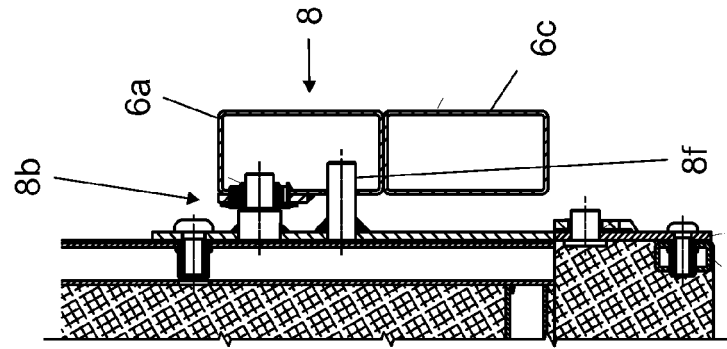


Fig. 6

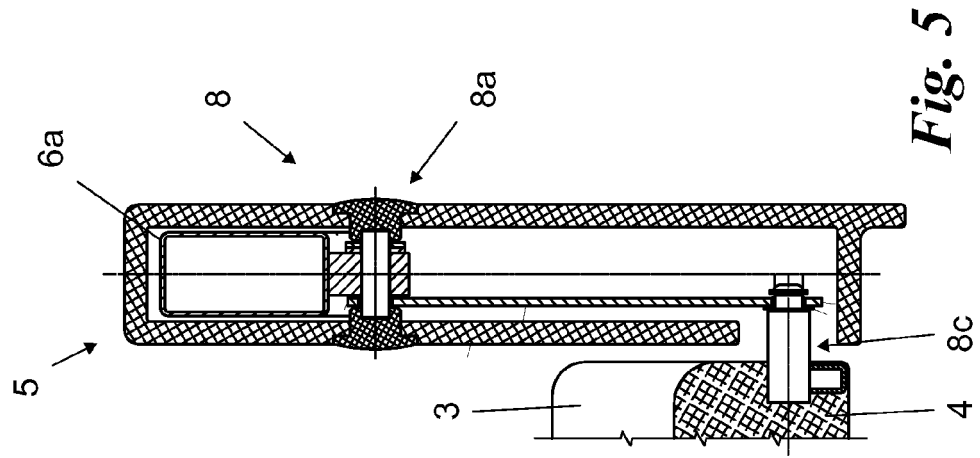


Fig. 5

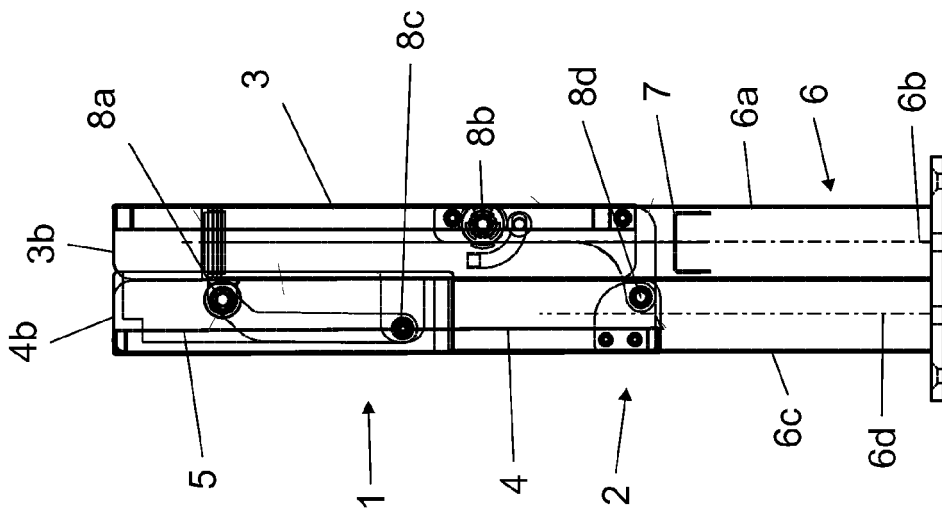


Fig. 4



EUROPEAN SEARCH REPORT

Application Number
EP 10 19 1490

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	JP 55 093352 U (NOT- READABLE) 27 June 1980 (1980-06-27) * figures 1-3 * -----	1-4,9,10	INV. A47C7/54 A47C1/121
X	JP H02 149540 U (NOT- READABLE) 20 December 1990 (1990-12-20) * figures 1-6 * -----	1,2,4-10	
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			TECHNICAL FIELDS SEARCHED (IPC)
			A47C
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 25 March 2011	Examiner Vollering, Johannes
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 10 19 1490

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25-03-2011

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REFERENCES CITED IN THE DESCRIPTION

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