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(54) **Stackable box with magnetic coupling**

(57) A stackable front-opening box consists of a base (1) closed at the top by a lid (2), the base (1) including a front panel (1a) hinged thereto and means (7) to retain in the closed position the front panel (1a), as well as magnetic coupling means arranged at corresponding positions in the bottom panel (1b) of the base and on the lid (2), said means being preferably corner reinforcements

(3) of ferromagnetic material arranged on the lid (2) and magnets (4) arranged at the corners of the bottom panel (1b). In this way, when a plurality of boxes are stacked the magnets 4 contained in the base 1 of each box magnetically engage the corner reinforcements 3 of the lid 2 of the underlying box and the boxes are securely stacked since they can not slide one with respect to the other.

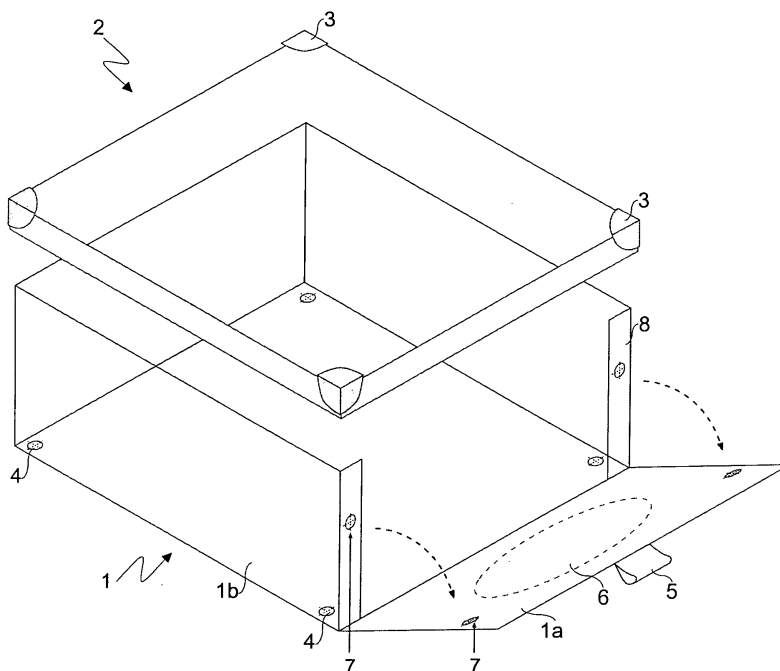


Fig.1

Description

[0001] The present invention relates to boxes, and in particular to a box provided with magnetic coupling means that allow a secure stacking of the boxes.

[0002] It is known that numberless kinds of boxes exist for containing the most different objects. Specific reference will be made hereafter to a box used to contain shoes or garments so as to make up for the lack of shelves and/or drawers, typically inside a closet.

[0003] Boxes are usually stacked in order to make the best use of space, but this implies a difficulty in accessing the content of the boxes in that it is not easy to pull a box out of the stack, especially if the overlying boxes are heavy. Moreover, if you wish to maintain the same order of the boxes to avoid wasting time in the search for the right box, it is also necessary to put the box back to its position under the other boxes with a difficulty even greater than in pulling it out.

[0004] In order to avoid these problems front-opening boxes have been devised that allow to access the content of a box without having to remove it from the stack. However, the repeated accesses into the stacked boxes cause small shiftings of the latter which result in a misalignment and therefore in instability of the stack. Moreover, in order to move the stack the only safe way is to move one or two boxes at a time, since the boxes may slide one over the other and cause the tumbling of the stack.

[0005] In order to overcome these drawbacks the applicant has already devised a stackable front-opening box, described in WO 2006/064527, that allows to obtain a secure stack and to access the content of a box without moving neither the latter nor the overlying boxes. This is achieved by fixing the upturned box lid on the base by introducing pins with divergent legs into holes formed at corresponding positions in the base and in vertically projecting side tabs formed on the lid, the base comprising a front panel hinged thereto along a flexure line so as to grant access to the box even with the lid fixed on the base.

[0006] Although this type of box achieves the intended objects, nonetheless it still has some drawbacks.

[0007] In the first place it requires a rather complicated structure with shaping of the lid to obtain the side tabs, as well as a precise perforation of the tabs and base at corresponding positions for the introduction of the pins.

[0008] Secondarily, since the heads or legs of the pins with divergent legs project inside the box, the garment items contained therein can get caught in the pins and be damaged.

[0009] Therefore the object of the present invention is to provide a box which is free from said drawbacks. This object is achieved by means of a box that includes means for magnetic coupling arranged on the lid and in the bottom panel of the base. Other advantageous features of the present box are disclosed in the dependent claims.

[0010] The main advantage of the box according to the present invention is that of retaining the advantages of

known stackable boxes yet with a more conventional and therefore cheaper structure, that is also more readily accepted by the user.

[0011] Still another advantage of this box stems from the fact that it does not include elements that could risk to cause a damage to its content.

[0012] Further advantages and characteristics of the box according to the present invention will be clear to those skilled in the art from the following detailed description of an embodiment thereof, with reference to the annexed drawings wherein:

Fig.1 is a front perspective view of the box with the lid raised with respect to the base and the front panel open;

Fig.2 is a front view of the closed box with an indication in broken lines of the opening movement of the front panel; and

Fig.3 is a side view of the box located in a stack between an overlying box and an underlying box.

[0013] With reference to said figures, there is seen that a box according to the present invention conventionally consists of a base 1, typically of parallelepipedal shape, that is closed at the top by a lid 2 of slightly greater size so as to be inserted onto base 1.

[0014] The novel aspect of the present box is the presence of magnetic coupling means to secure its base 1 to the lid of an underlying box and lid 2 to the base of an overlying box in a stack. To this purpose, lid 2 is provided with corner reinforcements 3 of ferromagnetic material and base 1 is provided with magnets 4 arranged at the four corners of the bottom panel 1b. These magnets 4 are preferably embedded in the material of the bottom panel 1b and/or covered by a cover material.

[0015] Furthermore, as shown in Fig.2, the front panel 1a allows to access box 1 even when it is stacked since its height H is sufficiently lower than the height of the other side panels so that it can be rotated around a horizontal integral hinge, formed by the line joining it to the bottom panel 1b, even when lid 2 is inserted on the base.

[0016] For the convenience of the user, the front panel 1a is preferably provided with a tab 5 located at the center of its top edge that acts as a handle for the opening, with a window 6, to check the content without having to open the box, and with a first pair of magnets 7 cooperating with a second pair of magnets 7 of opposite polarity arranged at corresponding positions on the abutment flaps 8 of base 1, to retain panel 1a in the closed position.

[0017] It should be noted that the opening of the front panel 1a could take place also by rotation around an integral hinge that is vertical rather than horizontal as in the illustrated example. In such a case panel 1a would be joined along one of its vertical sides to one of the side panels rather than to the bottom panel 1b, and it would have a single locking magnet 7 arranged together with tab 5 along the side opposite to the hinge.

[0018] Obviously, the definition of front panel is meant

to indicate the panel that grants access inside the box, and said panel may be a short or long panel depending on the box shape. Moreover, nothing prevents from providing further access panels on non-adjacent sides of the box and from using locking means different from the pairs of magnets 7 with opposite polarity, such as ferromagnetic members coupling with magnets 7, press-studs, Velcro™ strips or other equivalent means.

[0019] When a plurality of boxes according to the present invention are stacked, as shown in Fig.3, the magnets 4 contained in the base 1 of each box magnetically engage the corner reinforcements 3 of the lid 2 of the underlying box. In this way, the boxes are securely stacked since they can not slide one with respect to the other.

[0020] It is clear that the above-described and illustrated embodiment of the box according to the invention is just an example susceptible of various modifications. In particular, the magnetic coupling means can change as to number, shape, type and arrangement as long as a correct correspondence is retained between those located in the bottom panel 1b and in lid 2.

[0021] For example, instead of the corner reinforcements 3 it is possible to arrange at the corners of lid 2 other magnets having a polarity opposite to magnets 4, as explained for the magnet pairs 7, or the magnets in lid 2 could engage members of ferromagnetic material located in the bottom panel 1b instead of magnets 4. In the absence of the corner reinforcements 3 it is also clear that the magnetic coupling means can be located at any position in the box, not necessarily at the corners.

[0022] Finally, it is obvious that the box can take any shape (e.g. round, triangular, etc.) and it can be made in any suitable material such as plastic, metal, wood and the like.

netic coupling means consist of corner reinforcements (3) of ferromagnetic material arranged on the lid (2) and magnets (4) arranged at the corners of the bottom panel (1b).

- 5 5. A box according to one of the preceding claims, **characterized in that** the means for retaining in the closed position the openable side panel (1a) are magnetic coupling means.
- 10 6. A box according to one of the preceding claims, **characterized in that** the openable side panel (1a) is provided with a tab (5) located at the center of the side opposite to the hinge side.
- 15 7. A box according to one of the preceding claims, **characterized in that** the openable side panel (1a) is provided with a window (6).
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Claims

1. Stackable front-opening box consisting of a base (1) closed at the top by a lid (2), the base (1) including at least an openable side panel (1a) hinged thereto along one of its sides, as well as means for retaining in the closed position said side panel (1a), **characterized in that** it further includes magnetic coupling means arranged at corresponding positions in the bottom panel (1b) of the base and on the lid (2).
2. A box according to claim 1, **characterized in that** the magnetic coupling means consist of at least one pair of magnets of opposite polarity.
3. A box according to claim 1, **characterized in that** the magnetic coupling means consist of at least one magnet and one member of ferromagnetic material.
4. A box according to claim 3, **characterized in that** it has a parallelepipedal shape and **in that** the mag-

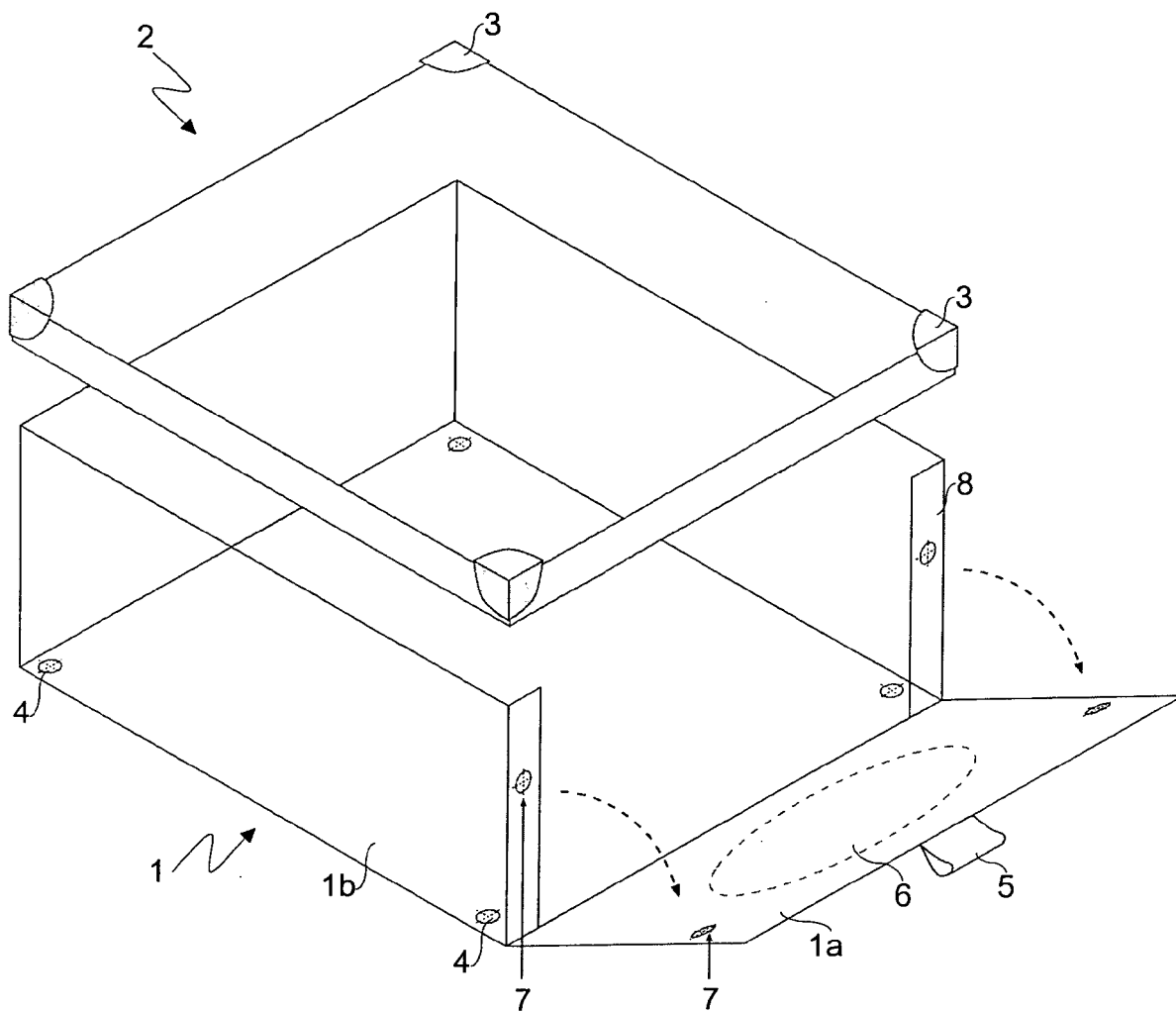
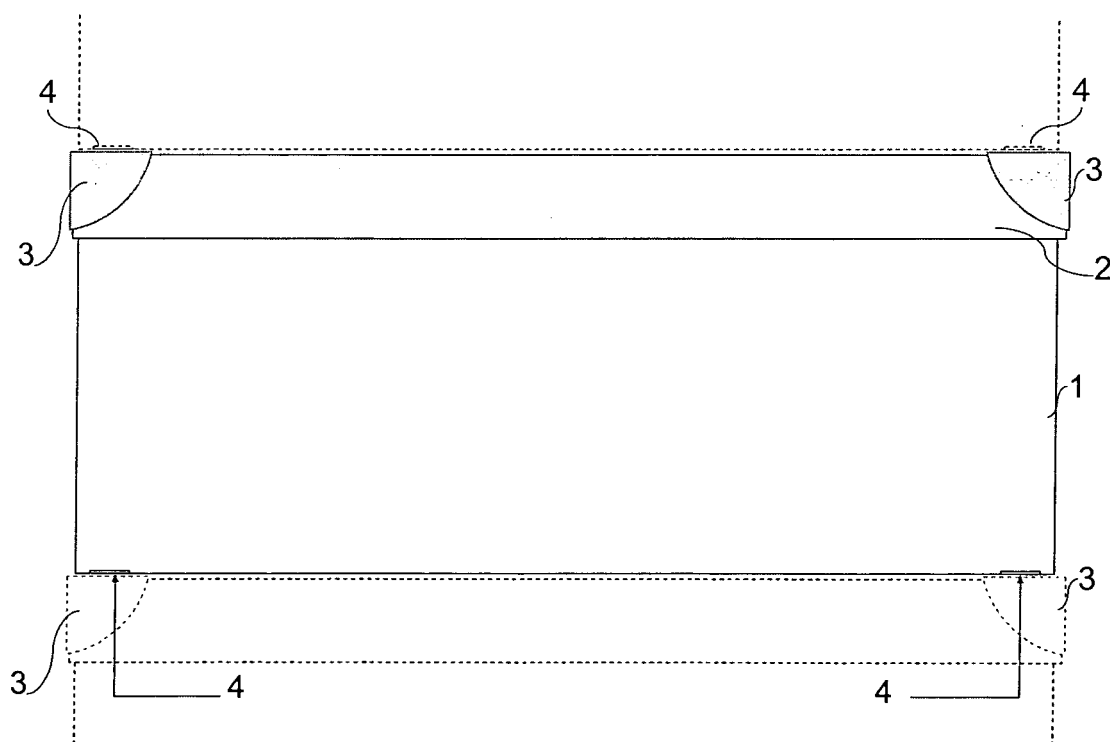
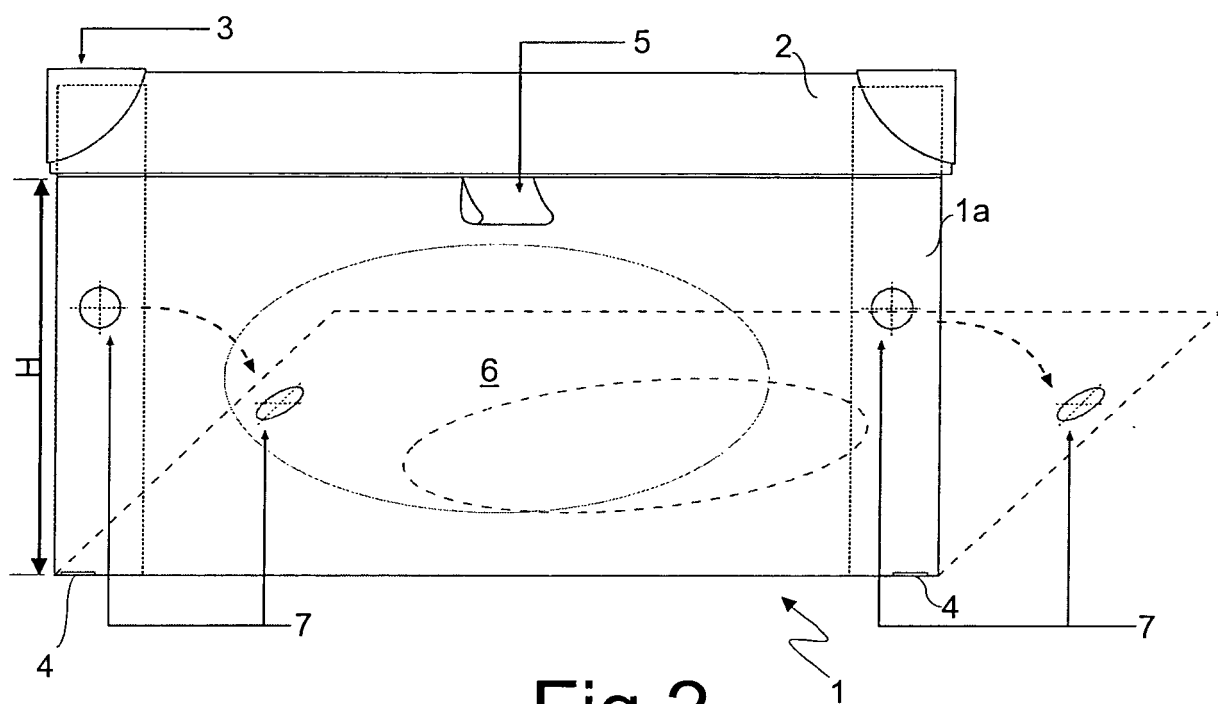


Fig.1





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 08 42 5276

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			B65D
Place of search		Date of completion of the search	Examiner
Munich		15 September 2008	Janosch, Joachim
<p>CATEGORY OF CITED DOCUMENTS</p> <p>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</p> <p>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</p>			

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 08 42 5276

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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