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(54) **BEAM STRUCTURE FOR ARTICLE CARRIER**

TRÄGERSTRUKTUR FÜR EINEN TRAGBEHÄLTER

STRUCTURE DE TIRANT POUR SUPPORT D'ARTICLES

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**FR-A- 2 423 399** **US-A- 2 764 284**  
**US-A- 4 127 304**

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**EP 0 956 245 B1**

## 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 of a desired number of containers. Ordinarily, such containers are smaller than an ordinary drinking glass 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 new beam structure which interconnects carrier side walls at their lower end. Previous beams have been constructed to form a "U-shaped" beam as highlighted in U.S. Patent No. 3,861,530, or French Patent No. 2 423 399. A further type of beam construction is that known as a "flat shape" beam. This can be found in U.S. Patent No. 2,764,284.

[0003] US 4 127 304 illustrates another type of beam structure in the form of an interior partition structure adapted to form two adjacent cells.

[0004] 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.

[0005] The present invention has overcome the difficulties associated with the previous types of beam, by providing a cut line to relieve the stresses caused by a concentration of score lines as well as to facilitate the beam formation.

[0006] In accordance with one aspect of the invention there is a beam structure of a carrier for packaging a plurality of articles. The beam structure bridges between opposed carrier side walls to be interposed between the articles and further to support the articles. The beam structure comprises a pair of bracket panels extending downwardly from the side walls, a pair of strips each extending between the bracket panels, a pair of gusset panels hinged interconnecting each bracket panel with the strips. **Each bracket panel is disposed in a face to face relationship with the gusset panels of a respective pair.** The strips are hinged along their common lower side edge to form a beam of a substantially V-shaped cross-section. The lower end portion of each bracket panel is severed by a cut from the adjacent portions of the beam structure.

[0007] In one optional feature of this aspect of the invention, the beam formed from the strips is provided at each end thereof with the respective pair of gusset panels so that each end of the beam is hingedly connected to the each bracket panel.

[0008] In another optional feature of this aspect of the invention, each bracket panel is hingedly connected

along its opposing side edges to the gusset panels of the respective pair, the side edges of each bracket panel is disposed generally perpendicular to each other, and the cut extends partially along the side edges of each bracket panel.

[0009] In a further optional feature of this aspect of the invention, each bracket panel is substantially trapezoidal in shape and is hingedly connected along its opposing oblique side edges to the gusset panels of the respective pair, and the cut extends entirely along a shorter edge of said each bracket panel.

[0010] In yet a further optional feature of this aspect of the invention, the strips define therebetween an acute angle to facilitate formation of said beam.

[0011] A second aspect of the invention provides a carrier for packaging a plurality of articles. The carrier comprises a pair of opposed side walls, and a beam structure which beam structure bridges between the side walls to support the articles.

[0012] A third aspect of the invention provides a blank for forming an article carrier having a beam structure of a substantially V-shaped cross-section. The blank comprises a pair of spaced carrier side walls, a pair of bracket panels extending toward each other from the side walls respectively, a pair of strips each extending between the bracket panels, and a pair of gusset panels hingedly interconnecting each of the bracket panels with the strips. The strips are hingedly connected together along a common side edge thereof to form the beam structure. A portion of each bracket panel is severed by a cut from the gusset panels of a respective pair.

[0013] Preferably, the beam structure to be formed from the strips may be provided at each end thereof with the respective pair of the gusset panels so that each end is hingedly connected to each bracket panel.

[0014] According to an optional feature of the third aspect of the invention each bracket panel may be hingedly connected along opposing side edges thereof to the gusset panels of the respective pair, the side edges of each bracket panel being disposed generally perpendicular to each other. Preferably, the cut may extend partially along the side edges of each bracket panel.

[0015] According to another optional feature of the third aspect of the invention each bracket panel may be substantially trapezoidal in shape and is hingedly connected along opposing oblique side edges thereof to the gusset panels of the respective pair, and the cut extends entirely along a shorter edge of each bracket panel.

[0016] Embodiments of the invention will now be described, by way of example only, with reference to the following drawings in which:

FIGURE 1 shows the beam structure formed from the carrier blank, according to the invention;

FIGURE 2 shows a plan view of one end of the beam structure according to the invention shown in Figure 1; and

FIGURE 3 shows a cross-sectional view of the beam structure as shown in Figure 2.

**[0017]** As illustrated in Figure 1, there is shown part of a carrier for forming a beam structure 10 attached to a carrier for packaging a plurality of horizontally arranged articles. The carrier is made from paperboard or similar foldable sheet material. The beam structure 10 extends between opposed carrier side walls 12, 14, and comprises a pair of oppositely disposed bracket panels 16, 18 hingedly connected to respective one of said side walls 12, 14.

**[0018]** Part of the carrier blank for forming one end of the beam structure 10 is shown in Figure 2. It comprises a bracket panel 16 hingedly connected along its upper edge to carrier side wall 12 along fold line 20. In this embodiment, the bracket panel 16 is substantially trapezoidal in shape. The bracket panel 16 is hinged along each of its opposing side edges 22, 24 to one of a pair of substantially triangular gusset panels 26, 28 along fold lines 30, 32 respectively. Gusset panel 26 is foldably connected along fold line 34 to a support panel 36. Likewise, gusset panel 28 is foldably connected along fold line 38 to a second support panel 40. First and second support panels 36, 40 are foldably connected together along their common side edge by fold line 42 and are connected to gusset panels 44, 46 at the opposite end of the beam structure 10, shown in Figure 1.

**[0019]** Each gusset panel 26, 28 is partially separated from bracket panel 16 by cut lines 48, 50 respectively which extend from fold lines 30, 32 respectively to the intersections of fold lines 34 and 38. Another cut line 52 separates bracket panel 16 from support panels 36, 40 and extends between cut lines 48 and 50 respectively.

**[0020]** The opposite end of beam structure 10 comprises a bracket panel 18 and gusset panels 44, 46 hingeably connected to bracket panel 18 and the other end of first and second support panels 32, 34. The above-mentioned panels 18; 44, 46 are in symmetrically opposite positions to bracket panel 16 and gusset panels 26, 28 and are of similar construction and not therefore more specifically described.

**[0021]** Turning to the construction of the carrier and in particular the beam structure 10, shown in Figure 1, the carrier is part erected to provide a pair of oppositely disposed side walls 12, 14. The bracket panels 16, 18 are hingeably connected to opposed carrier side walls 12, 14 such that the beam structure 10 is formed below the side walls 12, 14. The beam structure 10 is constructed by folding first and second support panels 36, 40 along their common fold line 42 and into an angular relationship with each other. Gusset panels 26, 28 folded into a face to face relationship with bracket panel 16 along fold lines 30, 32. Likewise, gusset panels 44, 46 are folded in a face to face relationship with bracket panel 18 along fold lines 53, 55 respectively. The expression "face to face relationship" as used herein refers to either the arrangement wherein each gusset panel is in con-

tact with the respective bracket panel face to face or the arrangement wherein each gusset panel is opposed to the respective bracket panel face to face with a space therebetween. In a face to face contacting relationship, each gusset panel 26, 28; 44, 46 may be attached to the respective bracket panel 16, 18 by glue or other means known in the art.

**[0022]** Each pair of gusset panels 26, 28; 44, 46 are folded about fold lines 36, 38; 54, 56 and are thereby brought into a substantially perpendicular arrangement with support panels 36, 40, to form the beam structure 10, shown in Figure 1. The other panels of the carrier can be placed in a set up condition such that the beam structure is able to receive and support at lip portion at least one article by the upper edges of support panels 36, 40.

**[0023]** As shown in Figure 1, the beam structure 10 extends between opposed carrier side walls 12, 14 enabling the structure to be interposed between articles and further to support the articles. The beam structure 10 comprises bracket panels 16, 18 extending downwardly from side walls 12, 14 and pairs of gusset panels 26, 28; 44, 46 hingeably connected with said bracket panels 16, 18 to form face to face relationship. Strips 36, 40 extend between and are hingeably connected to the gusset panels 26, 28; 44, 46. The strips 36, 40 are hinged along their common lower side edge 42 to form a beam of a substantially V-shaped cross-section, the lower end portion of each bracket panel 16, 18 being severed by a cut 48, 50, 52 from the adjacent portions of said beam structure 10.

**[0024]** Figure 3 illustrates part of the forming tool "T" used to fold the support panels 36, 40 along the fold line 42 and also illustrates a relief angle  $\alpha$  formed between the support panels 36, 40. The relief angle  $\alpha$  facilitates the engagement and disengagement of the forming tool "T" upon formation of the beam structure 10. To form the beam structure 10, the forming tool "T" is moved in the direction "A" as indicated in Figure 3. Cut lines 48, 50 and 52 separate the lower end portion of the bracket panel 16 from the gusset panels 26, 28 as well as from the support panels 36, 40. It will be appreciated by those skilled in the art that the relief angle  $\alpha$  can be altered by moving fold lines 30, 32; 34, 38 and/or cut lines 48, 50 or 52 according to particular requirements of the beam structure 10. The bracket panels 16, 18 are not necessarily trapezoidal in shape but may be triangular, pentagonal, or hexagonal. The positioning of cut lines 48, 50, 52 can be altered to any desired position in order to provide relief to the stresses caused by the concentration of fold lines. However, it is preferred that the relief angle  $\alpha$  is kept small enough to allow smooth introduction of articles into the carrier. A beam structure with a too wide relief angle would interfere with the articles to be loaded into the carrier. A preferred relief angle is an acute angle less than thirty (30) degrees.

**[0025]** The present invention and its preferred embodiment relates to a beam structure in a top gripping

carrier 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 a carrier. The shape of the blank minimizes the amount of paperboard required. The carrier 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 carriers including, but not limited to, those disclosed in U.S. Patent Nos. 2,764,284; 2,823,063; 2,823,064; 3,861,530; and 5,682,996 and French Patent No. 7811397 which patents are hereby incorporated by reference.

## Claims

1. A beam structure (10) of a carrier for packaging a plurality of articles, said beam structure bridging between a pair of opposed side walls (12, 14) of said carrier to support said articles, said beam structure comprising a pair of bracket panels (16, 18) extending downwardly from said side walls (12, 14) respectively; a pair of strips (36, 40) each extending between said bracket panels (16, 18); and a pair of gusset panels (26, 28; 44, 46) hingedly interconnecting each of said bracket panels (16, 18) with said strips (36, 40), said each bracket panel (16, 18) being disposed in a face to face relationship with said gusset panels (26, 28) of a respective pair **characterised in that** said strips being hingedly connected together along a common lower side edge thereof to form a beam of a substantially V-shaped cross-section, and **in that** a lower end portion of said each bracket panel being severed by a cut (48, 50, 52) from adjacent portions of said beam structure (10).
2. A beam structure according to claim 1, wherein said beam formed from said strips is provided at each end thereof with said respective pair of said gusset panels (26, 28) so that said each end of said beam is hingedly connected to said each bracket panel (16, 18).
3. A beam structure according to claim 1 or claim 2 wherein said each bracket panel is hingedly connected along opposing side edges (22, 24) thereof to said gusset panels (26, 28) of said respective pair, said side edges of said each bracket panel being disposed generally perpendicular to each other.
4. A beam structure according to claim 3 wherein said cut (48, 50, 52) extends partially along said side edges of said each bracket panel.
5. A beam structure according to claim 1 or claim 2, wherein said each bracket panel is substantially trapezoidal in shape and is hingedly connected along opposing oblique side edges (22, 24) thereof to said gusset panels of said respective pair, and said cut extends entirely along a shorter edge of said each bracket panel.
6. A beam structure according to any of the preceding claims wherein said strips (36, 40) define therebetween an acute angle to facilitate formation of said beam.
7. A carrier for packaging a plurality of articles, said carrier comprising a pair of opposed side walls (12, 14), and a beam structure (10) as claimed in any of claims 1 to 6, which beam structure bridging between said side walls to support said articles.
8. A blank for forming an article carrier having a beam structure (10) of a substantially V-shaped cross-section, said blank comprising a pair of spaced carrier side walls (12, 14); a pair of bracket panels (16, 18) extending toward each other from said side walls respectively; a pair of strips (36, 40) each extending between said bracket panels; and a pair of gusset panels (26, 28) hingedly interconnecting each of said bracket panels with said strips, said strips being hingedly connected together along a common side edge thereof to form said beam structure, a portion of said each bracket panel is severed by a cut (48, 50, 52) from said gusset panels of a respective pair.
9. A blank according to claim 8, wherein said beam structure to be formed from said strips is provided at each end thereof with said respective pair of said gusset panels (26, 28) so that said each end is hingedly connected to said each bracket panel (16, 18).
10. A blank according to claim 8 or claim 9 wherein said each bracket panel is hingedly connected along opposing side edges (22, 24) thereof to said gusset panels (26, 28) of said respective pair, said side edges of said each bracket panel being disposed generally perpendicular to each other.
11. A blank to claim 10 wherein said cut (48, 50, 52) extends partially along said side edges of said each bracket panel.
12. A blank according to claim 8 or claim 9, wherein said each bracket panel is substantially trapezoidal in shape and is hingedly connected along opposing oblique side edges (22, 24) thereof to said gusset panels of said respective pair, and said cut extends entirely along a shorter edge of said each bracket panel.

## Patentansprüche

1. Eine Stützstruktur (10) eines Trägers zur Verpackung einer Vielzahl von Gegenständen, wobei die Stützstruktur ein Paar von gegenüberliegenden Seitenwänden (12, 14) des Trägers überbrückt, um die Gegenstände zu stützen, wobei die Stützstruktur ein Paar von Stützwandflächen (16, 18), die sich von den jeweiligen Seitenwänden (12, 14) nach unten erstrecken, ein Paar von Streifen (36, 40), die sich jeweils zwischen den Stützwandflächen (16, 18) erstrecken, und ein Paar von Keilwandflächen (26, 28; 44, 46) umfasst, die jede der Stützwandflächen (16, 18) mit den Streifen (36, 40) gelenkig verbinden, wobei jede der Stützwandflächen (16, 18) in einer flächenberührenden Beziehung mit den Keilwandflächen (26, 28) eines jeweiligen Paares angeordnet ist, **dadurch gekennzeichnet, dass** die Streifen entlang einer gemeinsamen unteren Seitenkante davon gelenkig miteinander verbunden sind, um eine Stütze mit im Wesentlichen V-förmigen Querschnitt auszubilden, und dadurch, dass ein unterer Endabschnitt jeder Stützwandfläche durch einen Schnitt (48, 50, 52) von angrenzenden Abschnitten der Stützstruktur (10) getrennt ist.
2. Stützstruktur nach Anspruch 1, wobei die von den Streifen gebildete Stütze an jedem ihrer Enden mit dem jeweiligen Paar der Keilwandflächen (26, 28) ausgestattet ist, so dass jedes Ende der Stütze gelenkig mit jeder Stützwandfläche (16, 18) verbunden ist.
3. Stützstruktur nach Anspruch 1 oder 2, wobei jede Stützwandfläche gelenkig entlang gegenüberliegender Seitenkanten (22, 24) davon mit den Keilwandflächen (26, 28) des jeweiligen Paares verbunden ist, wobei die Seitenkanten jeder Stützwandfläche im Allgemeinen senkrecht zueinander angeordnet sind.
4. Stützstruktur nach Anspruch 3, wobei sich der Schnitt (48, 50, 52) teilweise entlang der Seitenkanten jeder Stützwandfläche erstreckt.
5. Stützstruktur nach Anspruch 1 oder 2, wobei jede Stützwandfläche im Wesentlichen trapezförmig und entlang ihrer gegenüberliegenden schrägen Seitenkanten (22, 24) gelenkig mit den Keilwandflächen des jeweiligen Paares verbunden ist und sich der Schnitt vollständig entlang einer kürzeren Kante jeder Stützwandfläche erstreckt.
6. Stützstruktur nach einem der vorstehenden Ansprüche, wobei die Streifen (36, 40) dazwischen einen spitzen Winkel definieren, um die Ausbildung der Stütze zu erleichtern.
7. Ein Träger zur Verpackung einer Vielzahl von Gegenständen, wobei der Träger ein Paar gegenüberliegender Seitenwände (12, 14) und eine Stützstruktur (10) nach einem der Ansprüche 1 bis 6 umfasst, wobei die Stützstruktur zwei Seitenwände überbrückt, um die Gegenstände zu stützen.
8. Ein Zuschnitt zur Ausbildung eines Gegenstandsträgers mit einer Stützstruktur (10) mit einem im Wesentlichen V-förmigen Querschnitt, wobei der Zuschnitt ein Paar voneinander beabstandeter Trägerseitenwände (12, 14), ein Paar von Stützwandflächen (16, 18), die sich von den jeweiligen Seitenwänden (12, 14) aufeinander zu erstrecken, ein Paar von Streifen (36, 40), die sich jeweils zwischen den Stützwandflächen erstrecken, und ein Paar von Keilwandflächen (26, 28) umfasst, die jede der Stützwandflächen mit den Streifen gelenkig verbinden, wobei die Streifen entlang einer gemeinsamen Seitenkante davon gelenkig miteinander verbunden sind, um die Stützstruktur auszubilden, wobei ein Abschnitt jeder Stützwandfläche durch einen Schnitt (48, 50, 52) von den Keilwandflächen eines jeweiligen Paares getrennt ist.
9. Zuschnitt nach Anspruch 8, wobei die aus den Streifen auszubildende Stützstruktur an jedem ihrer Enden mit dem jeweiligen Paar der Keilwandflächen (26, 28) ausgestattet ist, so dass jedes Ende der Stütze gelenkig mit jeder Stützwandfläche (16, 18) verbunden ist.
10. Zuschnitt nach Anspruch 8 oder 9, wobei jede Stützwandfläche gelenkig entlang gegenüberliegender Seitenkanten (22, 24) davon mit den Keilwandflächen (26, 28) des jeweiligen Paares verbunden ist, wobei die Seitenkanten jeder Stützwandfläche im Allgemeinen senkrecht zueinander angeordnet sind.
11. Zuschnitt nach Anspruch 10, wobei sich der Schnitt (48, 50, 52) teilweise entlang der Seitenkanten jeder Stützwandfläche erstreckt.
12. Zuschnitt nach Anspruch 8 oder 9, wobei jede Stützwandfläche im Wesentlichen trapezförmig und entlang ihrer gegenüberliegenden schrägen Seitenkanten (22, 24) gelenkig mit den Keilwandflächen des jeweiligen Paares verbunden ist und sich der Schnitt vollständig entlang einer kürzeren Kante jeder Stützwandfläche erstreckt.

## Revendications

1. Structure de tirant (10) d'un support pour emballer une pluralité d'articles, ladite structure de tirant créant une liaison entre une paire de parois latéra-

- les opposées (12, 14) dudit support pour supporter lesdits articles, ladite structure de tirant comportant une paire de panneaux de soutien (16, 18) s'étendant vers le bas respectivement depuis lesdites parois latérales (12, 14); une paire de bandes (36, 40) s'étendant chacune entre lesdits panneaux de soutien (16, 18); et une paire de panneaux de soufflets (26, 28; 44, 46) reliant de manière articulée chacun desdits panneaux de soutien 16, 18 auxdites bandes (36, 40), chaque dit panneau de soutien (16, 18) étant disposé face à face avec lesdits panneaux de soufflets (26, 28) d'une paire respective, **caractérisée en ce que** lesdites bandes sont reliées de manière articulée l'une à l'autre le long d'un bord latéral inférieur commun de celles-ci pour former un tirant à section transversale sensiblement en V, et **en ce qu'**une partie d'extrémité inférieure dudit panneau de soutien est séparée de parties adjacentes de ladite structure de tirant (10) par une ligne de découpe (48, 50, 52).
2. Structure de tirant selon la revendication 1, dans laquelle ledit tirant formé à partir desdites bandes comporte à chaque extrémité ladite paire respective desdits panneaux de soufflets (26, 28) de façon que chaque dite extrémité dudit tirant soit reliée de manière articulée à chaque dit panneau de soutien (16, 18).
  3. Structure de tirant selon la revendication 1 ou la revendication 2, dans laquelle chaque dit panneau de soutien est relié de manière articulée, le long de bords latéraux opposés (22, 24) de celui-ci, auxdits panneaux de soufflets (26, 28) de ladite paire respective, lesdits bords latéraux de chaque dit panneau de soutien étant disposés de manière globalement perpendiculaire l'un par rapport à l'autre.
  4. Structure de tirant selon la revendication 3, dans lequel ladite ligne de découpe (48, 50, 52) s'étend partiellement le long desdits bords latéraux de chaque dit panneau de soutien.
  5. Structure de tirant selon la revendication 1 ou la revendication 2, dans laquelle chaque dit panneau de soutien a une forme sensiblement trapézoïdale et est relié de manière articulée, le long de bords latéraux obliques opposés (22, 24) de celui-ci, auxdits panneaux de soufflets de ladite paire respective, et ladite ligne de découpe s'étend entièrement le long d'un bord plus court de chaque dit panneau de soutien.
  6. Structure de tirant selon l'une quelconque des revendications précédentes, dans laquelle lesdites bandes (36, 40) définissent entre elles un angle aigu pour faciliter la formation dudit tirant.
  7. Support pour emballer une pluralité d'articles, lesdits supports comportant une paire de parois latérales opposées (12, 14) et une structure de tirant (10) selon l'une quelconque des revendications 1 à 6, laquelle structure de tirant servant à créer une liaison entre lesdites parois latérales pour supporter lesdits articles.
  8. Ebauche pour former un support d'articles ayant une structure de tirant (10) à section transversale sensiblement en V, ladite ébauche comprenant une paire de parois latérales espacées (12, 14) de support; une paire de panneaux de soutien (16, 18) s'étendant l'un vers l'autre respectivement depuis lesdites parois latérales; une paire de bandes (36, 40) s'étendant chacune entre lesdits panneaux de soutien; et une paire de panneaux de soufflets (26, 28) reliant de manière articulée chacun desdits panneaux de soutien auxdites bandes, lesdites bandes étant reliées de manière articulée l'une à l'autre sur un bord latéral commun de celle-ci pour former ladite structure de tirant, une partie de chaque dit panneau de soutien étant séparée desdits panneaux de soufflets d'une paire respective par une ligne de découpe (48, 50, 52).
  9. Ebauche selon la revendication 8, dans laquelle ladite structure de tirant à former à partir desdites bandes comporte à chaque extrémité ladite paire respective desdits panneaux de soufflets (26, 28), de façon que chaque extrémité soit reliée de manière articulée à chaque dit panneau de soutien (16, 18).
  10. Ebauche selon la revendication 8 ou la revendication 9, dans laquelle chaque dit panneau de soutien est relié de manière articulée, sur ses bords latéraux opposés (22, 24), auxdits panneaux de soufflets (26, 28) de ladite paire respective, lesdits bords latéraux de chaque dit panneau de soutien étant disposés de manière globalement perpendiculaire l'un à l'autre.
  11. Ebauche selon la revendication 10, dans laquelle ladite ligne de découpe (48, 50, 52) s'étend partiellement le long desdits bords de chaque dit panneau de soutien.
  12. Ebauche selon la revendication 8 ou la revendication 9, dans laquelle chaque dit panneau de soutien a une forme sensiblement trapézoïdale et est relié de manière articulée sur ses bords latéraux obliques opposés (22, 24) auxdits panneaux de soufflets de ladite paire respective, et ladite ligne de découpe s'étend entièrement sur un bord plus court de chaque dit panneau de soutien.

FIG. 1



