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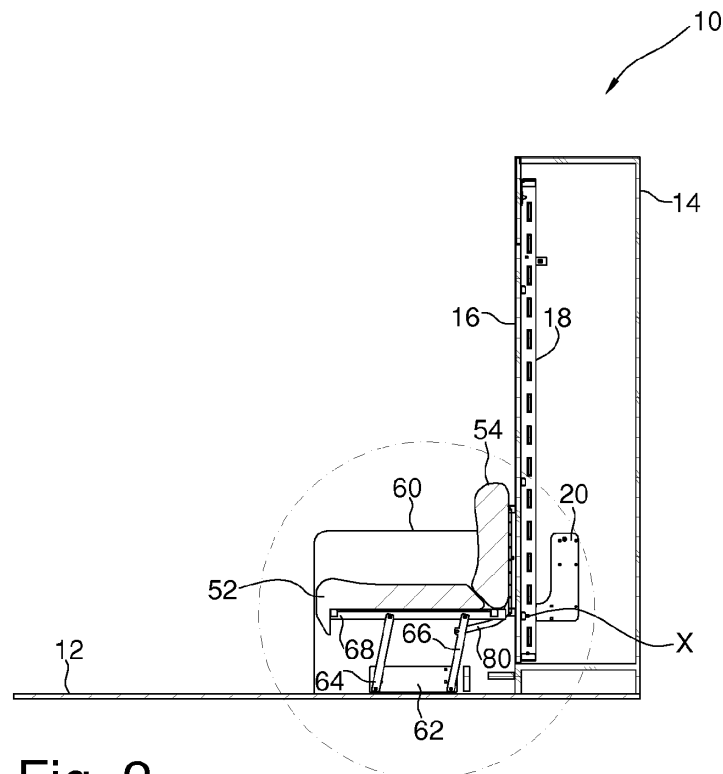
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BA ME(30) Priority: **07.05.2013 IT TV20130069**(71) Applicant: **Pessotto Reti sas****31018 Albina di Gaiarine (TV) (IT)**(72) Inventor: **Pessotto, Gianfranco****31018 GAIARINE (TV) (IT)**(74) Representative: **Citron, Massimiliano et al****Via Primo Maggio, 6****31020 San Fior (TV) (IT)**(54) **Piece of furniture with built-in bed**

(57) A furniture item (10) is described comprising a bed (18) that can be lowered by rotation around a horizontal rotation axis (X); a part (50) for sitting on comprising a movable seat (52) and a back (54) fixed to the bed, and a mechanism (64, 66) adapted to horizontally move away the seat from the axis, when the bed is lowered, at

least by a distance (D) equal to the horizontal length of the lowered back.

In this manner the part for sitting on splits and flattens a lot, thereby leaving a lot of stroke to the bed to lower to a comfortable height.

**Fig. 2**

Description

[0001] The present invention relates to a piece of furniture with a built-in bed, in particular a piece of furniture comprising a lowerable bed and a support for sitting, such as e.g. a couch, cot, chair or armchair.

[0002] There is known e.g. from CN202515095 (U), CN202515095 (U) or US5280656 furniture with a bed that can be lowered, by rotation around a horizontal axis, over an associated couch. When the bed is raised it disappears into the piece of furniture and the couch can be used to sit on, and when the bed is lowered one can lie down thereon. The seat and backrest get superimposed and covered by the descending bed, with the disadvantage that not only the couch over time will be damaged or creased, but the lowered bed stays far from the ground because of the underlying bulk of the couch. Suffice it to just think about how massive the normal padding of cushions or seats are. In addition, the backrest is movable, and the couch must be redone manually every time.

[0003] Thus it is desirable to have an improved technical solution that solves these problems, and to this solution is addressed the concept of the invention defined in the appended claims, in which the dependent ones define advantageous variants.

[0004] A furniture item is proposed (e.g. placed on the ground) comprising:

- a bed that can be lowered by rotation around a horizontal rotation axis (rotation axis of the bed);
- a part for sitting on comprising a movable seat and a backrest fixed to the bed,
- a mechanism adapted to horizontally move away the seat from the axis, when the bed is lowered, at least by a distance equal to the horizontal length of the lowered backrest.

[0005] The terms "horizontal" and "vertical" are intended for the furniture item as normally in use.

[0006] The aforementioned furniture item is advantageous because it allows

- displacing the seat relative to the backrest allowing the total vertical flattening and the collapse of the part for sitting on, so that the bed can remain less high with respect to ground. In other words, in this way the part for sitting on splits and flattens out a lot, thereby leaving a lot of stroke to the bed to lower at a comfortable height to climb on it;
- facilitating or preventing the remaking of said part when one lifts up the bed because the backrest, which is integral to the bed, and the seat, which can be moved via the mechanism by retrograde movement, are returned automatically and/or easily into place.

[0007] The horizontal axis can pass through the long or short side of the bed, and/or at any distance from the

edge.

ADVANTAGEOUS VARIANTS

[0008] In the following there are various technical options that can be implemented alone or in combination in said furniture item with appropriate means:

I. the mechanism can be adapted to vertically lower the seat (with respect to ground) when the bed is lowered. The advantage is to allow bringing the bed to a lower, and therefore more convenient, level;

II. the mechanism can be adapted to return the seat towards the axis when the bed is raised. The advantage is to obtain a mechanism that either automatically reconfigures the part for sitting on when the bed is raised, or at least minimizes the intervention on the furniture item limiting it to a thrust on the bed;

III. the mechanism can comprise an arm, at the least only one, which is inferiorly rotatable about a (second) horizontal axis, preferably substantially parallel to the first axis (of rotation of the bed), and is superiorly hinged to the seat (preferably below or to the side of it). It is a simple, robust, compact and relocatable construction, mountable anywhere, which also allows to easily obtain the motion or trajectories of the seat of variants (I) and (II);

IV. the mechanism can comprise at least two arms as in (III), preferably of about equal length and with rotation axes lying on a same horizontal plane, mounted to form on the whole an articulated quadrilateral or parallelogram with the seat. This allows in a simple way to guide the seat as it moves away from the rotation axis of the bed, preferably keeping the seat always parallel to the plane of support on the ground. The pair of arms so configured can be mounted below or on one side of the seat to support it at a certain distance from the ground, leaving sufficient room under it for cleaning or as temporary storage room;

V. in particular, one can use at least two pairs of arms as in (IV), located e.g. below or on opposite sides of the seat. This implies optimum stability and resistance for the (support of) the seat, while at the same time maintaining a space under the seat to lower it as much as possible and to ease the cleaning under it when it is raised;

VI. Preferably a or each arm, or arms in each pair (it can be sufficient even only one), is/are mounted so that its/their portion hinged to the seat remains inclined towards the bed, with respect to a vertical plane, when the bed is raised and vertical. So the weight of the sitting person loads the arms and pushes them towards the bed, naturally stabilizing the mechanism and hindering his accidental descent;

VII. one or each arm can be hinged at its bottom to a hand-rest of the part for sitting on, to an extension of the furniture item or directly to ground. The shape

of the arms can vary with the application, for simplicity a rectilinear shape is preferred;

VIII. the mechanism can comprise a synchronization device or means for synchronization/coupling between the bed and the seat, so as to move one by moving the other. This simplifies the operation and the user intervention. Preferably said means or device comprise or consist of a coupling lever or rigid element, e.g. hinged on one side to the seat and on the other to the bed.

IX. the furniture item can be servo-assisted by mounting an actuator, e.g. linear or rotary, to move the bed from the raised position to the lowered one, and/or vice versa. One can fix the actuator centrally on one side of the bed and the other connected to a cross-bar placed in the furniture item. The actuator can be assisted by gas springs pushing on the bed, to have a smaller, less powerful and less expensive actuator;

X. there can be a panel placed beneath the seat adapted to move in a horizontal position when the bed is lowered. The effect is to pad the empty space or compartment under the seat when it is raised in order to prevent access thereto. The panel can be mounted in many ways; a simple and effective variant (also exploits gravity) is that

XI. the panel can be hinged under the seat and be able to oscillate there with hinging axis parallel to said horizontal rotation axis. In this way it can set itself vertical to pad said compartment and flatten under the seat when the latter is lowered.

XII. To maximize the padding effect, the panel can be hinged at one edge of the seat, the edge being the most distant from the horizontal rotation axis of the bed.

XIII. There can be a mechanism to guide and/or move the panel in a horizontal position when the bed and the seat are raised. This mechanism can be implemented with levers, electric or pneumatic actuators (piston or motors), or simply by

XIV. an elastic element connected to the panel and a point of the furniture item (e.g. a point of the bed or of the seat or of the backrest or of the mechanism adapted to horizontally move away the seat from the axis), so that the elastic element pulls the panel positioning it horizontal.

XV. the said part for sitting on can be any structure adapted to support a lying or sitting person, such as e.g. a cot or sofa or chair or deckchair or armchair.

[0009] The advantages of the invention will be better clarified by the following description of an exemplary embodiment, illustrated in the accompanying drawing where:

fig. 1 shows a perspective view of a furniture item with a raised bed;

fig. 2 shows a side view and vertical section of the

furniture item in Fig. 1;

fig. 3 shows a perspective view of the furniture item in Fig. 1 with the bed lowered;

fig. 4 shows a side view and vertical section of the furniture item in Fig. 3;

fig. 5 shows an enlarged view of Fig. 2;

fig. 6 shows an enlarged view of Fig. 4,

Figure 7 shows a variant of the furniture item with bed lowered;

Figure 8 shows an enlargement of the dashed circle in Fig. 7;

Fig. 9 shows the variant of Fig. 7 with raised bed:

Figure 10 shows an enlargement of the dashed circle in Fig. 9.

[0010] In the drawings, same numerals indicate same parts, and the parts are described as in use.

[0011] A furniture item 10 placed on ground comprises a rectangular compartment 14 and an associated couch 50.

[0012] The compartment 14 has as a front wall a movable panel 16 coupled internally to a bedspring 18, both lowerable together through a rotation around a horizontal axis X thanks to a well-known pivoting on an inner plate 20. Fig. 1-2 and Fig 3-4 show the two configurations for the bedspring 18, raised and lowered respectively.

[0013] Outside of the panel 16 there is a couch 50, on which one can sit, formed by a movable seat 52 and a backrest 54 integral with the panel 16. Optionally the furniture item 10 comprises a base 12, large about like the bedspring 18 when lowered, and two armrests 60 to the sides of the couch 50.

[0014] The furniture item 10 comprises a mechanism that, when the bedspring 18 is lowered, is adapted to make the couch 50 collapse and decompose, to reduce its bulk below the panel 16. The mechanism comprises two identical pairs of arms 64, 66, one for each armrests 60, which are hinged by means of pins, with horizontal axis X2, at one of their lower end on a plate 62 fixed on armrests 60 (or to the compartment 14), and at the other upper end to a support element 68 for the seat 52. Overall, the arms 64, 66, the plate 62 and the element 68 are mounted to form an articulated parallelogram. The plate 62 can be replaced, when the armrests 60 are absent, e.g. by a bar connected to the compartment 14 or from a socle for support on the ground.

[0015] To the panel 16 and to an arm 66 or 68 is hinged a rigid lever 80 that connects them.

50 OPERATION

[0016] Reference is made in particular to Figures 5 and 6.

[0017] When the bedspring 18 is raised (fig. 5) the couch 50 is composed, with the seat 52 attached to the backrest 54. The arms 64, 66 are inclined towards the bedspring 18 (or, which is the same, towards the X axis) with respect to a vertical plane Y orthogonal to the base

12, so that the weight of a person sitting on the seat 52 maintains the mechanism stable and the panel vertical by pushing the seat 52 toward the panel 16.

[0018] When the bedspring 18 is lowered and arranged horizontal (Fig. 6), the lever 80 pushes an arm 64 or 66 and rotates the arms 64, 66 (counterclockwise in Fig. 5) to the opposite side of the X axis, moving it away from the latter. The movement of the arms 64, 66 involves both the horizontal removal of the seat 52 from the X axis, and its lowering to ground. At end-of-stroke the arms 64, 66 are inclined on the other side with respect to the plane Y (Fig. 6) and the backrest 54, which has rotated and lowered together with the panel 16, sets itself horizontal and locates in the space left free by the moved seat 52. This is possible because the arms 64, 66 have length and/or angular stroke such as to move the seat 52 away from the panel 16 by at least a distance equal to the horizontal length D of the lowered backrest 52 (Fig. 6), or at least a distance sufficient to leave the necessary space to it.

[0019] The furniture item 10 lends itself advantageously to be motorized. For example, inside the compartment 14 a linear actuator can be mounted, preferably assisted by gas springs (not shown) placed at the sides of the bedspring.

[0020] All the variants described can be advantageous supplemented with an additional advantageous option. It is noted that when the seat 52 is raised (fig. 5) there remains below it an empty and accessible compartment. It may happen that this compartment over time is filled with dirt or accidentally act as a receptacle for awkward objects or pets; or something can accidentally end up inside it and block the descent of seat 52. It is even more secure to prevent access to that compartment, e.g. to children and pets to avoid accidental crushing thereof.

[0021] To solve this problem, the system adopts a solution 90 as shown in Figures 7 and following. The armrests 62 are removed from the figures or absent, and the motion mechanism for the seat 52 is connected to the plate 62 or to a frame 92, e.g. fixed to the base of the compartment 14.

[0022] At the end of the seat 52, the farthest end from the compartment 14, there is hinged about an axis W, parallel to the X axis, the upper edge of a panel 94, e.g. rectangular. Preferably the height of the panel 94 is approximately equal to the distance that remains between the raised seat 52 and the base 12 or ground.

[0023] The edge of the panel 94 opposite to the hinge is free to oscillate, and exhibits a connection point, e.g. a bracket 98, for a spring or elastic element 96 in turn connected to the frame 92.

OPERATION

[0024] Figures 9 and 10 show the couch raised and the bed inside the compartment 14.

[0025] In this configuration, the panel 94 is vertical, e.g. thanks to gravity and/or to weights on the free edge

(not shown) and/or to a traction by the spring or elastic element 96.

[0026] Lowering the bed, the 52 seat moves forward and down. Consequently also does the top edge of the panel 94, which panel 94 rotates about the axis W toward the bottom of the seat 52 setting itself approximately horizontal because pulled by the spring or elastic element 96.

[0027] The spring or elastic element 96 not only pulls and rotates the panel 94 flattening it, but by stretching it compensates for the increasing distance between the bottom edge of the panel 94 and the frame 92.

[0028] The spring or elastic element 96 can be omitted (the panel 94 can be moved only pushed by the seat 52) or replaced by a generically extensible element with function to stabilize and/or facilitate the rotation of the panel 94.

[0029] As variations one can e.g. vary the position of axis W, the type of means for moving between two positions the panel 94 or the dimensions of the panel 94.

Claims

1. Furniture item (10) comprising

- a bed (18) that can be lowered by rotation around a horizontal rotation axis (X);
- a part (50) for sitting on comprising a movable seat (52) and a back (54) fixed to the bed,
- a mechanism (64, 66) adapted to horizontally move away the seat from the axis, when the bed is lowered, at least by a distance (D) equal to the horizontal length of the lowered back.

2. Furniture item according to claim 1, wherein the mechanism is adapted to vertically lower the seat when the bed is lowered.

3. Furniture item according to claim 1 or 2, wherein the mechanism is adapted to return the seat towards the axis (X) when the bed is raised.

4. Furniture item according to claim 1 or 2 or 3, wherein the mechanism comprises an arm (64, 66) which is inferiorly rotatable about a second horizontal axis (X2), preferably substantially parallel to the first axis (X), and is superiorly hinged to the seat.

5. Furniture item according to claim 4, wherein the mechanism comprises two arms (64, 66) as in the previous claim and mounted to form on the whole an articulated quadrilateral with the seat.

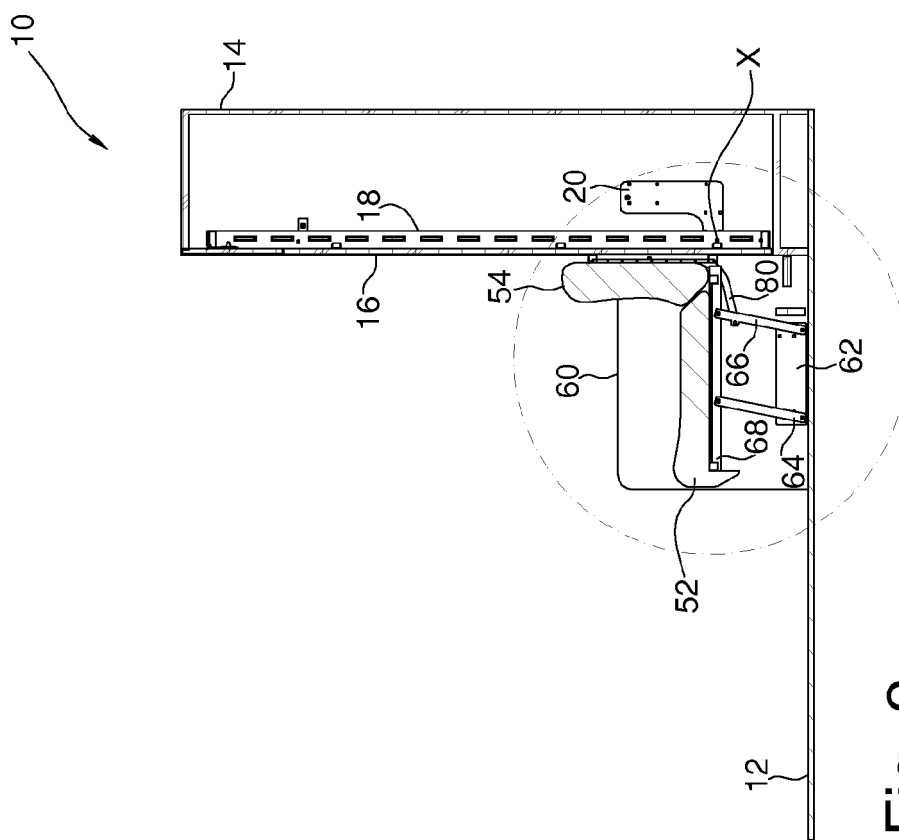
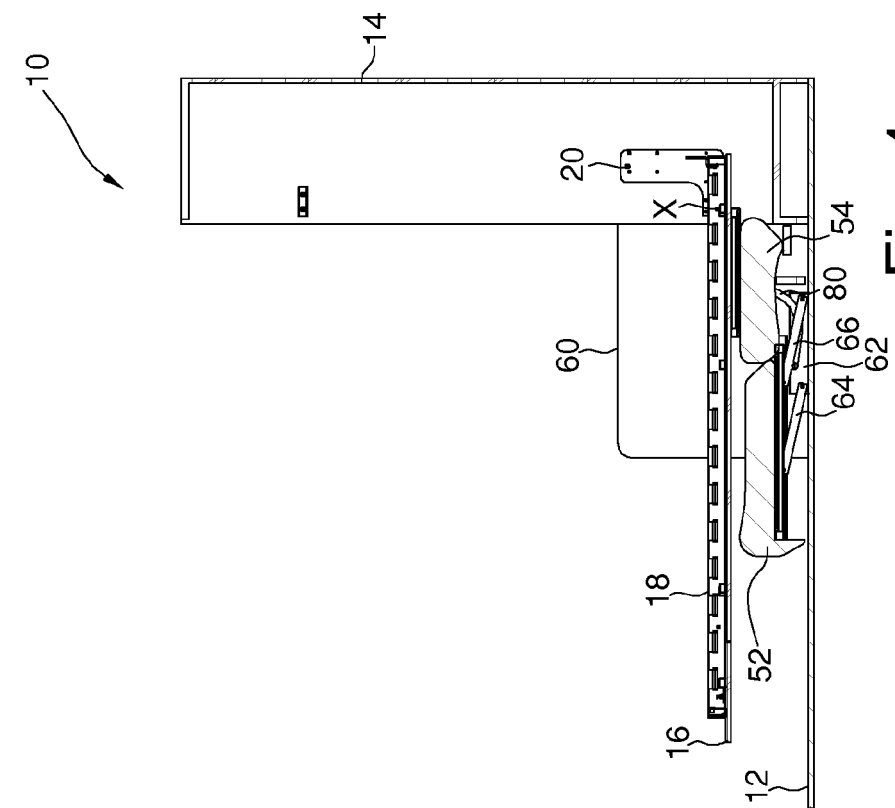
6. Furniture item according to claim 5, wherein the mechanism comprises two pairs of arms (64, 66) as in the previous claim, the arms being of about equal length and with rotation axes (X2) on a same horizontal plane, so as to form on the whole an articu-

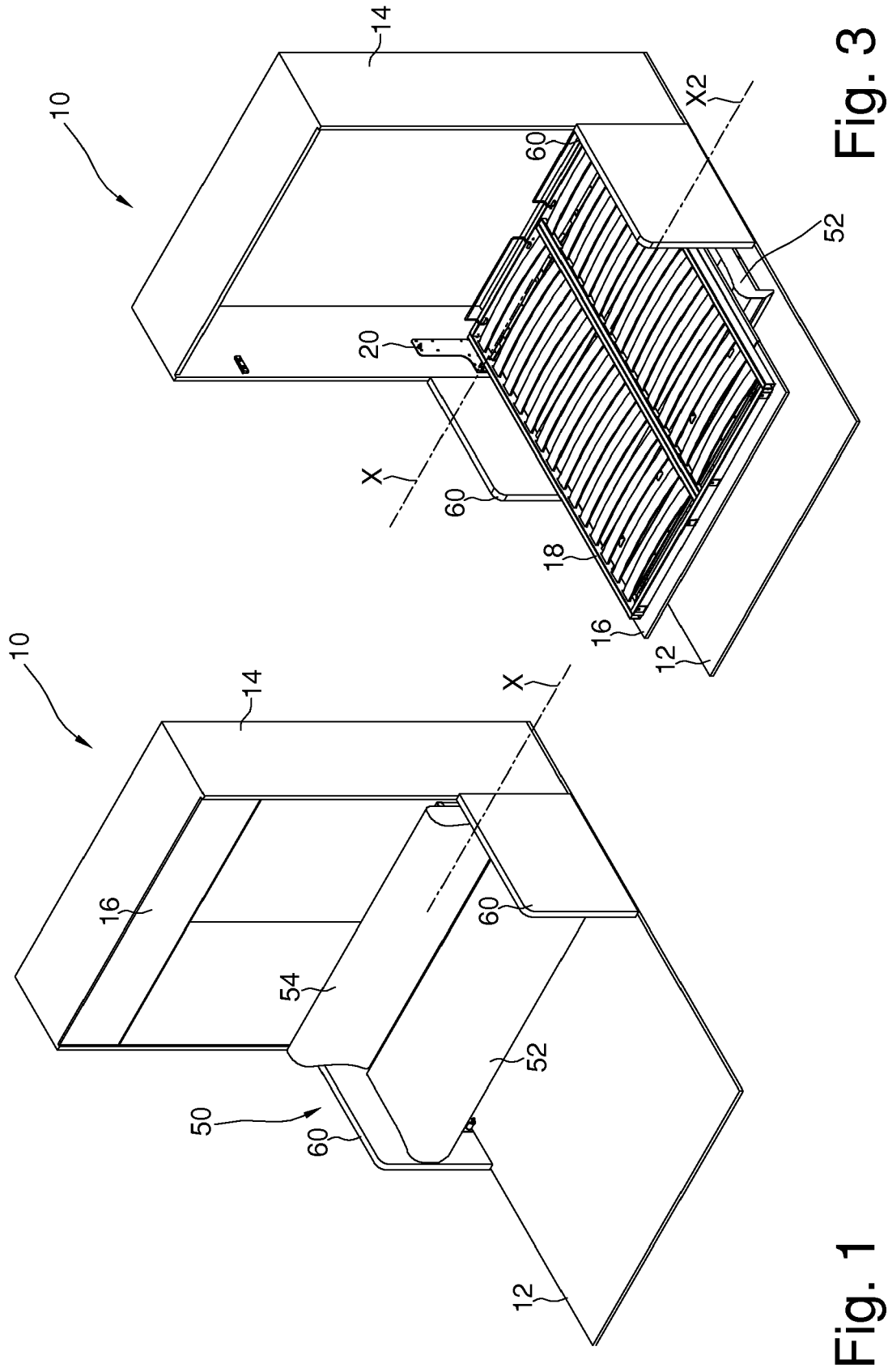
lated parallelogram with the seat.

7. Furniture item according to claim 4 or 5 or 6, wherein in the mechanism an or each arm (64, 66) is mounted so that its hinged portion to the seat remains inclined towards the bed with respect to a vertical plane (Y) when the bed is raised and vertical. 5
8. Furniture item according to claim 4 or 5 or 6 or 7, wherein one or each arm (64, 66) is hinged at its bottom to a hand-rest (60) of the part or to an extension of the item. 10
9. Furniture item according to any one of the preceding claims, comprising a synchronization device (80) between the bed and the seat, so as to move one by moving the other. 15
10. Furniture item according to claim 9, wherein the device comprises a lever or rigid coupling element (80) hinged on one side to the seat and on the other to the bed. 20
11. Furniture according to any one of the preceding claim, comprising a panel (94) arranged under the seat (52) and adapted to move in a horizontal position when the bed is lowered. 25
12. Furniture item according to claim 11, wherein the panel (94) is hinged under the seat (52) and is adapted to oscillate therein with a hinging axis (W) parallel to the horizontal rotation axis. 30
13. Furniture item according to claim 11 or 12, wherein the panel (94) is hinged at one edge of the seat (52), the edge being the farthest from the horizontal rotation axis (X). 35
14. Furniture according to any one of claim 10 to 13, comprising a mechanism for guiding and/or moving the panel (94) in a horizontal position. 40
15. Furniture according to claim 14, wherein the mechanism for guiding and/or moving comprises an elastic element (96) connected to the panel (94) and a point of the furniture item, so that the elastic element (96) pulls the panel setting it in horizontal position. 45

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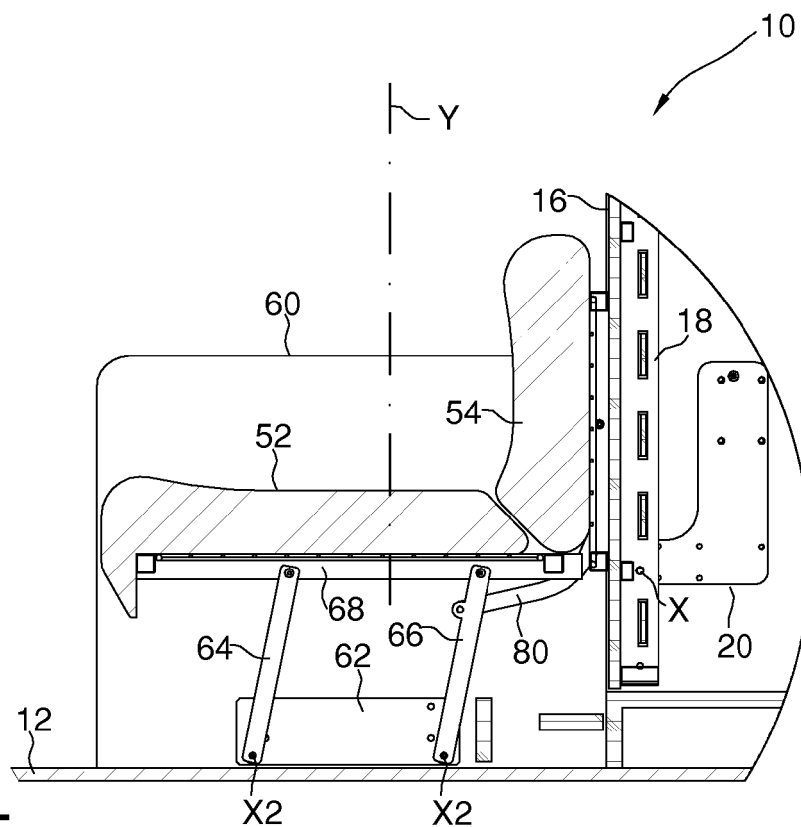


Fig. 5

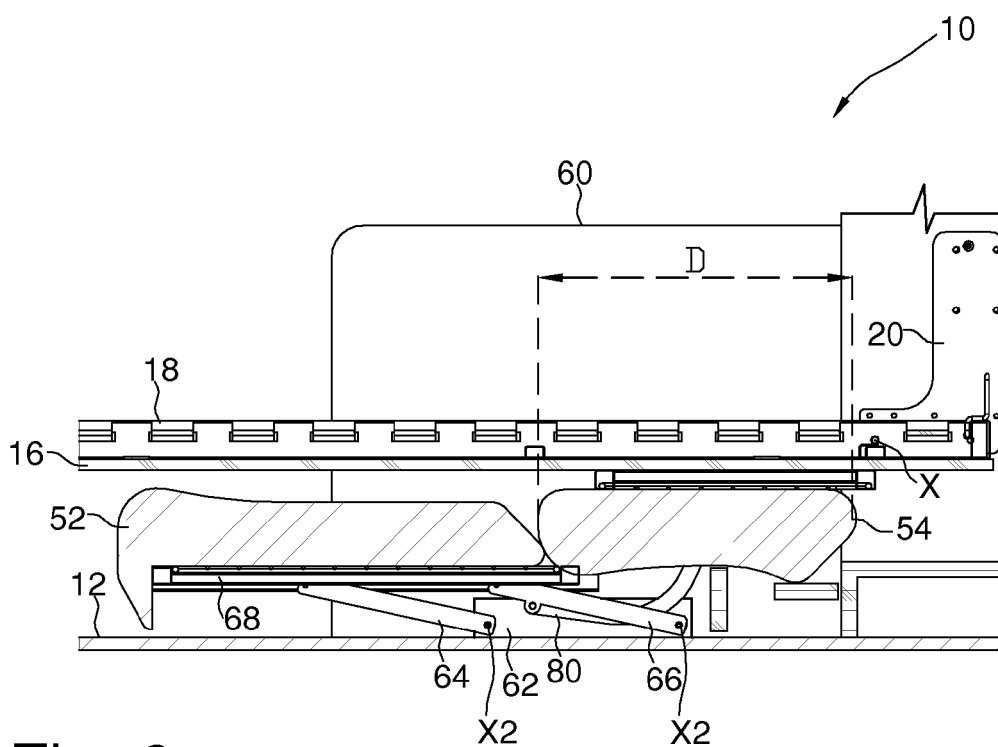


Fig. 6

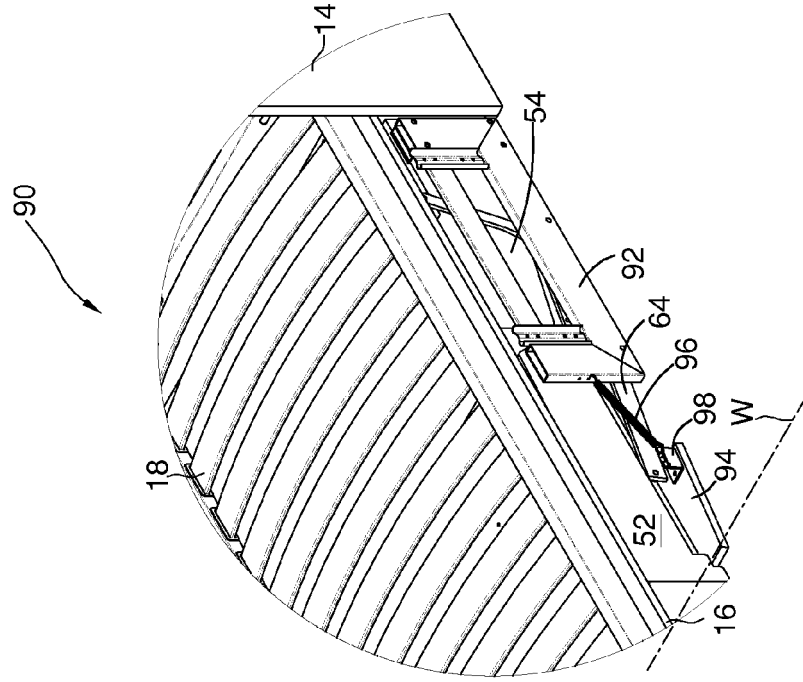
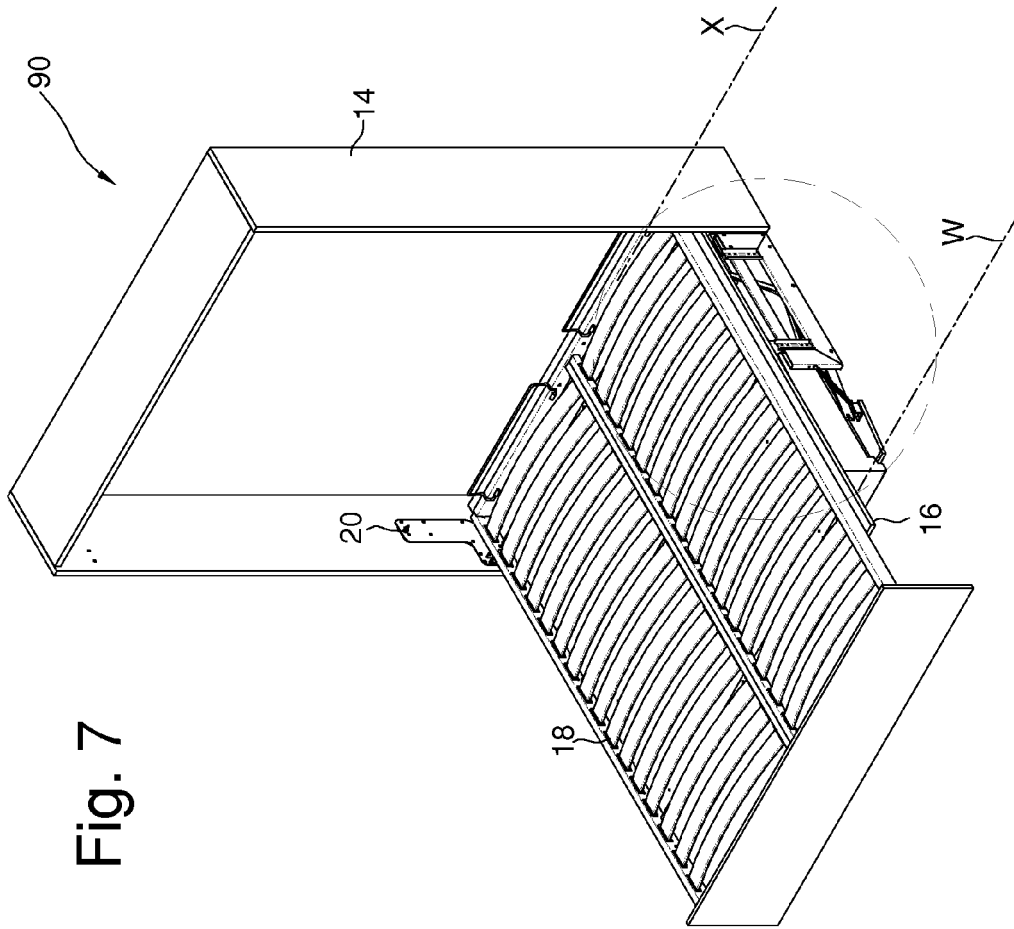


Fig. 8

Fig. 7

Fig. 9

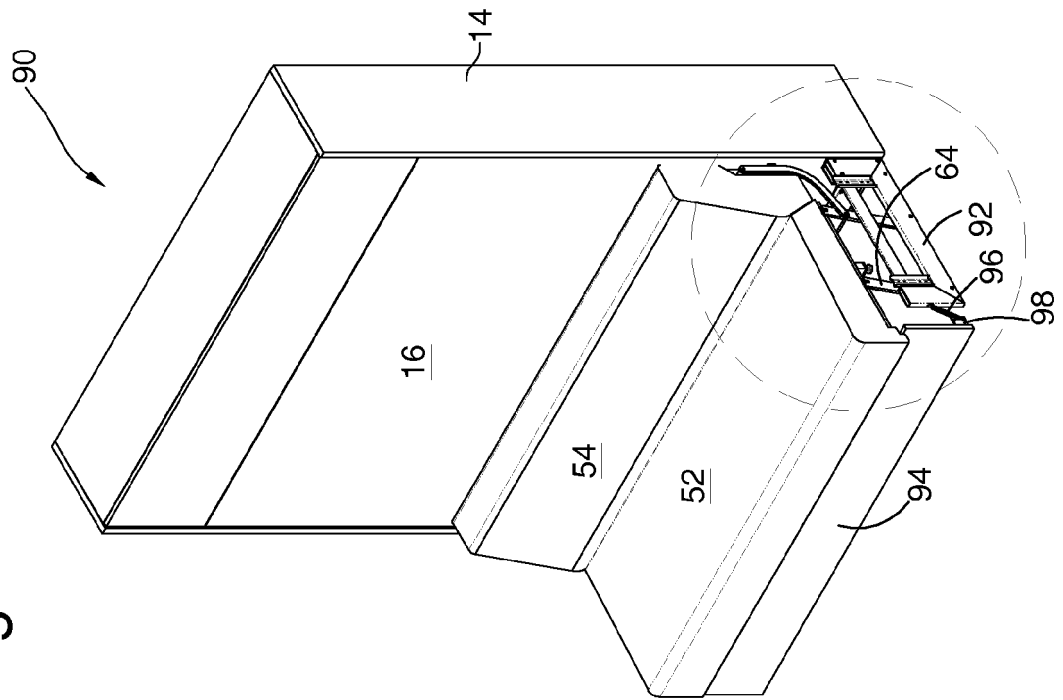
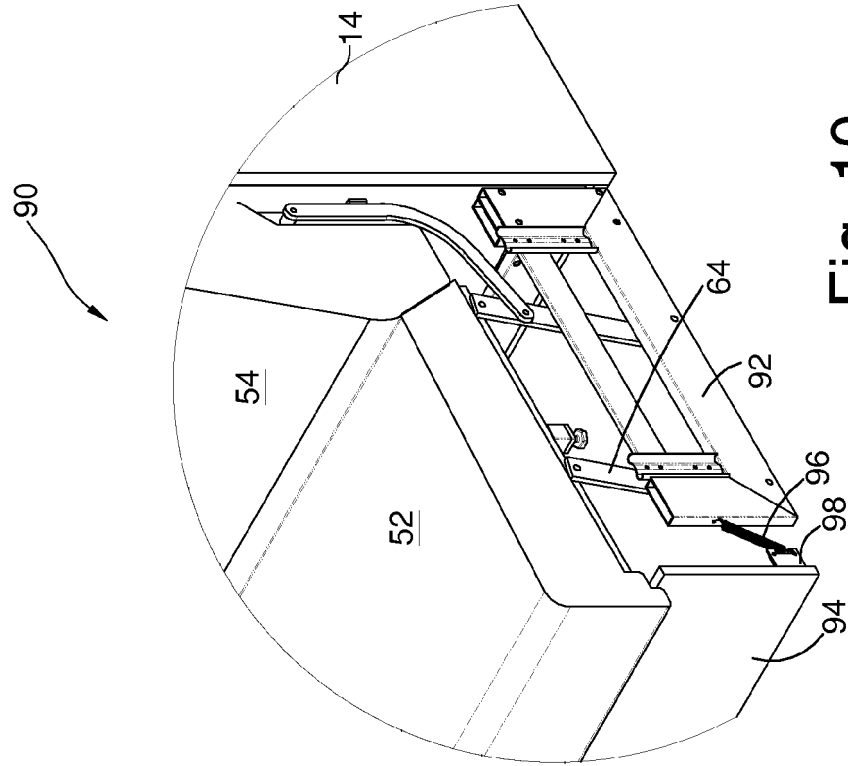


Fig. 10





EUROPEAN SEARCH REPORT

Application Number
EP 14 16 6278

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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Y	* page 6, line 4 - line 15; claims;	11,13,14	A47C17/165
A	figures *	4-8	
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	* claim 1; figures 1,2 *		
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			TECHNICAL FIELDS SEARCHED (IPC)
			A47C
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 30 May 2014	Examiner Amghar, Norddin
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	
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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The members are as contained in the European Patent Office EDP file on
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30-05-2014

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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