(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 0 756 997 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
05.02.1997 Bulletin 1997/06

(51) Int. Cl.[6]: **B65D 3/26**, B31C 3/00

(21) Application number: **95305374.1**

(22) Date of filing: **01.08.1995**

(84) Designated Contracting States:
DE FR GB

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(54) Easy-open container having directionally-oriented label tear

(57) An easy-open container (10) has a spirally-wound paperboard bodywall layer (17), interior barrier liner layer (22) and outer label layer (25) forming an easy-open seam (20) extending spirally between the ends (14,16) of the container (10). A feature is provided for directionally-orienting tearing of the label layer (25) to remove either the entire label layer (25) or just that portion (25a) of the label layer (25) which is in bridging relationship to the easy-open spiral seam (20) to allow opening of the container (10) along the spiral seam (20). The directionally-orienting tear feature is preferably provided by a reinforcing and tear strip (28) having directionally-orienting tear incorporated therein and which is positioned under the outer longitudinal edge portion (25a) of the label layer (25) and over the easy-open spiral seam (20) along with desired positioning of low strength and high strength bonding between the label layer (25), reinforcing and tear strip (28) and bodywall layer (17) to ensure tearing of the label layer (25) in the proper direction and removal of a desired portion (25a) of the label layer (25) when the container (10) is opened. The directionally-oriented tear feature may also include a directionally-orienting tear (30) incorporated in the label layer (25) itself to orient tear in the desired direction.

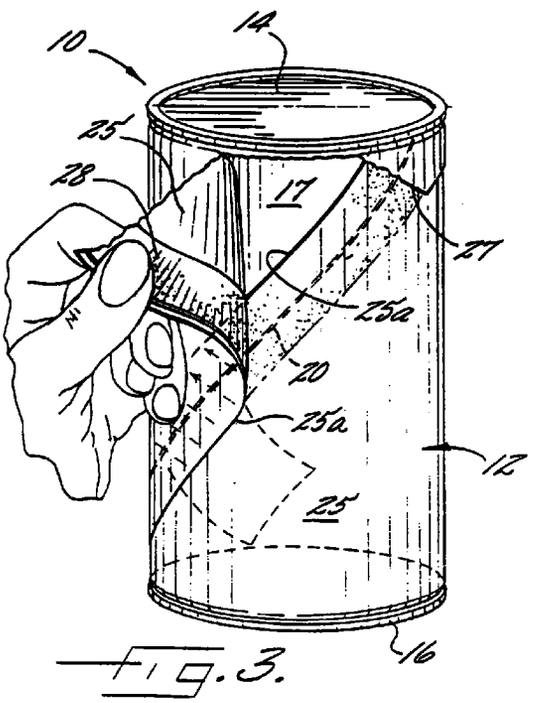

Fig. 3.

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Description

This invention relates to an easy-open container for packaging various products, particularly products under pressure such as biscuit and bread dough and the like. More specifically, this invention relates to an easy-open container having a spirally-wound bodywall layer forming an easy-open seam extending spirally between the ends of the container, an interior barrier liner layer, and an outer label layer, and being provided with means for directionally-orienting tearing of the label layer to remove at least that portion of the label layer which is in bridging relation to the easy-open spiral seam in the bodywall layer to allow opening of the container along such spiral seam.

Easy-open composite containers for packaging various products, particularly products under pressure such as refrigerated dough products and the like, constitute a significant commercial consumer product. Typically, these containers are formed of a spirally-wound paperboard or board stock bodywall layer and an interior liner layer for preventing leaking of the contents from the container. The spirally-wound bodywall layer usually includes a butt joint formed by adjacent edges of the bodywall layer and which forms a spiral seam extending from one end of the container to the other end. The exterior label layer surrounds the bodywall layer and covers or bridges the spiral seam to reinforce such seam and prevent premature opening along the spiral seam.

Commercially significant containers of this type are disclosed in commonly assigned U. S. Patent No. 3,981,433 which is directed to a one-step easy-open container including an inner liner layer, a bodywall layer and an outer label layer, all of which are spirally-wound to form a spiral easy-open seam in the bodywall layer. In this type of container, when the outer label layer is either totally removed or that portion bridging the spiral butt joint of the bodywall layer is torn away from the spiral seam, the pressurized dough products expands outwardly and causes the spiral seam of the bodywall layer to open. This allows access to the dough and the interior of the container through the spiral easy-open seam in the container.

The outer label layer surrounding the spiral seam in containers of this type is an important structural component of the container because the outer label layer bridges the spiral seam and maintains it in closed position. Accordingly, in order to easy-open the container, that portion of the label layer which bridges the easy-open spiral seam of the bodywall layer must be stripped away to expose the spiral seam for easy-opening. Alternatively, the label layer may be totally peeled away from and removed from the bodywall layer of the container. This is desirable if a coupon or other advertising material is positioned under the label layer for removal by the purchaser of the container when opening of the container.

Various mechanisms have been provided to aid in such easy-opening including provision of a tear tab for starting the peeling or removal of the label layer so that the label layer may be torn toward a "collar cut" extending around the periphery of the label layer near one end of the container for completely removing the label layer from the bodywall layer during easy-opening. Also, tear strips have been provided between the label layer and the bodywall layer in bridging relation to the easy-open spiral seam of the bodywall layer to act as a tearing medium for tearing away that portion of the label layer which bridges the easy-open spiral seam of the bodywall layer. However, with both procedures for removing the label layer from the spiral easy-open seam of the bodywall layer, tearing of the label layer in a desired direction has created problems and often such tearing does not accomplish the desired purpose of either removing the entire label layer or just a bridging portion of the label layer from the spiral seam of the bodywall layer for easy-opening of the container. Tearing is also affected by the direction of pulling or tear pressure applied by the user which is sometimes dictated by being right-handed or left-handed or by having the container in an upright position or in an upside-down position.

It is the object of this invention to provide an easy-open container for packaging various products, particularly products under pressure, and which includes therein means for directionally-orienting tearing of the label layer to remove at least that portion of the label layer in bridging relation to the easy-open spiral seam of the bodywall layer of the container to allow opening of the container along such spiral seam.

It has been found by this invention that the above object may be accomplished by providing an easy-open container particularly adapted for packaging products under pressure and which includes generally the following components and features.

A paperboard bodywall layer in strip form is spirally-wound and defines a substantially cylindrical container having opposed ends. The bodywall layer has longitudinal edges lying adjacent each other, preferably in abutting relationship, to define an easy-open spiral seam, preferably having a butt joint, extending between the opposed ends of the container. A flexible barrier liner layer in strip form is spirally-wound inside the bodywall layer in superimposed position therewith. A flexible label layer in strip form is spirally wound outside the bodywall layer in superimposed position therewith and has longitudinal edge portions overlapped with each other. The label layer is positioned in bridging relation to the easy-open spiral seam. A tab cut extends through the upper of the label layer edge portions and inwardly from the edge thereof to define a tear tab to be used in easy-opening of the container.

Means are provided for directionally-orienting tearing of the label layer to remove at least that portion of the label layer in bridging relation to the easy-open spiral seam to allow opening of the container along the spiral seam. Such directionally-orienting tear means may

include means incorporated directly in the label layer and extending generally transversely of the label layer strip in generally a cross-machine direction along with a desired type of bonding of the label layer to the bodywall layer of the container. Alternatively, the directionally-orienting tear means may include a reinforcing and tear strip positioned on the inside of the-upper of the overlapped label layer edge portions and in bridging relation to the easy-open spiral seam and having a directionally-orienting tear incorporated directly therein in a transverse or cross-machine direction along with high strength bonding means positioned between the reinforcing and tear strip and the upper label layer edge portion so that the label layer will tear with the tear strip for easy-opening of the container and other desired types of bonding between the label layer and the bodywall layer of the container.

If it is desired to remove the entire label layer during easy-opening of the container, the directionally-orienting tear means includes a low strength bonding means positioned between the label layer and the bodywall layer so that the label layer will peel and separate from the bodywall layer during removal of the label layer and/or reinforcing and tear strip from the easy-open spiral seam for opening of the container.

If it is desired to remove only that portion of the label layer which bridges the easy-open spiral seam of the bodywall layer, the directionally-orienting tear means includes a high strength bonding means positioned between the label layer and the bodywall layer so that the label layer will remain bonded to the bodywall layer and tear from the reinforcing and tear strip and the label layer edge portion bonded thereto during removal from the easy-open spiral seam.

Thus, an easy-open container is formed which has means for directionally-orienting tearing of the label layer to remove either the entire label layer from the container or at least that portion of the label layer which bridges the easy-open spiral seam to allow opening of the container along the spiral seam. The directionally-orienting tear feature will ensure that tearing of the label layer and/or the reinforcing and tear strip will occur as desired for accomplishing easy-opening of the container.

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

Figure 1 is a perspective view of an easy-open container provided according to a preferred embodiment of this invention;

Figure 2 is a perspective view of an easy-open container provided according to another preferred embodiment of this invention and illustrating the beginning of the easy-opening of the container;

Figure 3 is a perspective view, like Figure 2, showing a further progression of the easy-opening of the container of Figure 2;

Figure 4 is a plan view of the label layer of the container of Figures 2 and 3 after it has been totally removed from the container;

Figure 5 is a greatly enlarged fragmentary sectional view taken generally along the line 5-5 of Figure 2 and illustrating the construction of the easy-open seam of the container;

Figures 6 and 7 are cross-sectional views, like Figure 5, illustrating the manner in which the container is easy-opened by removal of the entire label layer from the bodywall layer of the container and exposing the spiral seam;

Figure 8 is a perspective view of an easy-open container provided according to another preferred embodiment of this invention;

Figure 9 is a greatly enlarged fragmentary sectional view taken generally along the line 9-9 of Figure 8 and illustrating the construction of the easy-open seam of the container;

Figure 10 is a cross-sectional view, like Figure 9, illustrating the manner in which the container is easy-opened by tearing of the tear strip and the portion of the label layer bonded thereto from bridging relation with the spiral seam of the bodywall of the container; and

Figure 11 is a diagrammatic view illustrating a preferred method and apparatus for producing the easy-open container of this invention.

In the following detailed description, various preferred embodiments of the invention are described. It will be understood, however, that the invention is not to be limited to its preferred embodiments and although specific terms are employed in describing the preferred embodiments, these are for purposes of illustration only and not for purposes of limitation. It will thus be apparent that the invention includes various alternatives, modifications and equivalents within the scope of the appended claims, as will be apparent to the skilled artisan.

Referring first to Figures 2-7, a preferred embodiment of an easy-open container **10** constructed in accordance with the present invention is illustrated therein. Figure 1 illustrates a modification to the embodiment of an easy-open container **10** illustrated in Figures 2-7 and will be described thereafter. Figures 8-10 illustrate yet another preferred embodiment of a container **10** and will be described in detail below. Figure 11 diagrammatically illustrates a preferred method and apparatus for forming a container **10** in accordance with this invention and will be described below.

The container **10**, of the embodiment illustrated in Figures 2-7, includes a generally cylindrical body portion **12**, a top end closure **14** and a bottom end closure **16**. The container further includes a spirally-wound paperboard bodywall layer **17** in strip form which forms the basic shape of the cylindrical body portion **12** of the container **10**. The bodywall layer **17** has longitudinal edges **17a** lying adjacent each other, preferably in abutting relation, and defining an easy-open spiral seam **20**,

preferably in the form of a butt joint, extending between the opposed ends of the body **12** and between the end closures **14** and **16** of the container **10**.

This bodywall layer **17** may be advantageously composed of conventional spiral-winding paperboard or board stock having a thickness of between 0.10 and about 0.35 inch, preferably between about 0.15 and 0.30 inch, for example 0.021 inch. Board stock conventionally used in the manufacture of spirally-wound containers is commercially available from various manufacturers including Sonoco Products Company, Republic Paperboard Corporation and Middletown Board Corporation. In order to function advantageously as the spirally-wound bodywall layer, the board stock typically is composed of kraft or recycled paper and can typically range from e.g. 50 to 100 lbs./ream. In some instances the board stock can include a weak exterior layer, e.g. a 0.003 inch exterior news.

The easy-open container **10** further includes a flexible barrier liner layer **22** in strip form spirally-wound inside the bodywall layer **17** in superimposed position therewith and has overlapping longitudinal edge portions **22a** in bridging relation to the spiral seam. This liner layer **22** may advantageously be a barrier type, flexible sheet material, such as a polymer/foil, a kraft/foil/polymer, a polymer/polymer, or a kraft/foil laminate. A high strength bonding means **23**, preferably in the form of a permanent adhesive, may be positioned between the liner layer **22** and the bodywall layer **17**. An expandable fold or pleat **24** may be provided in the lower of the overlapping liner layer edge portions **22a** and in bridging relation to the butt joint of the spiral seam **20**. The overlapping liner layer edge portions **22a** may be bonded by a low strength bonding means **30**, such as a heat seal. The liner layer **22** prevents the escape of liquids, oils and, preferably, gases into and out of the container bodywall layer **17** from the interior of the container **10** and expands through the easy-open spiral seam **20** during opening of the container **10**, as will be described in more detail below.

The container **10** further includes a flexible label layer **25** in strip form spirally-wound outside the bodywall layer **17** in superimposed position therewith and having longitudinal edge portions **25a** overlapped with each other. The label layer **25** is positioned in bridging relation to the easy-open spiral seam **20** and in the embodiment of Figures 2-7, the overlapped label layer edge portions **25a** are positioned in bridging relation to the easy-open spiral seam **20**. The label layer **25** is conventionally constructed from suitable materials, such as kraft paper, a polymer/foil laminate, a kraft paper/foil laminate, or the like.

The easy-open container **10** further includes a tab cut **27** extending through the upper overlapped label layer edge portion **25a** and inwardly from the outer edge thereof to define a tear tab which may be easily lifted open and pulled by the user to initiate easy-opening of the container **10** in a manner to be described below.

In the broadest aspect of this invention, means are provided for directionally-orienting tearing of the label layer **25** to ensure that the tearing of label layer **25** proceeds in the proper direction for removal of the desired portion thereof during easy-opening of the container **10**. This directionally-orienting tear means may take different forms and include different components of the container **10** and will be described with respect to each preferred embodiment of the container **10**.

In the embodiment of easy-open container **10** illustrated in Figures 2-7, the directionally-orienting tear means includes the following. A reinforcing and tear strip **28** is positioned between the overlapped label layer edge portions **25a** and in bridging relation to the easy-open spiral seam **20** for reinforcement thereof. A high strength bonding means **23**, preferably in the form of a permanent adhesive, is positioned between the reinforcing and tear strip **28** and the upper label layer edge portion **25a** so that the label layer **25** will tear with the tear strip **28** when easy-opening of the container **10**. Low strength bonding means **30**, preferably in the form of a frangible adhesive, is positioned between the reinforcing and tear strip **28** and the lower label layer edge portion **25a** so that the reinforcing and tear strip **28** will peel and separate from the lower label layer edge portion **25a** during tearing and removal of the reinforcing and tear strip **28** from the easy-open spiral seam **20**.

In this embodiment of container **10** illustrated in Figures 2-7, it is desirable to remove the entire label layer **25** from the bodywall layer **17** during easy-opening of the container **10** because of the presence of a coupon on the underside of the label **25** or otherwise. For that purpose, the directionally-orienting tear means further includes low strength bonding means **30**, preferably in the form of a frangible adhesive, positioned between the remainder of the label layer **25** and the bodywall layer **17** so that the remainder of the label layer **25** will peel and separate from the bodywall layer **17** during removal of the reinforcing and tear strip **28** from the easy-open spiral seam **20** for complete removal of the label layer **25** from the container **10** during easy-opening. This is illustrated in Figures 6 and 7.

The directionally-orienting tear means further includes means incorporated directly in the reinforcing and tear strip **28** to orient tearing thereof in a transverse or cross-machine direction of such strip, as indicated by the arrows in Figures 2-4, so that tearing of the strip **28** will occur in a transverse direction and cause tearing of the label layer **25** also in that direction (as shown in Figure 2). The tearing of the label layer **25** will continue in that direction to the upper end of the container **10** which has been closed by the closure **14** and will tear along the closure **14** circumferentially of the container **10** as the tear strip **28** is being peeled from the lowermost label layer edge portion **25a** and downwardly along the spiral seam **20** (as shown in Figure 3) until the label layer **25** reaches the bottom of the container **10**. The tearing of the label layer **25** then continues circumferentially around the bottom of the container **10** along the closure **16** to remove the entire label layer **25** from the

container **10** and expose the coupon for removal by the user (as shown in Figure 4).

The reinforcing and tear strip **28** may be formed from an oriented polymer film material, such as nylon, polypropylene, polyethylene terephthalate, etc. The directionally-oriented tear means incorporated in the reinforcing and tear strip **28** may be formed by orienting the polymer film material during manufacture. This can be accomplished by squeezing the molten resin from an extruder through a linear coat hanger dye into a thin wide sheet that is cast onto a highly polished chill roll, cooled and wound into a roll. By drawing the film faster over a chill roll in one direction versus the other, an orientation is imparted to the film plane. The long molecular structure is weakly cross-linked. This weaker, cross-linking fails easier than the long chain molecules, when force is applied, such as pulling during opening of the container **10**. A polymer film material manufactured using the above techniques will tear in the cross-machine or transverse direction significantly easier than in the machine or longitudinal direction. The directionally-oriented tear means incorporated in the reinforcing and tear strip **28** may also be formed mechanically including laser or heating to form scores or other pre-stressing or by folding or the like to form stress lines.

Referring now to the modified embodiment of container **10** illustrated in Figure 1, this embodiment includes all of the above described elements and features of the container embodiment of Figures 2-7 except that the reinforcing and tear strip **28** is eliminated and is not part of the directionally-orienting tear means. Therefore, like reference characters are given for the same features in this embodiment. The directionally-oriented tear means in this embodiment of container **10** of Figure 1 includes means incorporated directly in the label layer **25** itself and for orienting the tear thereof in generally a transverse direction of the label layer **25** and in generally a cross-machine direction of the label layer strip, as indicated by the arrows in Figure 1. The directionally-orienting tear means for this embodiment of container **10** of Figure 1 could also include desired low strength bonding means, as described above so that the label layer **25** will tear in generally the same direction and will be removed from the container **10** in generally the same manner as described above in connection with the embodiment of container **10** of Figures 2-7. For the purposes of this embodiment of Figure 1, the label layer **25** could be constructed of an oriented polymer film material as described above for the reinforcing and tear strip **28** laminated with other layers or materials, such as poly/poly, poly/kraft, poly/foil/poly, poly/foil/kraft, poly/metalized/poly, poly/metalized/kraft. The directionally-oriented tear means incorporated in the label layer **25** could be formed in the same manner as described above for the reinforcing and tear strip **28**.

It would, of course, be within the scope of this invention for the directionally-orienting tear means to include a directionally-oriented tear feature incorporated directly in both a label layer **25** and in a reinforcing and tear strip **28** for an easy-open container **10** and these components could be constructed of the materials described above with the directionally-oriented tear in each as described above.

Referring now to the embodiment of container **10** shown in Figures 8-10, like reference characters are given to components which are the same as described above with respect to the embodiments of Figure 1 and Figures 2-7 and only the differences in this embodiment of Figures 8-10 will be described. Basically, it is the intent of the construction of the easy-open container **10** of this embodiment of Figures 8-10 to remove only that portion of the label layer **25** which bridges the easy-open seam **20** during removal of the reinforcing and tear strip **28**, as shown in Figure 8. The remainder of the label layer **25** would remain attached to the bodywall layer **17**.

For that purpose, the upper label layer edge portion **25a** and the reinforcing and tear strip **28** only are in bridging relation to the spiral seam **20** in the bodywall layer **17** and the directionally-orienting tear means also includes a low strength bonding means, preferably in the form of a frangible adhesive, positioned between the reinforcing and tear strip **28** and the bodywall layer **17** on either side of the spiral seam **20** so that the strip **28** will peel and separate from the bodywall layer **17** and away from the spiral seam **20** during tearing and removal of the tear strip **28**, and the upper label layer edge portion **25a** bonded thereto in the manner described above. The directionally-orienting tear means also includes a high strength bonding means **23** positioned between the remainder of the label layer **25a** and the bodywall layer **17** so that the remainder of the label layer **25** will remain bonded to the bodywall layer **17** and tear from the reinforcing and tear strip **28** and the upper overlapped label layer edge portion **25a** bonded thereto during removal thereof from the easy-open spiral seam **20** for exposing the spiral seam **20** during easy-opening of the container **10** (as shown in Figures 8 and 10). As shown in these figures, the label layer **25** will tear at the spiral line at which it moves from superimposed position with the reinforcing and tear strip **28** to direct superimposed position with the label layer **17**.

The directionally-orienting tear means also includes means incorporated directly in the reinforcing and tear strip **28** for orienting tear thereof, like the embodiment of container **10** illustrated and described with respect to Figures 2-7, so that the reinforcing and tear strip and the label layer edge portion **25a** bonded thereto will tear in a transverse direction across the tear strip **28** to the tear line described above for the remainder of the label layer **25** which is bonded by high strength bonding means **23** to the label layer **17** for removal of only that portion thereof which bridges the spiral seam **20** for easy-opening of spiral seam **20** and the container **10**. The tear strip **28** and the directionally-oriented tear incorporated therein may be the same as that described above with respect to the embodiment of container **10** of Figures 2-7.

Various adhesives may be employed to provide the permanent adhesive utilized for the high strength bonding means **23**. The tear or peel strength of this permanent adhesive will vary depending upon the materials used in the component layers of the container **10**. The tear or peel strength must be greater than the tear strength of the liner layer **22** and the label layer **25** so that these layers will tear when the tear strip **28** is torn along the easy-open spiral seam. With current materials used for these component layers, it has been found that a peel strength greater than 2.20 lbs. per square inch is necessary. The permanent adhesive may include polyvinyl alcohol with or without clay mix, blended or reactor resins, special additives, such as manufactured by H.B. Fuller and identified as A1940 having 4000 CPS viscosity, 55% solids and 5.0 pH, K6030 having 3050 CPS viscosity, 55% solids and 5.0 pH, H3935 having 5500 CPS viscosity, 52% solids and 5.0 pH, and by National Starch and identified as 32-1984 having 5400 CPS viscosity, 56% solids and 4.5 pH, and 32-0215 having 4500 CPS viscosity, 55% solids and 4.0 pH.

Various adhesives can be employed as the frangible adhesive forming the low strength bonding means **30**. The tear or peel strength of this frangible adhesive will vary depending on the materials used in the component layers of the container **10**. The peel strength must be weak or less than the tear strength of the liner layer **22** and the label layer **25** so that the layers will peel rather than tear. With current material used, it has been found that a peel strength of 0.42 to 1.99 pounds per square inch is preferred. The frangible adhesive may include a high initial tack dextrine based adhesive commercially available from National Starch and Chemical Corporation, Grand Prairie, Texas as "71-5626B". This is a high solids (about 64%), high viscosity (about 2100 cps) acid modified (about 2.5 Ph) dextrine adhesive. Other frangible adhesives which can be successfully used include heavily filled, resinous, aqueous emulsion type adhesives such as, for example polyvinylacetate dispersed in water together with a tackifying alcohol and an inert filler such as clay, silicon dioxide calcium carbonate, talc and the like. The inert filler can insure that a weak discrete layer of adhesive remains between the superimposed components of the container to thereby provide for the fracture or breaking of the adhesive. In the alternative, a release coating, such as a microcrystalline wax, silicone or the like can be provided on the inner surface on either or both of the superimposed components of the container so that the adhesive layer is readily released upon drying.

It is important that the frangible adhesive used for the low strength bonding means **30** have a high initial tack or adhesive so that the overlapped components between which it is positioned are held together during, and immediately following, manufacture of the container **10**. It is also important that this frangible adhesive be capable of readily allowing peeling or separating of the superimposed components between which it is positioned upon easy opening of the container **10** by tearing the tear strip **28** along the easy-open seam **20**.

Referring now to Figure 11, a preferred method and apparatus is diagrammatically illustrated and which is suitable for producing the easy-open container **10** of this invention and particularly the embodiments of Figures 2-7 and 8-10.

As may be seen in Figure 11, a flexible barrier liner layer **22** in strip form is provided from any suitable source of supply and is fed at a desired angle to a mandrel **52** of a suitable tube spiral winding machine for being spirally-wound on the mandrel **52** to form overlapping liner layer edge portions **22a** in a manner well understood by those with ordinary skill in the art. While the liner layer **22** is being fed to the mandrel **52**, one of the longitudinal edge portions **22a** thereof is folded over on itself by an edge folder **53** to form a pleat **24**. Also, while the liner layer **22** is being fed to the mandrel **52**, a heater device **54** heats the other longitudinal edge portion **22a** of the liner layer **22** so that when these liner layer edge portions **22a** are overlapped with each other, a low strength bonding means **30** in the form of a heat seal will be positioned between such overlapped liner layer edge portions **22a**.

A paperboard bodywall layer **17** in strip form is provided from any suitable source of supply and is fed at a desired angle to the mandrel **52** for being spirally-wound onto the spirally-wound liner layer **22** on the mandrel **52** while positioning the longitudinal edges of the bodywall layer **17** in butt joint edge relationship to form a tube having a spiral seam **20** extending the length thereof in a manner well understood by those with ordinary skill in the art. While the bodywall layer **17** is being fed to the mandrel **52**, a permanent adhesive **23** is applied by a suitable adhesive applicator device **55** onto the top surface of the bodywall layer **17** to form a high strength bond between the bodywall layer **17** and the liner layer **22** when the bodywall layer **17** is spirally-wound onto the liner layer **22** on the mandrel **52**.

A label layer **25** in strip form is provided from a suitable supply source and is fed at a desired angle to the mandrel **52** for spirally-winding thereof onto the outer surface of the tube formed by the spirally-wound bodywall layer **17** and liner layer **22** as such tube is moving forward on the mandrel **52**. While the label layer **25** is being fed to the mandrel **52**, a reinforcing and tear strip **28** of narrower width than the label layer strip **25** and having a means incorporated therein for directionally-orienting tear in the transverse direction thereof is provided from a suitable supply source and is positioned in superimposed position under one outer longitudinal edge portion **25a** of the label layer strip **25**. Prior to positioning of the reinforcing and tear strip **28** under the one label layer longitudinal edge portion **25a**, a permanent adhesive is applied by a suitable applicator device **56** along the upper surface of the strip **28** so that a high strength bond is formed between the strip **28** and the one outer label layer edge portion **25a** when the strip **28** is superimposed thereunder.

While the superimposed reinforcing and tear strip

28 and label layer strip 25 are being fed to the mandrel 52, a frangible adhesive for the embodiment of container 10 of Figures 2-7 or a permanent adhesive for the embodiment of container 10 of Figures 8-10 is applied to the remainder of the bottom surface of the label layer strip 25 which is not covered by the reinforcing and tear strip 28 by a suitable adhesive applicator device 58 to form a low strength bond or a high strength bond between the label layer 25 and the bodywall layer 17 when the label layer 25 is spirally-wound onto the bodywall layer 17. Also, while the label layer strip 25 and the reinforcing and tear strip 28 are being fed to the mandrel 52, a frangible adhesive is applied by a suitable adhesive applicator device 59 to the bottom surface of the reinforcing and tear strip 28 for forming a low strength bond between the tear strip 28 and the other label layer longitudinal edge portion 25a when the label layer edge portions 25a are overlapped with each other during spiral-winding thereof. While the label layer strip 25 and reinforcing and tear strip 28 are being fed to the mandrel 52, a tab cut is formed by a suitable cutting mechanism 60 through the one outer label layer edge portion 25a and the reinforcing and tear strip 28.

The thus spirally-wound continuous tube having bodywall layer 17, liner layer 22 and label layer 25 are moved forwardly on the mandrel 52 to a cutting station where suitable cutting devices 65 cut the continuous tube into individual links for containers 10.

Thus, it may be seen, that this invention has provided an easy-open container for packaging various products, particularly products under pressure, and which provides means for directionally-orienting tearing of the label layer 25 to remove at least that portion of the label layer 25 in bridging relation to the easy-open spiral seam 20 of the bodywall layer 17 of the container 10 to allow opening of the container 10 along such spiral seam 20. A method has also been provided which may be utilized on conventional spiral-winding equipment without substantial modifications or new devices therein.

Claims

1. An easy-open container particularly adapted for packaging products under pressure and comprising:

   a spirally-wound paperboard bodywall layer in strip form defining a substantially cylindrical container having opposed ends, said bodywall layer having longitudinal edges lying adjacent each other to thereby define an easy-open spiral seam extending between said opposed ends;
   a flexible barrier liner layer in strip form spirally-wound inside said bodywall layer in superimposed position therewith;
   a flexible label layer in strip form spirally-wound outside said bodywall layer in superimposed position therewith and having longitudinal edge portions overlapped with each other, said label layer being positioned in bridging relation to said easy-open spiral seam;
   a tab cut extending through the upper of said label layer edge portions and inwardly from the edge thereof to define a tear tab to be used in easy-opening of said container; and
   means for directionally-orienting tearing of said label layer to remove at least that portion of said label layer in bridging relation to said easy-open spiral seam to allow opening of said container along said spiral seam.

2. An easy-open container, as set forth in claim 1, wherein said directionally-orienting tear means includes a reinforcing and tear strip positioned on the inside of the upper of said overlapped label layer edge portions and positioned in bridging relation to said easy-open spiral seam for reinforcement thereof, and high strength bonding means positioned between said strip and said upper label layer edge portion so that said label layer will tear with said tear strip when easy-opening of said container.

3. An easy-open container, as set forth in claim 1 or 2, in which said directionally-orienting tear means includes means incorporated in said label layer and extending generally transversely of said label layer strip and in generally a cross-machine direction for orienting tear of said label layer in that direction.

4. An easy-open container, as set forth in claim 2, in which said directionally-oriented tear means further includes means incorporated in said reinforcing and tear strip and extends generally transversely thereof for orienting tear of said strip in the transverse direction.

5. An easy-open container particularly adapted for packaging products under pressure and comprising:

   a spirally-wound paperboard bodywall layer in strip form defining a substantially cylindrical container having opposed ends, said bodywall layer having longitudinal edges lying in abutting relationship to each other and defining an easy-open spiral seam having a butt joint and extending between said opposed ends;
   a flexible barrier liner layer in strip form spirally-wound inside said bodywall layer in superimposed position therewith;
   a flexible label layer in strip form spirally-wound outside said bodywall layer in superimposed position therewith and having longitudinal edge portions overlapped with each other, said label layer being positioned in bridging relation to

said easy-open spiral seam;

means for directionally-orienting tearing of said label layer to remove at least that portion of said label layer in bridging relation to said spiral seam and including a reinforcing and tear strip positioned on the inside of the upper of said overlapped label layer edge portions and positioned in bridging relation to said easy-open spiral seam for reinforcement thereof, high strength bonding means positioned between said reinforcing and tear strip and said upper label layer edge portion so that said label layer will tear with said tear strip when easy-opening of said container, and means incorporated in said reinforcing and tear strip for directionally-orienting tearing of said reinforcing and tear strip and said label layer bonded thereto to remove said reinforcing and tear strip and at least that portion of said label layer in bridging relationship to said easy-open spiral seam; and

a tab cut extending through the upper of said label layer edge portions and said reinforcing and tear strip and extending inwardly from the outer edges thereof to define a tear tab to be used in initiating easy-opening of said container.

6. An easy-open container, as set forth in claim 5, wherein directionally-orienting tear means further includes a low strength bonding means positioned between said label layer and said bodywall layer so that said label layer will peel and separate from said bodywall layer during removal of said reinforcing and tear strip from said easy-open spiral seam for complete removal of said label layer from said container during easy-opening.

7. An easy-open container, as set forth in claim 6, in which said upper label layer edge portion and said reinforcing and tear strip overlap said lower label layer edge portion and said overlapped label layer edge portions and strip are in bridging relation to said spiral seam in said bodywall layer, and in which said directionally-orienting tear means further includes a low strength bonding means positioned between said reinforcing and tear strip and said lower label layer edge portion and between said lower label layer edge portion and said bodywall layer so that said reinforcing and tear strip will peel and separate from said lower label layer edge portion during removal of said reinforcing and tear strip from said easy-open spiral seam and then said lower label layer edge portion will peel and separate from said bodywall layer and said spiral seam during complete removal of said label layer during easy-opening of said container.

8. An easy-open container particularly adapted for packaging products under pressure and comprising:

a spirally-wound paperboard bodywall layer in strip form defining a substantially cylindrical container having opposed ends, said bodywall layer having longitudinal edges lying in abutting relationship to each other and defining an easy-open spiral seam having a butt joint and extending between said opposed ends;

a flexible barrier liner layer in strip form spirally wound inside said bodywall layer in superimposed position therewith;

a flexible label layer in strip form spirally-wound outside said bodywall layer in superimposed position therewith and having longitudinal edge portions overlapped with each other, said overlapped label layer edge portions being positioned in bridging relation to said easy-open spiral seam;

means for directionally-orienting tearing of said label layer to completely remove said label layer from said container during easy-opening and including a reinforcing and tear strip positioned between said overlapped label layer edge portions and in bridging relation to said easy-open spiral seam for reinforcement thereof, high strength bonding means positioned between said reinforcing and tear strip and said upper label layer edge portion so that said label layer will tear with said tear strip when easy-opening of said container, low strength bonding means positioned between said reinforcing and tear strip and said lower label layer edge portion and between said lower label layer edge portion and said bodywall layer and between the remainder of said label layer and said bodywall layer so that said reinforcing and tear strip will peel and separate from said lower label layer edge portion during removal of said reinforcing and tear strip from said easy-open spiral seam and then said lower label layer edge portion will peel and separate from said bodywall layer and said spiral seam and so that the remainder of said label layer will peel and separate from said bodywall layer during removal of said reinforcing and tear strip from said easy-open spiral seam, means incorporated in said reinforcing and tear strip for directionally-orienting tearing of said reinforcing and tear strip in a transverse or cross-machine direction; and

a tab cut extending through the upper of said label layer edge portions and said reinforcing and tear strip from the outer edges thereof and adjacent one of said opposed ends of said container to define a tear tab to be used in initiating easy-opening of said container.

9. An easy-open container, as set forth in claim 5,

wherein said directionally-orienting tear means further includes a high strength bonding means positioned between said label layer and said bodywall layer so that said label layer will remain bonded to said bodywall layer and tear from said reinforcing and tear strip and said upper overlapped label layer edge portion bonded thereto during removal from said easy-open spiral seam for exposing said spiral seam during easy-opening of said container.

10. An easy-open container, as set forth in claim 9, in which said upper label layer edge portion and said reinforcing and tear strip only are in bridging relation to said spiral seam in said bodywall layer, and in which said directionally-orienting tear means further includes a low strength bonding means positioned between said reinforcing and tear strip and said bodywall layer on either side of said spiral seam so that said reinforcing and tear strip will peel and separate from said bodywall layer and away from said spiral seam during tearing and removal of said tear strip and said upper label layer edge portion bonded thereto during easy-opening of said container.

11. An easy-open container, as set forth in claim 2, 5, 8 or 9, in which said high strength bonding means comprises a permanent adhesive.

12. An easy-open container, as set forth in claim 6, 8 or 10, wherein said low strength bonding means comprises a frangible adhesive.

13. An easy-open container, as set forth in claim 6, 8 or 10, wherein said high strength bonding means comprises a permanent adhesive and said low strength bonding means comprises a frangible adhesive.

14. A method of manufacturing an easy-open container having directionally-orienting tear comprising the steps of:

providing a flexible barrier liner layer in strip form, feeding the liner layer to a mandrel, and spirally-winding the liner layer on the mandrel to form overlapping liner layer edge portions;
providing a paperboard bodywall layer in strip form, feeding the bodywall layer to the mandrel, and spirally-winding the bodywall layer onto the spirally-wound liner layer on the mandrel while positioning the longitudinal edges of the bodywall layer in butt joint edge relationship to form a tube having a spiral seam extending the length thereof;
providing a flexible label layer in strip form and a reinforcing and tear strip of narrower width than the label layer strip and having a directionally-oriented tear incorporated therein in the transverse direction thereof, feeding such label layer and reinforcing and tear strip to the mandrel while applying a high strength bonding means to an upper surface of said reinforcing and tear strip and positioning the reinforcing and tear strip in superimposed position under one outer longitudinal edge portion of the label layer strip with the high strength bonding means therebetween and applying a low strength bonding means to a lower surface of said reinforcing and tear strip, and spirally-winding the superimposed label layer strip and reinforcing and tear strip onto the continuous tube on the mandrel with the longitudinal edges of the label layer strip in overlapped relation and positioning the reinforcing and tear strip and low strength bonding means in bridging relationship to the spiral seam in the spirally-wound bodywall layer; and
cutting the thus wound tubes into container lengths.

15. A method of manufacturing an easy-open container, as set forth in claim 14, further including

forming a tab cut through the one outer label layer longitudinal edge portion and the reinforcing and tear strip during feeding of the label layer and reinforcing and tear strip to the mandrel.

16. A method of manufacturing an easy-open container, as set forth in claim 14, or 15, further including

applying a low strength bonding means to the lower surface of the label layer not covered by the reinforcing and tear strip during feeding of the label layer and reinforcing and tear strip and the mandrel.

17. A method of manufacturing an easy-open container, as set forth in claim 16, in which said steps of applying a low strength bonding means comprises applying a frangible adhesive, and in which said step of applying a high strength bonding means comprises applying a permanent adhesive.

18. A method of manufacturing an easy-open container, as set forth in claim 14, or 15, further including

applying a high strength bonding means to the lower of the label layer not covered by the reinforcing and tear strip during feeing of the label layer and reinforcing and tear strip to the mandrel.

19. A method of manufacturing an easy-open con-

tainer, as set forth in claim 18, in which said steps of applying a high strength bonding means comprises applying a permanent adhesive, and in which said step of applying a low strength bonding means comprises applying a frangible adhesive.

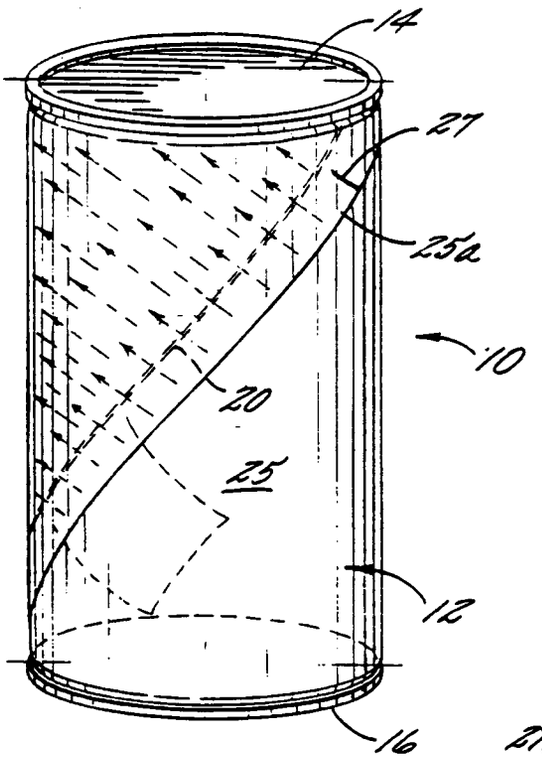

Fig. 1.

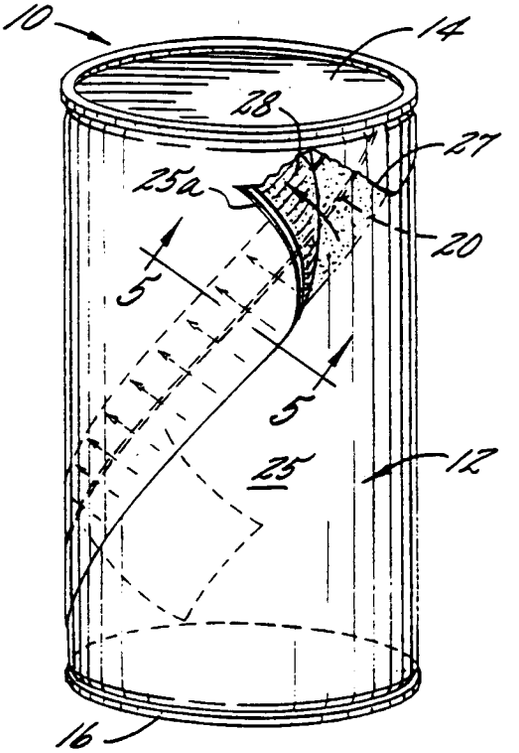

Fig. 2.

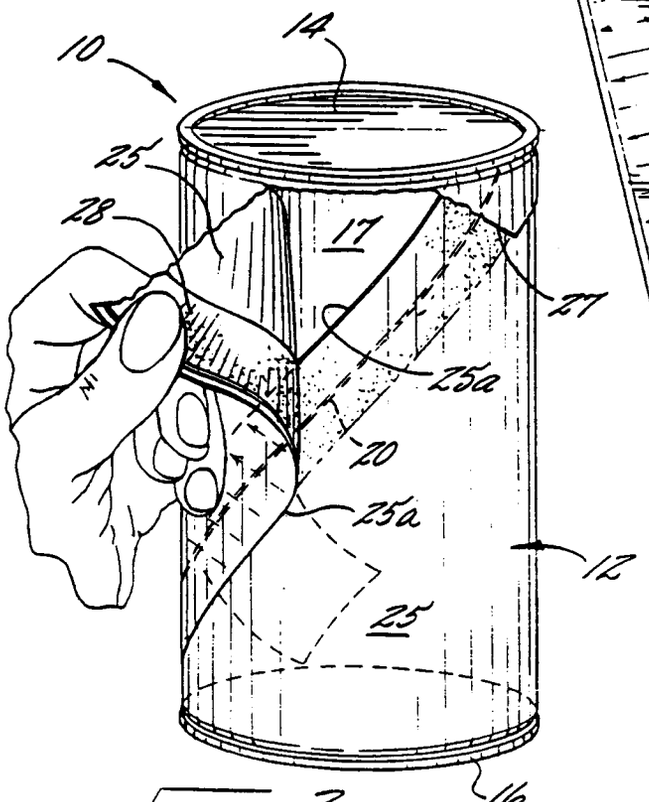

Fig. 3.

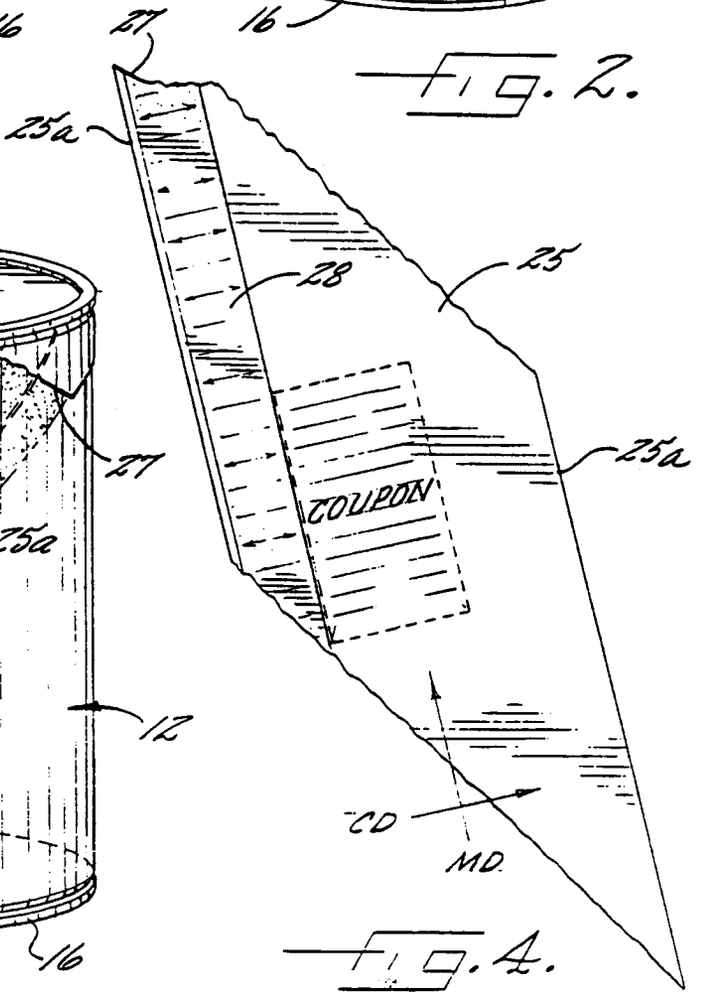

Fig. 4.

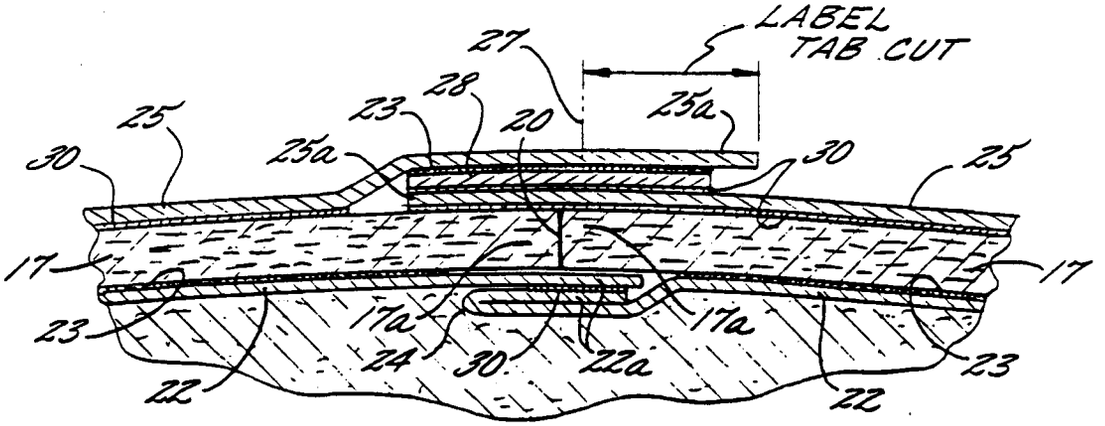

Fig. 5.

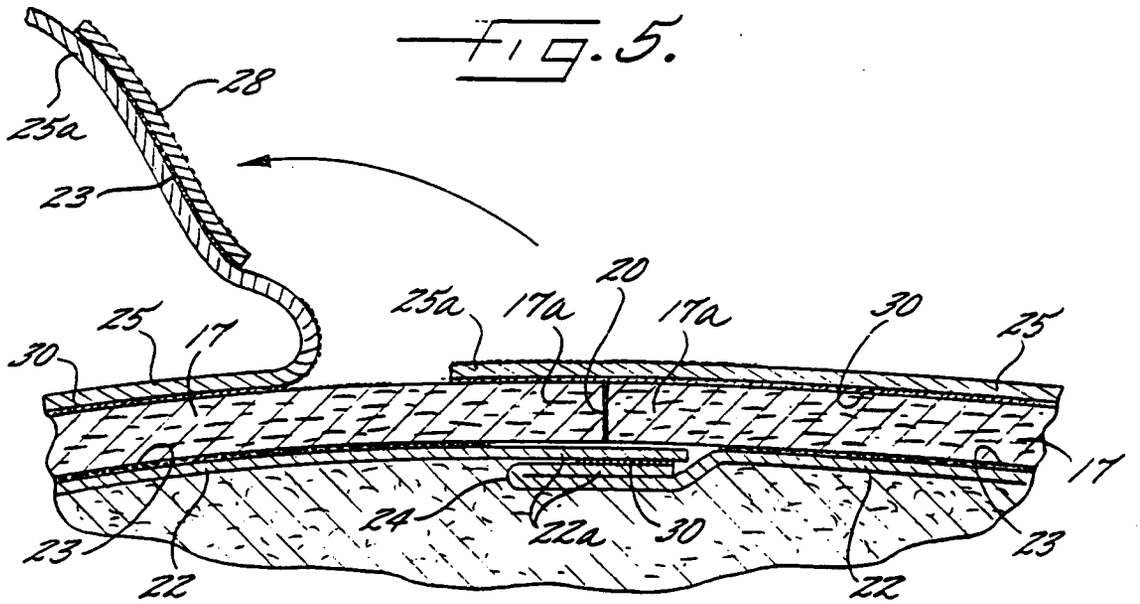

Fig. 6.

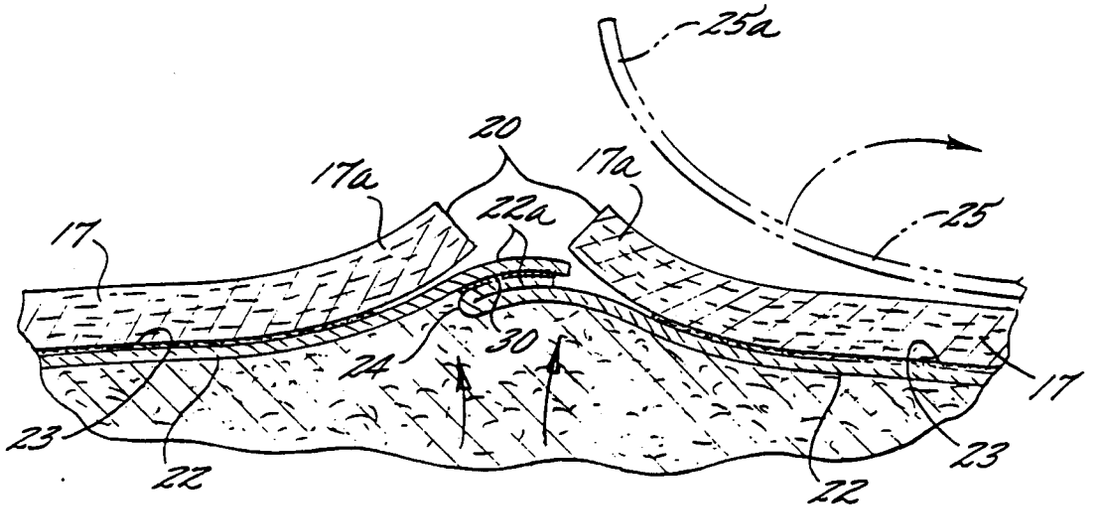

Fig. 7.

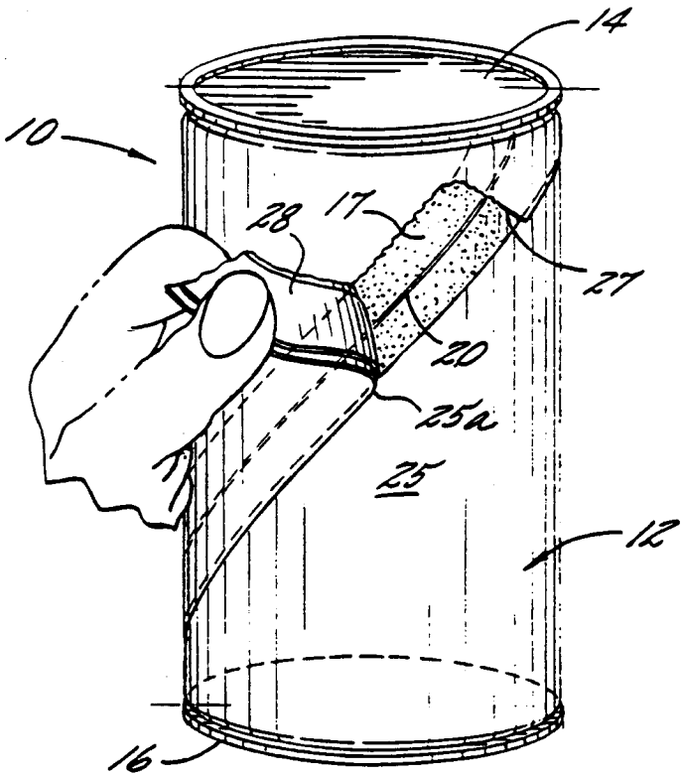

FIG. 8.

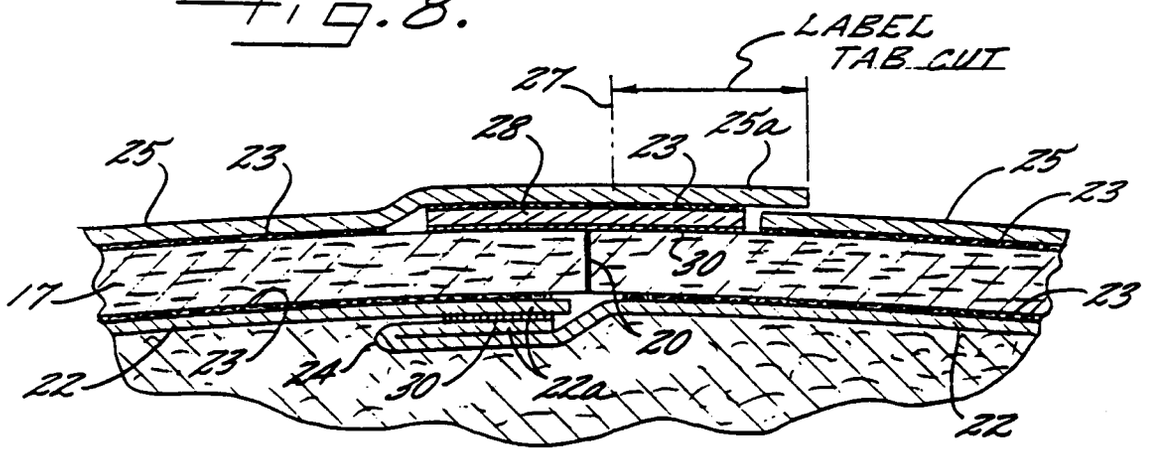

FIG. 9.

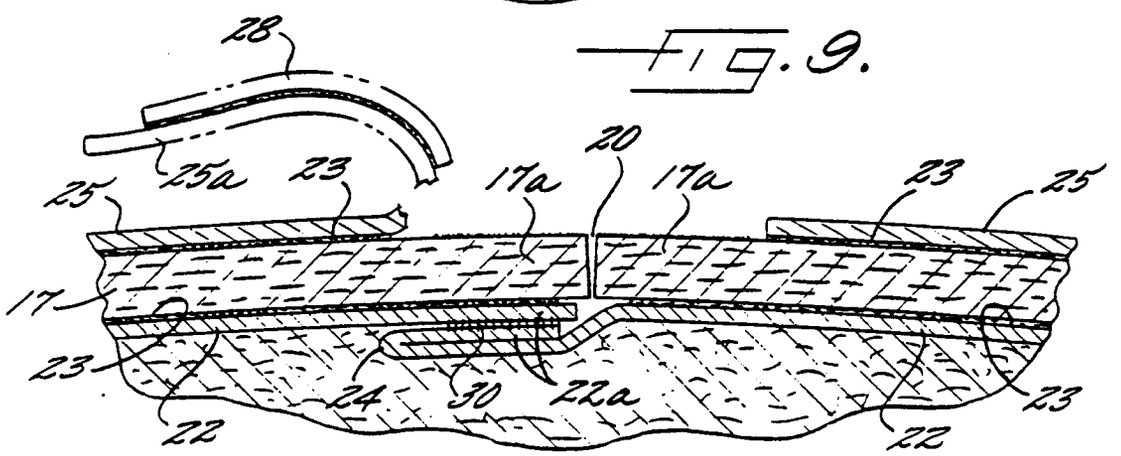

FIG. 10.

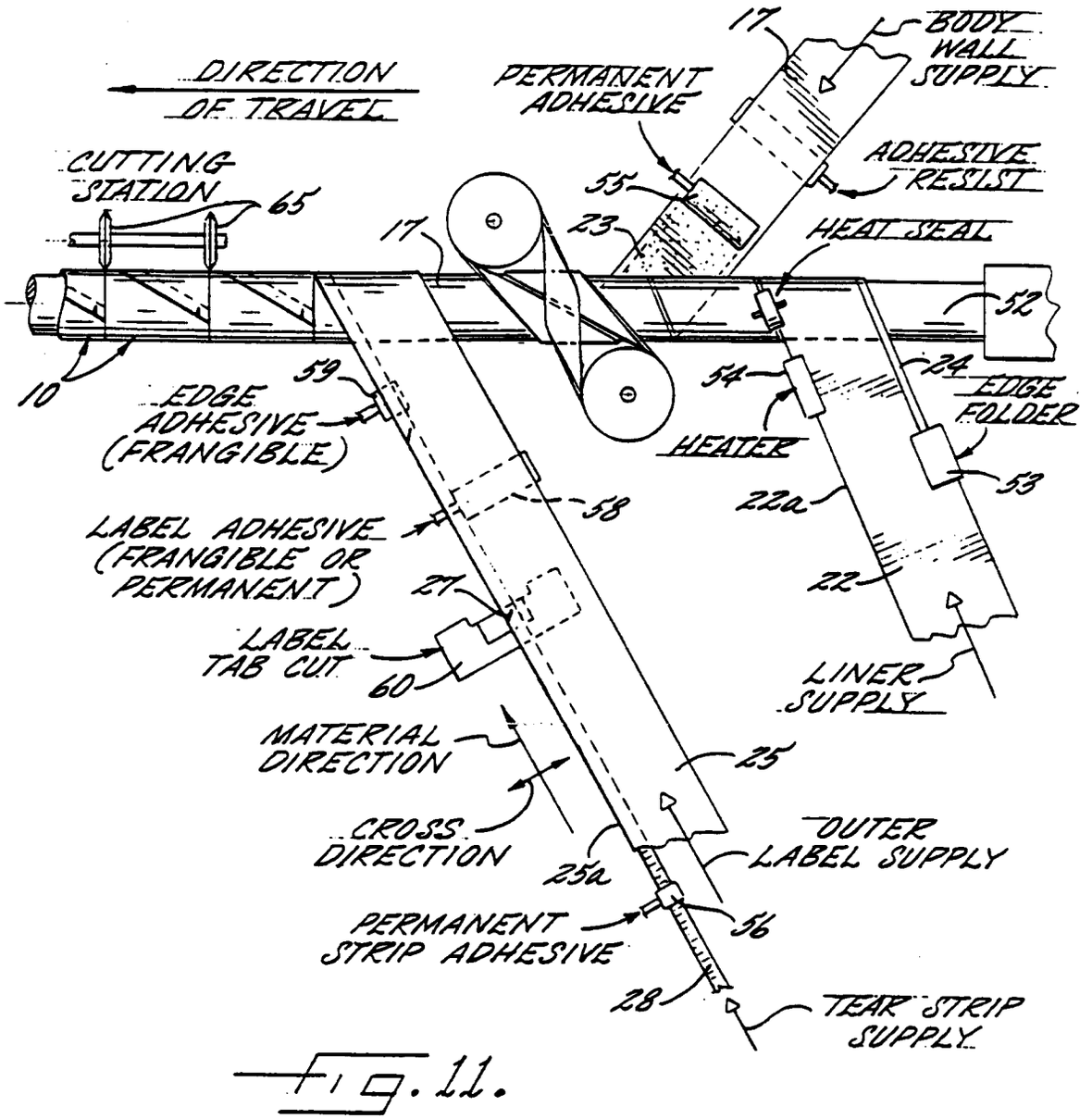
DIRECTION OF TRAVEL
CUTTING STATION
65
17
PERMANENT ADHESIVE
17
BODY WALL SUPPLY
ADHESIVE RESIST
55
23
HEAT SEAL
52
10
59
54
24
EDGE FOLDER
EDGE ADHESIVE (FRANGIBLE)
HEATER
53
58
22a
LABEL ADHESIVE (FRANGIBLE OR PERMANENT)
27
22
LABEL TAB CUT
60
LINER SUPPLY
MATERIAL DIRECTION
25
CROSS DIRECTION
OUTER LABEL SUPPLY
25a
PERMANENT STRIP ADHESIVE
56
28
TEAR STRIP SUPPLY

Fig. 11.

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 95 30 5374

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	US-A-3 940 496 (TURPIN ET AL)	1,2,5,6, 11-17	B65D3/26 B31C3/00
A	* the whole document *	8	
X	US-A-3 174 676 (STUMP ET AL)	1,2,5,6, 11-13	
A	* the whole document *	8,10,14	
X	US-A-4 257 316 (RODER ET AL)	1	
A	* the whole document *	5,14-16	
D,X	US-A-3 981 433 (THORNHILL ET AL)	1	
A	* the whole document *	5	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

B65D
B31C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	24 January 1996	Leong, C

CATEGORY OF CITED DOCUMENTS

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L : document cited for other reasons

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