(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 3 018 064 A1

(12) EUROPEAN PATENT APPLICATION
published in accordance with Art. 153(4) EPC

(43) Date of publication:
11.05.2016 Bulletin 2016/19

(21) Application number: **14819735.3**

(22) Date of filing: **30.06.2014**

(51) Int Cl.:
B65D 5/36 *(2006.01)* ***G09F 1/06*** *(2006.01)*
A47F 5/11 *(2006.01)*

(86) International application number:
PCT/ES2014/000110

(87) International publication number:
WO 2015/001151 (08.01.2015 Gazette 2015/01)

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

(30) Priority: **04.07.2013 ES 201300648**

(71) Applicant: **Mestres Armengol, Ferran**
08960 Sant Just Desvern (Barcelona) (ES)

(72) Inventors:
- **MESTRES ARMENGOL, Ferran**
  E-08940 Sant Just Desvern (Barcelona) (ES)
- **LÓPEZ FERNÁNDEZ, Francisco**
  E-08940 Cornella (Barcelona) (ES)

(74) Representative: **Juncosa Miro, Jaime et al**
Torner, Juncosa i Associates, S.L.
Gran Via de les Corts
Catalanes, 669 bis, 1º, 2ª
08013 Barcelona (ES)

(54) SELF-EXPANDING FOLDING HOLLOW BODY FOR DISPLAY UNIT AND SELF-EXPANDING FOLDING HOLLOW STRUCTURAL ASSEMBLY FOR DISPLAY UNIT

(57) The hollow body comprises an even number of quadrilateral panels (1, 2, 3, 4) hingedly attached forming an annular strip that can be arranged flat or expanded, the body being closed by fifth and sixth polygonal panels (5, 6) having a number of sides equal to the number of panels of the strip, and being attached to hook-shaped panels (7, 8) to which there is secured an elastic traction element (50) pulling on the fifth and sixth panels (5, 6), bringing them closer to one another, integrating two connection panels (13, 14) attached to edges of a panel of the annular strip, adjacent to the panel attached to said fifth and sixth panels (5, 6), and hook-shaped panels (9, 10) attached to said connection panels (13, 14) and arranged overlapping said hook-shaped panels (7, 8).

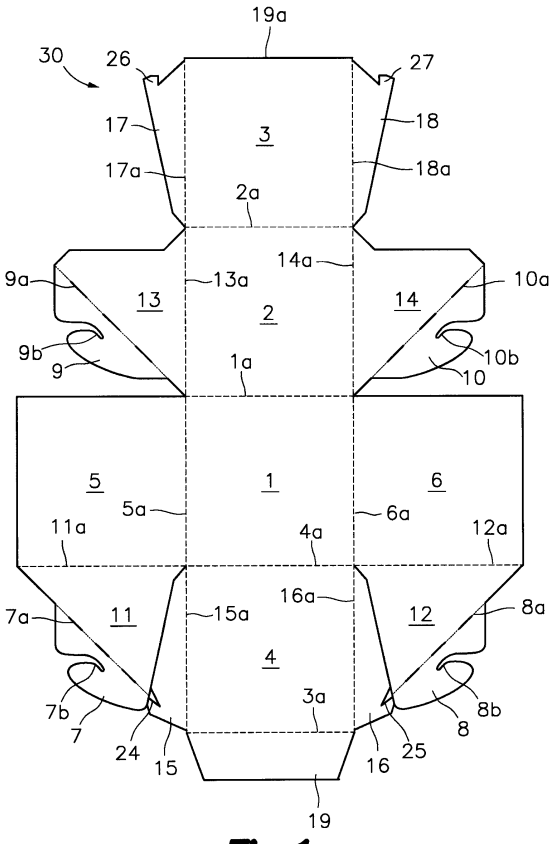

Fig. 1

EP 3 018 064 A1

Description

Technical Field

[0001] According to a first aspect, the present invention proposes a display unit adopting the shape of a particularly cubic or parallelepipedic folding hollow body, obtained from an arrangement of panels of a sheet material such as cardboard, corrugated cardboard, plastic, among others, capable of adopting a flat position in which the panels are substantially coplanar and overlapping, and an expanded position, in which the panels form with one another respective trihedrals, including at least one elastic element arranged for automatically driving the structure towards an expanded position for the purpose of forming the mentioned display unit.

[0002] In a second aspect, the invention proposes a structural assembly providing the integration of several of the mentioned hollow bodies according to various spatial configurations.

Prior Art

[0003] Self-expanding folding display units such as those disclosed in patent documents JP2009039343 and US 8348360, are known in the prior art.

[0004] Patent document WO 2009/037368, belonging to the same inventors, describes a self-expanding folding structure for a display unit including a number of embodiments. Particularly Figures 24 to 33 of this document disclose a prismatic display unit comprising a structure like the one described in the preamble of claim 1 of the present invention.

[0005] With respect to the mentioned background document, the invention provides a more stable, compact and resistant erect structure, better self-expansion conditions when drawing an elastic traction element on four faces of the assembly, and a simplified manufacture, allowing industrial mass production in preferred embodiments, with automatic gluing of the main parts thereof minimizing assembly operations. Furthermore, the mentioned elastic traction element is assured in a very secure manner to hooks resulting from at least four different panels of the sheet element, and two of said hooks have a portion adhered to a corresponding panel, providing overall a highly-resistant structure, regardless of the size of the hollow display body.

[0006] The hollow body will be obtained from a single piece of sheet material taking maximum advantage of the development of said sheet for defining the various faces of the hollow body.

Disclosure of the Invention

[0007] The self-expanding folding hollow body for a display unit of this invention comprises, according to a structure already used in said patent document WO 2009/037368, first, second, third and fourth quadrilateral panels hingedly attached to one another by respective first, second, third and fourth opposing connection edges forming an annular strip which by virtue of said first, second, third and fourth connection edges can be arranged in a flat position, in which two of said panels are substantially coplanar and overlapping, at least partially, with respect to two other panels, and an expanded position, in which said first, second, third and fourth panels form with one another respective dihedrals, the cubic or parallelepipedic hollow body being closed by fifth and sixth quadrilateral panels hingedly attached with respect to opposing edges of one of the panels of the annular strip, by means of respective fifth and sixth connection edges transverse to the connection edges of said panel with the other panels of the annular strip, such that by virtue of said fifth and sixth connection edges they can be arranged in said flat position, in which said fifth and sixth panels are substantially coplanar to the first, second, third and fourth panels (and in said expanded position, in which the fifth and sixth panels form respective dihedrals with the first, second, third and fourth panels demarcating said hollow body). To provide a self-expanding condition to this group of hingedly attached panels that have been described, there are provided first and second hook-shaped panels hingedly attached by respective first and second hooking connection edges to inner faces of said fifth and sixth panels, respectively, and one or more elastic traction elements connected to said first and second hook-shaped panels for pulling on the fifth and sixth panels, bringing them closer to one another towards the expanded position, closing a cube or parallelepiped.

[0008] Although the explained structure comprises an annular strip with four elements, as seen in Figure 31 of said patent document WO 2009/037368, said annular strip could comprise six or more elements providing corresponding faces, and the mentioned fifth and sixth panels closing the hollow body when they are drawn in by the elastic traction element, would have a corresponding number of sides.

[0009] The description of the invention will be provided, for the sake of simplification, in reference to an annular strip including the mentioned four panels.

[0010] According to the proposal of this invention, there are furthermore provided:

- first and second connection panels hingedly attached by respective connection edges to opposing edges transverse to said first and second connection edges of a panel of said annular strip which is adjacent to the panel hingedly attached to said fifth and sixth panels; and
- third and fourth hook-shaped panels which are hingedly attached to said first and second connection panels.

[0011] The mentioned third and fourth hook-shaped panels are thereby arranged substantially overlapping said first and second hook-shaped panels, respectively,

both in the flat position and in the expanded position, and said elastic traction element is connected to said first, second, third and fourth hook-shaped panels) for pulling on the first, second, third, fourth, fifth and sixth panels bringing them closer to one another, towards the expanded position. In other words, the pulling or drawing effort of the traction element is applied, besides to the two opposing faces closing the hollow body, to the rest of the elements of the annular strip, determining an optimized and very effective expansion for taking the hollow body to the three-dimensional display unit position.

[0012] The mentioned first, second, third, fourth, fifth and sixth panels and the first, second, third and fourth hook-shaped panels, as well as said first and second fixing panels and the first and second connection panels, are advantageously integrated in a single piece of sheet material in which the first and second fixing panels are hingedly attached by respective connection edges to the mentioned fifth and sixth panels.

[0013] According to a preferred embodiment, said first and second hooking connection edges of the first and second hook-shaped panels and said third and fourth hooking connection edges of the third and fourth hook-shaped panels are oriented in substantially diagonal directions with respect to the respective fifth and sixth panels, the pairs of overlapping hooking connection edges are thereby arranged in middle areas of the respective opposing fifth and sixth panels closing the hollow body when it is expanded.

[0014] In said embodiment and in order to obtain a very secure anchoring structure of said first and second hook-shaped panels, it has been provided that they are hingedly attached by hooking connection edges to respective first and second fixing panels fixed by adhesive to inner faces of the fifth and sixth panels, respectively.

Brief Description of the Drawings

[0015] Other features of the invention and the advantages provided by same will be better understood from the following detailed description of embodiments or variants, which must be interpreted in an illustrative and non-limiting manner, in reference to the attached drawings, in which:

Figure 1 shows the development of the self-expanding folding hollow body in an initial position prior to any folding operation, according to a first embodiment, in which the solid lines indicate cutting lines, and the discontinuous lines show folding lines, distinguishing between two opposing folding directions with two types of discontinuous lines;

Figure 2 shows a first step of the assembly process, according to said first embodiment, in which an adhesive is placed in first gluing positions;

Figure 3 shows a second step of the assembly process, according to said first embodiment, in which some faces are pressed against said first gluing positions, and an adhesive is placed in second gluing positions;

Figure 4 shows a third step of the assembly process, according to said first embodiment, in which another face is pushed against the second gluing positions, stressing that said first, second and third assembly steps can be easily automated in a machine for mass production;

Figure 5 shows a perspective view of the fourth step of the assembly process consisting of the positioning of an elastic traction element between the first and second housings and the third and fourth housings, in which the folding hollow body positioned halfway between the flat position and the expanded position is seen;

Figure 6 shows another perspective view opposite the one shown in Figure 5;

Figure 7 shows a fifth step of the assembly process, according to the first embodiment, in which the mechanical connection elements of the limiting panels are connected by crimping;

Figure 8 shows the self-expanding hollow body in the expanded position;

Figure 9 shows a view that is equal to the one shown in Figure 1 but of a second embodiment, particularly adapted for being carried out with thick materials, such as corrugated cardboard, for example;

Figure 10 shows the fifth step of the assembly process, according to the second embodiment, in which the mechanical connection elements of the limiting panels are attached by means of elastic elements;

Figure 11 shows a perspective view of the self-expanding hollow body, according to the second embodiment, in the flat position and stably held in said position;

Figure 12 shows a perspective view of a group of three self-expanding hollow bodies stacked and adhered to one another, according to one embodiment, to form an advertising assembly;

Figure 13 shows a view equal to the one shown in Figure 1 but of a third embodiment;

Figure 13 shows an axonometric view of a fourth embodiment, in which the hollow body has two square faces, and of four rectangular faces;

Figure 14 shows an axonometric view of a fifth embodiment, in which all the faces of the hollow body are rectangular; and

Figure 15 shows an axonometric view of a sixth embodiment, in which the hollow body has four square faces, and two diamond-shaped faces.

Detailed Description of Embodiments

[0016] First in reference to Figure 1, according to a first embodiment of the present invention the self-expanding folding hollow body for a display unit comprises first, second, third and fourth quadrilateral panels 1, 2, 3 and 4 hingedly attached to one another, by the respective first,

second, third and fourth connection edges 1a, 2a, 3a and 4a located on opposing edges of the aforementioned panels. Said assembly of panels thereby forms an annular strip which can be arranged in a flat position, in which two of said contiguous panels are substantially coplanar and overlapping, at least partially, with respect to two other contiguous panels, or in an expanded position, in which said first, second, third and fourth panels 1, 2, 3 and 4 form with one another respective dihedrals.

[0017] Fifth and sixth quadrilateral panels 5 and 6 are hingedly attached to opposing sides of said first panel 1, said opposing sides being transverse to said first and fourth connection edges 1a and 4a of said first panel 1.

[0018] Said fifth and sixth panels 5 and 6 can be arranged in a flat position, in which they are substantially coplanar to the first, second, third and fourth panels 1, 2, 3 and 4, or in said expanded position, in which the fifth and sixth panels 5 and 6 form respective dihedrals with the first, second, third and fourth panels 1, 2, 3 and 4, demarcating the mentioned hollow body 40.

[0019] To keep the assembly of panels in a flat coplanar arrangement in twos and overlapping, as depicted in Figure 11 a band 29 surrounding at least two of the first, second, third, fourth, fifth and sixth panels 1, 2, 3, 4, 5, 6 has been provided, said band 29 being extractable so that the hollow body self-expands. As can be seen in said Figure 11, the mentioned band 29 has at least one perforated line 20 facilitating the tearing thereof.

[0020] First and second hook-shaped panels 7 and 8 are in turn hingedly attached by respective first and second hooking connection edges 7a and 8a to the inner faces of the fifth and sixth panels 5 and 6, and at least one elastic traction element 50 connects said first and second hook-shaped panels 7 and 8 for pulling on the fifth and sixth panels 5 and 6, bringing them closer to one another towards the expanded position shown in Figure 8.

[0021] Said hollow body further includes first and second connection panels 13 and 14 hingedly attached by respective connection edges 13a and 14a to opposing edges of the second panel 2, which is, within said annular strip, adjacent to the first panel 1, and said connection edges 13a and 14a being transverse to said connection edges between the panels.

[0022] Third and fourth hook-shaped panels 9 and 10 are hingedly attached by respective third and fourth hooking connection edges 9a and 10a to edges of said first and second connection panels 13 and 14. Said third and fourth hook-shaped panels 9 and 10 are substantially overlapping with respect to said first and second hook-shaped panels 7 and 8, respectively, both in the flat position and in the expanded position, and said elastic traction element 50 is connected to said first, second, third and fourth hook-shaped panels 7, 8, 9 and 10 for pulling on the first, second, third, fourth, fifth and sixth panels 1, 2, 3, 4, 5 and 6, bringing them closer to one another, towards the expanded position, as illustrated in Figure 5.

[0023] It is seen in Figure 5 that the hooks located in the middle areas of the respective fifth and sixth panels 5 and 6, and with which the elastic traction element is engaged, are formed, in the case of the panel 5, by the overlapping of the first and third hook-shaped panels 7 and 9, and in the case of the panel 6, by the overlapping of the second and fourth hook-shaped panels 8 and 10.

[0024] Furthermore, as seen in Figure 1, the first and second hooking connection edges 7a and 8a, and the third and fourth hooking connection edges 9a and 10a, are oriented in substantially diagonal directions with respect to the edges of the fifth and sixth panels 5 and 6.

[0025] The previously described hinged attachment of the first and second hook-shaped panels 7 and 8, by means of said first and second hooking connection edges 7a and 8a, to the inner faces of the fifth and sixth panels 5 and 6 is achieved by means of first and second fixing panels 11 and 12 fixed by adhesive C1 to said inner faces of the fifth and sixth panels 5 and 6, as can be seen in Figures 2 and 3. Said first and second fixing panels 11 and 12 are each attached, by means of hinging, to the respective fifth or sixth panel 5 or 6, and to the respective first or second hook-shaped panel 7 or 8 by means of the respective connection edges 11a or 12a and the respective first or second hooking connection edges 7a or 8a.

[0026] For the purpose of achieving a simple and cost-effective production, all the parts forming said self-expanding hollow body, with the exception of the elastic traction means 50, are integrated in a single piece of sheet material 30, such that after cutting said sheet material 30, simple bending and gluing operations shown in Figures 2 to 8 allow obtaining said hollow body.

[0027] Given that the base material is sheet material 30, but the initial geometry of the hollow body is an annular strip formed by the hinged attachment of the first panel 1, attached to a side of the second panel 2 by means of said first connection edge 1a, the second panel 2 attached to a side of the third panel 3 by means of said second connection edge 2a, the third panel 3 attached to a side of the fourth panel 4 by means of said third connection edge 3a and the fourth panel 4 attached to a side of the first panel 1 by means of said fourth connection edge 4a, it has been provided that any one of said hinged connection edges 1a, 2a, 3a or 4a is obtained by fixing, by means of adhesive C2, a fixing flange 19 as shown in Figures 3 and 4, which thereby allows obtaining said annular strip from said sheet material 30.

[0028] According to the first embodiment described in Figure 1, said fixing flange 19 is between the third and fourth panels 3 and 4.

[0029] It can be seen in both Figure 1 and Figure 9 that in said piece of sheet material 30 there are provided first and second limiting panels 15, 16, hingedly attached by respective connection edges 15a, 16a to opposing edges transverse to said third and fourth connection edges 3a, 4a of the fourth panel 4, which is adjacent to the first panel 1, said first and second limiting panels 15, 16 having inclined edges which are provided for being connect-

ed to corresponding inclined edges of third and fourth limiting panels 17, 18 hingedly attached by respective connection edges 17a, 18a to opposing edges transverse to said second and third connection edges 2a, 3a of the third panel 3, which is adjacent to the second panel 2, such that the first and third limiting panels 15, 17 and the second and fourth limiting panels 16, 18 reach a coplanar position limiting expansion of the hollow body 40 in the expanded position and particularly determining a seating plane for the faces 5 and 6 pulled close to one another by the elastic traction element 50 (Figures 5 and 8).

[0030] Figure 9 shows an embodiment variant in which the mentioned inclined edges of the first, second, third and fourth limiting panels 15, 16, 17, 18 have associated therewith respective first, second, third and fourth engagement elements 20, 21, 22, 23, such that the inclined edges of the first and third limiting panels 15, 17 are connected to one another by an elastic ring 55, as shown in detail in Figure 10, arranged around the corresponding first and third engagement elements 20, 22 and the inclined edges of the second and fourth limiting panels 16, 18 are connected to one another by another elastic ring 55 arranged around the corresponding second and fourth engagement elements 21, 23.

[0031] Alternatively the mentioned inclined edges of the first, second, third and fourth limiting panels 15, 16, 17, 18 in the embodiment shown in Figures 1 to 4 have associated therewith respective first, second, third and fourth mechanical connection elements 24, 25, 26, 27, where the inclined edges of the first and third limiting panels 15, 17 are connected to one another by the mechanical interconnection of the corresponding first and third mechanical connection elements 24, 26, and the inclined edges of the second and fourth limiting panels 16, 18 are connected to one another by the mechanical interconnection of the corresponding second and fourth mechanical connection elements 25, 27. All this can be seen in Figure 7.

[0032] If said piece of sheet material is made of cardboard with a corrugated core and respective sheets attached to one another, it has been provided that the fifth and sixth panels 5, 6 have reinforcement flaps 28 connected by respective connection edges 28a to free edges thereof, said reinforcement flaps 28 being bent inwardly around said connection edges 28a and fixed by adhesive to inner faces of the fifth and sixth panels 5, 6. The mentioned inner corrugated core of the cardboard is thereby protected and not exposed in the area of the edges.

[0033] Another feature of this invention lies in the making of the hook-shaped panels to which the elastic traction element is secured. According to the invention, the first, second, third and fourth hook-shaped panels 7, 8, 9, 10 have respective first and second third and fourth housings 7b, 8b, 9b, 10b where said elastic traction element 50 is engaged, and said first and second housings 7b, 8b of the first and second hook-shaped panels 7, 8 are closer to the corresponding fifth and sixth panels 5, 6 than said third and fourth housings 9b, 10b of the third and fourth hook-shaped panels 9, 10 when said first and second hooking connection edges 7a, 8a of the first and second hook-shaped panels 7, 8 are adjacent to and coincide with said third and fourth hooking connection edges 9a, 10a of the third and fourth hook-shaped panels 9, 10, thereby facilitating the efficacy of drawing the faces 5 and 6 towards said expansion position of the hollow body.

[0034] As shown in Figures 29 to 31 of patent document WO 2009/037368 referred to in the prior art section, the self-expanding folding hollow body obtained from a single piece of sheet material can adopt other configurations, the panels 1, 2, 3, 4 particularly being rectangular or diamond-shaped, instead of squares providing a parallelepipedic structure, or the panels 5 and 6 being hexagonal, for example, and therefore using six panels forming an annular strip.

[0035] Therefore, by way of non-limiting example Figures 13, 14 and 15 show axonometric views of fourth, fifth and sixth embodiments, in which the hollow body has square, rectangular and diamond-shaped faces.

[0036] The invention also proposes a display unit assembly an example of which is shown in Figure 12, and it is defined by integrating a plurality of self-expanding folding hollow bodies 40 attached to others, where each of the hollow bodies has at least one of the first and third opposing panels 1, 3, which forms a base in the expanded position, fixed by adhesive to one of the first and third panels 1, 3 of another one of the hollow bodies 40. This assembly can adopt multiple configurations.

[0037] The features of the invention are defined in the following claims.

Claims

1. A self-expanding folding hollow body for a display unit, comprising:

   an even number of panels including at least first, second, third and fourth quadrilateral panels (1, 2, 3, 4) hingedly attached to one another by respective first, second, third and fourth opposing connection edges (1a, 2a, 3a, 4a) forming an annular strip which by virtue of said first, second, third and fourth connection edges (1a, 2a, 3a, 4a) can be arranged in a flat position, in which two of said panels are substantially coplanar and overlapping, at least partially, with respect to two other panels, and an expanded position, in which said first, second, third and fourth panels (1, 2, 3, 4) form with one another respective dihedrals;

   fifth and sixth polygonal panels (5, 6) with a number of sides equal to the number of panels forming the annular strip, said fifth and sixth panels (5, 6) being hingedly attached with respect to opposing edges of one of the panels of the

annular strip, by means of the respective fifth and sixth connection edges (5a, 6a) transverse to the connection edges of said panel with the other panels of the annular strip, and which by virtue of said fifth and sixth connection edges (5a, 6a) can be arranged in said flat position, in which said fifth and sixth panels (5, 6) are substantially coplanar to the first, second, third and fourth panels (1, 2, 3, 4), and in said expanded position, in which the fifth and sixth panels (5, 6) form respective dihedrals with the first, second, third and fourth panels (1, 2, 3, 4) demarcating said hollow body (40);

first and second hook-shaped panels (7, 8) hingedly attached by respective first and second hooking connection edges (7a, 8a) to inner faces of the fifth and sixth panels (5, 6), respectively; and

at least one elastic traction element (50) connected to said first and second hook-shaped panels (7, 8) for pulling on the fifth and sixth panels (5, 6), bringing them closer to one another, towards the expanded position,

characterized by further comprising:

first and second connection panels (13, 14) hingedly attached by respective connection edges (13a, 14a) to opposing edges transverse to said first and second connection edges of a panel of said annular strip, adjacent to the panel hingedly attached to said fifth and sixth panels (5, 6); and

third and fourth hook-shaped panels (9, 10) attached to said first and second connection panels (13, 14), where said third and fourth hook-shaped panels (9, 10) are substantially overlapping said first and second hook-shaped panels (7, 8), respectively, both in the flat position and in the expanded position, and said elastic traction element (50) is connected to said first, second, third and fourth hook-shaped panels (7, 8, 9, 10) for pulling on the first, second, third, fourth, fifth and sixth panels (1, 2, 3, 4, 5, 6), bringing them closer to one another, towards the expanded position.

2. The self-expanding folding hollow body for a display unit according to claim 1, **characterized in that** said first and second hooking connection edges (7a, 8a) of the first and second hook-shaped panels (7, 8) and said third and fourth hooking connection edges (9a, 10a) of the third and fourth hook-shaped panels (9, 10) are oriented in substantially diagonal directions with respect to the respective fifth and sixth panels (5, 6).

3. The self-expanding folding hollow body for a display unit according to claim 2, **characterized in that** the first, second, third and fourth hook-shaped panels (7, 8, 9, 10) define respective hooks located in middle areas of the respective fifth and sixth panels (5, 6).

4. The self-expanding folding hollow body for a display unit according to claim 1, 2 or 3, **characterized in that** the first and second hook-shaped panels (7, 8) are hingedly attached by said first and second hooking connection edges (7a, 8a) to respective first and second fixing panels (11, 12) fixed by adhesive (C1) to said inner faces of the fifth and sixth panels (5, 6), respectively.

5. The self-expanding folding hollow body for a display unit according to claim 4, **characterized in that** the first, second, third, fourth, fifth and sixth panels (1, 2, 3, 4, 5, 6), the first, second, third and fourth hook-shaped panels (7, 8, 9, 10), said first and second fixing panels (11, 12) and the first and second connection panels (13, 14) are integrated in a single piece of sheet material (30), where the first and second fixing panels (11, 12) are hingedly attached by respective connection edges (11a, 12a) to said fifth and sixth panels (5, 6).

6. The self-expanding folding hollow body for a display unit according to claim 5, **characterized in that** in said annular strip (1, 2, 3, 4), the first panel (1) is hingedly attached to a side of the second panel (2) by said first connection edge (1a), the second panel (2) is hingedly attached to a side of the third panel (3) by said second connection edge (2a), the third panel (3) is hingedly attached to a side of the fourth panel (4) by said third connection edge (3a) and the fourth panel (4) is hingedly attached to a side of the first panel (1) by said fourth connection edge (4a), a fixing flange (19) being provided at any one of said connection edges (1a, 2a, 3a, 4a).

7. The self-expanding folding hollow body for a display unit according to claim 6, **characterized by** further comprising first and second limiting panels (15, 16) hingedly attached by respective connection edges (15a, 16a) to opposing edges transverse to said third and fourth connection edges (3a, 4a) of the fourth panel (4), which is adjacent to the first panel (1), said first and second limiting panels (15, 16) having inclined edges connected to corresponding inclined edges of third and fourth limiting panels (17, 18) hingedly attached by respective connection edges (17a, 18a) to opposing edges transverse to said second and third connection edges (2a, 3a) of the third panel (3), which is adjacent to the second panel (2), such that the first and third limiting panels (15, 17) and the second and fourth limiting panels (16, 18) reach a coplanar position limiting the expansion of the hollow body (40) in the expanded position.

8. The self-expanding folding hollow body for a display unit according to claim 7, **characterized in that** said inclined edges of the first, second, third and fourth limiting panels (15, 16, 17, 18) have associated therewith respective first, second, third and fourth engagement elements (20, 21, 22, 23), where the inclined edges of the first and third limiting panels (15, 17) are connected to one another by an elastic ring (55) arranged around the corresponding first and third engagement elements (20, 22) and the inclined edges of the second and fourth limiting panels (16, 18) are connected to one another by another elastic ring (55) arranged around the corresponding second and fourth engagement elements (21, 23).

9. The self-expanding folding hollow body for a display unit according to claim 7, **characterized in that** said inclined edges of the first, second, third and fourth limiting panels (15, 16, 17, 18) have associated therewith respective first, second, third and fourth mechanical connection elements (24, 25, 26, 27), where the inclined edges of the first and third limiting panels (15, 17) are connected to one another by the mechanical interconnection of the corresponding first and third mechanical connection elements (24, 26) and the inclined edges of the second and fourth limiting panels (16, 18) are connected to one another by the mechanical interconnection of the corresponding second and fourth mechanical connection elements (25, 27).

10. The self-expanding folding hollow body for a display unit according to any one of the preceding claims, **characterized in that** the fifth and sixth panels (5, 6) have reinforcement flaps (28) connected by respective connection edges (28a) to free edges thereof, said reinforcement flaps (28) being bent inwardly around said connection edges (28a) and fixed by adhesive to inner faces of the fifth and sixth panels (5, 6).

11. The self-expanding folding hollow body for a display unit according to any one of the preceding claims, **characterized in that** the first, second, third and fourth hook-shaped panels (7, 8, 9, 10) have respective first and second third and fourth housings (7b, 8b, 9b, 10b) where said elastic traction element (50) is engaged, and said first and second housings (7b, 8b) of the first and second hook-shaped panels (7, 8) are closer to the corresponding fifth and sixth panels (5, 6) than said third and fourth housings (9b, 10b) of the third and fourth hook-shaped panels (9, 10) when said first and second hooking connection edges (7a, 8a) of the first and second hook-shaped panels (7, 8) are adjacent to and coincide with said third and fourth hooking connection edges (9a, 10a) of the third and fourth hook-shaped panels (9, 10).

12. The self-expanding folding hollow body for a display unit according to any one of the preceding claims, **characterized by** comprising a band (29) surrounding at least two of the first, second, third, fourth, fifth and sixth completely or partially overlapping panels (1, 2, 3, 4, 5, 6) keeping the hollow body (40) in the flat position.

13. The self-expanding folding hollow body for a display unit according to claim 12, **characterized in that** said band (29) has at least one perforated line (20) facilitating the tearing thereof.

14. The self-expanding folding hollow body for a display unit according to claim 1, **characterized in that** said third and fourth hook-shaped panels (9, 10) are hingedly attached by respective third and fourth hooking connection edges (9a, 10a) to edges of said first and second connection panels (13, 14),

15. A self-expanding folding hollow structural assembly for a display unit, **characterized by** comprising a plurality of self-expanding folding hollow bodies (40) according to any one of the preceding claims attached to one another, where each of the hollow bodies (40) has at least one of its opposing first and third panels (1, 3) fixed by adhesive to one of the first and third panels (1, 3) of another one of the hollow bodies (40).

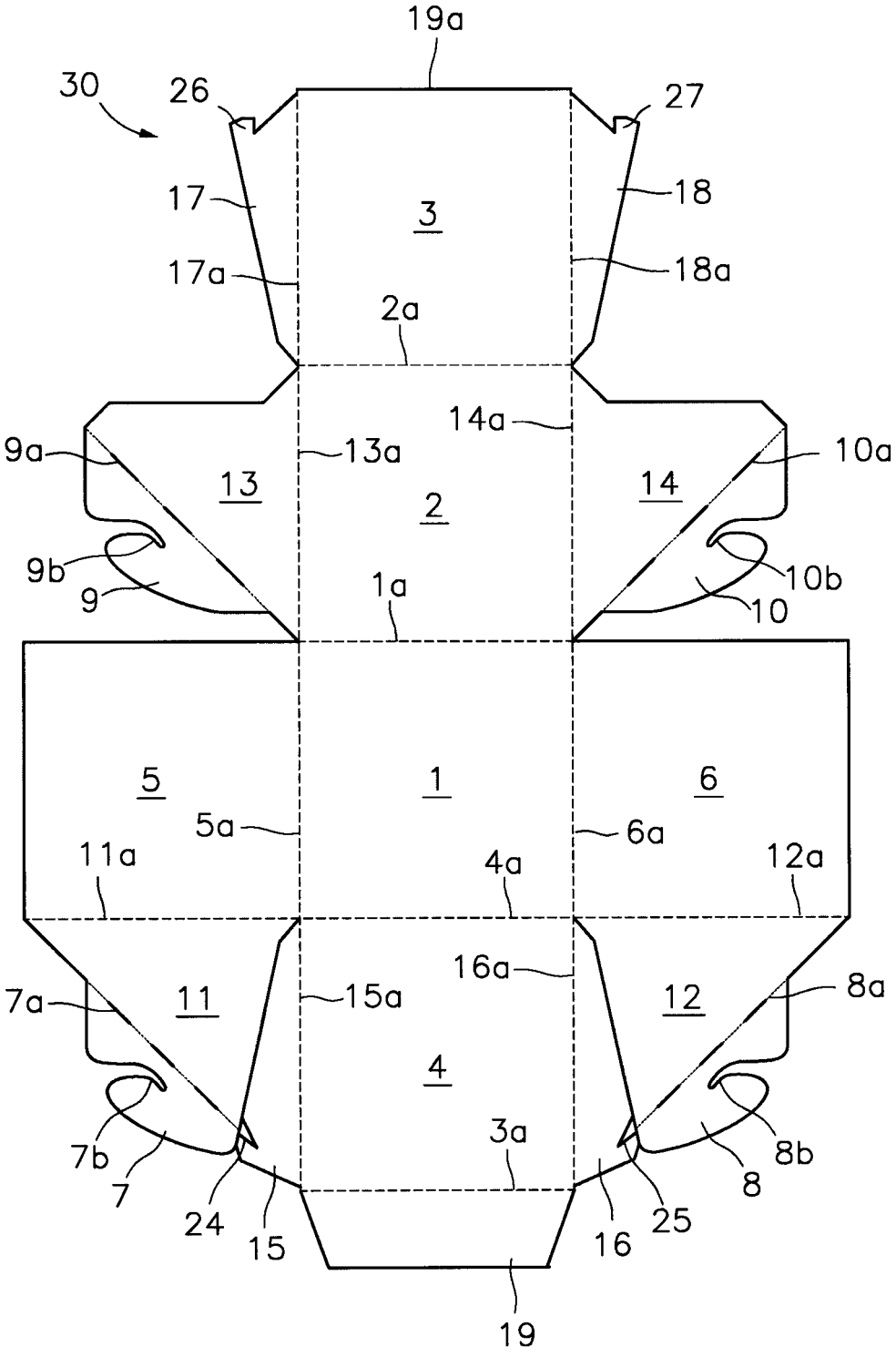
19a
30
26
27
17
18
3
17a
18a
2a
14a
9a
13a
10a
13
14
2
9b
10b
9
1a
10
5
1
6
5a
6a
11a
4a
12a
16a
7a
11
15a
12
8a
4
3a
7b
8b
7
8
24
25
15
16
19

Fig. 1

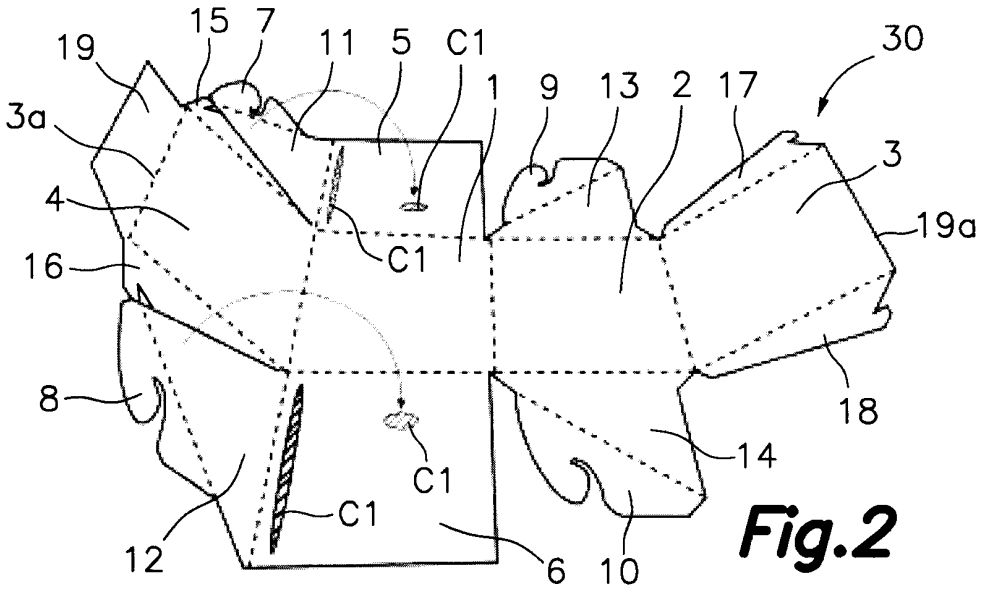

Fig.2

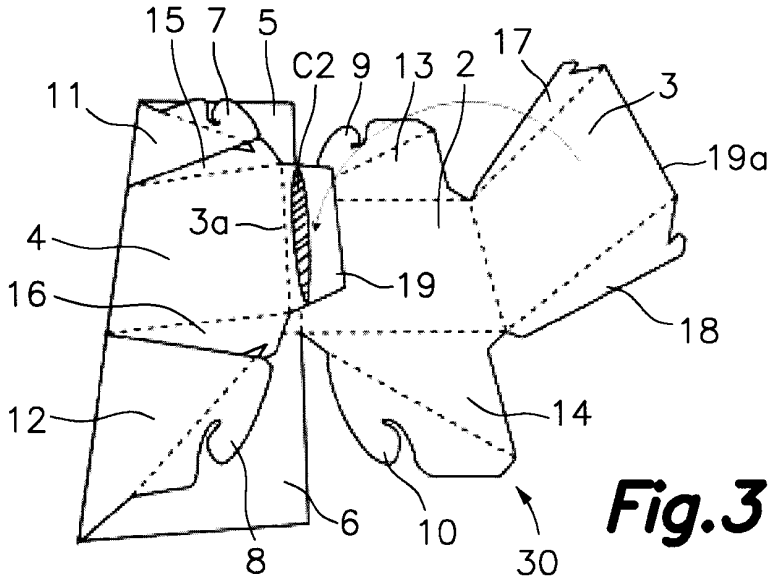

Fig.3

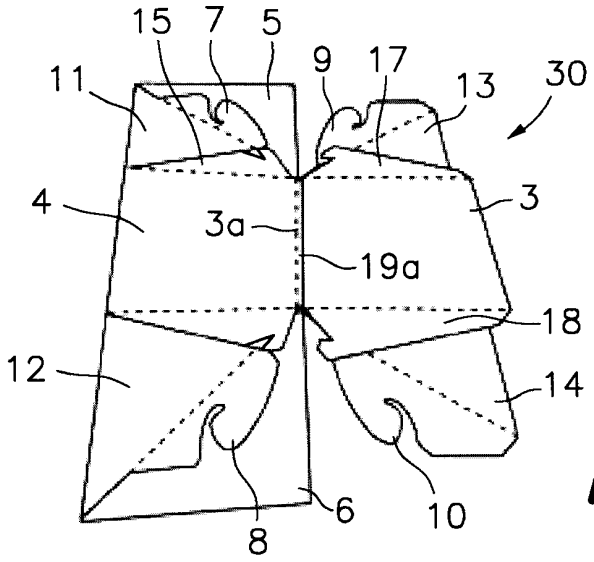

Fig.4

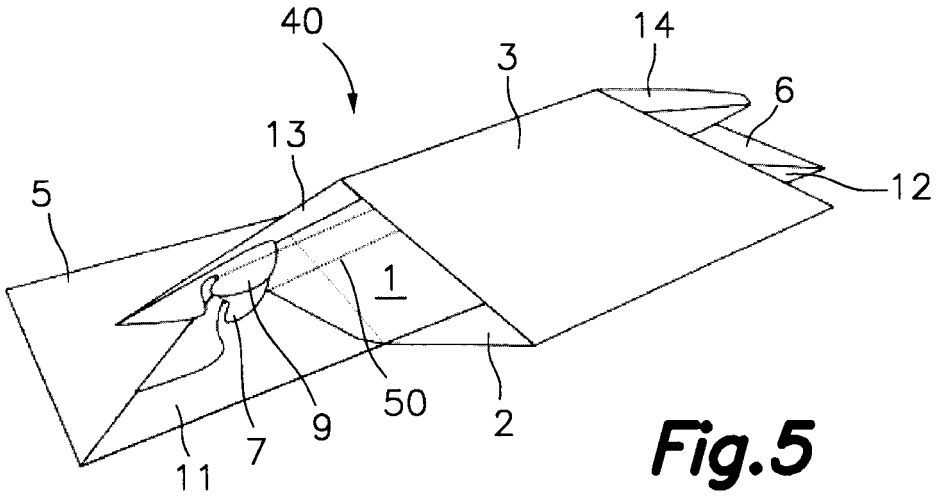

Fig.5

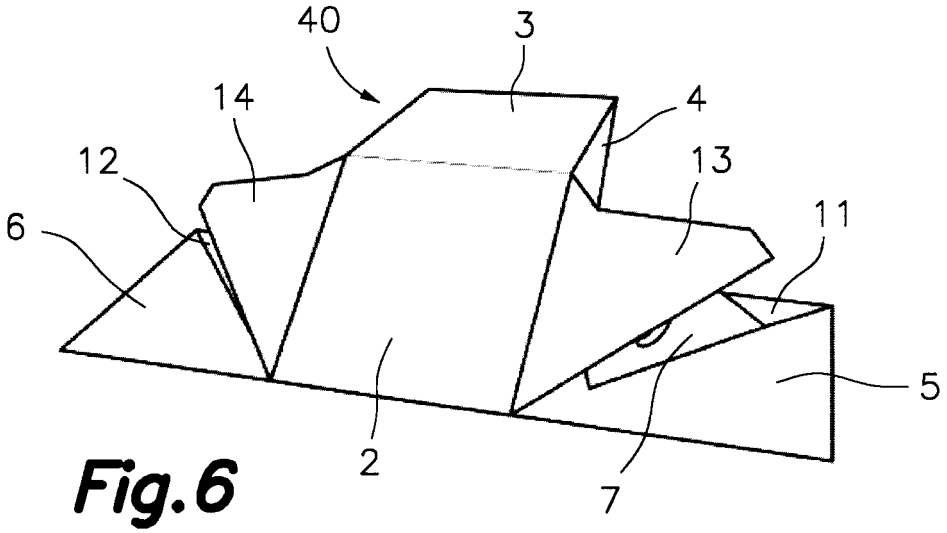

Fig.6

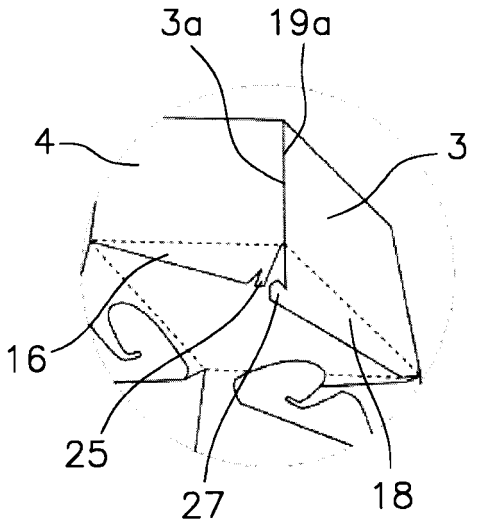

Fig.7

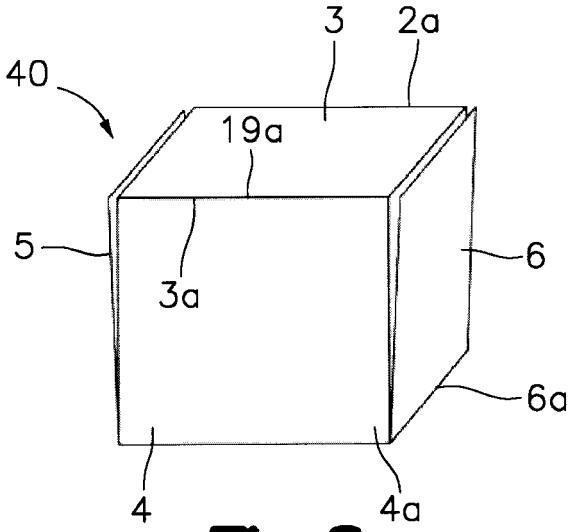

Fig.8

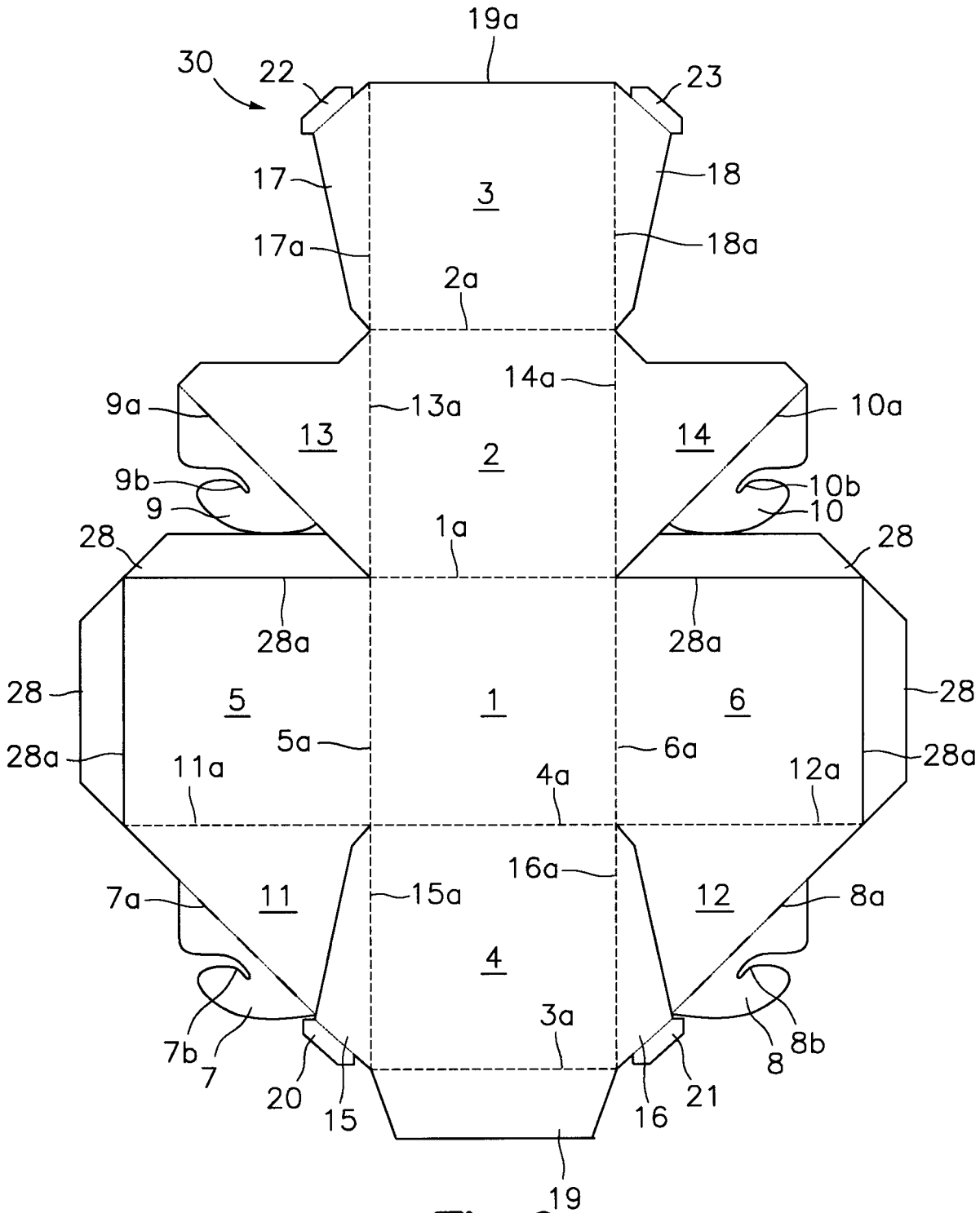
19a
30
22
23
17
18
3
17a
18a
2a
14a
9a
13a
10a
13
14
2
9b
10b
9
10
1a
28
28
28a
28a
28
28
5
1
6
28
5a
6a
28a
11a
4a
12a
16a
7a
11
15a
12
8a
4
3a
7b
7
20
15
16
21
8
8b
19

Fig.9

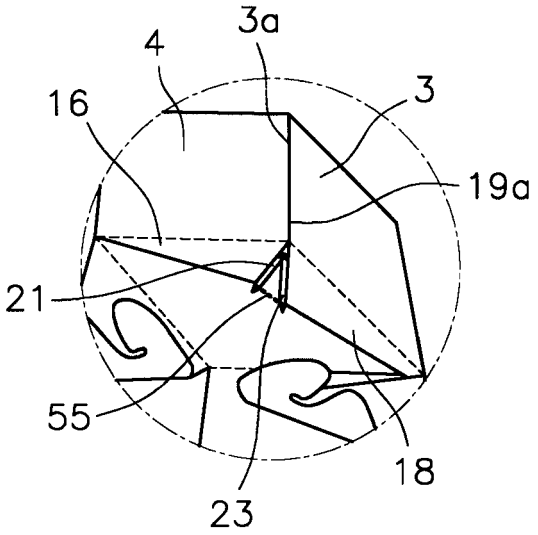

Fig. 10

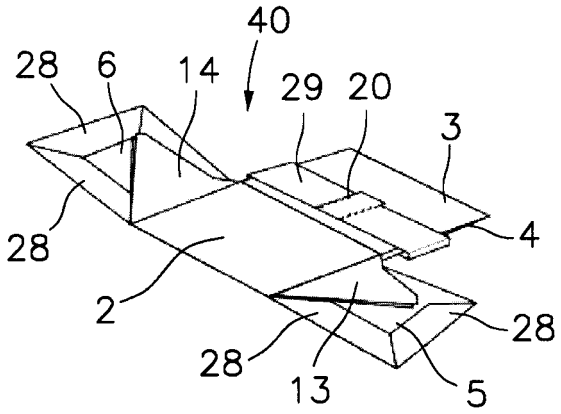

Fig. 11

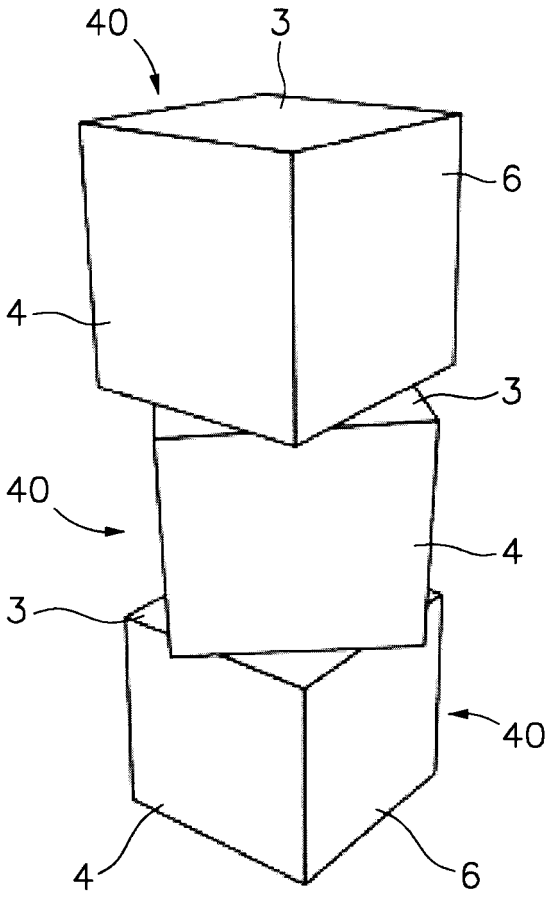

Fig. 12

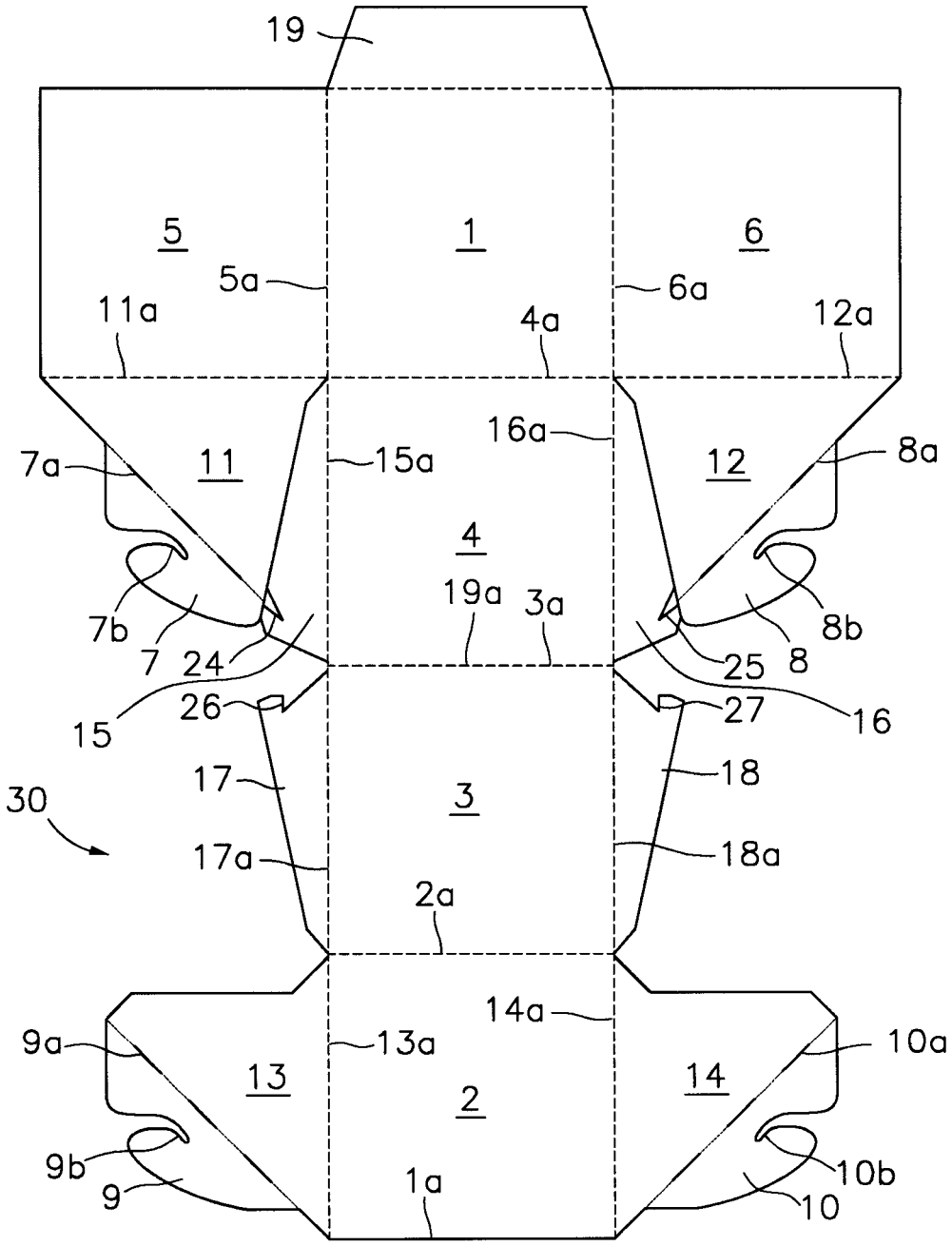
19
5
1
6
5a
6a
11a
4a
12a
16a
7a
11
15a
12
8a
4
19a
3a
7b
8b
7
24
25
8
15
26
27
16
17
18
30
3
17a
18a
2a
14a
9a
13a
10a
13
14
2
9b
10b
9
1a
10

Fig. 13

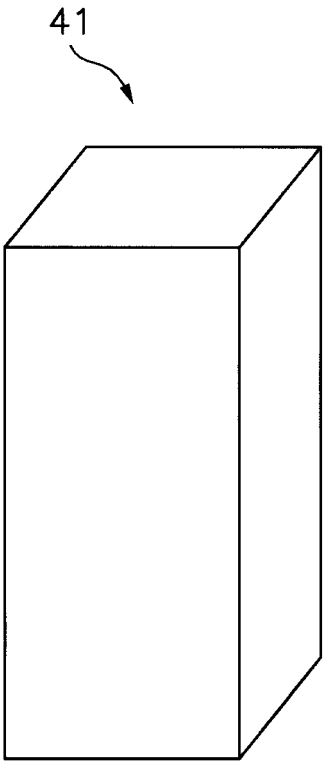

Fig. 14

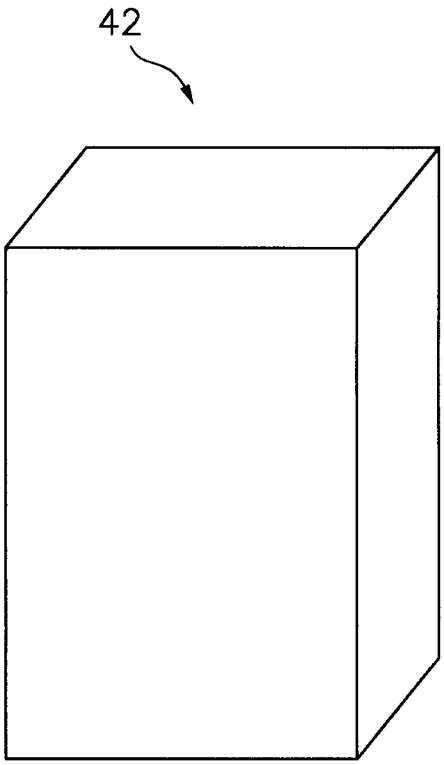

Fig. 15

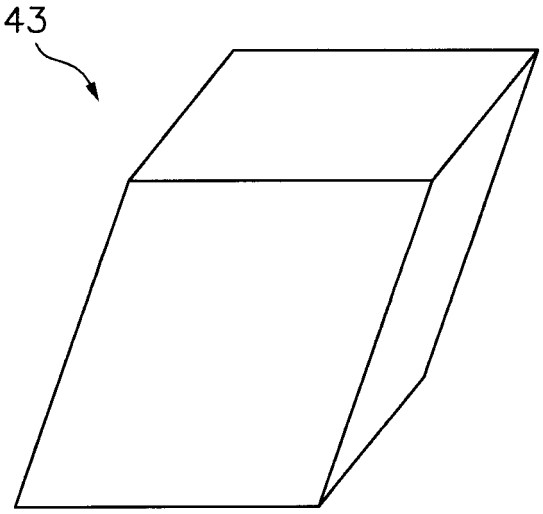

Fig. 16

INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES2014/000110

A. CLASSIFICATION OF SUBJECT MATTER

See extra sheet

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
B65D, G09F, A47F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPODOC, INVENES

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4619426 A (DRUECK JR FRED) 28/10/1986, column 2, lines 4 - 66; column 4, lines 6 - 52; abstract; figures.	1
A	US 4794024 A (CROWELL CHRISTOPHER S ET AL.) 27/12/1988, column 2, lines 27 - 46; column 3, lines 27- 58; column 4, lines 14 - 31; abstract; figures.	1
A	GB 1317155 A (STENVEN SECUDA ASSOCIATES LTD) 16/05/1973, page 2, line 71 - page 3, line 12; page 3, lines 72 - 119; figures.	1
A	ES 1008606U U (GRANDES PROMOCIONES S.A.) 01/05/1989, column 1, line 56 -column 2, line 50; column 3, line 21 - column 4, line 43; figures.	1

☒ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance.
"E" earlier document but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure use, exhibition, or other means.
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other documents , such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
16/09/2014	**(17/09/2014)**
Name and mailing address of the ISA/ OFICINA ESPAÑOLA DE PATENTES Y MARCAS Paseo de la Castellana, 75 - 28071 Madrid (España) Facsimile No.: 91 349 53 04	Authorized officer E. Balsera Porris Telephone No. 91 3493260

Form PCT/ISA/210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES2014/000110

C (continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of documents, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 6497601 B1 (WARD ERIC) 24/12/2002, column 2, line 34 - column 4, line 2; abstract; figures.	1
A	US 4854060 A (CORBO THOMAS E ET AL.) 08/08/1989, column 2, lines 9 - 49; abstract; figures.	1
A	US 3234682 A (ERNEST FRANKL) 15/02/1966, column 1, lines 23 - 53; figures.	1

Form PCT/ISA/210 (continuation of second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/ES2014/000110

Patent document cited in the search report	Publication date	Patent family member(s)	Publication date
US4619426 A	28.10.1986	NONE	
US4794024 A	27.12.1988	NONE	
GB1317155 A	16.05.1973	NONE	
ES1008606U U	01.05.1989	ES1008606Y Y	01.12.1989
US6497601 B1	24.12.2002	NONE	
US4854060 A	08.08.1989	NONE	
US3234682 A	15.02.1966	NONE	

Form PCT/ISA/210 (patent family annex) (July 2009)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/ES2014/000110

CLASSIFICATION OF SUBJECT MATTER

B65D5/36 (2006.01)
G09F1/06 (2006.01)
A47F5/11 (2006.01)

Form PCT/ISA/210 (extra sheet) (July 2009)

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- JP 2009039343 B **[0003]**
- US 8348360 B **[0003]**
- WO 2009037368 A **[0004] [0007] [0008] [0034]**