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(54) **Articulation for mechanism of sofa- or chair-beds**

(57) Articulation for mechanisms (20, 21) of sofa- or chair-beds, which comprises a first rotatable member (1) pivoted to a second rotatable member (2) for rotating around a rotation axis (A), wherein the first rotatable member (1) and the second rotatable member (2) comprise a first plate (7) and a second plate (12), respectively, substantially perpendicular to the rotation axis (A), wherein the first plate (7) is provided with at least two first radial protrusions (8, 9) which define at least one first lowered sector (10) covering a first angle (a1) and the

second plate (12) is provided with at least two second radial protrusions (13, 14) which define at least one second lowered sector (15) covering a second angle (a2), the two first radial protrusions (8, 9) being arranged between the two second radial protrusions (13, 14), or vice versa, so that the rotation of the first rotatable member (1) with respect to the second rotatable member (2) is limited by the contact of a first radial protrusion (8, 9) with a second radial protrusion (13, 14). The present invention also relates to a mechanism for sofa- or chair-beds comprising such articulation.

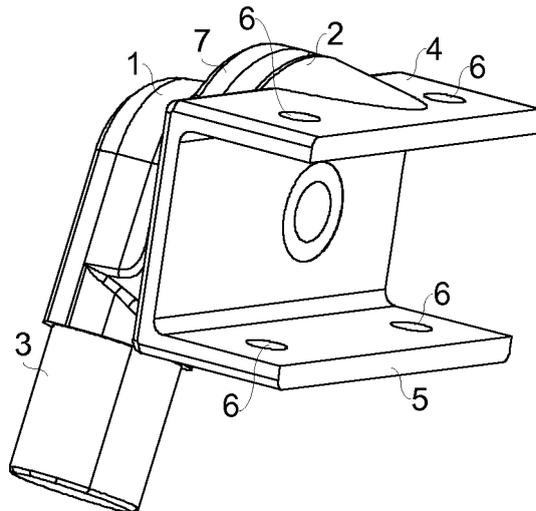


Fig.5

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Description

[0001] The present invention relates to an articulation for mechanisms of sofa-or chair-beds, and in particular an articulation which can be locked in a determined position for ensuring stability to a mechanism of a sofa- or chair-bed. The present invention also relates to a mechanism for sofa- or chair-beds comprising such articulation.

[0002] The known mechanisms for sofa- or chair- beds comprise one or more frames for supporting mattresses, seats, backs or other structural parts of the sofa- or chair-bed, which frames are pivoted to bars of other mobile or fixed components by means of articulations. These articulations must ensure stability and safety to the mechanism both in the night position and in the day position, since they are subject to the forces caused by considerable weights which act onto the frames, for example the weight of one or more persons.

[0003] Some known articulations comprise a first rotatable member pivoted to a second rotatable member for rotating around a rotation axis, wherein the first rotatable member and the second rotatable member comprise a first plate and a second plate, respectively, substantially perpendicular to the rotation axis. For unlocking the articulation in a use position, a screw or a pin are inserted into holes made in the two plates. However, this kind of articulation is relatively difficult to be locked and does not ensure the suitable stability of the mechanism, especially in the case of sofa-beds transformable into a bunk bed, where safety is very important due to the mutual position of the two beds.

[0004] It is therefore an object of the present invention to provide an articulation, which is free from said disadvantages. Said object is achieved with an articulation and a mechanism, whose main features are disclosed in claims 1 and 14, while other features are disclosed in the remaining claims.

[0005] Thanks to the particular radial protrusions which is provided with, the articulation according to the present invention allows to obtain at least two very stable positions of use, especially if the protrusions are walls of solid protruding sectors, namely if the rotatable members of the articulation are provided with at least one lowered sector and a protruding sector which cover complementary angles.

[0006] Furthermore, thanks to the particular angular positions of the radial protrusions, the articulation according to the present invention is even more stable, since the rotatable members can go beyond a deadlock, so as to keep the mechanism in a position which is hardly reversible once it has gone beyond this deadlock.

[0007] According to a particular aspect of the invention, the articulation is preferably provided with a safety device which is resistant and easy to be used, since it can be automatically locked and manually unlocked. For further improving safety, said device comprises a lock provided with a removable key, so as to unlock the articulation and

prevent its use by those who do not have the key.

[0008] Further advantages and features of the articulation according to the present invention will become clear to those skilled in the art from the following detailed and non-limiting description of an embodiment thereof with reference to the attached drawings, wherein:

- figure 1 shows a front view of the articulation;
- figure 2 shows a side view of the articulation of figure 1;
- figure 3 shows a top view of the articulation of figure 1;
- figure 4 shows a first perspective view of the articulation of figure 1;
- figure 5 shows a second perspective view of the articulation of figure 1;
- figure 6 shows a perspective view of the first rotatable member of the articulation of figure 1;
- figure 7 shows a rear view of the rotatable member of figure 6;
- figure 8 shows a front view of the second rotatable member of the articulation of figure 1;
- figure 9 shows a perspective view of the rotatable member of figure 8;
- figure 10 shows a partially exploded and sectioned front view of a mechanism comprising the articulation of figure 1 in an unlocked position; and
- figure 11 shows a partially exploded and sectioned front view of a mechanism of figure 10 in a locked position.

[0009] Referring to figures 1 to 5, it is seen that the articulation according to the present invention comprises in a known way a first rotatable member 1 pivoted to a second rotatable member 2 for rotating around a rotation axis A. First rotatable member 1 has an elbow shape with a joint 3 for fixing in a perpendicular or inclined position with respect to rotation axis A a first bar of a mechanism of a sofa- or chair- bed. Second rotatable member 2 has a pair of parallel walls 4, 5 between which a second bar of a sofa- or chair-bed can be arranged. Walls 4, 5 are provided with a plurality of holes 6 for being fixed with screw, rivets or the like to such second bar.

[0010] Referring now also to figures 6 and 7, it is seen that first rotatable member 1 comprises a first substantially circular-shaped plate 7 substantially perpendicular to rotation axis A, which first plate 7 is provided with at least two first radial protrusions 8, 9, in particular radial walls, which define at least one first lowered sector 10 which covers a first angle α_1 greater than 90° , in particular comprised between 140° and 160° . First radial protrusions 8, 9 also define a first protruding sector 11 which covers an angle substantially complementary to first angle α_1 .

[0011] Referring also to figures 8 and 9, it is seen that also second rotatable member 2 comprises a second substantially circular-shaped plate 12 substantially perpendicular to rotation axis A, which second plate 12 is

provided with at least two second radial protrusions 13, 14, in particular radial walls, which define at least one second lowered sector 15 which covers a second angle a_2 greater than 270° , in particular comprised between 310° and 320° . Second radial protrusions 13, 14 also define a second protruding sector 16 which covers an angle substantially complementary to second angle a_2 .

[0012] According to the invention, the two first radial protrusions 8, 9 are arranged between the two second radial protrusions 13, 14, or vice versa, so that the rotation of first rotatable member 1 with respect to second rotatable member 2 is limited by the contact of a first radial protrusion 8, 9 with a second radial protrusion 13, 14. In particular, first rotatable member 1 can rotate with respect to second rotatable member 2 with an angle substantially equal to the sum of first angle a_1 with second angle a_2 less a round angle, namely an angle comprised between 90° and 120° , in particular comprised between 100° and 110° .

[0013] First plate 7 and second plate 12 are provided with a first groove 17 and a second groove 18, respectively, having the shape of a cylindrical or frustoconical sector, so that these grooves 17, 18 form a cylindrical- or frustoconical-shaped seat 19 for a pin when they are mutually aligned. First groove 17 is made in first protruding sector 11 of first plate 7 and is aligned with first radial protrusion 9, and/or second groove 18 is made in second lowered sector 15 of second plate 12 and is aligned with second radial protrusion 14.

[0014] Referring to figures 10 and 11, it is seen that first rotatable member 1 is fixed to the end of a first bar 20 and second rotatable member 2 is fixed along a second bar 21. A pin 22 having a conical or frustoconical tip can slide along a guide 23 fixed to second bar 21 for penetrating into seat 19 when grooves 17 and 18 are aligned. Pin 22 is substantially parallel to second bar 21. A rod 24 is pivoted between pin 22 and a control lever 25 in turn pivoted to second bar 21. Elastic means 26, in particular a helical spring, fixed to rod 24 pull pin 22 toward rotatable members 1, 2. The pivoting point of control lever 25 to second bar 21 is comprised between a handle 27 and the pivoting point of the same lever to rod 24.

[0015] If grooves 17, 18 are not aligned, pin 22 is urged against first protruding sector 11 of first rotatable member 1, so that it cannot penetrate into these grooves and thus first rotatable member 1 cannot rotate with respect to second rotatable member 2 in the direction of arrow 28, as in figure 10. If grooves 17, 18 are aligned, pin 22 penetrates into the grooves, namely into seat 19, as in figure 11, so that first rotatable member 1 cannot rotate with respect to second rotatable member 2. Second bar 21 comprises a lock 29 provided with a removable key 30 which can be driven for locking a slot of rod 24, namely locking pin 22 into seat 19. Lock 29 must be unlocked and control lever 25 must be rotated manually for extracting pin 22.

[0016] Possible modifications and/or additions may be made by those skilled in the art to the hereinabove dis-

closed and illustrated embodiment while remaining within the scope of the following claims.

5 Claims

1. Articulation for mechanisms (20, 21) of sofa- or chair-beds, which comprises a first rotatable member (1) pivoted to a second rotatable member (2) for rotating around a rotation axis (A), wherein the first rotatable member (1) and the second rotatable member (2) comprise a first plate (7) and a second plate (12), respectively, substantially perpendicular to the rotation axis (A), **characterized in that** the first plate (7) is provided with at least two first radial protrusions (8, 9) which define at least one first lowered sector (10) covering a first angle (a_1) and the second plate (12) is provided with at least two second radial protrusions (13, 14) which define at least one second lowered sector (15) covering a second angle (a_2), the two first radial protrusions (8, 9) being arranged between the two second radial protrusions (13, 14), or vice versa, so that the rotation of the first rotatable member (1) with respect to the second rotatable member (2) is limited by the contact of a first radial protrusion (8, 9) with a second radial protrusion (13, 14).
2. Articulation according to the previous claim, **characterized in that** the first rotatable member (1) can rotate with respect to second rotatable member (2) with an angle substantially equal to the sum of the first angle (a_1) with the second angle (a_2) less a round angle.
3. Articulation according to the previous claim, **characterized in that** the first rotatable member (1) can rotate with respect to second rotatable member (2) with an angle comprised between 90° and 120° , in particular comprised between 100° and 110° .
4. Articulation according to one of the previous claims, **characterized in that** the first lowered sector (10) covers a first angle (a_1) greater than 90° , in particular comprised between 140° and 160° .
5. Articulation according to one of the previous claims, **characterized in that** the second lowered sector (15) covers a second angle (a_2) greater than 270° , in particular comprised between 310° and 320° .
6. Articulation according to one of the previous claims, **characterized in that** the first radial protrusions (8, 9) define also a first protruding sector (11) which covers an angle substantially complementary to the first angle (a_1).
7. Articulation according to one of the previous claims,

- characterized in that** the second radial protrusions (13, 14) also define a second protruding sector (16) which covers an angle substantially complementary to the second angle (a_2). 5
8. Articulation according to one of the previous claims, **characterized in that** the said radial protrusions (8, 9, 13, 14) are radial walls. 5
9. Articulation according to one of the previous claims, **characterized in that** the first plate (7) and the second plate (12) are provided with a first groove (17) and a second groove (18), respectively, so that these grooves (17, 18) form a seat (19) for a pin (22) when they are mutually aligned. 10
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10. Articulation according to the previous claim, **characterized in that** the first groove (17) is made in the first protruding sector (11) of the first plate (7) and/or the second groove (18) is made in the second lowered sector (15) of the second plate (12). 20
11. Articulation according to claim 9 or 10, **characterized in that** the first groove (17) is aligned with a first radial protrusion (9) and/or the second groove (18) is aligned with a second radial protrusion (14). 25
12. Articulation according to one of claims 9 to 11, **characterized in that** elastic means (26) pull the pin (22) toward the rotatable members (1, 2). 30
13. Articulation according to one of claims 9 to 12, **characterized in that** a lock (29) provided with a removable key (30) can lock the pin (22) into the seat (19). 35
14. Mechanism for sofa- or chair-beds, **characterized by** comprising an articulation according to one of the previous claims.
15. Mechanism according to the previous claim, **characterized in that** a rotatable member (1) is fixed to the end of a first bar (20) of the mechanism and a rotatable member (2) is fixed to a second bar (21) of the mechanism, wherein said pin (22) is substantially parallel to the second bar (21) and a rod (24) is pivoted between the pin (22) and a control lever (25) in turn pivoted to the second bar (21). 40
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16. Mechanism according to the previous claim, **characterized in that** the pivoting point of the control lever (25) to the second bar (21) is comprised between a handle (27) and the pivoting point of the same lever (25) to the rod (24). 50

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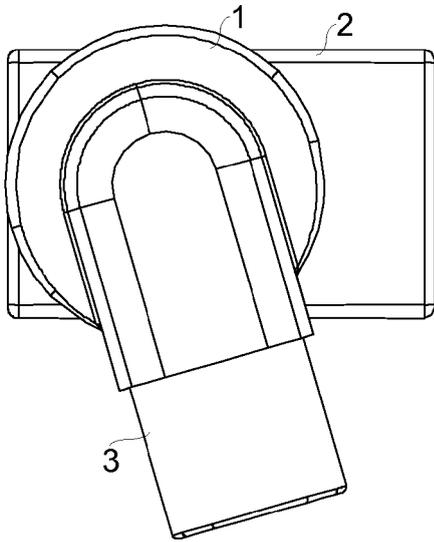


Fig.1

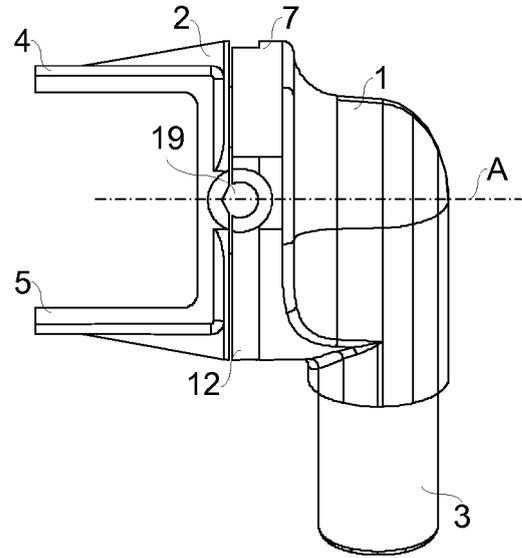


Fig.2

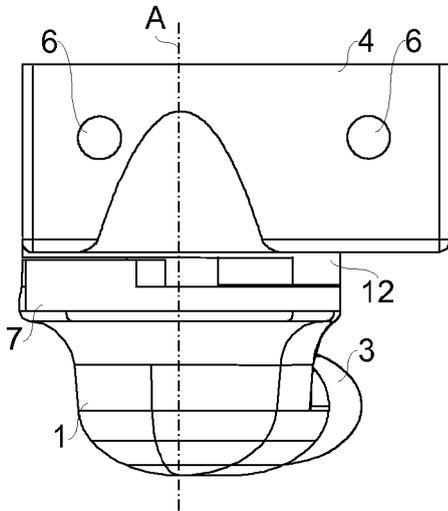


Fig.3

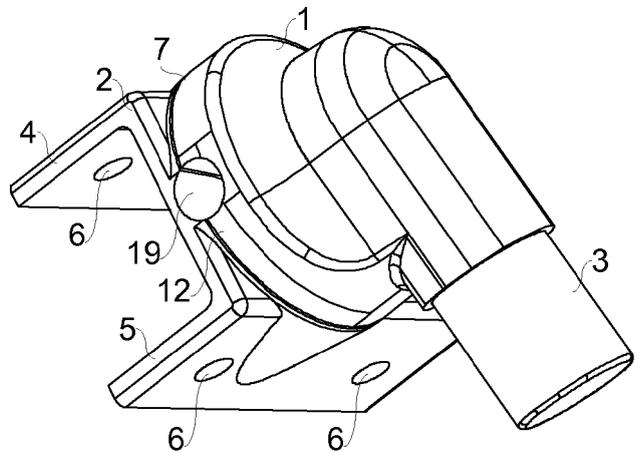


Fig.4

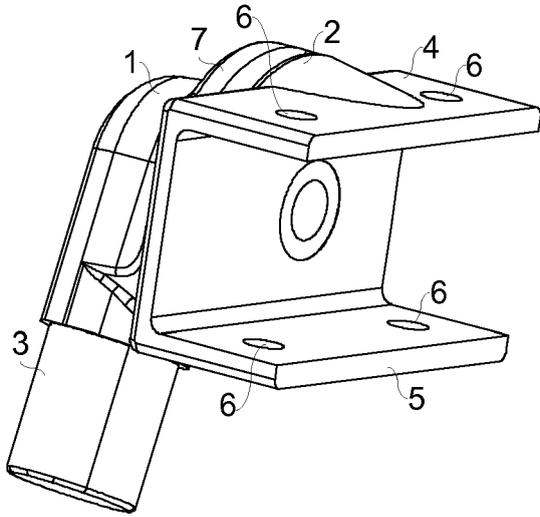


Fig.5

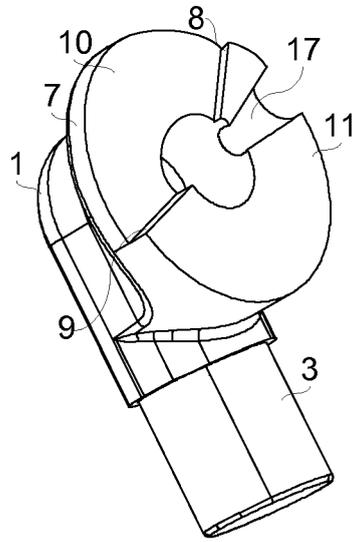


Fig.6

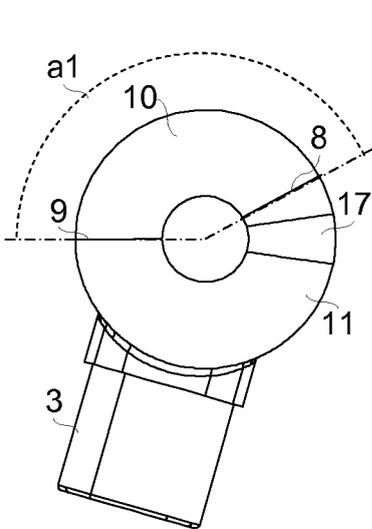


Fig.7

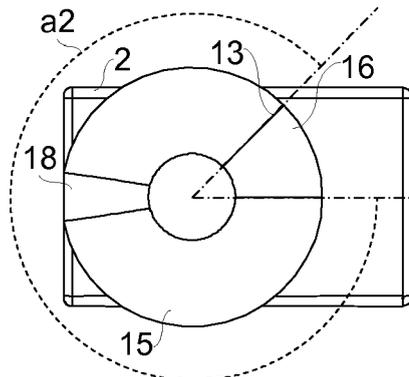


Fig.8

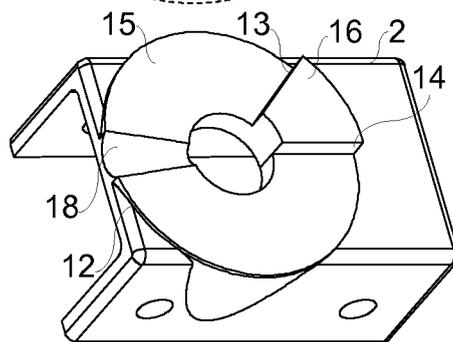


Fig.9

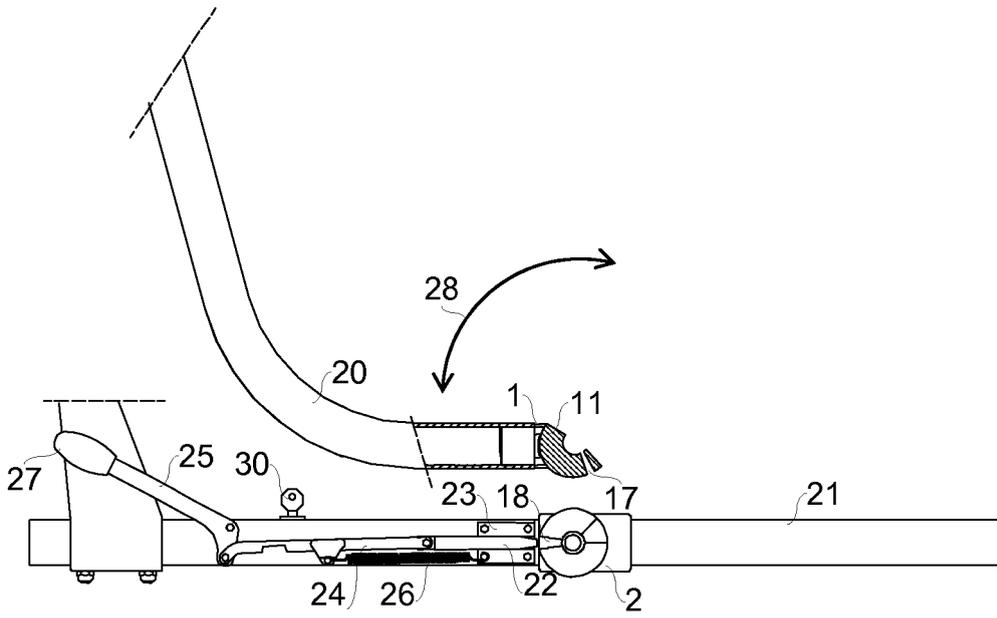


Fig. 10

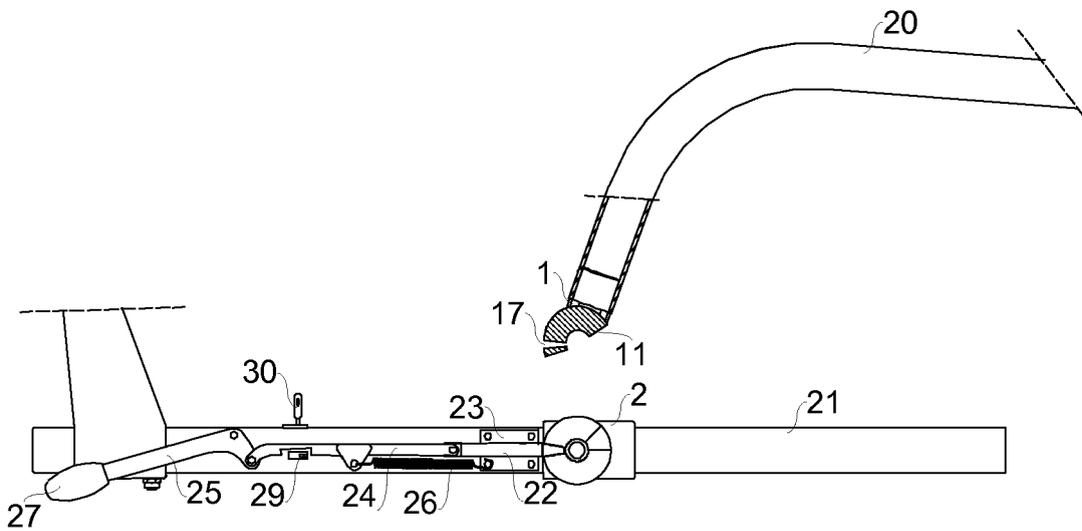


Fig. 11



EUROPEAN SEARCH REPORT

Application Number
EP 09 15 7931

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	WO 2006/067509 A1 (NINACLIP PLC [GB]; WOOTLIFF STANLEY JACK [GB]) 29 June 2006 (2006-06-29) * page 7, line 9 - page 10, line 12; figures 1-6 *	1-16	INV. A47C1/026 F16C11/10
A	DE 10 2005 032805 A1 (DORMA GMBH & CO KG [DE]) 25 January 2007 (2007-01-25) * paragraph [0022] - paragraph [0026]; figures 1-5 *	1-16	
A	JP 2006 046433 A (HIKARI CORP) 16 February 2006 (2006-02-16) * abstract; figures 1-10 *	1-16	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			A47C F16C
Place of search		Date of completion of the search	Examiner
Munich		19 August 2009	Klintebäck, Daniel
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	
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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 09 15 7931

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19-08-2009

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