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(54)

Beam structure for an article carrier

(57)

A carton and a blank of a carton for packaging one or more articles, incorporating a beam structure extending between opposed carton side walls enabling said structure to be interposed between portions of said one or more articles to support said article. The beam structure comprising a pair of support panels extending

between said side walls and connected thereto, the support panels are hinged along their common edge to form a beam of a substantially inverted "V-shaped" cross-section. A tab connected to the beam structure projects upwardly towards an article to be engaged therewith, thereby to reduce the relative movement of the carton and articles.

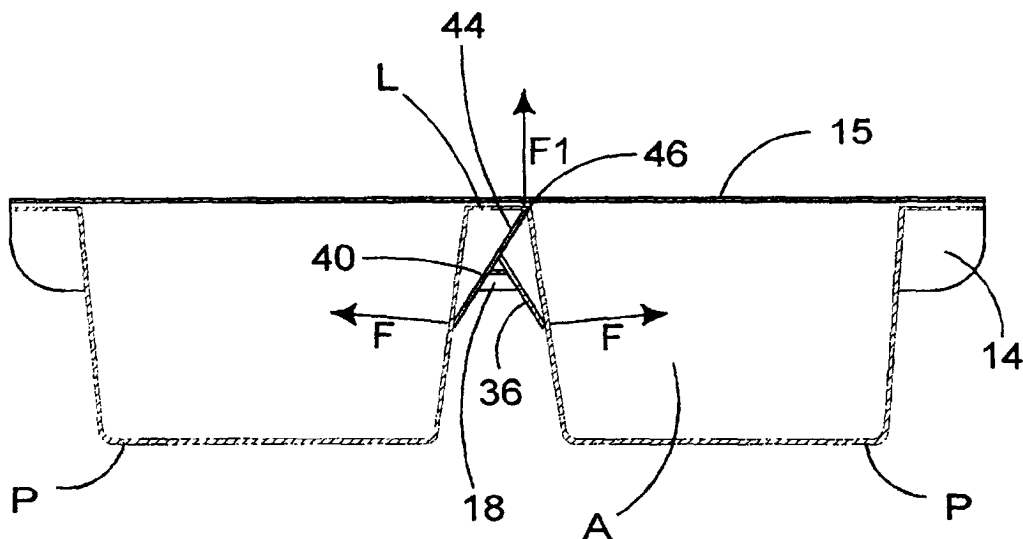


FIGURE 4

## Description

**[0001]** The present invention relates to an improved beam structure used to interlock articles such as so-called brick packages or interconnected cups or pots. Such groupings may constitute a single pair or any other desired arrangement such as two rows of two packages each, two rows of three, four or five packages each or greater number of rows desired number of containers. Ordinarily, such containers are relatively small and in order to provide for efficient handling during shipment and displays in retail outlets, it is desirable to stack the articles in tiers one above the other.

**[0002]** This invention relates particularly to a beam structure which interconnects a carton's side walls at their lower end. Previous beams have been constructed to form a "U-shaped" beam as highlighted in US patent 3 861 530 Calvert, or French patent FR 7 811 397. A further type of beam construction is that known as a "flat shape" beam. This can be found in US patent 4 869 424.

**[0003]** The problem with the U-shaped beam structure is that two folds are required along the lower end of the beam which increases the complexity of construction. The main problem associated with the flat shape beam structure is the concentration of the score lines to one particular point, which is undesirable.

**[0004]** Another example is illustrated in WO 98/33 722 Mead, which illustrates a beam structure which is substantially "V" shaped, and has gusset panels connecting the beam to the side panels of a carton.

**[0005]** A further problem with known beam structures is that they allow articles held within the carton to move relative to the carton, which may cause problems when handling or stacking the cartons.

**[0006]** The present invention seeks to overcome or at least mitigate the problems of the prior art.

**[0007]** One aspect of the invention provides a beam structure of a carton for packaging one or more articles, the beam structure extends between opposed carton side walls enabling the structure to be interposed between portions of the article to support the one or more articles. The beam structure comprises a pair of support panels extending between the side walls and connected thereto, the support panels being hinged along their common edge to form a beam of a substantially inverted "V"-shaped cross-section. A tab connected to the beam structure projects upwardly towards the one or more articles to be engaged therewith, thereby to reduce the relative movement of the carton and articles.

**[0008]** According to an optional feature of this aspect of the invention, a bracket panel may extend upwardly from each carton side walls, and a pair of gusset panels hingedly connected to each bracket panel and folded out of alignment therewith, wherein the pairs of gusset panels hingedly connect the support panels to the side panels. Preferably, the bracket panel comprises an upper edge which upper edge is severed by a cut from adjacent portions of the support panels.

**[0009]** According to an optional feature of this aspect of the invention the bracket panel may be substantially trapezoidal in shape.

**[0010]** According to another optional feature of this aspect of the invention the tab may be struck from one of the support panels and is formed integrally with the other of the support panels. Preferably, the upper edge of the tab abuts a flange of the article.

**[0011]** According to another optional feature of this aspect of the invention the relationship between the distance separating the two lower edges of the support panels and the angles subtended between the lower edges adjacent to the gusset panels, may be such as to facilitate the introduction of the at least one article.

**[0012]** According to a further optional feature of this aspect of the invention part of the support panels may each abut a wall of adjacent articles.

**[0013]** According to a still further optional feature of this aspect of the invention the gusset panels may be folded out of alignment with respect to each support panel so as to abut a wall of the adjacent articles.

**[0014]** According to yet another optional feature of this aspect of the invention the support panels may define therebetween an acute angle to facilitate formation of the beam.

**[0015]** A second aspect of the invention provides a blank for forming a beam structure attached to a carton for packaging at least one article wherein the beam structure extends between opposed side wall panels of the blank when erected to form a carton, and comprises support panels hingedly connected along their common side edge to form a beam of substantially inverted V-shaped cross-section, and wherein a tab is struck from one of the support panels and is connected to the other of the support panels.

**[0016]** According to an optional feature of this aspect of the invention, a bracket panel may be hingedly connected to each side wall panel, and a pair of gusset panels hingedly interconnecting each bracket panel and support panels to the side panels. More preferably, there may comprise an edge adjacent the support panels, which edge is severed by a cut from adjacent portions of the support panels.

**[0017]** According to another optional feature of the second aspect of the invention the tab may be struck from one of the support panels and is formed integrally with the other of the support panels.

**[0018]** According to yet another optional feature of the second aspect of the invention the bracket panel may be substantially trapezoidal in shape.

**[0019]** A third aspect of the invention provides a carton for packaging at least one article comprising a first side wall, a top wall and a second side wall hingedly interconnected in series and a beam structure, extending between opposed carton side walls enabling the structure to be interposed between portions of the article to support the article, the beam structure comprising support panels extending between the side walls, the pan-

els being hinged along their common upper side edge to form a beam of a substantially inverted V-shaped cross-section, and wherein a tab projects upwardly to prevent the relative movement of the carton and articles.

**[0020]** Exemplary embodiments of the invention will now be described, by way of example only, with reference to the accompanying drawings, in which:-

FIGURE 1 shows a blank for forming a beam structure according to one aspect of the invention;

FIGURE 2 shows a perspective view of the partially erected beam structure according to one aspect of the invention shown having an article introduced thereto;

FIGURE 3 shows a fully erected and loaded carton from the blank shown in Figure 1; and

FIGURE 4 shows a cross-sectional view along the line X-X of the carton as shown in Figure 3.

**[0021]** Referring to the drawings, and in particular Figure 1, there is shown one example of a blank 8 made from paperboard or similar foldable sheet material for forming a carton having a plurality of panels for forming a beam structure 10 provided therewith for packaging one or more articles. The beam structure 10 extends between, and is hingedly connected to, opposed carton side wall panels 12, 14 via bracket arrangements 22 and 24. Thus, the beam structure 10 can be interposed between portions of the article to support it. The carton preferably also comprises a top wall panel 15 hingedly connected to side wall panel 14 along fold line 17, and a flap 13 hingedly connected to side wall panel 12 along fold line 19.

**[0022]** In this embodiment, the bracket arrangement 22 comprises a bracket panel 16 hingedly connected along one edge to carton side wall panel 12 along fold line 20. Preferably, the bracket 16 is substantially trapezoidal in shape and fold line 20 is provided along its longest edge. The bracket panel 16 is hinged along each of its opposing oblique side edges to one of a pair of gusset panels 26, 28 along fold lines 30, 32 respectively. The gusset panels 26, 28 are substantially triangular in shape in the preferred embodiment. Of course the shape of the bracket panel and/or gusset panels are not limited to the shapes described above and it is envisaged that other shapes could be used to provide a beam of a substantially inverted "V" shaped cross-section.

**[0023]** Gusset panel 26 is hingedly connected along fold line 34 to an article support panel 36. Likewise, gusset panel 28 is hingedly connected along fold line 38 to a second article support panel 40.

**[0024]** It is desirable for reasons given below that a cut line 52 separates bracket panel 16 from support panels 36, 40 which in this embodiment extends between the intersections of fold lines 32 and 38 at one end and

the intersection of fold lines 30 and 34 at the other end.

**[0025]** A second bracket arrangement 24 is provided at the opposite end of beam structure 10 and comprises a bracket panel 18 hingedly connected to side wall panel 14 and gusset panels 26a, 28a hingedly interconnecting the bracket panel 18 to the article support panels 36, 40 respectively. The bracket arrangement 24 is in a symmetrically opposite position to arrangement 22 and is of a similar construction, so will not, therefore, be more specifically described.

**[0026]** First and second support panels 36, 40 are hingedly connected together along their common side edge by a fold line 42 and are further connected to the bracket arrangement 24 at the opposite end of the beam structure 10. A tab 44 formed integrally with second support panel 40, is struck from first support panel 36 along cut line 45. Cut line 45 interrupts fold line 42. In this embodiment, tab is shaped to provide a free end edge 46 that is shaped to support part of an article A, shown in Figures 3 and 4.

**[0027]** Turning to the construction of the carton illustrated in Figures 2, 3 and 4, it is envisaged that the carton of the present invention can be formed by a series of sequential folding and gluing operations which can be performed in a known straight line machine so that the carton is not required to be rotated or inverted to complete its construction. The folding process is not limited to that described below and can be altered according to particular manufacturing requirements.

**[0028]** Referring first to Figure 2 the carton blank 8 is part erected to provide a pair of oppositely disposed side walls 12, 14. The bracket panels 16, 18 are folded out of alignment with their respective side wall panels 12 and 14, such that there is preferably an acute angle therebetween.

**[0029]** The beam structure 10 is constructed by folding first and second support panels 36, 40 along their common fold line 42 into an angular relationship with each other, such that fold line 42 is uppermost, thereby forming an apex. This causes the article support tab 44 to project above the apex. The folding of the first and second support panels 36, 40 simultaneously causes gusset panels 26, 28 and 26a, 28a to be folded out of alignment with bracket panel 16 with cut lines 52, 52a allowing bracket panels 16, 18 to be displaced away from the support panels. Beneficially, cut line 52 provides relief to the stresses caused by the concentration of fold lines 30, 32, 34, 38.

**[0030]** Article A, such as a tray, is introduced to the carton, from above, such that individual pots P of the article are positioned either side of the beam structure 10, as shown in Figure 4. Of course, the invention could be applied to a carton for packaging other types of articles, for example bottles, cans, jars or other types of primary containers. Preferably, these containers are grouped together. Turning again to the embodiment illustrated, the introduction of the article A may itself cause the folding of the support panels 36, 40 about fold

line 42. Top wall panel 15 is then folded over the top of articles A and is secured to flap 13 using glue, or other suitable means known in the art, such as mechanical interlocking means, for example. The carton is now fully erected, as shown in Figures 3 and 4, with a beam of a substantially inverted "V" shaped cross section. The tab 44 projects towards the article A to be engaged therewith thereby to reduce the relative movement of the carton and articles.

**[0031]** As shown in Figure 4, the lip L of article A which interconnects the individual pots P is sandwiched between top wall panel 15 and the tab 44. Support panels 36 and 40 are held together in an angular relationship by abutment with the walls of the pots, which in turn urges tab 44 upwardly. This arrangement substantially prevents the relative movement of the article A and carton which may otherwise comprise the automated handling of the cartons and the stacking thereof.

**[0032]** In some embodiments, the gusset panels 26, 28, 26a, 28a and the bracket panels 16, 18 are shaped to define the angular arrangement between support panels and that the gusset panels abut a portion of adjacent pots. Thus outward forces F, F1 are applied to the sides of the pots P and to the lip L, because the support panels are urged back to their original form, by the resilience of the foldable sheet material. Beneficially, the abutment of the tab 44, the support panels 36, 40 and, optionally the gusset panels 26, 28 with the pots, minimises relative movement between the pots and carton, to produce a more rigid structure.

**[0033]** It is envisaged that the angular relationship between support panels 36 and 40 can be altered by moving fold lines 30, 32, 34, 38 and/or cut lines 52, 52a according to particular requirements of the beam structure 10. The bracket panels 16, 18 are not limited to being of trapezoidal shape and the positioning of cut line 52 can be altered to any desired position in order to provide relief to the stresses caused by the concentration of fold lines.

**[0034]** It will be recognised that as used herein, the terms "top", "bottom", "side" and "upper" with respect to the panels of the carton are relative terms, and that the carton may be reoriented as necessary or as desired. Any reference to hinged connections should not be construed as necessarily referring to a single fold line only; indeed it is envisaged that a hinged connection can be formed from a score line, a frangible line or one, two or more fold lines without departing from the scope of invention.

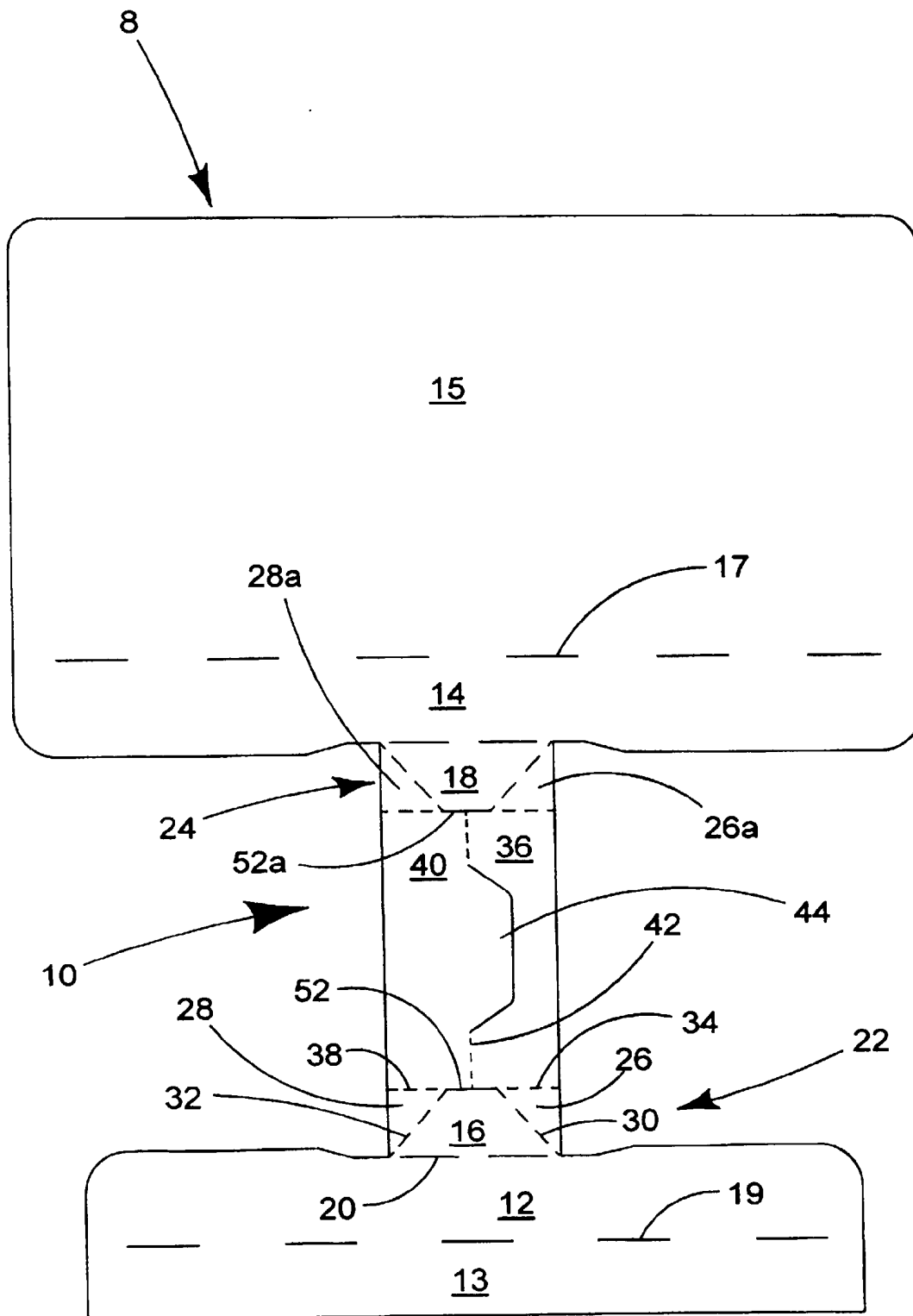
**[0035]** The present invention and its preferred embodiment relates to a beam structure in a top gripping carton which is shaped to provide satisfactory strength to hold at least one article securely but with a degree of flexibility so that the load transferred to the beam structure is absorbed by the carton. The shape of the blank minimises the amount of paperboard required. The carton can be applied to an array of articles by hand or automatic machinery. It is anticipated that the invention

can be applied to a variety of cartons and not limited to those of the top gripping sort, for example wraparound or fully enclosed cartons, there internal support for the articles is required.

## Claims

1. A beam structure of a carton for packaging one or more articles, said beam structure extends between opposed carton side walls enabling said structure to be interposed between portions of said one or more articles to support said one or more articles, said beam structure comprising a pair of support panels extending between said side walls and connected thereto, said support panels being hinged along their common edge to form a beam of a substantially inverted "V"-shaped cross-section, characterised in that a tab connected to the beam structure projects upwardly towards said one or more articles to be engaged therewith, thereby to reduce the relative movement of the carton and articles.
2. The beam structure as claimed in claim 1 wherein there further comprises a bracket panel extending upwardly from each said carton side walls, and a pair of gusset panels hingedly connected to each said bracket panel and folded out of alignment therewith, wherein said pairs of gusset panels hingedly connect said support panels to said side panels.
3. The beam structure as claimed in claim 1 or claim 2 wherein bracket panel comprises an upper edge which upper edge is severed by a cut from adjacent portions of said support panels.
4. The beam structure as claimed in claim 3 wherein said bracket panel is substantially trapezoidal in shape.
5. The beam structure as claimed in any preceding claim wherein said tab is struck from one of said support panels and extends upwardly from the other of said support panels.
6. The beam structure as claimed in claim 5 wherein the upper edge of the tab abuts a flange of the article.
7. The beam structure as claimed in any of the preceding claims wherein the relationship between the distance separating the two lower edges of said support panels and the angles subtended between said lower edges adjacent to said gusset panels, is such as to facilitate the introduction of said at least one article.

8. The beam structure as claimed in any preceding claim wherein part of said support panels each abut a wall of adjacent articles.
9. The beam structure as claimed in claim 8 wherein the gusset panels are folded out of alignment with respect to each said support panel so as to abut a wall of the adjacent articles.
10. The beam structure as claimed in any of the preceding claims wherein said support panels define therebetween an acute angle to facilitate formation of the beam.
11. A blank for forming a beam structure attached to a carton for packaging one or more article wherein the beam structure extends between opposed side wall panels of the blank, and comprises a pair of support panels extending between said side wall panels and connected thereto, said support panels being hingedly connected along their common side edge characterised in that a tab is stuck from one of said support panels and is connected to the other of said support panels.
12. The blank as claimed in claim 11 wherein there further comprises a bracket panel hingedly connected to each said side wall panel, and a pair of gusset panels hingedly interconnecting each said bracket panel and support panels to said side wall panels.
13. The blank as claimed in claim 12 wherein the bracket panel comprises an edge adjacent said support panels, which edge is severed by a cut from adjacent portions of said support panels.
14. The blank as claimed in any one of claims 11 to 13 wherein said tab is stuck from one of said support panels and is formed integrally with the other of said support panels.
15. The blank as claimed in any one of claims 11 to 14 wherein said bracket panel is substantially trapezoidal in shape.
16. A carton for packaging one or more articles comprising a first side wall, a top wall and a second side wall hingedly interconnected in series and a beam structure, extending between opposed carton side walls enabling said structure to be interposed between portions of said one or more articles to support said one or more articles, said beam structure comprising support panels extending between said side walls, said support panels being hinged along their common edge to form a beam of a substantially inverted "V"-shaped cross-section, characterised in that a tab projects upwardly from the beam to prevent the relative movement of the carton and articles.
17. A carton for packaging one or more articles comprising a first side wall, a top wall and a second side wall hingedly interconnected in series and a beam structure as claimed in any of claims 1 to 10.



# FIGURE 1

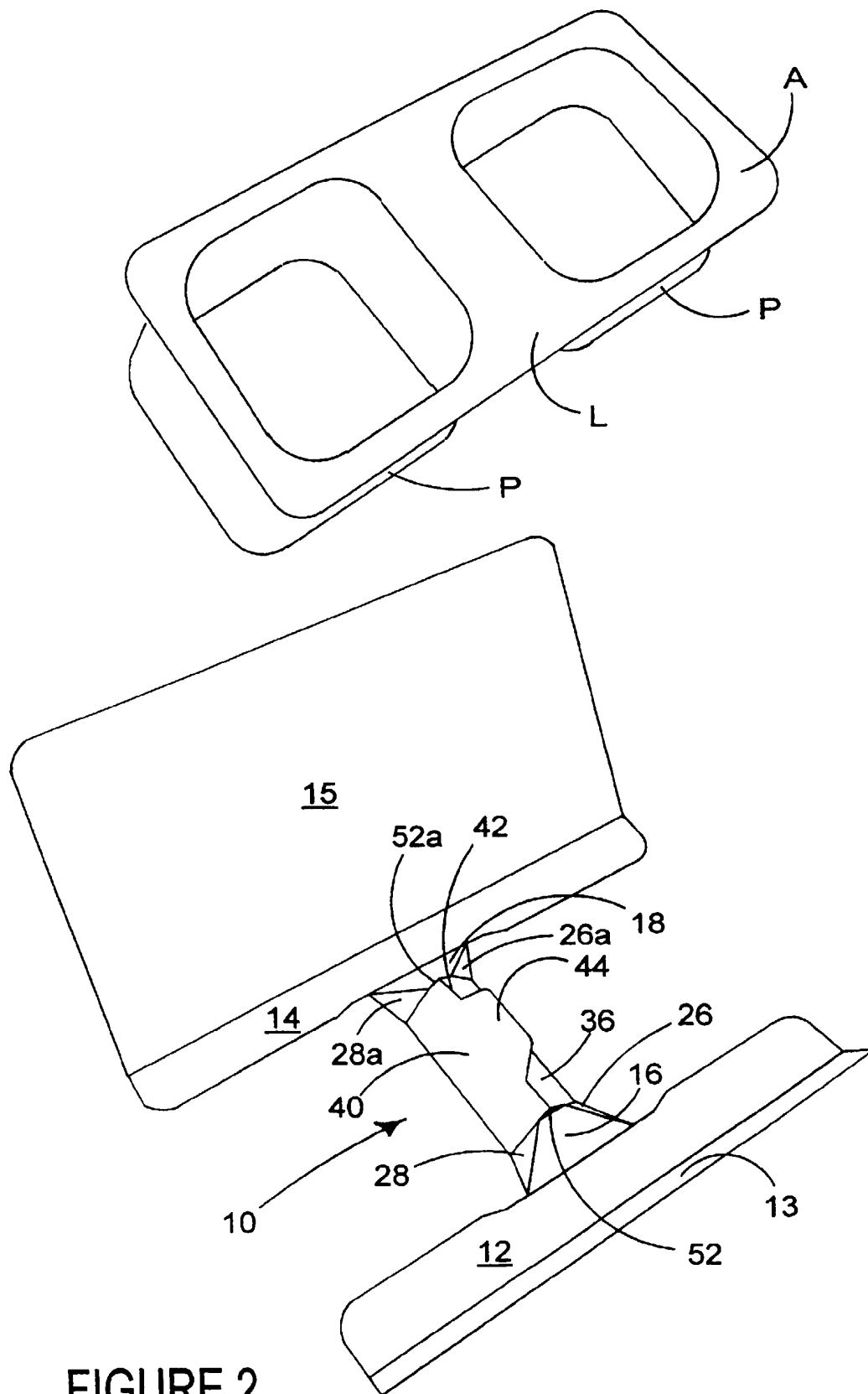


FIGURE 2

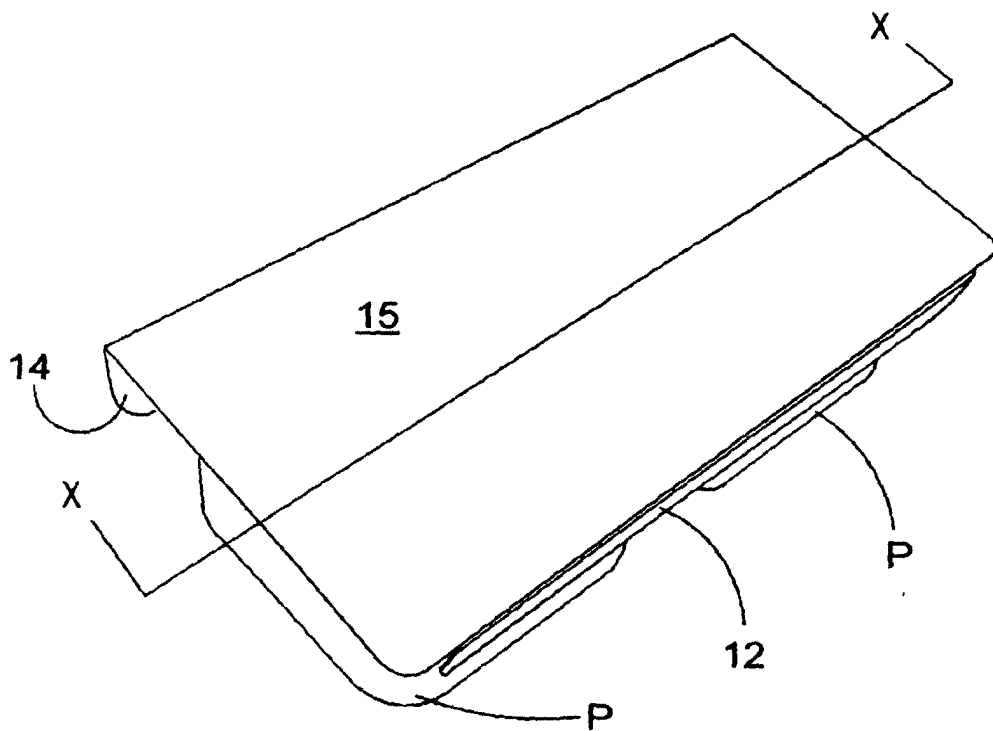


FIGURE 3

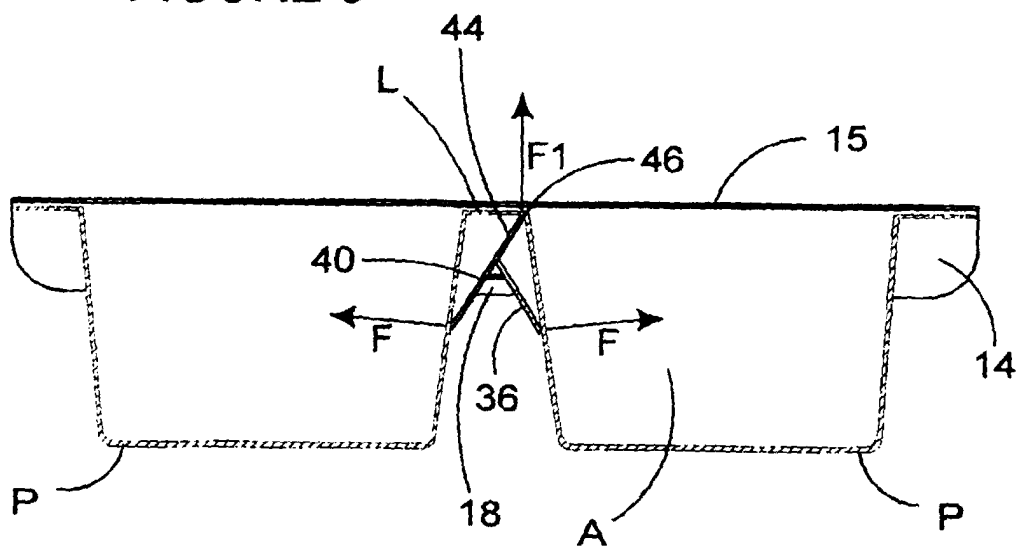


FIGURE 4



European Patent  
Office

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Application Number  
EP 00 20 2471

| DOCUMENTS CONSIDERED TO BE RELEVANT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                   |                                                     |                                              |
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| The present search report has been drawn up for all claims                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                   |                                                     |                                              |
| Place of search<br>THE HAGUE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                   | Date of completion of the search<br>1 November 2000 | Examiner<br>Zanghi, A                        |
| <p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone<br/>Y : particularly relevant if combined with another document of the same category<br/>A : technological background<br/>O : non-written disclosure<br/>P : intermediate document</p> <p>T : theory or principle underlying the invention<br/>E : earlier patent document, but published on, or after the filing date<br/>D : document cited in the application<br/>L : document cited for other reasons</p> <p>&amp; : member of the same patent family, corresponding document</p> |                                                                                                                   |                                                     |                                              |

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**ANNEX TO THE EUROPEAN SEARCH REPORT  
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