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(54) **BLANK FOR FORMING A CARTON AND A METHOD OF INSERTING EMPTY HOLLOW CORES BACK INTO THE CARTON**

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(57) **ABSTRACT**

A blank formed from cellulosic fibers is disclosed which is capable of being constructed into a carton. The carton is capable of housing a plurality of roll products, such as rolls of paper towels or rolls of toilet paper. Each of the roll products is wound onto a hollow core made from cellulosic fibers. The carton has a dispensing opening through which the roll products can be individually removed. The carton also has an empty hollow core insertion opening through which an empty hollow core can be inserted back into the carton for the purpose of being recycled along with the empty carton. A method of inserting the empty hollow cores back into the carton is also disclosed.

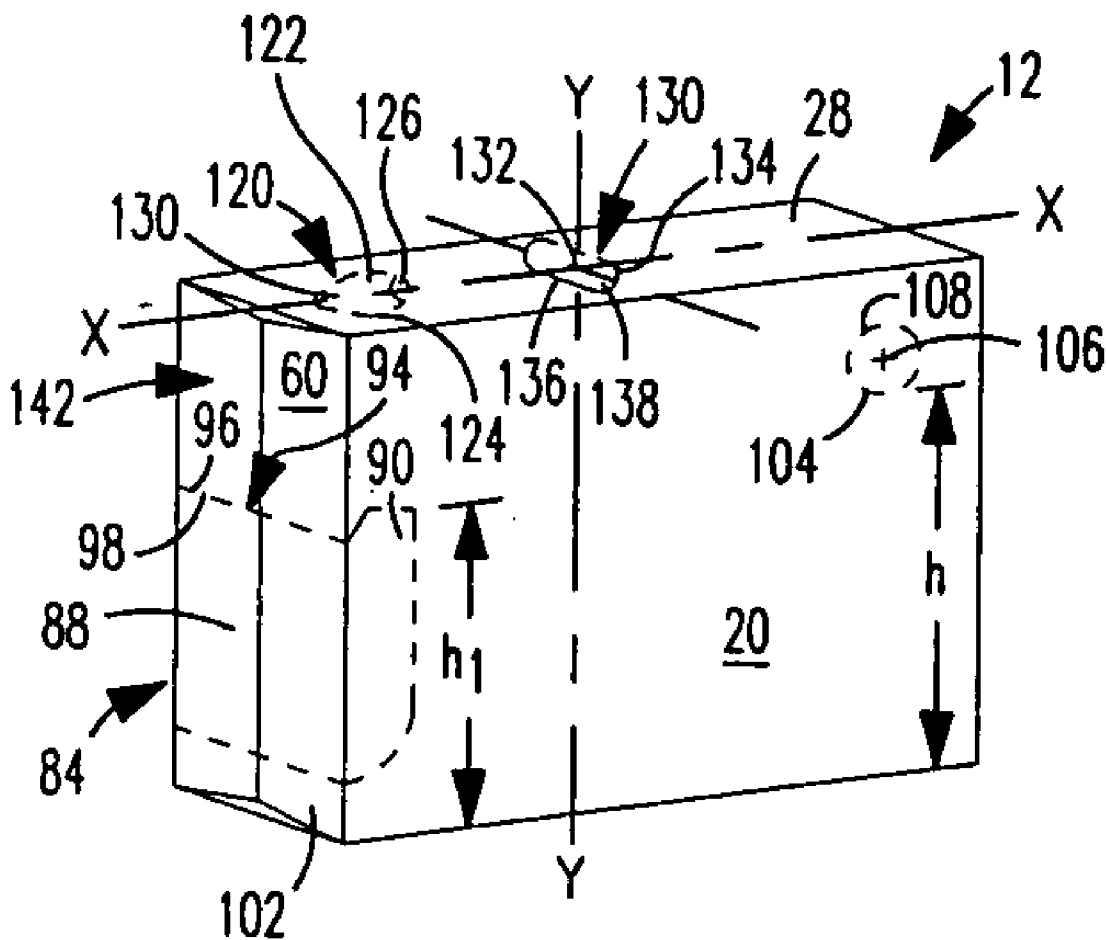
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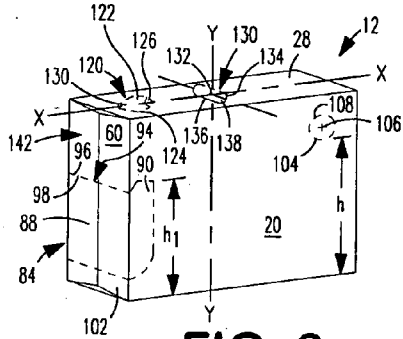


FIG. 3

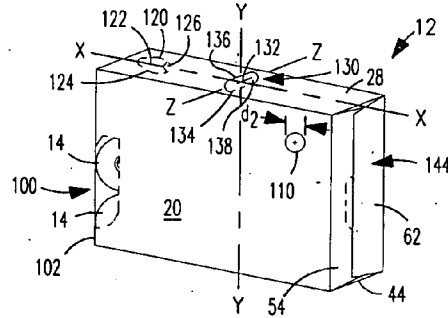


FIG. 4

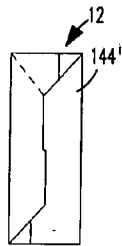


FIG. 5

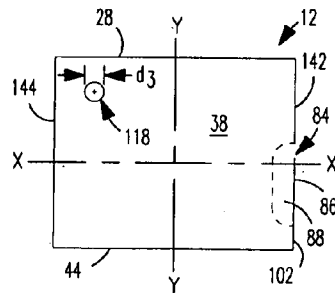


FIG. 6

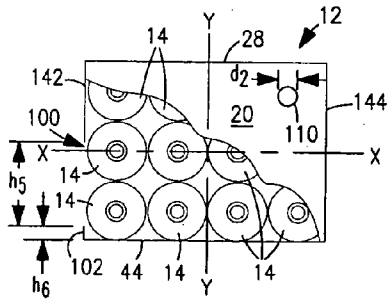


FIG. 7

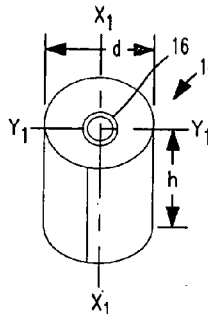


FIG. 8

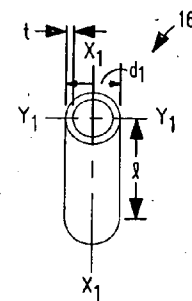


FIG. 9

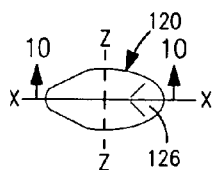


FIG. 10

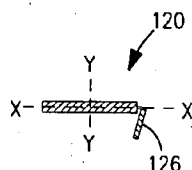


FIG. 11

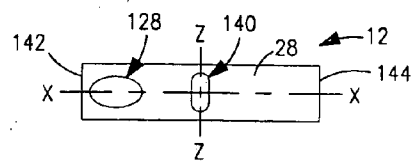


FIG. 12

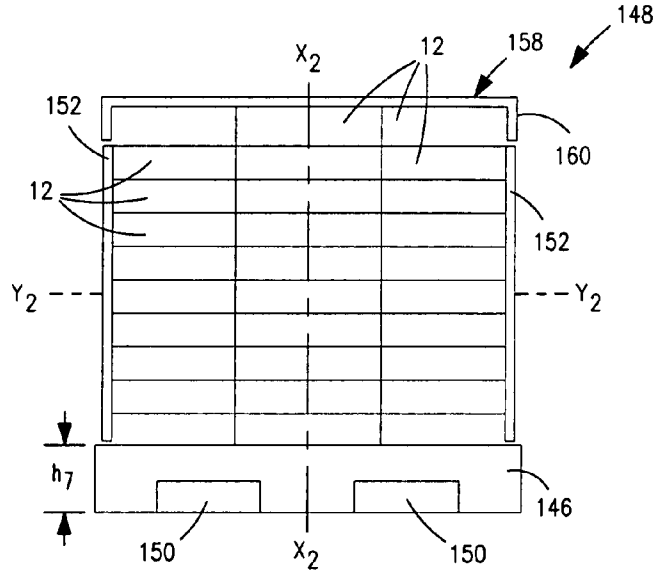


FIG. 13

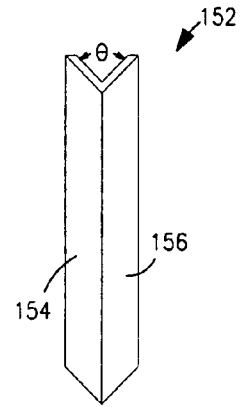


FIG. 14

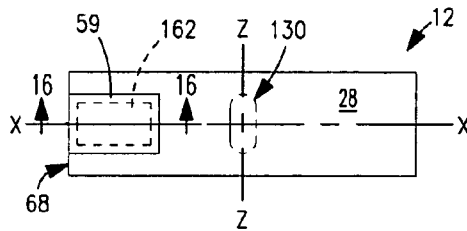


FIG. 15

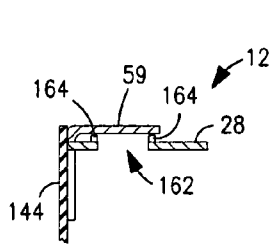


FIG. 16

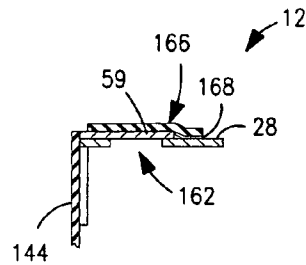


FIG. 17

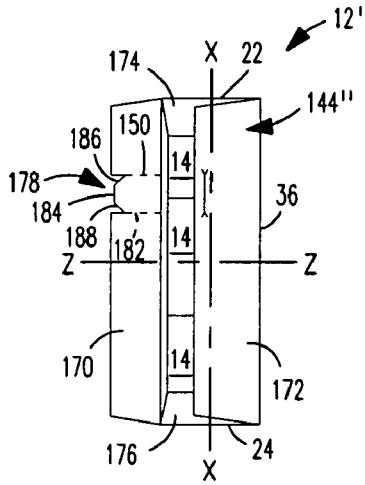


FIG. 18

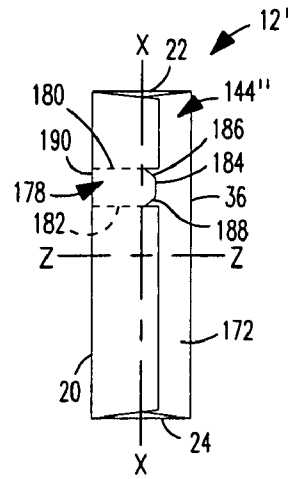


FIG. 19

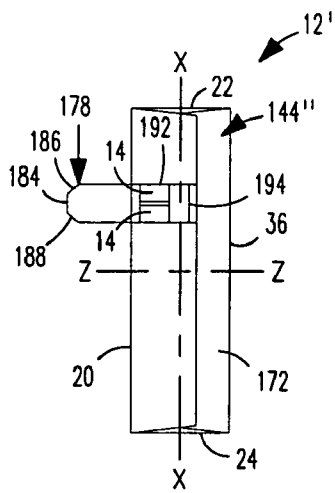


FIG. 20

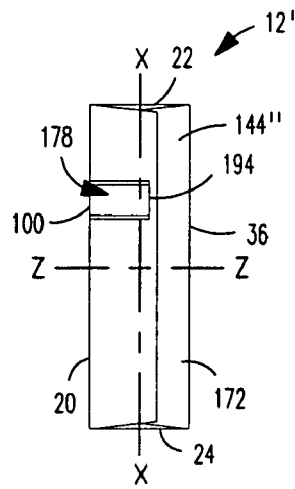


FIG. 21

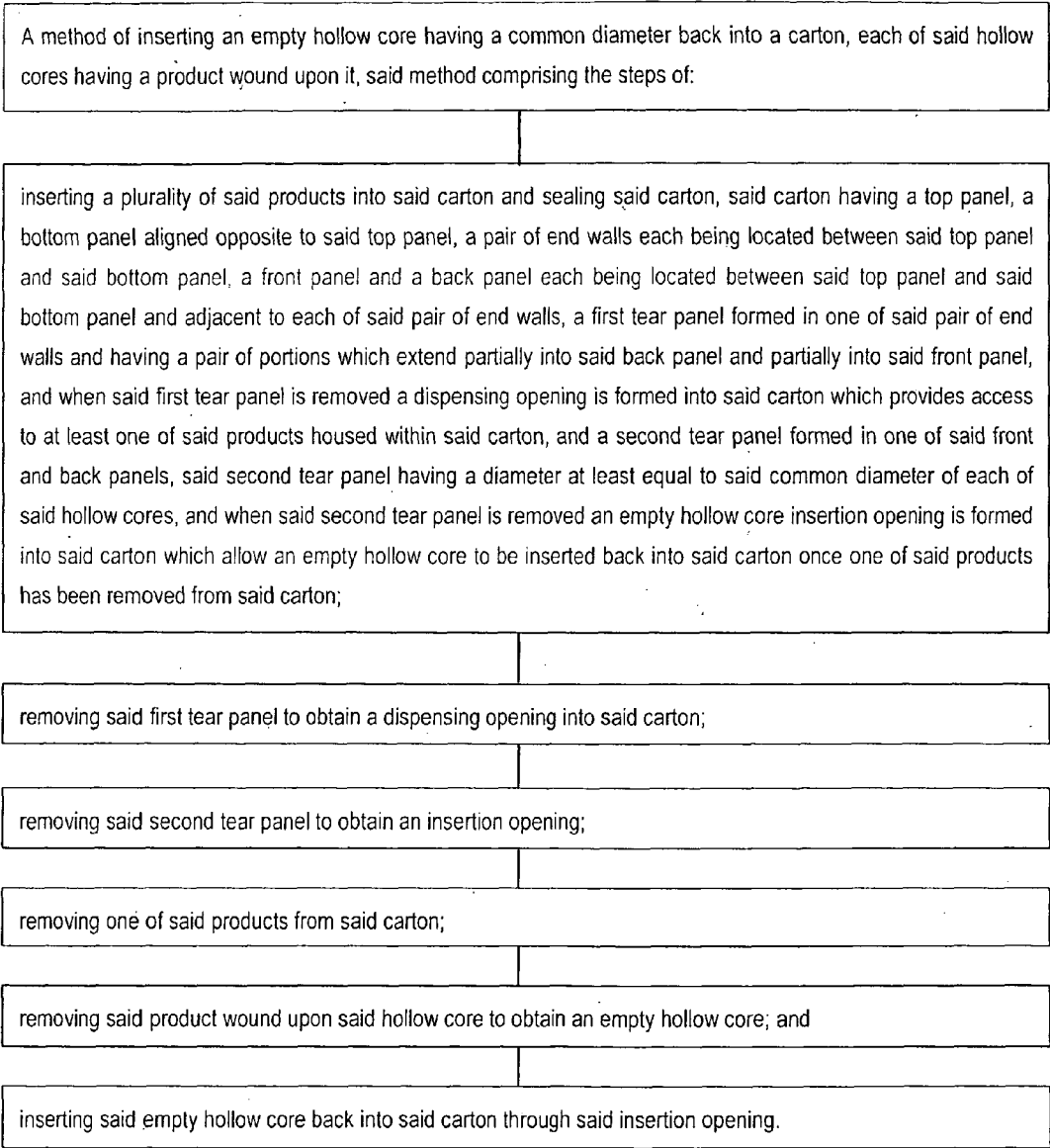


Fig. 22

BLANK FOR FORMING A CARTON AND A METHOD OF INSERTING EMPTY HOLLOW CORES BACK INTO THE CARTON

FIELD OF THE INVENTION

[0001] This invention relates to a blank capable of forming a carton and a method of inserting empty hollow cores back into the carton. More particularly, this invention relates to a paperboard carton capable of housing a plurality of roll products, such as rolls of paper towels, rolls of toilet paper, rolls of dry wipes, etc., which are wound onto a hollow core formed from cellulosic fibers, and recycling the empty hollow cores back into the carton.

BACKGROUND OF THE INVENTION

[0002] Today, many consumers desire to purchase products that utilize recycled materials and additionally can be recycled so as to benefit the environment. Some paper products, especially paper towel and toilet paper are manufactured from cellulose fibers that have been recovered and recycled and this is considered a superior and much more sustainable approach to disposable paper product manufacturing utilizing virgin wood (cellulose) fibers. However, up until now, it has been difficult to recycle the materials used to package and dispense these disposable paper products. Most paper towels and toilet paper is wound onto a hollow, paper or cardboard core during manufacture for easy dispensing. These products are typically referred to as roll products and have a generally cylindrical shape and contain multiple sheets of paper towels or toilet paper. A plurality of these roll products is then typically wrapped in plastic in multiples of 4, 6, 8, 12, 24 rolls and then packed into corrugated fiberboard cartons for easy shipment to a retailer for ultimate sale to consumers.

[0003] It has been found that the plastic wrap or sheeting used to form the commonly used wrappers cannot be easily collected and recycled. Therefore, this plastic wrap is often discarded and eventually the plastic wrap is landfilled where it is slow to break down. Even in communities where consumers take the extra time to collect and recycle the plastic film, it is difficult for some recyclers to know the specific plastic from which the wrap was produced and therefore it may still be difficult to properly segregated and successfully recycled the plastic wrap. In addition, consumers who wish to recycle the plastic wrap and the empty paper cores must first separate the paper or cellulosic based hollow cores from the plastic wrap during the recycling process. For this reason, many consumers who desire green (recyclable/sustainable) products wish to purchase paper towels and toilet paper in paper-based (paperboard) packaging/cartons. At present, there is no known commercial use of a paperboard carton to house, transport and display (retail applications) disposable paper products such as paper towel and bathroom tissue.

[0004] There are commercially available paperboard cartons for use with other kinds of cylindrical shaped products, i.e. aluminum cans. However, such paperboard cartons do not contain a separate opening to allow for the recapture of recyclable materials. One drawback with the existing plastic packaging for kitchen roll towels or bathroom tissue is that, up until now, there was no easy way to recycle the empty hollow cores and/or the removable panel covering the dispensing opening back into the carton once the sheets of paper towels or sheets of toilet paper were removed from the hollow cores. Many consumers were forced to discard the empty

hollow cores and the removable cover panels in their garbage receptacles. By providing an easy to use recycling alternative, the consumer will now be able to dispose of the empty hollow cores and the removable cover panels and recycle them along with the original paperboard carton. No further segregation of materials is required.

[0005] Now a blank capable of forming a paperboard carton having a dispensing opening and an empty hollow core insertion opening has been invented. The blank is capable of being formed into a carton capable of holding a plurality of roll products. The carton has a specific opening into which empty hollow cores can be inserted back into the carton once the cellulosic product has been removed there from. In addition, a method of inserting the hollow cores back into the carton is also disclosed.

SUMMARY OF THE INVENTION

[0006] Briefly, this invention relates to a blank for forming a carton having more than one opening to facilitate both the dispensing of carton contents as well as to recapture recyclable materials that are currently most often discarded. The blank includes an adhesive tab and a back panel located adjacent to the adhesive tab. The back panel has a top and a bottom. The blank also has a first vertical fold line positioned between the adhesive tab and the back panel. The blank further has a top panel located adjacent to the back panel. The top panel has a top and a bottom. The blank also has a second vertical fold line positioned between the back panel and the top panel. The blank further has a front panel located adjacent to the top panel. The front panel has a top and a bottom. The blank also has a third vertical fold line positioned between the top panel and the front panel. The blank further has a bottom panel located adjacent to the front panel. The bottom panel has a top and a bottom. The blank also has a fourth vertical fold line positioned between the front panel and the bottom panel. The blank also has a back panel top flap located adjacent to the top of the back panel, a back panel bottom flap located adjacent to the bottom of the back panel, a top panel top flap located adjacent to the top of the top panel, a top panel bottom flap located adjacent to the bottom of the top panel, a front panel top flap located adjacent to the top of the front panel, a front panel bottom flap located adjacent to the bottom of the front panel, a bottom panel top flap located adjacent to the top of the bottom panel, and a bottom panel bottom flap located adjacent to the bottom of the bottom panel.

[0007] The blank further has a first horizontal fold line disposed between the back panel and the back panel top flap, between the top panel and the top panel top flap, between the front panel and the front panel top flap, and between the bottom panel and the bottom panel top flap. The blank further has a second horizontal fold line disposed between the back panel and the back panel bottom flap, between the top panel and the top panel bottom flap, between the front panel and the front panel bottom flap, and between the bottom panel and the bottom panel bottom flap. The blank still further includes a first tear panel formed in the front panel and having a pair of portions which extends partially into the top panel and the bottom panel, and when the first tear panel is removed a first opening is formed into the carton formed from the blank. The blank still further includes a pair of second tear panels that can be opened to allow recapture of the recyclable core materials and the previously removed roll-dispensing tear panel.

[0008] This invention also relates to a carton formed from cellulose fibers and having a pair of openings for dispensing

and re-insertion of recyclable materials formed therein. The carton is capable of housing a plurality of generally cylindrically shaped products formed from cellulose fibers. Each of the products is wound upon a hollow core formed from cellulose fibers and having a common diameter. The carton includes a top panel, a bottom panel aligned opposite to the top panel, a pair of end walls each being located between the top and bottom panels, and a front panel and a back panel each being located between the top panel and the bottom panel and adjacent to each of the pair of end walls. The carton also has a first tear panel formed in one of the pair of end walls and having a pair of portions which extend partially into the back panel and partially into the front panel. The first tear panel defines a first opening when removed which provides access to at least one of the roll products housed within the carton. The carton further has a second tear panel formed in the back panel. The second tear panel has a diameter at least equal to the common diameter of each of the hollow cores. When the second tear panel is removed, an empty hollow core insertion opening is formed into the carton which allows an empty hollow core to be inserted back into the carton once one or more of the products has been removed from the carton.

[0009] Still further, this invention relates to a method of recycling hollow cores formed from cellulose fibers which are housed in a carton formed from cellulose fibers. Each of the hollow cores has a roll product formed from cellulose fibers wound upon it. The method includes the steps of inserting a plurality of the roll products, each having a hollow core, into the carton and sealing the carton. The carton has a top panel, a bottom panel aligned opposite to the top panel, a pair of end walls each being located between the top panel and the bottom panel, a front panel and a back panel each being located between the top panel and the bottom panel and adjacent to each of the pair of end walls. The carton also has a first tear panel formed in one of the pair of end walls and has a pair of portions which extend partially into the back panel and partially into the front panel. When the first tear panel is removed, a dispensing opening is formed into the carton which provides access to at least one of the products housed within the carton. The carton also has a second tear panel formed in one of the front and back panels. The second tear panel has a diameter at least equal to the common diameter of each of the hollow cores. When the second tear panel is removed, an empty hollow core insertion opening is formed into the carton which allows an empty hollow core to be inserted back into the carton once one of the products has been removed from the carton.

[0010] The method also includes removing the first tear panel to obtain a dispensing opening into the carton. The second tear panel is also removed to obtain an insertion opening. The method further includes removing at least one of the products from the carton and removing, such as by using the product, the product wound upon the hollow core to obtain an empty hollow core. This empty hollow core is then inserted back into the carton through the insertion opening.

[0011] The general object of this invention is to provide a blank capable of forming a carton and a method of recycling hollow cores and tear panels back into the original carton. A more specific object of this invention is to provide a paperboard carton capable of housing a plurality of roll products, such as rolls of paper towels or rolls of toilet paper, which are wound onto a hollow core formed from cellulose fibers, and recycling the hollow cores back into the original carton.

[0012] Another object of this invention is to provide a dispensing opening of a size and shape that will allow a consumer to easily grasp a roll product approximate its opposite ends and remove the roll product from the carton.

[0013] Another object of this invention is to provide a paperboard carton capable of housing a plurality of generally cylindrically shaped roll products and having an easy to open flap that is recloseable and which can be opened so that a potential consumer can reach in with his or her fingers and feel the product prior to purchase of the paperboard carton.

[0014] A further object of this invention is to provide a paperboard carton capable of housing a plurality of generally cylindrically shaped roll products each wound onto a hollow core formed from paper or cardboard, and providing an opening through which the hollow cores can be inserted back into the original carton so that both can be recycled together.

[0015] Still another object of this invention is to provide a method for recycling hollow cores formed from cellulose fibers which are housed in a carton formed from cellulose fibers.

[0016] Still further, an object of this invention is to provide a method for inserting an empty hollow core back into the original carton once the first roll product is removed from the carton.

[0017] Still further, an object of this invention is to provide a method for recycling the carton having at least one empty hollow core positioned therein.

[0018] Other objects and advantages of the present invention will become more apparent to those skilled in the art in view of the following description and the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019] FIG. 1 is a top view of a blank formed from cellulosic fibers into a paper, paperboard or cardboard blank that can be configured into a carton.

[0020] FIG. 2 is a partial view of an embodiment of a blank wherein the four bottom flaps are designed to automatically intermesh as a blank is assembled into a sleeve forming a closed end wall.

[0021] FIG. 3 is a perspective view of a carton formed from the blank shown in FIG. 1.

[0022] FIG. 4 is another perspective view of the carton formed from the blank shown in FIG. 1 showing the opposite end of the carton and having the first tear panel removed to reveal the dispensing opening and the second tear panel removed to reveal the empty hollow core insertion opening.

[0023] FIG. 5 is an end view of a carton having a self forming end wall formed from the blank shown in FIG. 2.

[0024] FIG. 6 is a plane view of the front panel showing another empty hollow core insertion opening.

[0025] FIG. 7 is a plane view of the back panel partially broken away to reveal twelve roll products housed in the carton.

[0026] FIG. 8 is a perspective view of a roll product wound upon a hollow core.

[0027] FIG. 9 is a perspective view of an empty hollow core after the roll product has been removed.

[0028] FIG. 10 is an enlarged top view of a fourth tear panel which covers a viewing opening and having a finger opening formed therein.

[0029] FIG. 11 is a cross-sectional view of the fourth tear panel after the finger opening flap has been pushed downward and the third tear panel has been removed from the top panel of the carton.

[0030] FIG. 12 is a top view of the carton shown in FIG. 1 showing a viewing opening and a handle opening.

[0031] FIG. 13 is a front view of a plurality of cartons stacked on a cardboard pallet and held in position by four L-shaped corner posts and a top cap.

[0032] FIG. 14 is a perspective view of an L-shaped corner post.

[0033] FIG. 15 is a view of an easy to open flap that is recloseable over a reach in window.

[0034] FIG. 16 is a partial cross-sectional view taken along line 16-16 showing the easy to open flap.

[0035] FIG. 17 is a partial cross-sectional view showing an alternative embodiment of the flap covered by a recloseable label.

[0036] FIG. 18 is an end view of the carton depicting another embodiment containing a partially separable flap and showing a first portion before it is sealed by an adhesive to an oppositely aligned second portion, and the partially separable flap capable of being separated from the first portion and being rotated to an open position so that a consumer can reach into the carton and physically feel the roll product and then the partially separable flap can be securely closed by tucking its free end into a slit formed in the second portion.

[0037] FIG. 19 is an end view of the carton shown in FIG. 18 when the end wall is closed.

[0038] FIG. 20 is an end view of the carton shown in FIG. 19 when the partially separable flap is rotated to its open position revealing at least one of the roll products contained in the carton.

[0039] FIG. 21 is an end view of the carton shown in FIG. 20 when the partially separable flap is rotated back against the end wall and its free end is tucked into a slit formed in the second portion.

[0040] FIG. 22 is a flow diagram of a method of inserting an empty hollow core back into the carton.

DETAILED DESCRIPTION OF THE INVENTION

[0041] Referring to FIGS. 1-4, a blank 10 and 10' are shown each of which can be assembled into a carton 12, see FIGS. 3 and 4. The blanks 10 and 10' can be formed from any cellulosic material. One or more different cellulosic fibers can be used to construct the cellulosic material. The cellulosic material can be paper, paperboard, cardboard or the like which is constructed from a plurality of cellulosic fibers. Desirably, the blank 10 is formed from paperboard. The material forming the blank 10 can be easily recycled or composted.

[0042] In FIG. 2, the blank 10' has four bottom flaps that are designed to automatically intermesh as the blank 10' is assembled into a sleeve forming a closed end wall.

[0043] Each of the blanks 10 and 10' can be a generally rectangular or elongated member having a longitudinal central axis X-X and a transverse central axis Y-Y. The thickness of each of the blanks 10 and 10', measured perpendicular to the X-X and Y-Y axes, can vary. Each of the blanks 10 and 10' can consist of one or more layers secured together. When two or more layers are present, each layer can have a similar or a different thickness. Desirably, when two or more layers are present, they are secured together such as by an adhesive. Alternatively, the two or more layers can be secured together by using heat, pressure, heat and pressure or by other mecha-

nisms known to those skilled in the art. The one or more layers forming the blanks 10 or 10' can be flat or planar layers or at least one of the layers can be corrugated or have some other configuration that adds thickness to the blanks 10 or 10'. Each of the blanks 10 and 10' is relatively thin. Each of the blanks 10 and 10' can have a thickness of less than about 0.2 inches. Desirably, each of the blanks 10 and 10' has a thickness of less than about 0.1 inches. More desirably, each of the blanks 10 and 10' has a thickness of less than about 0.05 inches. Even more desirably, each of the blanks 10 and 10' has a thickness of less than about 0.03 inches.

[0044] Referring to FIGS. 1-4, once the blank 10 or 10' is formed to a predetermined shape, it can be easily configured, folded, constructed, assembled or transformed into the carton 12. The blank 10 or 10' can contain one or more fold lines, score lines, crease lines, adhesive lines, etc. to facilitate folding and bending various portions and/or sealing or interlocking various portions together. The various portions of the blank 10 or 10' can be folded, bent over, doubled up, joined, taped, interlocked and/or be sealed or bonded together to form the carton 12. Desirably, the blank 10 or 10' is configured such that it can be folded at several locations upon itself and be sealed or bonded at least one location to form the carton 12. Adhesive or glue is normally used to seal the carton 12.

[0045] The carton 12 formed from the blank 10 or 10' has a longitudinal central axis X-X, a transverse central axis Y-Y, and a vertical central axis Z-Z. The carton 12 can vary in size and shape. Desirably, the carton 12 is a rectangular cube having six sides with at least two of the sides having a rectangular face. Alternatively, the carton 12 can be a cube having six congruent square faces. Still another alternative is to form a carton having more than six faces, such as a hexagon shape, along with a top and a bottom.

[0046] Referring to FIGS. 4, 7 and 8, the carton 12 can be sized to house or retain a plurality of roll products 14. The roll products 14 are generally cylindrically shaped products formed from cellulosic fibers. The roll products 14 can be formed with eco-friendly features. For example, the roll products 14 can be made from recycled cellulose fibers. The roll products 14 can be made hypoallergenic. The roll products 14 can be made with no added dyes or fragrances and can even be whitened without using chlorine. Such roll products 14 can be rolls of paper tissue, rolls of toilet paper or rolls of some other kind of paper product. Desirably, the roll products 14 are rolls of toilet paper or toilet tissue. The size and shape of the roll products 14 can vary.

[0047] Referring to FIGS. 8 and 9, each of the roll products 14 has a longitudinal central axis X_1 - X_1 and a transverse central axis Y_1 - Y_1 . Each of the roll products 14 is an elongated rectangular sheet containing multiple weakened lines (not shown) where it can be easily and cleanly separated from the remaining sheet. The weakened lines can be in the form of score lines, perforation lines, tear lines, etc. The elongated sheet is radially wound onto a hollow core 16 to form a roll product 14, see FIG. 8. The roll product 14 has a height h and an outside diameter d. The height h and the diameter d can vary. For a typical roll of toilet paper 14, the height h can range from between about 3.5 inches to about 5 inches. Desirably, the height h can range from between about 3.75 inches to about 4.5 inches. More desirably, the height h can range from between about 4 inches to about 4.4 inches. Even more desirably, the height h can range from between about 3.8 inches to about 4.25 inches.

[0048] The roll product **14** is compressible by at least 10 percent measured perpendicular to its longitudinal central axis X_1-X_1 , see FIG. 8. Desirably, each roll product **14** is compressible by at least 15 percent measured perpendicular to its longitudinal central axis X_1-X_1 . More desirably, each roll product **14** is compressible by at least 20 percent measured perpendicular to its longitudinal central axis X_1-X_1 . Each of the roll products **14** may also exhibit a relatively high coefficient of friction. Normally, the carton **12** can house from between 2 to 120 similar roll products **14**. An even number or an odd number of roll products **14** can be housed or retained in the carton **12**. Desirably, an even number of similar roll products **14** are housed in the carton **12**. For rolls of toilet paper, the carton **12** can be sized to house or retain 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40 or more rolls of toilet paper.

[0049] It should be understood that one could house different types of roll products with a single carton **12**, if desired. Desirably, each carton **12** will retain a plurality of like kind of roll products **14**.

[0050] Referring to FIG. 9, the hollow core **16** is shown as an elongated cylindrical member having a round or circular cross-section. However, the hollow core **16** can have any geometrical cross-sectional shape. Desirably, the cross-section of each of the hollow cores **16** is circular. The hollow core **16** has a longitudinal central axis X_1-X_1 and a transverse central axis Y_1-Y_1 . As depicted, the hollow core **16** has an external or common diameter d_1 , a thickness t and a length l . All three dimensions can vary. For a typical roll of toilet paper, the hollow core **16** can have an external or common diameter d_1 that ranges from between about 1 to about 3 inches, desirably, from about 1.5 to about 2.5 inches, and more desirably, from between about 1.6 to about 2 inches. The hollow core **16** can have a thickness t that ranges from between about 0.01 to about 0.2 inches, desirably, from between about 0.02 to about 0.15 inches, and more desirably, from between about 0.05 to about 0.1 inches. The hollow core **16** can have a length l that ranges from between about 3 to about 6 inches, desirably from between about 3.5 to about 5 inches, and more desirably from between about 3.75 to about 4.25 inches.

[0051] Referring again to FIG. 1, the blank **10** will be described from left to right and from top to bottom. The blank **10** includes an adhesive tab **18**. The adhesive tab **18** can be a thin strip of adhesive or glue that will bond to an adjoining portion of the blank **10** once it is pressed and/or heated. The adhesive tab **18** can contain a continuous area of adhesive or glue or two or more intermittent areas of adhesive or glue. The blank **10** also includes a back panel **20** located adjacent to the adhesive tab **18**. The back panel **20** has a top **22** and a bottom **24**. The top and bottom, **22** and **24** respectively, are measured relative to the transverse central axis Y-Y. The blank **10** also has a first vertical fold line **26** positioned between the adhesive tab **18** and the back panel **20**. The first vertical fold line **26** extends parallel to the transverse central axis Y-Y. The first vertical fold line **26** can be a score, a crease, a groove, an indentation, a line of weakness, etc. that extends into a portion of the thickness of the blank **10**. Those skilled in the art are well aware of how to form the first vertical fold line **26** in the blank **10**.

[0052] The blank **10** further has a top panel **28** located adjacent to the back panel **20**. The top panel **28** has a top **30** and a bottom **32**. The blank **10** also has a second vertical fold line **34** positioned between the back panel **20** and the top

panel **28**. The second vertical fold line **34** extends parallel to the transverse central axis Y-Y. The second vertical fold line **34** can be a score, a crease, a groove, an indentation a line of weakness, etc. that extends into a portion of the thickness of the blank **10**. Those skilled in the art are well aware of how to form the second vertical fold line **34** in the blank **10**.

[0053] The blank **10** further has a front panel **36** located adjacent to the top panel **28**. The front panel **36** has a top **38** and a bottom **40**. The blank **10** also has a third vertical fold line **42** positioned between the top panel **28** and the front panel **36**. The third vertical fold line **42** extends parallel to the transverse central axis Y-Y. The third vertical fold line **42** can be a score, a crease, a groove, an indentation, a line of weakness, etc. that extends into a portion of the thickness of the blank **10**. Those skilled in the art are well aware of how to form the third vertical fold line **42** in the blank **10**.

[0054] The blank **10** further has a bottom panel **44** located adjacent to the front panel **36**. The bottom panel **44** has a top **46** and a bottom **48**. The blank **10** also has a fourth vertical fold line **50** positioned between the front panel **36** and the bottom panel **44**. The fourth vertical fold line **50** extends parallel to the transverse central axis Y-Y. The fourth vertical fold line **50** can be a score, a crease, a groove, an indentation, a line of weakness, etc. that extends into a portion of the thickness of the blank **10**. Those skilled in the art are well aware of how to form the fourth vertical fold line **50** in the blank **10**.

[0055] Still referring to FIG. 1, the blank **10** also has a back panel top flap **52** located adjacent to the top **22** of the back panel **20**, a back panel bottom flap **54** located adjacent to the bottom **24** of the back panel **20**, a top panel bottom flap **56** located adjacent to the top **30** of the top panel **28**, a top panel bottom flap **58** located adjacent to the bottom **32** of the top panel **28**, a front panel top flap **60** located adjacent to the top **40** of the front panel **38**, a front panel bottom flap **60** located adjacent to the bottom **42** of the front panel **38**, a bottom panel top flap **64** located adjacent to the top **46** of the bottom panel **44**, and a bottom panel bottom flap **66** located adjacent to the bottom **48** of the bottom panel **44**.

[0056] The back panel top flap **52** has a height h_1 and the front panel top flap **60** has a height h_3 . The height h_1 of the back panel top flap **52** is approximately equal to the height h_3 of the front panel top flap **60**. Desirably, the height h_1 of the back panel top flap **52** is equal to the height h_3 of the front panel top flap **60**. The top panel top flap **56** has a height h_2 and the bottom panel top flap **64** has a height h_4 . The height h_2 of the top panel top flap **56** is greater than the height h_4 of the bottom panel top flap **64**. The height h_2 of the top panel top flap **56** can be approximately equal to the height h_1 of the back panel top flap **52** and approximately equal to the height h_3 of the front panel top flap **60**. Furthermore, the height h_4 of the bottom panel top flap **64** is less than the height h_1 of each of the back panel top flap **52** and is also less than the height h_3 of the front panel top flap **60**. The exact dimension of the heights h_1 , h_2 , h_3 and h_4 will vary depending upon the size of the carton **12**.

[0057] The top panel top flap **56** can optionally contain a pair of spaced apart slits **57**, **57**. The pair of spaced apart slits **57**, **57** can be aligned parallel to one another or be aligned at an angle relative to one another. Desirably, the pair of slits **57**, **57** is aligned parallel to one another. The pair of spaced apart slits **57**, **57** defines a flap **59** therebetween. The flap **59** will be explained in more detail later.

[0058] The adhesive tab **18** has a width w . The width w of the adhesive tab **18** can range from between about 0.25 inches to about 1 inch. Each of the back panel **20**, the top panel **28**, the front panel **38** and the bottom panel **44** has a width, w_1 , w_2 , w_3 and w_4 respectively. These widths w_1 , w_2 , w_3 and w_4 can vary depending on the size of the carton **12**. The width w_1 of the back panel **20** is approximately equal to the width w_3 of the front panel **38**. Desirably, the width w_1 of the back panel **20** is equal to the width w_3 of the front panel **38**. The width w_2 of the top panel **28** is approximately equal to the width w_4 of the bottom panel **44**. Desirably, the width w_2 of the top panel **28** is equal to the width w_4 of the bottom panel **44**. In addition, the width w_1 of the back panel **20** is greater than the width w_2 of the top panel **28**, and the width w_3 of the front panel **38** is greater than the width w_4 of the bottom panel **44**.

[0059] The above height and width dimensions apply to a carton sized to house twelve rolls of toilet paper. The dimensions of the blanks **10** and **10'** can be changed to produce a carton **12** that can hold various amounts of roll products **14**.

[0060] Still referring to FIG. 1, the back panel bottom flap **54** and the front panel bottom flap **62** are identical in size and configuration. The top panel bottom flap **58** and the bottom panel bottom flap **66** are identical in size and configuration. In addition, each of the back panel bottom flap **54** and the front panel bottom flap **62** is larger in size than either of the top panel bottom flap **58** or the bottom panel bottom flap **66**.

[0061] The blank **10** also has a first horizontal fold line **68** disposed between the back panel **20** and the back panel top flap **52**, between the top panel **28** and the top panel top flap **56**, between the front panel **38** and the front panel top flap **60**, and between the bottom panel **44** and the bottom panel top flap **64**. The blank **10** further has a second horizontal fold line **70** disposed between the back panel **20** and the back panel bottom flap **54**, between the top panel **28** and the top panel bottom flap **58**, between the front panel **38** and the front panel bottom flap **62**, and between the bottom panel **44** and the bottom panel bottom flap **66**. The first horizontal fold line **68** is aligned essentially parallel to the second horizontal fold line **70** and both the first and second horizontal fold line, **68** and **70** respectively, are aligned parallel to the longitudinal central axis X-X. The first and second horizontal fold lines, **68** and **70** respectively, can optionally contain perforations, **72** and **74** respectively, which can facilitate folding and forming the blank **10** into the carton **12**.

[0062] Referring now to FIG. 2, a blank **10'** is depicted which is similar to the blank **10** except that it has a back panel bottom flap **54'**, a top panel bottom flap **58'**, a front panel bottom flap **62'** and a bottom panel bottom flap **66'** that have a slightly different configuration. The back panel bottom flap **54'** is identical to the front panel bottom flap **62'** and the top panel bottom flap **58'** is identical to the bottom panel bottom flap **66'**. The back panel bottom flap **54'** contains a perforation line **76** which angles and intersects with the second vertical fold line **34**. Likewise, the front panel bottom flap **62'** contains a perforation line **78** which angles and intersects with the fourth vertical fold line **50**. The top panel bottom flap **58'** contains a spot of an adhesive or glue **80** and the bottom panel bottom flap **66'** also contains a spot of an adhesive or glue **82**. The adhesive or glue **80** is designed to secure the top panel bottom flap **58'** to the inside surface of the smaller portion of the back panel bottom flap **54'**. Likewise, the adhesive or glue **82** is designed to secure the bottom panel bottom flap **66'** to the inside surface of the smaller portion of the front panel bottom flap **62'**. The blank **10'** is then folded at the four

vertical fold lines **26**, **34**, **42** and **50** and the adhesive tab **18** is secured to the bottom panel **44** to form a hollow sleeve, not shown.

[0063] The second horizontal fold line **70** still contains the perforations **74** to facilitate folding and forming the blank **10'** into the carton **12**. The four bottom flaps **54'**, **58'**, **62'** and **66'** are then folded inward into the sleeve and the two spots of adhesive **80** and **82** will bond the top panel bottom flap **58'** to the back panel bottom flap **54'** and the bottom panel bottom flap **66'** to the front panel bottom flap **62'** respectively. The sleeve is then flattened for storage and/or shipment. At the manufacturing plant, the flat sleeve can be again opened into a sleeve. This action will cause the four bottom flaps **54'**, **58'**, **62'** and **66'** to intermesh and form one end wall of the carton **12**. This is referred to as a "self-forming end" or an "auto forming end".

[0064] Referring again to FIGS. 1, 3 and 6, the blank **10** also includes a first tear panel **84** formed in both the back panel top flap **52** and the front panel top flap **60**. The first tear panel **84** has a central portion **86** and a pair of end portions **88** and **90** which extends partially into the back panel **20** and into the front panel **38**, respectively. The size and shape of the first tear panel **84** can vary. Desirably, the first tear panel **84** can be of any geometrical shape. As depicted in FIG. 1, the first tear panel **84** has a rectangular central portion **86** sandwiched between the two irregular shaped end portions, **88** and **90** respectively. However, almost any geometrical configuration can be utilized. The rectangular central portion **86** is aligned perpendicular to the longitudinal central axis X-X of the carton **12**. The two end portions **88** and **90** are positioned at opposite ends of the central portion **86**. The end portions **88** and **90** are arranged at 90 degrees to the central portion **86**.

[0065] The end portions **88** and **90** can be constructed so that each extends a sufficient distance into each of the back and front panels, **20** and **38** respectively. When the end portions **88** and **90** extend to a distance that a major portion of the hollow core **16** is visible, it enables a consumer to reach in and grasp the roll product with one or both hands. Alternatively, the consumer can place his or her index finger in the hollow core **16** and extract the roll product from the carton **12** by pulling outward on the hollow core **16**. Desirably, one or both of the end portions **88** and **90** should extend at least about 1.5 inches inward into the back and/or front panels, **20** and **38** respectively, for a roll product **14** having a diameter d of about 4 inches. More desirably, one or both of the end portions **88** and **90** should extend at least about 2 inches inward into the back and/or front panels, **20** and **38** respectively, for a roll product **14** having a diameter d of about 4 inches. Even more desirably, one or both of the end portions **88** and **90** should extend at least about 2.5 inches inward into the back and/or front panels, **20** and **38** respectively, for a roll product **14** having a diameter d of about 4 inches.

[0066] The actual shape of the end portions **88** and **90** can vary. In addition, the end portion **88** can be identical or different in configuration from the other end portion **90**. One will notice in FIG. 1 that the end portion **88** is different in size and shape from the other end portion **90**.

[0067] It should be understood that one or more finger holes **92** can be optionally formed in the first tear panel **84**. Each finger hole **92** can vary in size, shape and location. For example, in FIG. 1, two finger holes **92**, **92** are depicted being formed in the first tear panel **84** approximate the first horizontal fold line **68**.

[0068] Referring now to FIG. 3, the first tear panel 84 is circumscribed by a continuous perforation line 94. The perforation line 94 contains a plurality of cuts 96 each separated by a land area 98. The length of the cuts 96 and the size of the land areas 98 can vary in dimension and thickness. Likewise, the cuts 96 and the land areas 98 can vary in geometrical shape. Various portions of the perforation line 94 can be linear or non-linear. Some portions of the perforation line 94 can be arcuate or curved in configuration. The cuts 96 have a length which range from about 1 to 4 times the length of the land areas 98. However, the cuts 96 can have a smaller length, an equal length or a greater length than the land areas 98.

[0069] Referring again to FIGS. 3 and 4, by tearing or breaking the perforation line 94, the first tear panel 84 can be completely removed from the carton 12. When the first tear panel 84 is removed, a dispensing opening 100 is formed in the carton 12 which is of sufficient size and shape to permit the roll products 14, housed in the carton 12, to be dispensed one at a time. The lower or bottom row of roll products 14 is dispensed through the dispensing opening 100, see FIG. 4. The size and shape of the dispensing opening 100 prevents the roll products 14 situated in the adjacent upper row from being dispensed.

[0070] Referring to FIG. 7, one can see that the carton 12 contains three horizontal rows of the roll products 14. The three rows include a bottom row, a middle row and an upper row, with four of the roll products 14 positioned in each of the horizontal rows. Only the roll product 14 situated in the bottom row and adjacent to the dispensing opening 100 can be initially dispensed from the carton 12. The size and shape of the dispensing opening 100 prevents the roll product 14 located directly above the left most roll product 14 in the lower row from being withdrawn from the carton 12 without deforming it. During the removal of the first roll product 14 from the carton 12, the roll product 14 located immediately above it will move downward and occupy the empty space left by the withdrawn roll product 14. The left most roll product located in the upper row will also simultaneously move downward to the middle row. This means that there will be only three roll products 14 left in the upper row.

[0071] Still referring to FIG. 7, the size and shape of the dispensing opening 100 is designed to permit only one of the roll products 14 to be withdrawn from the carton 12 at a time. One can see that the dispensing opening 100 is quite larger. For a carton 12 containing twelve or more rolls of toilet paper 14, each having a diameter of about 4.25 inches, the dispensing opening 100 should have a height h_5 , measured parallel to the transverse central axis Y-Y, of at least about 6 inches. Desirably, the height h_5 of the dispensing opening 100 is at least about 6.5 inches. More desirably, the height h_5 of the dispensing opening 100 is at least about 7 inches. Even more desirably, the height h_5 of the dispensing opening 100 is at least about 7.5 inches. Most desirably, the height h_5 of the dispensing opening 100 is at least about 8 inches. Another way of expressing the height h_5 of the dispensing opening 100 is to say that the height h_5 is at least about 1.35 times the external or common diameter of the roll product 14. Desirably, the height h_5 of the dispensing opening 100 is at least about 1.45 times the external or common diameter of the roll product 14. More desirably, the height h_5 of the dispensing opening 100 is at least about 1.55 times the external or common diameter of the roll product 14. Even more desirably, the height h_5 of the dispensing opening 100 is at least about 1.65 times the external or common diameter of the roll product 14.

Most desirably, the height h_5 of the dispensing opening 100 is at least about 1.75 times the external or common diameter of the roll product 14.

[0072] Still referring to FIG. 7, the carton 12 contains a lip 102 which is situated between the bottom panel 44 and the lower edge of the first tear panel 84. The lip 102 has a height h_6 which can vary in dimension. Desirably, the height h_6 of the lip 102 can range from between about 0.1 inches to about 2 inches. More desirably, the height h_6 of the lip 102 can range from between about 0.2 inches to about 1 inch. Even more desirably, the height h_6 of the lip 102 can range from between about 0.25 inches to about 0.75 inches. The width of the lip 102 can extend between the back panel 20 and the front panel 38 or be less than this dimension.

[0073] Referring again to FIGS. 1 and 3, the blank 12 also includes a second tear panel 104 formed in the back panel 20 and aligned adjacent to the second horizontal fold line 70. The second tear panel 104 can have any configuration but desirably is circular. The second tear panel 104 has a central axis 106 aligned perpendicular to the back panel 20. The second tear panel 104 includes a perforation line 108 which circumscribes a defined area. The perforation line 108 can consist of two or more cuts separated by land areas as was explained above with reference to the first and second horizontal fold lines, 68 and 70 respectively. The perforation line 108 can be continuous and extend 360 degrees around the defined area. Alternatively, the perforation line 108 can be non-continuous but the perforation line 108 should still extend about 300 degrees around the defined area. If a non-continuous perforation line is utilized, when the land areas of the perforations are broken, the remaining attached portion can be folded into the carton 12 so that it does not obstruct the insertion of an empty hollow core 16.

[0074] Referring to FIG. 3, the second tear panel 104 is located about 4 inches below the top panel 28. Desirably, the second tear panel 104 is located below or within about 3 inches of the top panel 28. The second tear panel 104 is also positioned diagonally away from the dispensing opening 100. Depending upon the physical dimensions of the carton 12, the second tear panel 104 is positioned at least about 8 inches away from the dispensing opening 100. Desirably, the second tear panel 104 is positioned at least about 10 inches away from the dispensing opening 100. Furthermore, the central axis 106 of the second tear panel 104 is located at a distance b from the bottom panel 44. The top of the first tear panel 84 is located at a distance b_1 from the bottom panel 44. The distance b is greater than the distance b_1 . Desirably, the distance b is greater than the distance ID , by at least about 2 inches. More desirably, the distance b is greater than the distance ID , by at least about 3 inches.

[0075] Referring to FIGS. 4 and 7, when the second tear panel 104 is removed, an empty hollow core insertion opening 110 is formed into the carton 12. The insertion opening 110 can vary in size and have any desired geometrical shape. Desirably, the insertion opening 110 is circular in configuration and has a diameter d_2 which is equal to or larger than the external or common diameter d_1 of the empty hollow cores 16. More desirably, the diameter d_2 of the insertion opening 110 is at least about 0.1 inches larger than the external or common diameter d_1 of the empty hollow cores 16. Even more desirably, the diameter d_2 of the insertion opening 110 is at least about 0.25 inches larger than the external or common diameter d_1 of the empty hollow cores 16. Most desirably, the diameter d_2 of the insertion opening 110 ranges from between

about 0.1 inches to about 1 inch larger than the external or common diameter d_1 of the empty hollow cores 16.

[0076] The diameter d_2 of the insertion opening 110 can range from between about 1 inch to about 3 inches. Desirably, the diameter d_2 of the insertion opening 110 is at least about 1.5 inches. More desirably, the diameter d_2 of the insertion opening 110 is at least about 1.75 inches. Even more desirably, the diameter d_2 of the insertion opening 110 is at least about 2 inches.

[0077] Referring again to FIG. 1, a third tear panel 112 is formed in the front panel 38 and is aligned adjacent to the second horizontal fold line 70. The third tear panel 112 has a central axis 114 aligned perpendicular to the front panel 38. The central axis of the third tear panel 112 can be coaxially aligned with the central axis 106 of the second tear panel 104.

[0078] The third tear panel 112 can be identical in size and shape to the second tear panel 104. Alternatively, the third tear panel 112 can be different in size and/or shape to the second tear panel 104. Desirably, the second and third tear panels, 104 and 112 are identical in size and shape. The third tear panel 112 includes a perforation line 116 which circumscribes a defined area. The perforation line 116 can consist of two or more cuts separated by land areas as was explained above with reference to the perforation line 108. The perforation line 116 can be continuous and extend 360 degrees around the defined area. Alternatively, the perforation line 116 can be non-continuous but the perforation line 116 should still extend about 300 degrees around the defined area. If a non-continuous perforation line is utilized, when the land areas of the perforations are broken, the remaining attached portion can be folded into the carton 12 so that it does not obstruct the insertion of an empty hollow core 16.

[0079] Referring now to FIG. 6, when the third tear panel 112 is removed, another empty hollow core insertion opening 118 is formed into the carton 12 through which an empty hollow core 16 can be inserted. The insertion opening 118 can vary in size and have any desired geometrical shape. Desirably, the insertion opening 118 is circular in configuration and has a diameter d_3 which is equal to or larger than the external or common diameter d_1 of the empty hollow cores 16. More desirably, the diameter d_3 of the insertion opening 118 is at least about 0.1 inches larger than the external or common diameter d_1 of the empty hollow cores 16. Even more desirably, the diameter d_3 of the insertion opening 118 is at least about 0.25 inches larger than the external or common diameter d_1 of the empty hollow cores 16. Most desirably, the diameter d_3 of the insertion opening 118 ranges from between about 0.1 inches to about 1 inch larger than the external or common diameter d_1 of the empty hollow cores 16.

[0080] As mentioned above, the diameter d_2 of the insertion opening 108 is desirably equal to the diameter d_3 of the insertion opening 118. The diameter d_3 of the insertion opening 118 can range from between about 1 inch to about 3 inches. Desirably, the diameter d_3 of the insertion opening 118 is at least about 1.5 inches. More desirably, the diameter d_3 of the insertion opening 118 is at least about 1.75 inches. Even more desirably, the diameter d_3 of the insertion opening 118 is at least about 2 inches.

[0081] Referring again to FIGS. 1, 3 and 4, a fourth tear panel 120 is formed in the top panel 28. The fourth tear panel 120 has a central axis 122 aligned perpendicular to the top panel 28. The fourth tear panel 120 includes a perforation line 124 which circumscribes a defined area. The perforation line 124 can consist of two or more cuts separated by land areas as

was explained above with reference to the second tear panel 104. The perforation line 124 can be continuous and extend 360 degrees around the defined area. Alternatively, the perforation line 124 can be non-continuous but the perforation line 124 should still extend about 300 degrees around the defined area. If a non-continuous perforation line is utilized, when the land areas of the perforations are broken, the remaining attached portion can be folded into the carton 12.

[0082] Referring to FIGS. 1, 10 and 11, a finger aperture 126 can optionally be formed in the fourth tear panel 120. The finger aperture 126 can be formed by surrounding a small area of the fourth tear panel 120 with cuts or perforations each separated by a narrow land area. When a person presses down on the small area, the land areas break and the finger aperture 126 is formed into the carton 12. The finger opening 126 is sized to allow a person to insert his or her index finger therein and pull up thereby separating the fourth tear panel 120 from the top panel 28 of the carton 12.

[0083] Referring now to FIG. 12, when the fourth tear panel 120 is removed, a viewing opening or window 128 is formed into the carton 12 through which a consumer can view the roll products 14. The viewing opening or window 128 can vary in size and shape. As shown, the viewing opening or window 128 has a generally tear drop shape or other aesthetically pleasing shape. The viewing opening or window 128 is located adjacent to the top 30 of the top panel 28. Desirably, the viewing opening or window 128 is located from between about 1 inch to about 6 inches of the top 30 of the top panel 28. The viewing opening or window 128 can be aligned along the longitudinal central axis X-X, as shown in FIG. 12, or be offset therefrom. The viewing opening or window 128 can expose an area of at least about 1 square inch. Desirably, viewing opening or window 128 could expose an area of at least about 2 square inches. More desirably, the viewing opening or window 128 could expose an area of at least about 3 square inches.

[0084] Referring again to FIGS. 1, 3 and 4, a fifth tear panel 130 is formed in the top panel 28. The fifth tear panel 130 has a central axis 132 aligned perpendicular to the top panel 28. The central axes 122 and 132 of the fourth and fifth tear panels, 120 and 130 respectively, can be aligned along a common central axis, such as the longitudinal central axis X-X, see FIGS. 3 and 4. The fifth tear panel 130 includes a perforation line 134 and a non-perforated portion 136. The perforation line 134 and the non-perforated portion 136 cooperate to circumscribe a defined area. The perforation line 134 can consist of two or more cuts separated by land areas as was explained above with reference to the second tear panel 104. The land areas of the perforation line 134 can be easily broken while the non-perforated portion 136 remains attached to the top 28 of the carton 12. This creates a flap 138 that can pivot, fold or bend along the non-perforated portion 136.

[0085] Referring again to FIG. 12, when the flap 138 of the fifth tear panel 130 is pushed downward into the carton 12, a handle opening 140 is formed which allows a consumer to insert one, two three or four fingers of one hand and easily carry the carton 12. The handle opening 140 should have its maximum dimension aligned parallel to the longitudinal central axis Z-Z. By orienting the handle opening 140 in this fashion, the back or front panels, 20 or 38 respectively, can be positioned adjacent to a leg of the person who is carrying the carton 12. This will facilitate a comfortable way to carry the carton 12.

[0086] Referring again to FIGS. 3-7, the carton 12 is formed from the blank 10. The carton 12 is capable of housing a plurality of generally cylindrically shaped products 14 formed from cellulose fibers. Each of the products 14 is wound upon a hollow core 16 formed from cellulose fibers. Each hollow core 16 has a common diameter d_1 . The carton 12 includes a top panel 28 and a bottom panel 44 aligned opposite to the top panel 28. The carton 12 also has a pair of end walls 142 and 144 each being located between the top panel 28 and the bottom panel 44. The carton 12 further has a front panel 38 and a back panel 20 each being located between the top panel 28 and the bottom panel 44 and adjacent to each of the pair of end walls 142 and 144. A first tear panel 84 is formed in one of the pair of end walls 142 and 144. The first tear panel 84 has a pair of portions 88 and 90, one of which extends partially into the back panel 20 and the other which extends partially into the front panel 38. When the first tear panel 84 is removed, a dispensing opening 100 is formed into the carton 12. A second tear panel 104 is formed in the back panel 20. The second tear panel 104 has a diameter d_2 which is at least equal to the external or common diameter d_1 of each of the hollow cores 16. When the second tear panel 104 is removed, an empty hollow core insertion opening 110 is formed into the carton 12. The insertion opening 110 allows an empty hollow core 16 to be inserted back into the carton 12 once one of the products 14 has been removed from the carton 12.

[0087] Referring to FIG. 5, an end wall 144' is shown which is constructed from the four bottom flaps 54', 58', 62' and 66' depicted in FIG. 2. The end wall 144' is a self forming end wall that is created when the folded flat blank 10 is opened into a hollow sleeve.

[0088] Referring now to FIG. 13, a plurality of cartons 12 is stacked on a movable pallet 146. The number of cartons 12 stacked on the pallet 146 can vary. For example, 20 or more cartons 12 can form a shipping quantity 148. The actual number of cartons 12 making up the stack will vary depending upon the size of each carton 12. In FIG. 13, thirty cartons 12 are shown making up one row of cartons 12. The pallet 146 can be sized to accommodate three rows which means ninety cartons 12 can be assembled into the stack.

[0089] The shipping quantity 148 has a longitudinal central axis X_2 - X_2 and a transverse central axis Y_2 - Y_2 . The size, height, weight, etc. of the shipping quantity 148 can vary. The pallet 146 can be formed from a heavy grade of cardboard. The thickness of the cardboard forming the pallet 146 can range from between about 0.2 inches to about 0.8 inches. The pallet 146 can vary in shape and size. Desirably, the pallet 146 has a rectangular or square configuration. The pallet 146 has a height h_7 which can range from between about 4 inches to about 10 inches. Desirably, the pallet 146 has a height h_7 of less than about 8 inches. The pallet 146 can contain two or more fork lift channels 150, 150. Two channels 150, 150 are depicted in FIG. 13. The two channels 150, 150 are sized, configured and spaced apart so as to receive the protruding forks on a fork lift truck. The channels 150, 150 can be located in the bottom of the pallet 146 or near the bottom of the pallet 146.

[0090] Referring to FIGS. 13 and 14, the stack of cartons 12 is held vertically upright by four corner post 152, two of which are depicted in FIG. 13. Each of the four corner posts 152 is formed from paperboard or cardboard. Each of the corner posts 152 can vary in length. Typically, all four corner posts 152 have the same length. Each of the four corner posts

152 has a pair of sides 154 and 156 which are aligned at an angle theta (θ). The angle θ can range from between about 85 degrees to about 95 degrees to form an approximately L-shape. Desirably, the angle θ is approximately 90 degree. More desirably, the angle θ is 90 degree.

[0091] A top cap 158 having a downwardly extending peripheral lip 160 is placed on top of the stack of cartons 12. The top cap 158 is also formed from paperboard or cardboard. The top cap 158 cooperates with the four L-shaped corner posts 152 and the pallet 146 to provide support to the cartons 12. A thin flexible wrap, not shown, which can be formed from a starch material, a thermoplastic material, a plastic material, or any other material known to those in the packaging art, can be wrapped around the perimeter of the stack to form the integral shipping quantity 148.

[0092] One should recognize that the cardboard cartons 12, the empty hollow cores 16, the pallet 146, the four corner posts 152, the top cap 158 are all constructed from cellulose fibers and can be recycled or composed thereby alleviating disposal in a landfill. In addition, the thin flexible wrap can also be recycled if it is made from a starch based product.

[0093] Referring now to FIGS. 1, 15 and 16, one can see that the flap 59 is folded upward along the first horizontal fold line 68 and is folded, bent or overlapped upon itself. In other words, the flap 59 is rotated 180 degrees from its position in the blank 10, see FIG. 1. Furthermore, the flap 59 will be positioned approximately 270 degrees from the remaining two portions of the top panel top flap 56 when the carton 12 is fully assembled from the blank 10. The flap 59 is designed to pivot or rotate about the first horizontal fold line 68 so that it can be oriented at 90 degrees or more relative to the upper surface of the top panel 28. The flap 59 can be moved from a closed position, where it is horizontally aligned adjacent to the top panel 28, to an open position where it is aligned at an angle of 90 degrees or more relative to the top panel 28. In other words, the flap 59 can be pivoted so as to be aligned perpendicular to the top panel 28. In the closed position, the flap 59 lies essentially parallel to the top panel 28. In the open position, the flap 59 is rotated or pivoted to expose an opening 162. The opening 162 is formed in the top panel 28 and extends completely through the thickness of the top panel 28. When the flap 59 is in the open position, a viewing and reach-in window is created into the carton 12.

[0094] The flap 59 is sized and configured to completely cover the opening 162. The opening 162 can vary in size and configuration. Desirably, the opening 162 has a surface area of at least about one square inch. More desirably, the opening has a surface area of at least about 1.5 square inches. Most desirably, the opening 162 has a surface area of 2 or more square inches. The opening 162 can be located where the fourth tear panel 120 is located. Alternatively, the opening 162 can be located between the fourth tear panel 120 and the first horizontal fold line 68. Still alternatively, the opening 162 can be made to overlap a portion of the fourth tear panel 120. The opening 162 functions as an inspection window wherein a potential customer can pull and pivot the flap 59 upward and backward and visually look through the opening 162 to see the roll products 14 housed in the carton 12. In addition, the potential customer can insert one or more fingers and/or his or her thumb through the opening 162 so as to actually touch and feel the softness and/or texture of the roll product 14 located adjacent to the opening 162. Some customers like to be able to feel the softness of toilet paper they are contemplating purchasing to make sure the toilet paper is

of a softness which suits them. Since toilet paper is a product that will actually contact the human body, some customers require that it is be very soft so as not to be abrasive against their skin during use. Toilet paper is sold in different grades of softness.

[0095] Referring to FIG. 16, an adhesive 164 is present between the top panel 28 and the lower surface of the flap 59. By "adhesive" it is meant a sticky, gummed substance, such as paste, glue, cement, etc., that provides adhesion. The adhesive 164 can be a hot melt adhesive, a cold melt adhesive, a co-adhesive, etc. The composition of the adhesive 164 can vary. The adhesive 164 should have a peel strength that will allow the flap 59 to be easily separated from the top panel 28 and allow the flap 59 to be easily reapplied to the top panel 28 more than once. The adhesive 164 should be made such that the flap 59 can be released from the top panel 28 and be resealed against the top panel 28 multiple times. One skilled in the adhesive arts will be able to select an adhesive 164 which is capable of performing this function.

[0096] It should be understood that when the flap 59 is adhesively secured to the top panel 28, the opening 162 will be completely closed. With the flap 59 closes the opening 162, a person looking at the carton 12 will not view the carton 12 as being violated in any way. The carton 12 will be a closed carton 12 and completely enclose any roll products 14 contained therein.

[0097] Referring now to FIG. 17, an alternative embodiment is shown wherein a label 166 having a lower adhesive surface 168 covers at least a portion of the flap 59 and is secured to a portion of the top panel 28. Desirably, the label 166 completely covers the flap 59 and is secured to a portion of the top panel 28.

[0098] The lower adhesive surface 168 contains an adhesive that is releasable and resealable. The lower adhesive surface 168 can be separated from and be reattached to the top panel 28 and/or to the flap 59 multiple times. The label 166 functions to temporarily secure the flap 59 to the top panel 28. The label 166 can be released or separated from the top panel 28 so that the flap 59 can be pivoted upward and backward away from the opening 162. Alternatively, the label 166 can be released or separated from the flap 59 so that the flap 59 can be pivoted upward and backward away from the opening 162.

[0099] The label 166 can be constructed from various materials. For example, the label 166 can be constructed from cellulosic fibers, from a film material, from a thermoplastic, from plastic, from a composite material, from a combination of two or more materials, etc. Desirably, the label 166 is formed from a recyclable or compostable material. By "recyclable" it is meant to reprocess from waste for reuse, to use again, to reclaim for a new use or function. By "compostable" it is meant to convert to compost.

[0100] Referring now to FIGS. 18-21, another embodiment a carton 12' is depicted. The carton 12' has an end wall 144" containing a first portion 170, a second portion 172, a third portion 174 and a fourth portion 176. The third and fourth portions, 174 and 176 respectively, are first folded and then the second portion 172 is folded at least partially over them. Lastly, the first portion 170 is folded so as to partially overlap the second portion 172 and can be secured thereto by one or more spots of adhesive, not shown.

[0101] In FIG. 18, the first portion 170 is depicted in an open positioned before it is folded over and partially overlaps the second portion 172. One can see that the carton 12' contains three rows of roll products 14. The rows can be arranged

in a vertical fashion. The first portion 170 contains a partially separable flap 178. The flap 178 can be formed from the same material which forms the remainder of the first portion 170. Alternatively, the flap 178 can be formed from a different material. The flap 178 can be initially secured to the remainder of the first portion by a pair of perforation lines 180 and 182. Alternatively, the pair of perforation lines 180 and 182 can be lines of weakness, score lines, etc. as is known to those skilled in the art. The pair of perforation lines 180 and 182 is designed to be broken so that at least a portion of the flap 178 can be separated from the first portion 170. The pair of perforation lines 180 and 182 can be aligned parallel to one another or be aligned at an angle to one another. The pair of perforation lines 180 and 182 can extend toward, up to or into the back panel 20. Desirably, the pair of perforation lines 180 and 182 extends up to the back panel 20. Another way of expressing this is to say that the pair of perforation lines 180 and 182 extends across the width of the first portion 170. The size and shape of the flap 178 can vary to suit one's needs. Desirably, the flap 178 has a generally rectangular shape. The flap 178 has a free end 184 which can contain a pair of bevel edges 186 and 188. The bevel edges 186 and 188 visually differentiate the free end 184 of the flap 178 from the remainder of the first portion 170. This feature makes it easy for a consumer to readily locate the flap 178. Although, a pair of bevel edges 186 and 188 is shown, the free end 184 of the flap 178 can be cut and/or shaped into any desired geometrical pattern or shape. For example, the free end 184 of the flap 178 can be rounded, have an arcuate shape, contain notches, be sinusoidal, have a finger tab extending outward therefrom, etc. If a finger tab is utilized, it can have a width which is less than the width of the flap 178.

[0102] The flap 178 also has an opposite end 190, see FIGS. 19 and 21, which is connected to the back panel 20. The flap 178 can rotate or move around the opposite end 190. For example, the flap 178 can rotate, from its initial closed position, wherein it is aligned flush with the first portion 170, to an open position once the pair of perforation lines 180 and 182 is broken. The flap 178 can rotate through an angle up to about 270 degrees. Desirably, the flap 178 can rotate through an angle of from between about 30 degrees to about 180 degrees. More desirably, the flap 178 can rotate through an angle of from between about 45 degrees to about 90 degrees.

[0103] The carton 12' is packaged and shipped from the manufacturer to the retailer with the flap 178 being in the closed position as shown in FIG. 19. At the retailer, if a consumer desired to feel the softness or texture of the roll products 14 housed in the carton 12', he or she can pull the flap 178 outward, away from the end wall 144", thereby causing the pair of perforation lines 180 and 182 to break. This action separates the flap 178 from the remainder of the first portion 170 although the flap 178 is always connected at its opposite end 190. An opening 192 occurs as the flap 178 is rotated away from the first portion 170. The opening 192 should be of sufficient size and shape to allow a consumer to easily insert his or her thumb as well as an index finger therethrough. Alternatively, the opening 192 should be of sufficient size to allow a consumer to insert two or more fingers through the opening 192. The opening 192 allows the consumer to reach into the carton 12' and physically touch and feel at least one of the roll products 14. This will allow a consumer to satisfy themselves that the roll products 14 housed in the carton 12' are of sufficient softness, or texture, or possesses the quality that they are looking for. After the physical inspection has

taken place, the flap 178 can be rotated back to a closed position. A slit 194, see FIGS. 20 and 21, is formed in the second portion 172. The slit 194 can be aligned parallel to the longitudinal central axis X-X or be aligned at an angle thereto. The slit 194 is of sufficient length to allow the free end 184 of the flap 178 to be tucked or inserted therethrough. Alternatively, the slit 194 is of sufficient length to allow the finger tab to be inserted therein or to engage therewith. The free end 184 of the flap 178, or the finger tab when it is present, should be able to be inserted at least 0.1 inches inward through the slit 194. Desirably, the free end 184 of the flap 178, or the finger tab when it is present, should be able to be inserted at least 0.2 inches inward through the slit 194. More desirably, the free end 184 of the flap 178, or the finger tab when it is present, should be able to be inserted at least 0.3 inches inward through the slit 194. This will create a secure attachment of the flap 178 with the remaining first portion 170 of the end wall 144".

[0104] It should be noted that the consumer, a store employee or someone else can return the flap 178, or the finger tab when it is present, from its open position to the closed position where the free end 184 is tucked or inserted through the slit 194. When the flap 178, or the finger tab when it is present, is tucked into the slit 194, the carton 12' will appear to be similar to an unopened carton 12'.

Method

[0105] A method of recycling empty hollow cores 16 formed from cellulose fibers back into the original package carton 12 will now be explained with reference to FIG. 22. A plurality of roll products 14, each formed from cellulosic material and each being wound upon an empty hollow core 16, are housed or retained in the carton 12. The carton 12 is formed also from cellulose fibers. Desirably, the carton 12 is constructed from paperboard. The carton 12 can be recycled or composed by itself or in combination with one or more of the empty hollow cores 16 once the roll product 14 has been removed from the respective hollow core 16. Each of the hollow cores 16 has a paper product 14, such as toilet paper, wound upon it. The roll product 14 usually includes multiple sheets of cellulosic material each separated by a weakened line, such as a perforation line or score line, so that one or more of the sheets can be removed from the roll product 14 at a given time. When all of the sheets are removed, an empty hollow core 16 will remain.

[0106] The method includes the steps of inserting a plurality of the roll products 14 into the carton 12 and closing and sealing the open end of the carton 12. The carton 12 can then be shipped to a retailer or directly to a consumer. The carton 12 has a top panel 28 and a bottom panel 44 aligned opposite to the top panel 28. The carton 12 also has a pair of end walls 142 and 144 each being located between the top panel 28 and the bottom panel 44. The carton 12 further has a front panel 38 and a back panel 20, each being located between the top panel 28 and the bottom panel 44 and adjacent to each of the pair of end walls 142 and 144. The carton 12 also has a first tear panel 84 formed in one of the pair of end walls 142 and 144 and has an end portion 88 which extends partially into the back panel 20 and another end portion 90 which extends partially into the front panel 38. When the first tear panel 84 is removed, a dispensing opening 100 is formed into the carton 12. The dispensing opening 100 provides access to at least one of the products 14 housed within the carton 14. A roll product situ-

ated in the bottom row or adjacent to the bottom panel 44 can be withdrawn from the dispensing opening 100.

[0107] A second tear panel 104 is formed in either the back panel 20 or in the front panel 38. The second tear panel 104 has a diameter d_2 which is at least equal to the external or common diameter d_1 of each of the hollow cores. When the second tear panel 104 is removed, an empty hollow core insertion opening 110 is formed into the carton 12. The insertion opening 110 allows an empty hollow core 16 to be inserted back into the carton 12 once one of the products 14 has been removed from the carton 12. One of the products 14 has to be first removed from the carton 12 in order to form a void space before the empty hollow core 16 can be inserted back into the carton 12.

[0108] The method also includes removing the first tear panel 84 to obtain the dispensing opening 100 into the carton 12. The second tear panel 104 is also removed to obtain the insertion opening 110. One of the products 14 is then removed from the carton 12 and the product which is wound upon the hollow core 16 is used up to obtain an empty hollow core 16. The method further includes inserting the empty hollow core 16 back into the carton 12 through the insertion opening 110.

[0109] The method can also include recycling or composting the carton 12 after it has been filled with one or more empty hollow cores 16.

[0110] The method further includes forming the second tear panel 104 in the back panel 20 and forming a third tear panel 112 in the front panel 38. The third tear panel 112 has a diameter d_3 which is at least equal to the external or common diameter d_1 of each of the hollow cores 16. When the third tear panel 112 is removed, another empty hollow core insertion opening 118 is formed into the carton 12. The insertion opening 118 provides another opening so that an empty hollow core 16 can be inserted back into the carton 12 once one of the products 14 has been removed from the carton 12. With the presence of both of the empty hollow core insertion openings 110 and 118, one can insert an empty hollow core 16 back into the carton 12 from either the back or front panels, 20 and 38 respectively.

[0111] While the invention has been described in conjunction with several specific embodiments, it is to be understood that many alternatives, modifications and variations will be apparent to those skilled in the art in light of the foregoing description. Accordingly, this invention is intended to embrace all such alternatives, modifications and variations which fall within the spirit and scope of the appended claims.

We claim:

1. A blank for forming a carton having a dispensing opening and an empty hollow core insertion opening, comprising:
 - a) an adhesive tab;
 - b) a back panel located adjacent to said adhesive tab and having a top and a bottom;
 - c) a first vertical fold line positioned between said adhesive tab and said back panel;
 - d) a top panel located adjacent to said back panel and having a top and a bottom;
 - e) a second vertical fold line positioned between said back panel and said top panel;
 - f) a front panel located adjacent to said top panel and having a top and a bottom;
 - g) a third vertical fold line positioned between said top panel and said front panel;
 - h) a bottom panel located adjacent to said front panel and having a top and a bottom;

- i) a fourth vertical fold line positioned between said front panel and said bottom panel;
 - j) a back panel top flap located adjacent to said top of said back panel;
 - k) a back panel bottom flap located adjacent to said bottom of said back panel;
 - l) a top panel top flap located adjacent to said top of said top panel;
 - m) a top panel bottom flap located adjacent to said bottom of said top panel;
 - n) a front panel top flap located adjacent to said top of said front panel;
 - o) a front panel bottom flap located adjacent to said bottom of said front panel;
 - p) a bottom panel top flap located adjacent to said top of said bottom panel;
 - q) a bottom panel bottom flap located adjacent to said bottom of said bottom panel;
 - r) a first horizontal fold line disposed between said back panel and said back panel top flap, between said top panel and said top panel top flap, between said front panel and said front panel top flap, and between said bottom panel and said bottom panel top flap;
 - s) a second horizontal fold line disposed between said back panel and said back panel bottom flap, between said top panel and said top panel bottom flap, between said front panel and said front panel bottom flap, and between said bottom panel and said bottom panel bottom flap;
 - t) a first tear panel formed in both said back panel top flap and in said front panel top flap, said first tear panel having a pair of portions which extends partially into said back panel and partially into said front panel, said first tear panel intersecting said first horizontal fold line, and when said first tear panel is removed a dispensing opening is formed into said carton; and
 - u) a second tear panel formed in said back panel and aligned adjacent to said second horizontal fold line, said second tear panel having a central axis aligned perpendicular to said back panel, and when said second tear panel is removed an empty hollow core insertion opening is formed into said carton.
- 2.** The blank of claim 1 further comprising a third tear panel formed in said front panel and aligned adjacent to said second horizontal fold line, said third tear panel having a central axis aligned perpendicular to said front panel, and when said third tear panel is removed another insertion opening is formed into said carton through which an empty hollow core can be inserted.
- 3.** The blank of claim 2 wherein said central axes of said second and third tear panels are coaxially aligned.
- 4.** The blank of claim 1 wherein said empty hollow core has a diameter and said second tear panel has a circular configuration with a diameter at least equal to said diameter of said empty hollow core.
- 5.** The blank of claim 3 wherein said second tear panel has a diameter of at least 1.5 inches and said second tear panel is circumscribed by a perforation line.
- 6.** The blank of claim 1 wherein said blank is folded and assembled into a six sided enclosed carton capable of housing a plurality of roll products, and each of said roll products has a hollow core upon which multiple sheets of said roll product are wound.
- 7.** The blank of claim 6 further comprising a fourth tear panel formed in said top panel, said fourth tear panel having

a central axis aligned perpendicular to said top panel, and when said fourth tear panel is removed a viewing opening is formed into said carton through which a consumer can view the roll products housed in said carton.

8. The blank of claim 7 further comprising a fifth tear panel formed in said top panel, said fifth tear panel having a central axis aligned perpendicular to said top panel, and when said fifth tear panel is removed a handle opening is formed which allows a consumer to carry said carton.

9. The blank of claim 6 wherein said top panel top flap has a pair of spaced apart slits formed therein which create a pivotable flap.

10. A carton formed from cellulose fibers and having a dispensing opening and an empty hollow core insertion opening, said carton capable of housing a plurality of generally cylindrically shaped products formed from cellulose fibers, each of said products being wound upon a hollow core formed from cellulose fibers and having a common diameter, said carton comprising:

- a) a top panel;
- b) a bottom panel aligned opposite to said top panel;
- c) a pair of end walls each being located between said top panel and said bottom panel;
- d) a front panel and a back panel each being located between said top panel and said bottom panel and adjacent to each of said pair of end walls;
- e) a first tear panel formed in one of said pair of end walls and having a pair of portions which extend partially into said back panel and partially into said front panel, and when said first tear panel is removed a dispensing opening is formed into said carton; and
- f) a second tear panel formed in said back panel, said second tear panel having a diameter at least equal to said common diameter of each of said hollow cores, and when said second tear panel is removed an empty hollow core insertion opening is formed into said carton which allow an empty hollow core to be inserted back into said carton once one of said products has been removed from said carton.

11. The carton of claim 10 wherein said second tear panel has a diameter which is greater than said common diameter of each of said hollow cores.

12. The carton of claim 10 wherein said second tear panel has a circular configuration with a central axis which is located within about 3 inches of said top tear panel and diagonally away from said dispensing opening.

13. The carton of claim 12 wherein said second tear panel is located at a greater distance from said bottom panel than said dispensing opening when said carton is resting on said bottom panel.

14. The carton of claim 10 further comprising a third tear panel formed in said front panel, said third tear panel having a diameter which is equal to said diameter of said second tear panel.

15. The carton of claim 10 further comprising an inspection opening formed in said top panel which is sized to allow a person to insert at least one finger through said opening and touch an adjacent roll product housed in said carton, said opening being covered by a flap, and said flap being releasably secured to said top panel by an adhesive.

16. The carton of claim 10 further comprising a fourth tear panel formed in said top panel, and when said fourth tear

panel is removed a viewing opening is formed into said carton through which a consumer can view said products housed in said carton.

17. The carton of claim 10 further comprising a fifth tear panel formed in said top panel, and when said fifth tear panel is removed a handle opening is formed which allows a consumer to carry said carton.

18. The carton of claim 10 wherein one of said pair of end walls contains a rotatable flap having a free end that can be rotated to expose an opening into said carton through which a person can insert a thumb and index finger so as to physically touch at least one of said roll products housed in said carton, and said flap can be rotated back to a closed position wherein said free end is inserted into a slit to reclose said carton.

19. A method of inserting an empty hollow core having a common diameter back into a carton, each of said hollow cores having a product wound upon it, said method comprising the steps of:

- a) inserting a plurality of said products into said carton and sealing said carton, said carton having a top panel, a bottom panel aligned opposite to said top panel, a pair of end walls each being located between said top panel and said bottom panel, a front panel and a back panel each being located between said top panel and said bottom panel and adjacent to each of said pair of end walls, a first tear panel formed in one of said pair of end walls and having a pair of portions which extend partially into said back panel and partially into said front panel, and when said first tear panel is removed a dispensing opening is formed into said carton which provides access to at least one of said products housed within said carton, and a

second tear panel formed in one of said front and back panels, said second tear panel having a diameter at least equal to said common diameter of each of said hollow cores, and when said second tear panel is removed an empty hollow core insertion opening is formed into said carton which allow an empty hollow core to be inserted back into said carton once one of said products has been removed from said carton;

- b) removing said first tear panel to obtain a dispensing opening into said carton;
- c) removing said second tear panel to obtain an insertion opening;
- d) removing one of said products from said carton;
- e) removing said product wound upon said hollow core to obtain an empty hollow core; and
- f) inserting said empty hollow core back into said carton through said insertion opening.

20. The method of claim 19 wherein said carton and each of said hollow cores is formed from cellulose fibers, and said method further comprises recycling said carton containing one or more of said empty hollow cores.

21. The method of claim 19 further comprising forming said second tear panel in said back panel and forming a third tear panel in said front panel, said third tear panel having a diameter at least equal to said common diameter of each of said hollow cores, and when said third tear panel is removed, another empty hollow core insertion opening is formed into said carton which allows an empty hollow core to be inserted back into said carton once one of said products has been removed from said carton.

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