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(54) SYSTEM FOR MECHANICALLY ADJUSTING THE POSITION OF A TABLETOP

(57) Mechanical system for adjusting the position of an object (100), i.e. a tabletop, comprising:

- a frame comprising a first (101) and a second frame part (102);
- a first (201) and a second set (202) of supporting elements, being secured to the first (101) respectively second frame part (102);
- a first (203) and a second set (204) of positioning elements, being secured to opposing sides (103, 104) of the object (100);

wherein the pair of opposing positioning elements is supported by a pair of opposing supporting elements, and wherein any supporting element (302) and any positioning element (306) together form a guiding system having two extreme positions (701, 702), allowing for

- a linear translation between the two extreme positions (701, 702), and
- a rotation of the positioning element (306) relative to the supporting element (302), while being held at one of the extreme positions (701, 702).

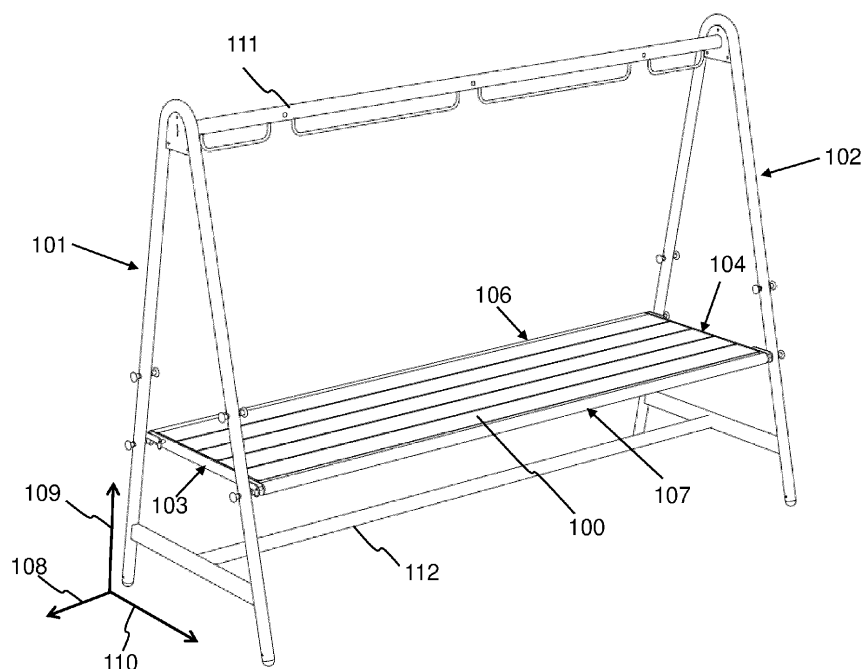


Fig. 1

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Description

Field of the Invention

[0001] The present invention generally relates to a mechanical system for adjusting the position of an object, e.g. a tabletop. In particular, a mechanical adjusting mechanism is presented that allows for a cost-efficient and robust solution, and allows to reposition the object by an individual user in a fast and easy way.

Background of the Invention

[0002] In various applications there is a need for flexibly adjusting the position of an object, e.g. a tabletop. For example, making a table suitable for dining as well as for a walking dinner, requires that the tabletop's height is adjustable. In another application, a sit-and-stand desk requires that the working height may be adapted according to the user's preferences.

[0003] Multiple systems are available in the state of the art to change the position of a tabletop. A first class of solutions makes use of an external energy source to drive the movement of the tabletop, usually an electrical drive. For example, in NL2001888C2 and www.sinetic-aiindustries.com/prodotti/you-fit/, solutions are disclosed using telescopic legs being electrically adjustable. Obviously, such systems are dependent on the availability of electrical energy, thereby complicating the installation, for example in an outside environment. Also the flexibility, e.g. when quickly furnishing a building or changing its layout, is limited. Finally, the electrical components increase the cost of the table, and additional protection for such components is required when used in an outside environment.

[0004] A second class of systems provide for a mechanical system, thereby allowing a manual adjustment of the tabletop, by. For example, in US5311827 a table is disclosed comprising telescopic legs and a spring counter weighting mechanism for adjusting the height. Also in <https://www.omnizonestands.com/manual-height-adjustable-standing-desk-47-x-29> telescopic legs are used, together with a crank allowing a user to manually adjust the height. In EP2946689B1 a desk with a vertically adjustable tabletop is disclosed, comprising wheel carts sliding vertically in side guides and comprising a counterweight arrangement to bias the weight of the tabletop. Such systems may be operated manually, generally by a single person. However, they all make use of moving components, adapted to rotate or slide during adjustment of the tabletop's height. Such moving mechanical parts increase the complexity and cost of the table, and reduce the robustness of the system, e.g. for outside use.

[0005] Finally, solutions exist wherein a shelf, e.g. serving as a laptop support, is placed in a rack, see e.g. <https://www.upstaa.com/en/>. Repositioning may be done by sliding the shelf out of the rack and placing it at another

height in the rack. Such a solution does not require any complex mechanics, but is only applicable to light and short tabletops. In case of a heavy, long tabletop, e.g. serving as a dining table or large desk, repositioning cannot be done by an individual user.

[0006] It is an objective of the present invention to disclose a mechanical system for adjusting the position of an object, e.g. a tabletop, that resolves the above described shortcomings of the prior art solutions. More particularly, it is an objective to present a simple mechanical adjusting mechanism, that provides a cost-efficient and robust solution, and that allows to repositioning the object by an individual user in a fast and easy way.

Summary of the Invention

[0007] According to a first aspect of the present invention, the above identified objectives are realized by a mechanical system for adjusting the position of an object, defined by claim 1, the mechanical system comprising:

- a frame comprising a first and a second frame part, each extending in a height direction and transverse direction and being spaced apart in longitudinal direction;
 - a first and a second set of supporting elements, being secured to the first respectively second frame part, the first and second set each comprising at least three supporting elements being placed at at least two different height positions;
 - a first and a second set of positioning elements, being adapted to be secured to respective opposing sides of said object, the first and second set each comprising two positioning elements;
- wherein in mounted condition the object is positioned between the first and second frame part and each pair of opposing positioning elements is supported from underneath by a pair of opposing supporting elements, and wherein any supporting element comprised in the supporting elements and any positioning element comprised in the positioning elements together form a guiding system having two extreme positions, the guiding system allowing for
- a linear translation of the positioning element relative to the supporting element between the two extreme positions, and
 - a rotation of the positioning element relative to the supporting element, while being held at one of the extreme positions.

[0008] Thus, the invention concerns a system for adjusting the position of an object. For example, the object is a tabletop. In another embodiment, any other type of object may be provided, e.g. a shelf, seat, couch, etc. The system comprises a frame, the frame comprising two different frame parts. In mounted condition, a frame part extends in transverse direction and in the height direction, the latter also referred to as the vertical direction.

Moreover, in mounted condition, the two frame parts are spaced apart in longitudinal direction, with the object placed in between them. In various embodiments, a frame part may have different shapes. For example, a frame part may consist of bars or slats, or may simply be a wall or panel. Typically, the object has two longitudinal sides and two transverse sides, being defined as those sides extending in the longitudinal respectively transverse direction when being in mounted condition.

[0009] The system further comprises a first and a second set of supporting elements. The first set of supporting elements is secured to the first frame part, and the second set to the second frame part. The first and second set each comprise at least three supporting elements, e.g. three or more pins or brackets attached to a frame part. The three supporting elements are placed at at least two different height positions. For example, four supporting elements may be provided per set, two of them at a first height and the other two at a second height. In another embodiment, three supporting elements may be provided, installed at two different height positions. In yet another embodiment, three supporting elements are provided, each of them placed at another height.

[0010] The system further comprises a first and a second set of positioning elements. In mounted condition, the first set of positioning elements is secured to a first transverse side of the object, and the second set is secured to a second, opposing, transverse side of the object. Each of the sets comprises two positioning elements, e.g. two brackets or two pins.

[0011] In mounted condition, each pair of opposing positioning elements is supported from underneath by a pair of opposing supporting elements. This means that each of the positioning elements, attached to a transverse side of the object, lies on a corresponding supporting element, attached to the frame. In other words, the object is merely supported by the supporting elements, and can be freely taken off from the upper side. The mounted condition refers to a state wherein all components have been assembled and the object is positioned in a stable condition, either horizontal or inclined.

[0012] Any supporting element and any corresponding positioning element together form a guiding system, thereby defining the possible movement of both elements relative to each other. Firstly, the guiding system is such that in vertical direction both elements can freely be separated, thereby allowing the object to be taken off in vertical direction. Moreover, the guiding system is such that a linear translation is possible of the positioning element relative to the supporting element, between two extreme positions. This means that a positioning element may linearly move relative to a supporting element, until an endpoint is reached. For example, a horizontal part of the positioning element may linearly slide over a pin, until a vertical protrusion of the positioning element touches the pin, thereby blocking a further translation of the positioning element. Finally, the guiding system is such that, after performing the aforementioned translation and

reaching the endpoint, the positioning element may rotate relative to the supporting element. For example, a protrusion of the positioning element, defining the endpoint, may act as a hook adapted to rotate around a pin, the latter supporting the positioning element during the rotation.

[0013] Various embodiments are possible for the guiding system. For example, a supporting element may comprise a pin attached to a frame part, while the positioning element may comprise a bracket attached to the object. In another embodiment, the role of the pin and bracket may be switched: brackets are now attached to the frame, while pins are attached to the object. Any other embodiments of the guiding system are possible, as long as a supporting element and a positioning element together form a guide allowing for the aforementioned translation and rotation.

[0014] The invented system has several advantages. First, the system allows to put the object in different positions, e.g. a low horizontal position, a high horizontal position and an inclined position. Indeed, repositioning the object may simply be done by lifting a first longitudinal side of the object, thereby releasing one pair of positioning elements from the corresponding pair of supporting elements. During this lifting action, the remaining pair of positioning elements is pivoted around the corresponding supporting elements. Next, the object is shifted until the remaining pair of positioning elements reaches its extreme position. Afterwards, the object is further rotated, thereby bringing its first longitudinal side towards a higher position. Due to the prior shift, the first longitudinal side may easily pass the higher supporting elements, without any risk of collision. Finally, the object may be pulled towards the user, such that the released side of the object can be positioned at a higher pair of supporting elements. In this way, a position is reached in which the initially released positioning elements now rest on the higher pair of supporting elements, resulting in a stable inclined position of the object. A similar method may be applied to move the object from the inclined position towards the high horizontal position. In this way, the invented mechanical system allows for various configurations and multiple applications. For example, the system may be used in an information stand, providing for one horizontal position serving as a desk and one inclined position used to present leaflets or books. In another example, a dining table or a desk with two horizontal positions at different heights may be provided, that may be used for sitting and standing. In yet another example, a rack may be provided, allowing for multiple different height positions.

[0015] Another advantage is that the system allows for a simple operation, by an individual user. Indeed, every action needed for repositioning, including releasing one side of the object from the frame, shifting the object, and rotating the object, can be done by a single person. In particular, during the rotation the guiding system is in one of its extreme positions, thereby preventing a downward shift of the object under its own weight and automatically

holding the object in a stable condition while rotating.

[0016] Finally, the invented system only uses simple mechanical components. No electrical components, or complex mechanics like gears, bearings, springs, etc. are needed. This contributes to a cost-efficient and robust solution. Moreover, the increased robustness allows for an outside use, e.g. as outdoor furniture when appropriate materials are used.

[0017] Optionally, as specified by claim 2, the mechanical system is dimensioned such that applying the translation and the rotation for a selected pair of opposing positioning elements allows to move the remaining pair of opposing positioning elements towards another height position, for repositioning at another pair of opposing supporting elements. This means that the dimensions of the components comprised in the system, as well as their mutual distances and positions, are selected in such a way that after releasing one longitudinal side of the object, the object may be shifted and rotated, thereby moving the released longitudinal side of the object in upwards direction.

[0018] Optionally, as specified by claim 3, the mechanical system is dimensioned such that the remaining pair of opposing positioning elements can be moved during the repositioning, without touching any of the supporting elements. This means that the dimensions of the components comprised in the system, as well as their mutual distances and positions, are selected in such a way that during the repositioning of the object, no collisions occur between components of the system.

[0019] Optionally, as specified by claim 4, in mounted condition, the object is held in stable position without being fixed to the frame, while each guiding system formed by a used supporting element and positioning element is in one of the extreme positions. This means that the object is supported by the supporting elements on the frame, or is leaning on the supporting elements, but is not connected to the supporting elements or the frame. Moreover, when the object is in a stable position, e.g. in horizontal or inclined position, the guiding systems are at their endpoint, e.g. a protrusion of the bracket is in contact with the pin. In this way, the object cannot be moved in horizontal direction during use, increasing the user convenience and safety.

[0020] Optionally, as specified by claim 5, in mounted condition a gap in longitudinal direction is present between a first respectively second side of the object and the first respectively second frame part, and the first respectively second set of positioning elements and supporting elements are placed in the gap. This means the object is not in contact with a frame part, but a gap is present between them, in which the supporting elements and positioning elements are found. This implies that any translation and rotation of the object happen in one plane, perpendicular to the longitudinal direction. In other words, a shift of the object in longitudinal direction is prevented.

[0021] Optionally, as specified by claim 6, a supporting element comprises a pin, and a positioning element com-

prises a bracket, the bracket comprising a bar and two protrusions. The bracket and the pin together form the guiding system, the bar being adapted to slide over the pin between two extreme positions defined by the two protrusions.

[0022] Optionally, as specified by claim 7, the supporting element comprises a flange, e.g. a disk shaped part, connected to an outer end of the pin. Moreover, in mounted condition each bracket comprised in the first and second set of positioning elements, is connected to a first respectively second transverse side of the object, and is spaced apart in longitudinal direction from that side. Furthermore, each pin comprised in the first and second set of supporting elements extends in longitudinal direction towards the object, and the flange is placed between the bracket and the first or second transverse side of the object. In this way, the flange allows to guide the bracket while linearly translating, thereby preventing any displacement in longitudinal direction.

[0023] Optionally, as specified by claim 8, the first and second set of supporting elements each comprises a first, second and third supporting element, wherein the first and second supporting element are placed at the same height position, and the third supporting element is placed at another height position. This means at least one horizontal and one inclined position of the object is possible, wherein the horizontal position may be low or high.

[0024] Optionally, as specified by claim 9, all supporting elements have an identical shape and all have a reference point. A reference point of a supporting element is for example the centre of the circular cross section of a pin. Moreover, the distance between the reference point of the first supporting element and the reference point of the second supporting element is equal to the distance between the reference point of the second supporting element and the reference point of the third supporting element. In other words, the horizontal distance, measured between two supporting points at the same height position, is the same as the inclined distance, measured between two supporting points at different height positions. This allows for at least one horizontal and one inclined position of the object.

[0025] Optionally, as specified by claim 10, the first and second set of supporting elements each further comprise a fourth supporting element, wherein the third and fourth supporting element are placed at the same height position. This allows for two different horizontal positions of the object, each at another height level.

[0026] Optionally, as specified by claim 11, the distance between the reference point of the first supporting element and the reference point of the second supporting element is equal to the distance between the reference point of the first supporting element and the reference point of the fourth supporting element. This implies that four supporting elements are placed according to a trapezium, with either the short or the long side on top. This allows for two different horizontal positions, and two dif-

ferent inclined positions.

[0027] Optionally, as specified by claim 12, in mounted condition, the height position of the first and second supporting element is smaller than the height position of the third and fourth supporting element, and the distance between the reference point of the first supporting element and the reference point of the second supporting element is larger than the distance between the reference point of the third supporting element and the reference point of the fourth supporting element. This implies that four supporting elements are placed according to a trapezium, with the short side on top.

[0028] Optionally, as specified by claim 13, the two protrusions comprised in the positioning element consist of an outer protrusion and an inner protrusion. Moreover, in mounted condition, the object can be positioned in:

- a low horizontal position, wherein the object is supported by the first and second supporting element, of which the pin is in contact with the outer protrusion;
- a high horizontal position, wherein the object is supported by the third and fourth supporting element, of which the pin is in contact with the inner protrusion;
- an inclined position, wherein the object is supported by the second and third supporting element, of which the pin is in contact with the outer protrusion;
- a mirrored inclined position, wherein the object is supported by the first and fourth supporting element, of which the pin is in contact with the outer protrusion.

In this way, four different positions of the object are possible, and in each of that positions, the object is held in stable condition.

[0029] Optionally, the first and second frame part each comprise two posts, wherein in mounted condition said two posts are converging with increasing height.

[0030] Optionally, the system comprises a third and a fourth set of supporting elements, wherein the first and said third set of supporting elements are fixed to opposing sides of the first frame part and the second and fourth set of supporting elements are fixed to opposing sides of the second frame part. In this way, a second object may be positioned at the other side of a frame part.

[0031] Optionally, as specified by claim 14, the object is a tabletop.

[0032] According to a second aspect of the present invention, the above identified objectives are realized by a method for adjusting the position of an object, defined by claim 15, the method comprising:

- providing a frame comprising a first and a second frame part, each extending in a height direction and transverse direction and being spaced apart in longitudinal direction;
- securing a first and a second set of supporting elements to the first respectively second frame part, the first and second set each comprising at least three supporting elements being secured at at least two

different height positions;

- providing an object;
- securing a first and a second set of positioning elements to respective opposing sides of the object, the first and second set each comprising two positioning elements;
- positioning the object between the first and second frame part, such that each pair of opposing positioning elements is supported from underneath by a pair of opposing supporting elements;
- releasing a selected pair of opposing positioning elements from the corresponding pair of supporting elements, and shifting the remaining pair of opposing positioning elements to a first extreme position;
- rotating said remaining pair of opposing positioning elements while being held in the first extreme position, such that the object is rotated and the selected pair of opposing positioning elements is moved towards another height position;
- shifting the remaining pair of opposing positioning elements towards a second extreme position;
- repositioning the selected pair of opposing positioning elements, thereby being supported by another pair of supporting elements at another height position.

Brief Description of the Drawings

[0033]

Fig. 1 and Fig. 2 show a mechanical system for adjusting the position of a tabletop, according to an embodiment of the invention.

Fig. 3, Fig. 4, Fig. 5 and Fig. 6, give a closer view of the supporting elements and positioning elements, according to an embodiment of the invention.

Fig. 7 illustrates the guiding system and its two extreme positions, according to an embodiment of the invention. Fig. 8 illustrates another possible embodiment of such a guiding system.

Fig. 9 and Fig. 10 illustrate different positions of the tabletop, according to an embodiment of the invention.

Fig. 11, Fig. 12, Fig. 13 and Fig. 14 illustrate how the tabletop may be repositioned, according to an embodiment of the invention.

Fig. 15 illustrates an embodiment of the invention, comprising two tabletops and two mechanical systems for repositioning.

Fig. 16 illustrates an embodiment of the invention, comprising an additional parasol.

Fig. 17 shows an embodiment of the invention, illustrating the flexibility to build various configurations.

Fig. 18 shows an embodiment of the invention, wherein a profile is integrated on the top side of the frame.

Detailed Description of Embodiment(s)

[0034] Fig. 1 shows an object 100 and a frame comprising a first frame part 101 and a second frame part 102. The figure indicates the longitudinal direction 108, the height direction or vertical direction 109, and the transverse direction 110. In the shown embodiment, the object 100 is a tabletop having two longitudinal sides 106, 107 and two transverse sides 103, 104. A frame part 101, 102 comprises two posts, converging with increasing height. The two frame parts 101, 102 are connected by a horizontal bar 111 on top, and a horizontal bar 112 at the bottom side.

[0035] Fig. 2 shows that a first set of supporting elements 201 is secured to the first frame part 101, and a second set of supporting elements 202 is secured to the second frame part 102. Moreover, a first set of positioning elements 203 is connected to the first transverse side 103 of the tabletop 100, and a second set of opposing positioning elements 204 is connected to the second transverse side 104 of the tabletop 100. In mounted condition, as shown in Fig. 1, the tabletop 100 is placed between both frame parts 101, 102. The positioning elements 203, 204 are supported from underneath by corresponding supporting elements 201, 202, such that the tabletop can freely be taken off from above.

[0036] Fig. 3 to 6 give a closer view of the positioning elements 203 and the supporting elements 201. In the shown embodiment, a set of supporting elements 201 comprises four identical supporting elements 301, 302, 303, 304, of which elements 301 and 302 are at a first height position, and elements 303 and 304 are at a second, higher, height position. The supporting element 301 comprises a pin 311, the supporting element 302 comprises a pin 312, and similar for the other supporting elements. The pins 311, 312 extend towards the object 100. Fig. 6 shows that a disk-shaped flange 602 is connected to the end of the pin 311. Similarly, the other pins have a disk-shaped flange at their outer end. A set of positioning elements 203 comprises two identical positioning elements 305, 306. In the shown embodiment, a positioning element 306 comprises a bracket, the latter comprising a horizontal part 402 and two vertical protrusions pointing downwards, namely an inner protrusion 400 and an outer protrusion 401. Fig. 6 shows that a gap 600 in longitudinal direction 108 is present between the first transverse side 103 of the tabletop 100 and the first frame part 101, the supporting elements 302, 301 and positioning elements 306, 305 being placed in that gap 600. Similarly, a longitudinal gap is present between the second transverse side 104 of the tabletop 100 and the

second frame part 102, in which the supporting elements 202 and positioning elements 204 are found. Moreover, Fig. 6 shows that the bracket 305 is spaced apart from the transverse side 103 of the tabletop 100, see the longitudinal gap 601, and the flange 602 is positioned in the gap 601. An analogous configuration is used for the other positioning elements. Preferably, the positioning elements and supporting elements are provided in a durable material, allowing a positioning element to slide over a supporting element. For example, anodised or galvanised steel may be used. In another example, plastics may be used, if a sufficient thickness is provided.

[0037] A supporting element 302 and a positioning element 306 together form a guiding system, as is further illustrated in Fig. 7. The guiding system has two extreme positions 701 and 702. In the first extreme position 701, the pin 312 of the supporting element 302 is in contact with the outer protrusion 401 of the positioning element 306, see Fig. 7(a). In the second extreme position 702, the pin 312 of the supporting element 302 is in contact with the inner protrusion 400 of the positioning element 306, see Fig. 7(b). A linear translation is possible between the two extreme positions 701, 702, wherein the horizontal part 402 of the positioning element 306 slides over the pin 601 of the supporting element 302, until one of the extreme positions 701, 702 is reached. Furthermore, when being in one of the extreme positions 701, 702, a rotation is possible of the positioning element 306 around the supporting element 302. The protrusion 401, 402 thereby acts as a hook turning around the pin 601. Finally, by tilting the positioning element 306, it can be separated from the supporting element 302 in vertical direction. Remark that the representations given in Fig. 7 are conceptual; compared to Fig. 3, Fig. 7(a) is obtained as a side view from the left, but the frame has been omitted. Moreover, the supporting element 302 is indicated in Fig. 7, though it is actually hidden when taking a side view of Fig. 3.

[0038] Fig. 8 illustrates another embodiment of the guiding system. In this embodiment, the supporting element 803 comprises a bracket, secured to a frame part, and the positioning element 800 comprises a pin, secured to the tabletop. Like for the previous embodiment, a linear translation is possible between two extreme positions 801 and 802, as well as a rotation of the positioning element 800 while being held in one of the extreme positions 801, 802.

[0039] Fig. 9 and Fig. 10 illustrate the different possible positions of the tabletop 100 can be obtained when using the system described above. In Fig. 9(a) and Fig. 10(a) the tabletop 100 is in a low horizontal position, e.g. for use as a dining table. In this position, the outer protrusions 401 and 1001 of the positioning elements 306 respectively 305, are in contact with the corresponding supporting elements 302 respectively 301, thereby holding the tabletop 100 in a stable position. In Fig. 9(b) and Fig. 10(d), the tabletop 100 is in an inclined position, e.g. for use as an exhibition stand. Just like for the low horizontal

position, in the inclined position the outer protrusions 401 and 1001 of the positioning elements 306 respectively 305, are in contact with the corresponding supporting elements 302 respectively 303. This also applies for the mirrored inclined position shown in Fig. 10(b). Therefore, the horizontal distance between the centre of supporting elements 301 and 302 is equal to the diagonal distance between the centre of supporting elements 302 and 303, and equal to the diagonal distance between the centre of supporting elements 301 and 304. In Fig. 9(c) and Fig. 10(c) the tabletop 100 is in a high horizontal position, e.g. for use during a reception. In this position, the inner protrusions 400 and 1000 of the positioning elements 306 respectively 305, are in contact with the corresponding supporting elements 304 respectively 303, thereby again holding the tabletop 100 in a stable position. Compared to the low horizontal position, the guiding systems are now in the reversed extreme position. Therefore, in the shown embodiment, the distance between the centres of supporting element 303 and 304 is smaller than the distance between the centres of supporting element 301 and 302. The four supporting elements 301 - 304 are thus placed according to a trapezium with the short side on top. In other embodiments, other positions may be chosen for the supporting elements, e.g. according to a trapezium with the long side on top, or another number of supporting elements may be used, e.g. three or more than four.

[0040] Fig. 11 to 14 illustrate the movement of the tabletop 100 during repositioning. In Fig. 11 (a) and Fig. 13(a), the tabletop 100 is in the low horizontal position. The method for changing the position towards the inclined position of Fig. 11(e) or Fig. 13(c) comprises the following steps:

- First, the longitudinal side 107 of the tabletop 100 is lifted by a user standing on the right side of Fig. 11(a), thereby releasing positioning element 306 from supporting element 302. This is shown in Fig. 11(b). During this lifting action, the remaining positioning element 305 is pivoted with respect to the supporting element 301. It is clear that the opposing elements, at the other transverse side of the tabletop 100, not shown in the figure, are also released.
- Next, the remaining positioning element 305 is shifted in a direction away from the user, until the guiding system formed by positioning element 305 and supporting element 301 reaches again an extreme position. This is shown in Fig. 11 (c).
- Next, the tabletop 100 is rotated by the user, as is shown in Fig. 11(d) and Fig. 13(b). During this step, the remaining positioning element 305 is rotated around supporting element 301, while being held in its extreme position. During this rotation, the released positioning element 306 is moved towards a higher height position. The figures show that due to the preceding shift, the tabletop 100 can be rotated without colliding with any of the supporting elements.

- Next, the user pulls the tabletop 100 towards himself. In this way, the remaining positioning element 305 is again shifted, until the guiding system formed by positioning element 305 and supporting element 301 reaches the other extreme position. In this way, the released positioning element 306 can be repositioned, thereby being supported by the higher supporting element 304, see Fig. 11(e) and Fig. 13(c).

[0041] Further, the method for changing the tabletop 100 from the inclined position of Fig. 11(e) or Fig. 13(c) towards the high horizontal position of Fig. 12(e) or Fig. 13(f) comprises the following steps:

- First, the longitudinal side 106 of the tabletop 100 is lifted by a user standing on the left side of Fig. 12(a), thereby releasing positioning element 305 from supporting element 301. This is shown in Fig. 12(a). During this lifting action, the remaining positioning element 306 is pivoted with respect to the supporting element 304. It is clear that the opposing elements, at the other transverse side of the tabletop 100, not shown in the figure, are also released.
- Next, the tabletop 100 is rotated, as is shown in Fig. 12(b-c) and Fig. 13(d). During this step, the remaining positioning element 306 is rotated around supporting element 304, while being held in its extreme position. During this rotation, the released positioning element 305 is moved towards a higher height position. The figures show that the positioning element 305 passes by the supporting element 303 from the outside, again avoiding any collision.
- Next, the user pushes the tabletop 100 away from himself. In this way, the remaining positioning element 306 is shifted, until the guiding system formed by positioning element 306 and supporting element 304 reaches again an extreme position. This is shown in Fig. 12(d) and Fig. 13(e).
- Finally, downwardly rotating the transverse side 106 of the tabletop 100 allows to reposition positioning element 305 at supporting element 303, see Fig. 12(e) and Fig. 13(e-f).

[0042] It is clear from the described method above, that any of the required steps can be performed by a single user. Fig. 14 illustrates a similar method for adjusting the tabletop's 100 position from the high horizontal position of Fig. 14(a), towards an inclined position in Fig. 14(d), and towards the low horizontal position of Fig. 14(f).

[0043] Fig. 15 shows an embodiment wherein two tabletops 100 and 1500 are provided. One transverse side of the second frame part 102 comprises the supporting elements 202, for supporting tabletop 100. Moreover, the other transverse side of the second frame part 102 comprises supporting elements 1501, for supporting tabletop 1500. In this way, a chain of tabletops may be obtained, wherein each individual tabletop may have a different position, and wherein each of the tabletops may be re-

positioned using the mechanism according to the invention.

[0044] Fig. 16 and Fig. 17 illustrate how the table(s) given in the previous figures may be supplemented with a parasol 1600. In an outdoor environment, the parasol may offer shade on sunny days. In an inside environment, the parasol may offer acoustic absorption and an increased visibility due to protection against incident light and reflections. The parasol 1600 comprises a foldable material 1603, having longitudinal fold lines 1602. The parasol 1600 further comprises transverse bars 1601, extending through holes in the material 1603. In the figures, the parasol 1600 is shown in used condition, being unfolded. The parasol 1600 may be changed to an unused condition by folding the material 1603 according to the folding lines 1602. This may be done by moving the ends 1604 and 1605 in transverse direction, such that the material 1603 slides over the bars 1601. In this way, an easy and self-explanatory operation is obtained.

[0045] Fig. 18 illustrates another embodiment of the frame. Whereas in the embodiment of Fig. 1 the top bar 111 has a round cross section, the top bar 1800 of Fig. 18 is a specifically designed profile. The profile 1800 has a flat bottom surface 1801, in which for example a socket may be placed or lighting may be integrated. Furthermore, the profile is hollow, offering space e.g. to keep electric cabling in a practical and invisible way. The profile 1800 may be designed in a multifunctional way, allowing to use the same design for different applications and environments.

[0046] Although the present invention has been illustrated by reference to specific embodiments, it will be apparent to those skilled in the art that the invention is not limited to the details of the foregoing illustrative embodiments, and that the present invention may be embodied with various changes and modifications without departing from the scope thereof. The present embodiments are therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein. In other words, it is contemplated to cover any and all modifications, variations or equivalents that fall within the scope of the basic underlying principles and whose essential attributes are claimed in this patent application. It will furthermore be understood by the reader of this patent application that the words "comprising" or "comprise" do not exclude other elements or steps, that the words "a" or "an" do not exclude a plurality, and that a single element, such as a computer system, a processor, or another integrated unit may fulfil the functions of several means recited in the claims. Any reference signs in the claims shall not be construed as limiting the respective claims concerned. The terms "first", "second", "third", "a", "b", "c", and the like, when used in the description or in the claims are introduced to distinguish between similar

elements or steps and are not necessarily describing a sequential or chronological order. Similarly, the terms "top", "bottom", "over", "under", and the like are introduced for descriptive purposes and not necessarily to denote relative positions. It is to be understood that the terms so used are interchangeable under appropriate circumstances and embodiments of the invention are capable of operating according to the present invention in other sequences, or in orientations different from the one(s) described or illustrated above.

Claims

1. Mechanical system for adjusting the position of an object (100), comprising:

- a frame comprising a first (101) and a second frame part (102), each extending in a height direction (109) and transverse direction (110) and being spaced apart in longitudinal direction (108);

- a first (201) and a second set (202) of supporting elements, being secured to said first (101) respectively second frame part (102), said first (201) and second set (202) each comprising at least three supporting elements being placed at at least two different height positions;

- a first (203) and a second set (204) of positioning elements, being adapted to be secured to respective opposing sides (103, 104) of said object (100), said first (203) and second set (204) each comprising two positioning elements;

wherein in mounted condition said object (100) is positioned between said first (101) and second frame part (102) and each pair of opposing positioning elements is supported from underneath by a pair of opposing supporting elements, **CHARACTERIZED IN THAT:**

any supporting element (302) comprised in said supporting elements (201) and any positioning element (306) comprised in said positioning elements (203) together form a guiding system having two extreme positions (701, 702), said guiding system allowing for

- a linear translation of said positioning element (306) relative to said supporting element (302) between said two extreme positions (701, 702), and

- a rotation of said positioning element (306) relative to said supporting element (302), while being held at one of said extreme positions (701, 702).

2. Mechanical system according to claim 1, wherein said mechanical system is dimensioned such that applying said translation and said rotation for a selected pair of opposing positioning elements

(305) allows to move the remaining pair of opposing positioning elements (306) towards another height position, for repositioning at another pair of opposing supporting elements (304).

3. Mechanical system according to claim 2, wherein said mechanical system is dimensioned such that said remaining pair of opposing positioning elements (306) can be moved during said repositioning, without touching any of said supporting elements (201, 202).

4. Mechanical system according to any of the previous claims, wherein in mounted condition, said object (100) is held in stable position without being fixed to said frame, while each guiding system formed by a used supporting element (302) and positioning element (306) is in one of said extreme positions (701, 702).

5. Mechanical system according to any of the previous claims, wherein in mounted condition a gap (600) in longitudinal direction (108) is present between a first (103) respectively second side (104) of said object (100) and said first (101) respectively second frame part (102), and said first (203, 201) respectively second set (204, 202) of positioning elements and supporting elements are placed in said gap (600).

6. Mechanical system according to any of the previous claims, wherein said supporting element (302) comprises a pin (312) and said positioning element (306) comprises a bracket, said bracket comprising a bar (402) and two protrusions (400, 401), and wherein said bracket and said pin (312) together form said guiding system, said bar (402) being adapted to slide over said pin (312) between two extreme positions defined by said two protrusions (400, 401).

7. Mechanical system according to claim 6, wherein said supporting element (301) comprises a flange (602) connected to an outer end of said pin (311), and wherein in mounted condition:

- each bracket comprised in said first and second set of positioning elements (203, 204) is connected to a first (103) respectively second side (104) of said object (100), thereby being spaced apart in longitudinal direction (108) from said side (103, 104), and
- each pin (311) comprised in said first and second set of supporting elements (201, 202) extends in longitudinal direction towards said object (100), wherein said flange (602) is placed between said bracket and said first (103) or sec-

ond side (104) of said object (100).

8. Mechanical system according to any of the previous claims,

wherein said first (201) and second set (202) of supporting elements each comprises a first (301), second (302) and third supporting element (303), wherein said first (301) and second supporting element (302) are placed at the same height position, and said third supporting element (303) is placed at another height position.

9. Mechanical system according to claim 8, wherein all supporting elements (201, 202) have an identical shape and all have a reference point, and wherein the distance between said reference point of said first supporting element (301) and said reference point of said second supporting element (302) is equal to the distance between said reference point of said second supporting (302) element and said reference point of said third supporting element (303).

10. Mechanical system according to claim 8 or 9, wherein said first (201) and second set (202) of supporting elements each further comprise a fourth supporting element (304), wherein said third (303) and fourth supporting element (304) are placed at the same height position.

11. Mechanical system according to claim 9 and 10, wherein the distance between said reference point of said first supporting element (301) and said reference point of said second supporting element (302) is equal to the distance between said reference point of said first supporting element (301) and said reference point of said fourth supporting element (304).

12. Mechanical system according to claim 11, wherein in mounted condition, said height position of said first (301) and second supporting element (302) is smaller than said height position of said third (303) and fourth supporting element (304), and wherein the distance between said reference point of said first supporting element (301) and said reference point of said second supporting element (302) is larger than the distance between said reference point of said third supporting (303) element and said reference point of said fourth supporting element (304).

13. Mechanical system according to claim 12 and claim 6, wherein said two protrusions (400, 401) consist of an outer protrusion (401) and an inner protrusion (400), and in mounted condition, said object (100) can be positioned in

- a low horizontal position, wherein said object (100) is supported by said first (301) and second supporting element (302), of which said pin (311, 312) is in contact with said outer protrusion (401); 5
 - a high horizontal position, wherein said object (100) is supported by said third (303) and fourth supporting element (304), of which said pin is in contact with said inner protrusion (400); 10
 - an inclined position, wherein said object (100) is supported by said second (302) and third supporting element (303), of which said pin is in contact with said outer protrusion (401);
 - a mirrored inclined position, wherein said object (100) is supported by said first (301) and fourth supporting element (304), of which said pin is in contact with said outer protrusion (401). 15
14. Mechanical system according to any of the previous claims, 20
wherein said object is a tabletop (100).
15. Method for adjusting the position of an object (100), comprising: 25
- providing a frame comprising a first (101) and a second frame part (102), each extending in a height direction (109) and transverse direction (110) and being spaced apart in longitudinal direction (108); 30
 - securing a first (201) and a second set of supporting elements (202) to said first (101) respectively second frame part (102), said first (201) and second set (202) each comprising at least three supporting elements being secured at at least two different height positions; 35
 - providing an object (100);
 - securing a first (203) and a second set (204) of positioning elements to respective opposing sides (103, 104) of said object (100), said first (203) and second set (204) each comprising two positioning elements; 40
 - positioning said object (100) between said first (101) and second frame part (102), such that each pair of opposing positioning elements is supported from underneath by a pair of opposing supporting elements; 45
 - releasing a selected pair of opposing positioning elements (306) from the corresponding pair of supporting elements (302), and shifting the remaining pair of opposing positioning elements (305) to a first extreme position; 50
 - rotating said remaining pair of opposing positioning elements (305) while being held in said first extreme position, such that said object (100) is rotated and said selected pair of opposing positioning elements (306) is moved towards another height position; 55

- shifting said remaining pair of opposing positioning elements (305) towards a second extreme position;
- repositioning said selected pair of opposing positioning elements (306), thereby being supported by another pair of supporting elements (304) at another height position.

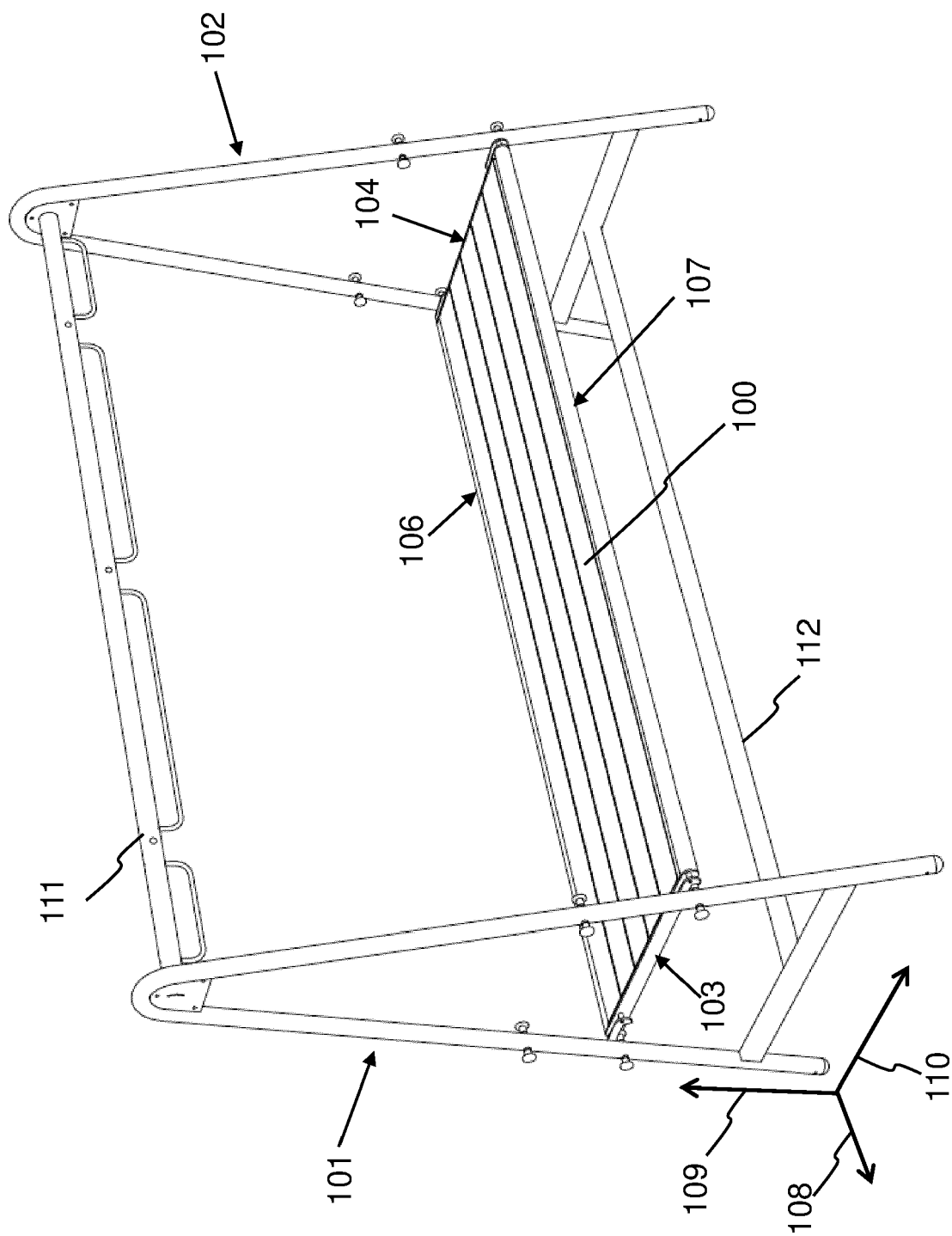


Fig. 1

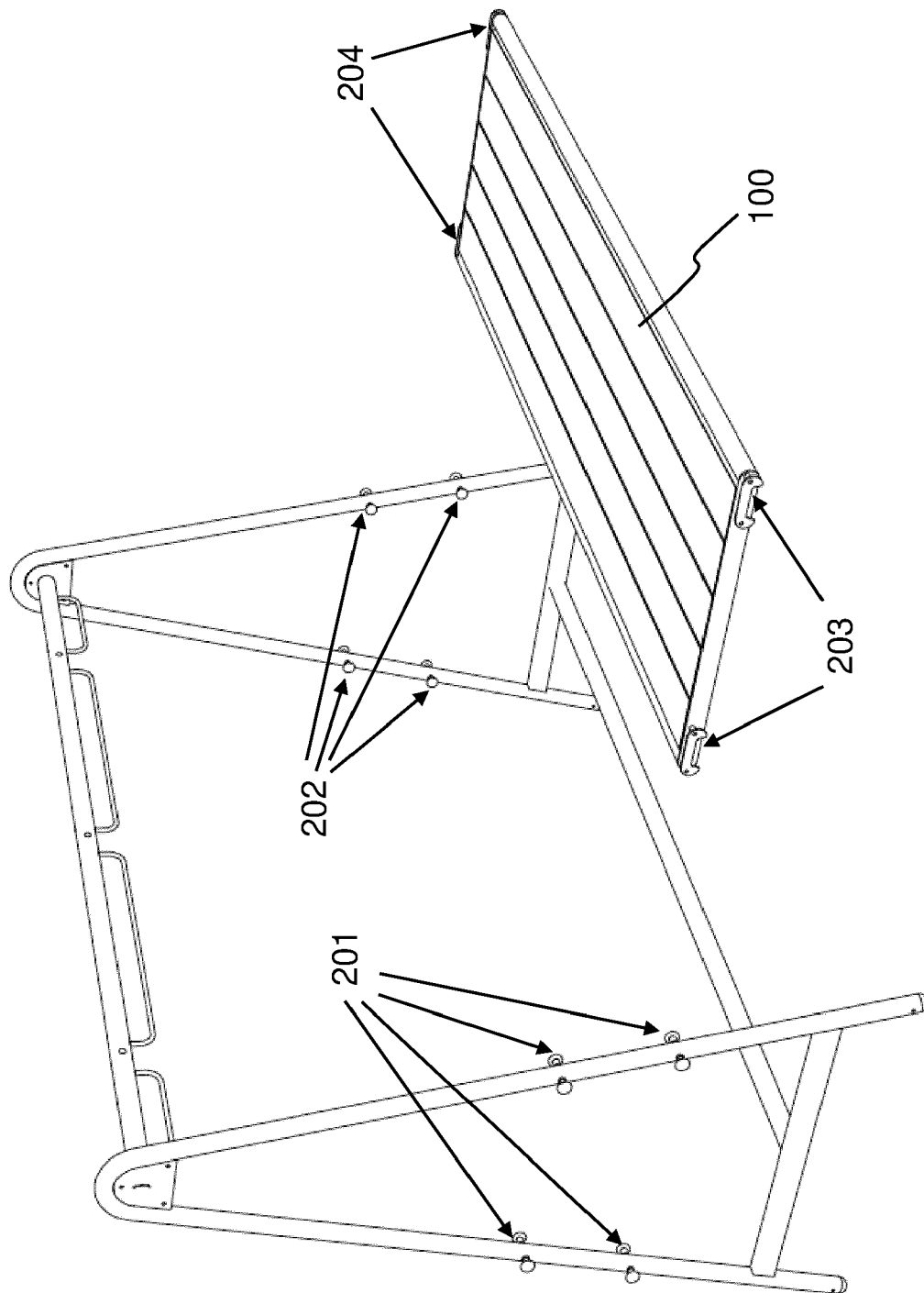


Fig. 2

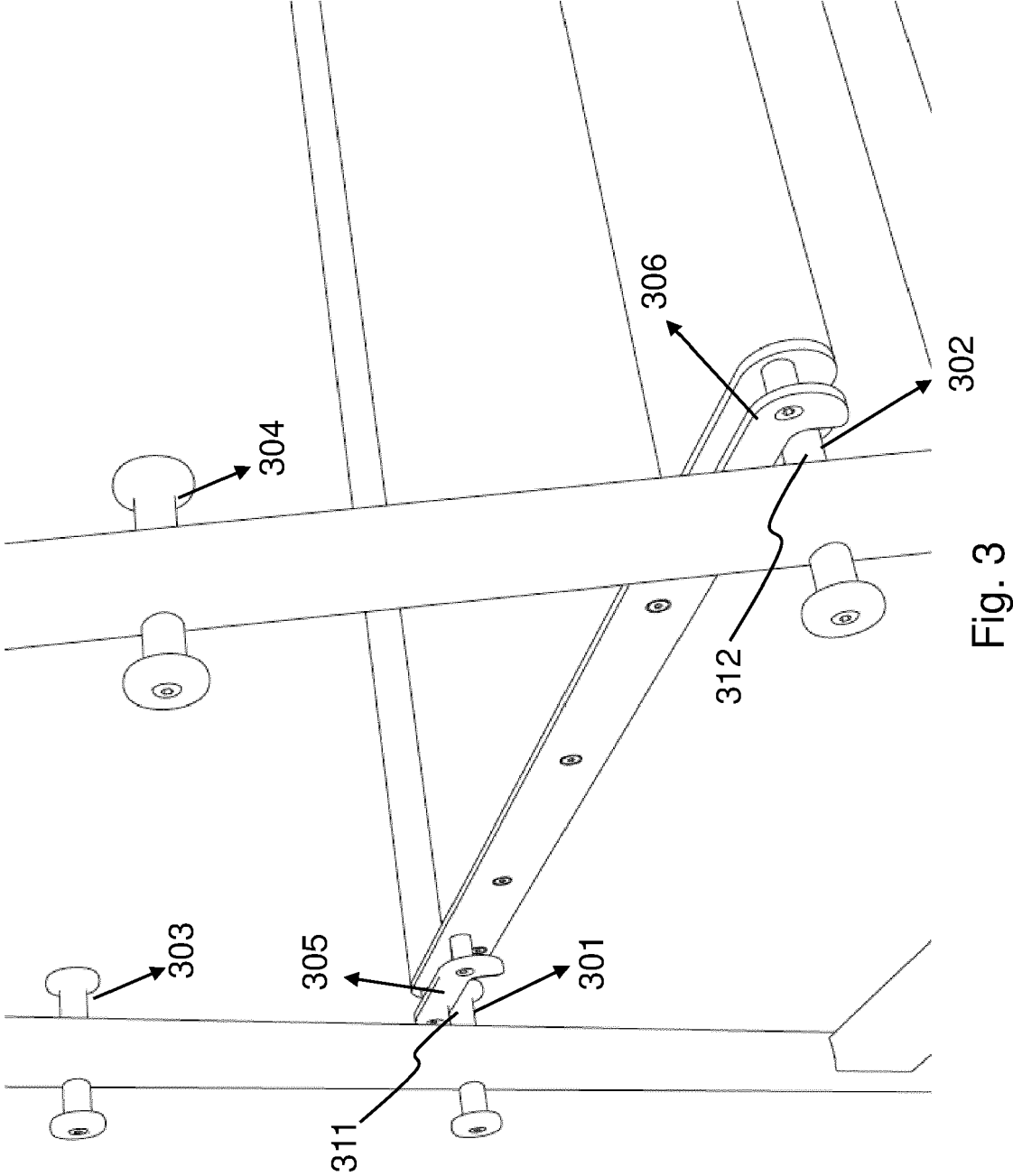


Fig. 3

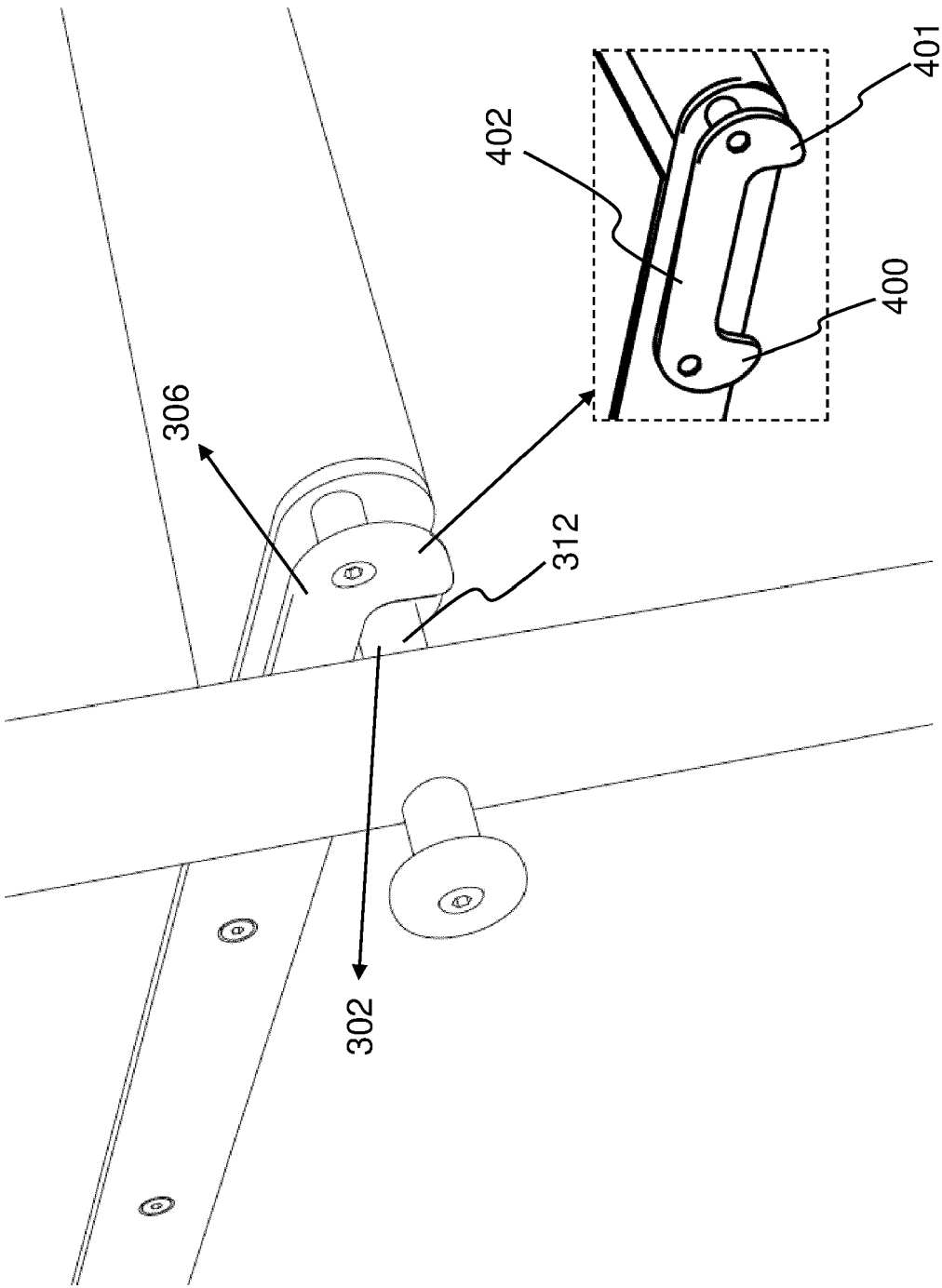


Fig. 4

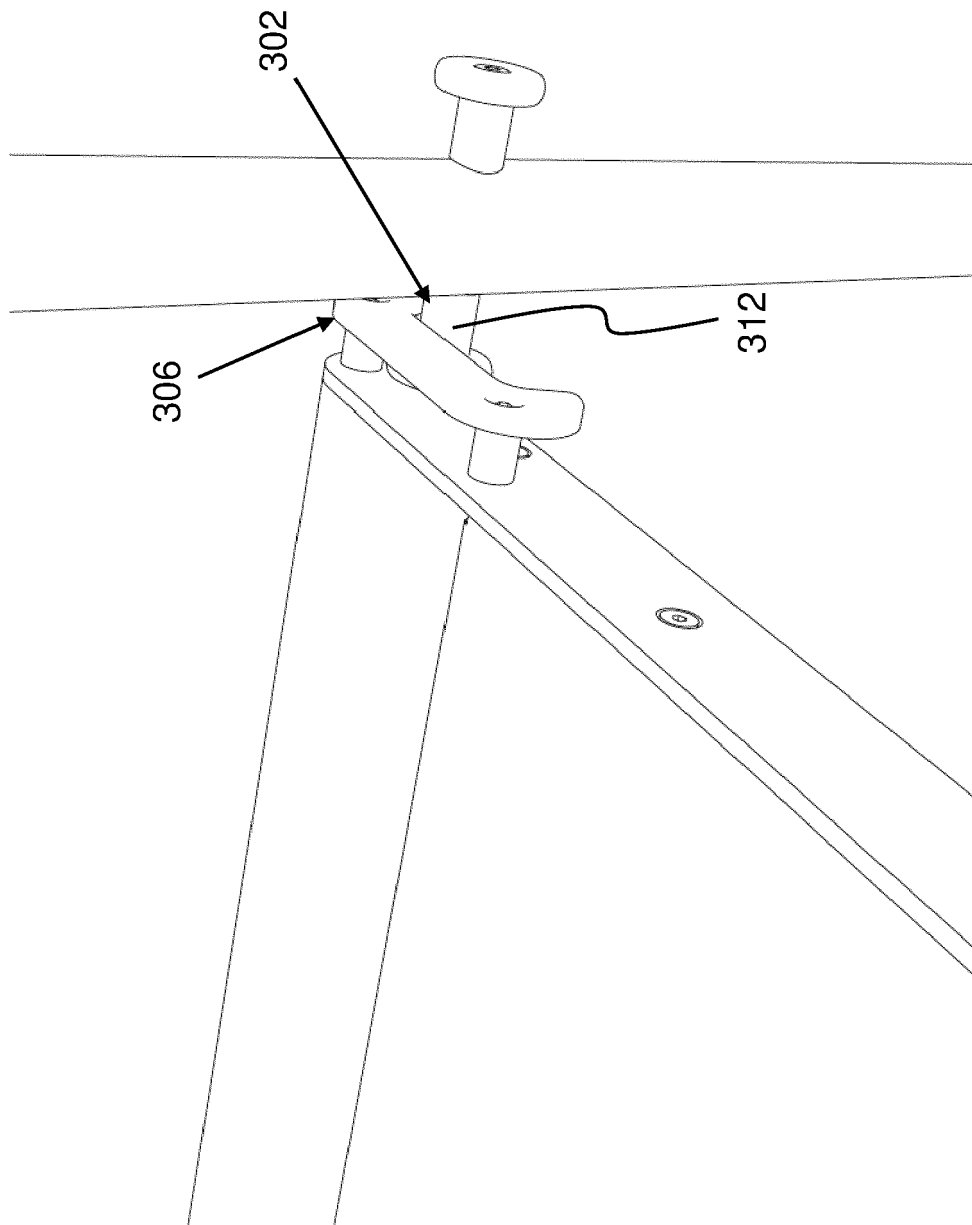


Fig. 5

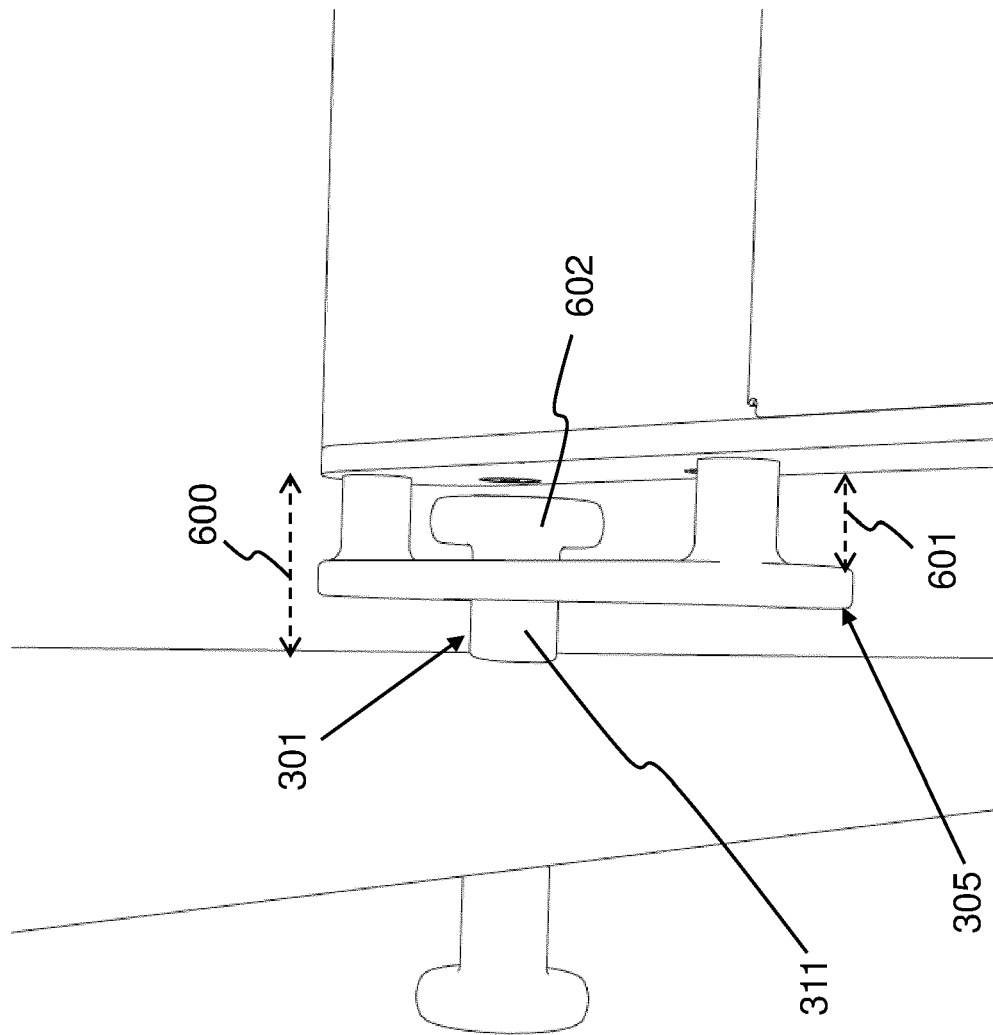


Fig. 6

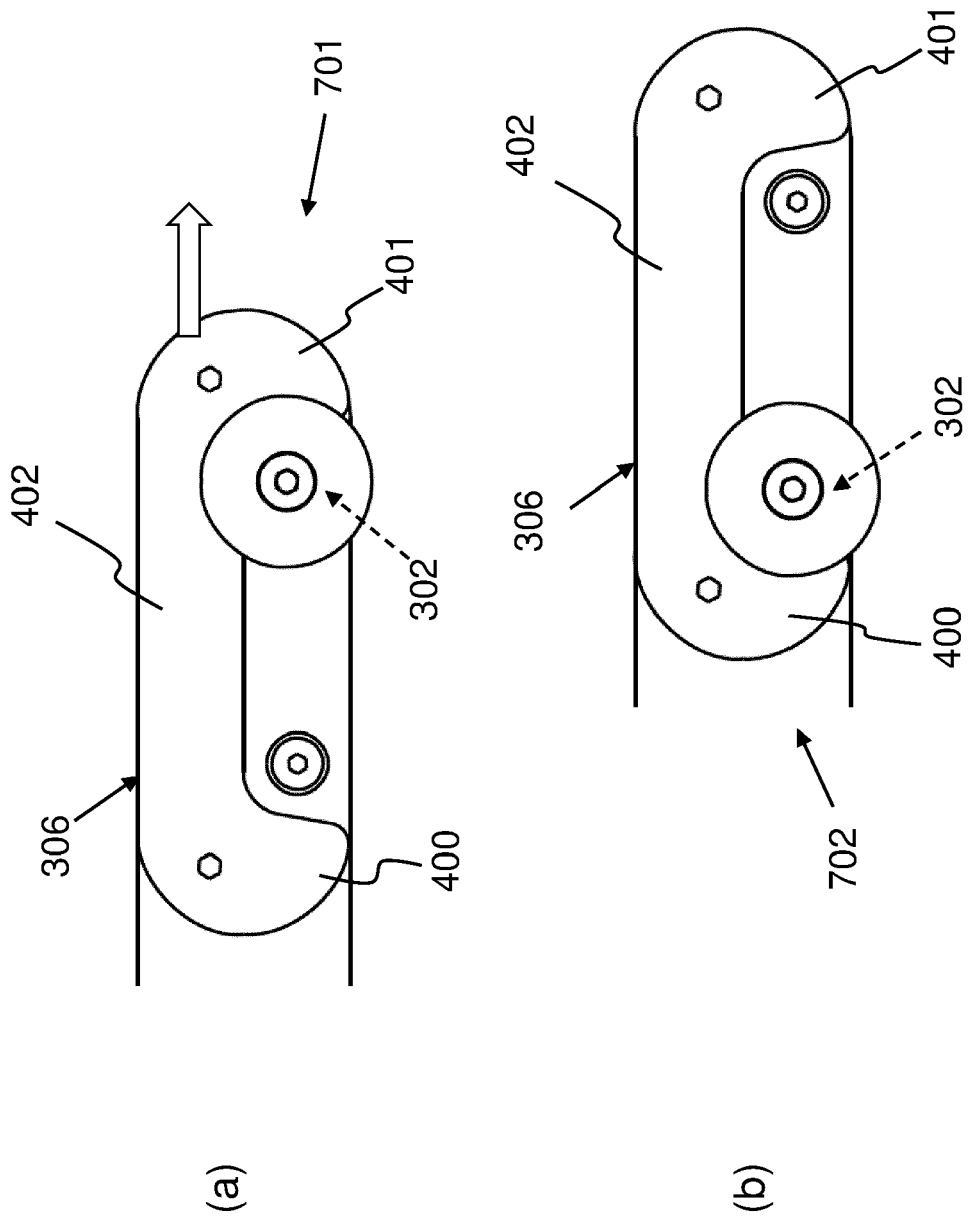


Fig. 7

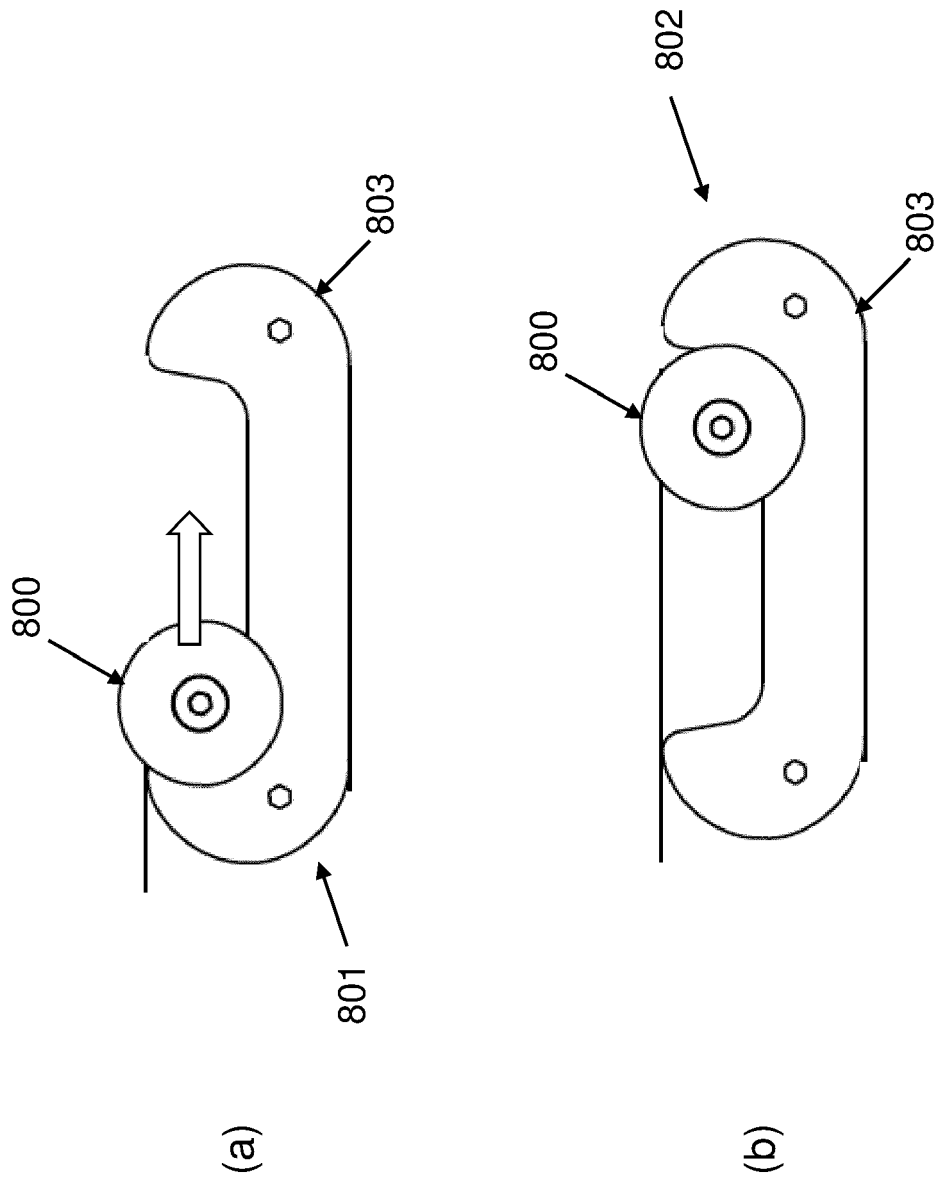


Fig. 8

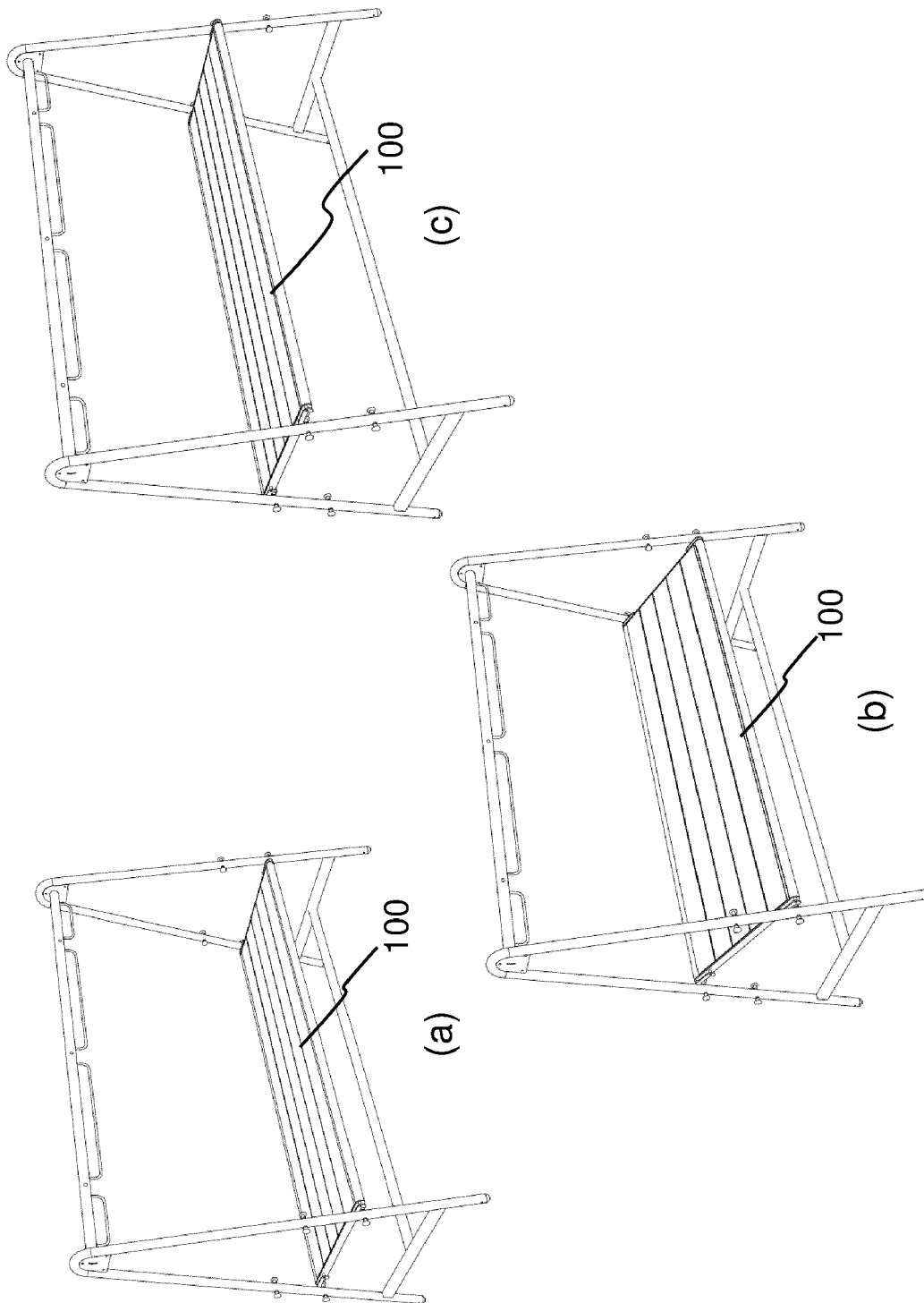


Fig. 9

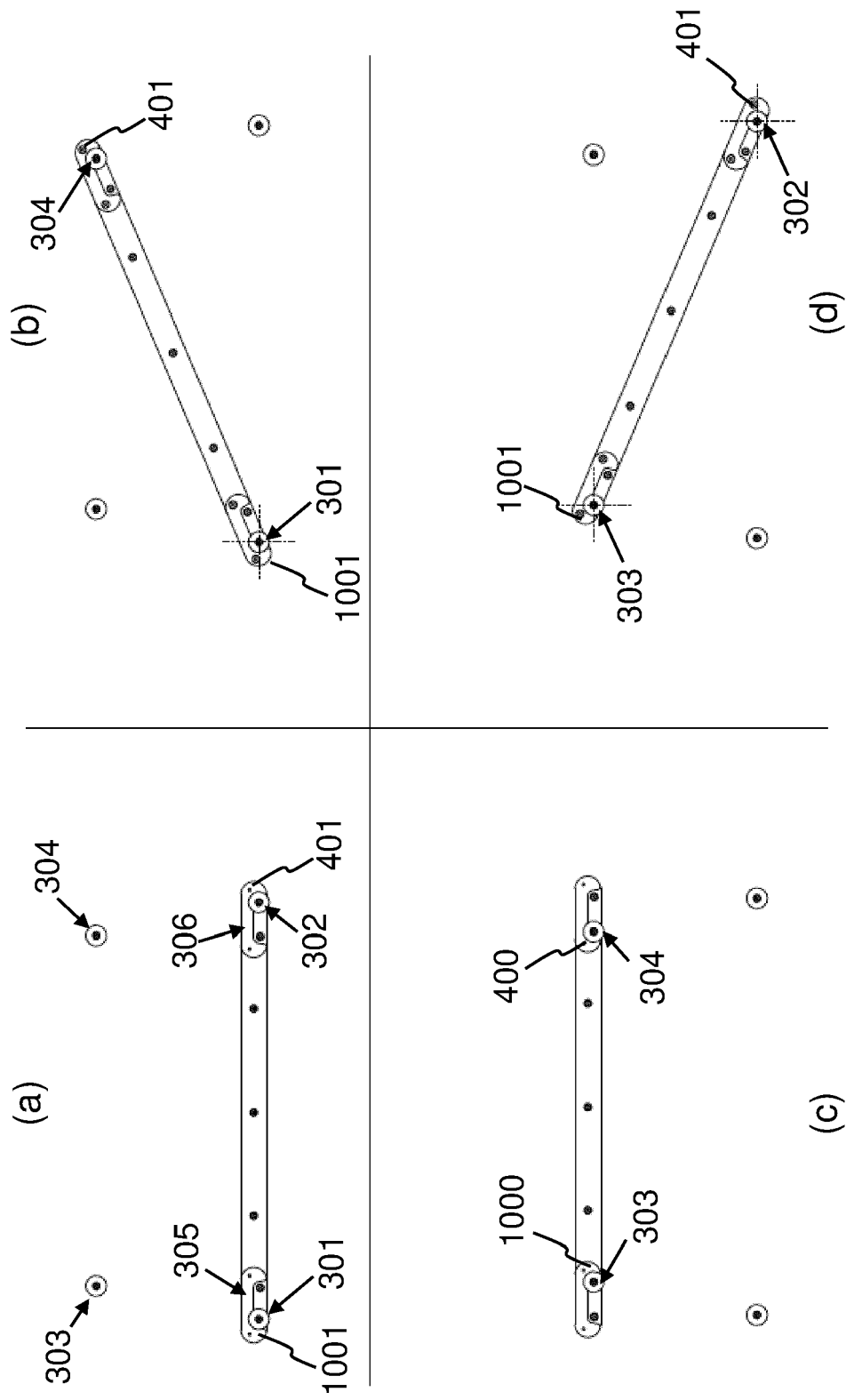


Fig. 10

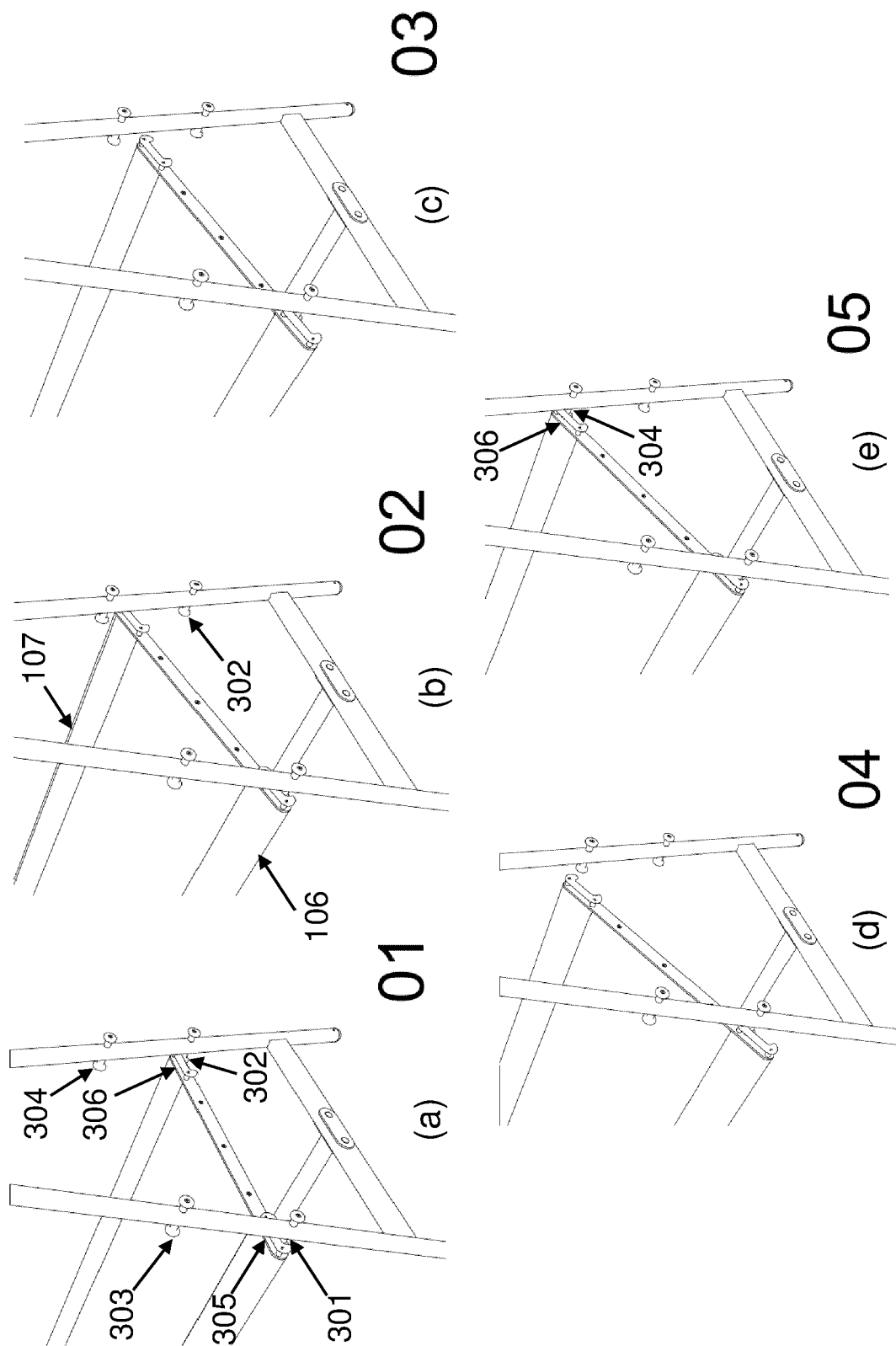


Fig. 11

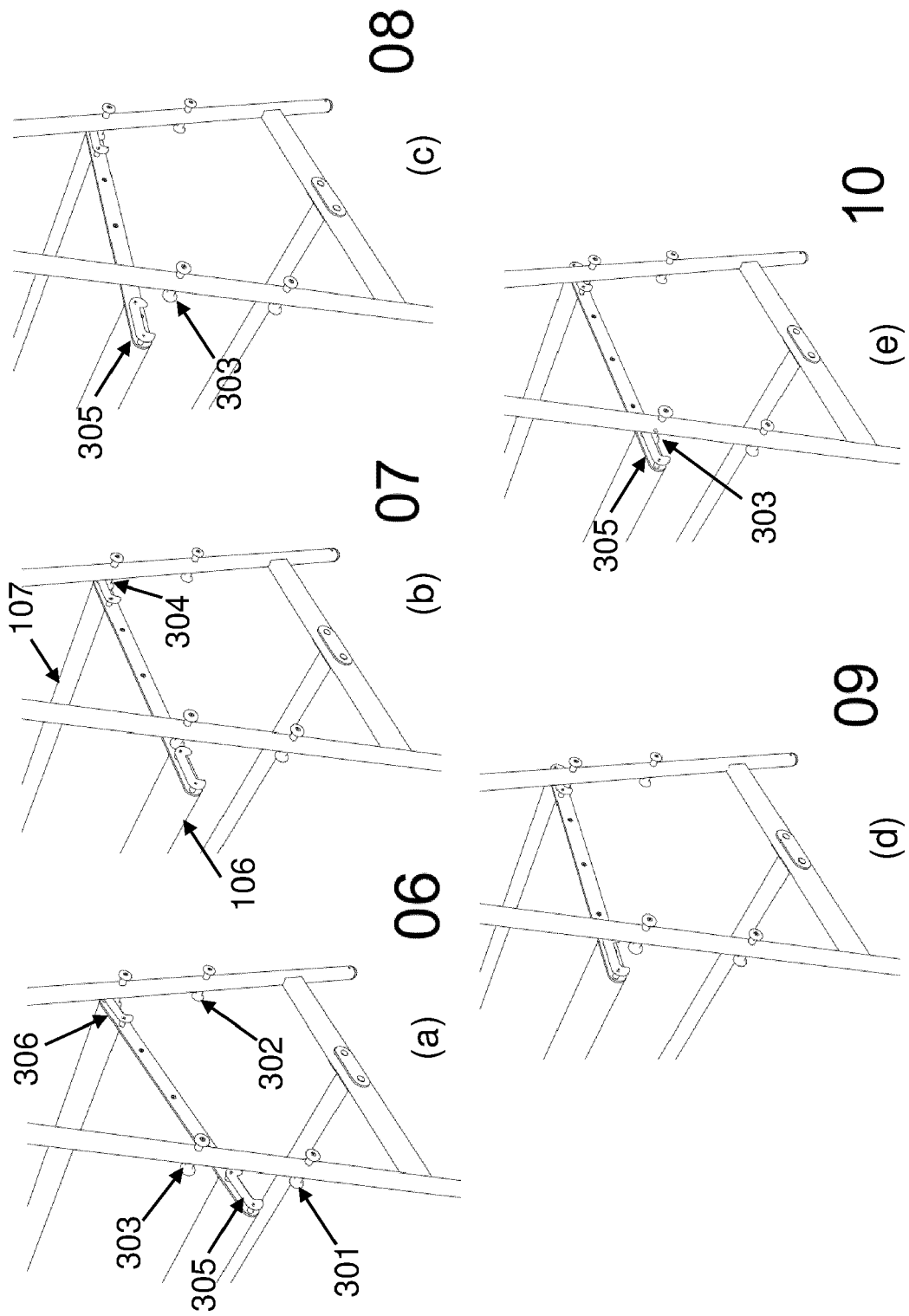


Fig. 12

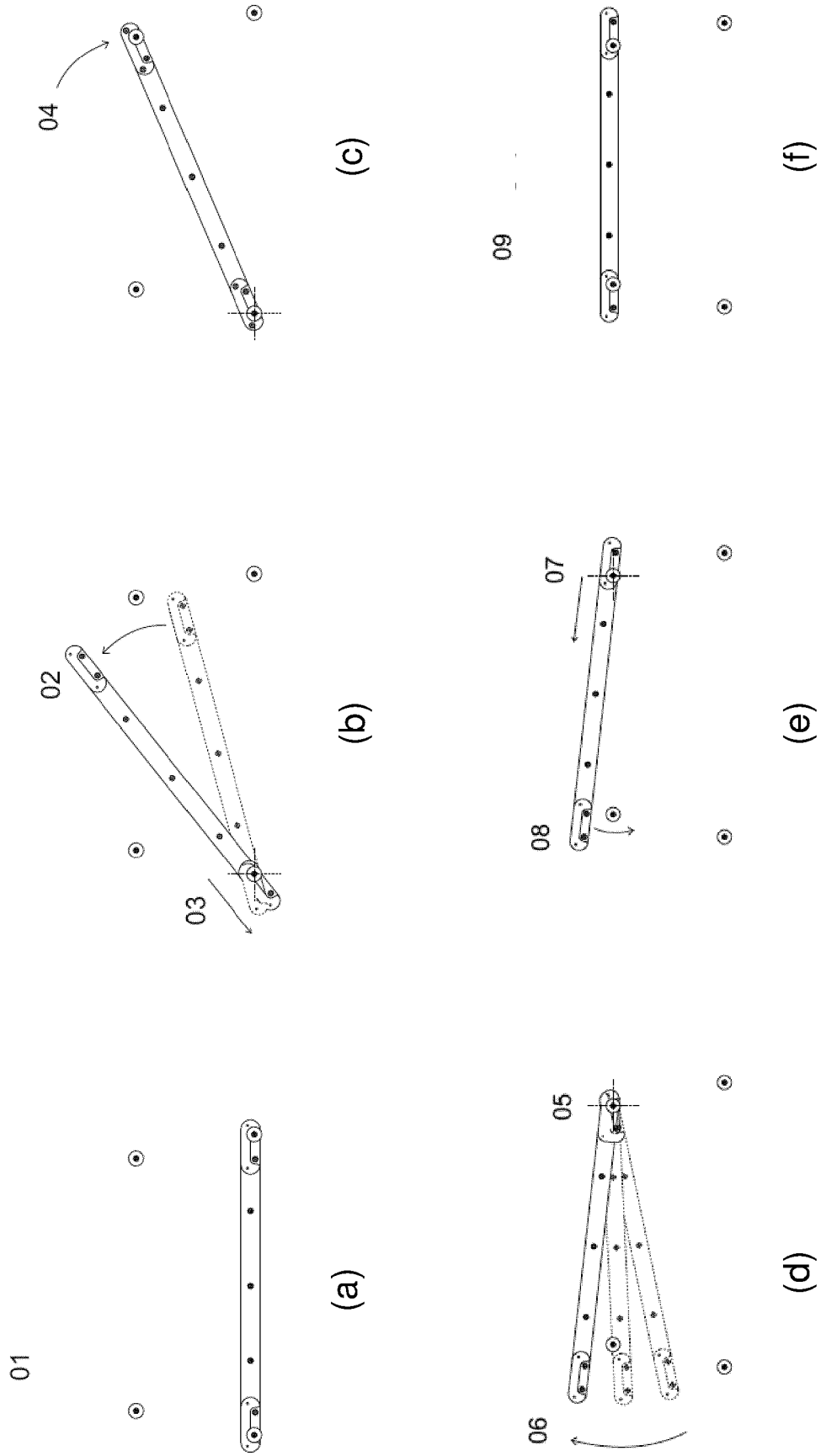


Fig. 13

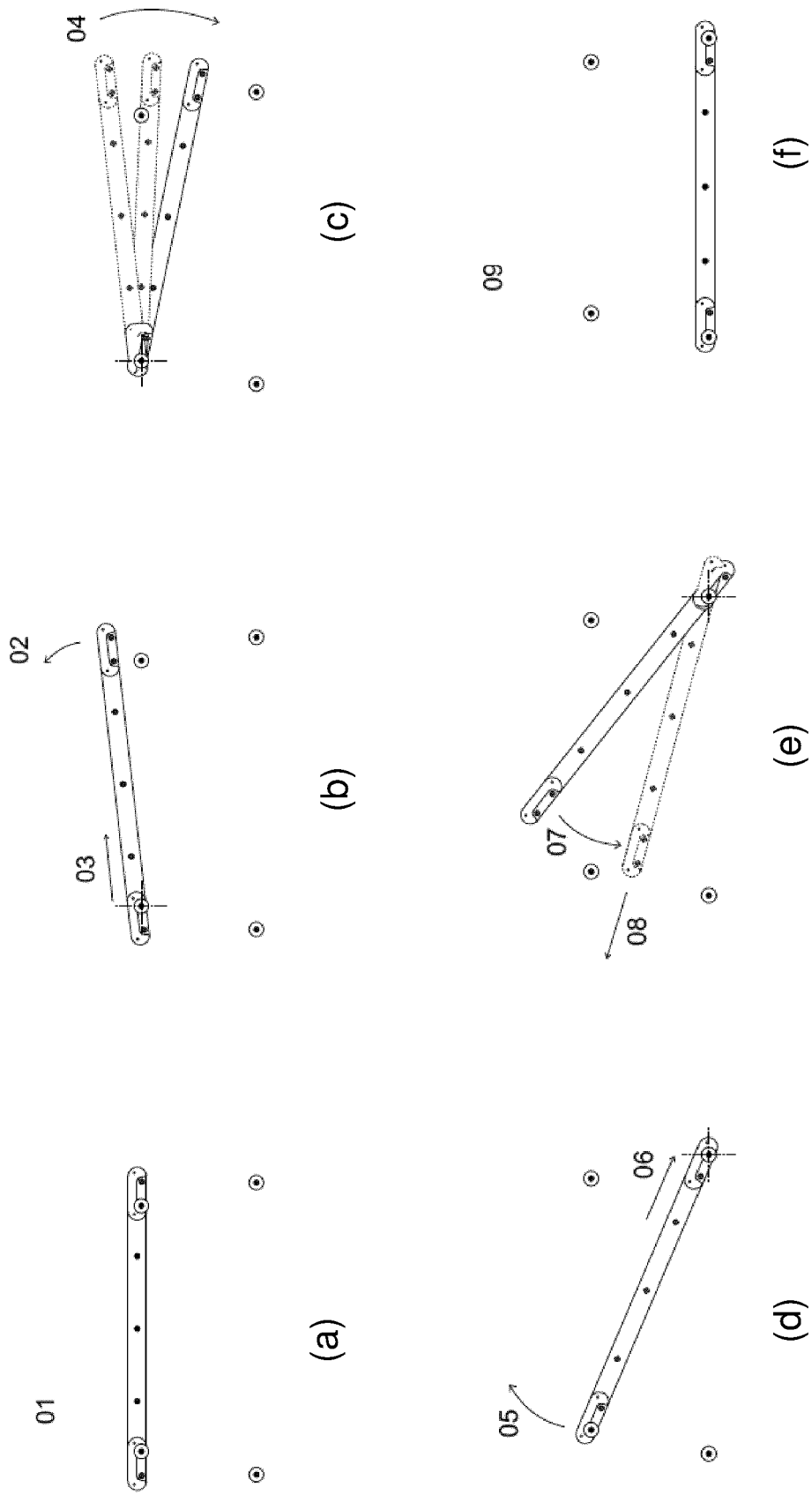


Fig. 14

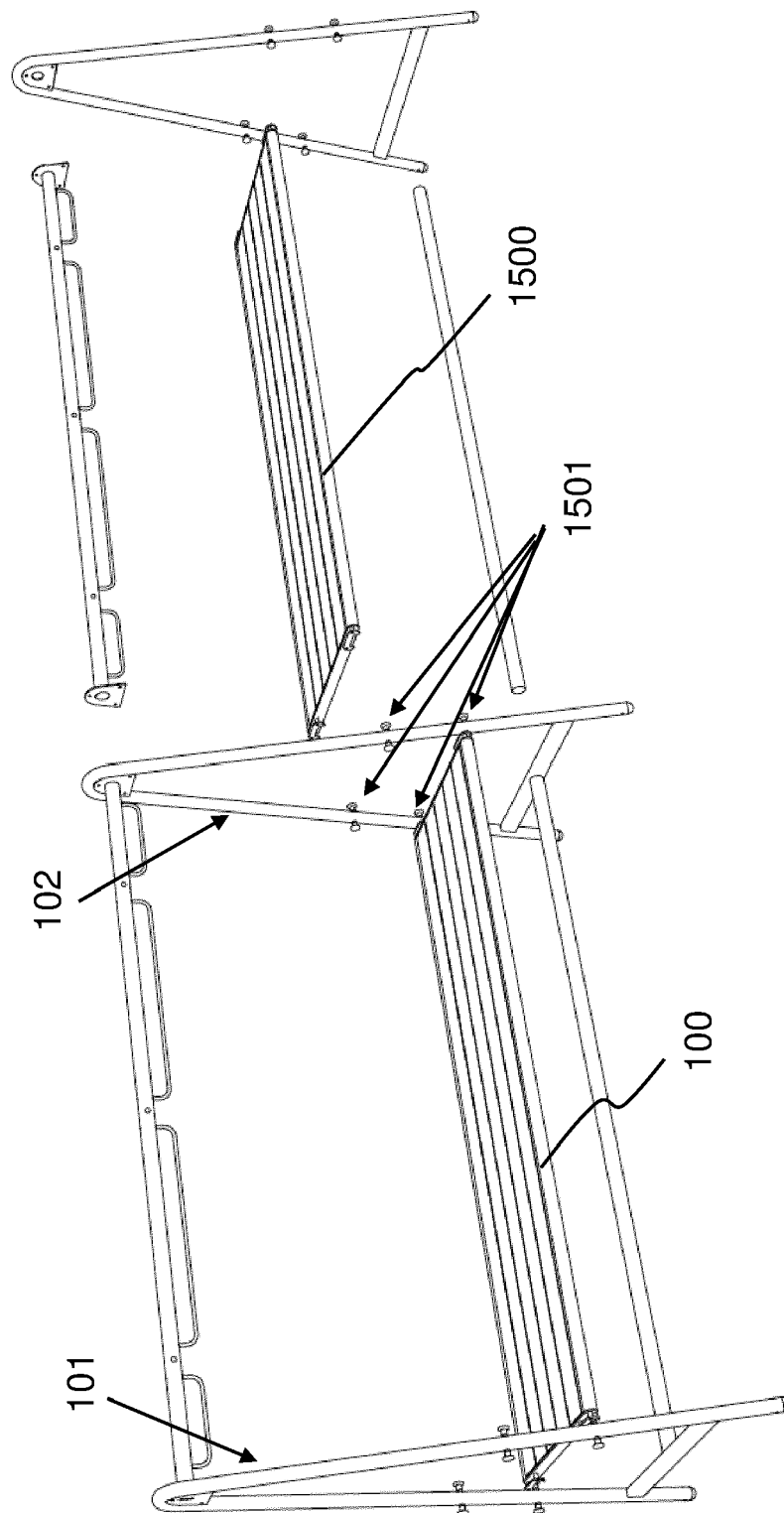


Fig. 15

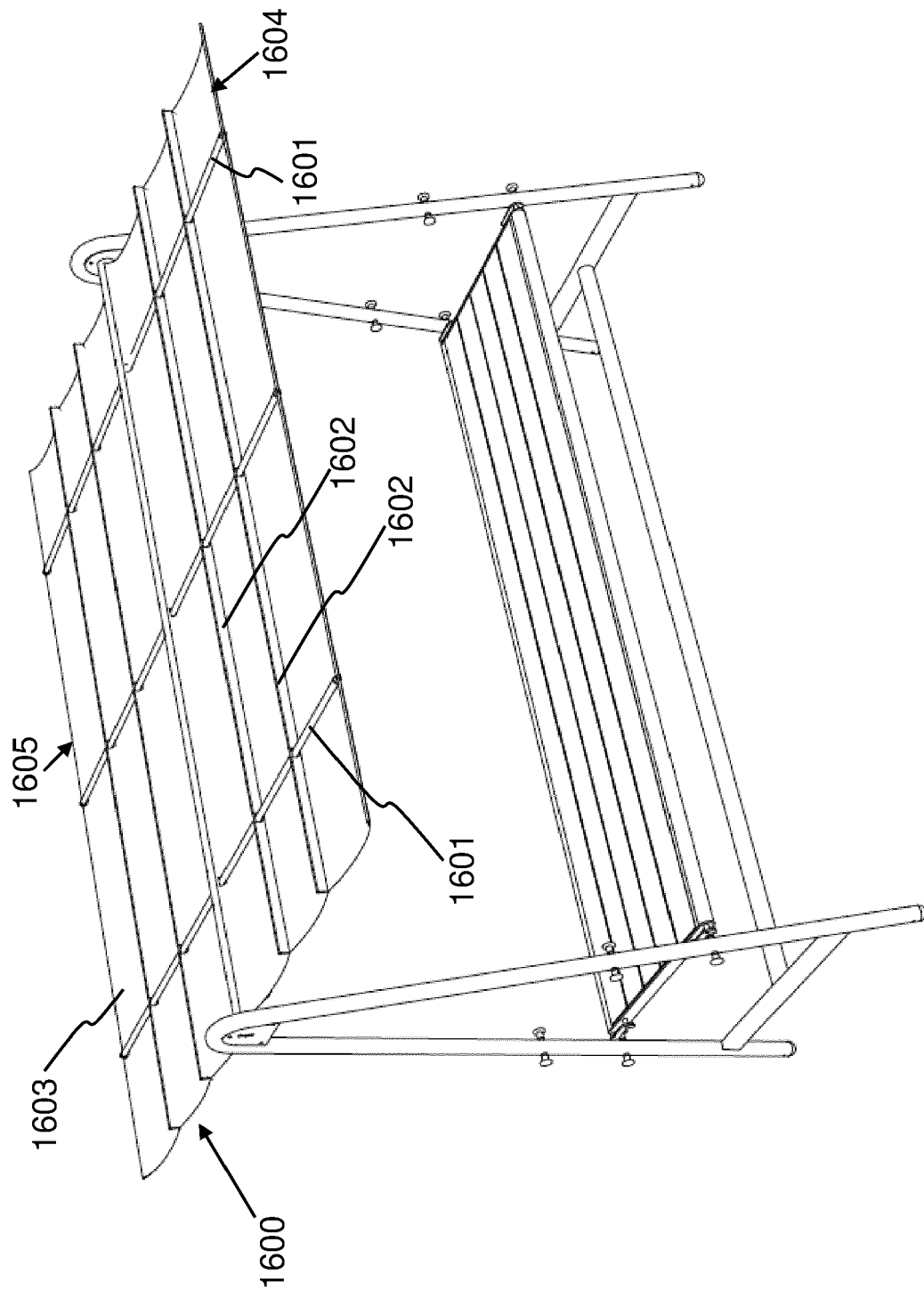


Fig. 16

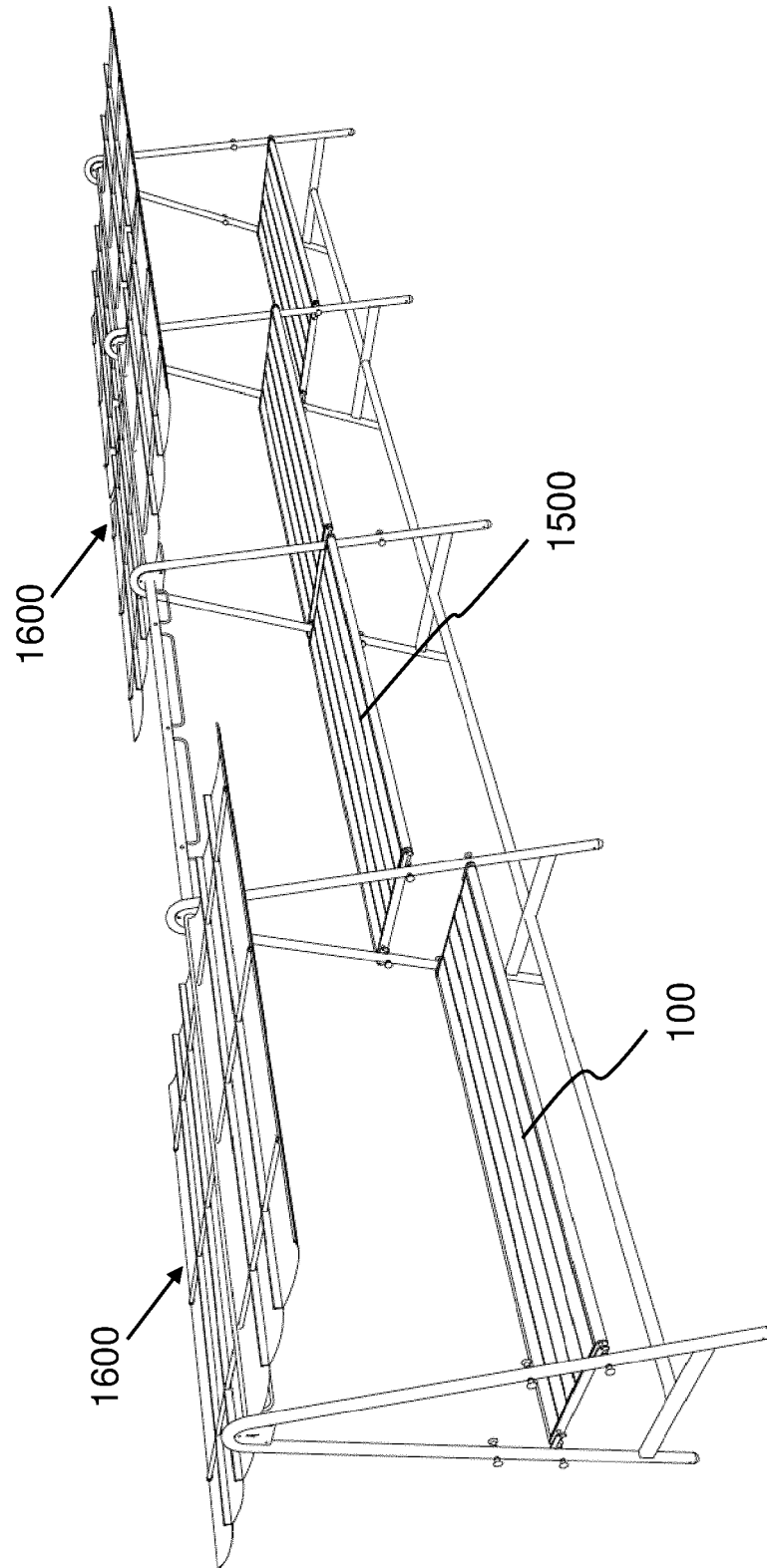


Fig. 17

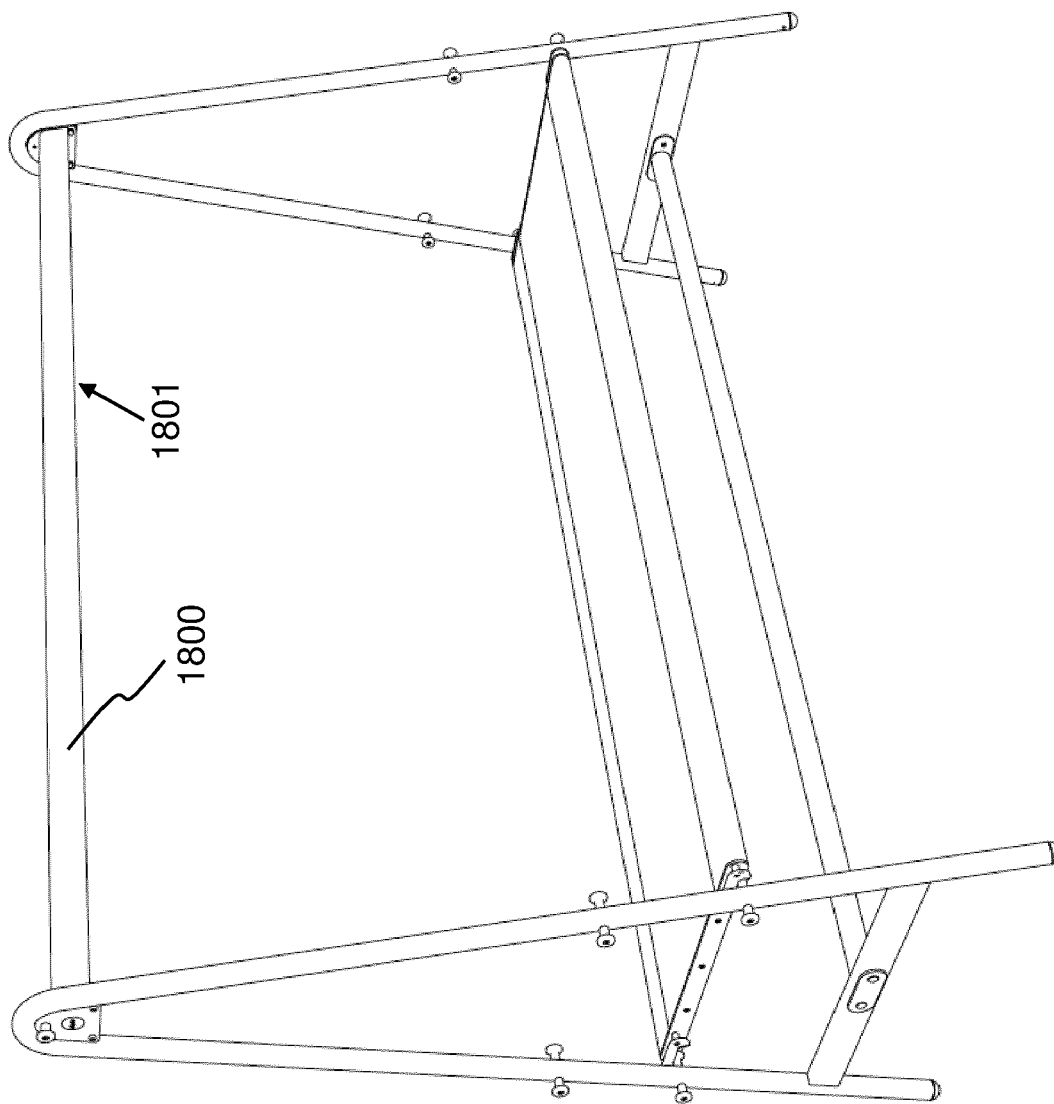


Fig. 18



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Application Number
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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 17 August 2021	Examiner de Cornulier, P
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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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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