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(54) **Carton and carton blank**

(57) A carton (50) of the top gripping type for receiving and retaining cylindrical articles (C), which carton comprises a main panel having at least one aperture (22a, 22b, 22c, 22d, 22e, 22f) for receiving and retaining an upper portion of a cylindrical article wherein a first aperture of said at least one aperture comprises a linear portion (84) which defines an edge of said first aperture for engaging the article on a first side, said first aperture also comprising at least one tab (40) for engaging an article on a second side, said tab struck from a portion of said main panel opposing said linear portion and being displaceable to form said first aperture, said at least one tab structured and arranged such that the main panel is displaced downwardly at said second side with respect to said first side.

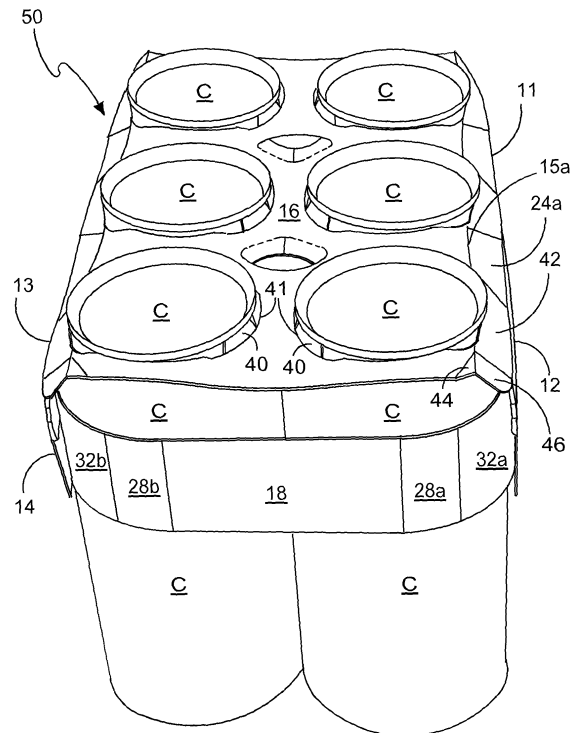


FIGURE 3

Description

Field of Invention

[0001] The present invention provides a carton for receiving a plurality of articles and a blank for forming the same, more particularly, but not exclusively the carton provides a top gripping carrier for said plurality of articles.

Background Art

[0002] Cartons for engaging multiple articles are useful for enabling consumers to obtain and transport a desired quantity of individual articles such as soft drinks or other beverages or food stuffs.

[0003] It is well known to provide top gripping article carriers in which an aperture is formed in a panel of the carrier; wherein a plurality of tabs are struck from said aperture around the periphery of the aperture. The tabs being displaced out of the plane of said panel when an article is received in the aperture and wherein said tabs surround the article and engage a flange or lip of the article.

[0004] Such a carrier is disclosed in US 2,936,070 to Poupitch and in US 5,188,225 to Jorba. It can be difficult to remove the articles from such carriers without damaging the carton.

[0005] It is desirable to provide an article carrier which can be reused such that empty articles can be replaced in the carrier to facilitate transportation of the empty articles, for example to a recycling station or for return to the distributor.

[0006] It is also desirable for ecological and economic reasons to minimise the quantity of material required whilst at the same time providing a secure carrier for the articles.

Summary of Invention

[0007] According to a first aspect of the invention there is provided a carton for receiving and retaining articles which carton comprises a main panel having at least first and second apertures each for receiving and retaining an upper portion of a respective article wherein said first and second apertures each comprise an edge portion which edge portions are disposed on opposing sides of the main panel, each edge portion being engageable with said respective article, the first and second apertures each comprising a tab for engaging with said respective article, the tabs of the first and second apertures each being struck from, and displaceably connected to, a medial portion of the main panel between the first and second apertures, each tab being disposed at a position opposing a respective one of the edge portions, which tabs are displaceable to engage respective articles when the respective articles are received in said first and second apertures whereby the tabs of the first and second apertures when displaced cause downward pressing force to

be applied to said medial portion so that the main panel is bowed downwardly such that said medial portion defines a lowermost elevation of the main panel and the edge portions define an uppermost elevation of the main panel.

[0008] Preferably, said edge portion is in the plane of a hinged connection between the main panel and second panel hinged to the main panel.

[0009] Preferably, the main panel is bowed concavely when viewed from the above such that a cross section of said main panel is U-shaped.

[0010] Preferably, the edge portion is linear.

[0011] Preferably, said aperture comprises three tabs disposed adjacent a notional line longitudinally bisecting the main panel.

[0012] Preferably, said aperture comprises a pair of opposing curved sections for forming curved edges of said main panel which engage with curved portions of a cylindrical article.

[0013] Preferably, the main panel comprises at least one finger aperture for carrying the carton.

[0014] Preferably, said aperture comprises three tabs disposed adjacent a notional line longitudinally bisecting the main panel.

[0015] Preferably, a side panel is hinged to opposing edge of the main panel.

[0016] Preferably, a strap portion is hingedly connected between each end of the side panels to form an end retention structure.

[0017] Preferably, at least one gusset panel interconnects the strap portion and the side panel.

[0018] Preferably, the carton comprises a shoulder panel hingedly interconnecting the main panel and the side panel.

[0019] Preferably, the shoulder portion comprises at least one trapezoidal portion defined in part by said linear portion of the aperture and in part by a pair of fold lines extending transversely across the shoulder portion from said linear portion to a fold line connecting the side panel to the shoulder panel.

[0020] More preferably, said trapezoidal portion facilitates deflection of the shoulder portion about an article.

[0021] Preferably, said main panel comprises a pair of fold lines defining in part a corner relief portion for facilitating displacement of a corner of the main panel.

[0022] Preferably, each of said first and second apertures is a single through hole that allows a top of said respective article to be fully exposed when said respective article is received in said each aperture.

[0023] According to a second aspect of the invention there is provided a blank for forming a carton for receiving and retaining cylindrical articles, which blank comprises a main panel having at least first and second apertures each for receiving and retaining an upper portion of a respective article wherein said first and second apertures each comprise an edge portion, said edge portions of the first and second apertures are disposed on opposing sides of the main panel, each edge portion being engage-

able with said respective article, the first and second apertures each comprising a tab for engaging with said respective article, the tabs of the first and second apertures being struck from, and displaceably connected to, a medial portion of the main panel between the first and second apertures, each tab being disposed at a position opposing a respective one of the edge portions, said tabs are displaceable to engage said respective articles when said respective articles are received in said first and second apertures whereby the tabs of the first and second apertures when displaced cause downward pressing force to be applied to said medial portion so that the main panel is bowed downwardly such that said medial portion defines a lowermost elevation of the main panel and the edge portions define an uppermost elevation of the main panel when said respective articles are received in said first and second apertures.

[0024] According to a third aspect of the invention there is provided a package comprising a carton and a group of cylindrical articles, which carton comprises a main panel having an aperture which receives and retains an upper portion of each cylindrical article wherein each aperture comprises a linear portion which defines an edge for engaging a respective article on a first side, each aperture also comprising at least one tab for engaging said respective article on a second side, said at least one tab being struck from a portion of main panel opposing said linear portion and being displaceable to form each aperture, said at least one tab structured and arranged such that the main panel is displaced downwardly at said second side with respect to said first side.

[0025] According to a fourth aspect of the invention there is provided a carton of the top gripping type for receiving and retaining cylindrical articles, which carton comprises a main panel having at least one aperture for receiving and retaining an upper portion of a cylindrical article wherein a first aperture of said at least one aperture comprises a linear portion which defines an edge of said first aperture for engaging the article on a first side, said first aperture also comprising at least one tab for engaging an article on a second side, said tab being struck from a portion of said main panel opposing said linear portion and being displaceable to form said first aperture, said at least one tab structured and arranged such that the main panel is displaced downwardly at said second side with respect to said first side.

[0026] Preferably, the main panel comprises a second aperture disposed adjacent said first aperture wherein said second aperture comprises at least one further tab disposed adjacent said at least one tab wherein said at least one tab and said at least one further tab are disposed about a notional line bisecting the main panel such that the main panel is bowed downwardly upon receipt of an article within each of said first and second apertures such that said notional line is lowermost.

Brief Description of Drawings

[0027] Exemplary embodiments of the present invention will now be described with reference to the accompanying drawings in which:

FIGURE 1 illustrates a plan view of a blank for forming a carton according to a preferred embodiment of the present invention;

FIGURE 2 illustrates a perspective view of a carton according to a preferred embodiment of the present invention;

FIGURE 3 illustrates a second perspective view of the carton according to the preferred embodiment of the present invention; and

FIGURE 4 illustrates a side view of the carton according to the preferred embodiment of the present invention.

Detailed Description of Exemplary Embodiments of the Present Invention

[0028] Referring to the drawings there is shown in Figure 1, a blank 10 for forming the carton 50 shown in Figure 3. Blank 10 comprises a top panel 16 also referred to as a main panel 16 which comprises apertures 22a, 22b, 22c, 22d, 22e, 22f each for receiving an article C preferably an uppermost surface of the articles is visible through the apertures 22a, 22b, 22c, 22d, 22e, 22f, as illustrated in Figures 2 to 4. Each of the apertures 22a, 22b, 22c, 22d, 22e and 22f are substantially the same; they will be described by reference to aperture 22a only.

[0029] Aperture 22a comprises first and second opposing arcuate portions 80, 82 and a linear portion 84. In the preferred embodiment the linear portion 84 is disposed along an outer edge of the top panel 16. Aperture 22a also comprises a plurality of tabs 40. Tabs 40 are defined in part by a weakened line 41. In the preferred embodiment weakened line 41 is a cutline. The weakened line 41 facilitates folding of the tabs 40 out of the plane of the top panel 16. In the preferred embodiment three tabs 40 are provided which are positioned so as to fold in an arc, and which tabs 40 are disposed opposite the linear portion 84. The tabs 40 are located on a section of the aperture 22a which is adjacent a notional line bisecting the top panel 16 in a longitudinal direction. In this way the tabs 40 are structured and arranged so as to facilitate displacement of the top panel 16 such that the top panel is placed in a state of tension when articles are received in the apertures 22a, 22b, 22c, 22d, 22e, 22f wherein a central portion comprising the notional line is lowermost and the outer edges of the top panel 16 comprising the linear portion 84 are uppermost.

[0030] Top panel 16 comprises a pair of fold lines 11, 13, which hingedly connect the top panel 16 to side pan-

els 12 and 14 respectively.

[0031] Fold lines 15a and 15b, together with fold lines 11 and 13 respectively, define, at least in part, outer shoulder portions 24a, 24b which in a setup carton 50 are folded about a shoulder portion of an article C received in one of the apertures 22a, 22b, 22c, 22d, 22e, 22f, as shown in Figures 2 to 4.

[0032] The outer shoulder portions 24a, 24b comprise fold lines 45 which in combination with fold line 11 and linear portion 84 define a trapezoidal portion 42. Fold line 11 and 13 each comprise cut lines 51 which are arranged in pairs. Each pair of cut lines 51 is disposed along a portion of fold line 11 or 13 which forms a part of a trapezoidal portion 42.

[0033] The trapezoidal portions 42 facilitate tightening of the carton 50 about the articles C.

[0034] Blank 10 further comprises finger apertures 60 disposed along a notional line bisecting the top panel 16 in a longitudinal direction. Finger apertures 60 are disposed between four adjacent apertures 22a, 22b, 22e, 22d and 22b, 22c, 22e, 22f respectively. The finger apertures 60 comprise a pair of tabs 62a, 62b which are hinged to top panel 16 along fold lines 63a, 63b respectively. Tabs 62a, 62b are separated by a cutline 61. Tabs 62a, 62b are optionally provided for cushioning a user's finger when the finger aperture 60 is deployed for carrying the carton 50.

[0035] Blank 10 also comprises additional fold lines 45 and 47 disposed in each corner of the top panel 16. Additional fold line 45 and fold line 15a/15b define in part a first tab 46 whereas additional fold line 47 and fold line 15a/15b define in part a second tab 44. These first and second tabs 44, 46 can be folded so as to provide relief in the corner of the main panel. In an alternative embodiment this reduction in the rigidity in the corner of the main panel 16 allows the carton 50 to be wrapped in a tertiary material such as shrink wrap or other known material and reduces the likelihood of the corner portion perforating the shrink wrap.

[0036] Blank 10 comprises a pair of end retention structures 90a, 90b hinged to each of the side panels 12, 14.

[0037] The end retention structures 90a, 90b comprise an end panel 18, 20 at each end of which a corner panel 28a, 28b; 30a, 30b is hingedly connected thereto along a fold line 21a, 21b; 23a, 23b respectively. Each corner panel 28a, 28b; 30a, 30b is also hinged to a respective first gusset panel 32a, 32b; 34a, 34b.

[0038] Each of the first gusset panels 32a, 32b; 34a, 34b are hingedly connected to a second gusset panel 36a, 26b; 38a, 38b respectively. Second gusset panels 38a, 36a are hingedly connected to opposing ends of side panel 12 whereas second gusset panels 36b, 38b are hingedly connected to opposing ends of side panel 14.

[0039] Turning now to Figures 2 and 3, there is shown a constructed carton 50 assembled around a group of articles C. In the preferred embodiment the group of ar-

ticles C consist of six substantially cylindrical articles C, such as beverage cans, arranged in two rows of three articles C.

[0040] Figures 2 and 3 show that side panel 12 has been folded about fold line 11. Second gusset panel 38a has been folded such that it is placed between side panel 12 and first gusset panel 34a.

[0041] Corner panel 30a has been folded substantially about the article C such that the end retention structure 90a is assembled about the end of the group of articles C. In this way, end retention structure 90a forms a strap about the end of the group of articles C.

[0042] Further it can be seen that shoulder portion 24a has been folded about fold lines 11 and 15a so as to form about a shoulder of the articles C.

[0043] The linear portion 84 of aperture 22 forms an engaging edge for the carton 50 to engage the article C. The tabs 40 each comprise an engaging edge for engaging with a lip or flange of the article C. The engagement of the article C by the engaging edge is substantially in the same plane as the main panel 16 at the point of engagement; in other words the engaging edge does not project or extend above the main panel 16.

[0044] Referring to Figure 4 it can be seen that the top panel 16 is bowed downwardly in the centre. It will be appreciated by those skilled in the art that top panel 16 is placed in an state of tension as a result of the displacement in top panel 16 caused by insertion of the articles into the apertures

[0045] The present invention provides an economical carton requiring a minimal quantity of material to provide a package for a plurality of articles C, wherein a main panel 16 comprises apertures 22a, 22b, 22c, 22d, 22e, 22f for engaging articles C and a strap portion 90a, 90b for maintaining the bases of the articles C in close proximity.

[0046] It will be further be appreciated that the apertures 22a, 22b, 22c, 22d, 22e, 22f provided to engage the articles C are non-circular in shape, the apertures 22a, 22b, 22c, 22d, 22e, 22f each engage an article C having a cylindrical shape or at least having a circular cross section at the point of engagement.

[0047] Due to the non-circular shape of the apertures 22a, 22b, 22c, 22d, 22e, 22f the carton 50 engages the articles C at discrete locations about its periphery. Furthermore, it can be seen that gaps are formed between the carton 50 and the articles C at locations where the carton 50 does not engage the articles C.

[0048] Furthermore, the portion of each aperture 22a, 22b, 22c, 22d, 22e, 22f where tabs 40 are provided engages an article C such that a central portion of the main panel 16 is bowed when the carton 50 engages with the articles C. By providing an engaging arrangement with the tabs 40 on one side of the aperture 22a, 22b, 22c, 22d, 22e, 22f a biasing device is created which biasing device ensures the main panel 16 is pretensioned such that the articles C securely engaged within the carton 50.

[0049] This is illustrated best in Figure 4 wherein it is

shown that tabs 40 provided engage only on an innermost side of an article C, creating a brace between an article C and main panel 16, forcing a central inner portion of main panel 16 downwardly. It is envisaged that in other embodiments such tensioning of the main panel 16 may be achieved by other means of non-symmetrical engagement or biasing of the main panel when receiving the articles C. In the present embodiment, by providing engaging tabs 40 that fold upwardly out of the plane of the main panel 16 on only less than half the circumference of an aperture 22a, 22b, 22c, 22d, 22e, 22f the main panel 16 is caused to bow downwardly to compensate. Preferably engaging tabs 40 are provided on only a quarter of the circumference of an aperture 22a, 22b, 22c, 22d, 22e, 22f. It is envisaged in other embodiments that uneven engagement of an article C and bowing of the main panel 16 is achieved by means of a single tab, optionally arcuate or having an arcuate engaging edge, formed only on an innermost segment of an aperture 22a, 22b, 22c, 22d, 22e, 22f.

[0050] Finger apertures 60 are provided in the main panel 16 for allowing a user to lift the carton 50. Providing tabs 40, along one side of the article receiving apertures 22a, 22b, 22c, 22d, 22e, 22f, increases retention of the articles C within the main panel 16; when the carton 50 is lifted by the finger apertures 60.

[0051] The main panel 16 exerts a force upon the articles C which furthers serves to maintain the articles C in their group formation. When the articles C are received in the carton 50, the introduction of articles C increases the rigidity of the top or main panel 16 of the carton 50.

[0052] It can be appreciated that various changes may be made without departing from the scope of the present invention, for example, the size and shape of the panels may be adjusted to accommodate articles of differing size or shape.

[0053] Alternatively, the carton 50 may be configured and arranged to accommodate groups of articles C other than the 2 by 3 array illustrated in the preferred embodiment.

[0054] It will be recognised that as used herein, directional references such as "top", "base", "end", "side", "inner", "outer", "upper" and "lower" do not limit the respective panels to such orientation, but merely serve to distinguish these panels from one another. Any reference to a frangible line can also be construed as a cut line, score line, perforate line or slit, without departing from the scope of invention. Also, any reference to hinged connection should not be construed as necessarily referring to a single fold line only; indeed it is envisaged that hinged connection can be formed from one or more of the following, a line of demarcation or weakened line, a score line, a frangible line or a fold line without departing from the scope of invention.

Claims

1. A carton for receiving and retaining articles which carton comprises a main panel having at least first and second apertures each for receiving and retaining an upper portion of a respective article wherein said first and second apertures each comprise an edge portion which edge portions are disposed on opposing sides of the main panel, each edge portion being engageable with said respective article, the first and second apertures each comprising a tab for engaging with said respective article, the tabs of the first and second apertures each being struck from, and displaceably connected to, a medial portion of the main panel between the first and second apertures, each tab being disposed at a position opposing a respective one of the edge portions, which tabs are displaceable to engage respective articles when the respective articles are received in said first and second apertures whereby the tabs of the first and second apertures when displaced cause downward pressing force to be applied to said medial portion so that the main panel is bowed downwardly such that said medial portion defines a lowermost elevation of the main panel and the edge portions define an uppermost elevation of the main panel.
2. A carton according to claim 1 wherein said edge portion is in the plane of a hinged connection between the main panel and second panel hinged to the main panel.
3. A carton according to either one of claims 1 or 2 wherein the main panel is bowed concavely when viewed from the above such that a cross section of said main panel is U-shaped.
4. A carton according to any one of claims 1 to 3 wherein said edge portion is linear
5. A carton according to any one of claims 1 to 4 wherein said aperture comprises a pair of opposing curved sections for forming curved edges of said main panel which engage with curved portions of a cylindrical article.
6. A carton according to any one of claims 1 to 5 wherein each of said first and second apertures comprises three tabs disposed adjacent a notional line longitudinally bisecting the main panel.
7. A carton according to any one of claims 1 to 6 wherein a side panel is hinged to opposing edge of the main panel.
8. A carton according to claim 7 wherein a strap portion hingedly interconnects each side panel at both ends thereof to form an end retention structure.

9. A carton according to claim 8 wherein the carton comprises a shoulder panel hingedly interconnecting the main panel and the side panel.
10. A carton according to claim 9 wherein the shoulder portion comprises at least one trapezoidal portion defined in part by said linear portion of the aperture and in part by a pair of fold lines extending transversely across the shoulder portion from said linear portion to a fold line connecting the side panel to the shoulder panel. 5
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11. A carton according to claim 10 wherein said trapezoidal portion facilitate deflection of the shoulder portion about an article. 15
12. A carton according to any one of claims 1 to 11 comprising a pair of fold lines defining in part a corner relief portion for facilitating displacement of a corner of the main panel. 20
13. A carton according to any one of claims 1 to 12 wherein each of said first and second apertures is a single through hole that allows a top of said respective article to be fully exposed when said respective article is received in said each aperture. 25
14. A blank for forming a carton for receiving and retaining cylindrical articles, which blank comprises a main panel having at least first and second apertures each for receiving and retaining an upper portion of a respective article wherein said first and second apertures each comprise an edge portion, said edge portions of the first and second apertures are disposed on opposing sides of the main panel, each edge portion being engageable with said respective article, the first and second apertures each comprising a tab for engaging with said respective article, the tabs of the first and second apertures being struck from, and displaceably connected to, a medial portion of the main panel between the first and second apertures, each tab being disposed at a position opposing a respective one of the edge portions, said tabs are displaceable to engage said respective articles when said respective articles are received in said first and second apertures whereby the tabs of the first and second apertures when displaced cause downward pressing force to be applied to said medial portion so that the main panel is bowed downwardly such that said medial portion defines a lowermost elevation of the main panel and the edge portions define an uppermost elevation of the main panel when said respective articles are received in said first and second apertures. 30
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15. A package comprising the carton of any one of claims 1 to 13 and at least one article received in the aperture.

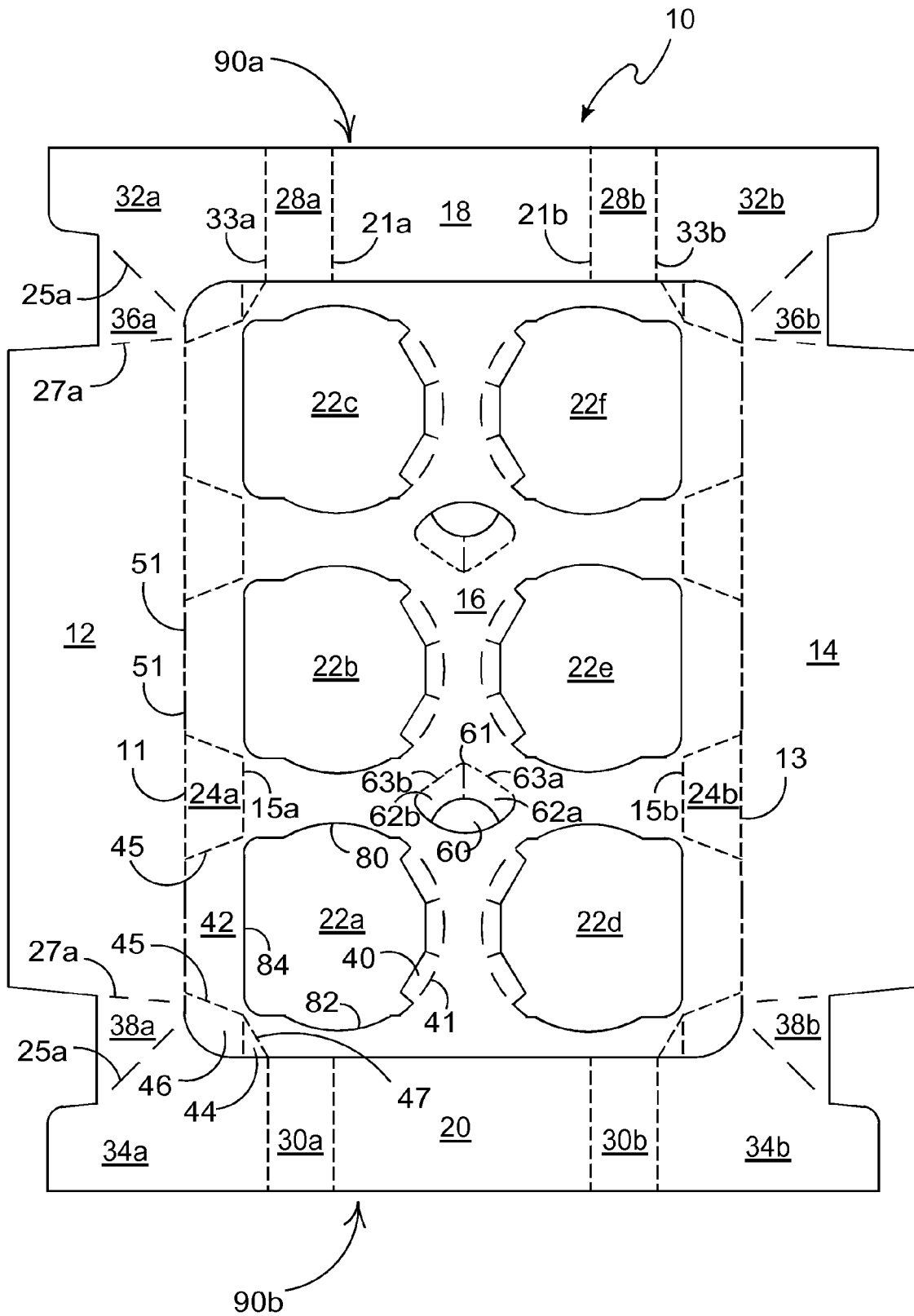


FIGURE 1

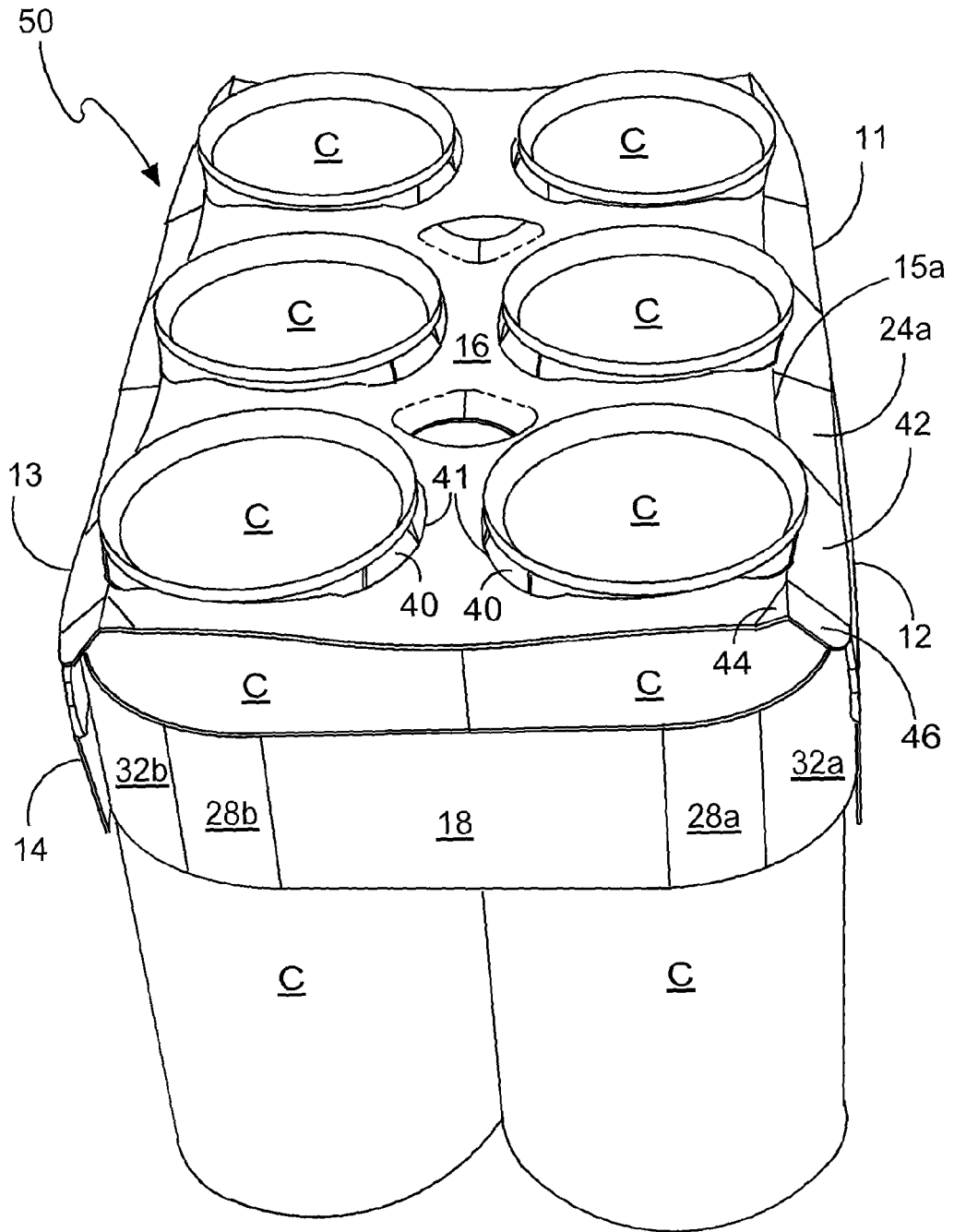


FIGURE 3

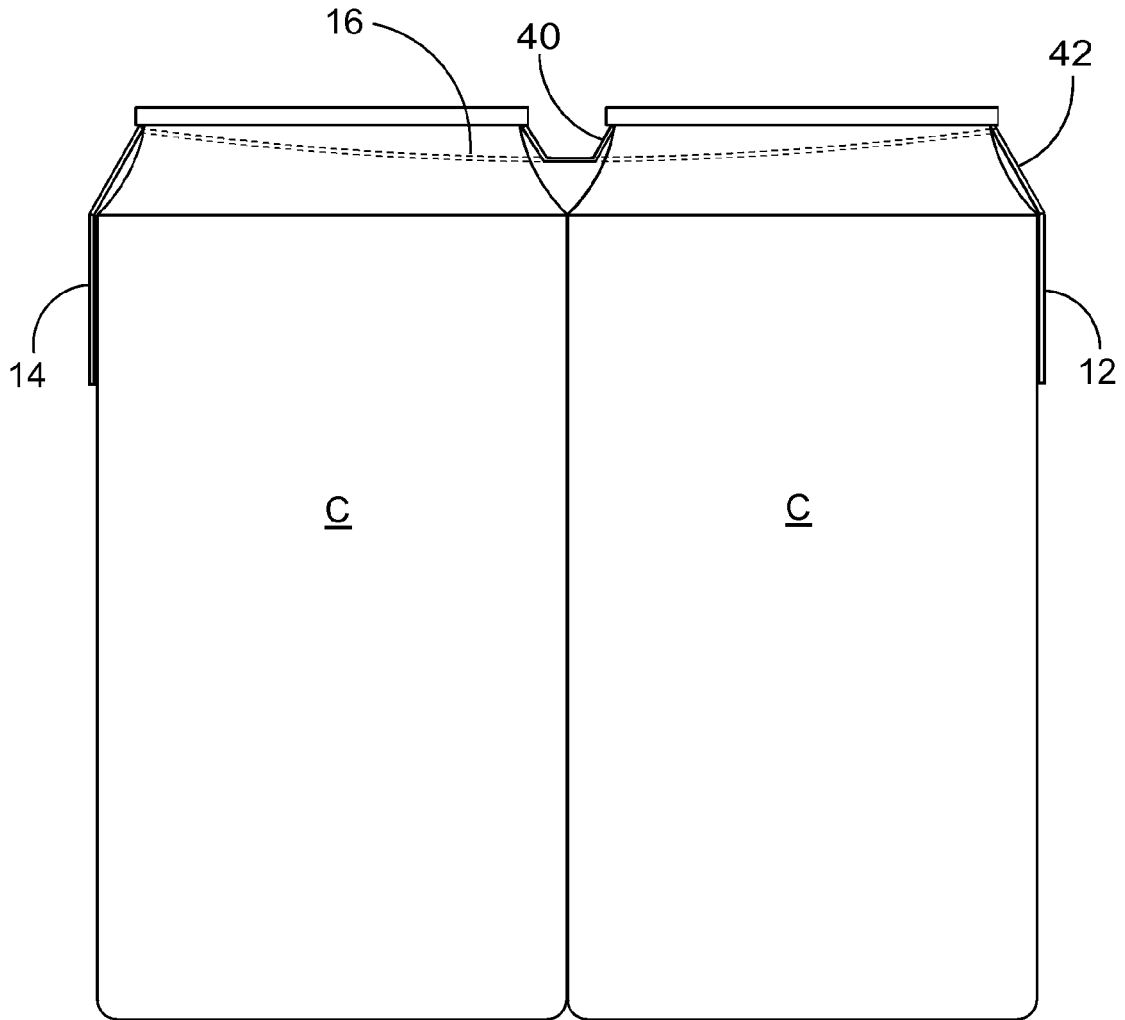


FIGURE 4



EUROPEAN SEARCH REPORT

Application Number
EP 08 17 0317

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 5 188 225 A (JORBA JOSE [ES]) 23 February 1993 (1993-02-23) * column 3, lines 1-54; figures 1-3 * -----	1-6,13, 15	INV. B65D71/46
X	DE 12 36 147 B (BURTON MACHINE CORP JOHN) 9 March 1967 (1967-03-09) * column 3, line 62 - column 6, line 16 * -----	1-6,13, 15	
X	EP 0 780 320 A (RIVERWOOD INT CORP [US]) 25 June 1997 (1997-06-25) * column 2, lines 1-57; figures 1,2 * -----	1-6,13, 15	
			TECHNICAL FIELDS SEARCHED (IPC)
			B65D
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
Munich		4 February 2009	Cazacu, Corneliu
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			

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EPO FORM 1503 03.02 (P04C01)



Application Number

EP 08 17 0317

CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing claims for which payment was due.

- Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due and for those claims for which claims fees have been paid, namely claim(s):
- No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

- All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.
- As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.
- Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:
- None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:
see additional sheet(s)
- The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).



**LACK OF UNITY OF INVENTION
SHEET B**

Application Number

EP 08 17 0317

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1-6, 13-15

apertures and tabs relating to receiving the articles

2. claims: 7-11

side panel relating to covering the articles

3. claim: 12

corner relief portion related to facilitating displacement
of a corner of the main panel

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

EP 08 17 0317

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

04-02-2009

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5188225	A	23-02-1993	NONE	

DE 1236147	B	09-03-1967	NONE	

EP 0780320	A	25-06-1997	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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- US 5188225 A, Jorba [0004]