A tear strip opening device for containers comprises opposed guide strip structures (34, 36), mounted externally and internally of the panel (35) to be torn. Two strip sections (31, 33) of the external structure form guide strips, while a strip section (37) of the internal structure forms a tear strip. The guide strips are relatively non-tearable across their widths and have either pre-defined lines of weakness or lines of weakness sufficiently numerous that their exact location is not important. A starting pull tab can be formed at the ends of both structures, enabling a longitudinally confined tear strip to be initiated. The subsequent tearing action is confined by edges of the external guide strips. The use of mirror image strip elements on opposite sides of the container wall is preferred, as it simplifies the manufacture of the openable container, by minimizing the materials required and facilitating their alignment.
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Background and Summary of the Invention

Much development work has been done in connection with the design of tear-opening features for cartons, envelopes, and other forms of packages and containers. Highly advantageous forms of such devices are described and claimed in the above-mentioned related applications. In general, known tear-opening structures have comprised guide strip means, formed of relatively non-tearable materials, secured on the outside surface of a panel to be opened. The guide strip means typically is formed with a guiding edge, which can be an edge of the guide strip or the longitudinally extending line of weakness formed in the guide strip material. In either case, the guide strip effectively forms a cutting edge against which the wall of the container can be cleanly torn. Frequently, the guide strip means is arranged to form two spaced-apart guide edges, so that a thin, longitudinally extending strip of wall panel material can be cleanly torn away during the opening process.

Tear-opening devices of known construction typically employ a tear strip element, secured to the internal surface of the panel to be opened and which is generally aligned with the guide strip means mounted on the outer surface of the panel. An end of the tear strip element is accessible, enabling it to be pulled outward relative to the container panel, causing the panel to be torn
longitudinally by a shearing action between the guide strip means mounted on the outer surface and the tear strip means mounted on the inner surface of the panel.

A wide variety of devices have been proposed for defining the guide strip means provided on the outside of the container wall. The most elementary of these is a single strip of material, or a pair of spaced-apart strips, formed of relatively non-tearable material and adhered to the outer surface of the container wall. A more advantageous form of guide strip arrangement may comprise a pair of spaced-apart guide strip elements mounted on a common carrier strip formed of tearable material. Such an arrangement is disclosed in the Kim U.S. Patent No. 5,035,328. The carrier strip serves to support and space the guide strip elements and thus facilitates their mounting on the container wall. A guide strip arrangement may also be provided in which a relatively wide, composite guide strip structure is provided, which is tearable longitudinally in any one of a plurality of locations, while being highly resistant to tearing in the transverse direction. The longitudinal tearability of the structure may be provided by incorporating a substantial number of narrow, longitudinally extending elements, by utilizing available plastic materials having unidirectional tearing characteristics and/or by providing multiple longitudinally extending lines of weakness in otherwise relatively tear-resistant material. With guide strip structures of the type described, a tear strip of narrower width dimensions than the guide strip structure may be located anywhere between the edges of the structure. When the tear strip is drawn outwardly, guide strip edges are automatically formed by rupturing of the guide strip structure along longitudinal guide lines or lines of weakness.

Although the structures described above are functionally advantageous and serve well to perform the
container-opening functions for which they were designed, they can in some instances inconvenience the container manufacturing process, because of the need to use a variety of materials in forming the guide strip and tear strip elements, and the need for the exercise of care in the relative alignment of the guide strip materials, on the outside of the container wall, with the tear strip elements, on the inside of the container wall.

Pursuant to the present invention, a novel and improved arrangement is provided which significantly simplifies the process of manufacturing containers with tear strip opening devices without in any way compromising the performance of the tear-opening feature. Indeed, performance of the tear-opening feature is, if anything, enhanced. More specifically, the device of the invention incorporates a uniquely advantageous form of double guide strip construction in which separate guide strip structures are mounted directly opposite each other on the outside and inside surfaces of the container wall to be opened. Pursuant to the invention, the structure mounted on the outside surface of the panel effectively constitutes the guide strip means, while the guide strip structure, mounted in directly opposing relation on the inside surface of the panel, constitutes the tear strip means. Two important advantages are derived from this arrangement: First, a similar (typically identical) - dual purpose strip-like structure serves both functions, of providing a guide strip means and a tear strip means respectively on the outside and inside surfaces of the panel. Thus, a single component can serve both purposes, whereas with conventional structures, one type of material serves to provide the guide strip structure, and a different type of material provides the tear strip structure. A second significant advantage to be derived from the invention is the facility of accurately aligning the guide strip means, on the
outside surface of the panel, with the tear strip means, on the inside surface.

The structure of the invention accommodates a wide variety of strip-forming structures which, when mounted on opposed surfaces of a container panel, provide a uniquely advantageous double strip opening device.

For a more complete understanding of the above and other features and advantages of the invention, reference should be made to the following detailed description of preferred embodiments of the invention, and to the accompanying drawing.

Description of the Drawing

Figs. 1-12 are enlarged, fragmentary cross-sectional perspective representations of various forms of double guide strip opening devices constructed in accordance with the principles of the invention.

Figs. 13-16 are enlarged fragmentary cross-sectional perspective representations of wide tear strip structures utilizing spaced apart pairs of double guide strip opening devices according to the invention.

Fig. 17 is a fragmentary perspective view illustrating a wide tear strip opening feature generally in accordance with the structures of Figs. 13 or 16.

Fig. 18 is a fragmentary perspective view, showing the wide opening feature of Fig. 17 after partial opening.

Fig. 19 is a fragmentary perspective view illustrating an opening device according to the invention, in which mirror image strip structures are used to form a single tear-open strip.
Fig. 20 is a perspective view, similar to Fig. 19, showing the tear strip structure of Fig. 19 after partial opening.

Fig. 21 is a fragmentary perspective view of a further modified form of the invention, for use particularly where the external and internal guide strip structures have multiple lines of weakness.

**Description of Preferred Embodiments**

Referring now to the drawing, and initially to Fig. 1 thereof, the reference numeral 10 designates generally a section of container panel, which is to be severed by the tear-opening feature of the invention. The panel 10 can be of any appropriate material. For corrugated cartons, the panel 10 will be formed of corrugated board. For folding cartons, the panel typically will be formed of a relatively thin fiberboard material, Kraft paper, plastic and/or metal foil. For envelopes and the like, the panel 10 may be formed of paper. The form of tear-opening device shown in Fig. 1 comprises mirror image assemblies 11, 12, mounted on opposite sides of the panel 10. As will be understood, the assemblies 11, 12 are in elongated strip form, being provided substantially in continuous lengths, as from a large roll, for example. In the illustration of Fig. 1, the assembly 11 includes a carrier strip 13, which is formed of a material which is easily tearable at least in the longitudinal direction. Paper, thin plastic, thin metal foil, or other readily tearable materials are suitable for the carrier strip. Adhesively or otherwise bonded to the inner surface 14 of the carrier strip 13, are continuous, longitudinally extending strips 15, 16. The latter strips are formed of a material which is relatively non-tearable at least on the width direction. Suitable materials are certain plastics such as polyvinyl chloride or polyethylene, reinforced paper, certain metal foils, fiberglass reinforced materials, and the like. The exposed
surfaces 17 of the guide strips 15, 16 are adhesively or otherwise bonded to the outer surface 18 of the container panel 10. As shown in the cross-sectional view of Fig. 1, there is a slight gap 19 formed between the adjacent inner edges of the respective strips 15, 16, forming a natural, longitudinally extending line of weakness along the composite strip 11.

In the illustration of Fig. 1, the composite strip 12, mounted on the internal surface of the panel 10, strip 12 is constructed identically to the strip 11, and is mounted directly opposite to and longitudinally co-extensive with the outer strip structure 11, in mirror image fashion.

For bonding of the guide strips to the container panel 10, it is usually desirable to supply wet or pressure sensitive adhesives, applied to the surface(s) of the guide strips which contact the panel 10. Heat sealing procedures may also be employed if desired.

The panel 10 may be torn open along a tear line axis 20 by gripping an end portion of one of the longitudinally extending plastic strips 21, 22 of the internal strip structure 12. Pursuant to the invention, although the inner and outer structures can be identical construction, the inner strip element (for example, strip 22) forms a tear strip element, while the cooperating outer strip (strip element 15 in this case) functions as a guide strip element. The opening function of the structure is, of course, well known. The novelty and its attendant advantages are derived in large part from the fact that the inside and outside structures are mirror images.

In the modification of Fig. 2, the dual guide strip structure comprises a continuous, longitudinally extending carrier strip 30, formed of paper or other suitable tearable material. Adhesively or otherwise bonded to the inner surface of the carrier strip are continuous,
longitudinally extending strips 31, 32 and 33 of plastic or other relatively non-tearable material. The composite guide strip structure identified generally by the reference numeral 34 is mounted on the external surface of the container opening panel 35, and a mirror image duplicate guide strip structure 36 is mounted on the inside surface of the panel. In the arrangement of Fig. 2, the center strip 37 of the internal assembly functions as a tear strip element, in cooperation with spaced-apart guide strip elements 31, 33 of the external guide strip structure.

In the embodiment of Fig. 3, a container opening panel 40 is provided with outer and inner mirror image guide strip structures 41, 42, each comprising a continuous, longitudinally extending carrier strip 43, 44, formed of tearable material and mounting, in this illustration, six continuous, longitudinally extending guide strip elements 45, 46, formed of relatively non-tearable material. In the structure illustrated in Fig. 3, a tear strip function may be formed by any one or more of the internal strip elements 46 cooperating with a straddling pair of guide strip elements 45, carried by the external structure 41. In the arrangement of Fig. 3, the position of the tear strip element(s) need not be symmetrical with respect to the longitudinal center line of the strip structures 41, 42, but can be offset to one side.

In the modification of Fig. 4, a container panel 50 is provided externally and internally with dual, mirror image guide strip structures 51, 52, each comprising a carrier strip 53, 54 and multiple, longitudinally coextensive strips 55, 56 of relatively non-tearable material. The function and performance of the modification of Fig. 4 is substantially similar to that of Fig. 3. Typically, the double guide strip structure of either Fig. 3 or Fig. 4 will be provided at one end with short slots or notches (not shown), defining the start of a tear strip. The
slotted end can be conveniently gripped and pulled outward, causing the tear strip structure and panel to be severed longitudinally along defined spaces between the strips 55 of the external guide strip structure. In this respect, a tear strip element may be formed by one, or more than one, of the internal strip elements 56, and the location of the tear strip-forming element(s) 56 can be symmetrical or asymmetrical with respect to the longitudinal axis of the guide strip structures 51, 52, as will be readily understood.

The modification of Fig. 5, a container opening panel 60, is provided with external and internal guide strip structures 61, 62, each comprising a carrier strip 63, 64, each carrying a large plurality of longitudinally extending string-like elements 65, 66. The string-like elements typically can be fiberglass elements, or yarns formed of fiberglass elements, elements of strong monofilament or multifilament plastic or the like. The arrangement, in any case, is such that effectively continuous, longitudinally extending lines of weakness are formed between adjacent elements 65 and 66. By notching, slotting or otherwise constructing one end of the structure, one or more tear strip tabs (not shown) are formed. When pulled outwardly, the tearing will continue along the lines established, as confined by a particular set of guide yarns 65, of the external structure 61, cooperating with a particular set of tearing yarns 66, of the internal structure 62.

In the modification of Fig. 6, a container panel 70 is provided with dual guide strip structures 71, 72 on its external and internal surfaces respectively. The opposed structures 71, 72 are formed of a continuous strip of generally homogenous plastic material, which may incorporate unidirectionally oriented reinforcing fibers and which is extruded or otherwise formed in a manner to provide highly unidirectional tearing characteristics.
Such materials are well known in the art and do not, in themselves, form any part of the invention. Pursuant to the present invention, continuous, longitudinally extending strips 71, 72 of such materials, oriented to accommodate longitudinal tearing, are bonded to the external and internal surfaces of the container panel. The strip structures 71, 72 preferably are notched or slotted for a short distance at one end to define a tear strip tab (not shown). When such a tab is pulled outwardly, the structure tears continuously and longitudinally along spaced-apart lines predefined by the location of the initial cuts or slots.

In the modification of Fig. 7, a container panel 80 is provided on its opposite surfaces with dual guide strip structures 81, 82. The structures 81, 82 are comprised of a large plurality of continuous, longitudinally extending linear elements, which may be yarns or fibers of fiberglass or strong plastic arranged in side by side fashion in a matrix 85, 86 of a suitable tearable plastic or other material. The arrangement is such that effective longitudinally extending lines of weakness are formed between adjacent pairs of longitudinal elements 83, on the external structure, and adjacent elements 84 on the internal structure. A tear strip/guide strip arrangement is formed by initiating a starting tab (not shown) at one end of the structure, enabling the defined, longitudinally extending strip of material to be removed from the container panel 80.

In the modification of Fig. 8, a container panel 90 is provided with opposed, mirror image guide strip structures 91, 92 on its external and internal surfaces. The Fig. 8 modification, the guide strip structures are continuous strips of a suitable relatively non-tearable plastic or other material provided with spaced-apart, longitudinally extending lines of perforations 93, 94 which form
longitudinally extending lines of weakness. When the dual guide strip structures are mounted in mirror image fashion on the container wall 90, the respective lines of perforation 93, 94 are aligned directly opposite each other, and serve to define a removable tear strip section. The center section 95 of the internal structure cooperates with the spaced-apart outer strip sections 96, 97 of the outer structure, to form a tear strip/guide strip arrangement for removing a defined strip section from the panel 90.

In the modification of Fig. 9, a container panel 100 is provided with dual guide strip structures corresponding substantially to those shown in Fig. 2, but mounted on the panel surfaces in inverted orientation relative to that of Fig. 2. Thus, the structures 101, 102 each comprise a carrier strip 103, 104 of relatively tearable material, and each mounts a series of three strips 105, 106 of material relatively non-tearable in a widthwise direction. In the modification of Fig. 9, the relatively non-tearable, longitudinally extending strips 105, 106 are bonded to the container panel 100 through the relatively thin, longitudinally tearable carrier strips 103, 104. The opening function is basically the same, however, as that of the modification of Fig. 2.

In the modification of Fig. 10, a container panel 110 is provided with continuous, longitudinally extending guide strip structures 111, 112, each comprising a single strip of relatively non-tearable plastic material. In the illustrated arrangement, three strip-like sections 113, 114 of the respective structures 111, 112 are formed by continuous, longitudinally extending deep V-shaped grooves 115, 116. The V-shaped grooves 115, 116 extend sufficiently deep into the body of the plastic material so as to form effective lines of weakness, extending continuously longitudinally throughout the length of the
strip-like structure. At one end, the structure can be slotted or notched in alignment with the respective grooves 115, 116, to form a starting pull tab (not shown). It will be understood, of course, that the grooves 115, 116 may be formed on opposite sides of each of the strip structures 111, 112, to extend toward the center, if desired. Such an arrangement is disclosed in my co-pending United States application Ser. No. 543,461.

The modification of Fig. 11 is similar to that of Fig. 10, except that the double guide strip structures are subdivided into six strip-like sections, instead of three. A container panel 120 has guide strip structures 121, 122 of mirror image structure mounted on its respective external and internal surfaces. A series of deep V-shaped grooves 123, 124 divide the respective guide strip structures into a plurality of continuous, longitudinally extending strip-like sections 125, 126. The guide strip structures 121, 122 are formed of a suitable, relatively non-tearable plastic material, with the V-shaped grooves 123, 124 forming longitudinally extending lines of weakness along which the structures may be torn. Any one or more of the strip-like sections 125, 126 may define the tear structure, typically, two or more of the strip-like sections, intermediate the edge extremities, will define a tear-away strip section. Typically, the strip section is defined by initial cuts or notches (not shown) at one end of the structure, which starts the tear down a particular set of grooves.

In the modification in Fig. 12, a container panel 130 is provided with dual guide strip structures 131, 132 on its opposite surfaces, each formed of a relatively non-tearable plastic material formed in a "corduroy" configuration with multiple, closely spaced grooves 133, 134, forming continuous, longitudinally extending lines of weakness and effectively subdividing the otherwise intact
guide strip structures into a plurality of narrow, elongated strip-like sections 135, 136. By notching the structure at one end, as heretofore described, a pull strip section (not shown) is defined by an opposed spaced pair of the grooves 133, 134. When the start tab is pulled outwardly, a tear strip section is confined longitudinally by the predefined pair of grooves 133, 134, such that a well-defined tear strip is formed by progressively pulling the tear strip section from one end.

In Figs. 13-16 there are shown several examples of wide tear strip structures, for example of the type disclosed in Kim U.S. Patent No. 5,050,741, formed using dual guide strip arrangements as previously described. In Fig. 13, a container panel 140 is provided with two sets of spaced-apart dual guide strip assemblies 141, 142. Each of the dual guide strip assemblies is constructed in the manner of Fig. 1. When opening the structure of Fig. 13, the outer non-tearable strip sections 143, 144 of the external guide strip structures serve respectively as widely-spaced guide strips. These guide strips cooperate with strip elements 145, 146 of the internal guide strip structures, which function in the capacity of widely-spaced tear strips. A wide section of the panel 140 is removed during the tear-open procedure.

In the modification of Fig. 14, a container panel 150 is provided with widely-spaced sets of dual guide strip assemblies 151, 152. Each of these assemblies comprises external and internal longitudinally extending strips 153, 154 of relatively non-tearable plastic material, each provided with a continuous, longitudinally extending deep V-groove 155, 156, forming a line of weakness. A mirror image structure is formed on the internal surface of the container panel, as shown. The opening function of the Fig. 14 modification is substantially the same as that of the modification in Fig. 13, with external outer strip
sections 157, 158 forming widely-spaced guide strip sections for cooperation with internal, widely-spaced tear strip sections 159, 160.

The modification of Fig. 15 is closely similar to that of Fig. 13. A container panel 170 is provided with spaced-apart dual guide strip assemblies 171, 172. The individual dual guide strip assemblies are constructed in the same manner as in Fig. 13, except that the carrier strip elements, 173, 174 are mounted directly on the surfaces of the container 170, in the manner of the modification of Fig. 9. The opening function of the Fig. 15 modification is the same as that of Figs. 13 and 14.

In the modification of Fig. 16, a container panel 180 is provided with spaced-apart dual guide strip assemblies 181, 182, each comprising structures of the type shown in Fig. 5. Carrier strips 183-186, of material which is relatively tearable mount a series of closely spaced, longitudinally extending elements 187 of a material which is relatively non-tearable, typically elements or yarns of fiberglass or strong plastic. In each of the widely-spaced guide strip structures 181, 182, longitudinally confined tear lines may be formed between any two adjacent pairs of the longitudinally extending elements 187, above and below the container panel. The operation of the structures is essentially the same as that of Fig. 5.

Figs. 17 and 18 illustrate a wide strip opening structure for a container 200. Dual, guide strip structures 201, 202 are provided on the panel 200, spaced apart a considerable distance and extending longitudinally over the full length of the panel to be opened. At one end edge of the container panel 200, the guide strip structures 201, 202 and the container wall itself are provided with a longitudinally extending starting slot or cut 203, which extends from the edge of the carton a short distance
longitudinally along the guide strip structures. The slots 203 may be formed at the time of the manufacture of the container, if desired, or may be formed at the time of opening of the container, if greater security is desired.

As shown in Fig. 18, the end of the tear strip section 204, located between the slots 203, forms a wide tear strip, which may be gripped at the end and pulled outward of the carton. Once started down the longitudinal lines of the slots 203, the tear will continue along those lines for the full length of the tear strip structures 201, 202.

As will be understood, in any of the forms of opening devices shown in Figs. 1-16, where the lines of weakness are well-defined, it is advantageous to align the slots 203 with such predefined lines of weakness. In structures such as shown in Figs. 5-7, 12 and 16, the starting slots may be established virtually anywhere between the edge extremities of the dual strip assemblies.

In the illustration of Figs. 19 and 20, a dual guide strip opening structure generally of a type shown in Figs. 2-12 is formed by mounting of opposed guide strip assemblies 210, 211, one directly opposite the other, extending over the full length of a container panel 212 to be opened. Starting slots 213 are provided at one end, either at the time of container manufacture or later, as desired, to form a starting pull tab 214. As described in connection with Figs. 17 and 18, the starting slots 213 are aligned with predefined lines of weakness, if any. Where the lines of weakness are sufficiently numerous, alignment of the starting slots 213 is not significant. If desired, the starting slots 213 may be disposed at an angle, diverging to the free edge 215 of the starting tab. In that manner, the starting slots can be arranged to intersect with predefined, longitudinally extending lines.
of weakness, even if not precisely aligned therewith in the first instance.

Although the optimum embodiment of the invention utilizes identical strip structures externally and internally of the container panel to be opened, where the strip structure is of a type providing a multiplicity of possible lines of weakness, for example with structures of the type shown in Figs. 3-7, 11 and 12, the external and internal strip structures may be of different width and possibly even of different structure. Such an arrangement is shown in Fig. 21, in which strip structures of the type illustrated in Fig. 6 are employed.

As is clear in Fig. 21, the external strip structure 220 is wider than the internal structure 221. The material of the strip structures is unidirectionally fiber reinforced, so as to be relatively tearable in the longitudinal direction and relatively non-tearable in the width direction. Spaced-apart starting slots 222, 223 are formed in the strip structures and in the intervening section of container wall 224 to define a starting pull tab 225. Pursuant to the invention, the starting slots are located inside the side edges of the narrower of the two strip structures, so that strip margins 226, 227 are formed on each lateral side of a central, tear-away strip section 228.

In the embodiment of Fig 21, the longitudinal tear lines defining the tear strip section 228 are defined by the positions of the starting slots 222, 223. Where the strip structure is as shown in Fig. 6, the tear lines can be located virtually anywhere within the edge extremities of the narrower strip 221. With strip materials such as shown in Fig. 12, the starting slots are aligned with or arranged to intersect with pre-defined lines of weakness, which will define the tear strip section.
In any of its various modifications, only some of which are illustrated herein, the structure of the invention enables important advantages to be realized in the manufacture and utilization of tear-opening features for containers of all types (the term "container" being used in a generic sense to include boxes, envelopes, drums, flexible packages and the like). In a particularly advantageous form of the invention, opposed guide strip structures are mirror images, as the identical structures being used both externally and internally of the openable container panel. This enables the container manufacturer to install advantageous forms of tear-opening structures using only a single component. The individual guide strip structures, whether of composite construction or of a single material, can be provided in a continuous roll, and both openable surfaces of the container panel are provided with the same guide strip structure, either from a common roll supply or from a plurality of rolls of the same material. In either case, rather significant economies and conveniences are provided at the manufacturing stage. Inasmuch as the external and internal guide strip structures are the same, proper alignment of the materials during application is simplified. Moreover, proper alignment (or not) is easily and quickly ascertained by visual inspection. Since both the external and internal structures should be installed in mirror image fashion.

It should be understood, of course, that the specific forms of the invention herein illustrated and described are intended to be representative only, as certain changes may be made therein without departing from the clear teachings of the disclosure. Accordingly, reference should be made to the following claims in determining the full scope of the invention. In the claims, wherever the context permits, reference to "tearable" materials shall mean materials that are relatively easily tearable at least in
the longitudinal direction, and reference to "non-tearable" materials shall mean materials that are relatively difficult to tear, at least in the width-wise direction.
I Claim:

1. A double guide strip opening device for a container wall, which comprises
   (a) inner and outer elongated guide strips mounted on external and internal surfaces of said container wall, in generally opposed, at least partially overlapping relation to each other, and extending along a line to be torn,
   (b) said container wall having at least one or spaced-apart sets of structures comprised of said inner and outer guide strips,
   (c) each of said guide strips having opposite side edges and formed to be relatively non-tearable in the width direction and relatively more tearable in the longitudinal direction,
   (d) each of said guide strips forming one or more longitudinally extending tear lines intermediate its side edges,
   (e) tear lines of the inner and outer guide strips of each structure being generally aligned in opposed relation in at least two spaced-apart locations to define a tear strip section which is removable along said tear lines,
   (f) said tear strip section, when pulled outward with respect to said container wall, being severed from said guide strips along with a section of said container wall,
   (g) the remaining portions of said structures of inner and outer guide strips, after severing of said tear strip section, forming spaced-apart guide strip edges.
2. An opening device according to claim 1, further characterized by,
(a) one guide strip being mounted externally and one guide strip mounted internally on said container wall, in opposed relation,
(b) each of said strips comprising strip elements mounted on the container wall and having two or more spaced-apart tear lines,
(c) strip sections of said opposed guide strips being defined by two of the tear lines therein and forming a tear strip section severable from the body of said structure of guide strips by outward pulling on an end of said section.

3. An opening device according to claim 1, further characterized by,
(a) said device including spaced-apart structures of said guide strips arranged in two opposed pairs,
(b) said spaced-apart structures of guide strips defining a tear-out section of said container wall between and of greater width than the respective structures of opposed tear strips.

4. An opening device according to claim 1, further characterized by,
(a) said spaced-apart tear lines being pre-defined by spaced-apart cuts of limited length provided in an end portion of said structures of guide strips and forming a separable pull tab therein.
5. An opening device according to claim 1, further characterized by,
   (a) said guide strips each comprising a plurality of longitudinally extending, relatively non-tearable elements mounted on a relatively tearable carrier strip.

6. An opening device according to claim 1, further characterized by,
   (a) said tear lines being formed by providing longitudinally extending lines of weakness in said guide strips.

7. An opening device according to claim 1, further characterized by,
   (a) said guide strips being formed, at least in part, by a generally homogeneous material which is oriented to be relatively tearable in a longitudinal direction and relatively less tearable in a transverse direction.

8. An opening device according to claim 1, further characterized by,
   (a) said guide strips being formed by a plurality of separate, longitudinally extending strip-like elements of relatively non-tearable material.
9. An opening device according to claim 8, further characterized by,
(a) said guide strips each comprising at least three longitudinally extending strip-like elements defining at least two spaced-apart tear lines.

10. An opening device according to claim 1, further characterized by,
(a) said guide strips each comprising a plurality of longitudinally extending elements of relatively non-tearable material laid in side-by-side relation, and
(b) a relatively more easily tearable material forming a matrix for said longitudinally extending elements.

11. The method of forming a tear opening device for the wall of a container, as defined in claim 1, which comprises
(a) providing one or more guide strips in substantially continuous lengths,
(b) said guide strips including at least two longitudinally extending strip-like sections initially joined together in laterally adjacent relation but separable longitudinally,
(c) bonding one or more outer sections of guide strips to an external surface of said wall over the portion thereof to be torn open,
(d) bonding one or more inner sections of guide strips to an internal surface of said wall in substantially opposed and at least partially overlapping relation to said outer sections and substantially longitudinally coextensive therewith,
(e) said inner and outer sections of guide strips forming one or more structures defining two or more spaced-apart
tear lines on the inside and outside of said container wall, and
(e) the spaced-apart tear lines on the inside of said container wall being substantially aligned with the spaced-apart tear lines on the outside of said container wall to form a separable tear strip section.

12. A method according to claim 11, further characterized by
(a) forming at least two longitudinal cuts of limited length at an end of said guide strips, between the lateral edges thereof, to pre-define said spaced-apart tear lines and to facilitate initial tearing action.

13. A method according to claim 12, further characterized by
(a) providing two guide strips, one outside and one inside said container wall, in generally directly opposed relation, and
(b) forming at least two spaced-apart cuts at one end of each of said guide strips and between the edges of both of them to define one or more pull tabs.

14. A method according to claim 13, further characterized by
(a) said guide strips on both sides of said container wall being provided with at least two spaced-apart and pre-defined longitudinally extending lines of weakness, and
(b) positioning said pull tab with respect to said spaced-apart lines of weakness such that pulling outwardly on said
tab causes progressive severance of intermediate strip sections of said guide strips extending between said lines of weakness, together with a strip section of said wall confined between said intermediate strip sections.
AMENDED CLAIMS
[received by the International Bureau on 9 February 1993 (09.02.93);
original claim 14 deleted;
original claims 1-5, 9 and 11-13 amended;
remaining claims unchanged (5 pages)]

1. A double guide strip opening device for a container
   wall, which comprises
   (a) said container wall having at least one structure
       comprised of inner and outer elongated guide strips mounted
       respectively on internal and external surfaces of said
       container wall, in generally opposed, at least partially
       overlapping relation to each other, and extending along a
       line to be torn,
   (b) each of said guide strips having opposite side edges
       and formed to be relatively non-tearable in the width
       direction and relatively more tearable in the longitudinal
       direction,
   (c) each of said guide strips forming one or more
       longitudinally extending tear lines intermediate its side
       edges,
   (d) tear lines of the inner and outer guide strips of
       said at least one structure being generally aligned in
       opposed relation in spaced-apart locations to define a tear
       strip section which is removable along said tear lines,
   (e) said tear strip section, when pulled outward with
       respect to said container wall, being severed from said
       guide strips along with a section of said container wall,
   (f) the remaining portions of said at least one
       structure, after severing of said tear strip section,
       forming spaced-apart guide strip edges.

2. An opening device according to claim 1, further
   characterized by,
   (a) one guide strip being mounted externally and one
       guide strip mounted internally on said container wall, in
       opposed relation,
   (b) each of said strips forming spaced-apart tear lines,
   (c) a strip section of each of said opposed guide strips
       being defined by spaced apart tear lines therein forming a
9 tear strip section severable from the body of said at least
10 one structure by outward pulling on an end of said strip
11 section.

3. An opening device according to claim 1, further
2 characterized by,
3 (a) said device including spaced-apart individual struc-
4 tures of said guide strips arranged in two opposed pairs,
5 (b) each of said spaced-apart individual structures
6 defining at least one tear line,
7 (c) said spaced-apart individual structures of guide
8 strips defining a tear-out section of said container wall
9 between and of greater width than the respective individual
10 structures.

4. An opening device according to claim 1, further
2 characterized by,
3 (a) said spaced-apart tear lines being pre-defined by
4 spaced-apart cuts of limited length provided in an end
5 portion of said at least one structure and forming a
6 separable pull tab therein.

5. An opening device according to claim 1, further
2 characterized by,
3 (a) said guide strips each comprising a plurality of
4 longitudinally extending, relatively non-tearable elements
5 mounted on a relatively more tearable carrier strip.

6. An opening device according to claim 1, further
2 characterized by,
3 (a) said tear lines being formed by providing
longitudinally extending lines of weakness in said guide strips.

7. An opening device according to claim 1, further characterized by,
(a) said guide strips being formed, at least in part, by a generally homogeneous material which is oriented to be relatively tearable in a longitudinal direction and relatively less tearable in a transverse direction.

8. An opening device according to claim 1, further characterized by,
(a) said guide strips being formed by a plurality of separate, longitudinally extending elements of relatively non-tearable material.

9. An opening device according to claim 8, further characterized by,
(a) said guide strips each comprising at least three longitudinally extending strip-like elements defining said spaced-apart tear lines.

10. An opening device according to claim 1, further characterized by,
(a) said guide strips each comprising a plurality of longitudinally extending elements of relatively non-tearable material laid in side-by-side relation, and
(b) a relatively more easily tearable material forming a matrix for said longitudinally extending elements.
The method of forming a tear opening device for the wall of a container, as defined in claim 1, which comprises
(a) providing one or more elongated guide strips in substantially continuous lengths,
(b) bonding at least a first elongated guide strip to an external surface of said wall over the portion thereof to be torn open,
(c) bonding at least a second elongated guide strip to an internal surface of said wall in generally opposed at least partially overlapping relation to said first elongated guide strip and substantially longitudinally coextensive therewith,
(d) said first and second elongated guide strips forming a guide strip structure defining one or more spaced-apart tear lines on the inside and outside of said container wall, and
(e) one or more of said guide strip structures forming at least two tear lines spaced from each other on the inside of said container wall substantially aligned with at least two tear lines spaced from each other on the outside of said container wall to form a separable tear strip section.

A method according to claim 11, further characterized by
(a) forming at least two longitudinal cuts of limited length at an end of said one or more guide strip structures, between the lateral edges of said elongated guide strips, to pre-define said tear lines and to facilitate initial tearing action.

A method according to claim 12, further characterized by
3 (a) providing two guide strip structures, at laterally
4 spaced locations on said container wall, and
5 (b) forming at least one cut at one end of each of said
6 guide strip structures between the edges thereof to define
7 one or more pull tabs.
**INTERNATIONAL SEARCH REPORT**

A. **CLASSIFICATION OF SUBJECT MATTER**
   IPC(5) : B65D 3/26,17/00,27/38
   US CL : 229/205,238; 233/201,205; 53/412; 493/212,377,923,963
   According to International Patent Classification (IPC) or to both national classification and IPC

B. **FIELDS SEARCHED**
   Minimum documentation searched (classification system followed by classification symbols)
   U.S. : 53/133.5; 229/206,239,240,309,924,926; 383/203,204,207,208,209,210; 493/930
   Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
   Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. **DOCUMENTS CONSIDERED TO BE RELEVANT**

<table>
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<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
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<td>Y</td>
<td>US, A, 3,127,087 (SPEES) 31 March 1964, See figs. 18,19, and 34, col. 4, line 48-col. 5, line 7, and col. 6, lines 41-51.</td>
</tr>
<tr>
<td>Y</td>
<td>US, A, 4,773,541 (RIDDELL) 27 September 1988, See fig. 2 and col. 3, lines 19-35.</td>
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</table>

[X] Further documents are listed in the continuation of Box C. [ ] See patent family annex.

Date of the actual completion of the international search: 12 NOVEMBER 1992

Name and mailing address of the ISA/Commissioner of Patents and Trademarks
Box PCT
Washington, D.C. 20231
Facsimile No. NOT APPLICABLE

Form PCT/ISA/210 (second sheet)(July 1992)
**DOCUMENTS CONSIDERED TO BE RELEVANT**

<table>
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<th>Relevant to claim No.</th>
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**INTERNATIONAL SEARCH REPORT**

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<th>Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)</th>
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<tr>
<td>This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:</td>
</tr>
<tr>
<td>1. ☐ Claims Nos.: because they relate to subject matter not required to be searched by this Authority, namely:</td>
</tr>
<tr>
<td>2. ☒ Claims Nos.: Claim 10 because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:</td>
</tr>
<tr>
<td>Claim 10 fails to comply with PCT Article 17(2)(a)(ii) because it cannot be determined what or where the claimed &quot;matrix&quot; is.</td>
</tr>
<tr>
<td>3. ☐ Claims Nos.: because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(e).</td>
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<th>Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)</th>
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<tr>
<td>This International Searching Authority found multiple inventions in this international application, as follows:</td>
</tr>
<tr>
<td>1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.</td>
</tr>
<tr>
<td>2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.</td>
</tr>
<tr>
<td>3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:</td>
</tr>
<tr>
<td>4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:</td>
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</table>

**Remark on Protest**

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

Form PCT/ISA/210 (continuation of first sheet(1))(July 1992)*