

Carton

Field of the Invention

The invention relates generally to the field of cartons for packaging articles. More specifically, though not exclusively, the invention relates to cartons that have a partition panel by which the carton may be lifted and which divides an interior volume of the carton into two or more sections.

Background of the Invention

Cartons are required that allow articles to be carried by some form of handle structure, and further that divide an interior volume of the carton into sections such that articles loaded into the carton do not contact substantially contact one another.

In order to create a partition within the interior volume of the carton, it is necessary to provide a number of panels that, during erection of the carton, are positioned between outer walls of the carton to create sections into which the articles can be loaded. These panels are disadvantageous at least in that they increase the area of a blank required to form such a carton, an increase in which area leads to higher unit cost as each carton requires a physically greater amount of material, such as paperboard. Another disadvantage is that the partition requires means by which it is secured to proximal parts of the carton walls, which securement is required to be robust to withstand the stress placed upon the carton during use.

The present invention seeks to overcome or at least mitigate the above disadvantages by providing a carton blank that uses a reduced amount of material in providing the necessary panels to form a carton, and also by providing additional strength in the manner in which at least portions of the partition is secured to the proximal parts of the carton wall.

Summary of the Invention

A first aspect of the present invention provides a carton for holding articles, which carton comprises walls that define an interior volume for accepting the articles, the

carton further comprising first and second partition panels for forming a partition to divide that interior volume, from which partition extends a handle structure, which handle structure is formed from a first handle element provided by a portion of the first partition panel, and a second handle element hinged to the first handle element, the two partition panels being hinged to one another, a third handle element for forming the handle structure being provided by a portion of the second partition panel.

Preferably, the second partition panel is folded into coplanar contact with the first partition panel such that the third handle element is in coplanar contact with the first handle element.

Preferably, the second handle element is one or more of a) folded into coplanar contact with the third handle element thereby to sandwich that third handle element between the first and second handle elements; or b) hinged to a connecting tab that connects the second handle element to an end wall of the carton.

Preferably, the second partition panel comprises a hinged tab that extends from a side edge of the second partition panel, through an aperture formed in an end connecting panel and is secured to an end wall of the carton, wherein said end connecting panel connects one end of the first partition panel to a side wall of the carton.

Preferably, the distance between the fold line connecting the first and second partition panels and the opposed edges of those two partition panels is less than or equal to half the total distance between those two opposed edges.

A second aspect of the present invention provides a blank for forming a carton, which blank comprises panels in linear series for forming walls of the carton defining an interior volume for accepting articles, the blank further comprising first and second panels for forming a partition to divide that interior volume, from which

partition extends a handle structure, which handle structure is formed from first and second handle elements that are hinged to one another and extending along one edge of the aforesaid linear series, the first handle element being provided by a portion of the first panel for forming the partition, the second panel for forming the partition being hinged to the first panel for forming the partition and providing a third handle element for forming the handle structure.

Preferably, the second panel for forming the partition is foldable into coplanar contact with the first panel for forming the partition such that the third handle element is in coplanar contact with the first handle element.

Alternatively, the second handle element is one or more of a) foldable into coplanar contact with the third panel thereby to sandwich that third handle element between the first and second handle elements; or, b) is hinged to a connecting tab that connects the second handle element to a panel for forming an end wall of the carton.

Preferably, the blank further comprises a first and a second bottom panel hinged to an edge of the aforesaid linear series adjacent the third handle element, and wherein the third handle element is substantially half the width of the first handle element such that a distance between adjacent edges of the third handle element and the first bottom panel, is substantially equal to the width of the second bottom panel.

Preferably, the first and second bottom panels have equal width and are spaced apart by a distance substantially equal to that width to allow first and second bottom panels of an identical blank to nest between the first and second bottom panels of the blank.

Preferably, the first panel for forming the partition is hinged to a first panel of the linear series, which first panel of the linear series connects the first panel for forming the partition to a panel for forming an exterior wall of the carton and which comprises an aperture defined therein, whereby a portion of the partition is securable to a

portion of an exterior wall of the carton through that aperture when the carton is erected.

Preferably, the panels of the blank are sized such that a carton erected from that blank is capable of receiving six bottles each of a first volume, whilst the blank is nestable with other such blanks to allow six such blanks to be cut from a sheet of material measuring 1 meter by 1.4 meters, wherein said first volume is one of:

330ml; or

400ml; or

10 500ml.

A third aspect of the present invention provides a method of erecting a carton for holding articles, from a blank, which method comprises folding a secondary partition panel of the blank into coplanar contact with a primary partition panel so that a hinged connecting tab extends away from an edge of the resulting composite partition and overlies an aperture formed in an end connecting panel to which the composite partition is hinged, the method further comprising folding an end panel of the blank into coplanar contact with the end connecting panel and securing the hinged end tab of the secondary partition panel to the end panel through the aforesaid aperture, such that erecting the carton causes the hinged end tab to pass through the aforesaid aperture to extend along a portion of the end panel.

Preferably, a package comprising a carton is loaded with one or more articles.

A fourth aspect of the present invention provides a sheet of material within which are defined a plurality of blanks for forming cartons, each blank comprising panels in linear series for forming walls of the carton defining an interior volume for accepting articles, the blank further comprising first and second panels for forming a partition to divide that interior volume, from which partition extends a handle structure, which handle structure is provided by a first and a second handle element that are hinged one to the other and extending along one edge of the aforesaid linear series, the first handle element extend from the first panel for forming the partition, the second panel

for forming the partition being hinged to the first panel for forming the partition and comprising a third handle element for forming the handle structure, and each blank comprising a first and a second bottom panel hinged to an edge of the aforesaid linear series adjacent the third handle element, and wherein the third handle element
5 is substantially half the width of the first handle element such that a distance between adjacent edges of the third handle element and the first bottom panel, is substantially equal to the width of the second bottom panel, and wherein the first and second bottom panels have equal width and are spaced apart by a distance substantially equal to that width to allow first and second bottom panels of an
10 identical blank to nest between the first and second bottom panels of the blank.

A fifth aspect of the invention provides a blank for forming a carton for receiving a plurality of articles, said blank comprising: an elongate medial section having an axis of elongation and including first and second side wall panels and first and second
15 end wall panels; a first exterior section formed alongside said medial section and including a plurality of handle elements for, when said blank is erected into a finished carton, forming a composite handle structure by which said carton is lifted, said plurality of handle elements comprising first and second handle elements, said first handle element being arranged at one end of said first exterior section; and a second
20 exterior section formed alongside said medial section such that the medial section is disposed between the first and second exterior sections, the second exterior section including first and second bottom panels and a third handle element for, when said blank is erected into a finished carton, forming the composite handle structure in cooperation with the first and second handle elements.

25 Preferably, there further comprises first and second partition panels for forming a partition for dividing an interior volume of a carton when the blank is erected, wherein the first partition panel is hingedly connected to the medial section along a first fold line disposed generally perpendicular to the axis of elongation and wherein the second partition panel is hingedly connected to the first partition panel along a
30 second fold line substantially parallel to the axis of elongation.

Preferably, the second end wall panel is disposed at one of the opposed ends of the medial section, the medial section further including an end connecting panel that is disposed at the other opposed end of the medial section for, when the blank is erected, being secured to the second end wall panel, the first partition is hingedly
5 connected to the end connecting panel along the first fold line.

Preferably, the first handle element is provided by a portion of the first partition panel and wherein the third handle element is provided by a portion of the second partition panel.

Preferably, the second handle element is hingedly connected to the first handle
10 element along a third fold line that is disposed generally perpendicular to the axis of elongation.

Preferably, the third fold line is disposed collinear with the first fold line.

Alternatively, the first and second end wall panels and the first and second side wall panels are arranged in the sequence of the second end wall panel, the second side
15 wall panel, the first end wall panel and the first side wall panel, and wherein the end connecting panel is hingedly connected to the first side wall panel.

Brief Description of the Drawings

Exemplary embodiments of the invention will now be described with reference to the accompanying drawings, in which:

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Fig. 1 illustrates a carton blank according to a preferred embodiment of the present invention;

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Fig. 2 illustrates a plurality of blanks of Figure 1 nested together in a manner that minimises the amount of material necessary to produce them;

Fig. 3 illustrates a first step in a series of folding operations that can be employed to erect a carton from the blank of Figure 1;

Fig. 4 illustrates a second step in the series of folding operations of Figure 3;

Fig. 5 illustrates a third step in the series of folding operations of Figure 3;

Fig. 6 illustrates a fourth step in the series of folding operations of Figure 3;

Fig. 7 illustrates a carton partially erected from the blank of Figure 1;

Fig. 8 illustrates an erected carton from the blank of Figure 1;

Fig. 9 illustrates the blank of Figure 1 with marked up dimensions;

Fig. 10 illustrates a blank according to a second embodiment of the present invention;

Fig. 11 illustrates a view of the blank of Figure 10 nested with other such blanks

Fig. 12 illustrates a blank according to a third embodiment of the present invention;

Fig. 13 illustrates a view of the blank of Figure 11 nested with other such blanks; and

Figs. 14 to 19 illustrate sequential views of the blank of Figure 12 undergoing folding operations to set the blank up into a carton.

Detailed Description of the Preferred Embodiments

The present invention relates to a carton, specifically a carton comprising a partition which divides an interior volume into two or more parts. The blank 1 shown in Figure 1 comprises panels for forming a first embodiment of such a carton.

The blank 1 comprises a glue flap 11, a primary partition panel 10, an end connecting panel 12, a first side panel 14, a first end panel 16, a second side panel 18 and a second end panel 20 connected, one to the next, in a linear series. The aforementioned panels are hinged one to the next by corresponding fold lines 72, 88, 94, 98, 106, 110.

The primary partition panel 10 is hinged along a lower edge thereof, via a fold line 80, to a secondary partition panel 31 and comprises first 36 and second 38 spacer panels defined therein. The first spacer panel 36 is hinged to the primary partition panel 10 via a fold line 74. The first 36 and second 38 spacer panels overlap such that a hinged glue tab 37 of the first spacer panel 36 is defined within the second spacer panel 38 and interrupts the fold line 76 hinging the second spacer panel 38 to the primary partition panel 10. This hinged glue tab 37 is connected to an end of the first spacer panel 36 by a fold line 78. Similarly, a hinged glue tab 39 is connected, via a fold line 92, to an end of the second spacer panel 38. The second spacer panel 38 extends across a side edge of the primary partition panel 10 over the fold line 88, connecting the primary partition panel to the end connecting panel 12 such that the hinged glue tab 39 thereof is defined within the end connecting panel 12. Provided by a top end of the primary partition panel 10, opposed to the secondary partition panel 31, is a handle element 28, which handle element 28 comprises first 52 and second 54 finger apertures defined within which are first 42 and second 40 finger flaps respectively. These first 42 and second 40 finger flaps are hinged to the handle element 28 via respective fold lines 43, 41. As illustrated, the primary partition panel 10 and the handle element 28 comprise numerous glue spots G which will be discussed in greater detail below, with reference to the process of erecting the carton from the blank 1 of Figure 1.

Beneath the primary partition panel 10 of the blank 1 is provided the secondary partition panel 31. The secondary partition panel 31, however, does not extend fully across the width of the lower edge (relative to the orientation of the partition panel in the erected carton) of the primary partition panel 10. The primary partition panel 10 extends the full height of the proximate edge of the connecting panel 12 adjacent

thereto. The lowermost edge of the primary partition panel 10 rises upwardly from with distance from the connecting panel 12. The fold line 80 connecting the primary 10 and secondary 31 partition panels then extends transversely away from the connecting panel 12 from an uppermost point on this lowermost edge. On an
5 opposing side of the fold line 80 the lowermost edge of the primary panel 10 then descends away from the fold line 80, with proximity to the opposing side edge of the primary partition panel 10. The fold line 80 connecting the primary partition panel 10 to the secondary partition panel 31 is thus offset upwardly from the lowermost edge of the primary panel 10 adjacent the glue panel 11.

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A bottom end of this secondary partition panel 31, opposed the fold line 80 connecting the primary 10 and secondary 31 partition panels, provides an interior handle element 30. Defined within the interior handle element 30 is an aperture 56 that is sized and shaped to mirror, about the fold line 80 connecting primary 10 and
15 secondary 31 partition panels, the location and geometry of the second finger aperture 54 in the handle element 28. Hinged to one side of the secondary partition panel 31, via fold line 82, is a third spacer panel 32. This third spacer panel 32 has a hinged glue tab 33 connected thereto along a fold line 73. Defined partially within the secondary partition panel 31 is also a fourth spacer panel 34, hinged to the
20 secondary partition panel 31 along a fold line 86. A hinged glue tab 35 extends from the fourth spacer panel 34 into the third spacer panel 32, connected to the fourth spacer panel via fold line 84 that interrupts, and is coaxial with, the fold line 82 hinging the third spacer panel 32 to the secondary partition panel 31. Hinged to an opposing side of the secondary partition panel 31, closest to the end connecting
25 panel 12, is a hinged glue tab 29 connected thereto via a fold line 96.

A handle reinforcement panel 22 is hinged to a side edge of the handle element 28 by a fold line 90, within which handle reinforcement panel 22 a third 48 and a fourth
30 50 finger aperture are defined. Third 46 and fourth 44 finger flaps are defined, respectively, within the third 48 and fourth 50 finger apertures, and these finger apertures 48, 50 are connected to the handle reinforcing panel 22 via respective fold lines 47, 45. An edge of the handle reinforcing panel 22 opposing the fold line 90 is

connected to a connecting tab 104 along a fold line 102. This connecting tab 104 connects the handle reinforcing panel 22 to the first end panel 16 via a short fold line 99. The operation of this connecting tab 104 is discussed in greater detail below. Both the handle reinforcing panel 22 and the connecting tab 104 comprise further
5 glue spots G which will be described in further detail below.

The end connecting panel 12, hinged to the primary partition panel 10, comprises an aperture 41 within which is defined the hinged glue tab 39 of the second spacer panel 38. The hinged glue tab 39 only partially fills the aperture 41 such that an
10 edge of the aperture is spaced from the free edges of the hinged glue tab 39 for reasons that will be discussed further below. A lower portion of the end connecting panel 12 is cut away to accommodate the protrusion of the hinged glue tab 29 of the secondary partition panel 31. The position of this hinged glue tab 29, and the cut
15 away portion of the end connecting panel 12 is such as to be equidistant from a notional intersection between the fold line 80 hinging the primary 10 and secondary 31 partition panels together, with the fold line 88 hinging the end connecting panel 12 to the primary partition panel 10. This allows, in the manner described in more detail
20 below, the hinged glue tab 29 of the secondary partition panel 31 to be folded over into vertical registry over the aperture 41 in the end connecting panel 12. As illustrated, glue spots G are located on the first side panel 14 so as to correspond to the position of the hinged glue tabs 33, 35 of, respectively, the third 34 and fourth 32
25 spacer panels when folded in the manner described below. The shape of the connecting panel 12 is such that the side thereof connected to the primary partition panel 10 is shorter than the opposing side thereof connected to the first side panel 14. This is because the uppermost edge of the connecting panel 12 rises a lesser
30 amount, with distance from the first side panel 14, than the upward dimension of the cut away portion, described above, formed in the lower portion of the connecting panel 12. The rising uppermost edge of the connecting panel 12 causes a corresponding rise in a lowermost edge of the handle reinforcing panel 22, which is consequently narrower proximate the primary partition panel 10 than it is at its
opposing end.

Hinged to an opposing edge of the end connecting panel 12 is the first side panel 14, which first side panel is hinged along an adjacent lower edge, via a fold line 100, to a first bottom panel 26, and along an opposing edge to the first end panel 16 via a fold line 98.

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The first bottom panel 26 comprises apertures 70 and securement flaps 58, 60 for providing a complementary securement means with a second bottom panel 24 described below.

10 The first end panel 16 comprises a peaked upper edge and is connected along one side via fold line 98 to the first side panel 14 and along a co-axial short fold line 99 to the connecting tab 104. Along an opposing edge the first end panel 16 is hinged to the second side panel 18 along the fold line 106 and defined in the first end panel 16 is a glue line G for securing the first end panel 16 to the glue flap 11 of the primary
15 partition panel 10 in the manner described below.

The second side panel 18 is further hinged, along an opposing edge, via fold line 110, to the second end panel 20, and along a lower edge thereof to the second bottom panel 24, via a fold line 108. The second side panel 18 is further illustrated
20 as comprising glue spots G for securing the second side panel 18 to the glue flaps 37, 39 of the first 36 and second 38 spacer panels in the manner described below.

The second bottom panel 24, similar to the first bottom panel 26, comprises aperture 70 and comprises securement tabs 62, 64 for complementarily securing with the
25 securement flaps 58, 60 to engage the second bottom panel 24 to the first bottom panel 26.

The second end panel 20 is peaked along its upper edge similar to the first end panel 16, and comprises a number of glue spots and lines G for securement to other
30 panels of the blank 1 during the erection process described below.

It is contemplated that the positioning of the reinforcing handle element 22 adjacent the handle element 28, in conjunction with a tapering of the interior handle element 30 at a complementary angle to a tapering of each of the first 26, and second 24 bottom panels allows the blank to be nested with other such blanks with a minimum
5 wastage of intervening material, such as paperboard, from which the blanks are produced. This is accomplished by allowing adjacent blank 1 to nest together more closely by interlocking peripheral edges thereof such that the overall spacing between a common point on each is reduced in comparison to a case in which the blank 1 are disposed side-by-side without any interlocking. An example of this is
10 shown in Figure 2, wherein six such blanks are nested together such that they may be produced from a standardized sheet of paperboard measuring approximately 1m by 1.4m. A lateral spacing between the interior handle element 30 and the first bottom panel 26, and similar spacing between the first 26 and second bottom panel 24 allows those panels, from a second blank 1 (orientated at 180 degrees to first
15 blank 1) to be tessellated therebetween, to aid this reduction in wasted material. To this end, it is preferred that the blank 1 be restricted to providing only two handle elements (the handle element 28, and the reinforcing handle element 22) along the upper edge of the aforementioned linear series of panels, and that these two handle elements are positioned adjacent one another above one end of that linear series of
20 panels. This is advantageous in that, in the manner illustrated in Figure 2, a second blank 1 rotated 180 degrees may then be located along side this first blank 1, such that the handle elements 28, 22 of the first panel become disposed substantially beside the handle elements 22, 28 of the second blank 1. It is also preferred that the interior handle element 30 be provided at only half width of the result handle
25 structure of the carton 3, such that the spacing between adjacent terminal edges of the interior handle element 30 and the first bottom panel 26 is sufficient to accept the second bottom panel 24 of another blank 1 nested therebeneath. If the interior handle element 30 were substantially the same width as the handle element 28, insufficient space would be provided for this to be possible. It is further preferred
30 that the first 26 and second 24 bottom panels be of equal dimension and also preferably partially tapered to allow the bottom panels 26, 24 of one blank 1 to nest between the bottom panels 26, 24 of another blank 1.

As shown in Figure 9, it is contemplated that the height H1 of the primary partition panel 10 including the handle element 28, i.e., the distance between the upper edge of the handle element 28 and the fold line 80 hinging the primary partition panel 10 to the secondary partition panel 31, is equal to the height H1 of the secondary partition panel 31 including the interior handle panel 30. H1 is substantially equal to or less than half the maximum vertical dimension H2 of the blank 1, and less than the total height of the carton H4. The total height H3 of the primary partition 10 panel including the handle element 28 is less than H4. In the preferred embodiment of the blank 1, the spacing between fold lines 82, 86, 74, 76 connecting the spacer panels 32, 34, 36, 38 to the partition panels 10, 31 is 62mm and the carton 3, when constructed, can accommodate bottles of 330ml volume (approximately 11 – 12 fl oz.). The preferred embodiment of the blank 1 has a maximum vertical dimension of 870mm and a maximum horizontal dimension of 275mm. It is contemplated that each of the foregoing dimensions can be altered to accommodate different packaging requirements.

Turning now to a preferred method of erecting a carton 3 (shown in stages of erection in Figures 3 to 8) from the blank 1 of Figure 1, it is contemplated that an adhesive be applied to the glue spots G on the primary partition panel 10 and to the handle element 28. The glue spots G are located preferably below the first spacer panel 36, and intermediate the first spacer panel 36 and the second finger aperture 54, and above that second finger aperture 54. Additional glue spots G are located proximate the side edges of the handle element 28. It is contemplated that the secondary partition panel 31 is then folded upwardly, about the fold line 80, into co-planar contact with portions of the primary partition panel 10. This results in the interior handle element 30 being brought into co-planar contact with portions of the handle element 28, and the aperture 56 defined within the interior handle element 30 being located in registry over the second finger aperture 54. The size of the aperture 56 and the interior handle element 30 is such that the registry of that aperture 56 over the second finger aperture 54 of the handle element 28 does not foul the hinging of the second finger flap 40 about the fold line 41. The resulting

arrangement of panels is shown in Figure 3. Where the adhesive applied to the above described glue spots G is sandwiched between the primary partition panel 10 and the secondary partition panel 31 or between the handle element 28 and the interior handle element 30, it acts to secure the contacting surfaces together, in the arrangement illustrated in Figure 3.

Adhesive is then applied to glue spots G on the handle reinforcing panel 22, above and below the third 48 and fourth 50 finger apertures defined therein. Additional adhesive is applied to glue spots G on the handle reinforcing panel 22 proximate the connecting tab 104, as well as to glue spots G on the first side panel 14 where the hinged glue tabs 33, 35 of the third 32, and fourth 34 spacer panels are to contact the first side panel 14. Also, the connecting tab 104 has adhesive applied thereto. The primary partition panel 10 is then folded about fold line 88 to bring portions of the secondary partition panel 31 and primary partition panel 10 into contact with the first side panel 14, bringing, as a result, portions of the interior handle element 30 and the handle element 28 into contact with portions of the handle reinforcing panel 22. The resulting arrangement of panels is illustrated in Figure 4 in which, hidden beneath the primary partition panel 10, the third 32 and fourth 34 spacer panels are secured to the first side panel 14 by their hinged glue tabs 33, 35 and the handle reinforcing panel 22 is secured to the interior handle element 30 and portions of the handle element 28. Glue flap 11 is disposed over the first side panel 14 but not secured thereto.

As can be seen from Figure 1, 3 and 4 the hinged glue tab 39 of the second spacer panel 38 extends from a side of the primary partition panel 10. This hinged glue tab 39 overlies the hinged glue tab 29 of the secondary partition panel 31 (not shown in Figure 4), which is rotated through the aperture 41 in the end connecting panel 12 as the primary partition panel 10 is folded about fold line 88.

Adhesive is then applied to the glue spots G of the first end panel 16 and second side panel 18 where, respectively, the hinged glue tabs 37, 39 of the first 36 and second 38 spacer panels, and the glue flap 11, will come into contact. The first side

panel 14 is then folded about fold line 98 to bring the primary partition panel 10 into contact with the second side panel 18 and thereby to secure the first 36 and second 38 spacer panels thereto by their hinged glue tabs 37, 39. The glue flap 11 is secured to the first end panel 16 via the glue spot G thereon, and the connecting tab 104 is secured to contacting portions of the first end panel 16, in the arrangement shown in Figure 5.

To complete the construction of a flat collapsed tubular structure from the blank 1, glue is applied to the glue spot G on the second end panel 20 before it is folded about fold line 110 into securement with portion of the end connecting panel 12 and hinged glue tab 29 extending through the aperture 41 in the end connecting panel 12, to result in the arrangement shown in Figure 6 showing a partially erected carton 3, in flat collapsed condition.

Once the above folding and gluing operations have been completed the carton 3 is ready to be partially erected in the following preferred manner described below.

The partition structure, created by primary partition panel 10 and secondary partition panel 31, is disposed intermediate the first 14 and second 18 side panels and secured to the first end panel 16 being via the glue flap 11 and the connecting tab 104 and to the second end panel 20 via the end connecting panel 12 and the hinged glue tab 29 of the secondary partition panel 31. Hinging the first 14 and second 18 side panels about the respective end panels 12, 20 of the carton 3 erects the carton 3 into a tubular condition. This operation causes the first 36, second 38, third 32 and fourth 34 spacer panels to be struck from the primary 10 and secondary 31 partition panels respectively and to take up an orientation perpendicular to the partition structure and interconnecting the first 14 or second 18 side panels with the corresponding adjacent one of the primary 10 or secondary 31 partition panels. These spacer panels 36, 38, 32, 34 create, between them, individual storage wells for receiving articles.

Once in an opened tubular condition, the carton 3 may be loaded with articles from above or below and the bottom of the carton may be closed by folding of the first 26 and second 24 bottom panels about respective fold lines 100 and 108 into the plane of the bottom edge of the first 14 and second 18 side walls, there to be secured to one another by complementary tab and aperture arrangement provided by the securement tabs 62, 64 and apertures struck from the first bottom panel 26 by the deflection of the securement flaps 58, 60 out of the plane of the first bottom panel 26. The securement tabs 62, 64 have enlarged terminal portions that require deformation to pass through those resulting apertures, and which resist disengagement thereafter.

The carton 3 before or after being loaded with articles may be lifted using its handle structure, which handle structure is formed from the handle element 28 and handle reinforcing panel 22 between which is sandwiched interior handle element 30. This handle structure enhances the robustness of the first 52 and second 54 finger apertures in the handle element 28 by providing additional thicknesses of the blank material to withstand the stresses of the weight of the carton 3. The first finger flap 42 is in registry with the fourth finger flap 44 and similarly the second finger flap 40 is in registry with the third finger flap 46 such that the corresponding pairs of finger flaps may be struck from the respective finger apertures simultaneously upon insertion of fingers through those apertures.

A second embodiment of a blank 101 is shown in Figure 10, which second blank 101 is very similar to the blank 1 illustrated in Figure 1. Like reference numerals have been used in Figures 10 and 11 to indicate like features, prefixed with "1" to denote this second embodiment. Only the differences between this second embodiment and the first will be discussed below.

The first 116 and second 120 end panels, and the connecting panel 112 are not peaked in this second embodiment and instead have top edges (relative to their orientation in the erected carton) that linearly extend between the corresponding upper edges of the first 114 and second 118 side panels. This is advantageous at

least in that these panels provide a continuous flat edge against which a primary partition panel 110 and handle reinforcement panel 122 of a subsequent blank 101 may tessellate when nested in the manner shown, for example, in Figure 11.

- 5 The blank 101 lacks the connecting tab 104 of the first blank 1; the handle reinforcing panel 122 of the resulting carton (not shown) is connected only at one end thereof, to the primary partition panel 110.

Erection of a carton from the second blank 101 follows the same process as
10 described above in relation to the first blank 1. The partition structure that results from the primary partition panel 110, handle reinforcing panel 122 and secondary partition panel 131 is connected at one end to the first end panel 112, by the glue flap 111 of the primary partition panel 110. The opposing end of the primary partition panel 110 is connected by the hinged connection to the connecting panel 112.

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A third embodiment of a blank 201 is shown in Figure 12, which third blank 301 is similar to the second blank 101 described above. Like reference numerals have been used in Figures 12 to 19 to indicate features common to Figure 10, prefixed with "2" to denote this third embodiment. Only the differences between this third
20 embodiment and the second will be discussed below.

Blank 201 shares the majority of its features in common with blank 101 of Figure 10. The secondary partition panel 231, however, does not extend fully across the width of the lower edge (relative to its orientation the erected carton 203 of Figure 19) of
25 the primary partition panel 210. The primary partition panel 210 extends the full height of the connecting panel 212 adjacent thereto, and the lowermost edge thereof rises upwardly, toward an upper edge thereof, with distance from the connecting panel 212. The fold line 280 connecting the primary 210 and secondary 231 partition panels then extends, transversely away from the connecting panel 212, from an
30 uppermost point on this lowermost edge of the primary partition panel 210. On an opposing side of the fold line 280 the lowermost edge then descends away from the fold line 280, with proximity to the opposing side edge of the primary partition panel

210. As illustrated, the primary partition panel 210 is not symmetrical about a central axis thereof, and the lowermost edge thereof is higher at the edge thereof adjacent the glue flap 211 than it is at the edge thereof adjacent the connecting panel 212. The fold line 280 connecting the primary partition panel 210 to the secondary partition panel 231 is thus offset upwardly from the lowermost edge of the primary panel 210 adjacent the glue panel 211. This arrangement permits a greater portion of the primary partition panel 210 to be connected to the connecting panel 212 than in the blank 101 of Figure 10.

The blank 201 lacks the hinged glue tab 29 of the secondary partition panel 31 described above in relation to the blank 1 of Figure 1. The connecting panel 212 therefore lacks the cut away portion of the blank 101. Thus the arrangement of the carton 203, when erected in the manner shown in Figure 19, differs from the first and second embodiments in that there is no connection between the secondary partition panel 231 and the connecting panel 212. For this reason, it is particularly advantageous that the connection between the primary partition panel 210 and the connecting panel 212 be maximised, to promote structural integrity in the carton.

The first 212 and second 216 end panels and the connecting panel 212 have flat upper edges, as is the case with the second embodiment, and thus the blank 201 of the third embodiment is also nestable in a yet more material efficient way than the first embodiment, because these flat upper edges permit closer tessellation of adjacent blanks 201, as is shown best in Figure 13.

The above described exemplary process for erecting the blank 1 of the first embodiment into the carton 3 may be followed to form the blank 201 of this embodiment into a carton 203. Figures 14 to 19 show a sequence of steps in this folding operation process. Briefly stated, as described above, the secondary partition panel 231 is hinged upward into contact with the primary partition panel 210 (as shown in Figure 14), before the primary partition panel 210 is then hinged across over the first side panel 214, thereby sandwiching portions of the secondary partition panel 231 between the primary partition panel 210 and the handle reinforcement

panel 222. An aperture 256 in the secondary partition panel 231 aligns with corresponding apertures 254 and 250 in the primary 210 and secondary 231 partition panels so that the resulting partition arrangement has apertures defined therethrough for use by a user as finger holes to carry the resulting carton, as shown
5 in Figure 15. Glue spots G on the primary partition panel 210 and on the handle reinforcing panel 222 secure the partition arrangement as a single unit. The lack of hinged glue panel 29, 129 of the first and second embodiments means that, when the first side panel 214 is folded over onto the first end panel 216, as shown in Figure 16, the glue spots on the second end panel 220 need to be arranged to avoid
10 securement to the upper surface of the glue tab 239 or the second spacer panel 238, visible through the aperture 241 in the connecting panel 212. Folding the second end panel 220 into securement with the connecting panel 212 completes the collapsed tubular condition of the carton, which may be erected fully by separating the opposing side 214, 218 and end 216, 220 panels and closing the bottom panels 224,
15 226 as described above.

It can be appreciated that various changes may be made within the scope of the present invention, for example, the size and shape of the panels and apertures may be adjusted to accommodate articles of differing size or shape. In other
20 embodiments of the invention it is envisaged that a different number of spacer panel may be provided to create a different number of wells into which articles may be inserted. Further, it is contemplated that no spacer panels be provided at all such that the carton is divided only by the partition panels.

25 Where the above description has described the provision of adhesive, this contemplates, amongst others, liquid adhesive substances such as glues and resins, as well as the use of welding or mechanical fastening devices. It is also contemplated that the adhesive may be applied, rather than to the glue spots indicated in Figure 1, to the surfaces of the blank 1 that will come into contact with
30 those glue spot positions, such as amongst other locations, the hinged glue tabs 29, 33, 35, 37, 39 and glue flap 11. It is further contemplated that the adhesive could be

applied to both the glue spots and to those contacting surfaces, for further enhanced securement.

It is further contemplated that the secondary partition panel 31 may be hinged to the
5 primary partition panel 10 along a side edge thereof rather than a lower edge as
described above. The glue flap 11 could, in this case, be struck from adjacent
portions of the secondary partition panel 31, and be reduced in size to provide an
edge of the primary partition panel 10 to provide the necessary hinge. Alternatively,
the hinge could be between the handle element 28 and the interior handle element
10 30, along an adjacent edge thereof opposed to the reinforcing handle element 22.

It will be recognised that as used herein, directional references such as "top",
"bottom", "front", "back", "end", "side", "inner", "outer", "upper" and "lower" do not
limit the respective panels to such orientation, but merely serve to distinguish these
15 panels from one another. 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 short slit,
a frangible line or a fold line without departing from the scope of the invention.

CLAIMS

- 5 1. A carton for holding articles, which carton comprises walls that define an interior volume for accepting the articles, the carton further comprising first and second partition panels for forming a partition to divide that interior volume, from which partition extends a handle structure, which handle structure is formed from a first handle element provided by a portion of the first partition panel and a second handle element hinged to the first handle element, the first
10 and second partition panels being hinged to one another, a third handle element for forming the handle structure being provided by a portion of the second partition panel.
- 15 2. The carton according to claim 10, wherein the second partition panel is folded into coplanar contact with the first partition panel such that the third handle element is in coplanar contact with the first handle element.
- 20 3. The carton according to claim 2, where the second handle element is one or more of: a) folded into coplanar contact with the third handle element thereby to sandwich that third handle element between the first and second handle elements; or, b) hinged to a connecting tab that connects the second handle element to an end wall of the carton.
- 25 4. The carton according to any one of claims 1 to 3, wherein the second partition panel comprises a hinged tab that extends from a side edge of the second partition panel, through an aperture formed in an end connecting panel and is secured to an end wall of the carton, wherein said end connecting panel connects one end of the first partition panel to a side wall of the carton.
- 30 5. A blank for forming a carton, which blank comprises panels in linear series for forming walls of the carton defining an interior volume for accepting articles, the blank further comprising first and second panels for forming a partition to

divide that interior volume, from which partition extends a handle structure, which handle structure is formed from first and second handle elements that are hinged to one another and extending along one edge of the aforesaid linear series, the first handle element being provided by a portion of the first panel, the second panel being hinged to the first panel and providing a third handle element for forming the handle structure.

6. The blank according to claim 5, wherein the second panel is foldable into coplanar contact with the first panel such that the third handle element is in coplanar contact with the first handle element.

7. The blank according to claim 5, where the second handle element is one or more of: a) foldable into coplanar contact with the third panel thereby to sandwich that third handle element between the first and second handle elements; or, b) is hinged to a connecting tab that connects the second handle element to a panel for forming an end wall of the carton.

8. The blank according to any one of claims 5 to 7, wherein the blank further comprises first and second bottom panels hinged to an edge of the aforesaid linear series, the first bottom panel being disposed adjacent the third handle element, and wherein the third handle element is substantially half the width of the first handle element such that a distance between adjacent edges of the third handle element and the first bottom panel, is substantially equal to the width of the second bottom panel.

9. The blank according to claim 8, wherein the first and second bottom panels have equal width and are spaced apart by a distance substantially equal to that width to allow first and second bottom panels of an identical blank to nest between the first and second bottom panels of the blank.

10. The blank according to any one of claims 5 to 9, wherein the first panel for forming the partition is hinged to a first panel of the linear series, which first

panel of the linear series connects the first panel for forming the partition to a panel for forming an exterior wall of the carton, the first panel of the linear series comprising an aperture defined therein, whereby a portion of the partition is securable to a portion of an exterior wall of the carton through that aperture when the carton is erected.

11. The blank according to any one of claims 5 to 10, wherein the panels of the blank are sized such that a carton erected from that blank is capable of receiving six bottles each of a first volume, whilst the blank is nestable with other such blanks to allow six such blanks to be cut from a sheet of material measuring 1 meter by 1.4 meters, wherein said first volume is one of:

- a. 330ml; or
- b. 400ml; or
- c. 500ml.

12. A sheet of material within which are defined a plurality of blanks for forming cartons, each blank comprising panels in linear series for forming walls of the carton defining an interior volume for accepting articles, the blank further comprising first and second panels for forming a partition to divide that interior volume, from which partition extends a handle structure, which handle structure is provided by a first and a second handle element that are hinged one to the other and extending along one edge of the aforesaid linear series, the first handle element extending from the first panel for forming the partition, the second panel for forming the partition being hinged to the first panel for forming the partition and comprising a third handle element for forming the handle structure, and each blank comprising a first and a second bottom panel hinged to an edge of the aforesaid linear series adjacent the third handle element, and wherein the third handle element is substantially half the width of the first handle element such that a distance between adjacent edges of the third handle element and the first bottom panel, is substantially equal to the width of the second bottom panel, and wherein the first and second bottom panels have equal width and are spaced apart by a distance substantially

equal to that width to allow first and second bottom panels of an identical blank to nest between the first and second bottom panels of the blank.

13. The carton according to any one of claims 1 to 4, wherein the distance
5 between the fold line connecting the first and second partition panels and the opposed edges of those two partition panels is less than or equal to half the total distance between those two opposed edges.

14. A blank for forming a carton for receiving a plurality of articles, said blank comprising:

10 an elongate medial section having an axis of elongation and including first and second side wall panels and first and second end wall panels;

a first exterior section formed alongside said medial section and including a plurality of handle elements for, when said blank is erected into a finished carton, forming a composite handle structure by which said carton is
15 lifted, said plurality of handle elements comprising first and second handle elements, said first handle element being arranged at one end of said first exterior section; and

a second exterior section formed alongside said medial section such that the medial section is disposed between the first and second exterior sections, the second exterior section including first and second bottom panels and a third handle element for, when said blank is erected into a finished carton, forming the composite handle structure in cooperation with the first and
20 second handle elements.

15. The blank according to claim 14, further comprising first and second partition
25 panels for forming a partition for dividing an interior volume of a carton when the blank is erected, wherein the first partition panel is hingedly connected to the medial section along a first fold line disposed generally perpendicular to the axis of elongation and wherein the second partition panel is hingedly

connected to the first partition panel along a second fold line substantially parallel to the axis of elongation.

- 5 16. The blank according to claim 15, wherein the second end wall panel is disposed at one of the opposed ends of the medial section, the medial section further including an end connecting panel that is disposed at the other opposed end of the medial section for, when the blank is erected, being secured to the second end wall panel, the first partition is hingedly connected to the end connecting panel along the first fold line.
- 10 17. The blank according to claim 15 or 16, wherein the first handle element is provided by a portion of the first partition panel and wherein the third handle element is provided by a portion of the second partition panel.
18. The blank according to any of claims 15 to 17, wherein the second handle element is hingedly connected to the first handle element along a third fold line that is disposed generally perpendicular to the axis of elongation.
- 15 19. The blank according to claim 18, wherein the third fold line is disposed collinear with the first fold line.
- 20 20. The blank according to claim 16, wherein the first and second end wall panels and the first and second side wall panels are arranged in the sequence of the second end wall panel, the second side wall panel, the first end wall panel and the first side wall panel, and wherein the end connecting panel is hingedly connected to the first side wall panel.