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(54) **Device for quickly coupling a backrest**

(57) Device for coupling the backrest frame (2) with the base structure (3) of a chair (1), comprising hooking means (A) for removably connecting the backrest frame (2) to the base structure (3), or the seat frame, of the chair (1) and fixing means (F) to reversibly fix the backrest frame (2)to the base structure (3), or the seat frame, of the chair (1), characterized in that said hooking means (A) comprise a constraint providing the backrest frame (2) with at least one rotational degree of freedom in relation to the base structure (3), or the seat frame, of the chair (1) and in that said fixing means (F) comprise at least one device for reversibly locking the rotation of the backrest frame (2) with respect to the base structure (3), or the seat frame, of the chair. (1)

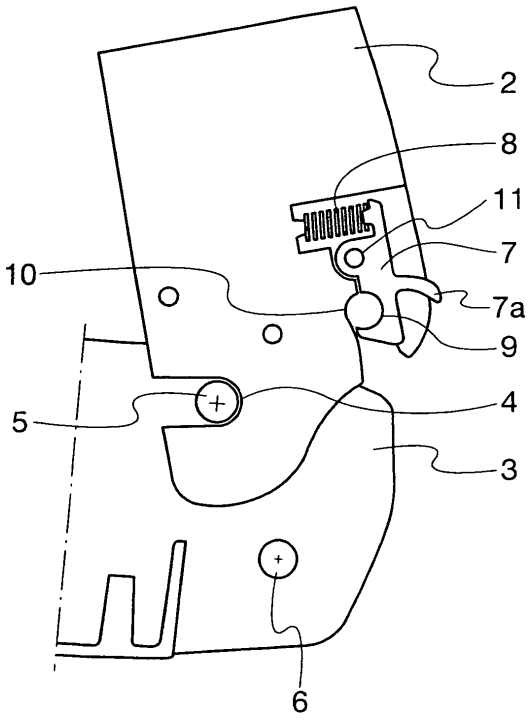

Fig. 4

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Description

Field of the invention

[0001] The present invention relates to the field of chairs, particularly the field of office chairs. In more detail, the present invention relates to a device for quickly coupling the backrest to the base structure or to the seat of a chair.

State of the Art

[0002] As known from the background art it is possible for the user to partially or totally assemble the backrest and the seat of an office chair, right on site. This allows reducing the size of the chair packaging, such that it becomes handier and easy to transport.

[0003] The Patent Application US 2012/0019038, for example, describes a backrest provided with an L-shaped rigid rod whose long side is inserted inside the backrest frame and short side sticks out. The protruding end of the rod is provided with holes to quickly fix the short side of the L-shaped rod to the base structure of the chair, or to the seat frame if not included in the base structure. Screws can pass through such holes, the screws being adapted to engage the same number of threaded holes found on the base structure of the chair, at the underside of the seat. The user can therefore assemble the chair right on site and possibly disassemble it simply unscrewing the threaded screws, disengaging them from the corresponding holes.

[0004] Even though this device provides an easy coupling of the backrest to the base structure of the chair without using an especial tool but only a common screwdriver, during assembling it proves to be awkward, because it is necessary to place the seat upside down on the floor in order to engage the backrest. Moreover, because of the operation complexity, at least two people will be probably required, the first to hold the backrest and the second to simultaneously engage the screws to the holes. Thus, the assembling method takes long time, nullifying the advantage of not using specific tools. Furthermore, on the first try the holes found on the rod may not line up exactly with those found on the seat, forcing the user to repeat the operation again and again, such that the time required for the backrest assembling prolongs further.

[0005] Finally, since the device described in the Application US 2012/0019038 cannot assure that the backrest firmly hold the seat, it will be necessary to tighten again the screws whenever they loose.

[0006] As an alternative to this device, the assembly of the backrest to the base structure of an office chair by means of snap hooking means is known.

[0007] For example, the European Patent EP 1112706 describes this solution, wherein the backrest frame is provided with an L-shaped rigid rod with a protruding side adapted to be inserted inside a housing formed in the supporting structure of the chair seat. The coupling mechanism makes use of two sliders, the first arranged on the L-shaped rod and the second arranged inside the seat. In particular, when the rod is inserted in the seat, a pressure is exerted on it causing the two sliders to engage in convenient recesses obtained inside the structure supporting the seat.

[0008] Although the invention allows a quick coupling of the backrest to the seat without tool use, the possible removal of the backrest from the seat proves to be inconvenient and complicated.

[0009] The engaging mechanism for the two sliders is actually permanent and it is not possible to carry out reverse disassembling operation, unless a tool is used (such as a screwdriver) to force the uncoupling of the upper slider through an open hole obtained on the upper surface of the seat.

[0010] According to another modification known in the art, the partial release of the backrest can be achieved by the use of spring mechanisms.

[0011] This solution is described in Korean Patent KR101007505, which describes a chair having a spring mechanism in its armrest, which, when activated by a specific lever, releases a coupling pin between the armrest and the backrest, consenting independent rotation of the backrest in relation to the seat.

[0012] Thus, the backrest is freely tiltable with respect to the seat, but it is impossible to uncouple it from the seat. In fact, the backrest is irreversibly hinged to the chair armrest. It is therefore an object of the present invention to go beyond the limits of the known prior art, solving the aforementioned problems of the latter concerning the coupling of a removable backrest to a chair.

[0013] Another object of the present invention is to create a device, being actually reversible, for quickly coupling the backrest to the seat of a chair so as to allow to completely uncouple the backrest from the seat without difficulty, and to obtain a small package during the respective chair delivery. As a result, the chair is much more handy, and transportable.

[0014] A further object of the present invention is to create a device for quickly coupling the backrest to the base structure or to the seat of a chair, which can be user-friendly.

Summary of the invention

[0015] The present invention achieves these and other objects through a device for coupling the backrest frame to the base structure or to the seat frame of a chair, the device comprising hooking means for removably connecting the backrest frame to the base structure or to the seat frame of the chair and fixing means to reversibly fix the backrest frame to the base structure or to the seat frame of the chair. These hooking means comprise a constraint providing the backrest frame with at least one rotational degree of freedom in relation to the base structure or to the seat frame of the chair and the fixing means

comprise at least one device for reversibly locking the rotation of the backrest frame with respect to the base structure or to the seat frame of the chair.

[0016] This solution allows to quickly and easily couple and uncouple the backrest frame from the base structure or from the seat frame of a chair, without using further tools to engage the two parts.

[0017] According to an aspect of the present invention, the hooking means comprise at least one pin and at least one open- profile hook for removably coupling with said at least one pin, wherein said at least one pin is integral with the base structure, or to the respective seat frame, of the chair and said at least one hook is integral with the backrest frame, or vice versa.

[0018] According to another aspect of the present invention, the at least one hook is "U" shaped.

[0019] During the engaging step, the hook provides stability and at the same time, if the chair should be disassembled, allows also the user to completely uncouple the backrest frame from the base structure or from the seat frame, thanks to its open- profile.

[0020] According to another aspect of the present invention, the locking device of said fixing means is selectively operable by hand between a fixing position and a releasing position of the rotation of the backrest frame with respect to the base structure, or with respect to the seat frame, of the chair.

[0021] According to another aspect of the present invention the locking device comprises an actuating lever or an actuating slider and a matching part for reversibly locking the actuating lever or actuating slider. The actuating lever, or the similar actuating slider, is constrained to the backrest whereas the matching part is constrained to the base structure, or to the seat frame, of the chair, or vice versa.

[0022] According to another aspect of the present invention, the locking device comprises elastic means acting on the actuating lever or actuating slider.

[0023] According to another aspect of the present invention, the locking device comprises an actuating lever having an open- profile end for coupling to the matching part that is pin-shaped, wherein the actuating lever is hinged to the backrest frame and the pin-shaped matching part is integral with the base structure, or with the seat frame, of the chair, or vice versa.

[0024] According to another aspect of the present invention, the open-profile end of the actuating lever is U-shaped with its concavity facing upward, when the end engages the pin-shaped matching part.

[0025] The presence of the lever allows the user to easily and quickly couple and uncouple the device, without using any tools, but merely lifting up or lowering the lever by hand such that the U-shaped profile engages or disengages the pin-shaped matching part. According to another aspect of the present invention, the pin-shaped matching part and the pin for the hook of said hooking means are integral with the base structure, or with the seat frame, of the chair, whereas the actuating lever and the hook are constrained to the backrest frame. The backrest frame comprises at least one slide profile for sliding on the pin-shaped matching part.

[0026] According to a further aspect of the present invention, the slide profile partly precedes the open-profile end of said actuating lever.

[0027] The present invention further concerns a method for coupling the backrest frame to the base structure, or to the seat frame, of a chair, comprising a coupling device to couple the backrest frame to the base structure, or to the seat frame, of the chair provided with hooking means for removably connecting the backrest frame to the base structure, or to the seat frame, of the chair, and fixing means to reversibly fix the backrest frame to the base structure, or the to seat frame, of the chair, characterized in that said hooking means comprise a constraint providing the backrest frame with at least one rotational degree of freedom in relation to the base structure, or in relation to the seat frame, of the chair and in that said fixing means comprise at least one device for reversibly locking the rotation of the backrest frame with respect to the base structure, or with respect to the seat frame, of the chair, the method comprising in sequence the steps of:

a) coupling the hooking means with each others;
b) rotating the backrest frame about the hooking means;
c) engaging the fixing means to each others;
d) constraining firmly and reversibly the backrest frame to the base structure, or to the seat frame, by means of the locking device.

[0028] According to an aspect of the present invention, the method provides the use of hooking means comprising at least one pin and at least one open-profile hook for removably coupling with said at least one pin, wherein said step a) comprises the step of:

a.1) inserting said pin into said hook.

[0029] According to a last aspect of the present invention, the method provides that said backrest frame comprises at least one slide profile for sliding on at least one pin-shaped matching part, and wherein said step c) comprises the step of:

c.1) sliding the matching part inside the slide profile.

Brief description of the drawings

[0030] Further characteristics and advantages of the present invention will be more evident from the following description, made for illustration purposes only and without limitation, with particular reference to the accompanying schematic drawings, wherein:

- Figure 1 is a side section of the backrest seat totally

engaged to the base structure of a chair;
- Figure 2 is a side section of the backrest seat partially engaged to the base structure of a chair;
- Figure 3 is a side view of the backrest frame without the locking device, and the base structure during disengaging step;
- Figure 4 is a detail of the backrest frame and the base structure when the hooking means A are mutually engaged;
- Figure 5 is a detail of the backrest frame and the base structure when the hooking means A are mutually engaged and the fixing means F are partially and mutually engaged;
- Figure 6 is a detail of the backrest frame and the base structure totally and mutually engaged.

Detailed description of a preferred embodiment of the present invention

[0031] Referring to figures, and particularly to figure 1, the device for quickly coupling the backrest to the base structure or to the seat of a chair 1, according to the particular embodiment of the present invention herein described, allows a backrest frame 2 - the upper part S of which is outlined only in figure 1, this upper part S being intended to support the backrest frame and being incident or orthogonal to the lower part of backrest frame 2 that is shown in the rest of the figures - to couple with a base structure 3 that is integral with, or anyway constrained to, the chair base itself.

[0032] It is necessary to point out that in this context the term "base structure" means the substantially rigid member of a chair, joined to the pedestal or the base of the chair, which is intended to support the seat attached thereto, with or without a respective seat frame, and the backrest, attached to such an element through a respective backrest frame.

[0033] It should be also noted that, in the embodiment of the invention described herein, the backrest frame 2 is intended to be coupled to the base structure 3 of a chair, but, as it will be apparent to those skilled in the art, the same invention can be easily implemented with a backrest frame 2 intended to be coupled to a seat frame of a chair, without for this reason departing from the herein required protection scope.

[0034] It should be noted that with the definition "backrest frame" is meant a supporting frame of the backrest and generally any rigid portion of the latter, usually not designed to directly contact the user's back.

[0035] Further, it should be noted, for a complete treatise, that herein the backrest of a chair means the chair portion where the user's back lays, whereas the seat means the chair portion where the user sits; whereas, as mentioned, the term "base structure" means the member directly carrying the seat or a seat frame, in addition to the backrest frame, and that is intended to be joined to a pedestal in a known manner, or to a base possibly provided with wheels to allow the displacement thereof.

[0036] According to the present invention, the device comprises hooking means A and fixing means F, allowing the backrest seat 2 and the base structure 3 to engage reversibly and reliably.

[0037] The hooking means A comprise a constraint of the kind with engagement of complementary juxtaposed parts that does not allow, in itself, to firmly engage the backrest seat 2 to the base structure 3, whereas the fixing means F substantially allow to lock the previously mentioned hooking means A in the engaging position of the backrest frame 2 to the base structure 3 of the chair.

[0038] In more detail, the hooking means A are shaped so as to provide the quick coupling and uncoupling of the backrest frame 2 to the base structure 3 of the chair providing as well the backrest seat 2 with at least one rotational degree of freedom in relation to the base structure 3. In the illustrated embodiment, the hooking means A provide only one rotational degree of freedom. However, possible modifications of the present invention comprise embodiments wherein the hooking means A allow the backrest frame 2 to have at least a further degree of freedom in relation to the base structure 3 of the chair. In the embodiment of the present invention herein illustrated, referring also to figures 2 and 3, the hooking means A comprise at least one hook 4 obtained in the backrest frame 2 and at least one corresponding pin 5 protruding from and integral with the base structure 3 of the chair.

[0039] The hook 4 has an open, U-shaped profile, which may be removably coupled to the pin 5. Particularly, this U-shaped open-profile together with the structure of the frame 2, allows the hook 4 to be coupled to the pin 5, when its concavity substantially faces the front part of the base structure 3, in a generally horizontal direction (see figures 3 and 4), wherein the backrest frame 2 is not in its operating position, the respective backrest being substantially parallel to the seat (see in particular figure 4).

[0040] The concavity of the hook 4 is preferably oriented so that it doesn't release the pin 5 when the backrest frame 2 is coupled to the base structure 3, and the backrest frame 2 is arranged in its operating position, that is having the respective backrest incident or orthogonal to the seat of the chair, as it can immediately deduced from figure 6. For example, the concavity of the open U-shaped profile of the hook 4 can face upward when the backrest frame 2 is in the use position, after being coupled to the frame 3. The open part of the "U" has a size providing a minimum clearance between the pin 5 and the hook 4, so as to make easier the insertion of the first in the second.

[0041] As it should be noticed, further tricks to make easier the insertion of the pin 5 into the U-shaped opening of the hook 4 can be provided, such as forming a countersink at such a mouth opening.

[0042] Moreover, it should be noted that, although in the attached figures only one hook 4 and only one pin 5 are shown, the device according to the present invention may comprise two pins 5 at both sides of the base struc-

ture 3, or even at both sides of the respective seat frame, protruding from said base structure 3, or from the seat frame, and shaped so as to engage two respective hooks 4 correspondingly positioned on the backrest frame 2 of the chair.

[0043] However, the hooking means may be otherwise formed. For example, a general open shape other than the U shape can be used to form the hook 4.

[0044] The fixing means F comprise a locking device allowing a reversible lock of the backrest frame 2 with respect to the base structure 3, once the hooking means A have determined at least a rotational constraint of the frame 2 in relation to the base structure 3, and preferably the backrest frame 2 and the base structure 3 have achieved a specific and predefined position one relative to the other.

[0045] Particularly, according to a preferred aspect of the present invention, the hooking means A are shaped so as to provide at least the removable rotational constraint of the backrest frame 2 to the base structure 3 of the chair, or otherwise to the respective seat frame, and the fixing means F are shaped so as to firmly lock the backrest frame 2 with respect to the base structure 3, or with the seat frame of the chair, only as a result of a rotation of a preset angle of the backrest frame 2 from the position in which the hooking means A determine the afore said rotational constraint.

[0046] In other words, as previously seen, the hooking means A allow the backrest frame 2 to rotate between an initial position of hooking the backrest frame 2 itself to the base structure 3, or to the seat frame, of a chair, and a final position wherein the fixing means F and the respective locking device may be operated for reversibly and firmly fixing the afore said backrest frame 2 to the base structure 3, or to the respective seat frame.

[0047] In the embodiment of the invention shown in the figures, this locking device of the fixing means F comprises an actuating lever 7, constrained to the backrest frame 2 and a matching part 6 integral with the base support 3 of the chair. The matching part 6 is a substantially cylindrical, pin-shaped element protruding from the base structure 3 of the chair and preferably constrained such as to be integral with it. The lever 7 is shaped as a two arm lever, constrained to the backrest frame 2 such a way it is able to rotate about a pivot 11.

[0048] According to what previously described, as it should be noted, thanks to the particular geometric shape of the parts involved, the actuating lever 7 can engage the matching part 6 only when the hooking means A restrain the backrest frame 2 and the base structure 3, even if they can reciprocally rotate, and when, as a result of a preset angle rotation of the backrest seat 2 with respect to the base structure 3, the frame 2 and the base structure 3 are arranged in a preset relative position, different from the relative coupling position provided by the hooking means A.

[0049] As such, in this position, the lever 7 can rotate around the pivot 11 between a position in which it engages with, or hook to, the pin-shaped matching part 6, and a position in which it releases such a matching part 6, only when the hooking means A are engaged with each others, that is when the opening of the hook 4 obtained in the backrest frame 2 engages the pin 5 protruding from the base structure 3 of the seat, after the rotation of a preset angle of the backrest frame 2 occurred with respect to the base structure 3, starting from the initial position wherein the opening of the hook 4 engages the pin 5. Even though the fixing means F herein described are provided with a locking device comprising only one lever 7 removably engaging only one matching part 6, it should be noted that is possible, in any case, a device according to the present invention comprising, on the sides of the base structure 3 or the seat frame, fixing means having a locking device provided with two levers that can removably engage two respective matching parts.

[0050] It should be noted also that, instead of the actuating lever 7, it is possible to provide an actuating slider, for example translatable along a substantially straight line, that can reversibly engage an appropriately shaped matching part, or else any other known locking device able to further constrain the backrest frame 2 and the base structure 3 to each other, or to the respective seat frame, thanks to countering parts, substantially preventing the afore said hooking means A from disengaging from each other and the backrest frame 2 from moving in relation to the base structure 3, or to the seat frame. Turning back to the embodiment of the fixing means F herein described, the end of the first arm of the lever 7 has an open, U-shaped profile 9 shaped so as to easily engage the matching part 6. Preferably this first arm also has an actuating protrusion 7a helping an user to operate the lever 7 by hand.

[0051] The concavity of the open- profile 9 can be shaped to face upward when the end of the lever 7 engages the matching part 6, or it can always be shaped to conveniently and easily engage the matching part 6, once the hook 4 is coupled with the respective pin 5. The matching part 6 is arranged on the base structure 3 in a position lower than the pin 5 and may comprise, like the pin 5, a slide wheel axially and rotationally constrained therewith to aid the insertion of the lever 7 inside the opening 9.

[0052] Due to the substantial alignment of the pin-shaped matching part 6 and the pin 5 on the base structure 3 of the chair and to the shape of the opening of the hook 4 of the frame 2, and also because of the shape of the backrest seat 2 and the respective actuating lever 7, the backrest frame 2 is substantially required to rotate around the pin 5 so as to make possible the engagement of the matching part 6 to the opening 9 of the lever 7 in an accurate and preset respective position relative to the base structure 3.

[0053] Preferably, the second arm of the lever 7 cooperates with elastic means 8 intended to push such a lever 7 toward a position of engagement to the matching part 6.

[0054] In the embodiment shown in figures, the elastic

means 8 are spring shaped and their first end is constrained to a second arm of the lever 7, and the opposite end is constrained to the backrest frame 2.

[0055] The elastic means 8 are shaped so as to prevent the lever 7 from rotating in the direction allowing the open-profile 9 to release the matching part 6 and accordingly they apply on the lever 7 a thrust towards the engaging direction of the open- profile 9 with the matching part 6.

[0056] Preferably, on the backrest frame 2 in correspondence to the fixing means, at least one slide profile 10a, 10b, is obtained. In the illustrated embodiment of the invention two slide profiles are shown, an upper one 10a and a lower one 10b, joined to each other to define an open U shape. The distinction between upper profile 10a and lower profile 10b is shown in detail only in figure 3. Conveniently, hereinafter and in the rest of the figures the two slide profiles 10a and 10b are referred to as slide profile 10.

[0057] As better explained hereafter, the slide profile 10 can act as a guide for the matching part 6 during the assembling step of the backrest frame 2 on the base structure 3 of the chair, before the matching part cooperates with the lever 7.

[0058] The present invention provides other embodiments of the slide profile 10. In an embodiment, for example, the slide profile can consist only of the upper profile 10a.

[0059] Moreover, in different embodiments, the fixing means F can be formed such that it is not necessary to provide one or more profiles. For example, the locking device can be formed as a tong-shaped element having movable jaws that are pushed against each other, for example by elastic means.

[0060] Generally, as previously mentioned, general fixing means able to firmly hold the backrest of a chair and operable to allow the first to release from the second, are within the protection scope of the present invention.

[0061] To get a quick coupling of the backrest to the seat by way of the above described quick coupling device, at first a user couples the hooking means A, then inserts the pin 5 up to the end of the "U" of the hook 4, as shown in figure 4.

[0062] Once the pin 5 is inserted in the hook 4, the user rotates the frame 2 about the pin 5 such that during rotation, the pin 5 does not release the preferably U-shaped open- profile of the hook 4.

[0063] Figure 5 shows the concavity of the U-shaped open-profile of the hook 4 facing upward at the end of the rotation.

[0064] During the final step of the afore mentioned rotation of the frame 2 about the pin 5, the matching part 6 can finally engage the fixing means F. Particularly, in the embodiment shown herein, the slide profile 10 guides the matching parts 6 along its path in the fixing means F (see figure 5).

[0065] At the end of the rotation of the backrest 2, that is the travel of the matching part 6 along the slide profile 10, the matching part 6 can therefore firmly and reversibly engage the fixing means F. In particular, the user couples the lever 7 to the matching part 6, which is firmly held inside the U-shaped profile thanks to the operation of the elastic means 8.

[0066] It will be evident that, during the backrest rotation operations, the user should operate the lever 7 by hand, countering the action of the elastic means 8, such as to allow the travel of the matching part 6 along the whole length of the slide profile 10 (as shown in figure 6).

[0067] Then, the lever 7 may be possibly operated by hand to allow the matching part 6 to pass from a fixing position to a releasing position, thus enabling the backrest seat 2 to rotate again relative to the base structure 3 of the chair and possibly enabling the backrest seat 2 to uncouple from the base structure 3.

[0068] Finally, in the embodiment shown, the hook 4 and the pin 5 are integral with the backrest frame 2 and the base structure 3 of the chair, respectively; however, as an expert in the art can easily understand, the hook 4 can be provided integral with the base structure 3 and the pin 5 can be integral with the backrest frame 2 instead.

[0069] Similarly, as shown in this embodiment, the lever 7, the elastic means 8 and the pivot 11 can be integral with the backrest frame 2 and, therefore, the matching part can be integral with the base structure 3, or, alternatively, the lever 7, the elastic means 8 and the pivot 11 can be formed integral with the base structure 3 of the chair, and therefore in this case the matching part 6 can be integral with the backrest seat 2.

[0070] As the person skilled in the art can easily understand, both the above mentioned solutions are within the required protection scope.

Claims

1. Device for coupling the backrest frame (2) to the base structure (3), or to the seat frame, of a chair (1), of the type comprising hooking means (A) for removably connecting the backrest frame (2) to the base structure (3), or to the seat frame, of the chair (1) and fixing means (F) to reversibly fix the backrest frame (2) to the base structure (3), or to the seat frame, of the chair (1), **characterized in that** said hooking means (A) comprise a constraint providing the backrest frame (2) with at least one rotational degree of freedom in relation to the base structure (3), or to the seat frame, of the chair (1), and **in that** said fixing means (F) comprise at least one device for reversibly locking the rotation of the backrest frame (2) with respect to the base structure (3), or to the seat frame, of the chair (1).

2. Device according to claim 1, **characterized in that** said hooking means (A) comprise at least one pin (5) and at least one hook (4) with open-profile for removably coupling with said at least one pin (5), wherein said at least one pin (5) is integral with the

base structure (3) or with the seat frame, of the chair (1), and said at least one hook (4) is integral with the backrest frame (2), or vice versa.

3. Device according to claim 2, **characterized in that** said at least one hook (4) is "U" shaped.

4. Device according to any one of the preceding claims, **characterized in that** said locking device to lock said fixing means (F) is selectively operable by hand between a fixing position and a releasing position of the rotation of said backrest frame (2) with respect to the base structure (3), or to the seat frame, of the chair (1).

5. Device according to any one of the preceding claims, **characterized in that** said locking device comprises an actuating lever (7) or an actuating slider and a matching part (6) for reversibly locking the actuating lever (7) or the actuating slider, said actuating lever (7) or actuating slider being constrained to the backrest frame (2) and said matching part (6) being constrained to the base structure (3), or to the seat frame, of the chair (1), or vice versa.

6. Device according to claim 5, **characterized in that** said locking device comprises elastic means (8) acting on said actuating lever (7) or actuating slider.

7. Device according to claim 5 or 6, **characterized in that** said locking device comprises an actuating lever (7) having an end with an open profile (9) for coupling to said matching part (6) that is pin-shaped, wherein the actuating lever (7) is hinged to said backrest frame (2) and said pin-shaped matching part (6) is integral with said base structure (3), or with said seat frame, or vice versa.

8. Device according to claim 7, **characterized in that** said open-profile end (9) of the actuating lever (7) is U-shaped with its concavityfacing upward, when said end engages said pin-shaped matching part (6).

9. Device according to claim 7 or 8 in combination with any one of claims 2 or 3, wherein said pin-shaped matching part (6) and said pin (5) for the hook (4) of said hooking means are integral with said base structure (3), or said seat frame, of the chair (1) and said actuating lever (7) and said hook (4) are constrained to said backrest frame (2), the backrest frame (2) comprising at least one slide profile (10) for sliding on said pin-shaped matching part (6).

10. Device according to claim 9, **characterized in that** said at least one slide profile (10) partly precedes the open- profile end (9) of said actuating lever (7).

11. Method for coupling the backrest frame (2) to the base structure (3) of a chair (1), by means of a coupling device to couple the backrest frame (2) to the base structure (3), or to the seat frame, of a chair (1), comprising hooking means (A) for removably connecting the backrest frame (2) to the base structure (3), or to the seat frame, of the chair (1), and fixing means (F) to reversibly fix the backrest frame (2) to the base structure (3), or to the seat frame, of the chair (1), **characterized in that** said hooking means (A) comprise a constraint providing the backrest frame (2) with at least one rotational degree of freedom in relation to the base structure (3), or to the seat frame, of the chair (1), and **in that** said fixing means (F) comprise at least one device for reversibly locking the rotation of the backrest frame (2) with respect to the base structure (3) of the chair (1), the method comprising in sequence the steps of:

a) coupling the hooking means (A) with each others;
b) rotating the backrest frame (2) about the hooking means (A);
c) engaging the fixing means (F) to each others;
d) constraining firmly and reversibly the backrest frame (2) to the base structure (3) by means of the locking device.

12. Method according to claim 11, wherein said device for coupling the backrest frame (2) with the base structure (3), or to the seat frame, of a chair (1) comprises hooking means (A) provided with at least one pin (5) and at least one open- profile hook (4) for removably coupling with said at least one pin (5), wherein said step a) comprises the step of:

a.1) inserting said pin (5) into said hook (4).

13. Method according to claim 11 or 13, wherein said backrest frame (2) comprises at least one slide profile (10) for sliding on at least one pin-shaped matching part (6), and wherein said step c) comprises the step of:

c.1) sliding the matching part (6) inside the slide profile (10).

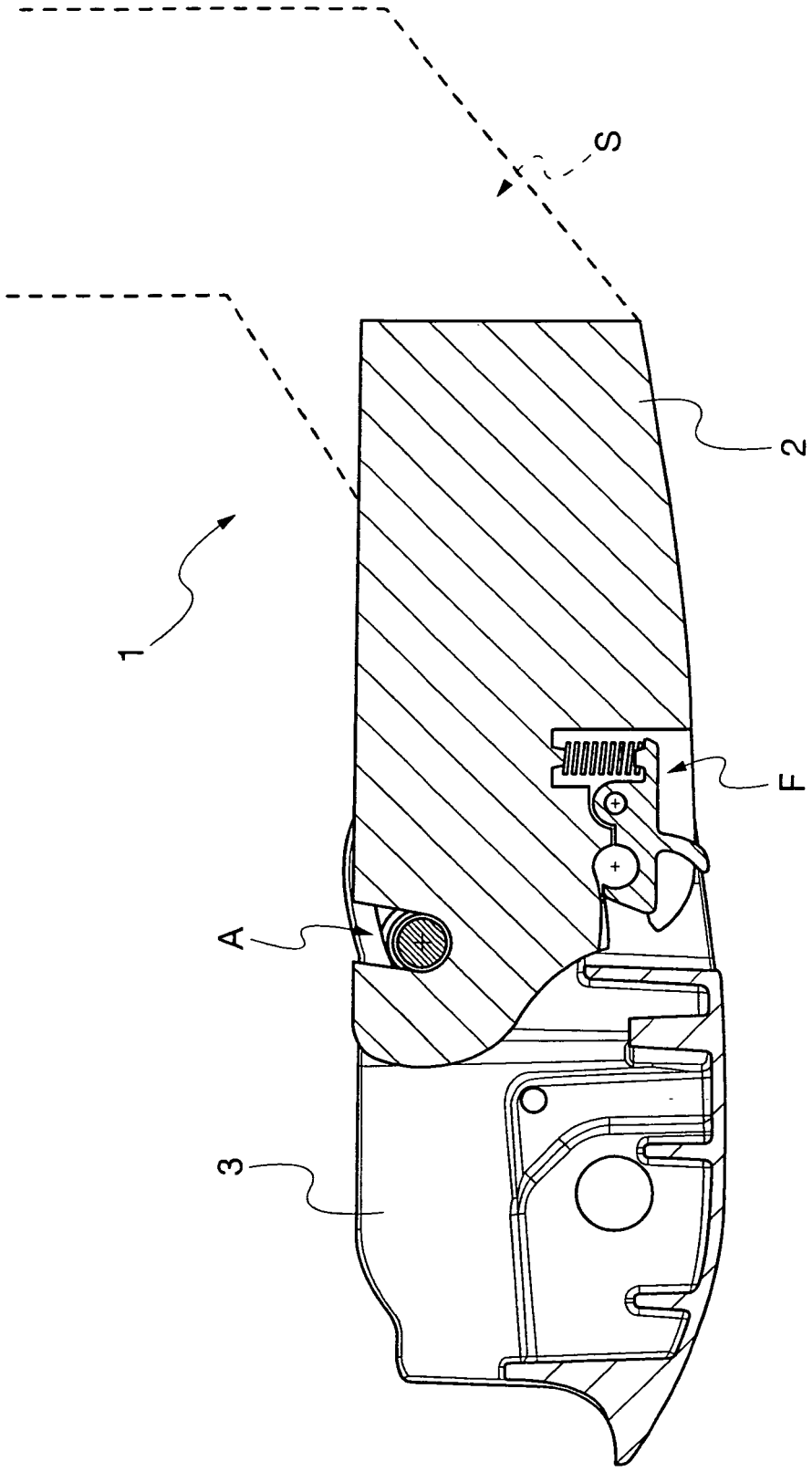

Fig. 1

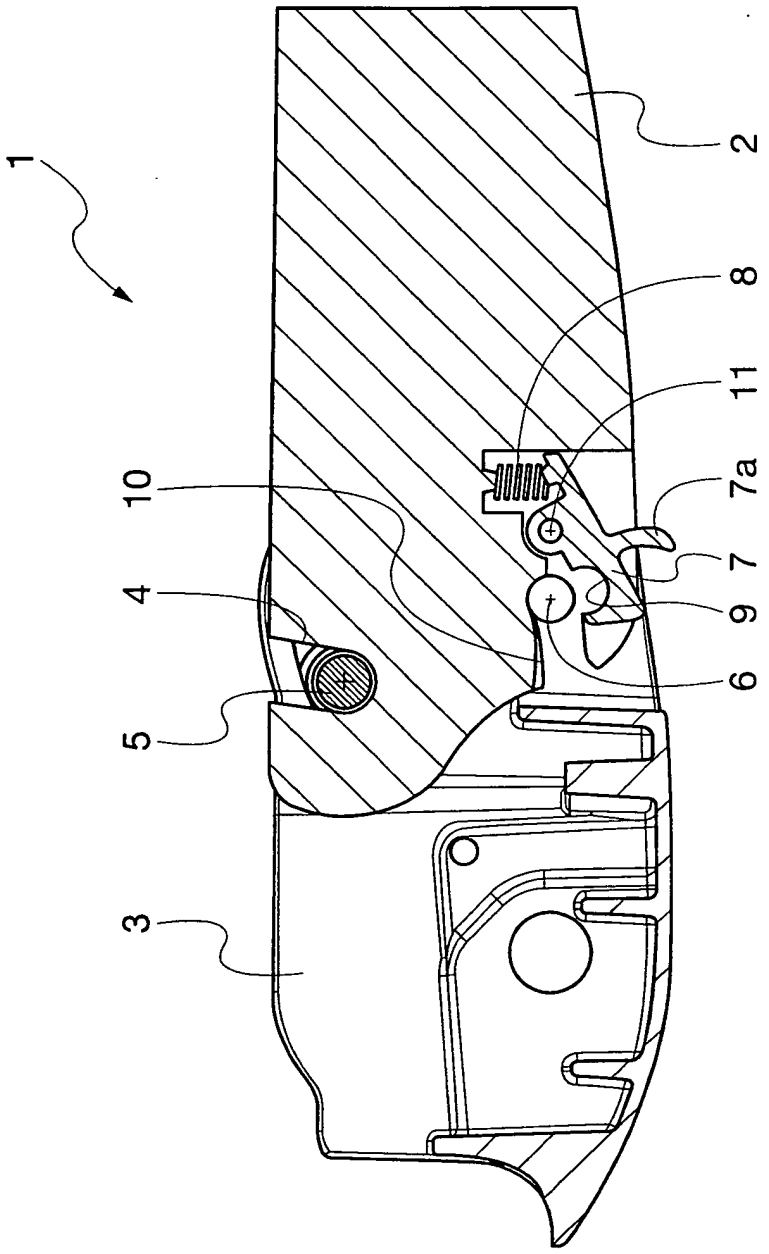

Fig. 2

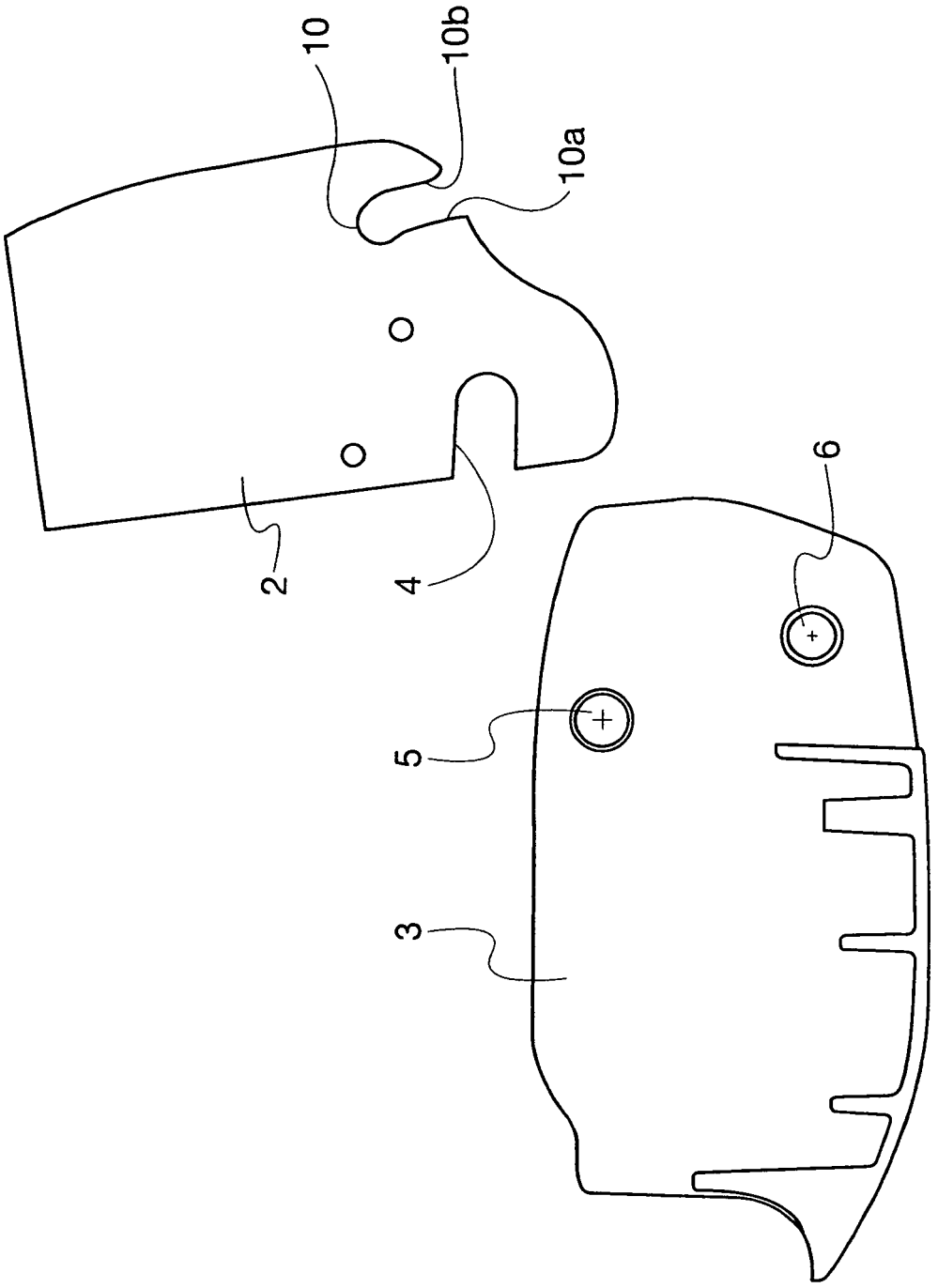

Fig. 3

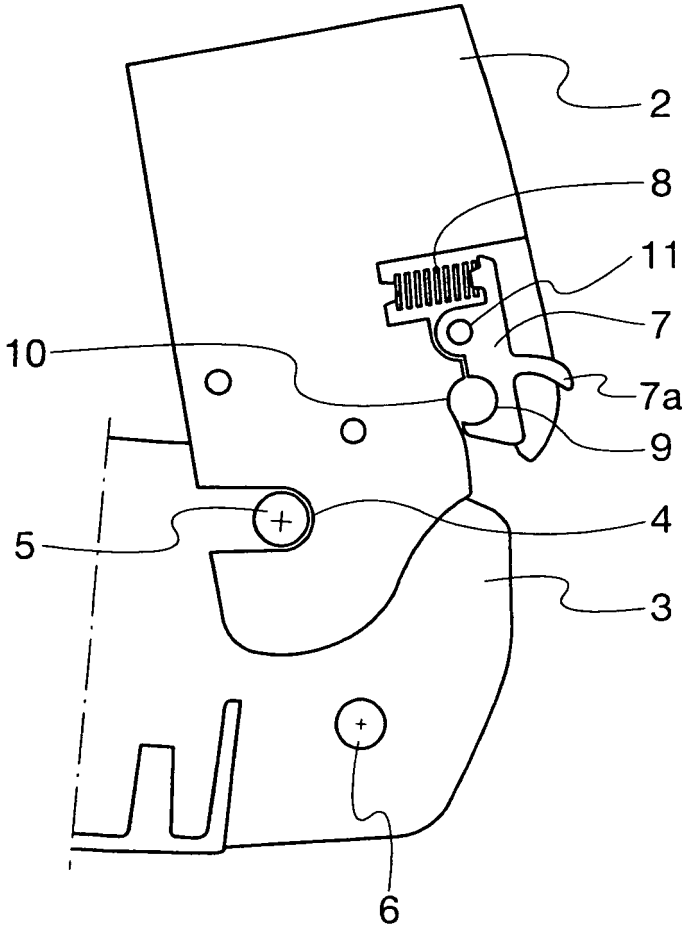

Fig. 4

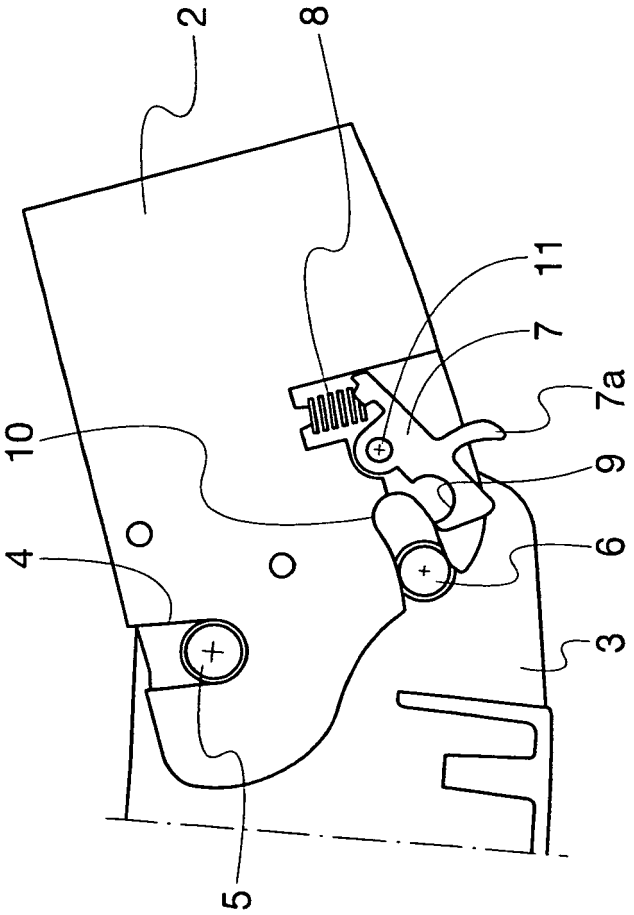

Fig. 5

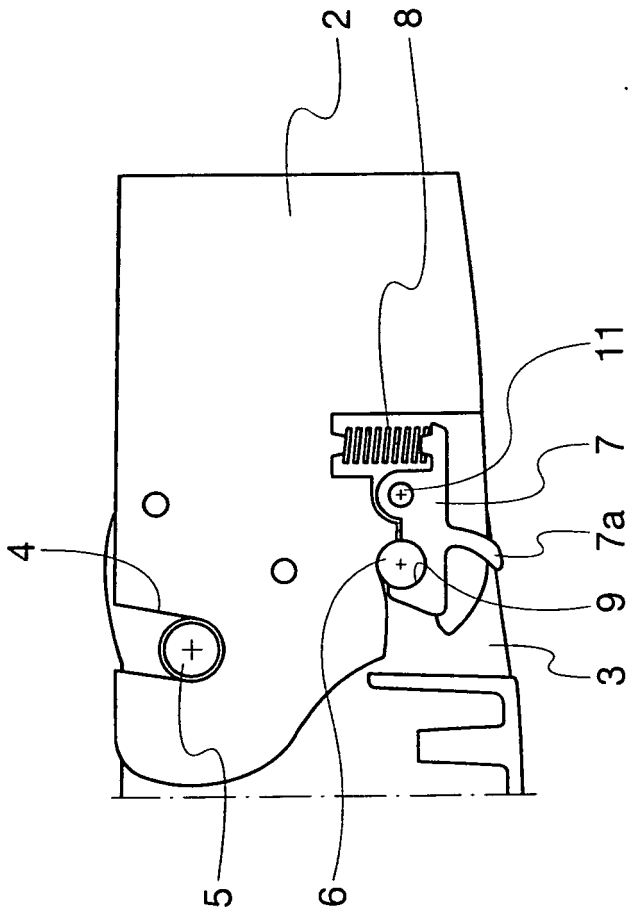

Fig. 6

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EUROPEAN SEARCH REPORT

Application Number
EP 13 00 2070

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 8 083 288 B1 (WARNCKE ANTHONY J [US] ET AL) 27 December 2011 (2011-12-27) * column 5, line 17 - column 6, line 32 * * figures 9,11,12 * -----	1-13	INV. A47C4/02 A47C7/42
X	US 2007/120410 A1 (WIECEK GLENN N [US]) 31 May 2007 (2007-05-31) * figures 2,4 * -----	1-5, 11-13	
			TECHNICAL FIELDS SEARCHED (IPC)
			A47C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	5 August 2013	Sainz Martínez, M

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05-08-2013

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 8083288 B1	27-12-2011	US 8083288 B1	27-12-2011
		US 2012104806 A1	03-05-2012
US 2007120410 A1	31-05-2007	CN 101346080 A	14-01-2009
		EP 1954165 A2	13-08-2008
		US 2007120410 A1	31-05-2007
		WO 2007064649 A2	07-06-2007

EPO FORM P0459

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Patent documents cited in the description

- US 20120019038 A **[0003] [0005]**
- EP 1112706 A **[0007]**
- KR 101007505 **[0011]**