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(54) **ADJUSTABLE BED DEVICE COMPRISING CARRIER ELEMENTS**

(57) Adjustable bed device comprising support parts (1a, 1b, 1c, 1d, 1e) on which a mattress element is placeable, comprising hinges (2) to hingeably connect the successive support parts (1a, 1b, 1c, 1d, 1e) to each other, and comprising a carrier structure for supporting the support parts (1a, 1b, 1c, 1d, 1e), in which the carrier structure comprises carrier elements (3a, 3b, 3c, 3d, 3e) which are respectively connected to the bottom sides of suc-

cessive support parts (1a, 1b, 1c, 1d, 1e), the hinges (2) form part of the carrier structure and hingeably connect the successive carrier elements (3a, 3b, 3c, 3d, 3e) to each other, so that the support parts (1a, 1b, 1c, 1d, 1e) connected thereto are hingeably moveable and that the hinge axes (A) of said hinges (2) extend above the bottom sides of said support parts (1a, 1b, 1c, 1d, 1e) and method for manufacturing such a bed device.

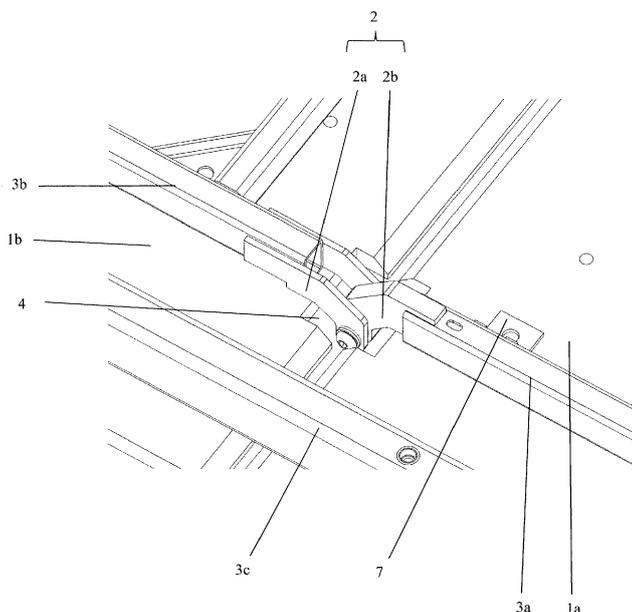


Fig. 12

Description

[0001] The present invention relates to an adjustable bed device comprising two or more support parts on which a mattress element is placeable, comprising hinges, so that the successive support parts are hingeable with respect to each other, and comprising a carrier structure for supporting the support parts.

[0002] The present invention also relates to a method for manufacturing an adjustable bed device, in which this bed device comprises two or more support parts on which a mattress element is placeable, hinges so that the successive support parts are hingeable with respect to each other and a carrier structure for supporting the support parts.

[0003] The term adjustable bed device may refer to an adjustable bed, but may also refer to other adjustable furniture devices comprising a mattress element and support parts, such as an armchair, a lounge chair, a terrace chair, etc.

[0004] By hinging the support parts with respect to each other, it is possible to bring a mattress element which is supported by the support parts into the desired position. These bed devices usually have a base position, in which all of the support parts extend in virtually the same plane, so that the mattress element can assume a horizontal position with respect to the floor on which the bed device is placed and other positions in which certain support parts are at an angle with respect to this floor, so that portions of the mattress element are also at an angle. However, a drawback of these existing bed devices is that, when not all of said support parts extend in the same plane, these require a great degree of support and are subjected to many forces. Often, the support is insufficient, as a result of which the hinges absorb many forces and will consequently start to wear quickly and break. The support parts themselves are also subject to a great degree of wear. Also, the distance between the adjacent edges of the successive support parts changes during hinging of these support parts. The mattress element supported by these support parts is thus being pulled apart and pushed back together during hinging of the support parts. Normally, fabric is also provided around at least a portion of the mattress element, so that this fabric is also pulled apart and pushed back together. As a result thereof, the mattress element and the fabric are subjected to quite significant loads, as a result of which they have to have a strong structure. Even with a strong structure, the mattress element and the fabric are subject to a large degree of wear, as a result of which the service life of such bed devices is limited and the fabric and the mattress element have to be replaced within a short space of time. Thus, the fabric will quickly suffer from folds and tears. In order to solve this problem, reinforcing elements are already attached to the fabric at the location of the transitions between successive support parts. However, this results in additional costs for material and additional production time.

[0005] Another drawback is the fact that the existing adjustable bed devices have to be manufactured by one manufacturer and have to be supplied as one complete unit, as fastening the various components to each other is complicated.

[0006] It is therefore an object of the invention to manufacture an adjustable bed device in which the hinges and the support parts are subjected to loads to a lesser degree and the mattress element is less susceptible to wear and it is also an object to facilitate the manufacturing of adjustable bed devices.

[0007] This object is achieved by providing an adjustable bed device comprising two or more support parts on which a mattress element is placeable, comprising hinges so that the successive support parts are hingeable with respect to each other, and comprising a carrier structure for supporting the support parts, in which the carrier structure comprises carrier elements which are connected to the bottom sides of successive support parts, respectively, the hinges form part of the carrier structure and hingeably connect the successive carrier elements to each other, so that the support parts, which are connected to said carrier elements, are hingeable with respect to each other and in which the hinge axes of said hinges extend at the location of the transition between respective successive support parts and, viewed from the bottom sides of successive support parts at the location of the transition between said support parts, said hinge extends from the bottom sides of the support parts beyond said bottom sides, so that the hinge axis extends above the bottom sides of said support parts.

[0008] Normally, an adjustable bed device is designed to be placed on a floor. The bottom sides of the support parts are then directed towards the floor, while the top sides extend opposite the bottom sides.

[0009] Here, the support parts are supported by the carrier elements in a satisfactory manner. Here, the carrier structure provides excellent support for the support parts. As the hinges form part of the carrier structure, the load to which these hinges are subjected during hinging of the support parts is small, since the forces which act on the support parts are readily absorbed by the carrier elements. The hinges form part of the carrier structure and are connected here to said carrier elements and the carrier elements are connected to said support parts. Here, the hinges are preferably not directly connected to said support parts. Preferably, the adjustable bed device additionally comprises a raising system in order to raise the support parts and thus hinge them with respect to each other, in which the raising system connects said different carrier elements with each other, so that forces which act on one carrier element are readily transmitted to one or more other carrier elements.

[0010] In addition, the hinge axes extend above the bottom sides of the support parts, at the location of the transition of said successive support parts, and they are therefore situated higher than these bottom sides. Consequently, the load on the hinges is reduced, as a result

of which these are less susceptible to wear and hinging of the successive support parts with respect to each other can proceed smoothly.

[0011] Due to the position of these hinge axes, the distance of the adjacent edges of the successive support parts also changes little during hinging of these support parts, as a result of which the mattress element which has been placed on the support parts and/or additionally the fabric which has for example at least partly been fitted around the mattress element are only subjected to a small degree of stretching and shrinking during hinging of the support parts. As a result thereof, it is not necessary to provide very strong and high-quality fabric and/or mattress elements. Also, no additional reinforcing elements have to be provided for the mattress element and any fabric. The service life of such a bed device is therefore long. Also, the edges of the successive support parts can be placed closer together, because the distance between said edges changes little during hinging of these successive hinge parts and there is thus little danger of these touching each other during hinging of these support parts. Consequently, less force is exerted on the hinges during hinging of the support parts. The mutual movability of the support parts is also improved as a result. The ergonomics of the adjustable bed device are also improved if the distance between the edges of the support parts changes less during hinging. The reason for this is that the mattress element shortens to a lesser degree and will thus exert less pressure on the body resting on the bed device.

[0012] The result is thus an adjustable bed device which is readily able to withstand forces and which has a long service life. Since the hinges are subjected to less load, the bed device also produces less noise during hinging. Also, less force is required to raise the support parts, as a result of which the components of the bed device are less susceptible to wear and hinging of the support parts can be performed more satisfactorily.

[0013] In a preferred embodiment, the carrier elements comprise carrier frames. A frame is very well suited to support a support part. The reason for this is that the support parts are often designed as panel-shaped elements. In addition, attaching a frame to a panel-shaped element is simple. Thus, the frame can be screwed onto the support part. The carrier frame is for example a framework composed of several rods and/or tubes. The dimensions of the framework may be chosen here to be sufficiently large so that said support part is well supported by the carrier frame connected thereto. Furthermore preferably, such a carrier frame is made of metal, so that the carrier frame has a certain strength and thus readily contributes to the sturdiness of the adjustable bed device. Still more preferably, each carrier element is a carrier frame.

[0014] Preferably, at least one of said carrier elements is a fixed carrier frame which is provided to be stationary and one support part is connected in a fixed position to said carrier frame. Here, the term stationary is under-

stood to mean that the position of the fixed carrier frame does not change during hinging of the various support parts. Thus, for example, it has a fixed position with respect to the floor on which the adjustable bed device is placed. The support part which is then directly or indirectly connected to the fixed carrier frame in a fixed position, will then also not move during hinging of the support parts with respect to each other. This support part which remains stationary is then for example configured to extend at the location of the pelvis when someone is lying on the bed device. For example, when the bed device comprises 4 support parts, such as a back support, a pelvis support, a leg support and a foot support, or 5 support parts, such as a neck support, a back support, a pelvis support, a leg support and a foot support, then the pelvis support is preferably the stationary support part. By using a carrier frame and a support part which are always in a fixed position, a stronger bed device is also obtained.

[0015] Furthermore, the support parts are preferably hingeable between a base position, in which all support parts extend virtually in the same plane, and hinge positions in which the support parts extend in several planes, in which, in the base position, all support parts are in direct contact with said fixed carrier frame. In the base position, the fixed carrier frame then directly supports all support parts. Here, the fixed carrier frame is then for example an outer frame which forms a sturdy basis for the bed device. If the adjustable bed device is provided with a raising system with raising elements for hinging the support parts with respect to each other, then each raising element is preferably connected, on one side, to this fixed carrier frame and, on the other side, to said carrier element to be raised. Each non-stationary support part is readily supported here by means of the raising system and the fixed carrier frame. If the raising system comprises motors to move the raising elements in order thus to be able to hinge the support parts, these motors are preferably attached to the fixed carrier frame.

[0016] In a very preferred embodiment, each carrier element is fastened in a fixed position to said respective support part. The fastening of the carrier elements to the respective support parts can consequently be made sturdy and strong. Here, the support part will also perform the same movement as the carrier elements. Thus, if the carrier elements which are connected to each other by means of hinges are hinged with respect to each other, then the support parts are hinged in the same way with respect to each other. This prevents certain components of the hinges to be subjected to excessive forces during hinging. Here, the carrier elements also follow the support parts, as a result of which the load on the hinges is additionally reduced. The carrier elements may, for example, be screwed onto the support parts.

[0017] In an extremely preferred embodiment, viewed at the location of a transition between two successive support parts, the respective hinge axes extend at the location of the top sides of said support parts. During

hinging of the successive support parts with respect to each other, the distance between the edges of these successive support parts hardly changes, if at all, as a result of which there is virtually no stretching or shrinking of the mattress element and as a result thereof these edges may be situated very close to each other, thus benefiting the sturdiness of the bed device.

[0018] Preferably, the successive carrier elements are each hingeably connected to each other by at least two hinges. Furthermore preferably, these hinges extend at a distance from each other. By using at least two hinges to hingeably connect two successive carrier elements to each other, a stronger connection is obtained between the carrier elements and less force is exerted on each hinge. The further the hinges extend from each other, the stronger the connection.

[0019] In a preferred embodiment, the support parts comprise indentations which extend from the bottom side to the top side at the location of the transition between the successive support parts through which the hinges are provided to extend. If the hinges extend at least partly through these indentations in order to ensure that the hinge axes are above the bottom sides of the successive support parts at the location of the transition between the successive support parts, the distance between the edges of the successive support parts may be limited.

[0020] The support parts are, for example, panels, such as rectangular panels. Thus, the support parts may be wooden panels. It is simple to fasten carrier elements to panels, such as wooden panels. Wooden panels are also sufficiently sturdy and have a limited weight. The carrier elements can be screwed onto panels.

[0021] In a specific embodiment, the carrier elements, at the location of the attachment of the carrier elements to their respective support parts, are relatively thin, so that fastening elements are easily fittable through the carrier elements. If the fastening elements are screws or nails, it is obviously easier to fit screws or nails through relatively thin elements. Also, it is then easier to fit the screws and nails straight. This thus facilitates the manufacturing of such bed devices. Optionally, these relatively thin parts of the carrier elements may be provided with openings through which the screws are fittable.

[0022] Furthermore preferably, the carrier elements comprise tubes and/or rods with recesses, in which case said relatively thin parts of the carrier elements may be formed by these recesses. These tubes and/or rods may be hollow. The recesses may be recesses in the form of a crescent.

[0023] In another embodiment, the carrier elements comprise tubes and/or rods, in which case these tubes and/or rods are fastenable to the respective support parts by means of platelets. Thus, the platelets may be L-shaped platelets if the carrier elements comprise rods.

[0024] One of said hinges preferably comprises two mating hinge parts, being a first forked hinge part and a second hinge part fitting in this first hinge part. Such hinges are very sturdy and able to absorb great forces.

[0025] Also preferably, at least one of said hinges comprises two curved hinge parts which engage in each other. Curved hinge parts take up little space, as a result of which the edges of the successive support parts can bear against each other closely.

[0026] The object is also achieved by providing a method for manufacturing an adjustable bed device, in which said bed device comprises two or more support parts on which a mattress element is placed, hinges, so that the successive support parts are hingeable with respect to each other, and a carrier structure for supporting the support parts, in which

- an upholstered first module is provided, comprising two or more support parts on which the mattress element is arranged;
- a second module is provided, comprising the carrier structure, in which said carrier structure comprises carrier elements and the hinges form part of the carrier structure and hingeably connect the successive carrier elements to each other;

in which, in order to connect said two modules, the carrier elements are connected in such a manner to the bottom sides of respectively the successive support parts that, viewed from the bottom sides to the top sides of successive support parts, at the location of the transition between respective successive support parts, the hinges extend beyond the bottom sides of the support parts, so that the hinge axes extend above the bottom sides of the successive support parts.

[0027] The two separate modules may be produced in the same company, but may also be made by separate companies. The carrier structure is, for example, essentially made of metal and can then be produced in a company and/or in a space in which metal components are manufactured. The manufacturing of the first upholstered module may then take place in a cleaner space, so that the fabric of the upholstered module does not become soiled. It is possible to opt to connect these modules to each other before supplying the bed device to the end customer. However, it is also possible to opt not to connect these modules until installation at the end customer. The required transport volume is thus limited and it is also easier to deliver separate modules to the end customer and bring them into the desired space. Using separate modules, it is possible to move easily through door and window openings, it is more readily possible to walk up stairs and/or use small lifts. The obtained bed device is then a bed device as has already been described above and thus comprises all the advantages as described above.

[0028] By using modules, it is also simple to produce bed devices of different dimensions. It is for example possible to provide one standard first module and one standard second module. By means of one first module and one second module, it is then possible to produce, for example, a single bed. It is possible to ensure that two

second modules are easily attachable to each other, so that a double bed can be produced using two second modules and two first modules. In addition, it may also be possible to provide a headboard module which is attachable to a carrier element of the second module, or, in case a double bed is provided, to carrier elements of both second modules. By using modules, it is also possible to switch between modules and to replace modules in an easy manner. It is for example important to replace a mattress element at regular intervals. In this case, only the first module then has to be replaced and the second module can be retained for a longer period of time.

[0029] Here, the second module then ensures that the support parts can hinge with respect to each other. The entire movement technology is thus situated in this second module, as a result of which manufacture of the first module is simple.

[0030] In a preferred embodiment, in order to manufacture the first module, the support parts are spaced apart in such a manner that all support parts extend in the same plane, the mattress element is arranged on top of the support parts and the fabric is fitted around the mattress element and fixed to the support parts. Here, the fabric is preferably fitted at least around the portion of the mattress element which is not in contact with the support parts, which are normally the sides which are intended to extend at the top and at the sides in installed position of the bed device. The reason for this is that the bottom side normally rests on the support parts and is thus in contact with the support parts. The fabric is fixed to the support parts, but preferably does not enclose the support parts completely, so that these support parts are still readily accessible in order to attach the second module thereto. The fabric may be fixed, for example, to the support parts by means of magnets, hook and loop fasteners, fastening elements, such as screws/nails, etc. Here, the support parts also do not have to be connected to each other directly before the mattress element is arranged thereon. This greatly facilitates manufacturing of the first module and thus of this bed device and means that the time required to manufacture such a bed device is reduced.

[0031] Furthermore preferably, in order to space the support parts apart, spacers are placed between the support parts, with said spacers being removed after or during upholstering. By means of these spacers, it is readily possible to regulate the mutual positions of the support parts, so that the resulting first module is always readily connectable to the second module.

[0032] Still more preferably, a series of openings is provided in the support parts at the desired locations and corresponding openings are also provided in the carrier elements, so that the two modules can easily be attached to each other by providing fastening means, such as screws, in these openings. Here, even a layperson is able to attach the two modules to each other in a simple manner.

[0033] In a very preferred embodiment, the resulting

adjustable bed device is a bed device as indicated above.

[0034] The present invention will now be explained in more detail by means of the following detailed description of a preferred embodiment of a bed device and a method according to the present invention. The intention of this description is solely to give illustrative examples and to indicate further advantages and particulars, and can therefore by no means be interpreted as a limitation of the area of application of the invention of the patent rights defined in the claims.

[0035] This detailed description uses reference numerals to refer to the attached drawings, in which:

- **Fig. 1** shows a perspective view of a bed device according to a first embodiment of the invention, in which the bed device is in a base position and the top side is clearly visible;
- **Fig. 2** shows a perspective view of a bed device according to a second embodiment of the invention, in which the bed device is in a base position and the top side is clearly visible;
- **Fig. 3** shows a different perspective view of the bed device illustrated in Fig. 1, in which the bottom side is clearly visible;
- **Fig. 4** shows a perspective view of the bed device illustrated in Fig. 1 in a hinged position;
- **Fig. 5** shows a perspective view of the bed device illustrated in Fig. 2 in a hinged position;
- **Fig. 6** shows a side view of the bed device illustrated in figures 1, 3 and 4 in the base position;
- **Fig. 7** shows a side view of the bed device illustrated in figures 1, 3, 4 and 6 in the hinged position;
- **Fig. 8** shows a detail view of a perspective view of the first embodiment of a bed device, in which the top side is clearly visible, at the location of a hinge;
- **Fig. 9** shows a detail view of a perspective view of the first embodiment of a bed device, in which the bottom side is clearly visible;
- **Fig. 10** shows a further detail view of Fig. 9, at the location of a hinge;
- **Fig. 11** shows a perspective view of a bed device according to a third embodiment of the invention, in which the bed device is in a base position and the bottom side is clearly visible;
- **Fig. 12** shows a detail view of a perspective view of the third embodiment of the bed device, in which the bottom side is clearly visible, at the location of a hinge.

[0036] These figures illustrate three possible embodiments of bed devices. Obviously, the present invention is not limited to these embodiments.

[0037] The first embodiment of the bed device illustrated in figures 1, 3, 4, 6 and 7 comprises 4 panel-shaped support parts (1a, 1b, 1c, 1d), being a foot support (1a), a leg support (1b), a pelvis support (1c) and a back support (1d). On these support parts (1a, 1b, 1c, 1d), a mattress element is placeable. For the sake of simplicity, the

mattress element is not illustrated in the figures. Furthermore, this bed device comprises a carrier structure for supporting these support parts (1a, 1b, 1c, 1d), with this carrier structure consisting of 4 carrier elements (3a, 3b, 3c, 3d) and 6 hinges (2). Each carrier element (3a, 3b, 3c, 3d) is connected to its successive carrier element (3a, 3b, 3c, 3d) by means of two hinges (2) which extend at a distance apart. The four carrier elements (3a, 3b, 3c, 3d) are respectively a foot frame (3a), which is screwed onto the bottom side of the foot support (1a), a leg frame (3b) which is screwed onto the bottom side of the leg support (1b), an outer frame (3c) which is screwed onto the bottom side of the pelvis support (1c) and a back frame (3d) which is screwed onto the bottom side of the back support (1d). Here, the outer frame (3c) forms a carrier frame to which additional components of the bed device (not illustrated here) are attachable, such as the legs, a headboard, etc.

[0038] The foot frame (3a), the leg frame (3b) and the back frame (3d) extend completely underneath their respective support parts (1a, 1b, 1d). The dimensions of the outer frame (3c) are thus that, in the base position of the bed device, in which all support parts (1a, 1b, 1c, 1d) extend in the same plane, all support parts (1a, 1b, 1c, 1d) are in direct contact with the outer frame (3c) and thus all support parts (1a, 1b, 1c, 1d) are directly supported by the outer frame (3c). As a result thereof, the bed device is very sturdy in its base position.

[0039] The second embodiment of the bed device illustrated in figures 2 and 5 and the third embodiment illustrated in Fig. 11 additionally, with respect to the first embodiment, comprise an additional panel-shaped support part (1e), namely a neck support (1e) which is hingeably connected to the back support (1d). The carrier structure additionally comprises a neck frame (3e) which is screwed onto the neck support (1e). This carrier structure thus comprises 5 carrier elements (3a, 3b, 3c, 3d, 3e) and eight hinges (2). The neck frame (3e) extends completely underneath the neck support (1e) and here the dimensions of the outer frame (3c) are also such that, in the base position of the bed device, all support parts (1a, 1b, 1c, 1d, 1e) are in direct contact with the outer frame (3c) and thus all support parts (1a, 1b, 1c, 1d, 1e) are directly supported by the outer frame (3c).

[0040] In all illustrated embodiments, the position of the support parts (1a, 1b, 1c, 1d, 1e) with respect to the carrier elements (3a, 3b, 3c, 3d, 3e) is such that all hinges (2) which connect the successive carrier elements (3a, 3b, 3c, 3d, 3e) to each other extend at the location of the transitions of the successive support parts (1a, 1b, 1c, 1d, 1e). Thus, there are in each case two hinges (2) at the location of two successive support parts (1a, 1b, 1c, 1d, 1e). Viewed from the bottom sides to the top sides of successive support parts (1a, 1b, 1c, 1d, 1e), these hinges (2) extend at the location of the transition between these support parts (1a, 1b, 1c, 1d, 1e) from the bottom sides of the support parts (1a, 1b, 1c, 1d, 1e) beyond these bottom sides virtually up to the top sides of these

support parts (1a, 1b, 1c, 1d, 1e), in such a manner that the hinge axes (A) extend virtually at the location of the top sides. As a result thereof, the opposite edges of the successive support parts (1a, 1b, 1c, 1d, 1e) do virtually not move towards each other or away from each other during hinging of support parts (1a, 1b, 1c, 1d, 1e) with respect to each other, as a result of which the mattress element which is placed on these support parts (1a, 1b, 1c, 1d, 1e) will not stretch or shrink during hinging of the support parts (1a, 1b, 1c, 1d, 1e).

[0041] Furthermore, at the location of the transition between two successive support parts (1a, 1b, 1c, 1d, 1e), each support part (1a, 1b, 1c, 1d, 1e) comprises two indentations (4) which extend from the bottom side to the top side, with the indentations (4) of opposite support parts (1a, 1b, 1c, 1d, 1e) extending opposite each other and that the hinges (2) extend through these indentations (4). Due to these indentations (4), the hinges (2) can readily extend from said bottom sides to said top sides. Here, they thus extend through the support parts (1a, 1b, 1c, 1d, 1e). By means of these indentations (4), the edges of the successive support parts (1a, 1b, 1c, 1d, 1e) may be virtually bearing against each other, as a result of which the mattress element is greatly supported and the hinges (2) themselves are not subjected to excessive load during use of the bed device.

[0042] The hinges (2) themselves each consist of two hinge parts (2a, 2b) which engage with each other in a more or less curved manner, with the one hinge part (2a) being a forked hinge part and the other hinge part (2b) fitting in the forked part of the first hinge part (2a) and that the hinge parts (2a, 2b) are connected to each other via a bolt.

[0043] The outer frame (3c) is configured to be stationary during use of the bed device. Preferably, the bed device is placed on a floor in such a manner that the outer frame (3c) extends virtually horizontally with respect to the floor. The pelvis support (1c) is connected in a fixed position to the outer frame (3c) as a result of which the pelvis support (1c) is then also stationary.

[0044] Furthermore, the bed device comprises raising elements (6) which are each connected, on one side, to the outer frame (3c) and, on the other side, are connected to a support part (1a, 1b, 1d, 1e) to be raised. By means of these raising elements (6) and by means of the hinges (2), the bed device can be moved to the desired hinged position. Several different hinged positions are possible.

[0045] In order to facilitate the attachment of the carrier elements (3a, 3b, 3c, 3d, 3e) to their respective support parts (1a, 1b, 1c, 1d, 1e), certain carrier elements (3a, 3b, 3d, 3e), in the first and the second embodiment of the bed device, may comprise crescent-shaped recesses (5), so that the carrier elements (3a, 3b, 3d, 3e) are locally thinner and screws can be fitted through them more easily. At the location of these recesses (5), openings may also be provided in the carrier elements (3a, 3b, 3d, 3e), into which screws can easily be fitted. Optionally, the support parts (1a, 1b, 1d, 1e) may then comprise corre-

sponding openings, in which the openings of the carrier elements (3a, 3b, 3d, 3e) extend opposite the openings of the support parts (1a, 1b, 1d, 1e), as a result of which the manufacturing/positioning of such bed devices can be carried out smoothly. The manner in which such bed devices may be manufactured will be indicated below.

[0046] In the third embodiment of the bed device illustrated in figures 9 and 10, the carrier elements (3a, 3b, 3c, 3d, 3e) comprise rods, with these rods being attached to their respective support parts (1a, 1b, 1c, 1d, 1e) by means of L-shaped platelets (7).

[0047] Such a bed device may be manufactured by first manufacturing two separate modules and then connecting these to each other. Connecting these modules may take place in the space where the bed device is intended to be positioned.

[0048] The first module is an upholstered module comprising the support parts (1a, 1b, 1c, 1d, 1e) and a mattress element placed on these support parts (1a, 1b, 1c, 1d, 1e). In order to manufacture this first module, the support parts (1a, 1b, 1c, 1d, 1e) are provided and placed next to each other so that all of them extend in the same plane at the desired distance and position from each other. In order to place the support parts (1a, 1b, 1c, 1d, 1e) at the suitable distance apart, spacers may be used. Subsequently, a mattress element is arranged on top of these support parts (1a, 1b, 1c, 1d, 1e), so that the mattress element makes contact with the top sides of the support parts (1a, 1b, 1c, 1d, 1e). The mattress element may, for example, be glued to the support parts (1a, 1b, 1c, 1d, 1e). The mattress element may comprise various elements, such as foam, mousse, feathers, etc. After this mattress element has been placed on the support parts (1a, 1b, 1c, 1d, 1e), a fabric is fitted around the mattress element and connected to the support parts (1a, 1b, 1c, 1d, 1e). The fabric is preferably attached to the support parts (1a, 1b, 1c, 1d, 1e) in such a way that a part of the support parts (1a, 1b, 1c, 1d, 1e) is not upholstered and is completely free, so that some of the bottom sides of the support parts (1a, 1b, 1c, 1d, 1e) are readily accessible in order to attach the second module thereto (see below).

[0049] The second module comprises the carrier structure. In order to manufacture this second module, the various carrier elements (3a, 3b, 3c, 3d, 3e) are provided and the hinges (2) are provided, following which the carrier elements (3a, 3b, 3c, 3d, 3e) are then connected to each other by means of the hinges (2). The raising elements (6) are also provided and attached to the carrier structure.

[0050] The only operation that still has to be performed then is to attach these two modules to each other. This can readily be achieved by placing the second module against the first module and screwing the second module onto the first module. The bottom sides of the support parts (1a, 1b, 1c, 1d, 1e) may be provided, for example, with openings and the carrier structure may also be provided with corresponding openings, so that all that has

to be done is to fit screws through the opposite openings. As a result thereof, the two modules may be attached to each other by a layperson.

Claims

1. Adjustable bed device comprising two or more support parts (1a, 1b, 1c, 1d, 1e) on which a mattress element is placeable, comprising hinges (2) so that the successive support parts (1a, 1b, 1c, 1d, 1e) are hingeable with respect to each other, and comprising a carrier structure for supporting the support parts (1a, 1b, 1c, 1d, 1e), **characterized in that** the carrier structure comprises carrier elements (3a, 3b, 3c, 3d, 3e) which are respectively connected to the bottom sides of successive support parts (1a, 1b, 1c, 1d, 1e), the hinges (2) form part of the carrier structure and hingeably connect the successive carrier elements (3a, 3b, 3c, 3d, 3e) to each other, so that the support parts (1a, 1b, 1c, 1d, 1e) are hingeable with respect to each other, and **in that** the hinge axes (A) of said hinges (2) extend at the location of the transition between respective successive support parts (1a, 1b, 1c, 1d, 1e) and, viewed from the bottom sides to the top sides of successive support parts (1a, 1b, 1c, 1d, 1e) at the location of the transition between said support parts (1a, 1b, 1c, 1d, 1e), said hinge (2) extends from the bottom sides of the support parts (1a, 1b, 1c, 1d, 1e) beyond said bottom sides, so that the hinge axis (A) extends above the bottom sides of said support parts (1a, 1b, 1c, 1d, 1e).
2. Adjustable bed device according to Claim 1, **characterized in that** the carrier elements comprise carrier frames (3a, 3b, 3c, 3d, 3e).
3. Adjustable bed device according to Claim 1 or 2, **characterized in that** at least one said carrier element (3a, 3b, 3c, 3d, 3e) is a fixed carrier frame (3c) which is provided to be stationary and one support part (1c) is connected in a fixed position to said carrier frame (3c).
4. Adjustable bed device according to Claim 3, **characterized in that** the support parts (1a, 1b, 1c, 1d, 1e) are hingeable between a base position, in which all support parts (1a, 1b, 1c, 1d, 1e) extend virtually in the same plane, and hinge positions in which the support parts (1a, 1b, 1c, 1d, 1e) extend in several planes, in which, in the base position, all support parts (1a, 1b, 1c, 1d, 1e) are in direct contact with said fixed carrier frame (3c).
5. Adjustable bed device according to one of the preceding claims, **characterized in that** each carrier element (3a, 3b, 3c, 3d, 3e) is fastened in a fixed position to said respective support part (1a, 1b, 1c,

- 1d, 1e).
6. Adjustable bed device according to one of the preceding claims, **characterized in that**, viewed at the location of a transition between two successive support parts (1a, 1b, 1c, 1d, 1e), the respective hinge axes (A) extend at the location of the top sides of said support parts (1a, 1b, 1c, 1d, 1e).
 7. Adjustable bed device according to one of the preceding claims, **characterized in that** the successive carrier elements (3a, 3b, 3c, 3d, 3e) are each hingeably connected to each other by at least two hinges (2).
 8. Adjustable bed device according to one of the preceding claims, **characterized in that** the support parts (1a, 1b, 1c, 1d, 1e) comprise indentations (4) which extend from the bottom side to the top side at the location of the transition between the successive support parts (1a, 1b, 1c, 1d, 1e), through which the hinges (2) are provided to extend.
 9. Adjustable bed device according to one of the preceding claims, **characterized in that** the support parts (1a, 1b, 1c, 1d, 1e) are panels.
 10. Adjustable bed device according to one of the preceding claims, **characterized in that** at least one of said hinges (2) comprises two mating hinge parts (2a, 2b), being a first forked hinge part (2a) and a second hinge part (2b) fitting in this first hinge part.
 11. Adjustable bed device according to one of the preceding claims, **characterized in that** at least one of said hinges (2) comprises two curved hinge parts (2a, 2b) which engage in each other.
 12. Method for manufacturing an adjustable bed device, in which said bed device comprises two or more support parts (1a, 1b, 1c, 1d, 1e) on which a mattress element is placed, hinges (2), so that the successive support parts (1a, 1b, 1c, 1d, 1e) are hingeable with respect to each other and a carrier structure for supporting the support parts (1a, 1b, 1c, 1d, 1e), **characterized in that**
 - an upholstered first module is provided, comprising two or more support parts (1a, 1b, 1c, 1d, 1e) on which the mattress element is arranged;
 - a second module is provided, comprising the carrier structure, in which said carrier structure comprises carrier elements (3a, 3b, 3c, 3d, 3e) and the hinges (2) form part of the carrier structure and hingeably connect the successive carrier elements (3a, 3b, 3c, 3d, 3e) to each other;
- in which, in order to connect said two modules, the carrier elements (3a, 3b, 3c, 3d, 3e) are connected in such a manner to the bottom sides of respectively the successive support parts (1a, 1b, 1c, 1d, 1e) that, viewed from the bottom sides to the top sides of successive support parts, at the location of the transition between respective successive support parts (1a, 1b, 1c, 1d, 1e), the hinges (2) extend beyond the bottom sides of the support parts (1a, 1b, 1c, 1d, 1e), so that the hinge axes (A) extend above the bottom sides of the successive support parts (1a, 1b, 1c, 1d, 1e).
13. Method according to Claim 12, **characterized in that**, in order to manufacture the first module, the support parts (1a, 1b, 1c, 1d, 1e) are spaced apart in such a manner that all support parts (1a, 1b, 1c, 1d, 1e) extend in the same plane, the mattress element is arranged on top of the support parts (1a, 1b, 1c, 1d, 1e) and the fabric is fitted around the mattress element and fixed to the support parts (1a, 1b, 1c, 1d, 1e).
 14. Method according to Claim 13, **characterized in that**, in order to space the support parts (1a, 1b, 1c, 1d, 1e) apart, spacers are placed between the support parts (1a, 1b, 1c, 1d, 1e), with said spacers being removed after or during the upholstering.
 15. Method according to one of Claims 12 to 14, **characterized in that** an adjustable bed device as indicated in Claims 1 to 11 is manufactured.

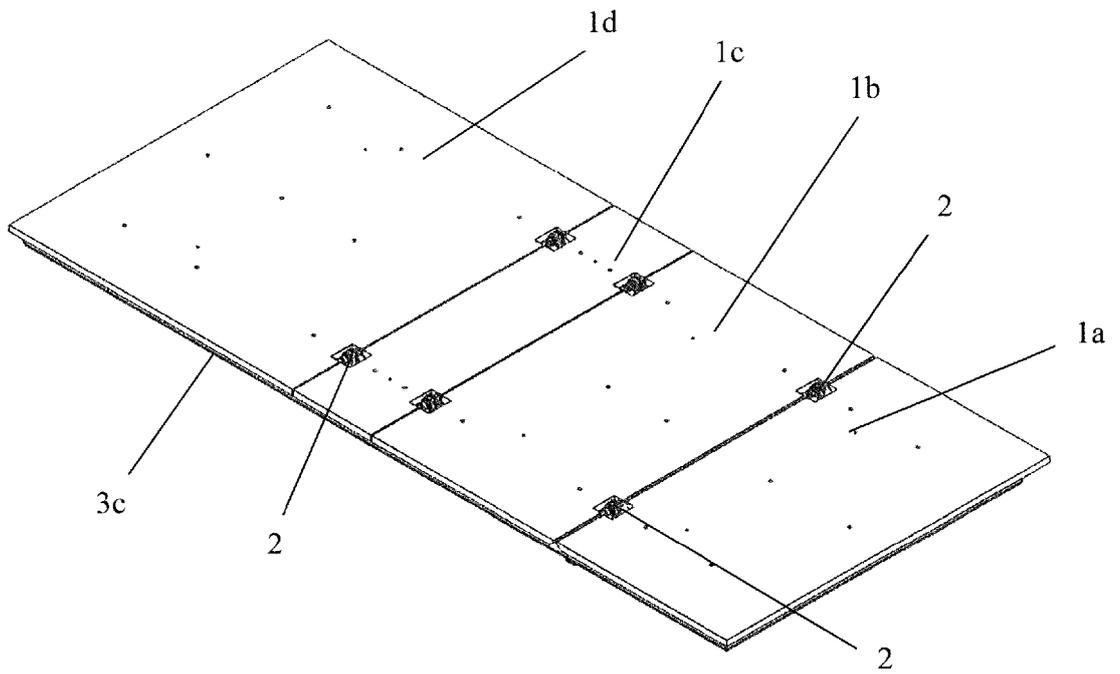


Fig. 1

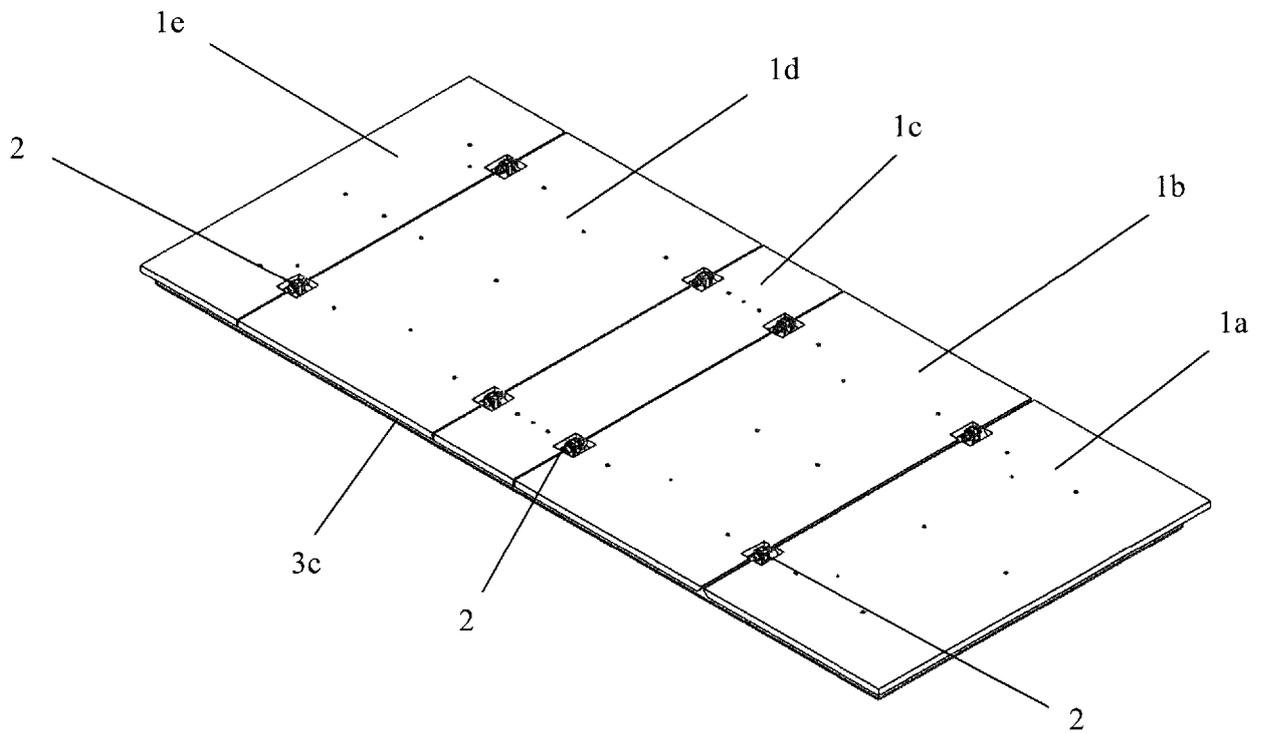


Fig. 2

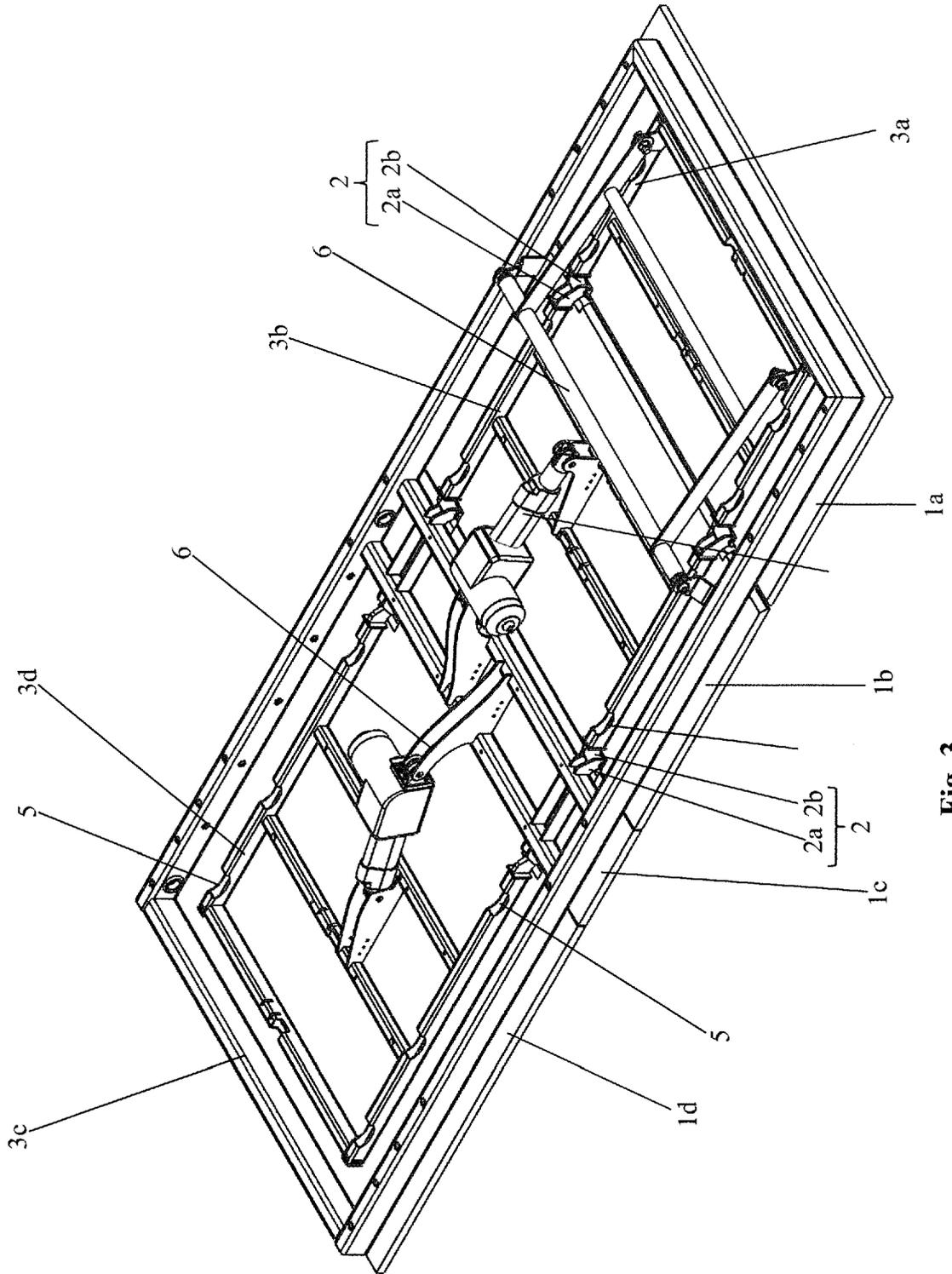


Fig. 3

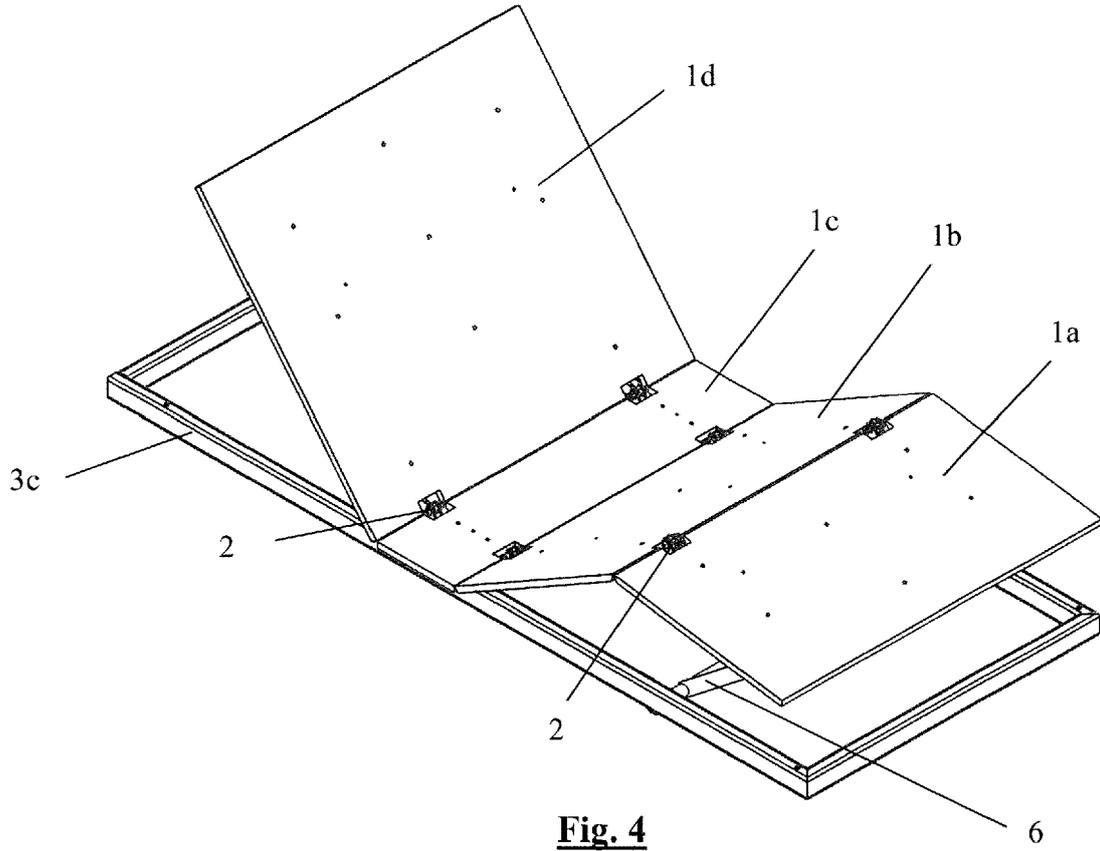


Fig. 4

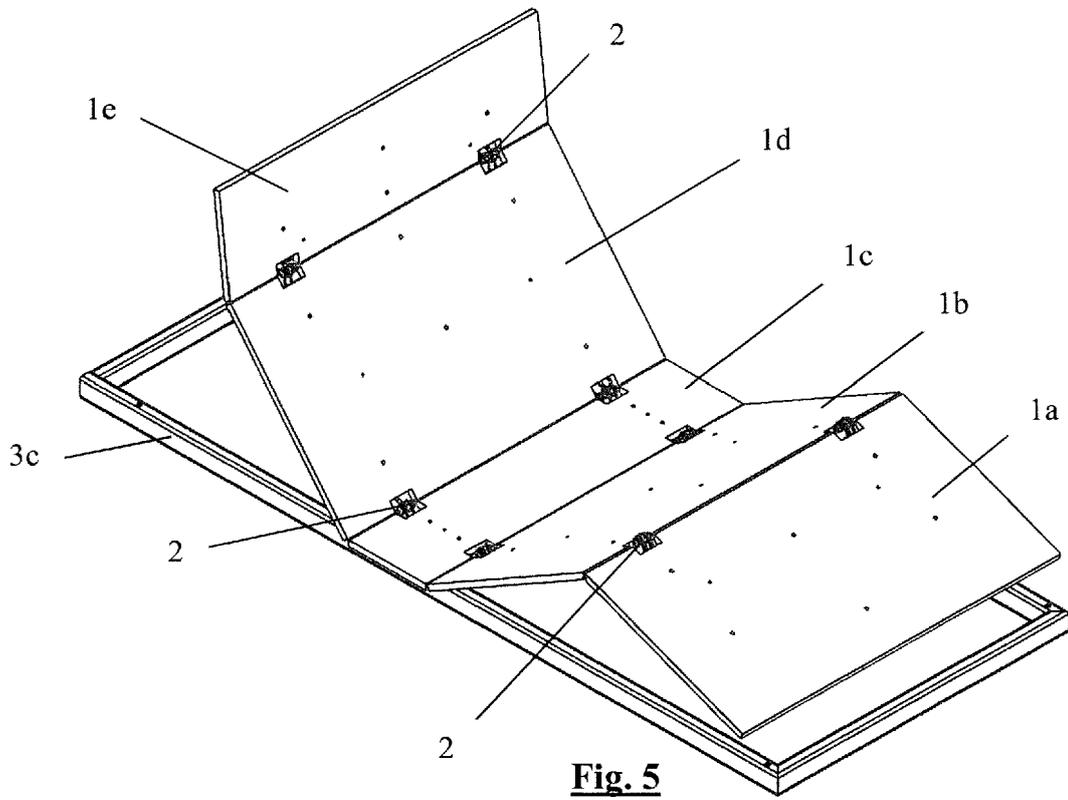


Fig. 5

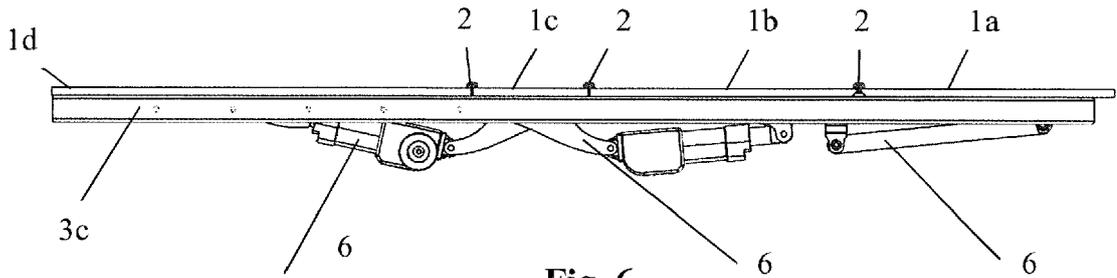


Fig. 6

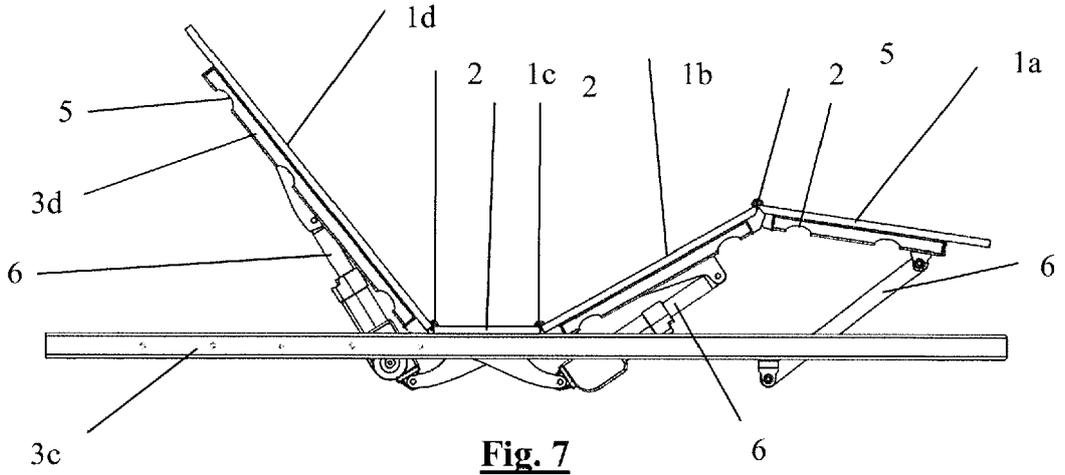


Fig. 7

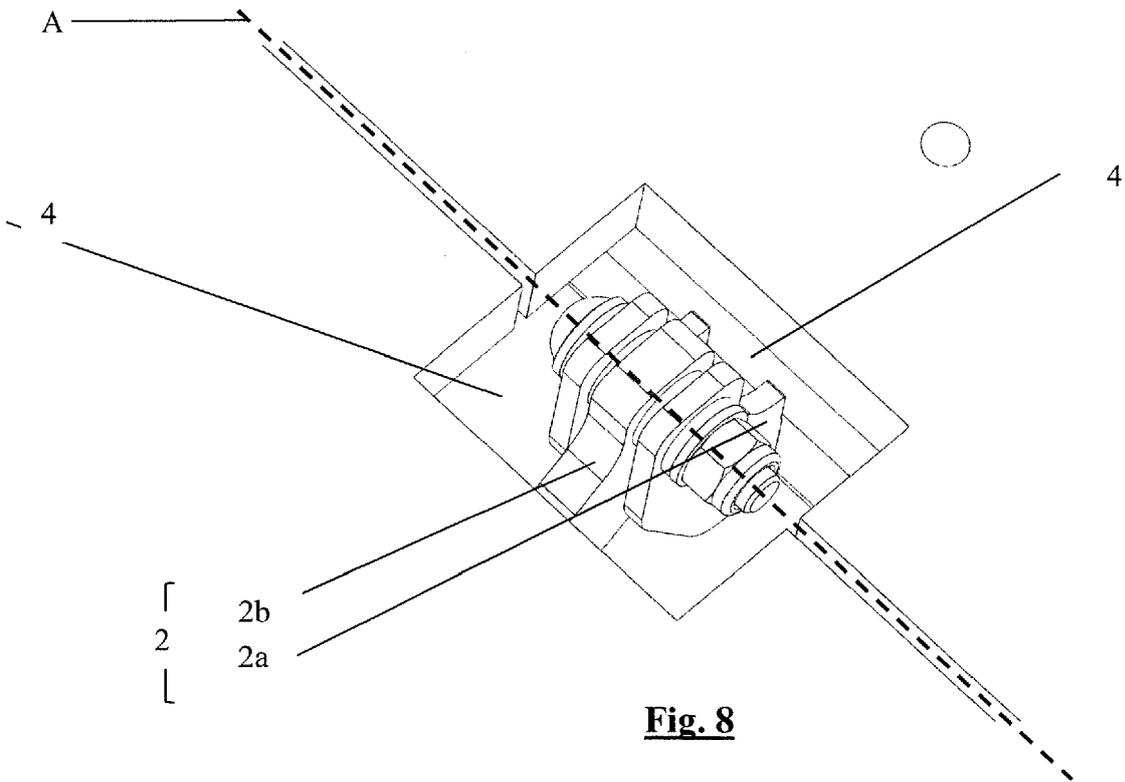


Fig. 8

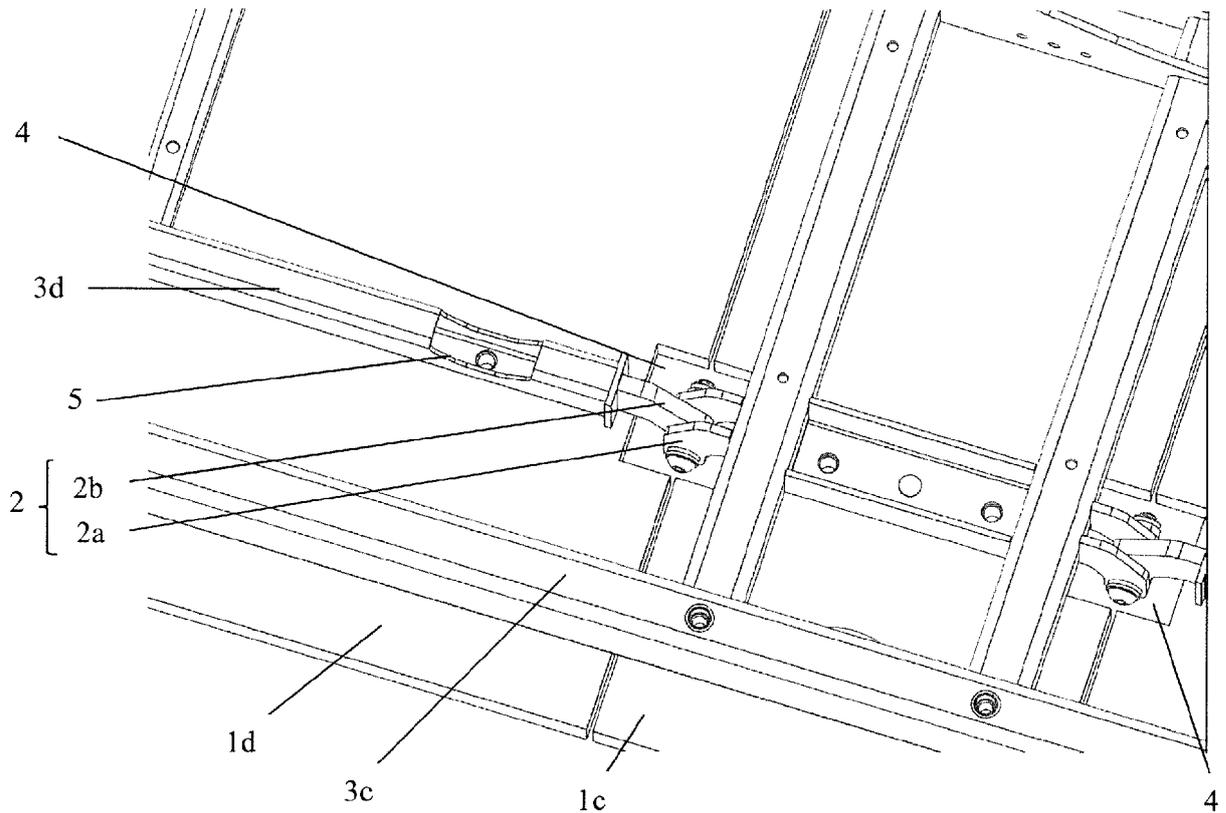


Fig. 9

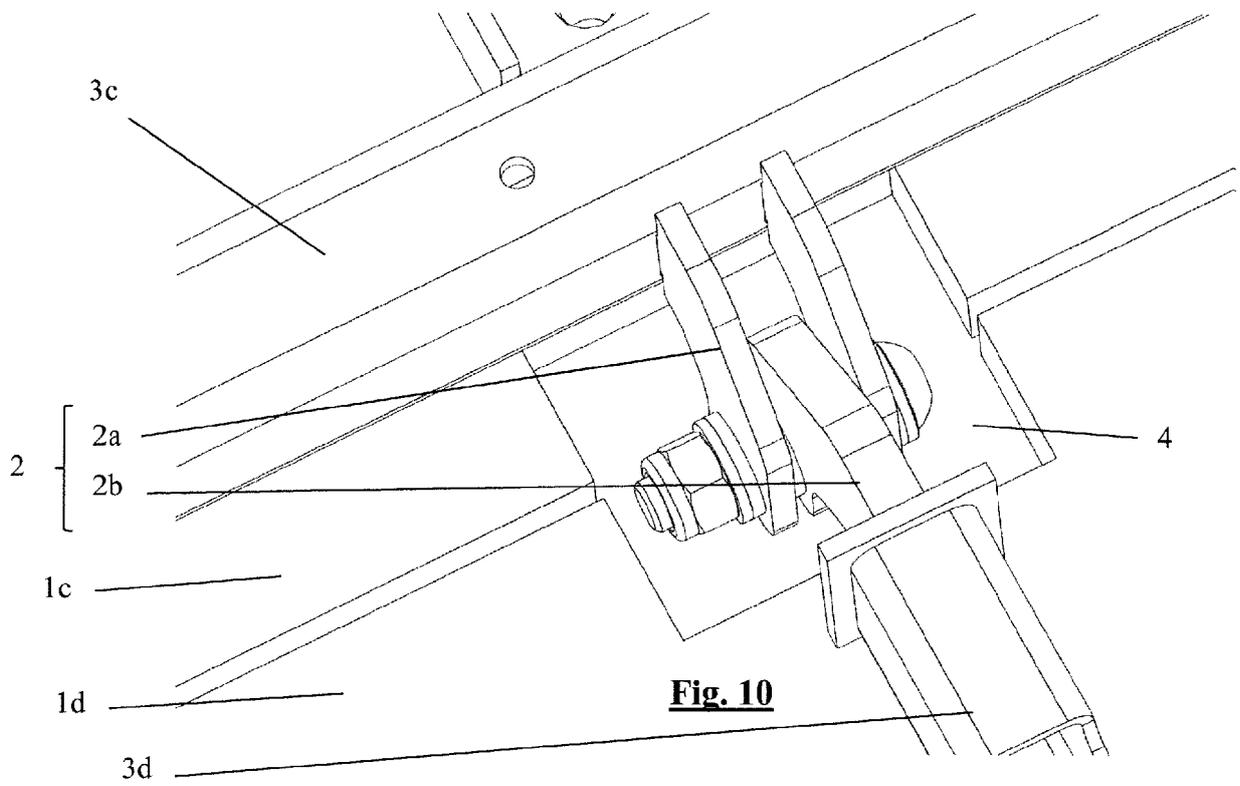


Fig. 10

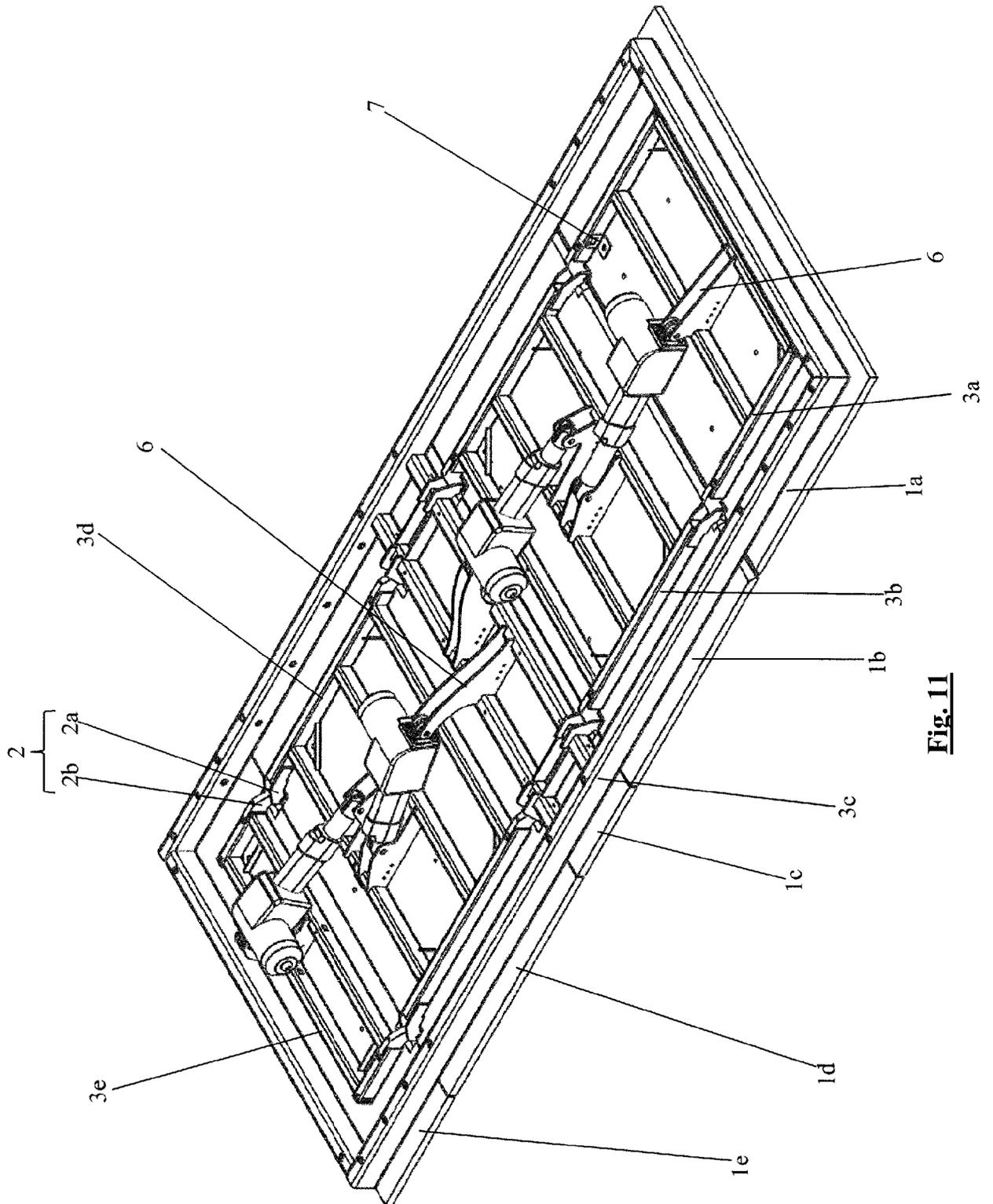


Fig. 11

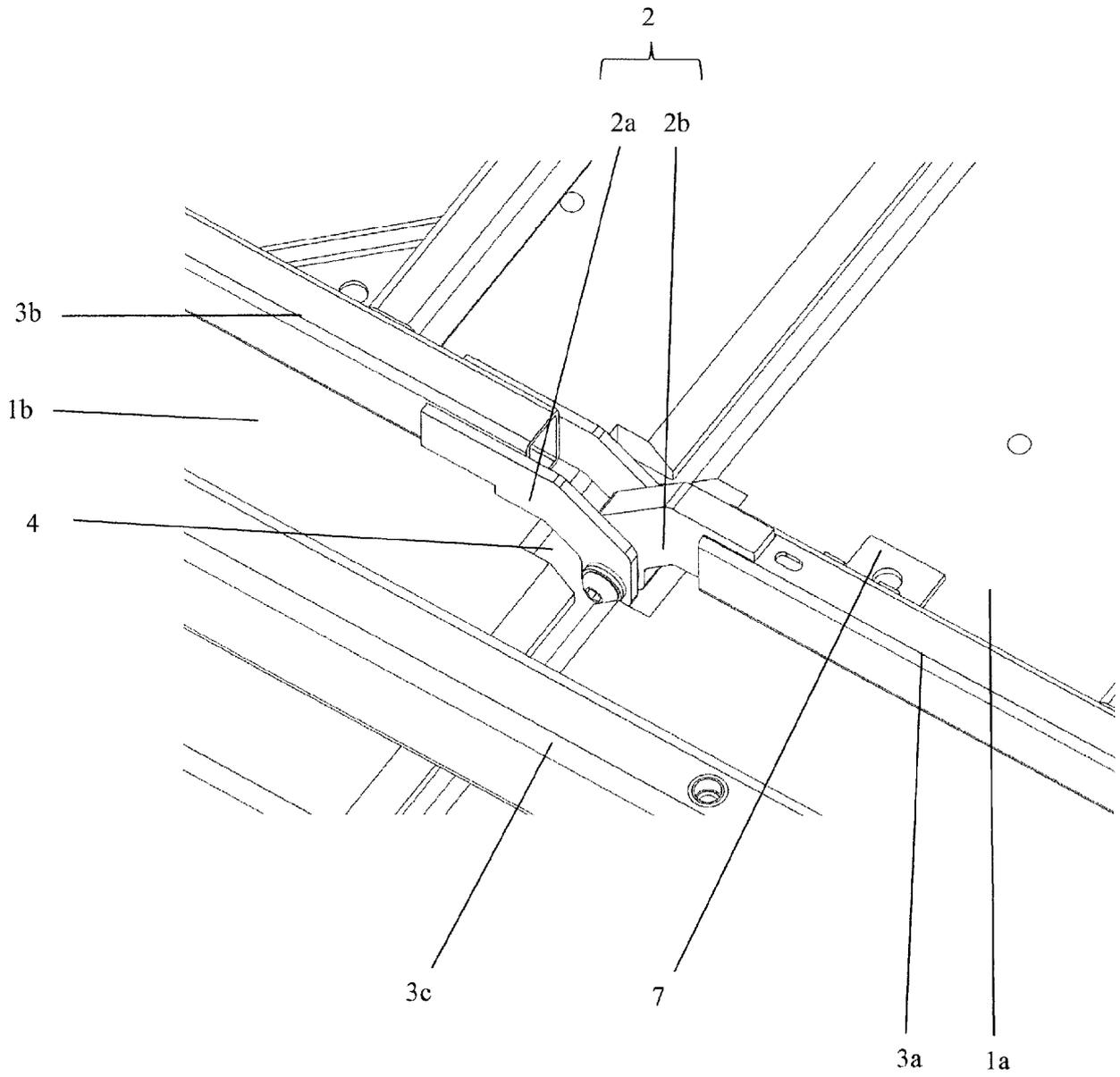


Fig. 12



EUROPEAN SEARCH REPORT

Application Number
EP 17 16 6974

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The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			A47C
Place of search		Date of completion of the search	Examiner
The Hague		15 August 2017	Lehe, Jörn
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5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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