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(54) **BED SYSTEM AND USE OF THE BED SYSTEM**

(57) The invention provides a bed system (1), as well as the use of the bed system (1), wherein the bed system (1) comprises a mattress supporting structure (2) having a chassis (4) with a transverse beam (6) that can be rotated between two terminal rotational positions.

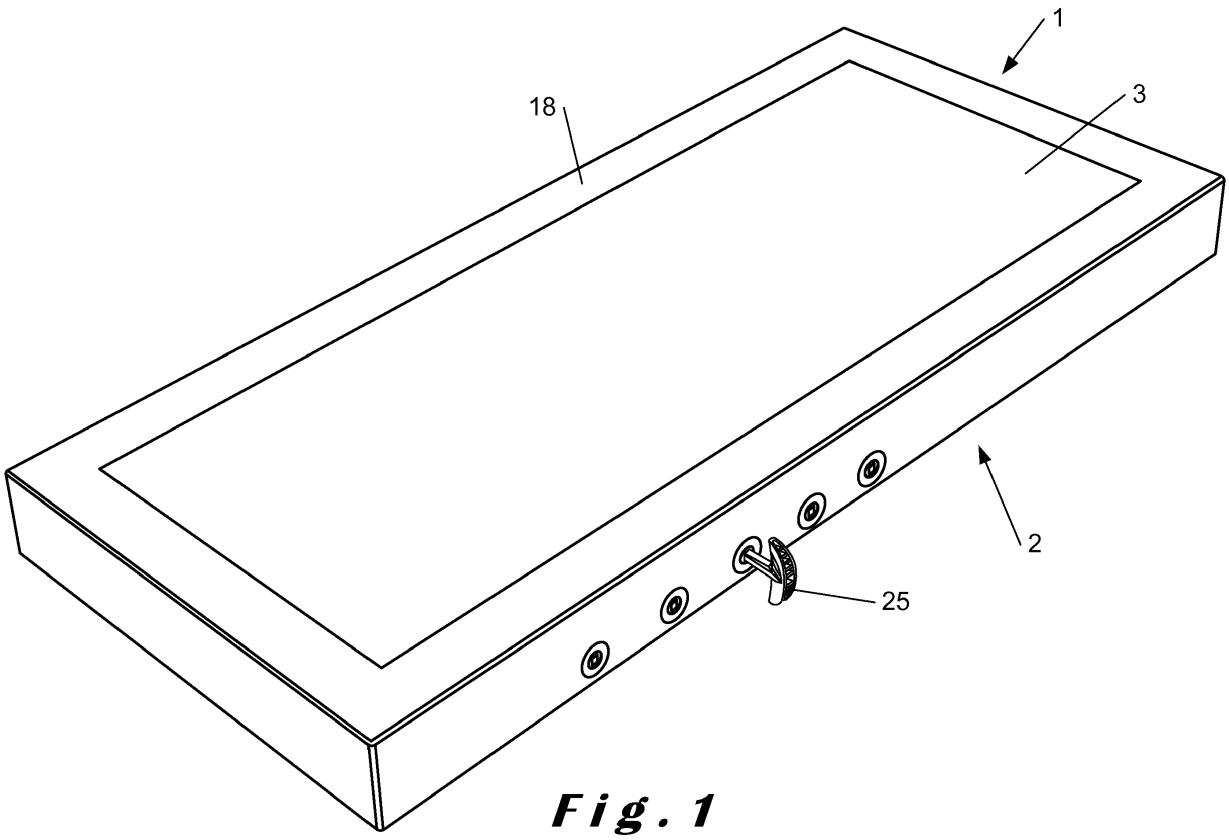

Fig. 1

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Description

Technical field

[0001] The present invention relates to a bed system according to the preamble of the first claim, as well as the use of such a bed system.

State of the art

[0002] WO2010037415 also describes a bed system. This bed system comprises a mattress supporting structure. The mattress supporting structure in turn comprises an upper surface for receiving a mattress, a chassis and an intermediate layer between the upper surface and the chassis. The intermediate layer is arranged for resiliently supporting the mattress on the upper surface, and for that purpose is provided with at least one spring means, in this case a plurality of springs mounted with their spring direction pointing up. The chassis is arranged to support the entirety of the intermediate layer and the mattress on the upper surface on a floor. Such a mattress supporting structure is sometimes referred to as a box spring.

[0003] In the mattress supporting structure according to WO2010037415, the circumference of the chassis is delimited by first and second longitudinal sides and first and second transverse sides, wherein the first longitudinal side is mounted opposite the second longitudinal side and the longitudinal sides are connected to each other by the transverse sides, wherein the first transverse side is mounted opposite the second transverse side. The chassis further comprises at least one transverse beam. The transverse beam is mounted between the first and second longitudinal sides, with a first transverse end of the transverse beam at the first longitudinal side and a second transverse end of the transverse beam at the second longitudinal side. The transverse beam is mounted rotatably about a rotational axis according to the lengthwise direction of the transverse beam. Thus, the transverse beam can be rotated between different rotational positions, of which at least a first and a second differ from each other.

[0004] The spring means according to WO2010037415, the plurality of springs, are arranged on the chassis in such a way that they are supported at their bottom side by the transverse beam, and they extend according to their spring direction to the upper surface. The transverse beam, in particular the circumference of the transverse beam in the circumferential direction of the transverse beam, is delimited by at least one longitudinal face and a second longitudinal face which are mutually different. Here, the first longitudinal face constitutes a first supporting face for at least one spring and the second longitudinal face constitutes a second supporting face for the same spring. In this way, the first supporting face supports the spring means in the first rotational position of the transverse beam, and the second supporting face supports the spring means in the second rotational position of the transverse beam. Due to the rotational axis of the transverse beam being arranged eccentrically in the transverse beam, the first and second supporting faces are at different distances from the rotational axis, allowing the height of the bottom of the spring to be adjusted relative to the chassis. This adjustment of the bottom of the spring allows the supporting characteristics of the upper surface to be adjusted for the mattress, and thus allows the support for a person lying on the mattress to be adjusted. This adjustment allows the support for a person on a mattress to be individualized, offering the person a better support during sleep. Thus, for instance, back problems, sleeping problems etc. can be taken care of.

[0005] However, the rotation of the transverse beam according to WO2010037415 is not limited. The transverse beam can therefore be rotated several times clockwise or counter-clockwise. As such, the entire circumference in the circumferential direction of the transverse beam has to be provided to support the spring, and the transverse beam also has to be suspended in a freely rotatable way in the chassis. It was found that as a result of this, specific requirements were made of the suspension of the transverse beam in the rest of the chassis, and for instance to the shape of the transverse beam. The transverse beam and the suspension for instance have to be able to resist bending forces when the transverse beam, suspended in a freely rotatable way, has a load placed on it by a person on a mattress on the upper surface. Specific demands are also made of the circumference of the transverse beam in the circumferential direction, at least in the places where a spring means is supported.

Description of the invention

[0006] It is therefore an object of the present invention to provide a bed system wherein the transverse beam and and/or its suspension can be simplified.

[0007] This object is achieved by means of a bed system with a mattress supporting structure. The mattress supporting structure comprises

a. an upper surface for receiving a mattress,
b. a chassis,
c. an intermediate layer between the upper surface and the chassis.

[0008] The intermediate layer is arranged for at least partly resiliently supporting the mattress on the upper surface. The chassis is arranged to support the entirety of the intermediate layer and the mattress on the upper surface, resiliently supported by the intermediate layer, on a floor. The chassis comprises at least one transverse beam. The transverse beam is mounted between two opposing sides of the circumference of the chassis. The transverse beam is rotatable about a rotational axis according to the lengthwise direction of the transverse

beam mounted between the two opposing sides of the circumference of the chassis. The transverse beam is furthermore rotatable between a first rotational position and a second rotational position different from the first rotational position. The rotational positions are characterized, for instance, by a position of the transverse beam around the rotational axis that can be expressed in degrees or radials relative to a reference point. The reference point may be freely chosen.

[0009] The intermediate layer comprises at least one spring means which extends, supported at its bottom by the transverse beam, along the spring direction between the transverse beam and the upper surface. The spring means is for instance a spring, in particular a pocket spring, where the spring is housed in a pocket.

[0010] The transverse beam, preferably the circumference of the transverse beam, more preferably the circumference of the transverse beam in the circumferential direction of the transverse beam, is delimited by at least a first face and a second face different from the first face. Preferably, the first and second faces are longitudinal faces.

[0011] The first face constitutes a first supporting face and the second face constitutes a second supporting face, wherein the first supporting face supports the spring means in the first rotational position of the transverse beam and the second supporting face supports the spring means in the second rotational position of the transverse beam. The first and second supporting faces are at different distances from the rotational axis, so that the height of the bottom of the spring means relative to the chassis can be adjusted.

[0012] According to an embodiment of the present invention, the first and second rotational positions are terminal rotational positions.

[0013] Because the first and second rotational positions are terminal rotational positions, and moreover the first and second rotational positions are also different, a rotational range of positions that cannot be taken up by the transverse beam is created between the two rotational positions. As a result, at least a part of the beam does not need to be adapted to support the at least one spring means, allowing, for instance, means that strengthen the transverse beam to be provided in that location, so that the transverse beam can resist the bending forces caused by stress.

[0014] According to preferred embodiments of the present invention, the transverse beam comprises retaining means to prevent the rotation of the transverse beam beyond the first and second positions. These retaining means help to ensure that the transverse beam cannot be rotated beyond the terminal rotational positions.

[0015] According to preferred embodiments of the present invention, the retaining means comprise first and second blocking parts. The first blocking part prevents rotation of the transverse beam beyond the first rotational position by abutting against a third blocking part of the chassis. The second blocking part prevents rotation of the transverse beam beyond the second rotational position by abutting against a fourth blocking part of the chassis.

[0016] According to preferred embodiments of the present invention, the transverse beam is further delimited, more preferably in the circumferential direction, by a third, preferably longitudinal, and a fourth, preferably longitudinal, face. The first blocking part preferably comprises the third face and the second blocking part preferably comprises the fourth face. Such third and fourth longitudinal faces allow the first and second blocking parts to be integrated into the shape of the transverse beam, further simplifying the assembly of the transverse beam in the chassis.

[0017] According to preferred embodiments of the present invention, the first and/or second blocking parts comprise at least one protrusion that extends relative to the respective third and/or fourth faces. Such blocking parts can further prevent the transverse beam from rotating beyond the terminal rotational positions.

[0018] According to preferred embodiments of the present invention, the rotational positions of the transverse beam are discrete rotational positions. Although the rotational positions can also be set in a continuous rather than a discrete manner, it was found that opting for discrete positions can further simplify the shape of the transverse beam and even of the suspension. The specific rotational position of the transverse beam can be maintained more easily in discrete positions than when a continuous positioning of the rotational beam is allowed.

[0019] According to preferred embodiments of the present invention, the transverse beam can only be rotated to two discrete rotational positions, namely the first and second rotational positions. It was found that by providing only two possible discrete rotational positions of the rotational beam, the construction of the rotational beam and also of the suspension is further simplified.

[0020] According to preferred embodiments of the present invention, the first supporting face is located opposite the first blocking part and the second supporting face is located opposite the second blocking part. The first and second supporting faces are adjacent. It was found that such a shape of the transverse beam is easy to manufacture.

[0021] According to preferred embodiments of the present invention, the transverse beam comprises a curved surface, wherein, more preferably, the first and second blocking parts, if present, are for instance connected by the curved surface, wherein the curved surface is provided at a substantially uniform distance from the rotational axis.

[0022] According to preferred embodiments of the present invention, the chassis comprises a supporting face. The supporting face may for instance be formed by a series of slats, a grid, a plate, preferably a substantially solid plate or a solid plate, or a combination of more than one of these. The supporting face can for instance be

made of wood, although other materials, such as for instance plastic, metal, etc. are also possible.

[0023] According to preferred embodiments of the present invention, the curved surface is provided to slide over the supporting face when rotating the transverse beam. Providing such a configuration allows support of the transverse beam to be provided by the supporting face, as a result of which the transverse beam will be less subject to bending stresses, as the transverse beam will be subjected more to compression stresses. More preferably, the transverse beam is provided with the curved surface over substantially its entire length, and the transverse beam is thus supported by the supporting face over substantially its entire length, allowing the bending load of the transverse beam to be further reduced. It should be noted that because the transverse beam is less subjected to bending stresses, the suspension of the transverse beam can also further be simplified. This, for instance, a simple snap connection can be provided, both in the longitudinal direction and to for instance maintain the transverse beam in discrete rotational positions, as this connection is subjected to fewer forces.

[0024] If the first and second rotational positions are terminal rotational positions, and moreover the first and second rotational positions are also different, a rotational range of positions that cannot be taken up by the transverse beam is created between the two rotational positions. This range can for instance be taken up by the curved surface.

[0025] According to embodiments of the present invention, the chassis comprises respective first and second bearings for rotatably receiving a first end of the transverse beam and a second end of the transverse beam, respectively. Such bearings are easily provided and further simplify the construction. The first and/or second bearings are for instance gliding bearings or a roller bearing, for instance a ball bearing.

[0026] According to embodiments of the present invention, the bearings and the transverse beam are mounted onto the supporting face. The supporting face thereby forms the third and fourth blocking parts. Such a configuration further simplifies the construction of the chassis.

[0027] According to embodiments of the present invention, the first and second ends of the transverse beam are received in the first and second bearings, respectively, by means of a snap connection. Such snap connections are simple and yet offer sufficient operational reliability.

[0028] According to preferred embodiments of the present invention, the discrete rotational positions are determined by a snap connection. Such a snap connection is simple and yet offers sufficient operational reliability, particularly now that the transverse beam is no longer suspended in a freely rotatable way. Moreover, such snap connections often provide audible and/or tactile feedback to the user to indicate that the transverse beam has taken up one of the discrete rotational positions.

[0029] According to preferred embodiments of the present invention, the bed system comprises means for providing a visual indication of the rotational position of the transverse beam. The visual indication shows the user in a simple manner that a particular rotational position has been reached.

[0030] According to preferred embodiments of the present invention, the circumference of the chassis is delimited by first and second longitudinal sides and first and second transverse sides. The first longitudinal side is mounted opposite the second longitudinal side and the longitudinal sides are connected to each other by the transverse sides, wherein the first transverse side is mounted opposite the second transverse side. It was found that the transverse beam according to the invention can easily be provided in such a configuration.

[0031] According to preferred embodiments of the present invention, the transverse beam is mounted between the first and second longitudinal sides with a first transverse end of the transverse beam at the first longitudinal side and a second transverse end of the transverse beam at the second longitudinal side. It was found that the transverse beam according to the invention can easily be provided in such a configuration.

[0032] The rotational positions taken up by the transverse beam are preferably predetermined rotational positions of the transverse beam corresponding to a particular setting of the spring means on the transverse beam in relation to the position of a person lying on the mattress on the upper surface.

[0033] Preferably, the rotational position of the transverse beam is set by means of a tool, preferably provided with a handle, that is provided on the transverse beam. The tool is preferably removably mountable onto the transverse beam, for instance by means of a snap connection.

[0034] The invention further relates to a bed with a mattress and the bed system according to the invention, wherein the mattress is received on the upper surface.

[0035] The invention also relates to the use of the bed system according to the invention, wherein the transverse beam is rotated into a rotational position, preferably corresponding to predetermined characteristics of a person.

Brief description of the drawings

[0036] The invention will be elucidated in further detail below by means of the following description and in reference to the appended figures.

Figure 1 shows an overview of an embodiment of the bed system according to the present invention.

Figure 2 shows the bed system of figure 1 in a cutaway view.

Figure 3 shows a first view in exploded perspective of an embodiment of the transverse beam according to the present invention.

Figure 4 shows the transverse beam of figure 3 in a second view in exploded perspective.
Figure 5 shows the transverse beam of figure 3 in the first view in the first rotational position.
Figure 6 shows the transverse beam in a mirrored embodiment in the second view of figure 4 in the second rotational position.
Figure 7A-7C shows different views of a bearing of an embodiment of the present invention.
Figure 8A-8N shows different views of an end of the transverse beam according to an embodiment of the present invention.
Figure 9 shows a cross section of the end received in the bearing.
Figure 10 shows a detail of the end received in the bearing with a tool.

Embodiments of the invention

[0037] The present invention will be described below with respect to particular embodiments and with reference to certain drawings, but the invention is not limited thereto, and is only limited by the claims. The drawings shown here are merely schematic depictions and are nonlimiting. In the drawings, the size of some of the elements may be exaggerated, meaning that they are not drawn to scale, and only for illustrative purposes. The dimensions and the relative dimensions do not necessarily correspond to actual reductions to practice of the invention.

[0038] Although certain aspects of the present invention are described in reference to specific embodiments, it should be clear that these aspects may be implemented in other forms.

[0039] Figure 1 shows an overview of an embodiment of the bed system according to the present invention. Figure 2 shows the bed system of figure 1 in a cut-away view. The bed system 1 comprises a mattress supporting structure 2. The mattress supporting structure 2 comprises

a. an upper surface 3 for receiving a mattress,
b. a chassis 4 and
c. an intermediate layer 5 between the upper surface 3 and the chassis 4.

[0040] Although the mattress is not shown in the figures, any mattress known to the person skilled in the art can be used. Preferably, the mattress is adapted to the support offered by the mattress supporting structure 2. Such a mattress supporting structure 2 is often referred to as a box spring.

[0041] Figure 1 and 2 show that the chassis 4 and the intermediate layer 5 are wrapped in a web, for instance a piece of woven fabric 18 or a non-woven material, to finish the assembly. The piece of fabric 18 thus forms the upper surface on which the mattress can be received.

[0042] The intermediate layer 5 is arranged for at least partly, preferably entirely, resiliently supporting the mattress on the upper surface 3.

[0043] The chassis 4 is arranged to support the entirety of the intermediate layer 5 and the mattress on the upper surface 3, resiliently supported by the intermediate layer 5, on a floor, by means of legs or otherwise. In order to at least partly resiliently support the mattress, the intermediate layer 5 is provided with at least one spring means 10. This spring means 10 is for instance a spring 19, for instance a spring 19 in a pocket, for instance a pocket spring. Furthermore, the spring means 10 can for instance comprise other means as well, such as for instance layers of foam 20. Figure 2 shows for instance the combination of a number of springs, in particular pocket springs, placed onto a few layers of foam or otherwise.

[0044] The circumference 7, shown in figure 2, of the chassis 4 is rectangular and is delimited by first and second longitudinal sides 71, 72 and first and second transverse sides 73, 74. The first longitudinal side 71 is mounted opposite the second longitudinal side 72 and the longitudinal sides 71, 72 are connected to each other by the transverse sides 73, 74. The first transverse side 73 is mounted opposite the second transverse side 74. However, such a configuration is not necessary for the present invention, and circumferences 7 having a different shape are also possible. Thus, for instance, the circumference may also adopt any other geometrical shape, such as for instance round, heart-shaped, etc.

[0045] Figure 2 further shows that the chassis 4 comprises at least one transverse beam 6. The transverse beam 6 is mounted between two opposing sides of the circumference 7 of the chassis 4. The transverse beam 6 is rotatable about a rotational axis 8 according to the lengthwise direction 9 of the transverse beam 6 mounted between the two opposing sides of the circumference 7 of the chassis 4. Figure 2 more specifically shows that the transverse beam 6 is mounted between the first and second longitudinal sides 71, 72 with a first transverse end 61 of the transverse beam 6 at the first longitudinal side 71 and a second transverse end 62 of the transverse beam 6 at the second longitudinal side 72. The first and second transverse ends are shown in figure 3.

[0046] Figure 2 further shows that preferably, a plurality of transverse beams 6 are provided, extending in an analogous manner between opposing sides of the circumference 7. Here, the transverse beams 6 are preferably mounted parallel to each other, so that a homogenous support of the mattress, and especially of the person who will eventually lie on the mattress, may be achieved.

[0047] Although transverse beams 6 may be provided so that substantially the entire mattress is supported by transverse beams 6, for instance by providing transverse beams 6 along substantially the entire length of the first and second longitudinal sides 71, 72, this is not necessary for the present invention. It is also possible for transverse beams 6 to be provided only in one or more regions along the longitudinal sides 71, 72. Thus, for instance,

figure 2 shows that transverse beams 6 are only provided in a specific region. In particular, five transverse beams 6 are provided, intended to offer support mainly to the back and the hips of a person lying on the mattress supported by the mattress supporting structure 2.

[0048] Although the transverse beams 6 according to figure 2 are all identical, this is not necessary for the present invention, and the transverse beams 6 may also be different. However, by providing identical transverse beams 6, the construction of the chassis 4 is simplified, and moreover a more homogenous support of a person lying on the mattress supported by the mattress supporting structure 2 is provided.

[0049] Figure 2 specifically shows that the chassis 4 comprises a supporting face 16. The supporting face 16 shown in figure 2 is constituted by a solid plate. In the embodiment shown in figure 2, the at least one transverse beam 6 is mounted onto the supporting face 16.

[0050] Figure 2 further shows that in addition to the transverse beams 6, a number of foam layers 20 are also provided. The transverse beams 6 together with the layers of foam 20 form a plane on which a plurality of springs 19, in particular pocket springs, are mounted. However, the plane on which the plurality of springs 19 are mounted does not need to be entirely resilient, and may for instance also be constructed from hard materials such as for instance wood, metal, etc.

[0051] At least one spring means 10 is supported by the transverse beam 6 at its bottom side 12. The spring means 10 extends along the spring direction 11 between the transverse beam 6 and the upper surface 3. Figure 2 further shows that a plurality of spring means 10, in this specific case pocket springs, are supported by each transverse beam 6.

[0052] The at least one transverse beam 6 is rotatable about the rotational axis 8 according to the lengthwise direction 9 of the transverse beam 6 mounted. Here, the transverse beam 6 is rotated between a first rotational position and a second rotational position different from the first rotational position.

[0053] Figure 2 shows that the rotational position of the transverse beam 6 can be set by means of a tool 25 that is provided on the transverse beam 6. The tool 25 is preferably removably mountable onto the transverse beam 6, for instance by means of a snap connection. Thus, figure 2 for instance shows that a single tool 25 is sufficient for rotating the different transverse beams 6 by providing the tool 25 on the respective transverse beams 6. The tool 25 is shown in more detail in figure 10. The tool 25 may be made from any material deemed suitable by the person skilled in the art, such as for instance wood, metal, plastic, etc.

[0054] Figures 3 through 6 show the transverse beam 6 in more detail.

[0055] Thus, these figures show that the transverse beam 6 is delimited by at least a first, preferably longitudinal, face 21 and a second, preferably longitudinal, face 22 different from the first face 21, wherein the first face 21 constitutes a first supporting face 31 and the second face 22 constitutes a second supporting face 32. The first supporting face 31 supports the spring means 10 in the first rotational position of the transverse beam 6 and the second supporting face supports the spring means 10 in the second rotational position of the transverse beam 6. The first and second supporting faces 31, 32 are at different distances from the rotational axis 8, so that the height of the bottom of the spring means 10 relative to the chassis 4 can be adjusted. Adjusting the height of the bottom 12 for instance allows the compression of the spring means to be adjusted, or the spring to be moved in the spring direction, so that an adjusted support of the mattress, and thus of the person who will position themselves onto the mattress, can be achieved.

[0056] Figures 2 through 6 show that the transverse beam 6 comprises retaining means 13 to prevent the rotation of the transverse beam 6 beyond the first and second positions.

[0057] In particular, these figures show that the retaining means 13 comprise first and second blocking parts 41, 42. Here, the first blocking part 41 prevents rotation of the transverse beam 6 beyond the first rotational position by abutting against a third blocking part 43 of the chassis 4, and the second blocking part 42 prevents rotation of the transverse beam 6 beyond the second rotational position by abutting against a fourth 44 blocking part of the chassis 4.

[0058] In figures 5 and 6, the transverse beam 6 is shown in the first and second rotational positions, and it is clearly shown how the supporting face 16 forms the third and fourth blocking parts 43, 44 and abuts against respectively the first and second blocking parts 41, 42.

[0059] Figures 2 through 6 further show that the transverse beam 6 is further delimited by third and fourth faces 23, 24. The first blocking part 41 comprises the third face 23 and the second blocking part 42 comprises the fourth face 24.

[0060] The figures further show that the first supporting face 31 is located opposite the first blocking part 41 and the second supporting face 32 is located opposite the second blocking part 42, and that the first and second supporting faces 31, 32 are adjacent. Furthermore, the first and second blocking parts 41, 42 are connected by a curved surface 15, wherein the curved surface 15 is provided at a substantially uniform distance from the rotational axis 8. Here, the curved surface 15 is arranged to slide over the supporting face 16 when rotating the transverse beam 6.

[0061] The cross section of the transverse beam 6 may however be determined in accordance with the desired heights for the bottom 12 of the spring means 10. Thus, the transverse beam 6 may be provided with a plurality of supporting faces corresponding to different rotational positions, and also to different heights of the bottom 12 of the spring means.

[0062] Preferably, the cross sections of the transverse beam 6 have in common that the curved surface 15 is

arranged in such a way that when rotating the transverse beam 6, it slides over the supporting face 16, so as to support the transverse beam when the transverse beam 6 supports the bottom 12 of the spring means with one of its supporting faces. Thus, the cross section of the transverse beam 6, where it supports the bottom of the at least one spring means 10, is preferably substantially divided into two regions: a first region where the curved surface 15 is provided and a second region where at least two supporting faces are provided, wherein elk of the supporting faces corresponds to a predetermined rotational position of the transverse beam 6. Although preferably a discrete number of supporting faces are provided, corresponding to discrete rotational positions of the transverse beam 6, the transverse beam 6 may also be arranged to be rotated between continuous rotational positions, each corresponding to a different height of the bottom of the spring means 10. This may be achieved by for instance using a curved supporting face that is arranged spirally around the rotational axis 8.

[0063] Preferably, the first and second rotational positions are terminal rotational positions due to the presence of the retaining means 13. The figures further show 3 - 6 that the first and/or second blocking parts 41, 42 comprise at least one protrusion 14 that extends relative to the third 23 and/or fourth 24 faces, respectively, so as to further ensure the terminal rotational positions of the transverse beam 6.

[0064] The figures further show that the transverse beam 6 can only be rotated to two discrete rotational positions, namely the first and second rotational positions. However, it is also possible for the transverse beam 6 to be rotatable to a plurality of rotational positions, as explained above.

[0065] Figures 7 and 8 show a number of preferred embodiments of details of the specific construction and mounting of the transverse beam 6.

[0066] Figure 7 more specifically shows a bearing 51 of the chassis 4. Figure 3 and 4 show that such a bearing 51 is mounted on either sides of the transverse beam 6, so that respective first and second bearings 51, 52 are provided for rotatably receiving a first end 61 of the transverse beam 6 and a second end 62 of the transverse beam 6, respectively. Although this bearing 51 is preferably made from plastic, for instance by molding, this is in no way necessary for the present invention, and other compositions or production methods may for instance be used for the bearing 51.

[0067] As shown in figures 3 and 4, the bearings 51, 52 are preferably mounted onto the supporting face 16 together with the transverse beam 6. For instance, figure 4 shows that the bearings 51, 52 are screwed onto the supporting face 16. This is of course not necessary for the present invention, and other fastening means may also be provided, such as for instance glue, nails, etc.

[0068] Figure 8 shows in more detail an end 61 of the transverse beam 6 received in, for instance, the bearing 51. Again, these elements are preferably made from plastic, for instance by molding. Again, this is in no way necessary for the present invention and other compositions or production methods may for instance be used for the end 61.

[0069] Located between the two ends 61, 62 is the rest of the transverse beam. Although the entire transverse beam 6 may be constructed from a single material, figure 4 for instance shows that this central part 40 of the transverse beam 6 comprises a separate part. This central part 40 is for instance hollow, so that the ends 61, 62 can be slid into it, as shown in figure 4. The hollow central part 40 may then for instance by be an extruded piece of aluminum, which can easily be manufactured, although of course other materials are also possible. The central part 40 may be attached in, for instance further, different ways to the ends 61, 62, if these are constructed from separate parts. It can for instance be glued, screwed, nailed, etc.

[0070] In figures 7 and 8, a number of cams 35 and openings 36 can be seen that cooperate if the end 61 is received in its corresponding bearing 51 as shown in figure 9. These cooperating cams 35 and openings 36 form a snap connection 17 that is able to removably snap the transverse beam 6 into the different discrete rotational positions.

[0071] Also provided are further cams 37 and openings 38 destined to snap fix the end 61 when inserting the end 61 into the corresponding bearing 51 so as to create a snap connection that is to prevent the transverse beam from being pulled out of the bearing too easily. This snap connection, however, allows an easy mounting of the transverse beam 6 into the bearings 51, 52.

[0072] Figure 10 shows that the bed system 1 comprises means 39 for providing a visual indication of the rotational position of the transverse beam 6. Figure 10 further shows the terminal first and second rotational positions, indicated with a triangle. It can be seen that the terminal positions are about 90° apart. Although this configuration offers advantages, the terminal positions may also be positioned apart differently, for instance at a smaller or larger angle.

[0073] The invention can be summarized in the following summarizing points:

1. A bed system 1 comprising a mattress supporting structure 2 comprising

   a. an upper surface 3 for receiving a mattress,
   b. a chassis 4,
   c. an intermediate layer 5 between the upper surface 3 and the chassis 4 for at least partly resiliently supporting the mattress on the upper surface 3, wherein the chassis 4 is arranged to support the entirety of the intermediate layer 5 and the mattress on the upper surface 3, resiliently supported by the intermediate layer 5, on a floor,

wherein the chassis 4 comprises at least one transverse beam 6, mounted between two opposing sides of the circumference 7 of the chassis 4, wherein the transverse beam 6 is mounted to be rotatable about a rotational axis 8 according to the lengthwise direction 9 of the transverse beam 6 between the two opposing sides of the circumference 7 of the chassis 4, between a first rotational position and a second rotational position different from the first rotational position, wherein the intermediate layer 5 comprises at least one spring means 10 that extends, at its bottom side 12 supported by the transverse beam 6, along the spring direction 11 between the transverse beam 6 and the upper surface 3, wherein the transverse beam 6 is delimited by at least a first face 21 and a second face 22 different from the first face 21, wherein the first face 21 constitutes a first supporting face 31 and the second face 22 constitutes a second supporting face 32, wherein the first supporting face 31 supports the spring means 10 in the first rotational position of the transverse beam 6 and the second supporting face supports the spring means 10 in the second rotational position of the transverse beam 6, wherein the first and second supporting faces 31, 32 are located at different distances from the rotational axis 8, so that the height of the bottom of the spring means 10 relative to the chassis 4 can be adjusted.

2. The bed system according to the preceding point, characterized in that the first and second rotational positions are terminal rotational positions.

3. The bed system 1 according to the preceding point, wherein the transverse beam 6 comprises retaining means 13 to prevent the rotation of the transverse beam 6 beyond the first and second positions.

4. The bed system 1 according to the preceding point, wherein the retaining means 13 comprise first and second blocking parts 41, 42, wherein the first blocking part 41 prevents rotation of the transverse beam 6 beyond the first rotational position by abutting against a third blocking part 43 of the chassis 4, and wherein the second blocking part 42 prevents rotation of the transverse beam 6 beyond the second rotational position by abutting against a fourth 44 blocking part of the chassis 4.

5. The bed system 1 according to the preceding point, wherein the transverse beam 6 is further delimited by third and fourth faces 23, 24, wherein the first blocking part 41 comprises the third face 23 and the second blocking part 42 comprises the fourth face 24.

6. The bed system 1 according to the preceding point, wherein the first and/or second blocking parts 41, 42 comprise at least one protrusion 14 that extends relative to the third 23 and/or fourth 24 faces, respectively.

7. The bed system 1 according to any of the preceding points 1 - 6, wherein the rotational positions of the transverse beam (6) are discrete rotational positions.

8. The bed system 1 according to the preceding point, wherein the transverse beam 6 can only be rotated to two discrete rotational positions, namely the first and second rotational positions.

9. The bed system 1 according to the preceding point, at least combined with point 0, wherein the first supporting face 31 is located opposite the first blocking part 41 and the second supporting face 32 is located opposite the second blocking part 42, and wherein the first and second supporting faces 31, 32 are adjacent.

10.The bed system 1 according to any of the preceding points 1 - 9, wherein the transverse beam 6 comprises a curved surface 15, wherein the curved surface 15 is provided at a substantially uniform distance from the rotational axis 8.

11.The bed system 1 according to the preceding point, at least combined with point 4 and preferably combined with point 9, wherein the first and second blocking parts 41, 42 are connected by the curved surface 15.

12.The bed system 1 according to any of the preceding points 1 - 11, wherein the chassis 4 comprises a supporting face 16.

13.The bed system 1 according to the preceding point, at least combined with point 10, wherein the curved surface 15 is arranged to slide over the supporting face 16 when rotating the transverse beam 6.

14.The bed system 1 according to any of the preceding points, wherein the chassis 4 comprises respective first and second bearings 51, 52 for rotatably receiving a first end 61 of the transverse beam 6 and a second end 62 of the transverse beam 6, respectively.

15.The bed system 1 according to the preceding point, at least combined with points 4 and 8, wherein the bearings 51, 52 and the transverse beam 6 are mounted on the supporting face 16, wherein the supporting face 16 constitutes the third and fourth blocking parts 43, 44.

16.The bed system 1 according to any of the points 11 or 15, wherein the first and second ends 61, 62 of the transverse beam 6 are received in the first and second bearings, respectively, 51, 52 by means of a snap connection.

17.The bed system 1 according to any of the points 11 - 16, at least combined with point 4 or 8, wherein the discrete rotational positions are determined by a snap connection 17.

18.The bed system 1 according to any of the preceding points, wherein the bed system 1 comprises means for providing a visual indication of the rotational position of the transverse beam 6.

19.The bed system 1 according to any of the preceding points, wherein the circumference 7 of the chassis 4 is delimited by first and second longitudinal sides 71, 72 and first and second transverse sides

73, 74, wherein the first longitudinal side 71 is mounted opposite the second longitudinal side 72 and the longitudinal sides 71, 72 are connected to each other by the transverse sides 73, 74, wherein the first transverse side 73 is mounted opposite the second transverse side 74.

20.The bed system 1 according to the preceding point, wherein the transverse beam 6 is mounted between the first and second longitudinal sides 71, 72 with a first transverse end 61 of the transverse beam 6 at the first longitudinal side 71 and a second transverse end 62 of the transverse beam 6 at the second longitudinal side 72.

21. Bed with a mattress and the bed system 1 according to any of the preceding points, wherein the mattress is received on the upper surface 3.

22.Use of the bed system 1 according to any of the preceding points, wherein the transverse beam 6 is rotated into a rotational position.

Claims

1. Bed system (1) comprising a mattress supporting structure (2) comprising

a. an upper surface (3) for receiving a mattress,
b. a chassis (4),
c. an intermediate layer (5) between the upper surface (3) and the chassis (4) for at least partly resiliently supporting the mattress on the upper surface (3), wherein the chassis (4) is arranged to support the entirety of the intermediate layer (5) and the mattress on the upper surface (3), resiliently supported by the intermediate layer (5), on a floor,

wherein the chassis (4) comprises at least one transverse beam (6), mounted between two opposing sides of the circumference (7) of the chassis (4), wherein the transverse beam (6) is mounted to be rotatable about a rotational axis (8) according to the lengthwise direction (9) of the transverse beam (6), between the two opposing sides of the circumference (7) of the chassis (4), between a first rotational position and a second rotational position different from the first rotational position, wherein the intermediate layer (5) comprises at least one spring means (10) that extends, at its bottom side (12) supported by the transverse beam (6), along the spring direction (11) between the transverse beam (6) and the upper surface (3), wherein the transverse beam (6) is delimited by at least a first face (21) and a second face (22) different from the first face (21), wherein the first face (21) constitutes a first supporting face (31) and the second face (22) constitutes a second supporting face (32), wherein the first supporting face (31) supports the spring means (10) in the first rotational position of the transverse beam (6) and the second supporting face supports the spring means (10) in the second rotational position of the transverse beam (6), wherein the first and second supporting faces (31, 32) are located at different distances from the rotational axis (8), so that the height of the bottom of the spring means (10) relative to the chassis (4) can be adjusted, **characterized in that** the first and second rotational positions are terminal rotational positions, wherein the transverse beam (6) comprises retaining means (13) to prevent the rotation of the transverse beam (6) beyond the first and second positions, wherein the retaining means (13) comprise first and second blocking parts (41, 42), wherein the first blocking part (41) prevents rotation of the transverse beam (6) beyond the first rotational position by abutting against a third blocking part (43) of the chassis (4), and wherein the second blocking part (42) prevents rotation of the transverse beam (6) beyond the second rotational position by abutting against a fourth (44) blocking part of the chassis (4), and wherein the transverse beam (6) is further delimited by third and fourth faces (23, 24), wherein the first blocking part (41) comprises the third face (23) and the second blocking part (42) comprises the fourth face (24).

2. The bed system (1) according to the preceding claim, wherein the first and/or second blocking parts (41, 42) comprise at least one protrusion (14) that extends relative to the third (23) and/or fourth (24) faces, respectively.

3. The bed system (1) according to any of the preceding claims, wherein the rotational positions of the transverse beam (6) are discrete rotational positions.

4. The bed system (1) according to the preceding claim, wherein the transverse beam (6) can only be rotated to two discrete rotational positions, namely the first and second rotational positions.

5. The bed system (1) according to the preceding claim, at least combined with claim 0, wherein the first supporting face (31) is located opposite the first blocking part (41) and the second supporting face (32) is located opposite the second blocking part (42), and wherein the first and second supporting faces (31, 32) are adjacent.

6. The bed system (1) according to any of the preceding claims, wherein the transverse beam (6) comprises a curved surface (15), wherein the curved surface (15) is provided at a substantially uniform distance from the rotational axis (8).

7. The bed system (1) according to the preceding claim and preferably combined with claim 5, wherein the

first and second blocking parts 41, 42 are connected by the curved surface 15.

8. The bed system (1) according to any of the preceding claims, wherein the chassis (4) comprises a supporting face (16).

9. The bed system (1) according to the preceding claim, at least combined with claim 6, wherein the curved surface (15) is arranged to slide over the supporting face (16) when rotating the transverse beam (6).

10. The bed system (1) according to any of the preceding claims, wherein the chassis (4) comprises respective first and second bearings (51, 52) for rotatably receiving a first end (61) of the transverse beam (6) and a second end (62) of the transverse beam (6), respectively.

11. The bed system (1) according to the preceding claim, at least combined with claim 8, wherein the bearings (51, 52) and the transverse beam (6) are mounted on the supporting face (16), wherein the supporting face (16) constitutes the third and fourth blocking parts (43, 44).

12. The bed system (1) according to any of the claims 10 or 11, wherein the first and second ends (61, 62) of the transverse beam (6) are received in the first and second bearings (51, 52), respectively, by means of a snap connection.

13. The bed system (1) according to any of the claims 10 - 12, at least combined with claim 3 or 4, wherein the discrete rotational positions are determined by a snap connection (17).

14. Bed with a mattress and the bed system (1) according to any of the preceding claims, wherein the mattress is received on the upper surface (3).

15. Use of the bed system (1) according to any of the preceding claims, wherein the transverse beam (6) is rotated into a rotational position.

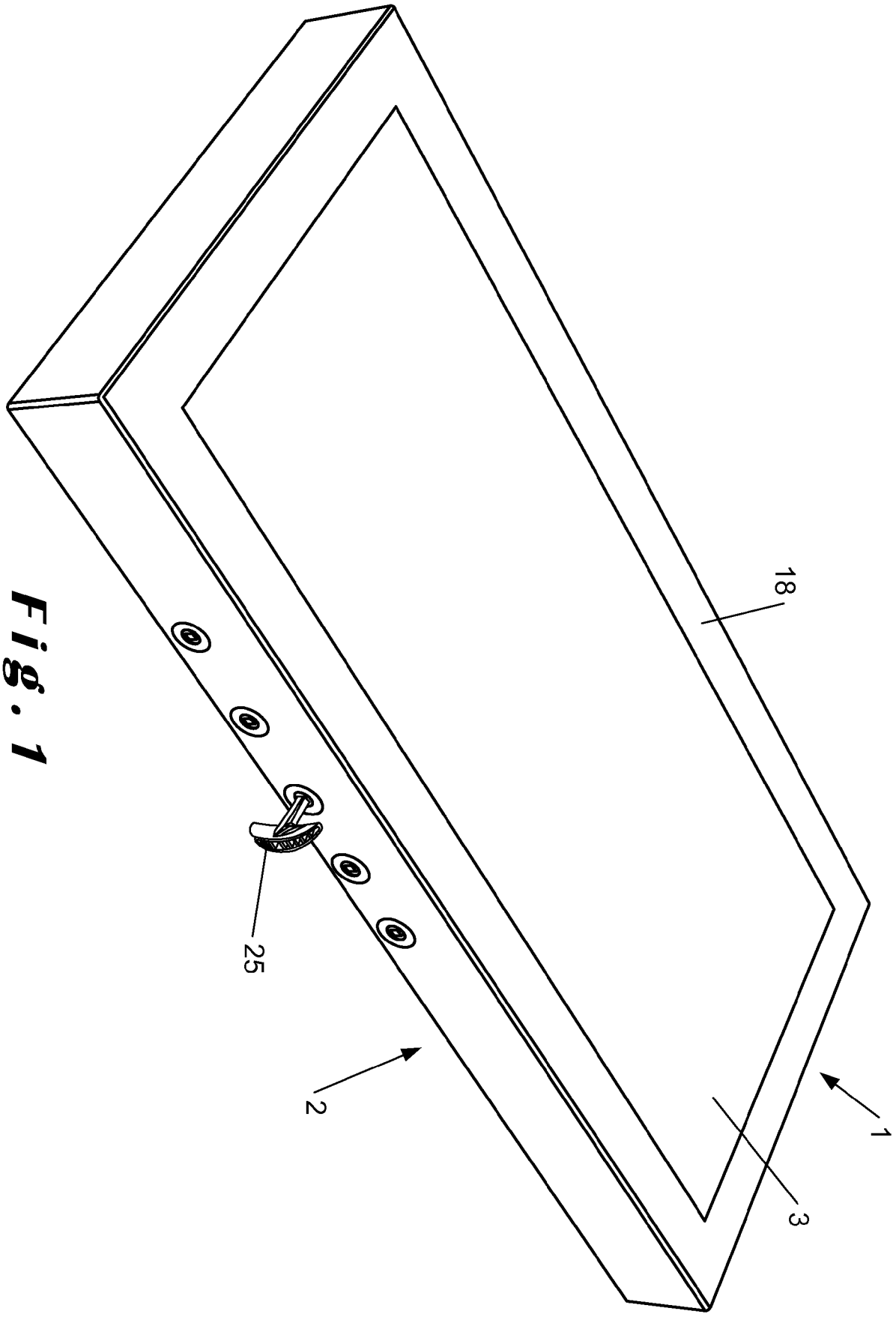

Fig. 1

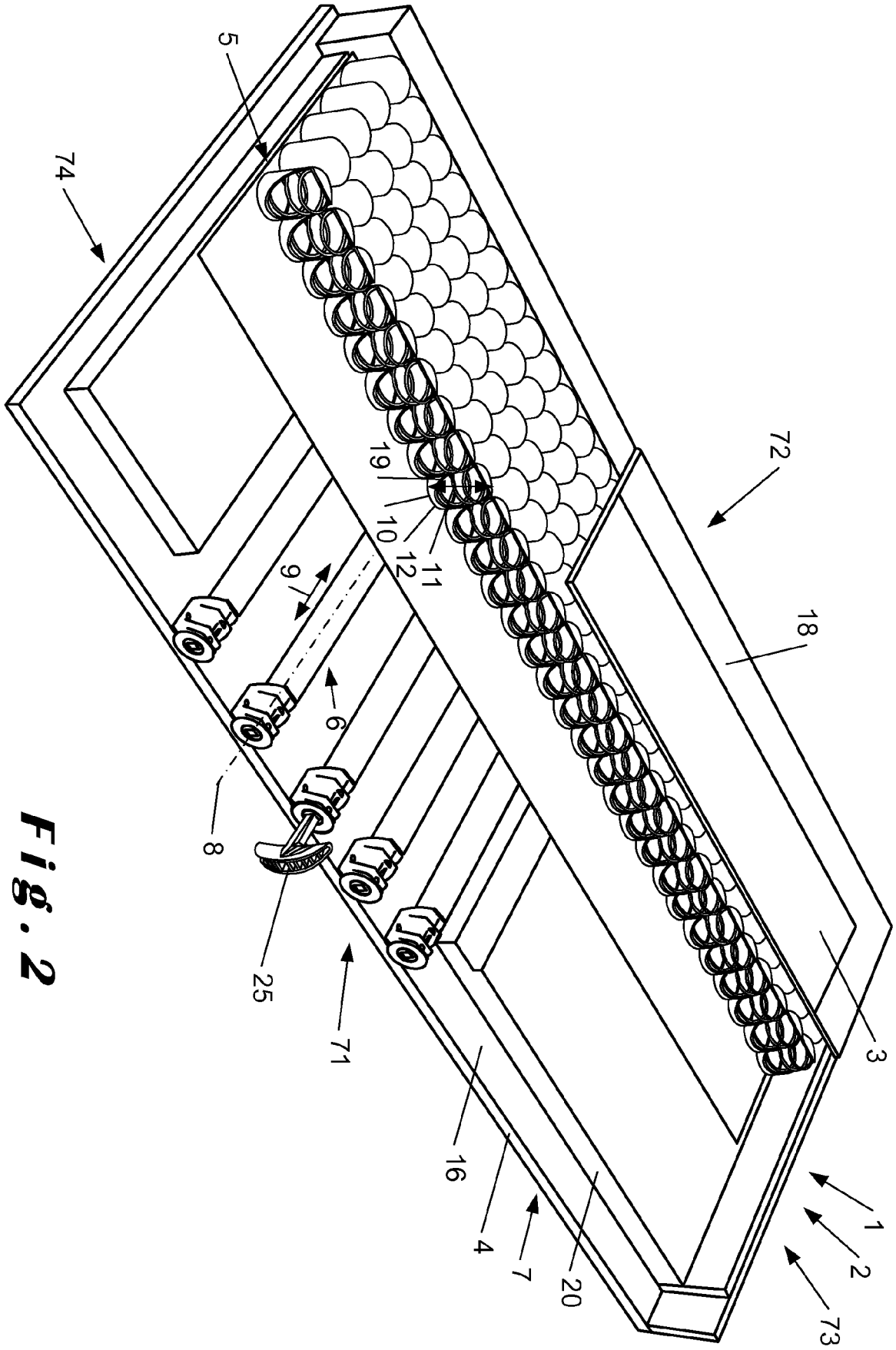

Fig. 2

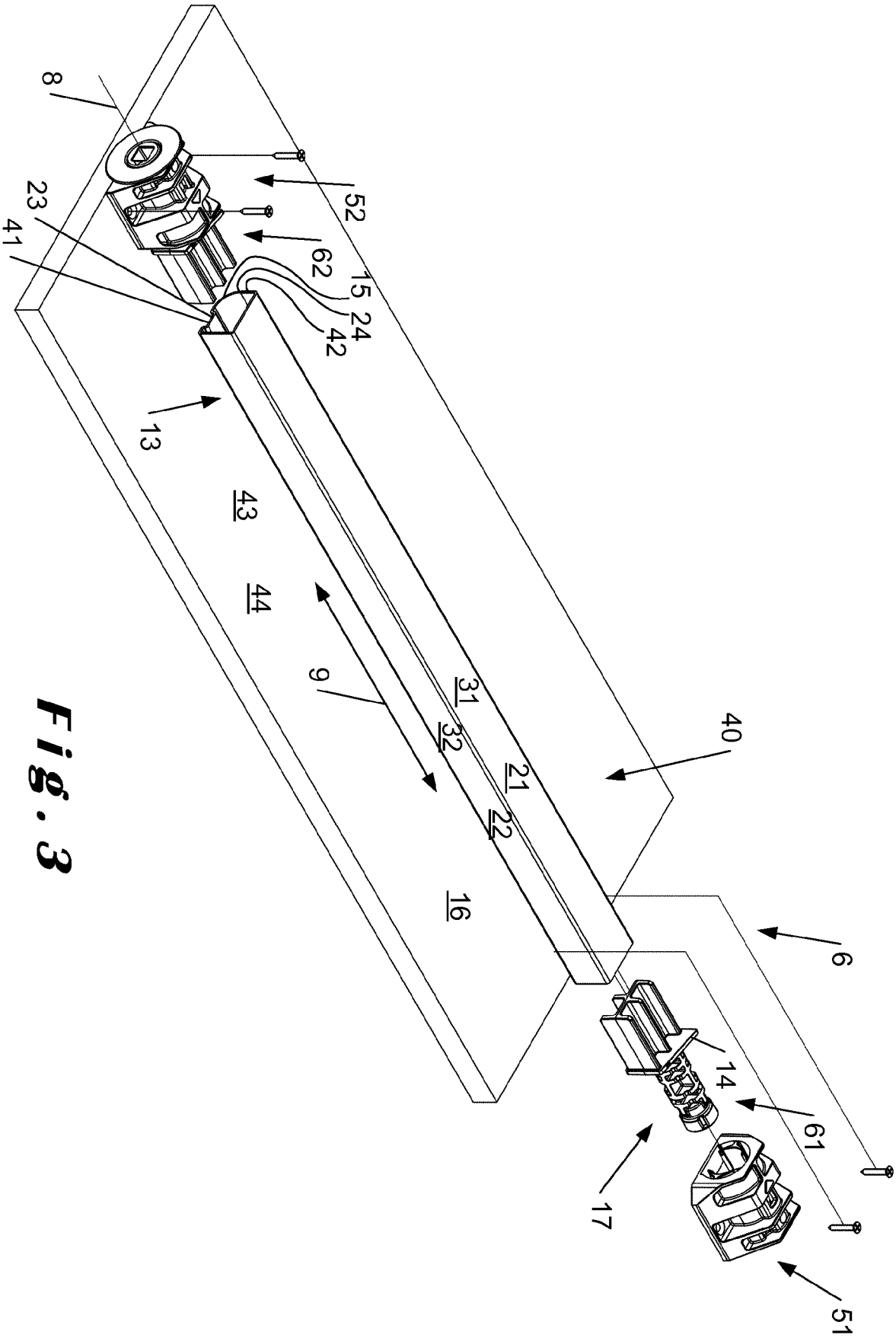

Fig. 3

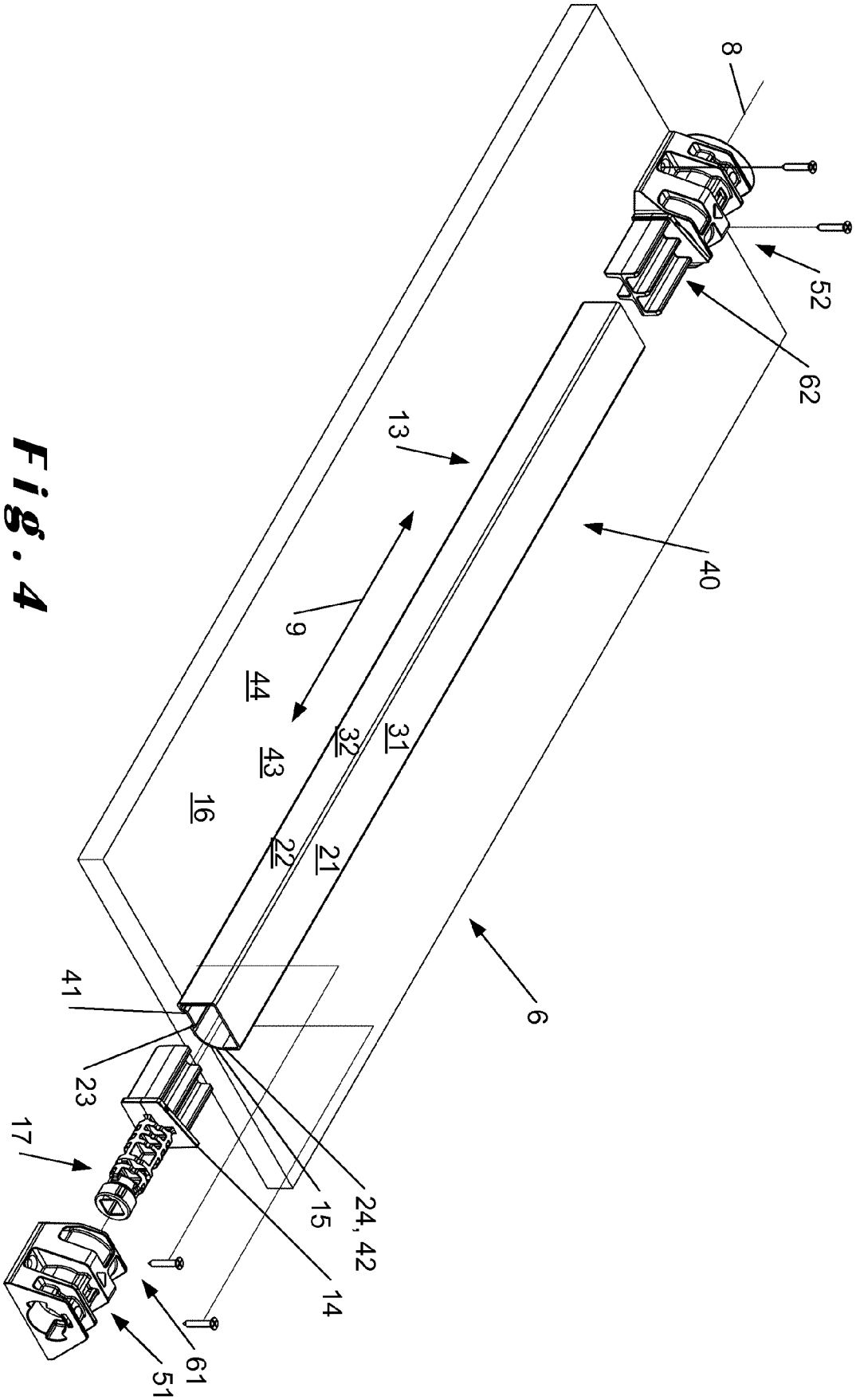

Fig. 4

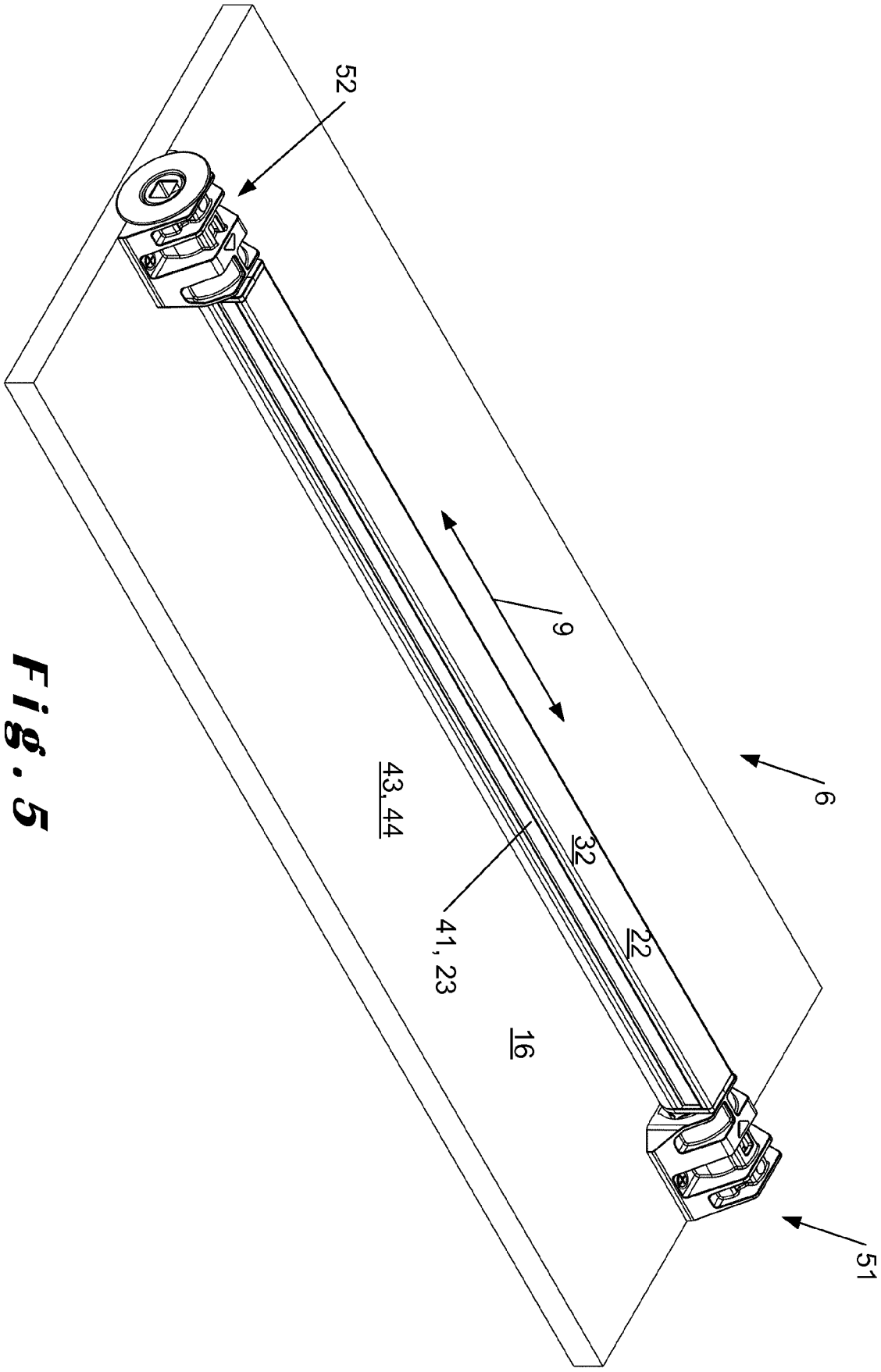

Fig. 5

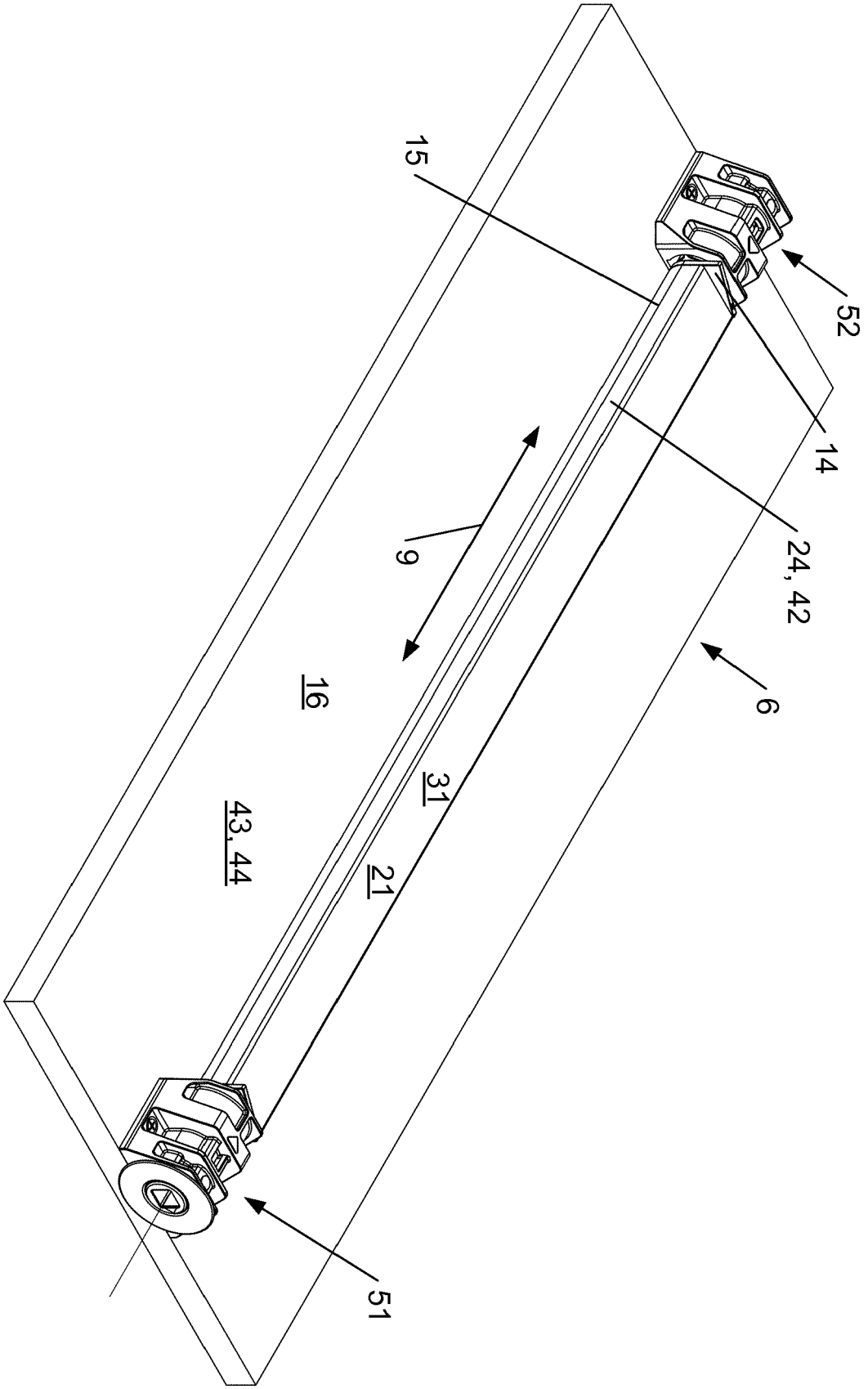

Fig. 6

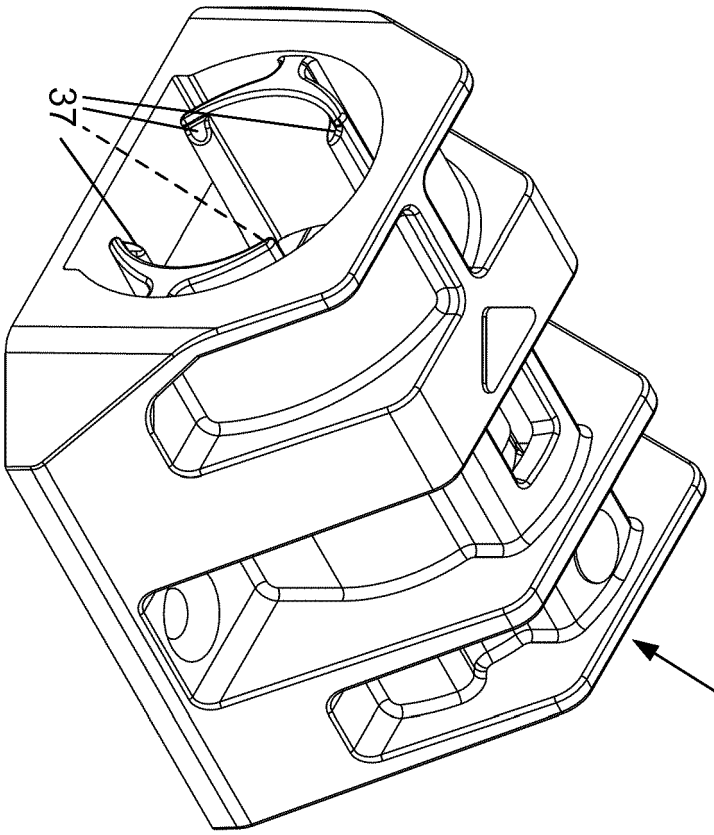

Fig. 7A

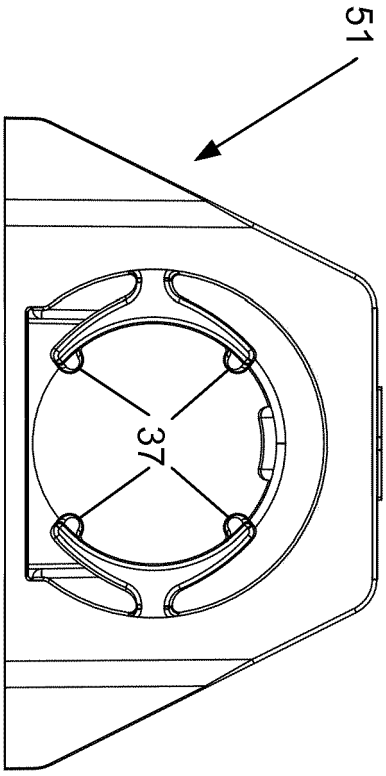

Fig. 7B

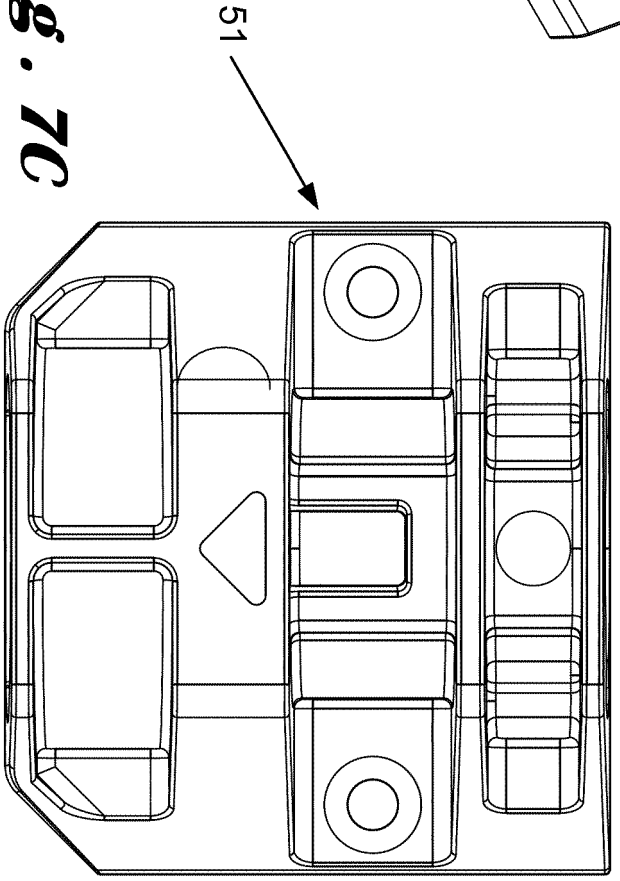

Fig. 7C

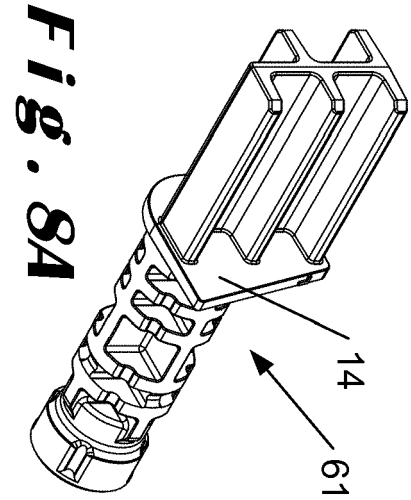

Fig. 8A

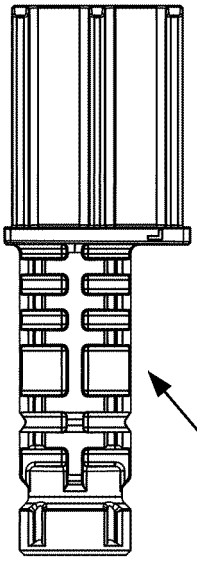

Fig. 8B

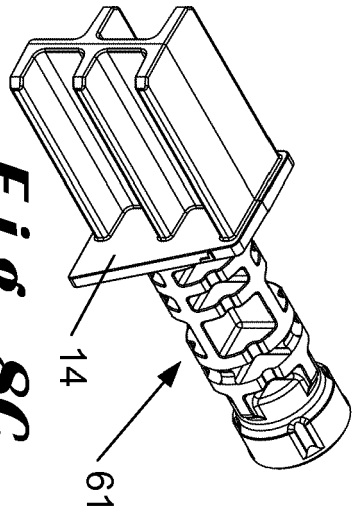

Fig. 8C

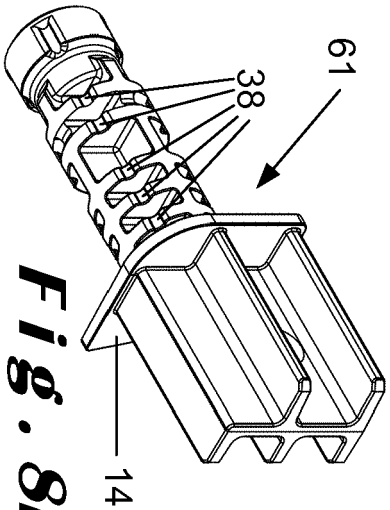

Fig. 8D

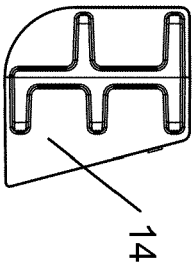

Fig. 8E

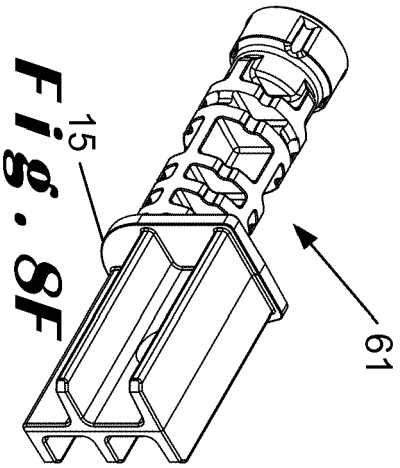

Fig. 8F

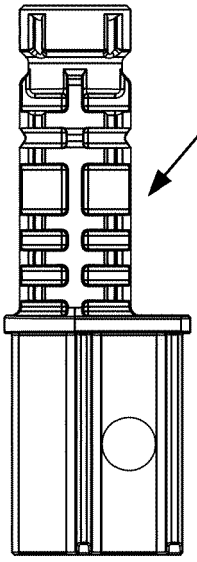

Fig. 8G

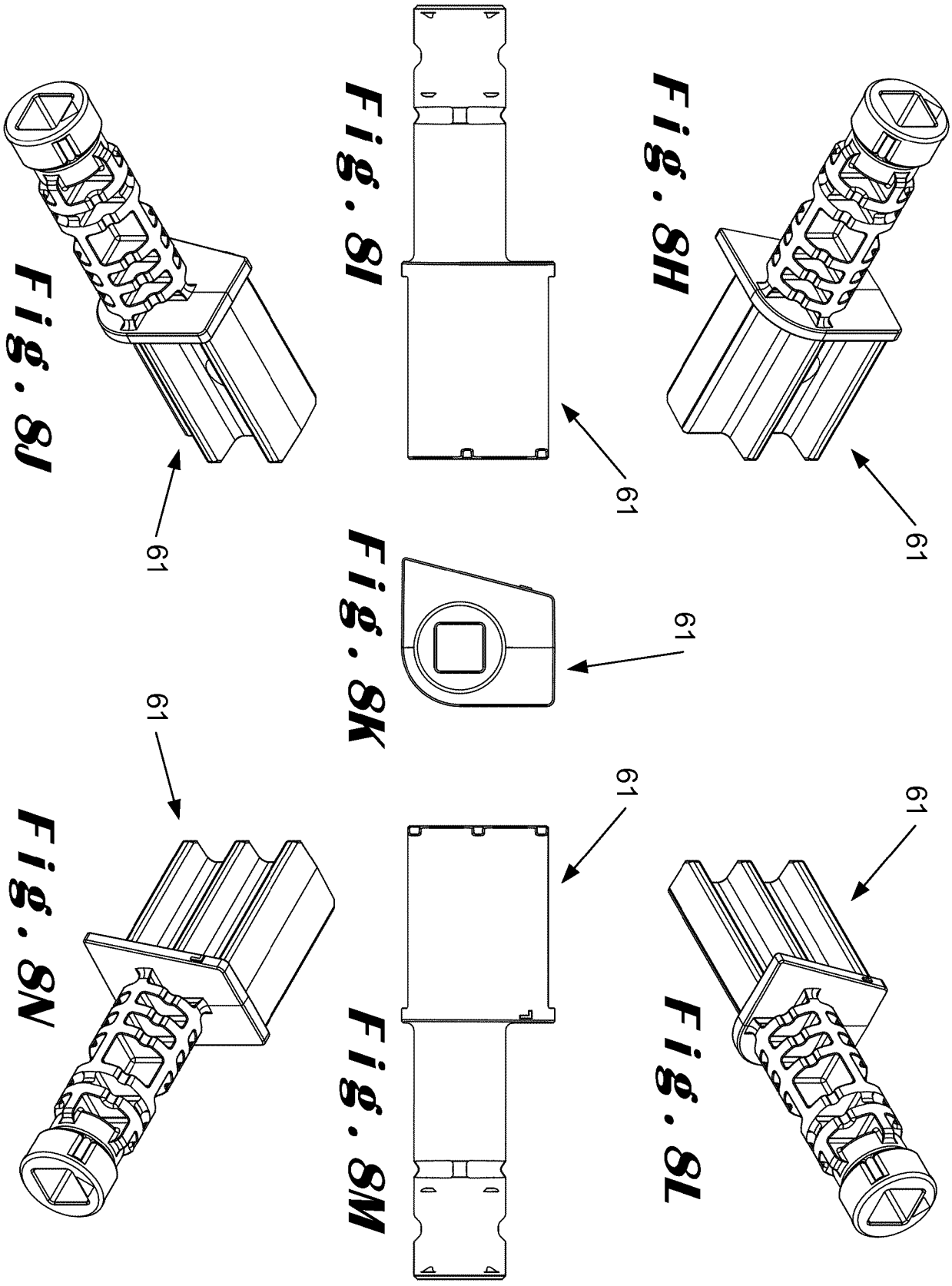

Fig. 8H

Fig. 8I

Fig. 8J

Fig. 8K

Fig. 8L

Fig. 8M

Fig. 8N

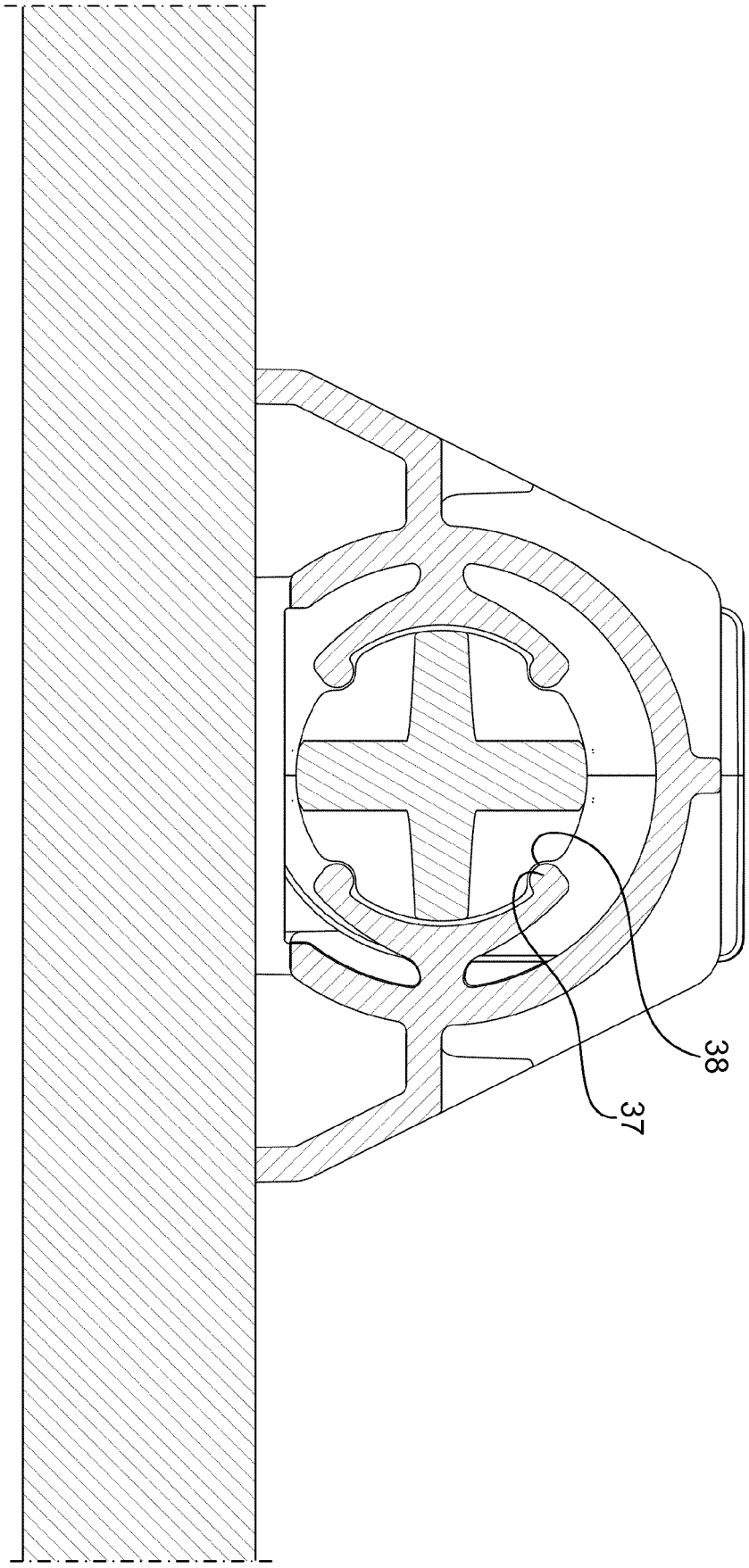

Fig. 9

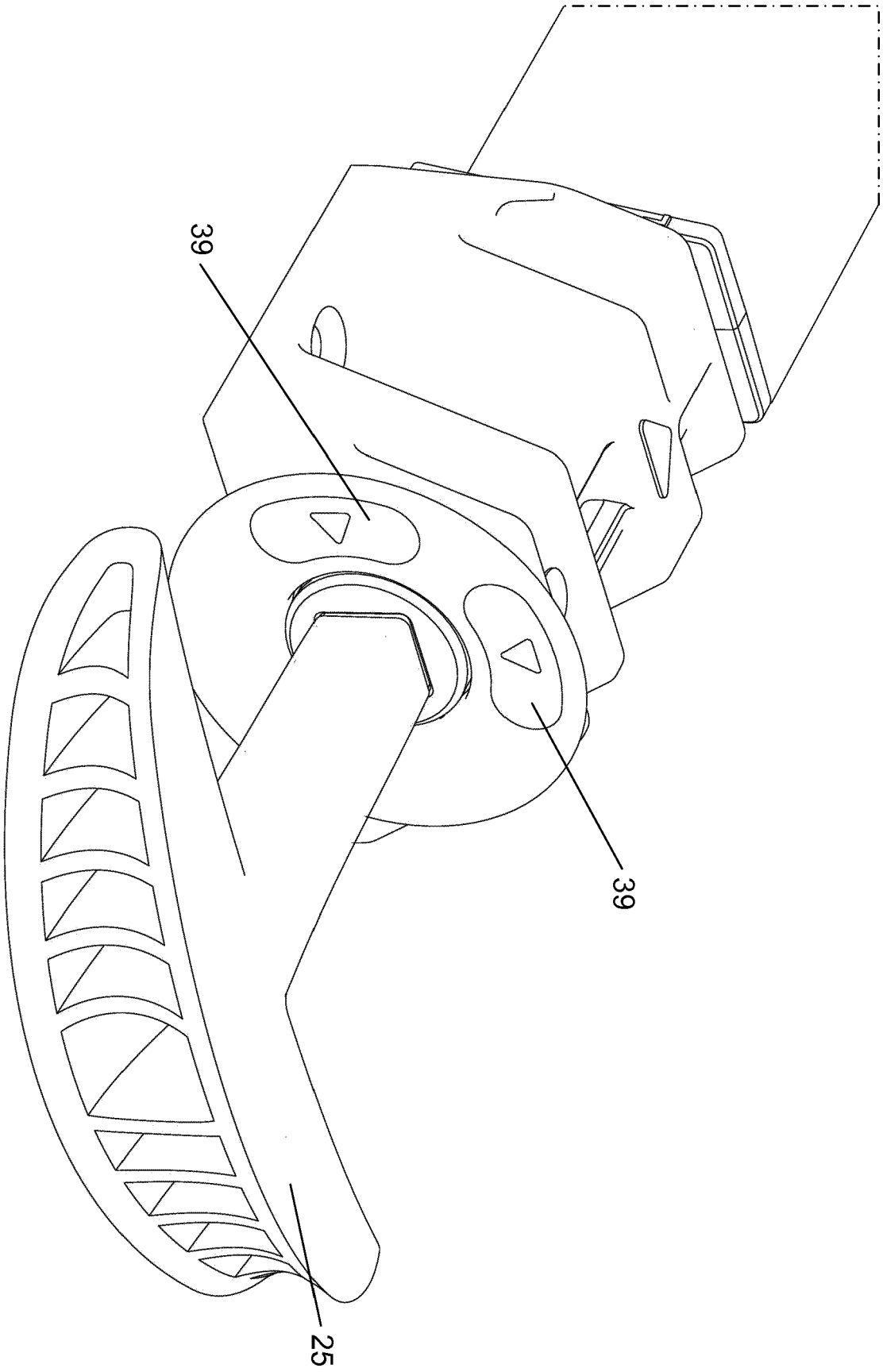

Fig. 10

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EUROPEAN SEARCH REPORT

Application Number
EP 18 20 3703

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A47C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	21 February 2019	Melo Sousa, Filipe

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