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(71) Applicant: **Samoa S.r.l.**
31014 Colle Umberto (TV) (IT)

(72) Inventors:
• **PERIN, Andrea**
31014 COLLE UMBERTO (TV) (IT)
• **ARMELLIN, Claudio**
31014 COLLE UMBERTO (TV) (IT)

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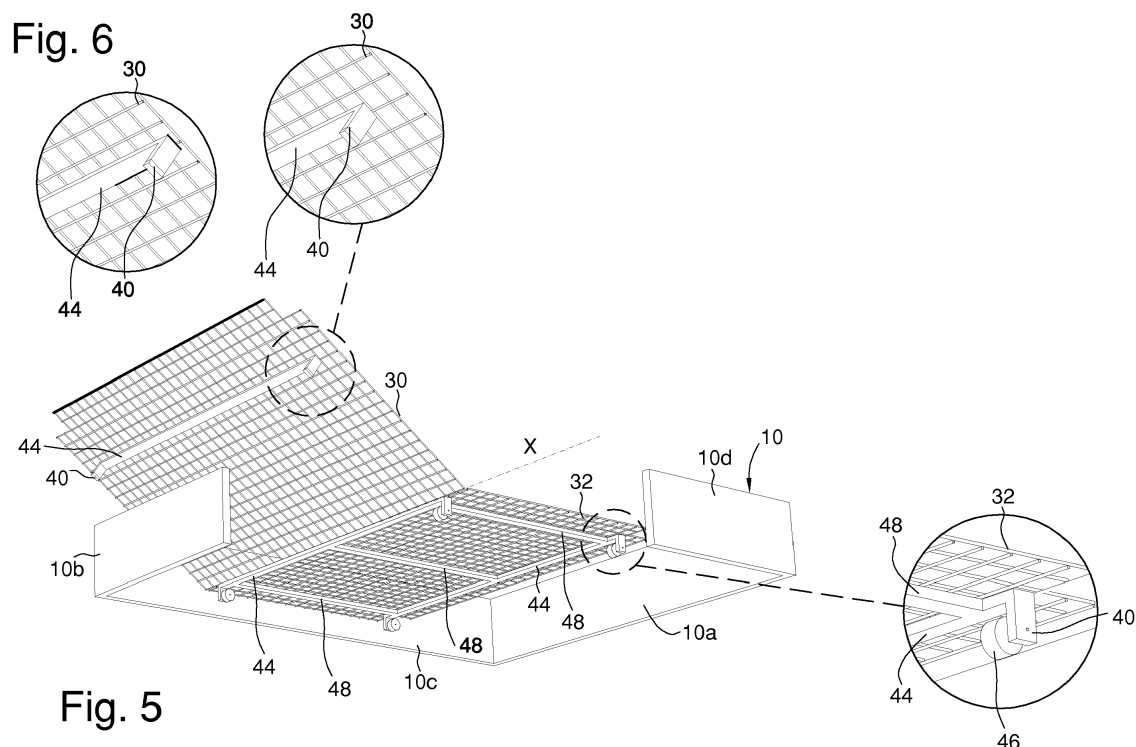
(74) Representative: **Citron, Massimiliano**
Via Primo Maggio, 6
31020 San Fior (TV) (IT)

(54) **ARTICULATED LIFTABLE BED**

(57) A bed (MC) is described comprising a hollow base container (10) comprising a bottom which substantially occupies internally the whole plan thereof, a flat platform movable relative to the container, wherein the bottom is constituted by two or more panels (30, 32)

placed side by side which are two by two constrained to each other so that a panel can be tilted with respect to another panel to make the surface of the bottom concave.

The container becomes a storage room easy to clean and comfortable to fill.



Description

[0001] The invention refers to an articulated liftable bed and a relative accessory thereof.

[0002] Articulated beds are known with lifting mechanisms that allow lifting and maintaining the bed net (or slats) of the bed (i.e. the so-called *bedspring*) at a certain height from the ground, allowing a housewife to tidy up the bed comfortably without bending and to have access to the space below the net.

[0003] EP2160961 shows as an example a similar bed with a net liftable through an electric motor. The net is hinged to a rectangular base chest (also called *container*) that delimits a closed volume to be used as a storage space.

[0004] A common problem with these beds is how to manage to clean underneath the chest and/or under the objects contained therein. For the purpose, there have been invented mechanisms that raise the chest, but they are cumbersome, expensive and still require muscular effort or an additional actuator. And the objects inside the chest must be moved manually nevertheless.

[0005] In some models the bottom of the container is made up of removable panels. Before cleaning, one must remove the objects that are on top of it, remove the panels, and then put everything back in the opposite order. Since the panels have a width equal to that of the bed, they are very large, heavy and inconvenient to move.

[0006] The main object of the invention is to improve this state of the art.

[0007] Another object is to solve or mitigate the aforementioned problem and/or propose a liftable bed with greater functionality.

[0008] A bed is therefore proposed comprising:

a hollow base container comprising a bottom which substantially occupies internally the whole plan thereof,

a flat platform movable relative to the container,

wherein the bottom is constituted by two or more panels placed side by side which are two by two constrained to each other so that a panel can be tilted with respect to another panel to make the surface of the bottom concave.

[0009] Thus, being able to tilt a panel with respect to the other, in order to clean under the bottom a person can e.g. just remove the objects on a panel, raise it by tilting it with respect to the other panel, clean underneath, move a panel remained horizontal, and clean the remaining area under the container.

[0010] Another aspect of the invention relates to a method for accessorizing a bed comprising a hollow base container and a flat platform displaceable with respect to the container, wherein a bottom, consisting of two or more panels

placed side by side that are two by two mutually constrained at adjacent edges thereof, is arranged inside the base container,

so that a panel is tiltable with respect to the other, i.e. so that, for a panel, the edge opposite to the constrained edge can be lifted to make the surface of the bottom concave.

[0011] Another aspect of the invention relates to a method for producing a bed equipped with a base hollow container and a flat platform displaceable with respect to the container,

wherein a bottom, consisting of two or more panels placed side by side that are two by two mutually constrained at adjacent edges thereof, is mounted inside the base container,

so that a panel is tiltable with respect to the other, i.e. so that, for a panel, the edge opposite to the constrained edge can be lifted to make the surface of the bottom concave.

[0012] Another aspect of the invention relates to a method for equipping a container of a bed, wherein the container is hollow and forms the base with respect to which a flat platform can be moved,

wherein a bottom, consisting of two or more panels placed side by side that are two by two mutually constrained at adjacent edges thereof, is placed inside the base container,

so that a panel is tiltable with respect to the other, i.e. so that, for a panel, the edge opposite to the constrained edge can be lifted to make the surface of the bottom concave.

[0013] Another aspect of the invention relates to an accessory for a bed such as the aforementioned one, wherein the accessory is a bottom for the container and is made up of two or more panels placed side by side that are two by two mutually constrained at adjacent edges thereof so that a panel is tiltable with respect to the other, i.e. so that, for a panel, the edge opposite to the constrained edge can be lifted to make the surface of the bottom concave. Existing beds can be equipped with the bottom as defined here.

[0014] For all the aspects mentioned above the following variants hold.

[0015] The hollow base container is a rigid and non-deformable body, serving as storage room for objects and preferably:

is of parallelepiped shape, with square or rectangular plan; and/or

comprises vertical side walls and an (optional) bottom; and/or

is open upwards to receive the platform; and/or

the platform closes it at the top when the platform is lowered.

[0016] Preferably the panels are

- two by two mutually constrained at their adjacent edges or have adjacent edges constrained to a common element. In each case the constraint is such that a panel has (a) an edge constrained to an adjacent panel and (b) the opposite edge able to be lifted with respect to the ground; and/or
- two by two mutually constrained so that a panel rotates with respect to the other, in particular constrained so as to form a hinge. E.g. the hinge can be "living", using flexible connection elements between the adjacent edges of the panels; or the constraint between the adjacent edges is made with flexible or rigid rings inserted in pass-through holes present along adjacent edges of the panels. More preferably, to give stiffness and strength to the articulation between a pair of panels, they are connected to each other by a mechanical hinge, and can rotate relatively about a fixed rotation axis (the geometric axis of the hinge substantially coincides with a border of a panel). Therefore, a or each panel is tiltable with respect to another panel through a rotation about an axis substantially passing through one edge thereof; and/or
- substantially equal, e.g. of area about half the internal plan of the container in case they are only two. The panels can also have plan and/or area different from each other, however it is advantageous to maximize the area of the translatable panel, e.g. by wheels, to maximize the area available for storage of objects not to be moved by hand; and/or
- of substantially rectangular or square plan, in particular with width substantially equal to that of the container;
- constrained to remain coplanar when they make up the bottom, to avoid steps inside the container; and/or
- removable from the container, for maximum ease of cleaning;
- only two, to simplify the system as much as possible. By increasing the number of panels there increase the articulations to be used and there decrease the area of a panel. Although there is no limit to the number of panels, the more comfortable variants in practice comprise two, three or four panels.

[0017] To facilitate the assembly and removal of the panels, preferably the panels comprise legs or feet resting on the ground, to not complicate the structure of the container. Alternatively the panels may be supported and/or guided by supports or guides present inside the

container.

[0018] The position of the legs or feet may be chosen to give the system further advantages. In particular, by placing the legs or feet substantially at the edges of a panel, they can be leaned on the brackets or angle brackets that normally connect the heads of the vertical walls forming the container. Thus, one can leave the panel inclined without supporting it in another way and by using supports that are already present in the container. Even a moderate inclination for a panel allows sufficient an advancement of the other panel for making easy the setting up of the storage space on the panel remained horizontal.

[0019] Preferably, the bed comprises an element for supporting and keeping a panel in an inclined position, in particular the first panel of the series of connected panels. This element may be

- a rigid element, such as a rod, movable under an inclined panel. The rigid element may be mounted on the container and/or on a panel and/or on the platform; and/or
- a flexible element, like a cable.

[0020] Preferably a panel is installed in the container so as to be translatable horizontally inside the container. In particular the panel being at the end of the panel series and remaining horizontal when the others/the other are/is inclined, is translatable. So the floor under the panel that remains horizontal can be uncovered by pulling the panel towards the inclined panel. There is no need to move objects on the panel that is always horizontal. The above installation can be done by equipping a panel with wheels or rollers sliding on the floor, in particular mounted on the legs or feet mentioned above. Or one may mount a panel, for simplicity only one, slidingly on the container, e.g. by supporting it through linear guides mounted on the inner vertical walls of the container.

[0021] Preferably a or each panel consists of a net or a grid or perforated structure, in order to improve the lightness and the breathability of the bottom.

[0022] Other advantages of a bed according to the invention:

- the mechanics or the means to be used to constrain the panels are not complicated or expensive; and
- the inclination of a panel can be exploited to hook it to the platform and keep it inclined effortlessly; and
- the container becomes a storage room simple to clean and easy to set up.

[0023] By *platform* here we mean a rigid plane, as even for example a net, able to support a mattress or at least one supine person. The platform size may be variable, e.g. single or double.

[0024] By *movable* platform we mean a movable platform or a platform articulated to the base hollow container so that it can only be tilted with respect to the container, or in addition the platform is movable or articulated to the hollow base container so as to be also translatable with respect to it while remaining substantially parallel to the hollow base container (i.e. to the floor on which the hollow base container rests) or moving with linear upward lifting.

[0025] The platform preferably

- is made up of slats or of a wire net; and/or
- is liftable with respect to the container by means of lifting arms which are hinged to the container and the platform. In particular the arms form an articulated parallelogram or quadrilateral and/or one of the two arms is extendable, e.g. through two segments telescopically mounted one inside the other, so that the lengthening of the arm involves an inclination of the net with respect to a horizontal plane.

[0026] In the text terms as *above*, *below*, *below*, *horizontal*, etc. are related to the bed or the panels as in use.

[0027] The advantages of the invention will be better clarified by the following description of exemplary embodiments of the bed, illustrated in the attached drawing wherein:

fig. 1 shows a side view of a liftable bed;

fig. 2 shows a partial three-dimensional view from above of the bed;

fig. 3 shows a view of the bed in fig. 2 in a second configuration;

fig. 4 shows a view of the bed in fig. 2 in a third configuration;

fig. 5 shows a view from below of the bed of fig. 4;

fig. 6 shows a variant for the detail circled in fig. 5.

[0028] In the figures, equal numbers indicate equal parts.

[0029] A bed MC, shown in fig. 1, comprises a fixed box-shaped frame 10 resting on a floor P and a bed-plane 20 that can be tilted with respect to the frame 10 thanks to a known mechanism formed by rigid arms 12.

[0030] The frame 10, the so-called *container*, is usually square or rectangular, and is formed by a front vertical wall 10b, two side vertical walls 10a, 10c, and a vertical rear wall 10d. The walls 10a-10d delimit an empty internal compartment V useful for containing objects.

[0031] The bed-plane 20 is a platform or supporting surface for example for a mattress or a person lying down. In the shown example the bed-plane 20 is a slatted bed-spring.

[0032] Refer now to Figures 2-5, which show in particular the container 10 and its interior.

[0033] The container 10 has a bottom formed by the juxtaposition of two panels 30, 32. The two panels 30, 32 are equal, and each occupies approximately half of the area enclosed by the walls 10a ÷ 10d.

[0034] In this example, the two panels 30, 32 are metal nets, and the panel 30 is the one placed near the foot-board of the bed, usually underneath the end of the bed-plane 20 which comes higher when the bed-plane 20 is inclined.

[0035] The two panels 30, 32 rest on the ground through feet, constituted of the folded ends 40 of transversal stiffening bars 44 placed under the two panels 30, 32. Preferably, the bars 44 are assisted in the supporting action by other bars 48 (Fig. 5), rigidly connected to the first ones and arranged orthogonally to them. Preferably the bars 48, 44 are integral to each other and form a support frame or chassis for a or each of the panels 30, 32.

[0036] On the feet of the panel 32 wheels 46 are mounted to make it slide on the floor P towards the wall 10b.

[0037] Overall, the panels 30, 32 are kept at a small distance from the floor P, which can be set by sizing the length of the ends 40.

[0038] The adjacent edges of the panels 30, 32, i.e. the edges located about at the center of the compartment V, are articulated to form a hinge, which allows e.g. the panel 30 to be inclined with respect to the panel 32 by rotating about a horizontal axis X, preferably coincident or almost coincident with one of the edges of a panel and preferably parallel to the axis of rotation of the bed-plane 20. The rotation axis of the wheels 46 is parallel to the X axis. Therefore, the panels 30, 32 are constrained to be able to close one on the other like a book.

[0039] As a variant, the adjacent edges of the panels 30, 32 may be articulated or hinged to a common element, such as a bar 44 (fig. 2).

[0040] Figures 2-5 also show a sequence of use of the bed MC. When the floor P under the panels 30, 32 is to be cleaned, first the bed-plane 20 has to be lifted to remove the objects on the panel 30. Then, the panel 30 is tilted (Fig. 3) to uncover the floor P below it. The inclined panel 30 can be hung to the platform or to the bed-plane 20 with a hook or a lace, or the container 10 may comprise a means (e.g. a rod) for locking the panel 30 in an inclined position. Such means can be alternatively mounted on one of the panels 30, 32. Once this cleaning is finished, the panel 32 (fig. 4), which remains horizontal and runs on wheels 48, is pulled forward to clean the floor P under the panel 32. The panel 30 in this phase can be rested against the wall 10b or inclined more than before.

[0041] Thus it is not necessary to remove the objects on the panel 32, and their displacement is greatly facilitated by the wheels 48.

[0042] Fig. 6 shows a variant for the position for the feet/ends 40, that is, they are aligned with the sides of the panel 30 (the edges closest to the walls 10c, 10d).

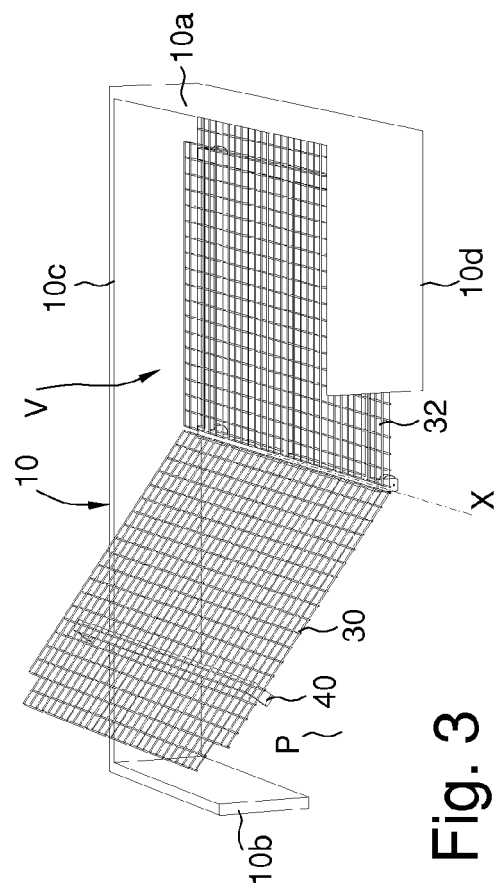
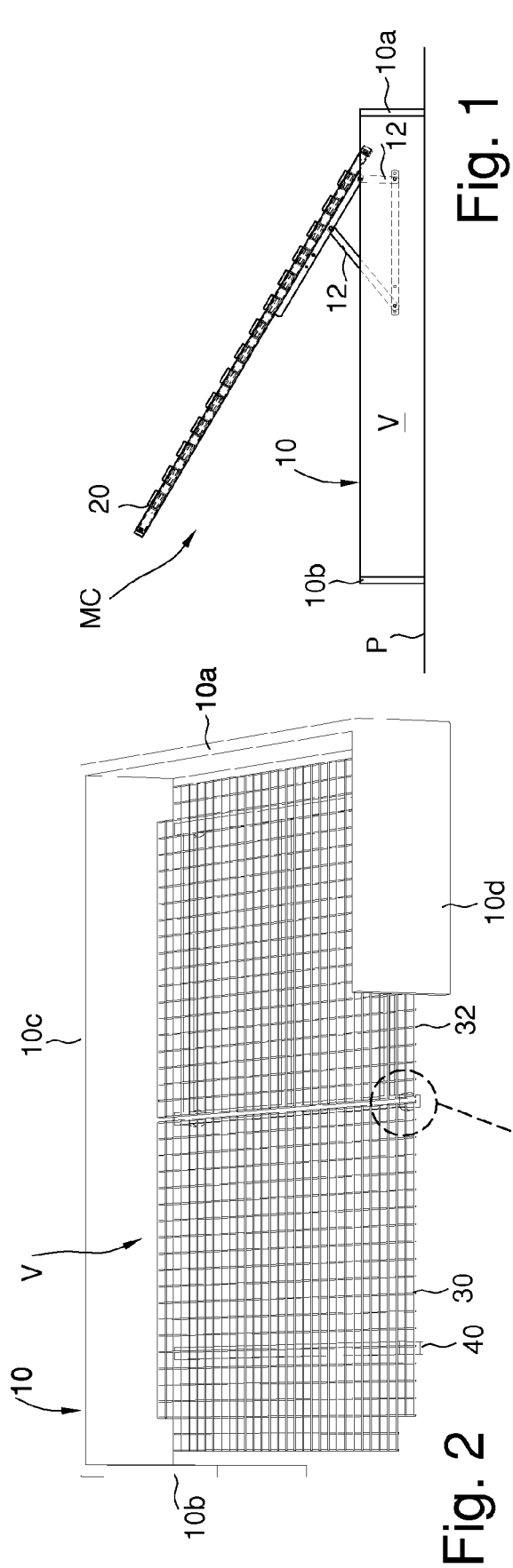
The advantage is that the feet/ends 40 are close enough to the walls 10c, 10d to be able to rest on the angular fixing brackets present inside the inner dihedral angles of the container 10. The result is that the panel 30 can be tilted easily and without additional means.

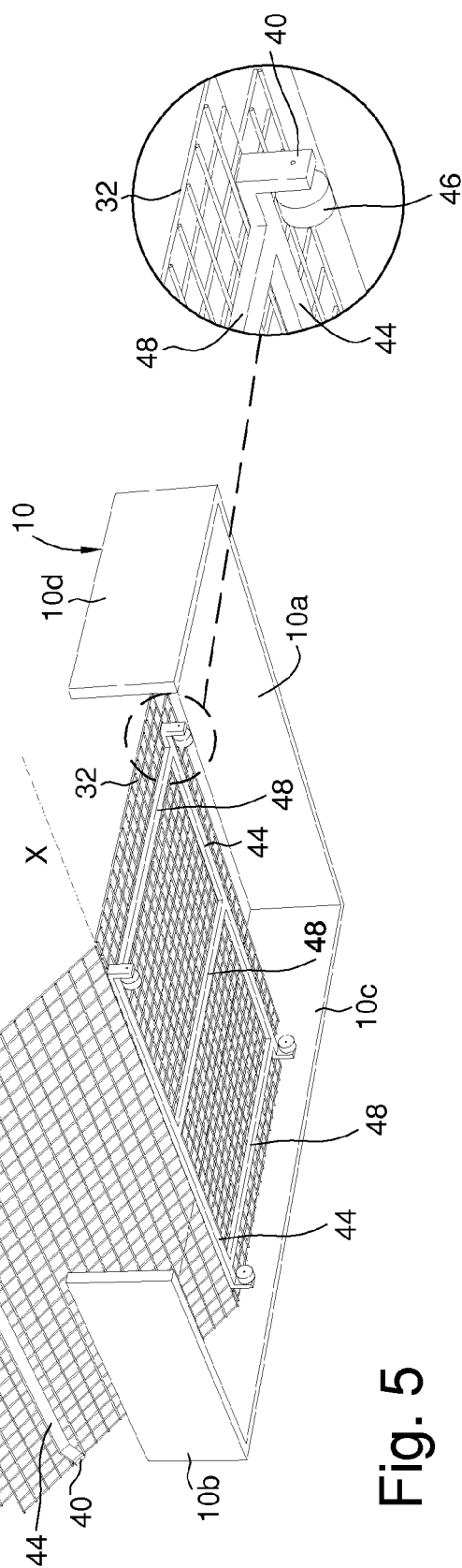
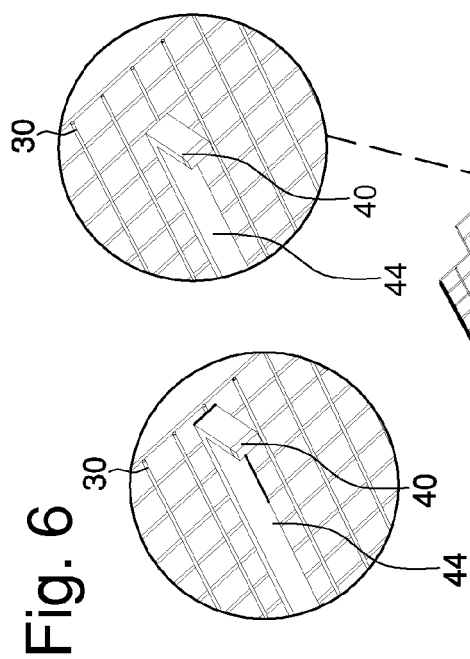
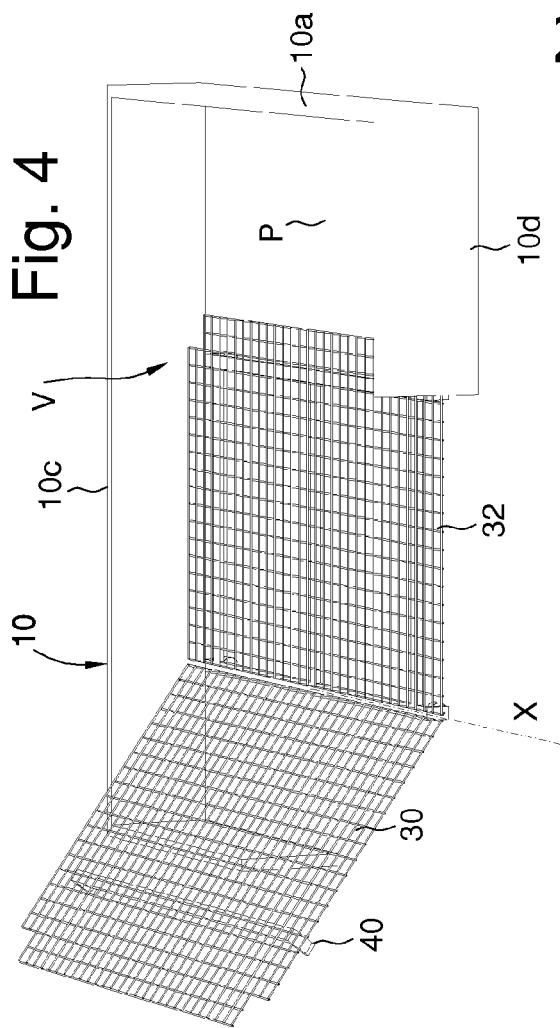
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wherein a or each panel is constituted by a net or a grid or a perforated structure.

Claims

1. Bed (MC) comprising: 10
 - a hollow base container (10) comprising a bottom which substantially occupies internally the whole plan thereof,
 - a flat platform (20) movable relative to the container, 15
 - wherein the bottom is constituted by two or more panels (30, 32) placed side by side which are two by two constrained to each other so that a panel can be tilted with respect to another panel 20
 - to make the surface of the bottom concave.
2. Bed according to claim 1, wherein the panels (32, 32) are mutually coupled two by two in correspondence to adjacent edges thereof. 25
3. Bed according to claim 1, wherein the panels (32, 32) have adjacent edges bound to a common element (44). 30
4. Bed according to claim 1 or 2 or 3, wherein the panels (32, 32) are two by two mutually coupled so as to form a hinge (X). 35
5. Bed according to claim 4, wherein the hinge comprises flexible connecting elements between the adjacent edges of the panels; or flexible or rigid rings inserted into through-holes present along adjacent edges of the panels. 40
6. Bed according to claim 4 or 5, wherein the panels are connected to one another via a mechanical hinge.
7. Bed according to any one of the preceding claims, wherein the panels (32, 32) are only two and are substantially equal. 45
8. Bed according to any one of the preceding claims, wherein the panels comprise feet (40) for resting on the ground. 50
9. Bed according to any one of the preceding claims, wherein at least one panel is equipped with wheels or rollers (46) sliding on the floor (P) on which the container rests. 55
10. Bed according to any one of the preceding claims,







EUROPEAN SEARCH REPORT

 Application Number
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			TECHNICAL FIELDS SEARCHED (IPC)
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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 7 March 2018	Examiner Kis, Pál
CATEGORY OF CITED DOCUMENTS 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 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			

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

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