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Smalley

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(54) **CARTON WITH HANDLE**

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B65D 5/46 (2006.01)
B31B 1/86 (2006.01)

(52) **U.S. Cl.** **229/117.14**; 493/88

(58) **Field of Classification Search** 229/117.14; 493/88; 206/163, 428

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

1,253,193	A	1/1918	Hill
2,383,183	A	8/1945	Fischer
2,594,376	A	4/1952	Arneson
2,702,144	A	2/1955	Forrer
2,718,301	A	9/1955	Palmer
2,785,847	A	3/1957	Forrer
2,797,856	A	7/1957	Jaeschke
2,810,506	A	10/1957	Kessler
2,868,433	A	1/1959	Anderson, Jr.
2,955,739	A	10/1960	Collura
3,112,856	A	12/1963	MacIntosh et al.
3,127,720	A	4/1964	Gentry et al.
3,204,815	A	9/1965	Weiss
3,309,005	A	3/1967	Pilger
3,334,767	A	8/1967	Cornelius et al.
3,355,012	A	11/1967	Weiss
3,381,881	A	5/1968	Granz et al.

(Continued)

FOREIGN PATENT DOCUMENTS

CA 877792 8/1971

(Continued)

OTHER PUBLICATIONS

International Search Report for PCT application No. PCT/US2010/025178, mailed Sep. 2, 2010.

(Continued)

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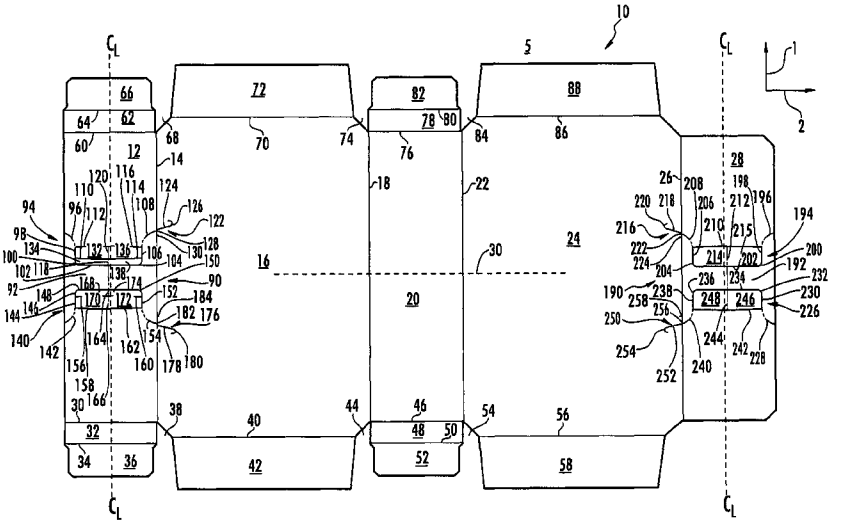
(57) **ABSTRACT**

A carton for containing a plurality of articles. The carton comprises a first top panel, a second top panel, a bottom panel, a first side panel, and a second side panel. A handle comprises a first handle and a second handle. The first handle comprises a first opening feature and a second opening feature. The first and second opening features of the first handle comprise a plurality of tear lines and at least one of the tear lines extends into the first side panel. The second handle comprises a first opening feature and a second opening feature. The first and second opening features of the second handle comprise a plurality of tear lines and at least one of the tear lines extends into the second side panel.

24 Claims, 8 Drawing Sheets



U.S. PATENT DOCUMENTS

3,554,402	A		1/1971	Lock
3,828,926	A		8/1974	Rossi
3,886,901	A		6/1975	Zeitler
3,904,036	A		9/1975	Forrer
3,933,303	A		1/1976	Kirby, Jr.
3,994,432	A		11/1976	Kirby, Jr.
4,029,204	A		6/1977	Manizza
4,036,423	A		7/1977	Gordon
4,096,985	A		6/1978	Wood
4,111,306	A		9/1978	Roccaforte
4,216,861	A		8/1980	Oliff
4,318,474	A		3/1982	Hasagawa
4,327,829	A		5/1982	Hughes
4,328,923	A		5/1982	Graser
4,329,923	A		5/1982	Iida
4,331,289	A		5/1982	Killy
4,364,509	A		12/1982	Holley et al.
4,375,258	A		3/1983	Crayne et al.
4,378,905	A		4/1983	Roccaforte
4,382,505	A		5/1983	Sutherland et al.
4,405,078	A	*	9/1983	Dutcher et al. 229/117.13
4,424,901	A		1/1984	Lanier
4,440,340	A		4/1984	Bakx
4,478,334	A		10/1984	Graser
4,498,619	A		2/1985	Roccaforte
4,508,258	A		4/1985	Graser
4,538,759	A		9/1985	Dutcher
4,545,485	A		10/1985	Oliff
4,546,914	A		10/1985	Roccaforte
4,558,816	A		12/1985	Wood
4,577,799	A	*	3/1986	Oliff 229/198.2
4,582,199	A	*	4/1986	Schuster 206/428
4,588,084	A		5/1986	Holley, Jr.
4,653,686	A		3/1987	Wood et al.
4,681,252	A		7/1987	Doerr et al.
4,684,059	A		8/1987	Rusnock
4,706,876	A		11/1987	Wilson
4,728,025	A		3/1988	Oliff
4,728,026	A		3/1988	Schuster
4,747,487	A		5/1988	Wood
4,784,266	A		11/1988	Chaussadas
4,784,316	A		11/1988	Crouch
4,785,991	A		11/1988	Schuster
4,802,583	A		2/1989	Calvert et al.
4,811,894	A		3/1989	Schuster
4,830,267	A		5/1989	Wilson
4,838,479	A		6/1989	Wood
4,875,586	A		10/1989	Chaussadas
RE33,110	E		11/1989	Wood et al.
4,958,734	A		9/1990	Wood et al.
4,966,324	A		10/1990	Steel
4,972,991	A		11/1990	Schuster
4,974,771	A		12/1990	Lavery
4,981,253	A		1/1991	Quaintance
5,000,313	A		3/1991	Oliff
5,002,186	A		3/1991	Cooper
5,020,337	A		6/1991	Krieg
5,060,792	A		10/1991	Oliff
5,072,876	A		12/1991	Wilson
5,094,359	A		3/1992	DeMars et al.
5,106,014	A		4/1992	Miller
5,108,030	A		4/1992	Schuster et al.
5,119,985	A		6/1992	Dawson et al.
5,197,598	A		3/1993	Stout et al.
5,221,041	A		6/1993	Stout et al.
5,222,658	A		6/1993	DeMaio et al.
5,234,102	A		8/1993	Schuster et al.
5,246,112	A		9/1993	Stout et al.
5,284,294	A		2/1994	Floyd
5,292,058	A		3/1994	Zoss et al.
5,292,059	A		3/1994	Oliff
5,297,725	A		3/1994	Sutherland
5,303,863	A		4/1994	Arasim
5,307,932	A		5/1994	Stout et al.
5,307,986	A		5/1994	Schuster
5,320,277	A		6/1994	Stout et al.
5,333,734	A		8/1994	Stout et al.
D350,480	S		9/1994	Sutherland
5,379,944	A		1/1995	Stout et al.
5,381,891	A		1/1995	Harris
5,385,234	A		1/1995	Stout et al.
5,395,044	A		3/1995	Stout
5,427,241	A		6/1995	Sutherland
5,458,234	A		10/1995	Harris
5,480,091	A		1/1996	Stout
5,482,203	A		1/1996	Stout
5,485,915	A		1/1996	Harris
5,495,727	A		3/1996	Strong et al.
5,524,756	A		6/1996	Sutherland
5,551,556	A		9/1996	Sutherland
5,582,343	A		12/1996	Dalvey
5,639,017	A		6/1997	Fogle
5,647,483	A		7/1997	Harris
5,669,500	A		9/1997	Sutherland
5,699,957	A		12/1997	Bin et al.
5,704,470	A		1/1998	Sutherland
5,738,273	A		4/1998	Auclair
5,794,778	A		8/1998	Harris
5,796,778	A		8/1998	Harris
5,826,782	A		10/1998	Stout
5,826,783	A		10/1998	Stout
5,873,515	A		2/1999	Dunn et al.
5,878,946	A		3/1999	Frerot et al.
5,906,313	A		5/1999	Oliff
5,915,546	A		6/1999	Harrelson
5,992,733	A		11/1999	Gomes
5,996,883	A		12/1999	Bates
6,019,276	A		2/2000	Auclair
6,021,899	A		2/2000	Sutherland
6,065,590	A		5/2000	Spivey
6,105,853	A		8/2000	Lamare
6,105,854	A		8/2000	Spivey et al.
6,109,438	A		8/2000	Sutherland
6,126,066	A		10/2000	Peterson et al.
6,129,266	A		10/2000	Oliff et al.
6,131,803	A		10/2000	Oliff et al.
6,164,526	A		12/2000	Dalvey
6,170,741	B1		1/2001	Skolik et al.
6,227,367	B1		5/2001	Harrelson et al.
6,237,839	B1		5/2001	Brown
6,250,542	B1		6/2001	Negelen
6,260,755	B1		7/2001	Bates et al.
6,273,330	B1		8/2001	Oliff et al.
6,302,320	B1		10/2001	Stout
6,425,520	B1		7/2002	Peterson
6,484,903	B2	*	11/2002	Spivey et al. 221/303
6,523,739	B2		2/2003	Heeley et al.
6,536,656	B2		3/2003	Auclair et al.
6,631,803	B2		10/2003	Rhodes et al.
6,758,337	B2		7/2004	Chargueraud et al.
6,766,940	B2		7/2004	Negelen
6,848,573	B2		2/2005	Gould et al.
6,905,066	B2		6/2005	Holley et al.
6,926,193	B2		8/2005	Smalley
6,942,140	B2		9/2005	Merzeau
6,968,992	B2		11/2005	Schuster
7,007,836	B2	*	3/2006	Smalley 229/117.13
7,273,161	B2		9/2007	Fogle et al.
7,427,010	B2		9/2008	Sutherland
7,472,791	B2		1/2009	Spivey, Sr.
7,743,968	B2		6/2010	Theelen
7,748,603	B2		7/2010	Fogle et al.
7,757,933	B2		7/2010	Dunn
7,793,779	B2		9/2010	Spivey, Sr. et al.
7,806,314	B2		10/2010	Sutherland
2003/0213263	A1		11/2003	Woog
2004/0074854	A1		4/2004	Fogle et al.
2005/0056658	A1		3/2005	Spivey
2005/0167478	A1		8/2005	Holley, Jr.
2006/0169755	A1		8/2006	Spivey, Sr.
2006/0273143	A1		12/2006	Finch
2007/0017962	A1		1/2007	Russ
2007/0029371	A1	*	2/2007	Theelen 229/117.13
2007/0039846	A1		2/2007	Spivey
2007/0051781	A1		3/2007	Holley, Jr.
2007/0108261	A1		5/2007	Schuster
2007/0164091	A1		7/2007	Fogle et al.

2007/0181658	A1	8/2007	Sutherland
2007/0205255	A1	9/2007	Dunn
2007/0295789	A1	12/2007	Ho Fung
2008/0067223	A1	3/2008	Jego
2008/0073420	A1	3/2008	Walling et al.
2009/0236408	A1	9/2009	Spivey, Sr. et al.
2010/0213249	A1	8/2010	Requena et al.

FOREIGN PATENT DOCUMENTS

CA	2 160 145		9/1995
DE	85 14 718.4		6/1985
DE	296 07 374	U1	4/1996
DE	201 12 228	U1	11/2002
DE	2004 018 649		4/2005
EP	0473 266		3/1992
EP	1 612 157		1/2006
WO	WO 96/27538		9/1996
WO	WO 99/28207		6/1999
WO	WO 00/78618	A1	12/2000
WO	WO 01/66434	A1	9/2001
WO	WO 03/037742	A2	5/2003
WO	WO/2005/080218		9/2005
WO	WO 2005/123532		12/2005
WO	WO/2007/089282		8/2007
WO	WO 2009/117562	A1	9/2009

OTHER PUBLICATIONS

Written Opinion for PCT application No. PCT/US US2010/025178, mailed Sep. 2, 2010.
PCT/US2009/037642—International Search Report and Written Opinion, mailed May 29, 2009.
PCT/US2010/025177, ISR mailed Sep. 2, 2010.
PCTUS2010/025177, WO mailed Sep. 2, 2010.
International Search Report and Written Opinion for PCT/US2011/030461 dated Dec. 26, 2011.

* cited by examiner

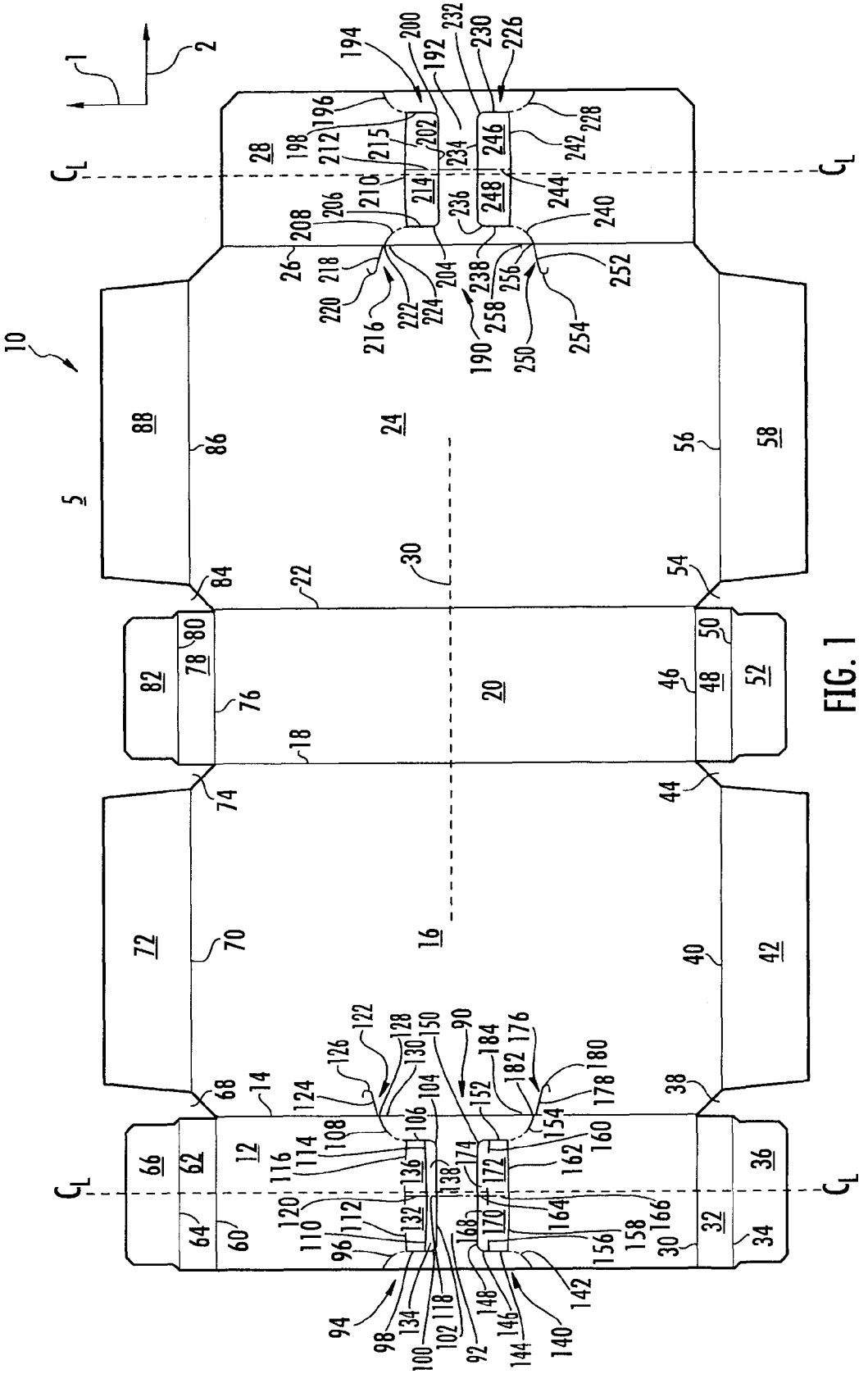

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FIG. 1

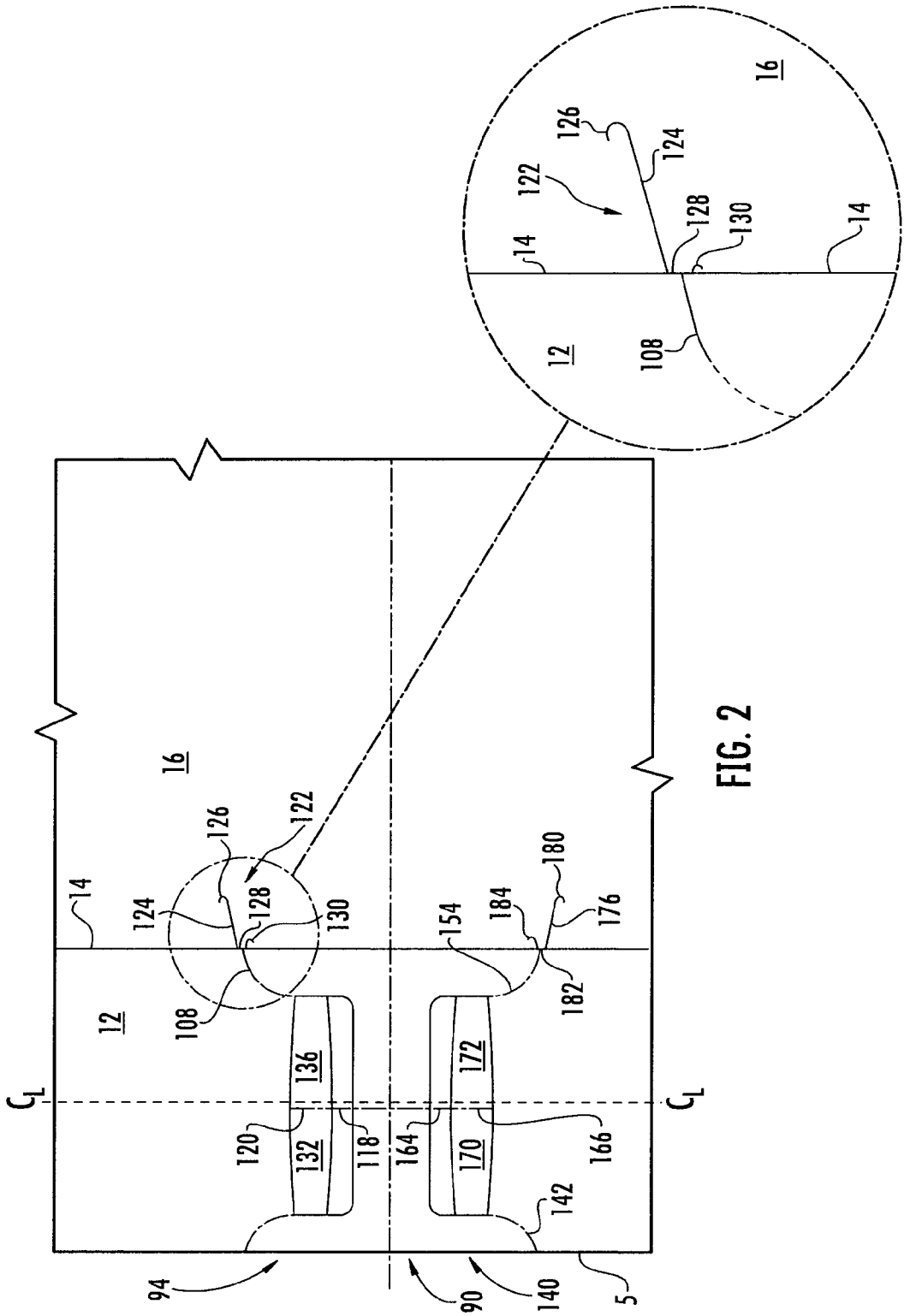
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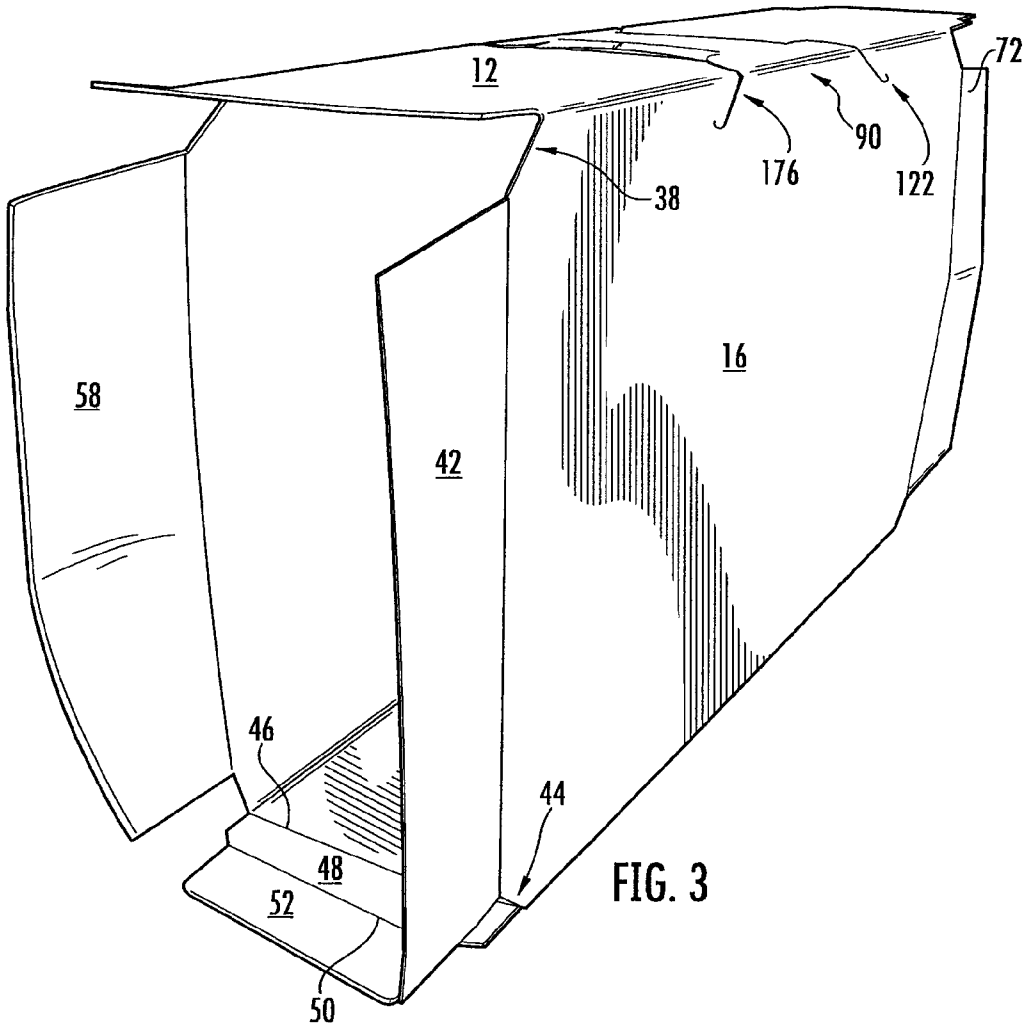
FIG. 2



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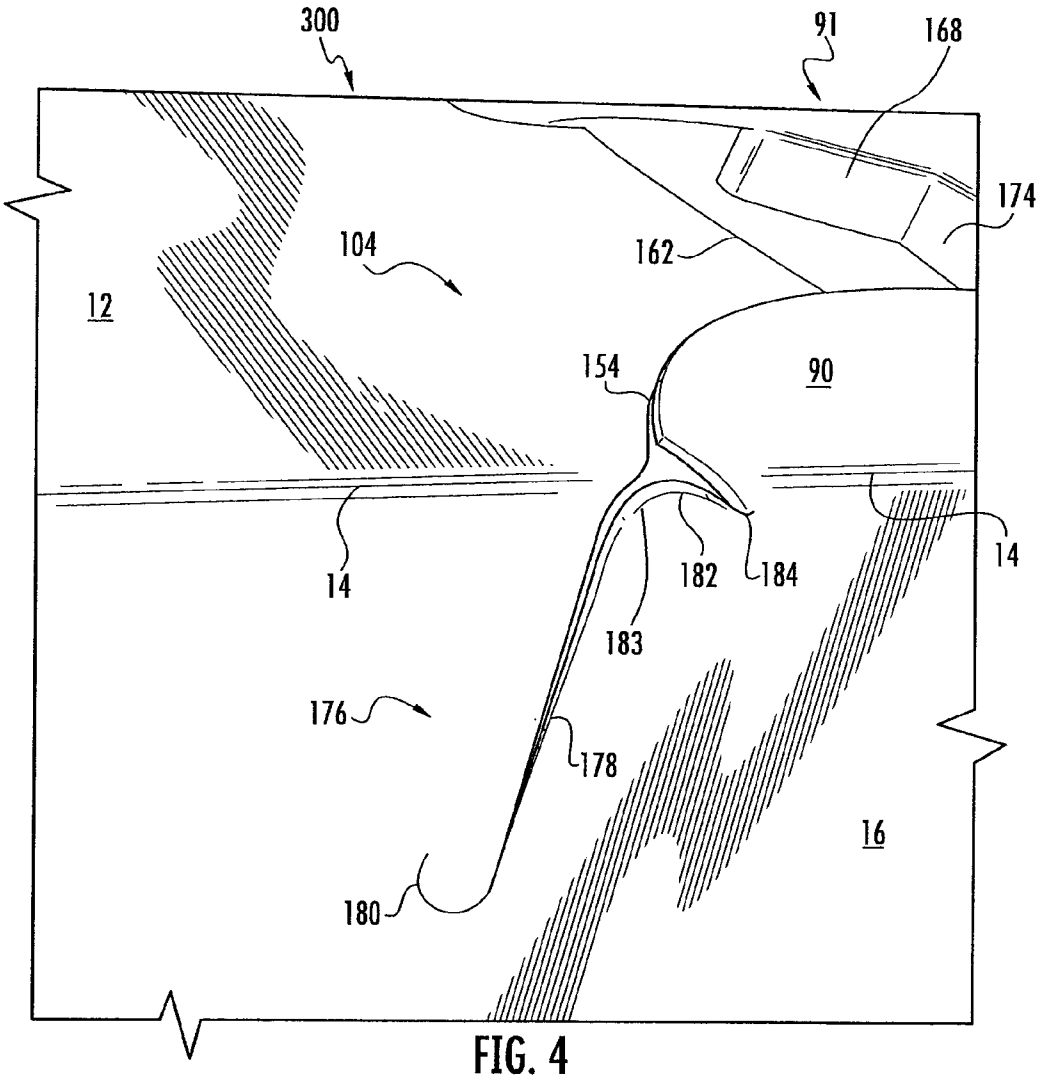

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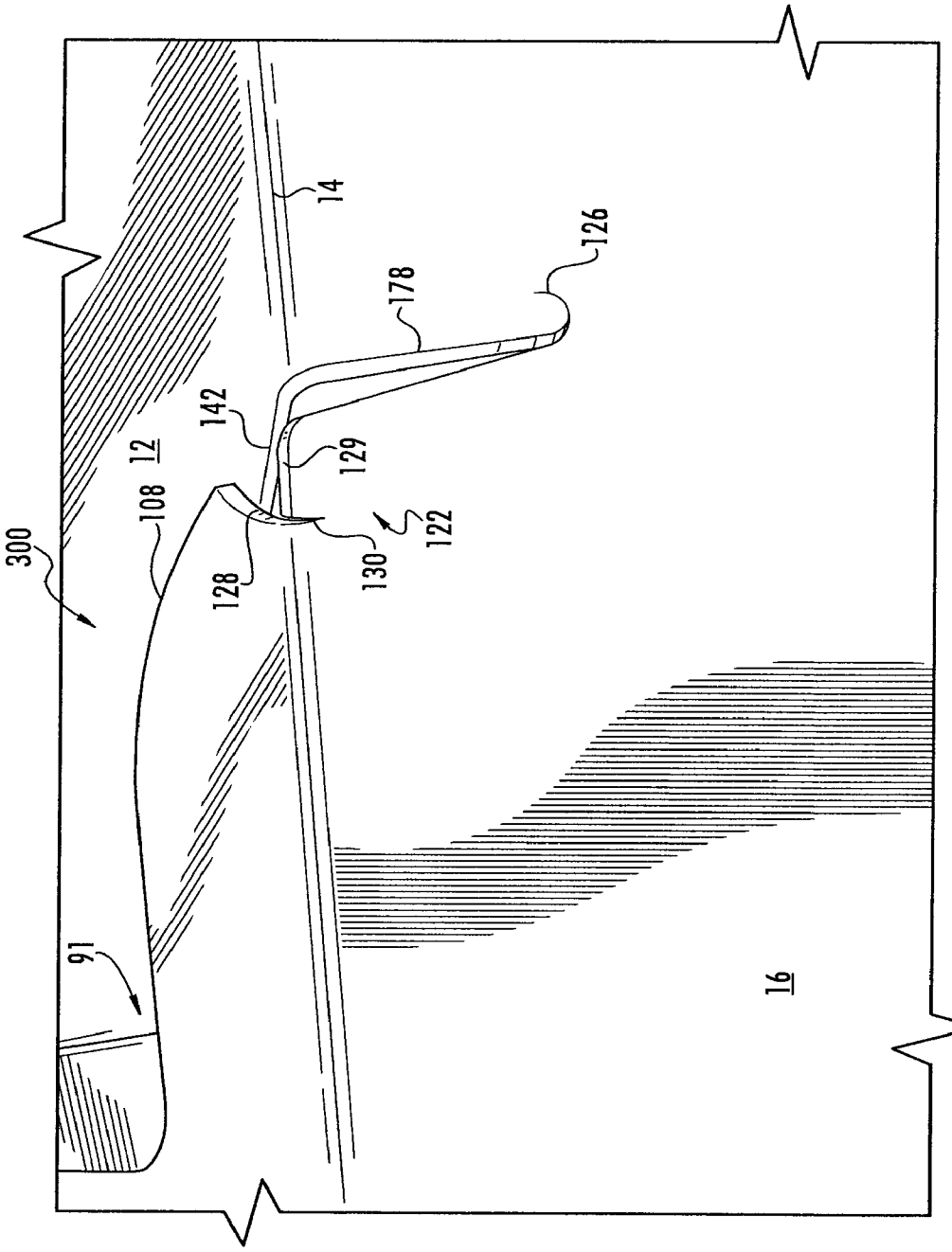

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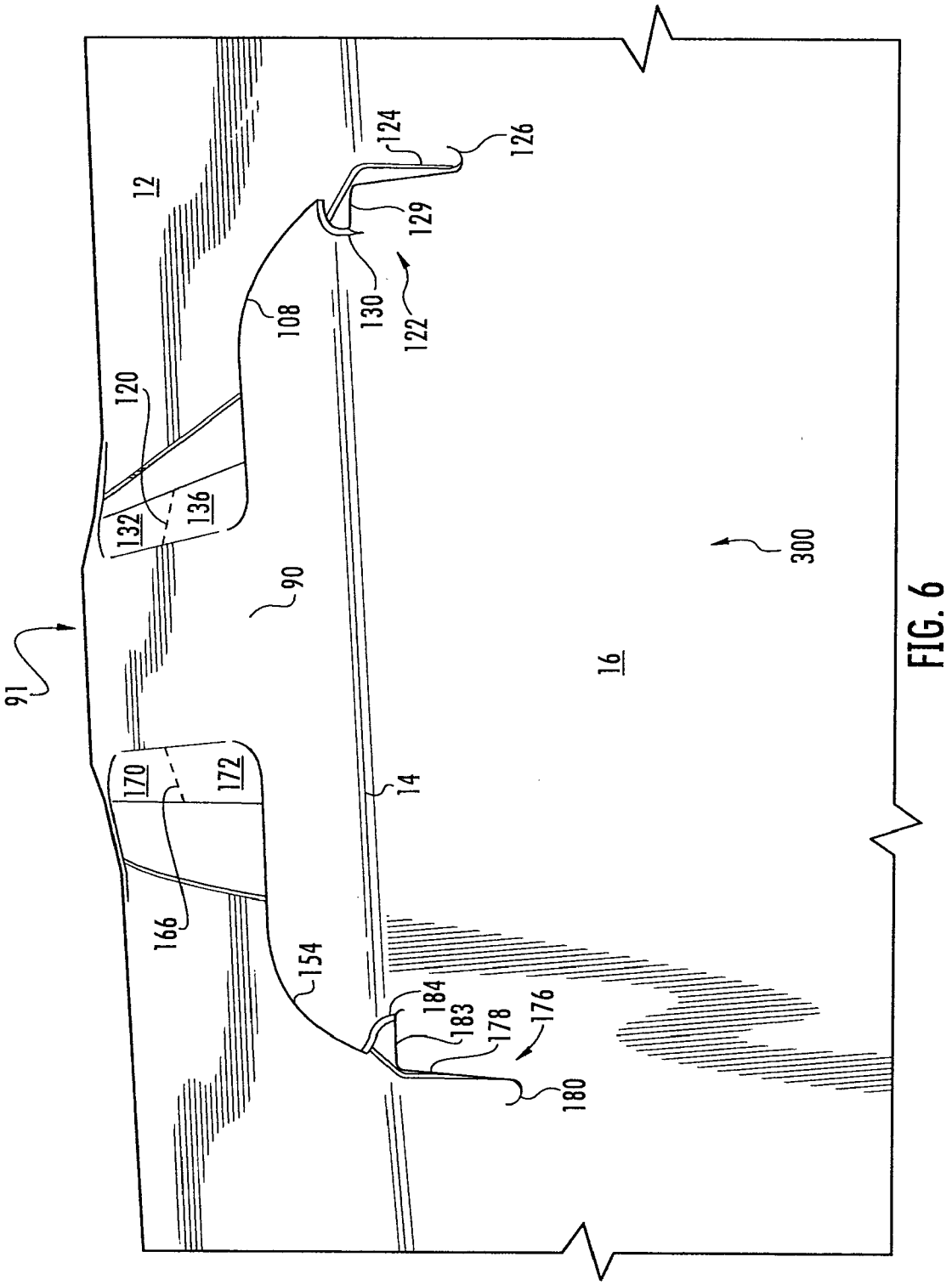
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FIG. 6

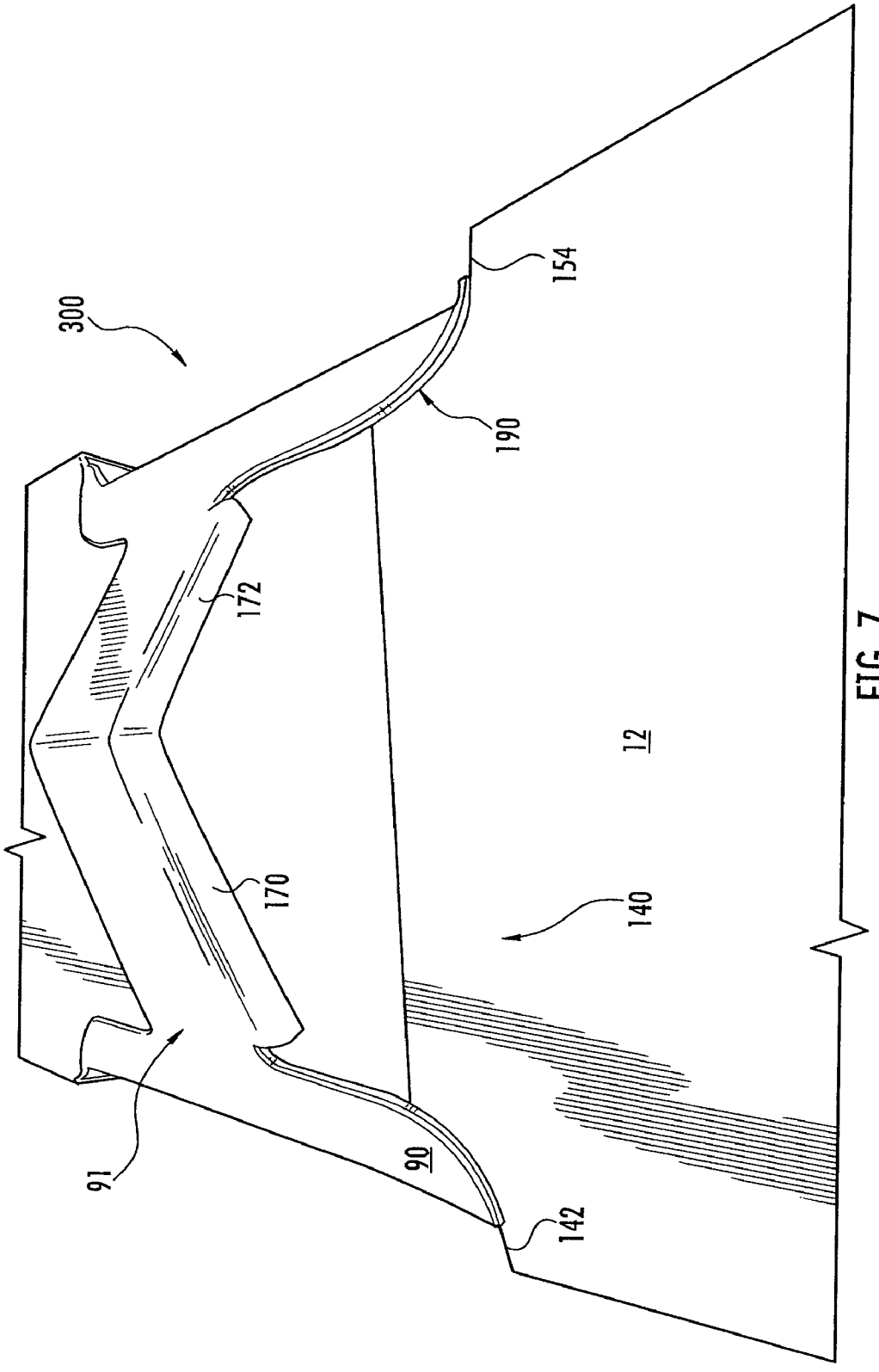

FIG. 7

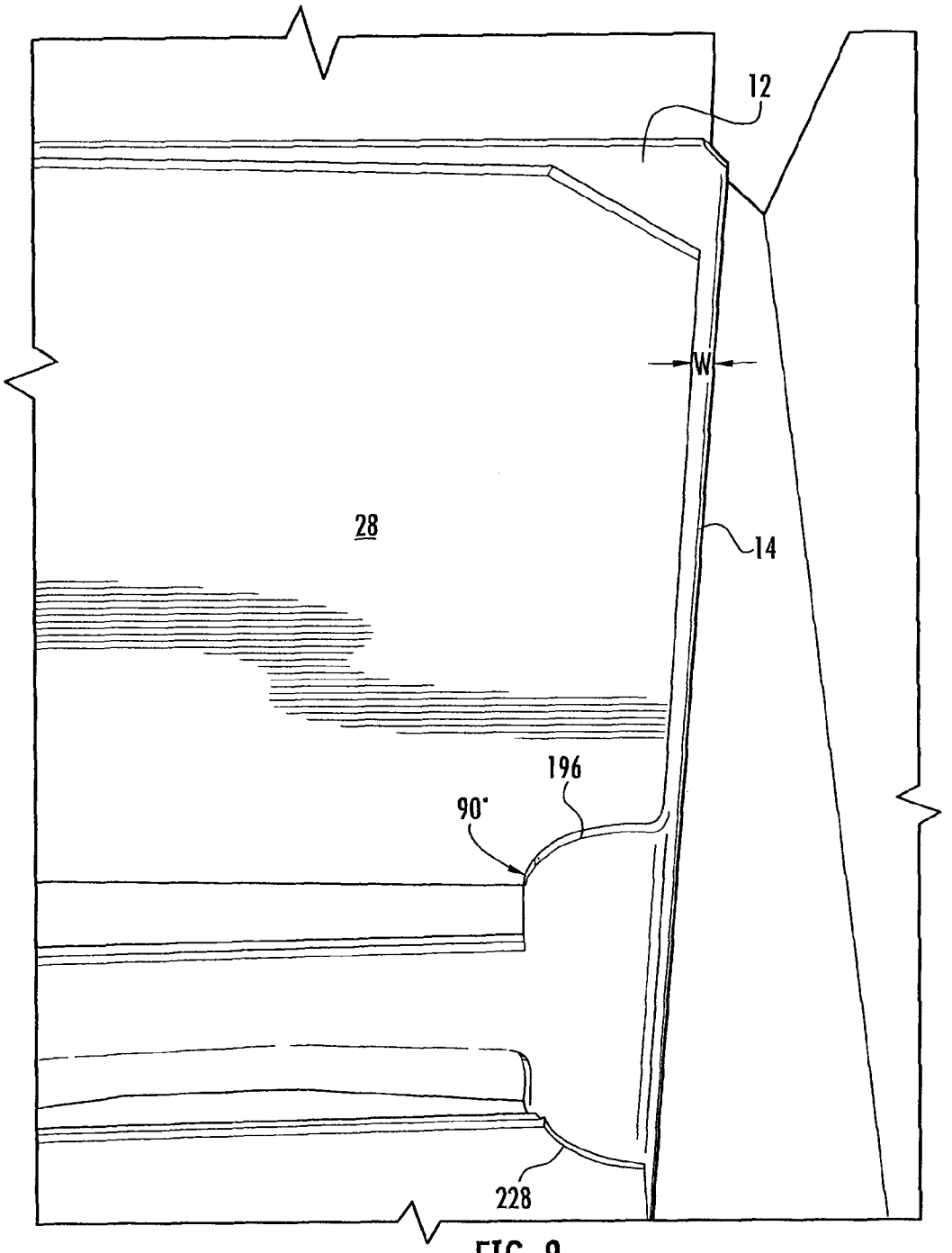

FIG. 8

CARTON WITH HANDLE

CROSS REFERENCE TO RELATED APPLICATION

This application claims the benefit of the filing date of U.S. Provisional Application No. 61/274,435, filed Aug. 17, 2009 is hereby claimed.

INCORPORATION BY REFERENCE

U.S. Provisional Patent Application No. 61/274,435, which was filed on Aug. 17, 2009, is hereby incorporated by reference for all purposes as if presented herein in its entirety.

BACKGROUND OF THE DISCLOSURE

The present disclosure generally relates to paperboard cartons for holding and carrying containers such as beverage cans. More specifically, the disclosure relates to a carton having a handle by which the carton and its contents can be carried.

SUMMARY OF THE DISCLOSURE

In one aspect, a carton for containing a plurality of articles comprises a plurality of panels that extend at least partially around and define an interior of the carton. A handle is formed by a first handle portion and a second handle portion in the top panel. The handle has features that extend into the side panels. When the handle is grasped and pulled up, these features break and displace to allow the handle to project upwardly from the carton for carrying. Further, an interlocking function of these features holds the handle in its upwardly projecting easily graspable configuration.

In another aspect, a carton comprises a plurality of panels that extends at least partially around an interior of the carton. The plurality of panels comprises a first top panel, a second top panel, a bottom panel, a first side panel, and a second side panel. The first top panel and the second top panel are at least partially overlapped to form a double ply top wall of the carton. A handle is formed by a first handle portion in the first top panel and a second handle in the second top panel registered with the first handle portion. The first handle portion comprises a first opening feature and a second opening feature. The first and second opening features of the first handle portion comprise a plurality of tear lines and at least one of the tear lines extends into the first side panel. The second handle portion comprises a first opening feature and a second opening feature. The first and second opening features of the second handle comprise a plurality of tear lines and at least one of the tear lines extends into the second side panel. Again, when the handle is accessed and pulled upwardly for carrying the carton, the tear lines break, displace, and interlock with the top of the carton to hold the handle in its deployed configuration for easy further grasping. In the process, stress caused by the weight of the carton and its contents is transferred to the sides of the carton, making the handle stronger and less prone to breaking.

In another aspect, a blank for forming the cartons of this disclosure comprises a plurality of panels including a first top panel, a second top panel, a bottom panel, a first side panel, and a second side panel. Handle features are formed in the first top panel and the second top panel and extend partially into the first side panel and the second side panel. The handle features cooperate to define a handle in a carton erected from the blank. A first handle portion is arranged in the first top panel and comprises a first opening feature and a second opening feature. The first and second opening features each comprise a first arcuate tear line at a first end of the opening feature, a second arcuate tear line at a second end of the opening feature with the second arcuate tear line terminating at a fold line between the first top panel and the adjacent side panel. A tear line extends from the fold line cut into the first side panel and has a hook shaped portion in the side panel. The second handle portion in the second top panel has a first opening feature and a second opening features and the first and second opening features each comprise a first arcuate tear line at a first end of the opening feature. A second arcuate tear line at a second end of the opening feature terminates at the fold line connecting the second top panel and the second side panel. A fold line cut proximate the second arcuate tear line extends along the fold line and a tear line extends from the fold line cut into the second side panel and has a hook shaped portion.

In another aspect, a method comprises providing a blank having a plurality of panels. The plurality of panels include a first top panel, a second top panel, a bottom panel, a first side panel, a second side panel, a first handle portion in the first top panel, and a second handle portion in the second top panel. The first handle portion comprises a first and second opening feature in the first top panel and extending into a first side panel. The second handle portion comprises a first and second opening feature in the second top panel and extending into a second side panel. The method comprises forming a top wall of the carton by at least partially overlapping the first top panel and the second top panel and aligning or registering a plurality of center tear lines of the first handle portion with a plurality of center tear lines of the second handle portion to form a double ply handle.

Those skilled in the art will appreciate the above stated features and benefits of the carton of this disclosure by reading the following detailed description of the embodiments with reference to the accompanying drawing figures. It is within the scope of the present disclosure that the above-discussed features be provided both individually and in various combinations.

According to common practice, the various features of the drawings are not necessarily drawn to scale. Dimensions of various features and elements in the drawings may be expanded or reduced to illustrate more clearly the embodiments of the disclosure.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a plan view of a blank used to form a carton.

FIG. **2** shows an enlarged view of a handle feature from the blank of FIG. **1**.

FIG. **3** shows a sleeve formed from the blank of FIG. **1**.

FIG. **4** shows an enlarged view of the upper and lower hook portions of the handle feature.

FIG. **5** shows the enlarged view of the hook portions sliding down the arcuate tear line.

FIG. **6** shows a view of both sides of the handle engaged as shown in FIG. **5**.

FIG. **7** shows the handle fully engaged with the notches in the upper hook portions slid to a stopping point along the arcuate tear lines.

FIG. **8** shows a view of the inside of the carton showing the offset handle spacing and the adhesion of the panels together a distance from the fold lines.

Corresponding parts are designated, where appropriate, by corresponding reference numbers throughout the drawings.

DETAILED DESCRIPTION OF THE EXEMPLARY EMBODIMENTS

The present disclosure generally relates to constructs, sleeves, cartons, or the like, and packages for holding and displaying containers such as jars, bottles, cans, etc. The containers can be used for packaging food and beverage products, for example. The containers can be made from materials suitable in composition for packaging the particular food or beverage item, and the materials include, but are not limited to, plastics such as PET, LDPE, LLDPE, HDPE, PP, PS, PVC, EVOH, and Nylon; and the like; aluminum and/or other metals; glass; or any combination thereof.

Packages according to the present disclosure can accommodate containers of numerous different shapes. For the purpose of illustration and not for the purpose of limiting the scope of the disclosure, the following detailed description describes beverage containers at least partially disposed within the package embodiments. In this specification, the terms "lower," "bottom," "upper" and "top" indicate orientations determined in relation to fully erected packages.

FIG. **1** is a plan view of a blank **10** used to form the carton **300** shown in FIGS. **4-7**. The blank **10** has a lateral axis L**1** and a longitudinal axis L**2**, and a peripheral portion **5** shown to the exterior of blank **10**. Blank **10** as illustrated is generally symmetric about an axis of symmetry **3** extending in the longitudinal direction. Blank **10** includes a generally rectangular top panel **12** foldably connected along a fold line **14** to a side panel **16**. Side panel **16** is foldably connected along a fold line **18** to a generally rectangular bottom panel **20**. Bottom panel **20** is foldably connected along fold line **22** to side panel **24**. Side panel **24** is connected along fold line **26** to a generally rectangular top panel **28**. Panels **16**, **24**, and **28** are generally rectangular, but may include at least one angled corner **38**, **44**, **54**, **68**, **74**, **84**. If all four corners are angled, the panels **16**, **24**, and **28** will form a slightly octagonal shape at their angled corners. Since top panel **28** folds under top panel **12** when blank **10** is formed into carton **300**, top panel **28** has a width (as measured in the longitudinal direction L**2**) that is shorter than top panel **12** to insure proper formation of the carton **300**.

End flaps **36**, **42**, **52**, **58**, **66**, **72**, **82**, **88** are generally included along first and second ends of panels **12**, **16**, **20**, and **24** of blank **10**. The end flaps **36**, **52**, **66**, **82** attached to panels **12** and **20** also include intermediate panels **32**, **48**, **62**, **78** to allow articulation about non-rectangular items when blank **10** is formed into the carton **300**. Specifically, at a first end of the blank **10**, an intermediate panel **32** is connected along fold line **30** to top panel **12**, and end flap **36** is connected to intermediate panel **32** along fold line **34**. As shown in FIG. **1**, end flap **36** generally, though not necessarily, has a smaller width than intermediate panel **32** or top panel **12**. Further, end flaps **52**, **66**, and **82** generally, though not necessarily, have a smaller width than their respective intermediate panel **48**, **62**, and **78** or top panel **12** and bottom panel **20**, respectively. Intermediate panel **32** and end flap **36** are separated from connection with side panel **16** by a gap **38**. End flap **42** is connected along fold line **40** to side panel **16**. End flap **42** is separated from connection with bottom panel **20** by a gap **44**. Intermediate panel **48** is connected along fold line **46** to bottom panel **20**, and end flap **52** is connected along fold line **50** to intermediate panel **48**. Intermediate panel **48** and end flap **52** are separated from connection with side panel **24** by a gap **54**. End flap **58** is foldably connected along fold line **56** to side panel **24**.

At a second end of the blank **10**, intermediate panel **62** is foldably connected along a fold line **60** to top panel **12**. End flap **66** is connected along fold line **64** to intermediate panel **62**. Intermediate panel **62** and end flap **66** are separated from side panel **16** by a gap **68**. An end flap **72** is connected along a fold line **70** to side panel **16**. End flap **72** is separated from bottom panel **20** a gap **74**. Intermediate panel **78** is connected along a fold line **76** to bottom panel **20**. End flap **82** is connected along a fold line **80** to intermediate panel **78**. Intermediate panel **78** and end flap **82** are separated from side panel **24** by a gap **84**. End flap **88** is connected along a fold line **86** to side panel **24**. Gaps **38**, **44**, **54**, **68**, **74**, **84** facilitate construction of the carton and also allow articulation about non-rectangular items when blank **10** is formed into a carton.

Blank **10** includes at least a first handle feature **90** and a second handle feature **190**. The first handle feature **90** and the second handle feature **190** collectively form handle **91** (see FIG. **7**). Handle **91** may have at least two plies formed by the overlapping top panels **12** and **28**. As shown in FIG. **1**, first handle feature **90** includes a handle panel **92** defined between opening features **94** and **140**. Opening feature **94** includes several portions defined by a plurality of tear lines and fold lines. The opening feature **94** generally extends in top panel **12** from peripheral portion **5** of the blank **10** along arcuate tear line **96**, to tear line **98**, which may be generally parallel with fold line **14**, to arcuate tear line **100**, to a cut/crease line **102**, which extends generally perpendicular to tear line **98**. The opening feature **94** continues from cut/crease line **102**, to arcuate tear line **104**, to tear line **106**, which may be generally parallel tear line **98**, to arcuate tear line **108**, and then to fold line **14**. The opening feature **94** is generally offset from a center line C_L of top panel **12** toward the free edge of the top panel. The offset of the handle feature **90** from the center of the top panel **12**, among other things, equalizes the gluing areas when the blank **10** is folded into carton **300**, especially when taking into account the panel set backs. Tear lines **110** and **112** extend between tear line **98** and center tear lines **118**, **120** to form panels **132** and **134**. Tear lines **114** and **116** extend between tear line **106** and center tear lines **118**, **120** to form panels **136** and **138**. Center tear lines **118** and **120** may be located at about the center of the opening feature **94** and be parallel with the center line C_L of panel **12** and may be offset from the center line C_L of panel **12**. To allow maximum glue area when folded, tear lines **110** and **112** are generally perpendicular to tear line **98**, and tear lines **114** and **116** are generally perpendicular to tear line **106**.

As shown in FIG. **1** and with specific reference to the enlarged detail provided in FIG. **2**, opening feature **94** includes cut portions **122**. Cut portions **122** extend along fold line **14** and extend into side panel **16**. Specifically, cut portions **122** include tear line **124** that extends from fold line **14** into side panel **16** to a dog leg turn or hook portion **126**, a fold line cut **128** that extends along fold line **14** between the intersection of tear line **124** and a cut **130**, with cut **130** extending from fold line **14** into side panel **16**. The arcuate tear line **108** generally intersects with fold line **14** along fold line cut **128**. The dog leg turn or hook portion **126** at least functions at least somewhat to prevent fold line cut **128** from extending further into side panel **16** when the handle **91** is erected.

Opening feature **140** is substantially similar to a mirror image of opening feature **94**. The opening feature **140** generally extends in top panel **12** from peripheral portion **5** of the blank **10** along arcuate tear line **142**, to tear line **144**, which

may be generally parallel fold line **14**, to arcuate tear line **146**, to a cut/crease line **148**, which extends generally perpendicular to tear line **144**. The opening feature **140** continues from cut/crease line **148**, to arcuate tear line **150**, to tear line **152**, which may be generally parallel with tear line **144**, to arcuate tear line **154**, and then to fold line **14**. The opening feature **140** is generally offset from the center line C_L of panel **12** with center tear lines **164** and **166** spaced similar distances from the center line C_L. In general, the offset of the handle from the center of the panel, among other things, equalizes the gluing areas when the blank **10** is folded into carton **300**, especially when taking into account the panel set backs. A panel set back arises because the top panels **12**, **28** may have different widths. Tear lines **156** and **158** extend between tear line **144** and center tear lines **164**, **166** to form panels **168** and **170**. Tear lines **160** and **162** extend between tear line **152** and center tear lines **164**, **166** to form panels **172** and **174**. To allow maximum glue area when folded, tear lines **156** and **158** may be generally perpendicular to tear line **144** and tear lines **160** and **162** may be generally perpendicular to tear line **152**. Center tear lines **118**, **120**, **164**, and **166** may be spaced similar distances from the center line C_L.

As further shown in FIG. **1**, opening feature **140** includes cut portions **176** that extend along fold line **14** and extend into panel **16**. Specifically, cut portions **176** include tear line **178** that extends from fold line **14** into side panel **16** to a dog leg turn or hook portion **180**, a fold line cut **182** that extends along fold line **14** between the intersection of tear line **178** and a cut **184**, with cut **184** extending from fold line **14** into panel **16**. The arcuate tear line **154** generally intersects with fold line **14** at fold line cut **182**. When the carton is lifted by the handle panel **92**, the first handle feature **90** pulls inwardly from the sides of top panel **12**. This causes the curved tear lines **96**, **108**, **142**, and **154** to sever. This, in turn, causes the tear lines in the side panels to sever down to their hook features. As a result, the weight of the carton and its contents is borne by the side panels **16** and **24** reducing the likelihood of tearing and handle failure.

Second handle feature **190** includes a handle panel **192** defined between opening features **194** and **226**. Opening feature **194** includes several portions defined by tear lines and fold lines. The opening feature **194** generally extends in top panel **28** from peripheral portion **5** of the blank **10** along arcuate tear line **196**, to tear line **198**, which may be generally parallel fold line **26**, to arcuate tear line **200**, to a cut/crease line **202**, which extends generally perpendicular to tear line **198**. The opening feature **194** continues from cut/crease line **202**, to arcuate tear line **204**, to tear line **206**, which may be generally parallel tear line **198**, to arcuate tear line **208**, and then to fold line **26**. The opening feature **194** is generally offset from a center line C_L of top panel **28** with center tear line **212** spaced from the center line C_L. The offset of the handle from the center of the top panel **28**, among other things, equalizes the gluing areas when the blank **10** is folded into carton **300**, especially when taking into account the panel set backs. Tear line **210** extends between tear lines **198** and **206** to form panels **214** and **215**, which are separated by center tear line **212**. To allow maximum glue area when folded, tear line **210** is generally perpendicular to tear line **198** and tear line **206**.

Opening feature **194** includes cut portions **216** that extend along fold line **26** and that extend into side panel **24**. Specifically, cut portions **215** include tear line **218** that extends from fold line **26** into panel **24** to a dog leg turn or hook portion **220**, a fold line cut **222** that extends along fold line **26** between the intersection of tear line **218** and a cut **224**, with cut **224** extending from fold line **26** into side panel **24**. The arcuate tear line **208** generally intersects with fold line **26** at fold line cut **222**.

Opening feature **226** is substantially similar to a mirror image of opening feature **194**. The opening feature **226** generally extends in top panel **28** from peripheral portion **5** of the blank **10** along arcuate tear line **228**, to tear line **230**, which may be generally parallel fold line **26**, to arcuate tear line **232**, to a cut/crease line **234**, which extends generally perpendicular to tear line **230**. The opening feature **226** continues from cut/crease line **234**, to arcuate tear line **236**, to tear line **238**, which may be generally parallel tear line **230**, to arcuate tear line **240**, and then to fold line **26**. The opening feature **226** is generally offset from the center line C_L of top panel **28** with center tear line **244** spaced from the center line C_L. Tear line **242** extends between tear lines **230** and **238** to form panels **246** and **248**, which are separated by center tear line **244**. To allow maximum glue area when folded, tear line **242** is generally perpendicular to tear line **230** and tear line **238**.

Since the top panels **12** and **28** are different widths to accommodate their overlap when folding the blank **10** to form the carton **300**, the center tear line offsets are different for top panels **12** and **28**. Once folded however, and accounting for the difference in widths, the center tear lines **118**, **120**, **164**, **166**, **212**, and **244** are disposed generally parallel, with center tear lines **118**, **120**, **164**, and **166** disposed generally above center tear lines **212** and **244**. The folded over or overlapped top panels **12**, **28** form a top wall of the carton **300**. The offset of the handle from the center of the panel, among other things, equalizes the gluing areas when the blank **10** is folded into carton **300**, especially when taking into account the panel set backs. As an example, if the width of top panel **12** is 116 millimeters (mm), the width of the bottom panel **20** is 117 mm, and the width of top panel **28** is 113 mm (the 3 mm difference allowing ease of creating the carton **300** without interference of the fold line **14** with the peripheral end of panel **28**). In this example, center tear lines **118**, **120**, **164**, and **166** are spaced 56 mm from the peripheral free end of top panel **12** and spaced 60 mm from the fold line **14**, while tear lines **212** and **244** are spaced 56 mm from the peripheral free end of top panel **28** and spaced 57 mm from the fold line **26**. Thus, when folding the top panels **12**, **28** into position to form the carton **300**, tear lines **118**, **120**, **164**, **166**, and tear lines **212** and **244** align to be spaced equidistant from the center line C_L, which is at 58.5 mm. The spacing, or offset, in this example is 1.5 mm from center line C_L when the carton **300** is formed. This offset allows equal areas for application of glue (which will be maximized on the carton) on each side of the opening features **94**, **140**, **194**, and **226**. Thus, the amount of offset of the handle is determined generally by the difference in widths between the panels being glued together.

Opening feature **226** includes cut portions **250** that extend along fold line **26** and that extend into side panel **24**. Specifically, cut portions **250** include tear line **252** that extends from fold line **26** into side panel **24** to a dog leg turn or hook portion **254**, a fold line cut **256** that extends along fold line **26** between the intersection of tear line **252** and a cut **258**, with cut **258** extending from fold line **26** into side panel **24**. The arcuate tear line **240** generally intersects with fold line **26** at fold line cut **256**. The j-hook features or portions provided in the side walls, shown at **126**, **180**, **220**, and **254**, generally stop the cuts from extending beyond their intended length by tearing or otherwise.

Additionally, the arcuate tear lines **96**, **108**, **142**, **154**, **196**, **208**, **228**, and **240** generally extend to an approximately 90-degree turn (at the intersection of **98** and **112** for **96**, at the intersection of **106** and **116** for **108**, at the intersection of **144**

and **158** for **142**, at the intersection of **152** and **162** for **154**, at the intersection of **198** and **210** for **196**, at the intersection of **206** and **210** for **208**, at the intersection of **230** and **242** for **228**, and at the intersection of **238** and **242** for **240**) or as close as possible. Generally, the squarer the angle, the greater the area available to receive glue, forming a stronger handle **91**.

FIG. **3** shows a sleeve formed from the partially erected blank of FIG. **1**. Generally, to form the sleeve shown in FIG. **3**, the blank **10** is first folded along fold lines **14**, **18**, **22**, and **26**. The top panel **28** is folded under top panel **12**, and adhesive may be applied to top panel **28** to adhere top panel **28** and top panel **12** together. As erection of the carton continues, end flaps and intermediate flaps may be folded about respective fold lines and overlapped with respect to one another and may at least partially form a closed end on one or both ends of the carton **300**.

An exemplary method of erecting the carton **300** is discussed in detail below and with reference to FIGS. **3-8**. At various stages of the erecting process, glue or other adhesive can be applied to the an exterior side of a portion of the top panel **28** and respective portions of the end flaps **36**, **66** of top panel **12**. Glue can also be applied to portions of the appropriate surfaces (i.e., interior or exterior surfaces) of the end flaps **42**, **52**, **58**, **72**, **82** and **88**. Further, glue may be alternatively applied to other flaps and/or panels. The blank **10** is first positioned with the exterior surface down. The blank **10** is folded at the fold lines **14**, **18**, **22**, and **26** to position the top panel **28** beneath or underlying top panel **12** in an overlapping fashion. The first handle feature **90** is in face-to-face contact and aligned or registered with the second handle feature **190**. The first handle feature **90** and the second handle feature **190** are aligned when center tear lines **118**, **120** align with center tear line **212** and center tear lines **164**, **166** align with center tear line **244**. Top panel **12** may be adhered with top panel **28** when the first handle feature **90** and second handle are aligned as described.

The partially erected blank **10** of FIG. **3** can be assembled into a open-ended sleeve by closing the end flaps on one end so that containers such as beverage cans can be loaded into the sleeve from the opposite open end. After loading the containers, the ends can be closed by at least partially overlapping and adhering the end flaps **36**, **42**, **52**, **58** at the open end of the carton and, if not previously closed, at least partially overlapping and adhering the end flaps **66**, **72**, **82**, **88** at the other end of the carton. The ends of the carton **300** can be closed by other closing steps and features and in different orders.

When the carton is closed and contains articles such as beverage cans, the handle **91** can be accessed by forcing one's fingers through the opening features along tear lines **110**, **114**, **156**, **160**. This causes the opening features **94** and **140** to break along tear lines **110** and **156** and to break along fold lines **210** and **242**. The resulting freed flaps then fold inwardly into the carton. One can then grasp the handle panels **92** and **192** in preparation for lifting the carton by its handle. The subsequent lifting upward of handle panels **92** and **192** severs arcuate cuts **96**, **108**, **142**, **154**, **194**, **208**, **228**, **240** and tear lines **124**, **178**, **218**, **252** allowing the handle to move upwardly to project from the top of the carton. The deployed handle may be lifted to carry the carton.

FIG. **4** shows an enlarged view of the upper and lower hook portions of the opening feature that extend into the side panel **16** of the erected carton. For discussion purposes only, the opening feature **104** will be discussed here in detail, but it is understood that the opening features **94**, **140**, **194** and **226** are substantially similar and that the discussion of opening feature **104** is generally applicable to opening features **94**, **194** and **226**. Referring to FIG. **4**, arcuate tear line **154** of the opening feature **104** intersects fold line **14** between the top **12** and side **16** of the carton and also intersects tear line **182** that is formed along the fold line **14**. Preferably, the arcuate tear line **154** intersects the tear line **182** at a predetermined location between its ends. Tear line **178** extends downwardly from the left end of the tear line **182** into the side panel **16** and terminates in J or hook-shaped end **180**. With this configuration, when the handle **91** is lifted upward, arcuate tear line **154** in top panel **12** is broken or severed, tear line **182** is broken or severed along its rather short length to form a slot with a slightly hook-shaped end **184**, and tear line **178** in side panel **16** is broken or severed down to the hook-shaped feature **180**. In FIG. **4**, these tear lines are shown already severed. It will be understood that the same severing action occurs at the other three corners of the handle feature of the carton as the handle is lifted upwardly.

With continued reference to the one feature **104**, the severing of the various tear lines as described forms a shoulder **183** between the upper end of the severed tear line **178** and the left end of the severed tear line **182**. As the handle **91** is pulled further upward, the shoulder **183** begins to slide progressively inward beneath the top **12** and riding along the inside surface of the top. At the same time, the arcuate edge formed by the severing of arcuate tear line **154** progressively moves into the slot formed on the right hand side of severed tear line **182**. At the end of this slot, the arcuate edge is engaged by the hook-shaped end **184** of the slit, which causes the arcuate edge essentially to lock or wedge in place within the slot. Of course, this happens simultaneously at all four corners of the handle. The ultimate result is that the handle, once pulled upwardly to its deployed configuration, remains in its upwardly extending deployed configuration. It can thus be grasped easily again and again when it is desired to carry the carton and its contents.

FIGS. **5-7** illustrate the just described progression when pulling the handle **91** upwardly to its deployed configuration. In FIG. **5**, handle **91** is in the process of being lifted upwardly toward its deployed configuration. The side panel **16** is Pdeflecting inwardly on the inside of the severed tear line **178**. Simultaneously, the shoulder (**183** in FIG. **4**, but not visible in FIG. **5**) is sliding inwardly beneath the top **12** of the carton and the arcuate edge left by severed tear line **142** is sliding into the slot formed by severed tear line **128** toward engagement with the hook-shaped end of the slot. When the arcuate edge encounters the hook-shaped end of the slot, the slot grips the arcuate edge to hold the handle in place in its upwardly extending deployed configuration.

FIG. **6** shows that the same action occurs at other corners of the handle feature as the handle is lifted upwardly by a user. The shoulders **129**, **183** have moved in FIG. **6** inwardly and are resting against the inner surface of the top wall. As the handle **91** is lifted further, the shoulders slide along the inner surface of the top wall until the hook-shaped ends of the slots engage and grip onto the arcuate edges formed by severed tear lines **154**, **142**, **96**, and **108**. At this point, the sides of the container in the region of the handle feature are prevented from moving in further and the handle is held in its upwardly extending deployed configuration as discussed above. FIG. **7** shows the handle **91** fully deployed with the notches in the upper hook portions slid to a stopping point along the arcuate tear lines **142**, **154**. Cut **130** in conjunction with fold line cut **128**, cut **184** in conjunction with fold line cut **182**, cut **224** in conjunction with fold line cut **222**, and cut **258** in conjunction with fold line cut **256** each form additional J-hook type features that act as retaining slips or slides for the handles **90** and **190**. As shown in detail in FIGS. **4-7**, these cuts create notches in carton **300** that allow the handles **90** and **190** to slide along

the arcuate tear lines **96**, **108**, **142**, **154**, **196**, **208**, **228**, and **240**. The handles **90** and **190** will generally slide along the curvature of the arcuate tear lines **96**, **108**, **142**, **154**, **194**, **208**, **228**, **240** until the resistance from the curvature arrests the slide, which generally is when the width of the handles between the notches is fully received along a pair of respective arcuate tear lines.

FIG. **6** shows carton **300** with panels **12** and **16** folded along fold line **14** and, although not visible in FIG. **6**, but shown in FIG. **8**, panel **28** underlies panel **12** and is secured thereto. The handle portion **90** and the handle portion **190** underlying it have been separated along their tear lines to a depolyed or carrying configuration. As can be seen, the act of pulling up on the handle panels has caused the curved tear lines (**108** is visible in FIG. **6**) to sever and the tear lines (**124** is visible) in the side panel to sever down to their hook features (**126** is visible in FIG. **6**). As the carton is lifted by the handle, its weight is transmitted to the side panels and converted to in-plane stress in the side panels **16** and **24** rather than out-of-plane stress in the top panels **12** and **28**. As a result, the carton is less likely to tear under its own weight as the carton is carried.

FIG. **8** shows a view of the inside of the carton showing the offset handle spacing and the adhesion of the panels together a distance from the fold lines. The spacing of the panel **28** from the fold line **14** is indicated by "w" in FIG. **8**. The spacing "w" arises because a width of top panel **28** is less than that of top panel **12** so the panels **12**, **28** will fit properly when the carton **300** is erected.

The blanks according to the present disclosure can be, for example, formed from coated paperboard and similar materials. For example, the interior and/or exterior sides of the blanks can be coated with a clay coating. The clay coating may then be printed over with product, advertising, price coding, and other information or images. The blanks may then be coated with a varnish to protect any information printed on the blank. The blanks may also be coated with, for example, a moisture barrier layer, on either or both sides of the blank. In accordance with the above-described embodiments, the blanks may be constructed of paperboard of a caliper such that it is heavier and more rigid than ordinary paper. The blanks can also be constructed of other materials, such as cardboard, hard paper, or any other material having properties suitable for enabling the carton to function at least generally as described herein. The blanks can also be laminated or coated with one or more sheet-like materials at selected panels or panel sections.

In accordance with the above-described embodiments, a fold line can be any substantially linear, although not necessarily straight, form of weakening that facilitates folding therealong. More specifically, but not for the purpose of narrowing the scope of the present disclosure, fold lines include: a tear line, such as lines formed with a blunt scoring knife, or the like, which creates a crushed portion in the material along the desired line of weakness; a cut that extends partially into a material along the desired line of weakness, and/or a series of cuts that extend partially into and/or completely through the material along the desired line of weakness; and various combinations of these features.

As an example, a tear line can include a slit that extends partially into the material along the desired line of weakness, and/or a series of spaced apart slits that extend partially into and/or completely through the material along the desired line of weakness, or various combinations of these features. As a more specific example, one type tear line is a series of spaced apart slits that extend completely through the material, with adjacent slits being spaced apart slightly so that a nick (e.g., a small somewhat bridging-like piece of the material) is defined between the adjacent slits for typically temporarily connecting the material across the tear line. The nicks are broken during tearing along the tear line. The nicks typically are a relatively small percentage of the tear line, and alternatively the nicks can be omitted from or torn in a tear line such that the tear line is a continuous tear line. That is, it is within the scope of the present disclosure for each of the tear lines to be replaced with a continuous slit, or the like. For example, a tear line can be a continuous slit or could be wider than a slit without departing from the present disclosure.

The above embodiments may be described as having one or more panels adhered together by glue during erection of the carton embodiments. The term "glue" is intended to encompass all manner of adhesives commonly used to secure carton panels in place.

The foregoing description illustrates and describes various exemplary embodiments. Various additions, modifications, changes, etc. could be made to the exemplary embodiments without departing from the spirit and scope of the claims. It is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense. Additionally, the disclosure shows and describes only selected embodiments of the disclosure, but the disclosure is capable of use in various other combinations, modifications, and environments and is capable of changes or modifications within the scope of the inventive concept as expressed herein, commensurate with the above teachings, and/or within the skill or knowledge of the relevant art. Furthermore, certain features and characteristics of each embodiment may be selectively interchanged and applied to other illustrated and non-illustrated embodiments of the disclosure.

What is claimed is:

1. A carton for containing a plurality of articles, the carton comprising:

a plurality of panels that extend at least partially around an interior of the carton, the plurality of panels comprising a first top panel, a first side panel foldably connected to the first top panel at a first fold line, a second top panel, a second side panel foldably connected to the second top panel at a second fold line, and a bottom panel foldably connected to the first and second side panels, wherein the first top panel and the second top panel are at least partially overlapped to form a top wall of the carton;

a first handle feature in the first top panel;

a second handle feature in the second top panel; and

a first opening feature in the first handle feature, the first opening feature comprising at least a first tear line extending to the first fold line, a second tear line collinear to the first fold line intersecting the first tear line, and a third tear line extending from the second tear line into the first side panel, wherein the third tear line terminates in a hook portion;

wherein the first handle feature and the second handle feature are in an overlapping substantially registered relationship to form a carrying handle formation.

2. The carton of claim **1**, wherein the first handle feature further comprises a second opening feature, the second opening feature comprising at least a fourth tear line extending to the first fold line, a fifth tear line collinear to the first fold line intersecting the fourth tear line, and a sixth tear line extending from the fifth tear line into the first side panel, wherein the sixth tear line terminates in a hook portion.

3. The carton of claim **2**, wherein the first tear line and the fourth tear line are arcuate tear lines.

4. The carton of claim 2, wherein the first handle feature further comprises a first handle panel defined between the first opening feature and the second opening feature.

5. The carton of claim 1, wherein the second tear line of the first opening feature terminates in a hook portion.

6. The carton of claim 1, wherein the first top panel comprises a first panel centerline, wherein the second top panel comprises a second panel centerline, wherein the first handle feature further comprises a plurality of center tear lines substantially parallel to the first panel centerline and wherein the second handle further comprises a plurality of center tear lines substantially parallel to the second panel centerline.

7. The carton of claim 6, wherein the plurality of center tear lines of the first top panel are offset from the first panel centerline and the plurality of center tear lines of the second top panel are offset from the second panel centerline.

8. The carton of claim of 1, wherein the second handle feature comprises a first opening feature, the first opening feature comprising at least a first tear line extending to the second fold line, a second tear line collinear to the second fold line intersecting the first tear line, and a third tear line extending from the second tear line into the second side panel, wherein the third tear line terminates in a hook portion.

9. The carton of claim 8, wherein the second handle feature further comprises a second opening feature, the second opening feature comprising at least a fourth tear line extending to the second fold line, a fifth tear line collinear to the second fold line intersecting the fourth tear line, and a sixth tear line extending from the fifth tear line into the second side panel, wherein the sixth tear line terminates in a hook portion.

10. The carton of claim 9, wherein the first tear line and the fourth tear line of the second handle feature are arcuate tear lines.

11. The carton of claim 9, further comprising a notch extending into the second side panel at a first end of the first tear line of the second handle feature.

12. The carton of claim 1, further comprising a notch extending into the first side panel at a first end of the first tear line.

13. The carton of claim 1, wherein the first tear line is an oblique tear line relative to a panel centerline.

14. The carton of claim 1, further comprising at least two end flaps respectively foldably attached to respective panels of the plurality of panels, wherein the end flaps are overlapped with respect to one another and thereby at least partially form a closed end of the carton.

15. A blank for forming a carton, the blank comprising:

a plurality of panels comprising a first top panel, a first side panel foldably connected to the first top panel at a first fold line, a second top panel, a second side panel foldably connected to the second top panel at a second fold line, and a bottom panel foldably connected to the first and second side panels;

at least two end flaps foldably connected to respective panels of the plurality of panels; and

handle features in the first top panel and the second top panel, wherein the handle features are for cooperating to at least partially define a handle in a carton erected from the blank, the handle features comprising:

a first opening feature and a second opening feature,

wherein the first and second opening features each comprise a first arcuate tear line at a first end of the opening feature, the first arcuate tear line terminating at the first fold line, a second tear line proximate the first arcuate tear line and collinear to the first fold line, and a third tear line extending from the second tear line into the first side panel and terminating in a hook portion.

16. The blank of claim 15, at least one of the end flaps comprises an intermediate panel arranged between the at least one end flap and respective panel.

17. The blank of claim 15, wherein the first top panel comprises a panel centerline and the second top panel comprises a panel centerline.

18. The blank of claim 17, wherein the first handle further comprises a plurality of center tear lines substantially parallel to the panel centerline of the first top panel and wherein the second handle further comprises a plurality of center tear lines substantially parallel to the panel centerline of the second top panel.

19. The blank of claim 17, wherein the plurality of center tear lines of the first top panel are offset from the panel centerline of the first top panel and the plurality of center tear lines of the second top panel are offset from the panel centerline of the second top panel.

20. The blank of claim 15, wherein the first top panel and the second top panel are different widths with a width of the second top panel being less than a width of the first top panel.

21. The blank of claim 15, wherein the first side panel and the second side panel each comprise at least one angled corner to createa gap between the angled corner and an adjacent end flap.

22. A method of erecting a carton comprising:

obtaining a blank comprising a plurality of panels comprising a first top panel, a first side panel foldably connected to the first top panel at a first fold line, a second top panel, a second side panel foldably connected to the second top panel at a second fold line, and a bottom panel foldably connected to the first and second side panels, the blank further comprising handle features in the first ton panel and the second top panel, the handle features comprising a first opening feature and a second opening feature, wherein the first and second opening features each comprise a first arcuate tear line at a first end of the opening feature, the first arcuate tear line terminating at the first fold line, a second tear line proximate the first arcuate tear line and collinear to the first fold line, and a third tear line extending from the second tear line into the first side panel and terminating in a hook portion;

forming a sleeve from the blank by folding the first top panel, the second top panel, the first side panel and the second side panel along respective fold lines; and

forming a top wall of the carton by at least partially overlapping the first top panel over the second top panel, wherein forming the top wall comprises forming a handle from the handle features.

23. The method of claim 22, further comprising grasping the handle to at least partially separate the handle from the top wall and lift the handle above the top wall.

24. The method of claim 23, wherein as the handle is lifted above the top wall a shoulder portion of a first opening feature and a shoulder portion of a second opening feature in the first top and first side panels, and a shoulder portion of a first opening feature and a shoulder portion of a second opening feature in the second top and second side panels engage with the first top panel and second top panel respectively and allow the shoulders to slide along a plurality of arcuate tear lines.

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