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Piece of furniture

Description

The invention relates to a piece of furniture with support legs having a joint arrangement for connecting the support legs in accordance with claim 1.

Such joint arrangements are used, for example, to adjust the height of a piece of seating furniture or a table. The joint arrangement is preferably executed in such a way that two pairs of support legs can be pivoted between a basic or normal position, in which the support legs are approximately parallel to one another or are slightly U- or V-shaped in relation to one another, and a scissor or cross-over position.

The structure of a joint arrangement that enables such a pivot is described, for example, in documents US 2,932,344 and DE 1 292 344 A. Accordingly, a piece of seating furniture is executed with four support legs that are pivotally attached to a seat's carcass, for example a frame of a seat surface. Two support legs are respectively joined together to form a pair of support legs, with both pairs of support legs being operatively connected by means of a joint arrangement such that the two pairs of seat legs can be pivoted synchronously in the manner described above between the normal position and the cross-over/scissor position. In both of these pivot positions, the pairs of seat legs each are in contact with stops. The joint arrangement has a coupling arm that is pivotally mounted on a base of the piece of seating furniture, the end portions of which each are connected to a pivot link, which in turn engages on one of the support legs. The coupling arm and the two pivot links connected to its end portions synchronize the pivoting movement of the two pairs of support legs and, in the normal position described, assume an approximately extended position in which the links (coupling arm and pivot links connected to it) are set slightly in a zigzag pattern relative to one another. When shifting to the cross-over position, the angle of incidence between the links is reduced, whereby the coupling arm is pivoted towards a vertical position (relative to the floor space of the piece of furniture). The two pairs of support legs each are linked to one another via crossbars, so that only one coupling link arrangement is required to synchronize the pivoting movement.

In these known solutions, a tension spring, which is fixed to a frame or a base of the piece of furniture, acts on the connecting area of the coupling arm with one of the pivot links. The positioning of this tension spring is performed such that the two pairs of support legs are held in the two positions (normal position, cross-over position) by pretensioning of the tension spring at the stops and support the pivoting movement in the direction of the stop during pivoting in the end pivoting area.

A similar joint arrangement is described in document DE 20 2013 100 020 U1, in which the pivoting of two pairs of support legs likewise is synchronized via a joint arrangement with a coupling arm arranged approximately in the center and two pivot links connected to it. This solution also includes a tension spring that pushes the joint arrangement and thus likewise the two pairs of support legs towards the normal position. Pivoting into the cross-over position then occurs against the force of the tension spring.

These known joint arrangements indeed make it possible to adjust the support legs very easily between the normal position and the cross-over position. However, the disadvantage is that the joint arrangement with the coupling link arrangement and the tension spring acting on it, on the one hand, requires a considerable amount of space (especially in the cross-over position) and, as a result, has a significant impact on the visual appearance of the piece of furniture. Furthermore, a considerable amount of technical effort is required to integrate the coupling link arrangement and the tension spring into the piece of furniture.

DE 199 28 829 A1 discloses a seat construction executed in the form of a lifting platform, in which an upper frame is held on a bottom side lower frame through four universal joints. This seat mechanism requires a considerable amount of technical effort, which is associated with high weight and, in addition, does not meet high aesthetic demands.

Patent application GB 554671 A likewise describes a seat construction executed in the form of a lifting platform, in which universal joints are arranged between a bottom side lower frame and an upper frame, whereby these can be adjusted by a lever

construction between a lower position and a higher position. This lever construction has a connecting link disc that slides onto a base when the lever is pivoted, with the geometry of the sliding block guide determining the height adjustment. In the maximum height position, this sliding block guide is supported on the lower frame with a flat surface.

A concept of this kind likewise can only be realized with a considerable amount of technical effort and, in terms of aesthetic demands, does not meet the requirements for high-quality furniture.

Document FR 2 757 752 A1 discloses a table that can be adjusted from a low position to a higher position, the table having four long and four short legs, with one long and one short leg each being joined together in a Y-shape. The table legs are connected in pairs by crossbars and hinged to a table top. In one position, the longer table legs can be folded against the underside of the table side, so that the table is supported on the floor by the short table legs. In another position, the long table legs can be tilted downwards in pairs, so that the table height is increased accordingly and the shorter table legs form a laterally protruding support for two table top extensions. On the one hand, a solution of this kind requires a considerable amount of technical effort, and on the other hand, the aesthetic impression takes some getting used to, since the size of the table top depends on the height of the table and the shorter table legs project laterally when the table top extensions are not in use.

Post-published DE 10 2019 117 223 B1 discloses a joint arrangement and pieces of furniture executed with such joint arrangements, in which the disadvantages described above are largely eliminated. The joint arrangement has a coupling link arrangement, via which the support legs are in operative connection to one another in pairs so that they can be pivoted between a scissor position and a U- or V-position for height adjustment. The joint arrangement moreover has a pretensioning device, via which the respective support legs are pretensioned in the direction of one of the positions. According to the technical teaching of DE 10 2019 117 223 B1, the pretensioning device and the coupling link arrangement are arranged transversely offset

to one another, so that the height-adjustable piece of furniture can be implemented in a very compact design.

During practical use, it was found that under unfavorable conditions, for example when the edge of the piece of furniture is raised so that it only stands on two support legs, the coupling link arrangement may pivot undesirably towards the scissor or cross-over position.

In contrast to this, the invention is based on the task of creating a piece of furniture executed with a joint arrangement in which functional reliability is improved vis-à-vis the afore-described prior art.

This task is accomplished by a piece of furniture with support legs and with a joint arrangement for connecting the support legs according to claim 1.

Advantageous further developments of the invention are subject of the sub-claims.

The joint arrangement according to the invention connects support legs to a piece of furniture and has a coupling link arrangement that has at least one pivotable coupling arm mounted on a base. The end sections of the coupling arm are hinged indirectly or directly on the support legs such that they can be pivoted between a lower scissor or cross-over position and a higher parallel, U-shape or V-shape position for height adjustment. The support legs are integrated into the joint arrangement directly or indirectly via adapters or the like and thus are part of the joint arrangement. According to the invention, a pretensioning device is also provided which pretensions at least one of the support legs in the direction of one of the positions.

To prevent inadvertent adjustment, the joint arrangement is provided with a locking device that locks the coupling link arrangement or the support legs preferably in the higher position (parallel, U or V-shape position) in a force-fit or form-fit manner. This locking device can be released manually in order to pivot the joint arrangement in the direction of the other, preferably the lower position of the support legs.

The provision of this locking device significantly improves the operational safety of the joint arrangement and the piece of furniture executed therewith, compared to the solutions described at the beginning, so that the piece of furniture meets the highest occupational safety requirements, even when used commercially.

In one embodiment of the invention, the locking device is executed with a pretensioned locking pin or a locking slide, which in the locking position comes into force-fit or form-fit engagement with the coupling link arrangement or a support leg/pair of support legs, in order to lock them preferably in the higher position. In this case, it is particularly preferred if the locking pin or the locking slide enters into a recess of the coupling link arrangement or of the support leg/pair of support legs in the locking position or engages behind a locking surface provided on the latter.

In one embodiment of the invention, the joint arrangement is executed with two pivot links, which, on the one hand, are connected to the coupling arm in an articulated manner, and, on the other hand, are respectively connected to a support leg in an articulated manner. As mentioned above, the connection to the support legs can be performed directly or via an adapter or the like.

The structure of the joint arrangement is particularly compact when the locking pin is guided on the base and a locking cam is provided on the coupling arm, on which the recess or the locking surface is formed. Of course, the recess or locking surface can also be provided directly on the coupling arm.

In one alternative of the invention, the locking pin is guided such that, during the adjustment from the lower position (cross-over position) in the direction of the higher position (U or V position), it is in contact with the locking cam or the coupling arm in a sliding manner.

Alternatively, the locking pin can be guided such that it is transferred to the locking position via a sliding guide during pivoting of the coupling arm.

In an alternative solution, the locking device is configured as a latch with latching elements, wherein, preferably in one position of the support legs, a snap-in nose engages behind a latching protrusion or enters a latching recess. The latching preferably is performed by elastic deformation of at least one of the latching elements.

A solution of this kind is characterized by an extremely simple structure, the latching elements, however, needing to be designed with a certain elasticity, which allows for elastic deformation to establish and release the latching.

In one embodiment of the invention, at least two of the support legs are connected to each other via a crossbar on which one of the latching elements is formed. This can then be brought into latching engagement with the other latching element, which in turn is formed, for example, on a frame supported by the support legs and bearing a seating surface. In place of the latching device, the crossbar can also be brought into locking engagement with a locking slide or locking pin.

Of course, this latching mechanism can also be provided in the area of the coupling link arrangement or in the area of the joints of the support legs.

In a particularly simply structured embodiment, the elasticity of at least one latching element is brought about by a cut-out that provides a certain spring elasticity to that latching element.

Unlocking is particularly easy if the joint arrangement is executed with a handle for manually releasing the locking pin or the latch.

This handle can, for example, be executed with a pull or bend strap that can be easily grasped by a user.

The position of this handle can be quickly recognized by the user if the handle is of a contrasting color.

The compact design can be further improved if the coupling link arrangement and the pretensioning device are offset approximately transversely to the pivot plane of the support legs.

For further improving operational safety, the pretensioning device can be laid out such that it has a dead center position in which maximum pretensioning is effective, with this dead center position being reached between the two initially indicated positions of the support legs, so that they are pretensioned via the pretensioning device in the direction of both support leg adjustments.

In one embodiment of the invention, the base carrying the coupling link arrangement is executed with two swivel brackets, to each of which a support leg is directly or indirectly hinged and which are preferably arranged with a transverse offset. A bridge web on which the coupling arm is pivotably mounted on the one hand, and in which the locking pin or other locking element also is preferably guided, extends between the two swivel brackets.

The pretensioning device can be a cylinder or a spring, preferably a compression cylinder or a compression spring.

It is particularly advantageous if, for example, a compression cylinder designed as a spring cylinder has a piston rod that is guided in a cylinder, and is pretensioned in the extension direction, for example by means of a spring (or hydraulically or pneumatically). In this context, it is particularly preferred if the pivot bearing support of the compression cylinder is not offset, as is generally the case, in the area of a bottom side of the cylinder remote from the piston rod, but rather offset towards the piston rod. In this way, in the kinematics according to the invention, a top dead center effect is intensified and the positioning in the respective end positions is optimized.

In a corresponding manner, the locking pin or other locking device can also be pretensioned by means of a spring or a cylinder. In this case, the pretension can be designed so as to act in the direction of the release position when adjusted by means of a sliding guide, while when a locking pin or other locking element is used, the

pretensioning device, for example the spring or the cylinder, acts in the direction of the locking position.

Preferred embodiments of the invention are explained in more detail below with the aid of schematic drawings, wherein:

Figure 1 is a schematic partial bottom view of a piece of furniture according to the invention, which is executed, for example, as a chair;

Figure 2 shows a detailed view of a coupling link arrangement of a joint arrangement of the piece of furniture according to figure 1;

Figure 3 shows a three-dimensional view of the joint arrangement according to figure 2, with a perspective from below onto the joint arrangement according to the invention;

Figure 4 is a partial sectional view of the piece of furniture along the sectional line A-A of figure 3;

Figure 5 shows the joint arrangement according to figures 1 to 4 in the scissor position;

Figure 6 is a partial view of a further embodiment of a piece of furniture according to the invention in a view corresponding approximately to figure 1;

Figure 7 is a sectional detailed view of the embodiment according to figure 6;

Figure 8 a schematic diagram of a pretensioning device of the piece of furniture according to figures 6 and 7;

Figure 9 is a variant of the embodiment according to figure 6;

Figure 10 shows a sectional detailed view of the embodiment according to figure 9 and

Figure 11 shows an embodiment with a locking slide.

The joint arrangement 1 described in the following is used, according to figure 1, which shows a partial bottom view of a piece of furniture 3, for hinging support legs 2, 4 and 2', 4' of the piece of furniture 3, for example a chair, an armchair or a table, such that the functional height of this piece of furniture 3 can be pivoted by adjusting support legs 2 , 4 and 2', 4', between a higher normal position, in which the support legs 2, 4 and 2', 4' are set approximately parallel or in a U- or V-shape to one another, and a

lower position, in which two support legs 2, 4 and 2', 4' each assume a cross-over position (also referred to as a scissor position).

The basic structure of the joint arrangement 1 according to the invention is illustrated by means of a piece of furniture 3 shown in figures 1 to 5, in which the support legs 2, 4 are hinged to a frame 6 by means of the joint arrangement 1 according to the invention, and the other support legs 2', 4' are hinged to the frame 6 by means of a simplified joint arrangement 1', which then in turn supports a table top or a seating surface. The support legs 2, 2' and 4, 4', respectively, are coupled to each other by means of crossbars 7, so that when one pair of support legs 2, 4 and 2', 4', respectively, is pivoted, the respectively other one is pivoted at the same time. The pairs of support legs 2, 2' and 4, 4' with the respective crossbars 7 can be designed in one piece or in several parts. According to the invention, the joint arrangement 1 can be held in position in the higher position of the piece of furniture 3 by means of a locking device 5, which is described in the following in more detail.

Figure 2 shows the joint arrangement 1 in the aforementioned higher position of the piece of furniture 3, in which the support legs 2, 4 are slightly inclined towards each other. A base 8 is fixed to the frame 6 for each pair of support legs 2, 2' and 4, 4', respectively, or is formed in one piece with it. As shown in figure 2, the base 8 extends between the two support legs 2, 4 associated with one another, each of which is hinged to the base 8 via a pivot joint 9, 10. In the region adjoining the pivot joints 9, 10, the base 8, in the representation according to figure 2, is tapered downwards, i.e. towards the indicated stand space 12, in the shape of a trapezoid with two sloping surfaces 14, 16 of the base 8 merging into an apex surface 18 running approximately parallel to the table top 6. In the region of the apex surface 18, a coupling arm 22 projecting on both sides, of a coupling link arrangement 36 is mounted on the base 8 by means of a joint 20, which coupling arm, in the normal position according to figure 2, is slightly inclined to the stand space 12 and to the frame 6, respectively. On each of the two free end sections of the coupling arm 22, which can be pivoted centrally around the joint 20, a respective end section of a pivot link 24, 26 is articulated. This linkage is respectively performed by means of a coupling joint 28, 30, which allows relative pivoting of the pivot links 24, 26 with respect to the coupling arm 22. The end sections of the pivot links 24,

26 that are remote from the coupling arm 22 in turn are linked to the respective support leg 2, 4 via leg joints 32, 34. In the normal position shown the coupling link arrangement 36 formed by the coupling arm 22 and the pivot links 24, 26 assumes an extended position, in which the aforementioned links 22, 24, 26 are set approximately in a zigzag pattern with respect to one another, these being only slightly set with respect to the stand spce 12 or the table top 6, preferably at an acute angle (angle of incidence < 45°).

The joint arrangement 1' (see figure 1) associated with the other two support legs 2', 4' is designed without a coupling link arrangement, so that the linkage is only effected via the two pivot joints 9' and 10' of the base 8'.

Figure 3 shows a three-dimensional partial view of the joint arrangement 1 of the piece of furniture 3 according to figure 2, the viewing direction being directed onto the joint arrangement 1 from below. It is apparent from this representation that a lever arm 38 is formed on the support leg 2 which projects laterally towards the base 8 and projects approximately at right angles to the longitudinal axis of the support leg 2 towards the base 8, and a pretensioning device engages at the end section of said lever arm, via which pretensioning device the support leg 4 is pretensioned into the respective position, in figure 2 into the higher normal position. In the illustrated embodiment, the pretensioning device is executed as a compression cylinder 40, the cylinder of which is coupled to the end section of the lever arm 38 via a cylinder joint 42. A piston rod 44 of the compression cylinder 40 is coupled to the base 8 via an implied piston rod joint 46. In the higher position shown in figure 2, the lever arm 38 extends approximately parallel to the pivot link 24. The axis of the compression cylinder 40 is set slightly inclined to the lever arm 38, so that the support leg 4 is pretensioned in the direction of the normal position. As the lever arm 38 engages on the support leg 4 at a distance from the pivot joint 9, corresponding to the pretension of compression cylinder 40, a torque acting in the direction of the higher position is transmitted to the support leg 4 which is connected to the other support leg 2 via the coupling link arrangement 36, so that this, too, is pretensioned accordingly into the normal position. In this normal position, the two support legs 2, 4 each are in contact with the table top 6 with their end sections 48, 50, so that their secure positioning is guaranteed. The contact area of the

end sections 48, 50 on the table top 6, or on another supporting area of the piece of furniture is designed in a suitable manner to be able to transmit the supporting forces.

In the illustrated example, the piston rod 44 engages the base 8 – of course, the opposite assembly is also possible, with the cylinder on the base side and the piston rod 44 on the support leg side.

As explained above, figure 3 shows a view of the joint arrangement 1 as seen from the stand space 12 according to figure 2, so that the underside of the tabletop 6 of the model is visible.

As explained above, the base 8, which will be described in more detail below, is attached to this table top 6 (or other supporting structure), to which the two support legs 2, 4 are linked via the pivot joints 9, 10. The two pivot joints 9, 10 are each formed on a pivot bracket 52, 54 of the base 8, with the pivot brackets 52, 54 each having three joint plates 56, which are formed at a distance from each other and engage between the joint projections 62 of the support legs 2, 4. In the illustration according to figure 3, only one of the joint plates and the joint projections 56, 62, respectively, of support leg 4 or the swivel bracket 52 is provided with reference signs. The articulated connection of the joint plates 56 and the joint projections 62 then occurs via a joint bolt 66, indicated by a dashed-dotted line, which is also visible in the view according to figure 2.

As can be seen from the illustration in figure 3, the two swivel brackets 52, 54 are arranged offset to each other transversely to the swivel direction. The pivot planes of the two support legs 2, 4 run approximately perpendicular to the drawing plane, so that the offset described above lies in the vertical of the drawing plane according to figure 3. As explained above, this offset is advantageous for moving the support legs 2, 4 from the normal position shown to the crossover position described below.

As shown in figure 3, a bridge web 68 extends between the two swivel brackets 52, 54, whose side surfaces visible in figure 3 form the apex surface 18 and the two inclined surfaces 14, 16 running obliquely to it. As explained above, a joint 20 is formed on this bridge web 68, which is designed with a stepped pivot bolt 70 that is held on the

bridge web 68. On this pivot bolt 70 the coupling arm 22, which projects on both sides, is then held such that it extends at a parallel distance from the bridge web 68. The two end sections of the coupling arm 22 are connected to the pivot links 24, 26 via the coupling joints 28, 30, the end sections of which are connected to the respectively associated support legs 2, 4 via the leg joints 32, 34.

According to the illustration of figure 3, the leg joints 32, 34 each are executed with a joint attachment 72 (merely the joint attachment 72 of the support leg 2 is visible in figure 3), to which a corresponding link attachment 74 is associated, which in turn is mounted on a pivot bolt 76 indicated by a dashed-dotted line. The link attachment of the pivot rod 26 linked to the other support leg 4 has a greater length than that of the pivot rod 24 due to the transverse offset. As indicated in figure 3, corresponding pivot bolts 78, 80 are also inserted in the coupling joints 28, 30.

The axial length of the joint plates 72 and the stepped pivot bolt 70 is chosen so that the coupling link arrangement 36 extends approximately parallel to the base 8 along the front side visible in figure 1 (at the top in figure 3) of the base 8.

The compression cylinder 40 is arranged at the rear of the base 8 (view according to figures 2 and 3). As explained above, the cylinder housing of the compression cylinder 40 engages the lever arm 38 of the support leg 4 via the cylinder joint 42. The piston rod 44 is coupled to the swivel bracket 54 via the piston rod joint 46, which is indicated in figure 3 by a dashed-dotted line.

By arranging the compression cylinder 40 at the rear and the joint link arrangement 36 at the front of the base 8, a split construction is implemented which makes it possible to adapt the geometry of the coupling link arrangement 36 and the pretensioning device, in this case specifically the compression cylinder 40, with the respective articulations in an optimal manner to the spatial conditions and the design of the respective piece of furniture. It is particularly advantageous in this respect that the coupling link arrangement 36 and the pretensioning device act on the support legs 2, 4 separately from one another in the broadest sense, so that also the lever ratios can be easily adapted to the circumstances. This is a significant difference compared to

conventional solutions, in which the pretensioning device acts directly on the link arrangement.

As can further be seen from the illustration of figure 3, the compression cylinder 40 extends approximately in the area of a step-down 82, which is formed by the lateral offset of the swivel bracket 54 with respect to the bridge web 68. In a corresponding manner, the coupling arm 22 is located in the area of a space formed by a step-down 84 between the pivot bracket 52 and the bridge web 68. This integration of functional elements, for example of the compression cylinder 40 and the coupling arm 22, into the spaces bounded on either side of the base 8 by the projecting swivel brackets 52, 54, enables an extremely compact, space-saving design of the joint arrangement 1 according to the invention.

From the view according to figure 3, it moreover is to be discerned that the positioning of the lever arm 38 is such that it can be moved, during pivoting, along the rear side of the swivel bracket 52 and the bridge web 68, which are at the bottom of figure 3.

Up to here, the embodiment according to the invention corresponds to that described in post-published patent DE 10 2019 117 223 B1 with regard to the fundamental structure of the joint arrangement and the piece of furniture, so that in view of further details and embodiments, reference is made to the description of that patent for the sake of simplicity.

According to the concept of the invention, the joint arrangement 1 can be locked by the locking device 5 displayed in figure 2 in the extended position, so that the piece of furniture 3 is fixed in position in the higher position and accidental shifting to the scissor position is prevented.

In the embodiment shown in figures 2 and 3, this locking device 5 has a locking bolt 86 that is guided in the base 8 in an axially movable manner and that, in the blocking position illustrated in figures 2 and 3, engages behind a locking cam 88 (figure 2), which, on the coupling arm 22, projects in the radial direction from the coupling arm

22 in the area of the joint 20. In the illustrated embodiment, the locking cam 88 is formed in the shape of a circular ring segment in the view according to figure 2, a locking surface 90 being formed on the right-hand end face in figure 2, with which the locking bolt 88 is in contact in the higher position illustrated (extended position of the coupling link arrangement 36). As will still be explained below in more detail, the locking bolt 38 is pretensioned in the direction of this locking position by way of a spring.

In the bottom view according to figure 3, the end section of the locking bolt 86 protruding from the base 8 is to be seen, which in this view covers the locking cam 88 with the locking surface 90 so that it is not visible.

Figure 4 shows a section along line A-A in figure 3. In this illustration, the locking cam 88, which projects from the coupling arm 22 in the radial direction, is to be seen quite clearly, with the locking surface 90 formed thereon on its front side, with which locking surface the end section of the locking bolt 86 projecting from the base 8 is in contact, so that, correspondingly, the coupling link arrangement 36 cannot be adjusted into a buckling position described in more detail in the following by the force of the pretensioning device.

In the illustrated embodiment, the locking bolt 86 is guided in a stepped guide 94 of the base 8. According to the specifically illustrated solution the part of the locking bolt 86 facing away from the locking cam 88 is recessed to form an actuating section 96, this recessed part being embraced by a tensioning spring 98 which, on the one hand, is supported on an end face 100 of the guide 94 and, on the other hand, acts on an annular shoulder between the actuating section 96 and a locking bolt head 102, so that the locking bolt 86, as mentioned above, is pretensioned in the locking direction,.

The end section of the actuating section 96 that is remote from the locking bolt head 102 protrudes from the base 8 at the back above the compression cylinder 40 (view according to figure 4). On this protruding end section an annular handle 104 is formed, which is optimized ergonomically, so that a user, by grasping the handle 104, can pull the locking bolt 86 into the base 8 against the force of the tension spring 98, so

that the movement of the coupling link arrangement 36 in the direction of the lower position (see figure 5 described below) is no longer blocked.

To further simplify actuation, the handle 104 is executed with a pull strap 106, which may be made, for example, of an elastic material such as plastic or leather. In particular, this pull strap 106 is in a contrasting color to the color of the piece of furniture 3, so that unlocking can be carried out in a simple manner, whereby this color design also makes the function of the locking device 5 “self-evident”, so to speak.

Figure 5 shows the joint arrangement 1 in the position that results when the support legs 2, 4 are shifted to the scissor position (lower position). As explained above, to achieve this pivoting movement, the locking lever 86 must be disengaged from the locking cam 88 by pulling the handle 104, so that the joint arrangement 1 is effectively unlocked. The adjustment from the higher position (U-, V-position) into the scissor position can be achieved, for example, by tilting the piece of furniture 3 slightly, so that it only rests on the support surface 12 with respectively one support leg 2 or 4 of the two pairs of support leg, and then applying a torque such that the supported support leg 2 pivots about its pivot joint 10 in the direction of the cross-over position. Of course, this pivoting can also be initiated by hand after unlocking.

The pivoting movement of the support leg 2 is synchronously transmitted to the other support leg 4 via the coupling link arrangement 36 and crossbars 7, the coupling arm 22 being pivoted clockwise from the slightly inclined position (with respect to the stand space 12) shown in figure 1 via pivot links 26 or 24 towards a vertical position, relative pivoting of pivot links 24, 26 to the respectively associated support leg 2, 4 being comparatively small. This pivoting of support legs 2, 4, 2', 4' takes place - as explained - around the pivot joints 9, 10.

During the pivoting of coupling arm 22, the locking cam 88 is overlapped by the guide 92 and the locking bolt 86 retracted therein, so that the latter no longer has to be held via the handle 104 and the front face of locking bolt head 102 correspondingly slides off the neighboring large surface of locking cam 88. The arcuate shape of the

locking cam 88 is laid out such that it prevents the locking bolt 86 from coming out of the guide 92 during the entire pivoting process.

During pivoting, the piston rod 44 of the compression cylinder 40, which is supported on the bridge web 68 in an articulated manner, retracts – this pivoting movement thus is performed against the pretension of the compression cylinder 40. This alone makes it more difficult to pivot the compression cylinder accidentally. In this retracted position of piston rod 44, the restoring force applied to support leg 2 by compression cylinder 40 is at its maximum. The linkage of the compression cylinder 40 to the support leg 2, i.e. the length and position of the lever arm 38 and the cylinder joint 42 as well as the position of the piston rod joint 46 on the bridge web 68 (base part 8) is selected such that the compression cylinder 40 reaches a dead center position with the maximum pretension force described above in an intermediate position between the two indicated positions (normal position, cross-over position).

When the support legs 2, 4 are pivoted further into the cross-over position, the coupling arm 22 is swung anticlockwise from the position shown in figure 2, so that the coupling link arrangement 36 correspondingly reaches the buckling position displayed in figure 5, in which the two pivot links 24, 26 are brought out of the extended position into a position, in which they extend almost parallel or are slightly inclined towards one another. In this cross-over position, the piston rod 44 has again somewhat extended out of the dead center position described above, with the support leg 2 and support leg 4 connected to it via the coupling link arrangement 36 being held in the cross-over position by the pretension applied by the compression cylinder 40. In this cross-over position, the support legs 2, 4, according to the illustrations of figure 5, are in contact with the inclined surfaces 14 and 16, respectively, of the base 8, which act as stops, while the two end sections 48, 50 of the support legs 2, 4 are raised from the tabletop 6.

If the support legs 2, 4 are now swung back into the higher position shown in figures 1 and 2, this can be done without actuating the locking device 5. When the coupling link arrangement 36 reaches the extended position shown in figure 2, the locking cam 86 then releases the guide 92 and thus the locking bolt 86, so that the latter

extends into the engagement position shown in figure 3 through the force of the tension spring 98 and engages behind the locking surface 90.

In the example described above, the locking device 5 is executed with spring-tensioned locking bolt 86, the locking cam 86 being formed on coupling arm 22. In principle, the locking bolt could also be designed on the coupling arm side or, for example, block the movement of the pivot links 24, 26. In principle, it is also conceivable to form the locking device such that it blocks pivoting of the coupling arm 22 in the area of the joint 20. Another solution is to adjust the joint bolt 88 via a sliding block guide that is formed so as to move the pivot bolt 88 or other locking element into the engagement position in a “forced” manner, so to speak, by means of axial displacement, rotation around the longitudinal axis or pivoting. In this case, it would then be preferable to pretension the locking bolt 88 in the direction of the release position, so that it automatically disengages when swinging back.

The position of the compression cylinder 40 is chosen so that in both positions, i.e. in the normal position shown in figures 1 and 2 and in the cross-over position illustrated in figures 6 and 7, the support legs 2, 4 are pretensioned through pretension of the compression cylinder 40 in the direction of the respective stop position and thus are reliably positioned. The dead center position of the compression cylinder 40 accordingly is between these two stop positions and can only be reached by overcoming the respective pretension, so that inadvertent or unintentional shifting and the associated change in the height of the piece of furniture is prevented.

In the embodiment described above, the base 8 and the coupling link arrangement 36 are made of a fiber-reinforced plastic material – but of course, these components can also be manufactured of metal, for example, or in a hybrid construction, with the base made of plastic and the coupling link arrangement made of metal.

In the embodiment described above, the support legs 2, 4 are attached to the respective joint plates 58, 60 of the base 8 via the joint projections 62, 64. In principle, the support legs can also be used in adapters, on which joint projections 62, 64 or other

joint arrangements are then provided for connection to the base 8. Such an adapter makes it possible to attach different support legs 2, 4 to the joint arrangement 8 with little effort, since the end section of the support legs 2, 4 only has to be laid out to the standard measure of the adapter.

Figure 6 shows a variant of the above-described embodiment, in which the structure of the locking device 5 is simplified compared to the afore-described solution. The basic structure of the piece of furniture 3 corresponds to that of the embodiment described above. Accordingly, four support legs 2, 2', 4, 4' are pivotably mounted on a frame 6 via pivot joints 9, 9' (the latter not visible), 10, 10', two pairs of support legs 2, 4 and 2', 4', respectively, being joined together via a crossbar 7, 7' to form a structural unit. In the illustrated embodiment, these pairs of support legs 2, 4 and 2', 4' each are formed in one piece with the crossbar 7, 7'. This can be done, for example, by injection molding or pressing. In the illustrated embodiment, the crossbars 7, 7' are not cylindrical or tubular as in the previously described embodiment, but are formed as a plate-shaped structure that connects the two pairs of support legs 2, 4 and 2', 4', respectively, along the area linked to the frame 6. A further particularity of the described embodiment consists in that the base 8, 8' carrying the coupling link arrangement 36 and the pretensioning device (compression cylinder 40) is formed in one piece with the frame 6, so that the latter likewise can be produced from plastic, for example, by injection molding or pressing.

Of course, a manufacture from metal or wood is also possible.

In the embodiment shown in figure 6, the locking device 5 according to the invention is provided on the pair of support legs 2', 4'. Naturally, the other pair of chair legs 2, 4, arranged on the right in figure 6, may also be provided with a corresponding locking device 5'.

In the embodiment shown in figure 6, the frame 6 is trough-shaped, with a bottom 108 and a peripheral wall 110 running approximately perpendicular to it, the peripheral wall 110 being raised in the area of the base 8, 8' and thus, as it were, laterally delimits

the base 8, 8'. As explained above, the frame 6 and the base 8, 8' are formed in one piece.

In the embodiment shown in figure 6, the locking device 5 has a snap-in nose 112 formed on the flat crossbar 7, which projects in the direction of a side cheek 114 of the peripheral wall 110. For secure latching, a latching protrusion 116 is arranged on this side cheek 114 of the peripheral wall 110 at a position corresponding to the snap-in nose 112, which the snap-in nose 112 engages from behind after latching. In figure 6, the pairs of support legs 2, 2', 4, 4' have not yet been pivoted into their higher U- or V-position, but are shown shortly before this position, in which the latching elements, i.e. the latching protrusion 116 and the snap-in nose 112, are not yet latched. As can be seen from figure 6, these two latching elements are arranged approximately in the middle between the two support legs 2', 4'. Of course, the position can also be selected differently depending on the circumstances and the desired aesthetic appearance.

Figure 7 shows the latching elements in the locking position, with the area in figure 6 in which the locking elements are formed being cut away and shown enlarged. This illustration shows that the flat strut 7 is formed with an L-shaped protruding base 118 towards the frame 6, on which base the snap-in nose 112 is arranged. As already mentioned, this protrudes towards the side wall 114 and has on its side at the bottom of figure 7, an inclined run-up surface 120 which, when the support legs 2', 4' are pivoted into their U-/V-position, runs up onto the locking protrusion 116 formed on the side cheek 114 and slides off the locking protrusion 116 due to the inclined position of the run-up surface 120, this sliding-off being made possible during pivoting of the support legs 2', 4' by elastic deflection of the snap-in nose 112 and the latching protrusion 116, respectively. Accordingly, the wall thicknesses and the material in the latching area are selected so as to allow for elastic deformation. The latching protrusion 116 accordingly has an inclined guide surface 121, on which the run-up surface 120 slides off when the support legs 2', 4' pivot.

In the fully pivoted state (figure 7), the supporting surface 122 engages behind a locking surface 124 of latching protrusion 116, which is located at the bottom in figure 7, so that the support legs 2', 4' are locked/latched in their U-/V-position. This latching can

only be released with a comparatively large amount of force, whereby the latching is then released by applying the support legs 2', 4' in the direction of the cross-over position and corresponding elastic deformation of the snap-in nose 112 and/or the latching protrusion 116. This resistance/release force is selected such that the release is only possible consciously.

As explained above, the pretensioning device, specifically the compression cylinder 40 in the described embodiments, is arranged at the base 8 located at the front in figure 6, while the coupling link arrangement 36 is provided in the area of the other base 8'.

Figure 8 shows a section through base 8, so that the compression cylinder 40 is visible. As explained above, the compression cylinder has a piston rod 44 that engages with the lever arm 38 of the joint arrangement 10. In the illustrated embodiment, the compression cylinder 40 is designed as a spring cylinder with a spring 123 that acts on the piston rod 44 in the direction of its extended position, i.e. in the direction of the U-/V-position of the support legs 2, 4. The coupling of the cylinder 40 to the base 8 is not performed in the area of a cylinder base 126, but offset towards the piston rod 44, so that, correspondingly, the cylinder joint 42 is offset towards the piston rod 44 with respect to the cylinder base 126. As explained above, this approximately central linkage of the compression cylinder 40 optimizes the over-dead-center effect vis-à-vis the solution initially described, in which linkage of the cylinder is effected on the cylinder bottom side, and accordingly also optimizes the introduction of force in the respective end positions (cross-over position and U-/V-position of the support legs 2, 2', 4, 4'), so that they are subjected to a comparatively large preload force in the direction of their end positions.

Figure 9 shows a variant of the embodiment according to figures 6 and 7, wherein the design of the snap-in nose 112 on crossbar 7 corresponds to that of figure 6, so that further explanations in connection with the snap-in nose 112 are dispensable.

In the embodiment shown in figure 9 in the latched position, the elasticity of the latching protrusion 116 is essentially set by a relief cut, this relief cut being made via two

slots 128, 130, whose distance b corresponds to the width of the latching protrusion 116. The geometry of the slots 128, 130 is chosen such that the desired elasticity during latching and thus also the force required for establishing and releasing the latching is achieved. For better disengagement, in the embodiment according to figure 9, a handle 104 is provided on the upper side, i.e. on the side remote from the slot base, via which the force to be applied for disengagement can also be applied by pulling on the handle 104 or by pivoting the handle 104 downwards (arrow in figure 9). This handle 104 can be formed integrally on the side cheek 114 of the peripheral wall 110. This lug-shaped handle 104 protrudes from the side cheek 114 and is thus well accessible without disturbing the design of the piece of furniture.

Figure 10 again shows a sectional view of the area in which the snap-in nose 112 and the latch protrusion 116 are formed. As explained, the piece of furniture 3 is shown in the latched position, with the supporting surface 122 of the latch 112 engaging the locking surface 124 of the latch protrusion 116 from behind. In this illustration, the second slot 130, which is not visible in figure 9, also is to be seen. As explained, the handle 104 protrudes from the side cheek 114 of the frame 6, in the rearward extension of the latching protrusion 116 so to speak, so that enough of the lever arm 38 is provided for releasing the latch.

As explained above, such latching can also be provided in the area of the coupling link arrangement 36 or the like. In the above-described embodiments, the latching protrusion can also be formed by a latching recess in the side cheek 114, into which the latching protrusion 112 then snaps. Of course, in kinematic reversal, also the latching recess can be formed on the crossbar 7 and the snap-in nose 112 can then be formed correspondingly on the side cheek 114.

In an embodiment shown in figure 11, the two concepts described above in the broadest sense are combined with each other with a locking bolt / locking slide and a latch in the area of crossbars 7, 7'. In figure 11, the piece of furniture 3 is illustrated similarly to the representation according to figure 6 in a view from below looking at the support leg-side surface of the bottom 108.

In this embodiment, too, the locking / latching occurs in the area of the flat crossbars 7, 7', via which the chair legs 2, 4 and 2', 4', respectively, are connected to one another. Two locking slides 134, 134' are guided along the floor 108 via guides 132, so that they can be adjusted from the locking position shown in figure 11 in the direction of the arrow towards a release position. In the illustrated locking position, each locking slide 134, 134' engages in a locking recess 136 indicated on crossbar 7, so that the two pairs of support legs 2, 4; 2', 4' each are fixed / locked in their U-/V-position. In this case, the locking slide 134 can be, for example, pretensioned in the direction of the locking engagement by means of a spring or other pretensioning device, so that the release has to take place against such pretensioning.

In principle, however, the locking slide 134 can also be guided such that it can be adjusted into the locking position or into the release position without pretension, so that locking can only be brought about consciously. When pretensioned, the locking slide 134 engages automatically, so to speak, in the locking recess 136 when the pairs of support legs 2, 4; 2', 4' each have reached their U/V position. The locking slide 134 can also be fixed in a release position with pretensioning, so that the locking can only be carried out consciously by releasing the locking slide 134.

Disclosed are a joint arrangement and a piece of furniture executed with such a joint arrangement. The joint arrangement is used to connect support legs to the piece of furniture, for synchronization of a pivoting movement of two associated support legs, a coupling link arrangement being provided which is arranged offset to a pretensioning device, via which the support legs are pretensioned into two positions, preferably a normal position and a cross-over position. According to the invention, the joint arrangement is releasably fixed in position by a locking device in one of the positions, preferably in the normal position, so that inadvertent adjustment is excluded.

List of reference signs:

1,1´ Joint arrangement

2, 2´ Support leg

3 Piece of furniture

4, 4´ Support leg

5 Locking device

6 Frame

7, 7' Crossbar

8, 8´ Base

9, 9´ Pivot joint

10, 10´ Pivot joint

12 Stand space

14 Inclined surface

16 Inclined surface

18 Apex surface

20 Joint

22 Coupling arm

24 Pivot link

26 Pivot link

28 Coupling joint

30 coupling joint

32 Leg joint

34 Leg joint

36 Coupling link arrangement

38 Lever arm

40 Compression cylinder

42 Cylinder joint

44 Piston rod

46 Piston rod joint

48 End section

50 End section

52 Swivel bracket

54 Swivel bracket

56 Joint plate

62 Joint protrusion

66 Joint bolt

68 Bridge web

70 Joint bolt

72 Joint attachment

74 Link attachment

76 Joint bolt

78 Joint bolt

80 Joint bolt

82 Step-down

84 Step-down

86 Locking pin

88 Locking cam

90 Locking surface

92 Guide

96 Actuating section

98 Tension spring

100 End face

102 Locking pin head

104 Handle

106 Pull strap

108 Bottom

110 Peripheral wall

112 Snap-in nose

114 Side cheek

116 Latching protrusion

118 Base

120 Run-up surface

121 Guide surface

122 Supporting surface

123 Spring

124 Locking surface

126 Cylinder base

128 Slot

130 Slot

132 Guide

134, 134' Locking slide

136 Locking recess

Patentkrav

1. Møbel (3) med støtteben (2, 4) og med en hængselsindretning til at forbinde støttebenene (2, 4), med et koblingsledarrangement (36), som har en drejelig koblingsarm (22), der er monteret på en sokkel (8), og hvis endeafsnit er direkte eller indirekte forbundet med støttebenene (2, 4) på en sådan måde, at disse kan drejes til højdejustering mellem en sakse- eller krydsposition og en højere parallel-, U- eller V-position, og med en forspændingsindretning til forspænding af mindst et støtteben (2, 4) i det mindste i retning af en af positionerne, **kendetegnet ved** en låseindretning (5) til aftagelig låsning af koblingsledarrangementet (36) på en kraft- eller formpasningsmåde eller støttebenene (2, 4) i en af positionerne, fortrinsvis i den højere position.

2. Møbel (3) ifølge krav 1, hvor låseindretningen har et låseelement, fortrinsvis en forspændt låsebolt (86) eller en låseskinne (134), som i låsestillingen kan bringes i kraft- eller formlåsende operativ indgreb med koblingsledarrangementet (36) eller med mindst et støtteben (2, 2', 4, 4') og derved fortrinsvis nedsænkes i en udsparing i koblingsledarrangementet (36) eller i en låseudsparing (136) af et støtteben (2, 2', 4, 4') eller støttebenspar eller griber ind bag en låseflade (90).

3. Møbel (3) ifølge et af de foregående krav, med to drejelige led (24, 26), som på den ene side er leddelt forbundet med koblingsarmen (22) og på den anden side er leddelt forbundet med et af støttebenene (2, 4), hvor låsebolten (86) fortrinsvis er ført på soklen (8), og der på koblingsarmen (22) er anbragt en låsekam (88), hvorpå udsparingen eller låsefladen (90) er udformet.

4. Møbel (3) ifølge krav 3, hvor låsebolten (86) under justeringen fra den nedre position mod den højere position i sektioner ligger an mod låsebolten (88) på en glidende måde.

5. Møbel (3) ifølge et af de foregående krav, med en glidestyring, der er indrettet til at overføre låseelementet, især låsebolten (86), til låsepositionen under drejning af koblingsarmen (22).

6. Møbel (3) ifølge krav 1, hvor låseindretningen er udformet som en låseanordning med låseelementer, hvor en låsetap (112) fortrinsvis i en position af støttebenene (2, 4) griber ind bag et låsefremspring (116) eller nedsænkes i en låseudsparing.

7. Møbel (3) ifølge krav 6, hvor låsningen sker ved elastisk deformation af mindst et af låseelementerne.

8. Møbel (3) ifølge krav 6 eller 7, hvor mindst to støtteben (2, 4; 2', 4') er forbundet via en tværstang (7, 7'), på hvilken et af låseelementerne er dannet, som kan bringes i låseindgreb med det andet låseelement, som er udformet på en ramme (6), der understøttes af støttebenene (2, 2', 4, 4').

9. Møbel (3) ifølge et af kravene 6 til 8, hvor mindst et låseelement er skåret frit i sektioner.

10. Møbel (3) ifølge et af de foregående krav, med et håndtag (104) til manuel udløsning af låseindretningen (5), hvor håndtaget (104) fortrinsvis har en trækflig (106).

11. Møbel (3) ifølge et af de foregående krav, hvor forspændingsindretningen har en dødpunktsposition, i hvilken en maksimal forspænding er effektiv, hvor forspændingsindretningen er indrettet til at nå dødpunktspositionen mellem de to positioner af støttebenene (2, 4), så forspændingen i begge positioner reduceres i forhold til dødpunktspositionen.

12. Møbel (3) ifølge krav 2 eller et af kravene vedrørende krav 2, hvor soklen (8) har to drejelige konsoller (52, 54), hvor der til hver især er hængslet et støtteben (2, 4), og som er anbragt med en tværgående forskydning, hvor de drejelige konsoller (52, 54) af soklen (8) er forbundet med en broskinne (68), på hvilken koblingsarmen (22) er drejeligt monteret, og i hvilken låsebolten (86) er ført.

13. Møbel (3) ifølge et af de foregående krav, hvor forspændingsindretningen er en cylinder eller en fjeder (123), fortrinsvis en trykcylinder (40) eller en tryk-fjeder.

14. Møbel (3) ifølge krav 13, hvor trykcylinderen (40) har en cylinder, i hvilken en stempelstang (44) er ført udtrækkeligt, hvor en drejelig montering af cylinderen finder sted i området mellem endeafsnittet på stempelstangssiden og en cylinderbund (126).

15. Møbel (3) ifølge krav 2 eller et af kravene vedrørende krav 2, hvor låsebolten (86) er fjederbelastet.

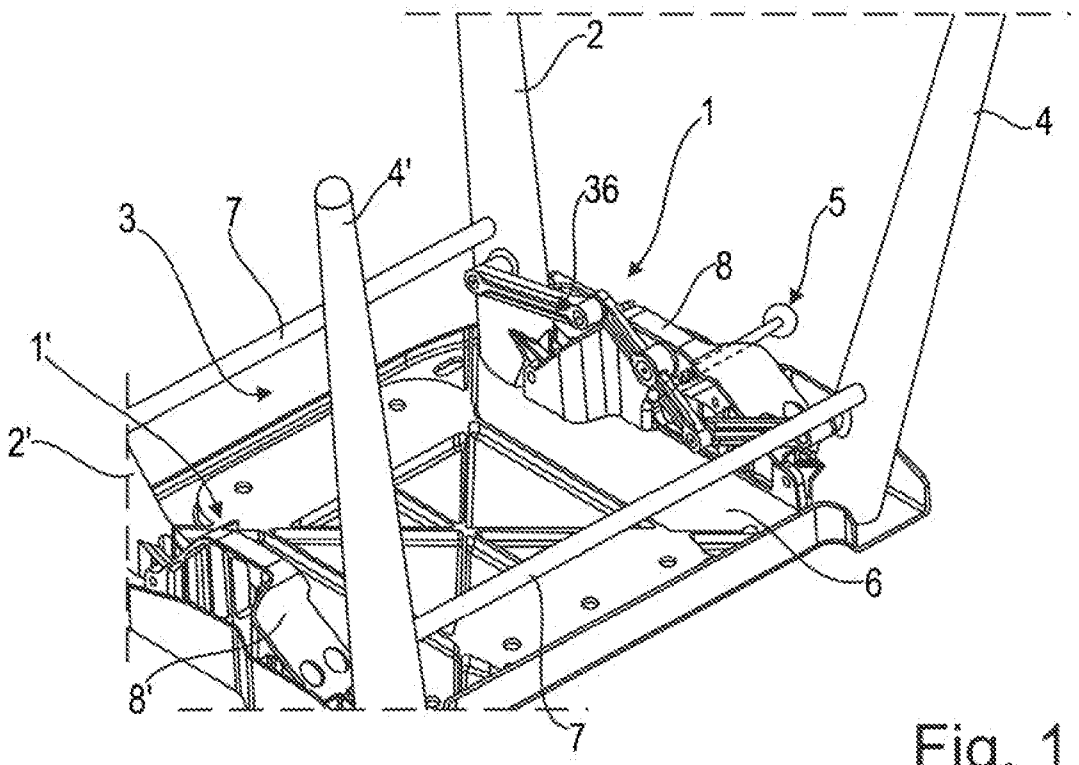
2
1
4
4'
36
5
3
7
8
1'
2'
6
8'
7

Fig. 1

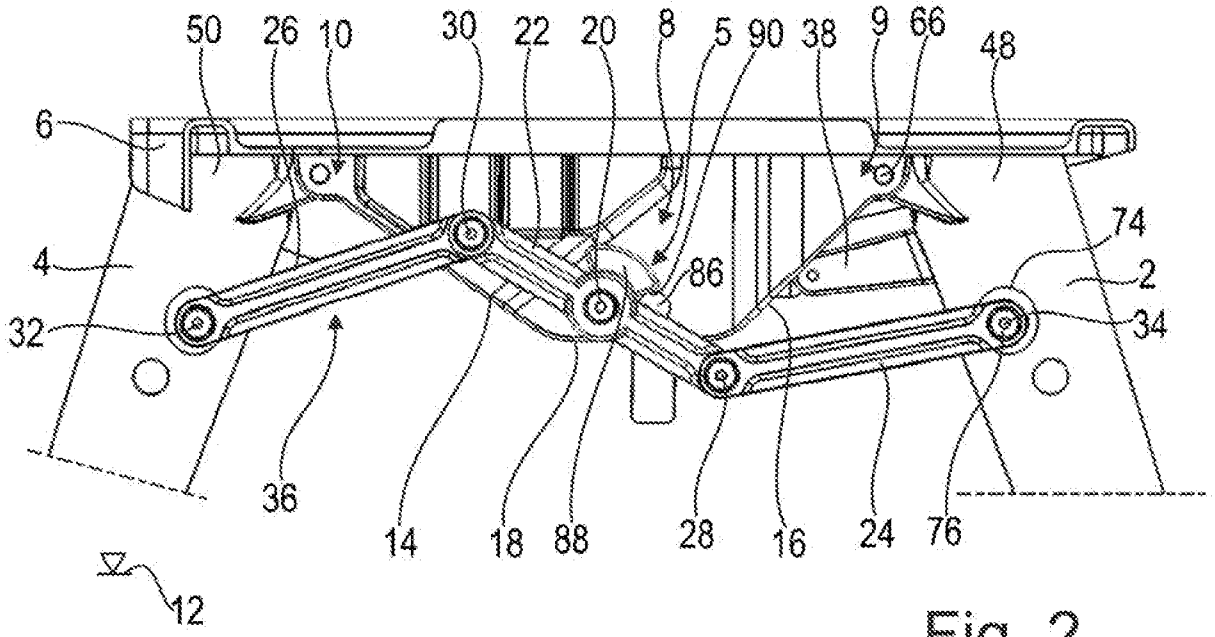
50
26
10
30
22
20
8
5
90
38
9
66
48
6
74
4
86
2
32
34
36
14
18
88
28
16
24
76
12

Fig. 2

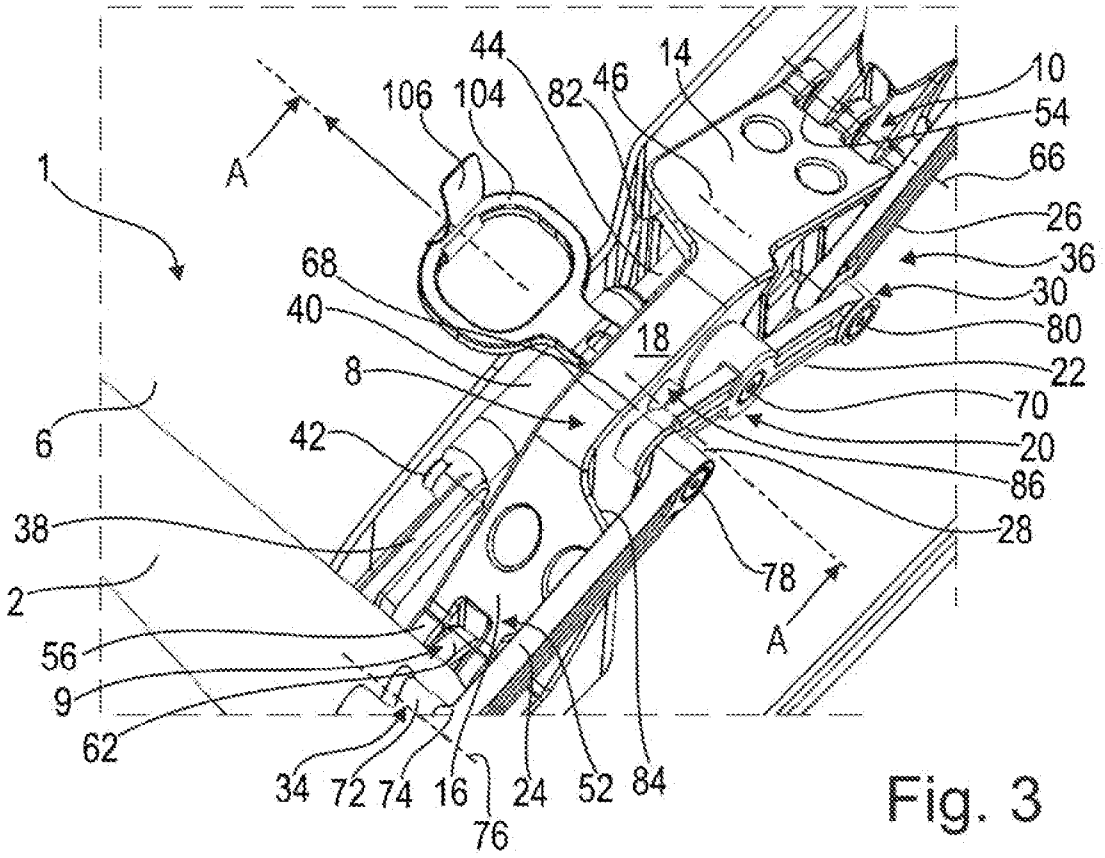

Fig. 3

Section A-A

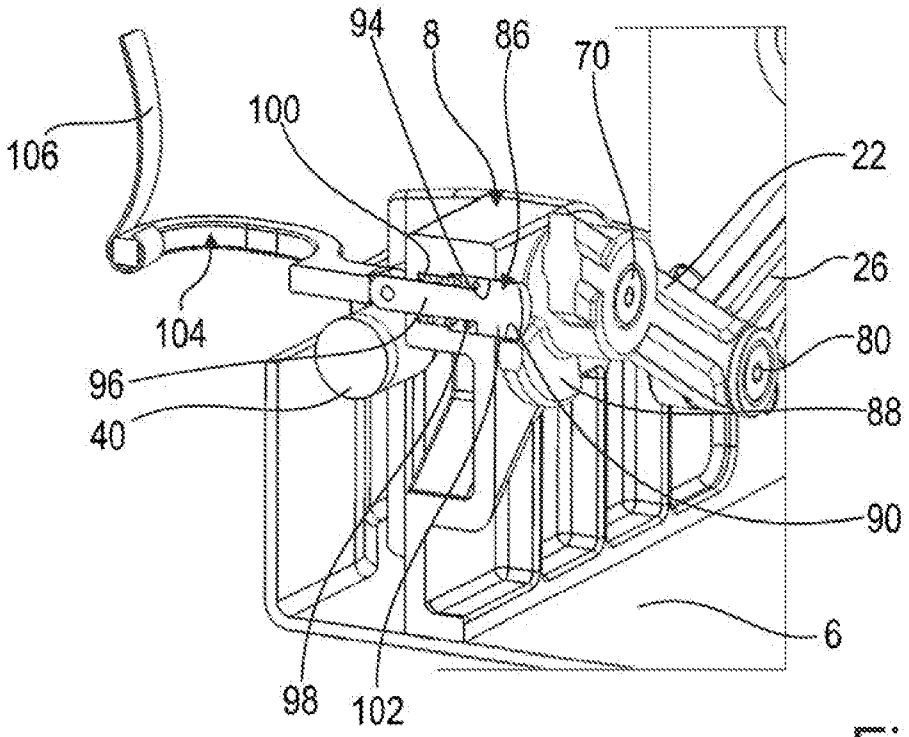

Fig. 4

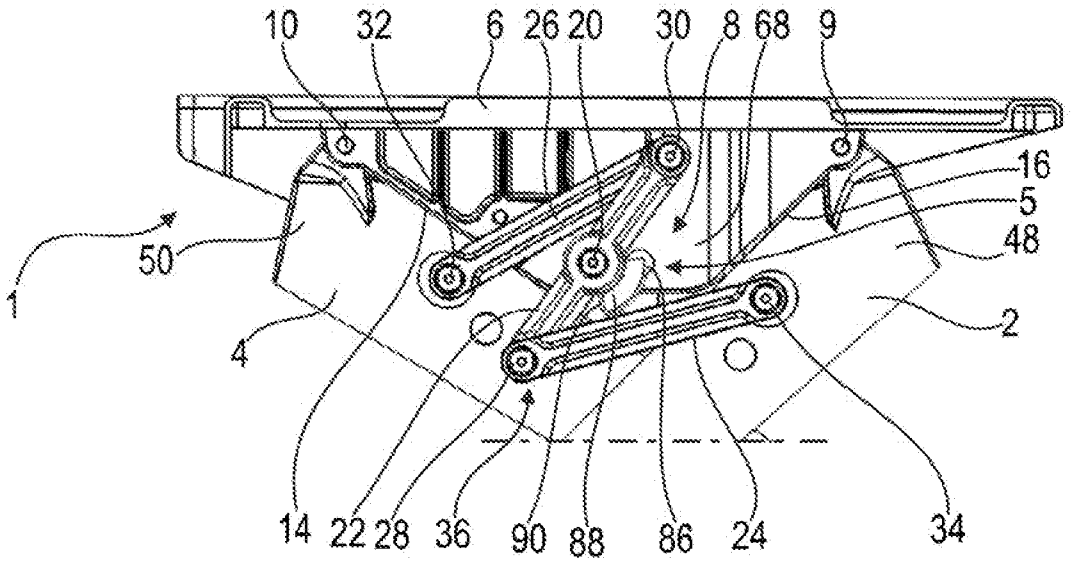

Fig. 5

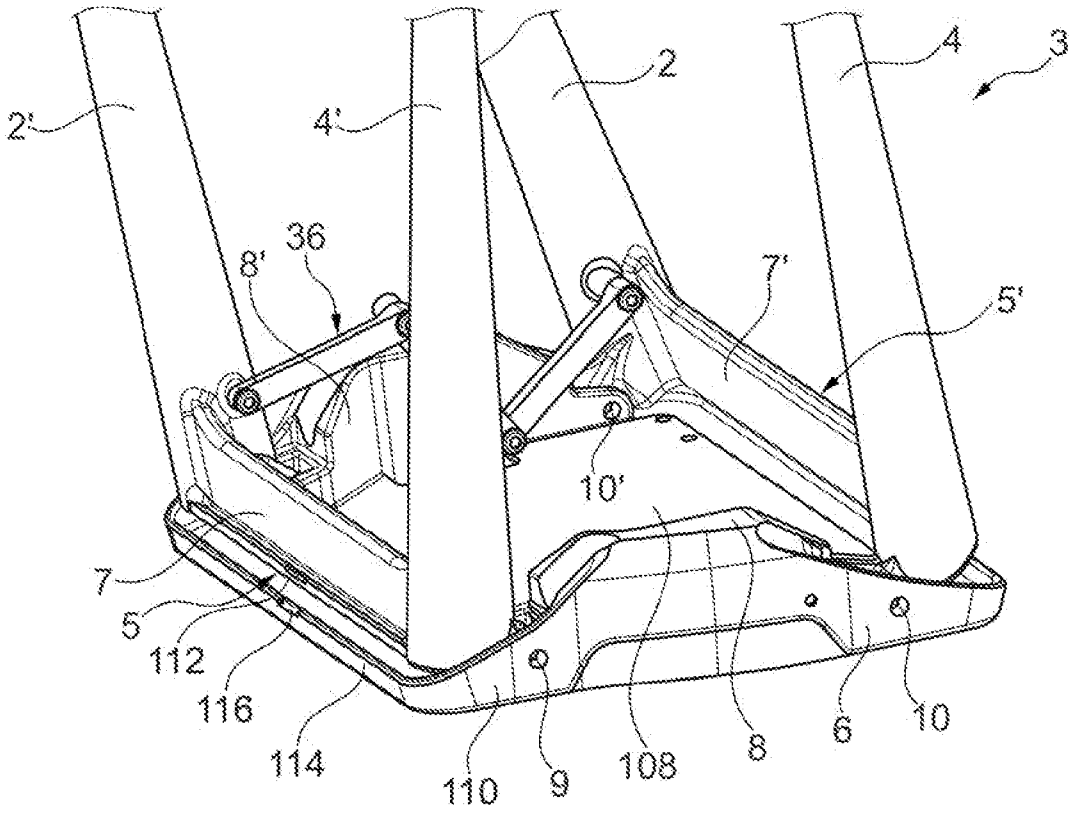
2'
4'
2
4
3
8'
36
7'
5'
10'
7
5
112
116
114
110
9
108
8
6
10

Fig. 6

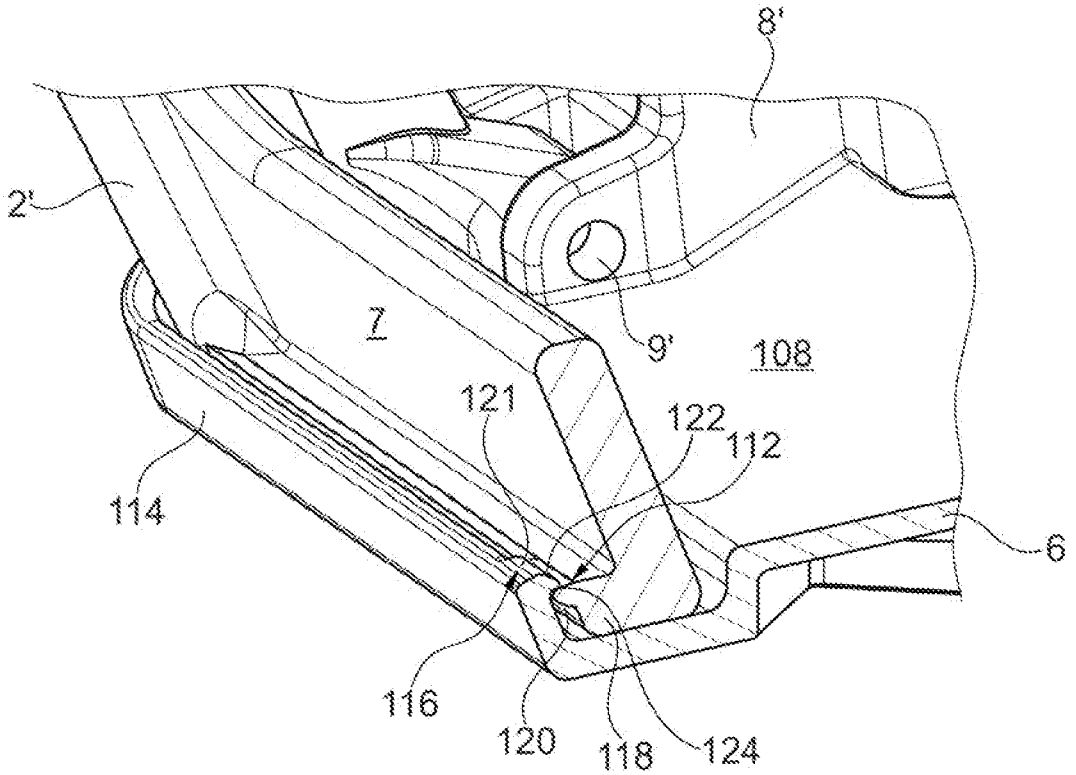
8'
2'
Z
9'
108
121
122
112
114
6
116
120
118
124

Fig. 7

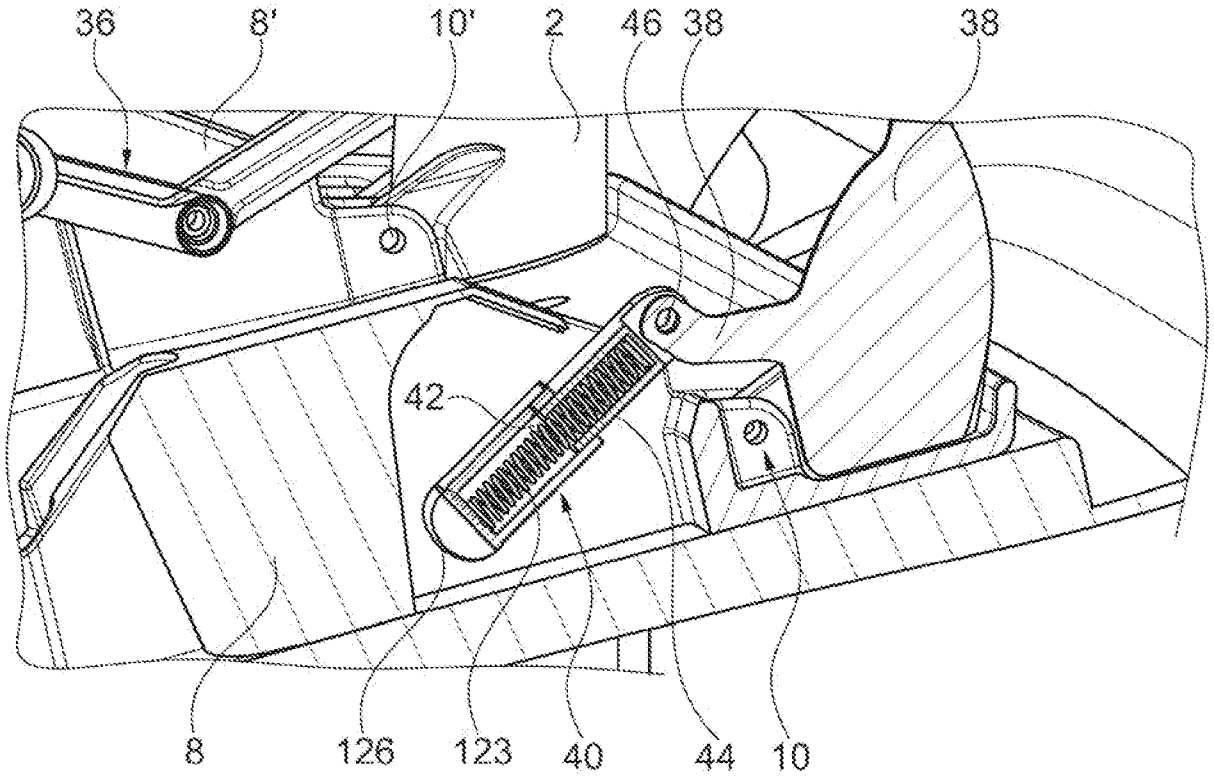

Fig. 8

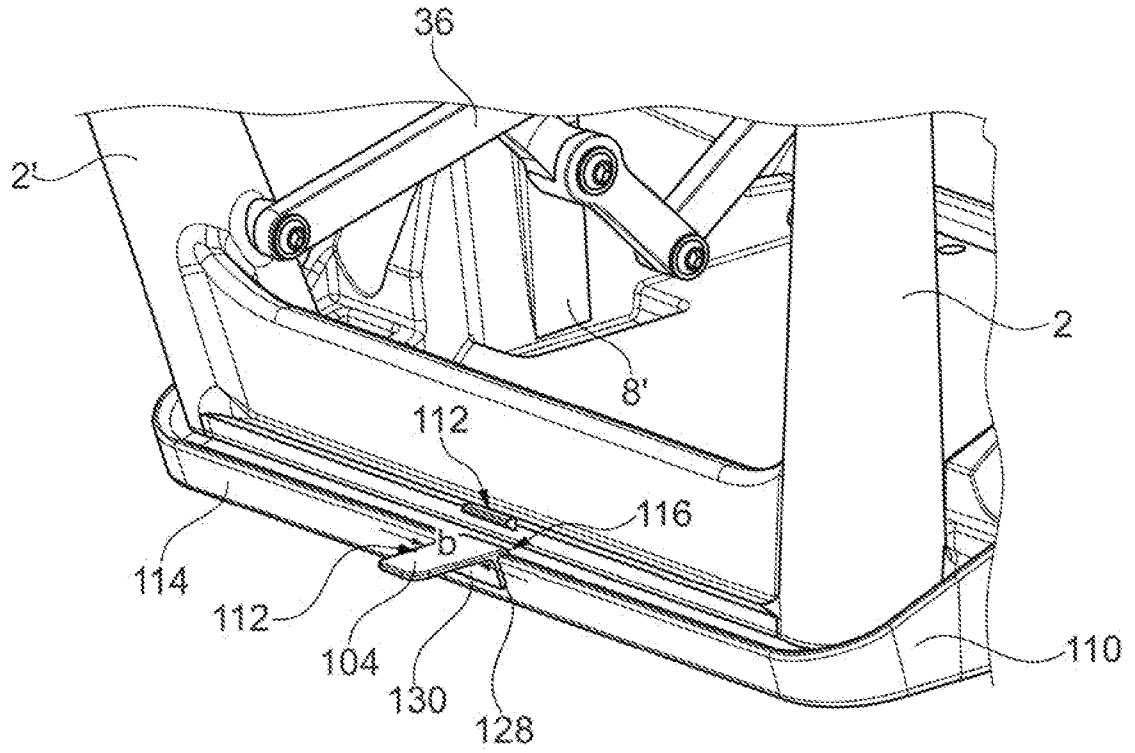
36
2'
2
8'
112
116
b
114
112
104
130
128
110

Fig. 9

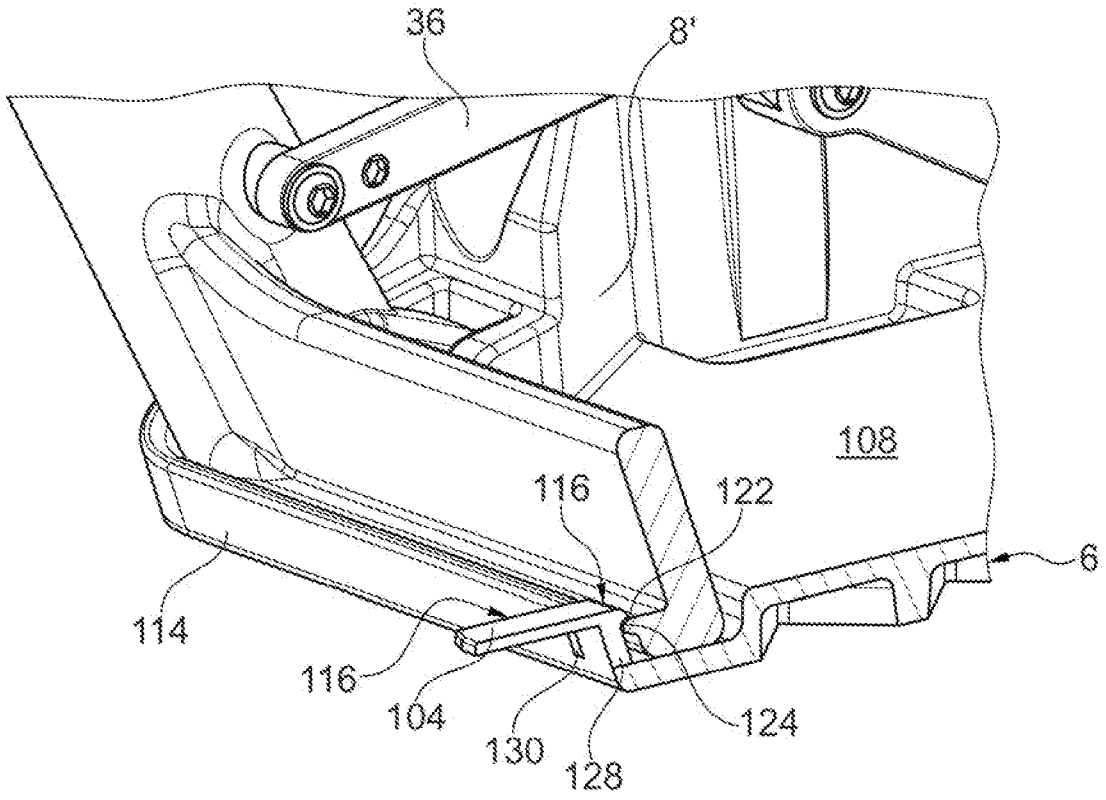
36
8'
108
116
122
6
114
116
104
130
128
124

Fig. 10

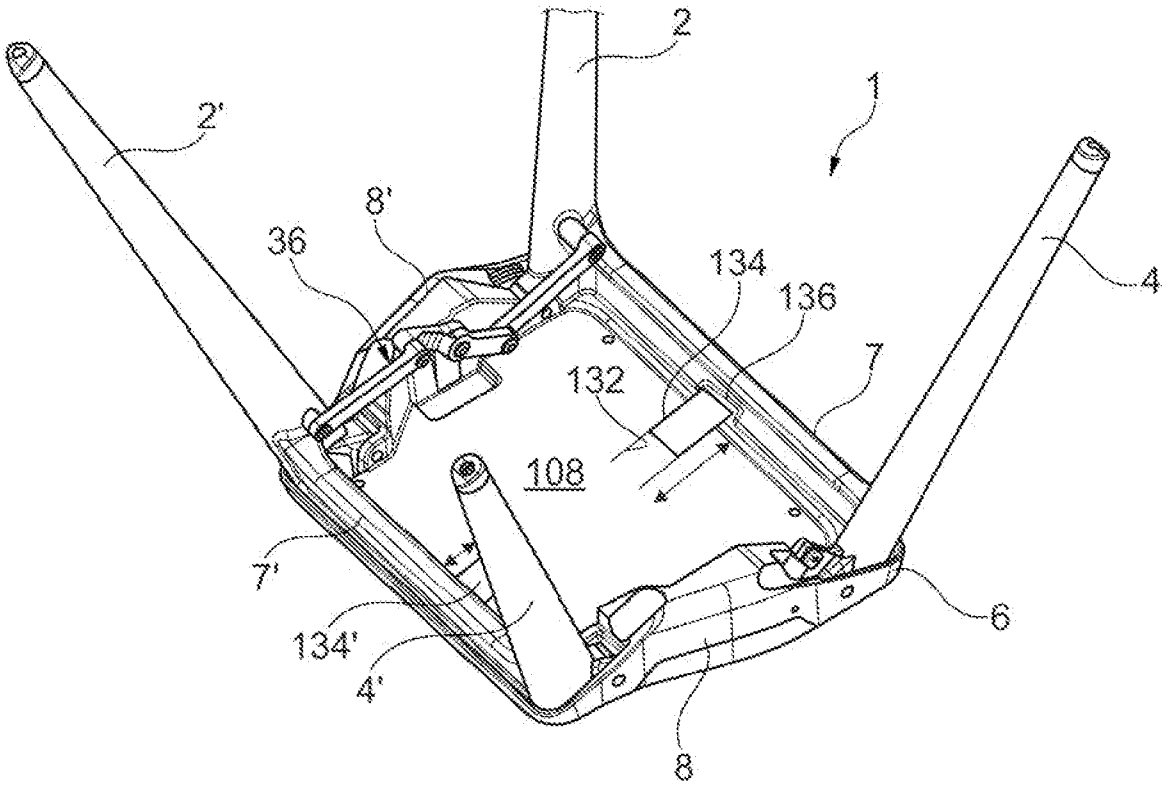

Fig. 11