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(71) Applicant (for all designated States except US): **MEAD-
WESTVACO CORPORATION** [US/US]; 501 South
5th Street, Richmond, Virginia 23219-0501 (US).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **BATES, Aaron** [US/
US]; 10814 Greater Hills Street, Raleigh, North Carolina
27614 (US).

(74) Agents: **SUZUKI, Tsugihiko** et al.; MeadWestvaco Cor-
poration, 1021 Main Campus Drive, Raleigh, NC 27606
(US).

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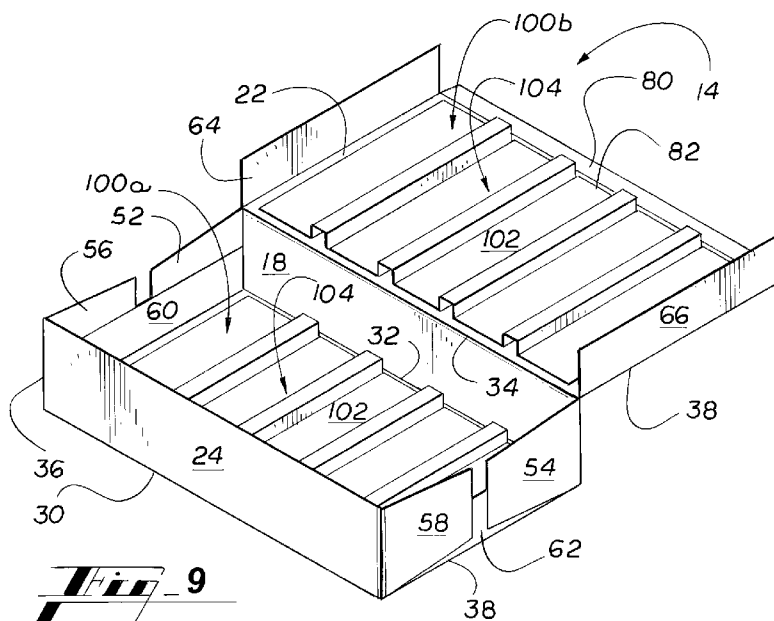
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[Continued on next page]

(54) Title: **CARTON WITH STACKING STRENGTH ENHANCING FEATURE**



(57) Abstract: A carton (10) includes a composite vertical wall which includes a first wall (22) provided by a panel of a first blank (14) for forming a carton, and a reinforcing member (100b) formed from a second blank (100). The reinforcing member (100) includes at least one substantially vertical rib (104).



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CARTON WITH STACKING STRENGTH ENHANCING FEATURE

TECHNICAL FIELD

[001] The disclosure relates generally to cartons for use in packaging articles and, more particularly, relates to a carton whose stacking strength is enhanced.

BACKGROUND

[002] Cartons are useful for allowing consumers to purchase, transport, and store a desired quantity of articles. However, some articles such as juice pouches are flexible and/or deformable. Such articles tend to get easily rearranged and crushed within the carton. Moreover, certain cartons do not have strength that is sufficient to physically protect their contents when other cartons are stacked on them. Such cartons may break open when subjected to compression. Therefore, what is needed is an improved carton for packaging flexible or deformable articles. The improved carton should have good stacking strength to protect the contents when stored or displayed with like cartons stacked on the carton.

SUMMARY

[003] The various embodiments of the present disclosure overcome the shortcomings of the prior art by providing a carton with a vertical wall that is configured to give the carton greater stacking strength.

[004] The foregoing has broadly outlined some of the aspects and features of the present disclosure, which should be construed to be merely illustrative of various potential applications. Other beneficial results can be obtained by applying the disclosed information in a different manner or by combining various aspects of the disclosed embodiments. Accordingly, other aspects and a more comprehensive understanding may be obtained by referring to the detailed description of the exemplary embodiments taken in conjunction with the accompanying drawings, in addition to the scope defined by the claims.

DESCRIPTION OF THE DRAWINGS

[005] FIG. 1 illustrates a perspective view of a carton according to a first exemplary embodiment of the disclosure.

[006] FIG. 2 illustrates a plan view of a carton blank for forming the carton of FIG. 1.

[007] FIG. 3 illustrates a plan view of a reinforcing member blank for forming a reinforcing member of the carton of FIG. 1.

[008] FIG. 4 illustrates a perspective view of the carton blank of FIG. 2 and the reinforcing member formed from the reinforcing member blank of FIG. 3 that are combined according to an exemplary step of a method for erecting the carton of FIG. 1.

[009] FIGs. 5 and 6 illustrate perspective views of the combined carton blank and reinforcing member, showing steps for loading and erecting the carton.

[0010] FIG. 7 illustrates a perspective view of the carton that has been partially erected, showing an exemplary step of a method for erecting the carton where side walls are in a vertical position.

[0011] FIG. 8 illustrates a fragmentary cross-sectional view taken along line 8-8 of FIG. 1.

[0012] FIGS. 9-12 are perspective views of the carton that has been partially erected, showing steps of an alternative method for erecting the carton of FIG. 1.

DETAILED DESCRIPTION

[0013] As required, detailed embodiments are disclosed herein. It must be understood that the disclosed embodiments are merely exemplary of the disclosure that may be embodied in various and alternative forms, and combinations thereof. As used herein, the word “exemplary” is used expansively to refer to embodiments that serve as illustrations, specimens, models, or patterns. The figures are not necessarily to scale and some features may be exaggerated or minimized to show details of particular components. In other instances, well-known components, systems, materials, or methods have not been described in detail in order to avoid obscuring the present disclosure. Therefore, specific structural and functional details disclosed herein are not to be interpreted as limiting, but merely as a basis for the claims and as a representative basis for teaching one skilled in the art.

[0014] Referring now to the drawings in which like numerals indicate like elements throughout the several views, the drawings illustrate exemplary embodiments of cartons that are designed for packaging and dispensing articles. The term carton refers, for the non-limiting purpose of illustrating the various teachings of the disclosure, to a container for enclosing, carrying, and dispensing articles, such as beverage pouches. The teachings of the disclosure can be applied to various containers of various articles to give the containers additional support against compressive forces. In general, articles such as beverage pouches do not provide sufficient support against compressive stresses.

[0015] The illustrated articles are stand-up pouches 1 which may be deformable and are made from a flexible material such as a plastic-aluminum laminated film. In the empty condition, each pouch 1 is flat. In the filled condition, each pouch 1 has a flat bottom and generally rectangular front and rear panels. The front and rear panels extend from the bottom into a mutual contacting and sealed relationship at the top of the pouch 1. The bottom of each pouch 1 is in the form, generally, of a hexagon. Each side wall of each pouch 1 has a generally triangular configuration with its base being at the bottom. Therefore, the bottom of each pouch 1 is considerably wider than the top when viewed from the side. An example of a beverage pouch is disclosed in U.S. Pat. No. 5,927,498, which is hereby included by reference.

[0016] Generally described, each of the illustrated cartons is formed from a blank, which is a sheet of foldable sheet material such as paperboard or another suitable substrate. As used herein, the term "suitable substrate" includes all manner of foldable sheet material such as paperboard, corrugated board, cardboard, plastic, combinations thereof, and the like. In the illustrated embodiments, a unitary blank is used to form the main portion or outer shell of a single carton although it should be recognized that two or more blanks may be employed, for example, to provide the carton structure described in more detail below. In the illustrated embodiments, a blank is designed to form a carton for packaging an exemplary arrangement of exemplary articles (a 2X5 arrangement). It is envisaged that the blank can be sized to form a carton for packaging other articles and/or different arrangements of articles.

[0017] As used herein, the term "fold line" refers to all manner of lines that define hinge features of the blank, facilitate folding portions of the blank with respect to one

another, or otherwise indicate optimal panel folding locations for the blank. A fold line is typically a scored line, an embossed line, or a debossed line. As used herein, the term "severance line" refers to all manner of lines that facilitate separating portions of the substrate from one another or that indicate optimal separation locations. Severance lines may be frangible or otherwise weakened lines, tear lines, cut lines, or slits. It should be understood that severance lines and fold lines can each include elements that are formed in the substrate of the blank including perforations, a line of perforations, a line of short slits, a line of half-cuts, a single half-cut, a cut line, an interrupted cut line, slits, scores, any combination thereof, and the like. The elements can be dimensioned and arranged to provide the desired functionality. For example, a line of perforations can be dimensioned or designed with degrees of weakness to define a fold line and/or a severance line. The line of perforations can be designed to facilitate folding and resist breaking, to facilitate folding and facilitate breaking with more effort, or to facilitate breaking with little effort.

[0018] Referring to a first exemplary embodiment illustrated in FIGs. 1-8, a carton 10 is formed from a unitary carton blank 14 and separate reinforcing members 100a, 100b. The carton blank 14 is configured as shown in FIG. 2 to provide an outer shell of the carton 10 and includes at least four primary panels for forming the carton 10. The primary panels of the carton blank 14 are a top wall 24, a first side wall 20, a bottom wall 18, and a second side wall 22. These panels 24, 20, 18, 22 are hingedly connected in series one to the next along longitudinal fold lines 30, 32, 34. The top wall 24 is hingedly connected to the first side wall 20 by fold line 30, the first side wall 20 is hingedly connected to the bottom wall 18 by fold line 32, and the bottom wall 18 is hingedly connected to the second side wall 22 by fold line 34. Additionally, an edge flap 80 is hingedly connected to the second side wall 22 by a fold line 82.

[0019] Each of the panels 18, 20, 22, 24 is provided with opposing end flaps that are connected to the respective primary panel along transverse fold lines 36, 38. Each of fold lines 36, 38 extends substantially the full length of the carton blank 14. The opposing end flaps include opposing lower end flaps 52, 54, opposing upper end flaps 56, 58, and opposing side end flaps 60, 62, 64, 66. The end flaps 52, 56, 60, 64 are hingedly connected to the panels 18, 20, 22, 24 along transverse fold line 36 while the end flaps 54, 58, 62, 66 are hingedly connected to the panels 18, 20, 22, 24 along the transverse fold line 38.

[0020] The carton 10 includes composite walls that are configured to give the carton 10 greater stacking strength. For example, the composite walls can include vertically extending ribs that protrude into the interior of the carton 10 to give the carton 10 greater stacking strength. In the illustrated embodiment, the composite walls are composite side walls 20/100a, 22/100b that include the side walls 20, 22 of the outer shell and reinforcing members 100a, 100b that are attached at least in part to the side walls 20, 22. Referring to FIG. 3, in the illustrated embodiment, each reinforcing member 100a, 100b is formed from a reinforcing member blank 100 that is separate from the carton blank 14. The illustrated reinforcing member blank 100 includes planar portions 102 and elements or segments that provide ribs 104. In this disclosure, the ribs 104 may also be referred to as supports or support members. Each illustrated rib 104 includes perpendicular sections 110, 112 and a medial parallel section 114. The planar portions 102 and the elements of the ribs 104 are connected one to the next along fold lines. When the reinforcing member blank 100 is erected as a reinforcing member 100a, 100b, planar portions 102 facilitate attachment to, or flat face contact with, the respective inside surface of the side wall 20, 22 and the ribs 104 protrude inward from the plane defined by the planar portions 102. Specifically, the elements of the ribs 104 are folded along respective fold lines and arranged such that the ribs 104 have a substantially "U" shaped cross section including a squared "U" shape. Specifically, the perpendicular sections 110, 112 are folded so as to be substantially perpendicular to the planar portions 102 to which they are hingedly connected respectively, and the medial parallel section 114 is offset and substantially parallel to the planar portions 102. The dimension D of each of the sections 110, 112, 114 is substantially greater than the thickness T of the side walls 20, 22 or the reinforcing members 100a, 100b.

[0021] In the illustrated embodiment, the ribs 104 are hollow-core structures or channel-like structures although in alternative embodiments the ribs have a solid core. Hollow-core or channel-like ribs 104 can provide a savings in material cost while providing the desired stacking strength. Further, a reinforcing member 100a, 100b with hollow-core or channel-like ribs 104 can easily be formed by folding, press-forming, thermo-forming or extrusion-forming a sheet of substrate.

[0022] In alternative embodiments, the shape of the cross-section of the ribs 104 includes rounded u-shaped, semi-circular, circular, triangular, hexagonal, v-shaped, l-shaped, t-shaped, combinations thereof, and the like. Different cross-section shapes can provide different resistance to bending and compressing. Further, different cross-section

shapes can be manufactured with various levels of difficulty. As such, the shape of the cross-section may be selected to optimize the ease of manufacturing and the strength of the rib. Further, ribs 104 with different sizes of cross-sections can provide different resistance to bending and compressing. In general, the greater the protrusion into the interior of the carton 10, the greater the amount of support.

[0023] Reinforcing members can be formed of various materials and according to various methods of manufacturing. In various embodiments, reinforcing members are folded paperboard, thermo-, extrusion- or press-formed paperboard, thermo-formed plastic, injection molded plastic, blow-molded plastic, combinations thereof, and the like.

[0024] An exemplary method of erecting the carton blank 14 along with the reinforcing members 100a, 100b in order to erect or form the carton 10 is now described. Referring to FIG. 2, the carton blank 14 is cut from a suitable sheet material such as described above. Referring to FIG. 3, two reinforcing member blanks 100 for forming the reinforcing members 100a, 100b are cut from a suitable sheet material such as described above. Each reinforcing member blank 100 is erected and formed into a reinforcing member having one or more ribs 104. Referring to FIG. 4, the reinforcing members 100a, 100b are secured at least partially to the side walls 20, 22 respectively to form composite side walls 20/100a, 22/100b of the carton. Means for securing includes glue or other adhesive, mechanical fasteners, hook and loop fasteners, combinations thereof, and the like. In alternative embodiments, the reinforcing members 100a, 100b are placed on, but not secured to, the side walls 20, 22 and held in place by the pouches 1 during the method of erecting the carton blank 14.

[0025] Referring to FIG. 5, two separate rows of filled pouches 1 are arranged on the composite side walls 20/100a, 20/100b. The ribs 104 define recesses that facilitate positioning and retaining the pouches 1 on the composite side walls 20/100a, 22/100b. Alternatively described, the ribs 104 partially partition the pouches 1 in each row. The two rows are placed on the composite side walls 20/100a, 22/100b respectively such that each pouch 1 lies on its front or rear panel. The illustrated bottoms of the pouches 1 in the left-hand side row as viewed in FIG. 5 face the tops of the pouches 1 in the right-hand side row. The illustrated pouches 1 in each row are arranged one next to another in somewhat overlapping relationship as best illustrated in FIG. 8.

[0026] The side end flaps 60, 62, 64, 66 are folded upward along transverse fold lines 36, 38 as shown in FIG. 5 and the side walls 20, 22, are folded toward each other along fold lines 32, 34 as shown in FIG. 6. Mechanical means can be used to help hold the pouches 1 in place during this step. This erecting step eventually brings the composite side walls 20/100a, 22/100b into the upright positions illustrated in FIG. 7. When the composite side walls 20/100a, 22/100b are in the upright positions, the pouches 1 in one row become nested with the pouches 1 in the other row in such a manner that the bottoms of the pouches 1 in the one row face the tops of the pouches 1 in the other row. In the carton shown in FIG. 1, the bottoms of the pouches 1 in the left-hand side row and the tops of the pouches 1 in the right-hand side row rest upon the bottom wall 18.

[0027] From the condition of FIG. 7, the top wall 24 and the edge flap 80 are folded down to their respective horizontal positions and glued or otherwise secured to each other. FIG. 1 illustrates the edge flap 80 as being glued to the outside surface of the top wall 24 although the edge flap 80 can alternatively be glued to the inside surface of the top wall 24. After the edge flap gluing step, the upper and lower end flaps 56, 52 are folded downward and upward respectively and glued to the side end flaps 60, 64 to provide an end closure structure for closing the rear end of the carton 10. The upper and lower end flaps 58, 54 are also similarly folded and secured to the side end flaps 62, 66 to provide the other end closure structure for closing the forward end of the carton 10. The fully erected carton 10 is thus provided as shown in FIG. 1. In the carton 10, the pouches 1 tightly occupy a space because the pouches 1 in one row are nested with those of the other row and also because the pouches 1 in each row are in the overlapping condition.

[0028] FIG. 8 is a fragmentary cross-sectional view of the carton of FIG. 1 and illustrates the condition of the inside of the fully erected carton 10. As illustrated in FIG. 8, the end closure structure at the forward end of the carton 10 is formed from the side end flaps 62, 66 and the upper and lower end flaps 58, 54. In like manner, the end closure structure at the rear end of the carton 10 is formed from the side end flaps 60, 64 and the upper and lower end flaps 56, 52. As viewed in FIG. 1, the fold lines 30, 32, 34, 82 form the horizontal longitudinal edges of the carton 10 while the transverse fold lines 36, 38 form the vertical transverse edges and horizontal transverse edges of the carton 10.

[0029] In this arrangement, the ribs 104 vertically extend entirely between the top wall 24 and the bottom wall 18 and protrude into the interior of the carton 10 to provide sturdy tubular columns for achieving greater stacking strength. The interior of the carton 10 can be at least partially defined by the inside surfaces of the walls 18, 20, 22, 24. The ribs 104 also provide greater structural integrity to the carton 10. For example, the ribs 104 are configured such that the composite side walls 20/100a, 22/100b resist bending and buckling as other cartons are stacked on the carton 10. Because of the ribs 104, the carton 10 may sustain greater weights when stacked within a group of like cartons.

[0030] An alternative method of forming the carton 10 of FIG. 1 is illustrated in FIGs. 9-12. A partially erected carton 10 as shown in FIGs. 9 and 12 can be formed from the carton blank 14 of FIG. 2 and reinforcing members 100a, 100b of FIG. 4. The various panels of the carton blank 14 have been described. In order to form the carton 10, the side end flaps 60, 62, 64, 66 are folded upward along transverse fold lines 36, 38 as shown in FIG. 9. Next, the top wall 24 is folded upward along the fold line 30, and the upper end flaps 56, 58 are folded inward and respectively glued to the side end flaps 60, 62. The bottom wall 18 is folded upward along the fold line 32, and the lower end flaps 52, 54 are folded inward and respectively glued to the side end flaps 60, 62. The reinforcing members 100a, 100b are secured to the side walls 20, 22 to form composite side walls 20/100a, 22/100b. This provides the partially fabricated carton 10 as shown in FIG. 9.

[0031] Next, two vertically-arranged, separate rows of filled pouches 1 are placed or loaded, either simultaneously or one row at a time, on composite side wall 20/100a as shown in FIGs. 10 and 11. The two rows are placed on the composite side wall 20/100a such that each pouch 1 lies with its longer axis extending between the top and bottom walls 24, 18. As illustrated, the bottoms of the pouches 1 in the upper row face the tops of the pouches 1 in the lower row. Alternatively, the bottoms of the pouches 1 in both the rows can face either the top or bottom wall as illustrated in FIG. 11. The illustrated pouches 1 in each row are arranged next to one another in a somewhat overlapping relationship.

[0032] After fully loading the carton 10 as shown in FIG. 11, the second composite side wall 22/100b is folded over along fold line 34 to cover the pouches 1 within the carton 10. The side end flap 64 is inserted into the carton so as to place the side end flap 64 alongside the inside surfaces of the upper and lower end flaps 56, 52 while the side end flap

66 is inserted into the carton so as to place the side end flap 66 alongside the inside surfaces of the upper and lower end flaps 58, 54. The side end flaps 64, 66 are not glued to, and thereby remain detached from, the adjacent upper and lower end flaps 56, 52. The edge flap 80 is then folded down and glued or otherwise secured to the outside surface of the top wall 24. Subsequently, the fully erected carton 10 is provided as substantially shown in FIG. 1. The carton 10 will be essentially of the same construction as created following the steps shown in FIGS. 4-7.

[0033] In various embodiments, the transverse dimension W3 of the side end flaps 64, 66 is somewhat longer than transverse dimension W2 of the side end flaps 60, 62, while still being no greater than the width dimension W4 of the finished carton 10.

[0034] It will be recognized that as used herein, directional references such as “top”, “bottom”, “base”, “end”, “side”, “inner”, “outer”, “upper”, “lower”, “forward”, and “rear” do not limit the respective panels to such orientation, but merely serve to distinguish these panels from one another. Any reference to a hinged connection should not be construed as necessarily referring to only a single fold line. It is envisaged that a hinged connection can be formed from one or more of one of the following, a score line, a line of perforation, a line of short slits or their combination, without departing from the scope of disclosure.

[0035] It should be understood that various changes may be made within the scope of the present disclosure. For example, the size and shape of the panels may be adjusted to accommodate articles of differing size or shape. The carton may accommodate only one or more than two rows of articles. The carton may be provided with one or more removable portions for access to the contents. Also, the pouches contained within the carton, although generally described herein as being in rows or groups with pouch bottoms oriented in a particular direction, may also be placed in various other configurations, such as with every other pouch bottom facing an alternating direction, or in other configurations where some pouches in a row will face one direction and other pouches in a row will face another direction.

[0036] The above-described embodiments are merely exemplary illustrations of implementations set forth for a clear understanding of the principles of the disclosure.

Variations, modifications, and combinations may be made to the above-described embodiments without departing from the scope of the claims. All such variations, modifications, and combinations are included herein by the scope of this disclosure and the following claims.

CLAIMS

1. A carton, comprising:
 - a composite vertical wall comprising:
 - a first wall provided by a panel of a first blank for forming a carton; and
 - a reinforcing member formed from a second blank, the reinforcing member comprising at least one substantially vertical rib.
2. The carton of claim 1, wherein the at least one rib protrudes into the interior of the carton.
3. The carton of claim 1, wherein the at least one rib has a hollow core.
4. The carton of claim 1, wherein the reinforcing member comprises a planar portion that is configured to be in flat face contact with the first wall.
5. The carton of claim 1, wherein the planar portion is secured to the first wall
6. The carton of claim 1, further comprising a top wall and a bottom wall connected to upper and lower edges of the first wall respectively, the at least one rib extending between the top wall and the bottom wall.
7. The carton of claim 1, wherein the at least one rib is intermediate corners of the carton that are adjacent vertical edges of the first wall.
8. The carton of claim 1, wherein the at least one rib comprises a plurality of ribs spaced at intervals along the horizontal dimension of the composite vertical wall.
9. The carton of claim 1, wherein the at least one rib comprises a pair of ribs that define a recess therebetween, the recess being configured to receive an article.

10. The carton of claim 1, wherein the at least one rib is configured to partition a pair of adjacent articles.

11. The carton of claim 1, wherein the at least one rib comprises a plurality of ribs configured to facilitate positioning a plurality of articles at positions along the width of the first wall.

12. A carton comprising:

an outer shell formed from a first blank so that the outer shell includes a top wall, a bottom wall, and a vertical wall which are provided by the first blank, the vertical wall extending between the top wall and the bottom wall of the outer shell; and

an inner reinforcing member formed from a second blank cut and formed separately from the first blank to provide the reinforcing member, the reinforcing member including a planar portion and at least one rib, the planar portion being disposed alongside the at least one rib and extending away from the rib,

the reinforcing member being secured to an inside surface of only a part of the first blank such that the at least one rib extends along the vertical wall entirely between the top wall and the bottom wall of the outer shell.

13. A carton of claim 12, wherein the second blank is attached to the outer shell that has been cut into the first blank.

14. A carton of claim 13, wherein the at least one rib is of a channel-like structure that is formed by folding a part of the second blank, and the planar portion is disposed on each of the opposite sides of the at least one rib.

15. A carton of claim 14, wherein the channel-like structure has a substantially U-shaped cross section.

16. A carton of claim 8, wherein the horizontal dimension of each of the intervals is substantially greater than the horizontal dimension of each of the ribs.

17. A carton comprising:

an outer shell formed from a first blank, the outer shell including a pair of top and bottom walls connected together by a pair of opposed side walls to form a tubular structure, the outer shell further including an end closure structure at least partially closing each of opposed ends of the tubular structure; and

an inner reinforcing member formed from a second blank cut and formed separately from the first blank so as to provide the reinforcing member, the reinforcing member including at least one rib and at least one planar portion,

the reinforcing member being secured to each of the opposed side walls of the outer shell such that the at least one rib extends between the top and bottom walls and such that the at least one planar portion extends away from the at least one rib, the at least one rib being disposed spaced from the opposed ends of the outer shell.

