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(71) Applicant: DOWBRANDS INC. [US/US]; 9550 Zionsville Road, Indianapolis, IN 46268 (US).

(72) Inventors: SAAD, Zain, E., M.; 2206 Wyllys Court, Midland, MI 48642 (US). DAWKINS, Richard; 1383 Savoy Lane, Saginaw, MI 48604 (US). COLUCCI, Michael, J.; 5617 South Chapel Drive, Saginaw, MI 48603 (US). PRICE, William, D.; 5200 Nakoma, Midland, MI 48640 (US).

(74) Agent: JOZWIAK, Elisabeth, T.; Patent Dept., P.O. Box 1967, Midland, MI 48641–1967 (US).

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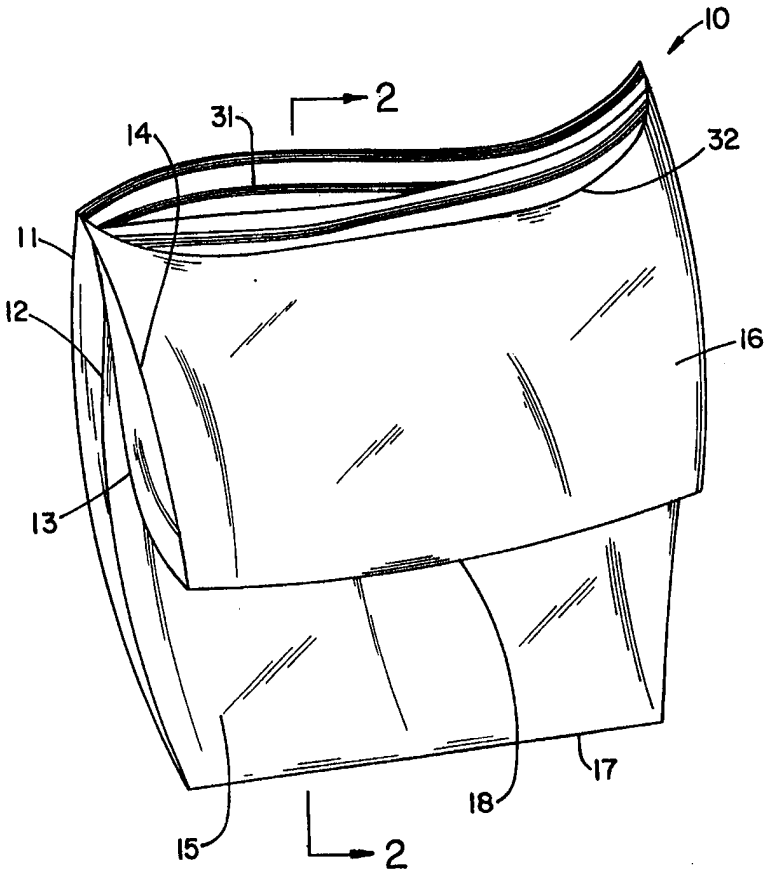
(54) Title: MULTICOMPARTMENT THERMOPLASTIC BAG

(57) Abstract

A multicompartment reclosable thermoplastic bag (10) having at least two compartments (15, 16) is disclosed. Each compartment has a top, a bottom, side edges, and two opposing sidewalls joined at the side edges and the bottom. Each compartment has a closure (31, 32) across the top thereof, which are arranged back–to–back and aligned such that the center points of each closure are less than 1/2 inch (1.27 cm) away from each other. The compartments are attached together proximate the tops of the compartments, and the bottoms of the compartments are free from being attached to each other. A process for making the bag is also disclosed.



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MULTICOMPARTMENT THERMOPLASTIC BAG

The present invention relates to reclosable thermoplastic bags. More particularly, the present invention relates to reclosable thermoplastic bags having multiple compartments.

Reclosable thermoplastic bags are commonly used in food packaging. The bags are generally made out of a plastic film and have two side walls that are folded at the bottom and sealed at the sides. The bags typically have a reclosable fastener at the top of the bag, such as, for example, an adhesive, a wire tie, or a plastic zipper such as that described in U.S. Patent 5,140,727, issued to Dais et al.

The consumers that use these bags often need more than one bag at any given time. Therefore, bags having more than one compartment have been developed. For example, U.S. Patent 4,993,844 discloses a compartmented pouch. However, the closures in the pouch of the '844 patent are displaced relative to one another, making it difficult for a consumer to close one compartment without squashing the contents of another compartment. Furthermore, the '844 patent describes a shared wall for the compartments, which restricts the available volume inside the compartment. Another example is U.S. Patent 5,024,536, which describes a resealable compartmented bag. However, the '536 patent describes the compartments of the bag as being sealed together along the bottom edges of the compartments, thereby restricting the available volume inside the compartments.

It would be an advance in the art of compartmented bags to provide a multicompartment bag in which all of the compartments can be closed simultaneously but opened independently of one another, and in which the available volume inside the compartments is maximized.

The present invention provides such a reclosable thermoplastic container having a plurality of compartments. In one aspect, the present invention is a multicompartment reclosable thermoplastic bag comprising at least two compartments, each compartment having a top, a bottom, side edges, and two opposing sidewalls joined at the side edges and the bottom, each compartment having a closure across the top thereof, the closures being arranged back-to-back, the closures being aligned such that the center points of each closure are less than 1/2 inch (1.27 cm) away from each other, wherein the compartments are attached together proximate the tops of the compartments, and the bottoms of the compartments are free from being attached to each other.

In a second aspect, the present invention is a process for making a reclosable thermoplastic bag having a plurality of compartments, the process comprising the steps of: folding a sheet of film in accordion fashion into at least four panels a, b, c and d, , the panels being in series so that panel a is adjacent to panel b, panel b is adjacent to panel c, and panel c is adjacent to panel d; applying a closure element to each panel such that all of the closure elements are aligned; and sealing the sides of the four panels to form a bag having at least two compartments, so that the closure elements form a closure to close the compartments to the outside.

The multicompartment bag of the present invention is advantageous because all of the compartments can be closed simultaneously, but each compartment can be opened independently of the other compartments, if desired. Furthermore, the volume available inside the compartments of the multicompartment bag of the present invention is increased because the compartments are not attached to each other along the bottom. Another advantage of the present invention is that the multicompartment bag can be made using a single sheet of thermoplastic film.

Fig. 1 is a perspective view of the multicompartment thermoplastic bag of the present invention.

Fig. 2 is a sectional view of the bag of Fig. 1.

Fig. 3 is a sectional view of a closure used in the bag of Fig. 1.

Fig. 4 is a plan view of an extruded sheet used to make the multicompartment bag of the present invention.

Fig. 5 is a perspective view of the sheet of Fig. 4.

Fig. 1 illustrates a multicompartment reclosable thermoplastic bag 10 of the present invention. Bag 10 includes at least two compartments 15 and 16. Each compartment 15 and 16 has a top, a bottom, side edges, and two opposing sidewalls joined at the side edges and the bottom. Thus, compartment 15 has a bottom edge 17 and two opposing side edges. Compartment 16 likewise has a bottom edge 18 and two opposing side edges. Each compartment also has a closure element across the top thereof. Thus, compartment 15 has closure 31 across the top thereof, while compartment 16 has closure 32 across the top thereof. The bag 10 also includes means for joining the compartments 15 and 16 proximate to the tops thereof.

Each sidewall of compartments 15 and 16 is made of a layer of thermoplastic film Thus, bag 10 includes at least four layers of film 11 12 13 and 14. Each layer 11 12 13 and 14 has a top edge, a bottom edge and two opposing side edges. Layers 11 and 12 are attached along the bottom and the side edges to form the compartment 15. Layers 13 and 14 are attached along the bottom and the side edges to form the compartment 16. Thus, as shown, layer 11 is an outer layer of the first compartment, while layer 12 is an inner layer of the first compartment. Likewise, layer 14 is an outer layer of the second compartment while layer 13 is an inner layer of the second compartment.

Fig. 2 illustrates a sectional view of an embodiment of the bag of the present invention. The layers 11 12 13 14 can be made from any suitable thermoplastic film such as, for example, low density polyethylene, linear low density polyethylene, substantially linear copolymers of ethylene and a C3-C8 α-olefin, polypropylene, polyvinylidene chloride, ethylene vinyl acetate, polylactic acid, mixtures of two or more of these polymers, or mixtures of one of these polymers with another thermoplastic polymer. The film can be a co-extruded film, if desired.

Bottom edge 17 of compartment 15 and bottom edge 18 of compartment 16 can be formed using any desired method. For example, the bottom edges can be formed by folding the film, by heat sealing, by ultrasonic sealing, by an adhesive seal, or by any other desired method.

The side edges of compartments 15 and 16 are formed by joining layers of film along the side edges thereof using any desired method. For example, the side edges can be formed by hot wire sealing, hot knife sealing, ultrasonic sealing, an adhesive seal, or by any other desired method. The result is that every two layers of film are joined together such that two layers together form a compartment. Thus, in Figs. 1 and 2, layers 11 and 12 are joined together to form compartment 15, while layers 13 and 14 are joined together to form compartment 16. If desired all layers can be joined along the side edges.

The bag 10 includes means for joining compartment 15 and compartment 16 proximate to the tops of the compartments, so that the bag 10 is a single unit. Compartments 15 and 16 can be joined, proximate to the tops, in any desired manner. For example, the compartments can be joined by a continuous or intermittent heat seal or ultrasonic seal.

Alternatively, as shown in Fig. 3, the compartments can be joined by a fold 52 in the film at the top of the bag between layers 12 and 13. Fold 52 can be above or below the fasteners. In a preferred embodiment, fold 52 extends about 0.5 inches above the bottom of the fasteners.

Alternatively, the means for joining compartments 15 and 16 can be an adhesive 36 disposed continuously or intermittently between layers 12 and 13. The adhesive is preferably applied to a point proximate to the closures. Suitable adhesives include any adhesive that provides sufficient adhesion to the film layers 12 and 13 so that the layers remain attached while compartments 15 and/or 16 are opened. Examples of such adhesives include HM2707 and HL2203, available commercially from H. B. Fuller. An adhesive is especially useful when closure elements are disposed along both layers 12 and 13, in order to stabilize and align the closures.

Compartments can be joined by any other suitable means, such as, for example, by extruded lamination of a polymer such as low density polyethylene. The effect of joining the compartments proximate to the top is to minimize movement of the aligned closure elements with respect to each other. When movement of the closures is minimized, it is easier for a consumer to close the compartments simultaneously and to open one or more compartments.

As shown in Fig. 3, in a preferred embodiment, both a fold 52 and an adhesive 36 are used as means for joining the compartments. In this embodiment, the adhesive 36 is applied from the point of fold 52 down to a point at least between the profiles 31b and 32b. This distance can be as high as 0.5 inches (12.7 mm), although preferably the adhesive is applied in a band having a width of from about 1/8 inch (3.17 mm) to about 1/16 inch (1.59 mm). Preferably the adhesive is applied between the profiles 31b 32b or above the profiles 31b 32b.

The bag 10 includes a closure disposed along the top of each compartment, so that each compartment 15 and 16 has a complete closure across the top. The term "closure element" is defined herein to mean one part of a closure. For example, on a zipper closure, a closure element is one profile or the other of the zipper, e.g., a rib profile or a groove profile. On an adhesive closure, a closure element is one adhesive strip or the other. The closure elements can be post-applied, integral or laminated to the film, all of which are commonly known methods of applying closures to reclosable thermoplastic bags.

In one embodiment, a double-sided zipper tape can be laminated to the tops of layers 12 and 13. A double-sided zipper tape is one in which both sides of the zipper

tape have a profile of a plastic zipper on it, i.e., a rib profile or a groove profile. The profiles extend outwardly from each side of the zipper tape such that a single zipper tape contains two profiles extending therefrom.

Fig. 3 illustrates a sectional view of closures 31 and 32 which can be used for the present invention. Closures 31 and 32 can be any suitable closures. For example, as shown, closure 31 can be a plastic zipper having interlockable profiles 31a and 31b, and closure 32 can also be a plastic zipper having interlockable profiles 32a and 32b. However, the closures can be adhesive closures or any other suitable reclosable closures, if desired.

The profiles 31a, 31b, 32a and/or 32b of the plastic zipper are disposed along the tops of layers 11 12 13 and 14, so that each compartment has a complete closure along the top thereof. The closure on any two compartments need not be the same, although they can be. For example, one compartment might have a plastic zipper while another compartment might have an adhesive closure.

The closures on each compartment are substantially aligned with each other such that all of the compartments can be closed with a single motion on the part of a consumer. In this manner, all of the compartments can be closed simultaneously. The term "aligned" is defined herein to mean that the center points of the profiles are lined up such that, as seen from a front view, only one closure element can be seen, with all of the other closure elements being lined up substantially behind that closure element and thus substantially hidden from view. Preferably, the closure elements are aligned such that the center points are less than or equal to 1/2 inch (1.27 cm) away from each other. More preferably, the center points are 1/4 inch (0.63 cm) away from each other, and most preferably, the center points are 1/8 inch (0.32 cm) away from each other.

As shown in Figs. 1-3, the closures are positioned such that the rib profiles 31b and 32b are aligned with each other. In the embodiment shown, the rib profiles are positioned back-to-back. The term "back-to-back" is defined herein to mean that the closure elements are positioned substantially adjacent to each other but extend away from each other. In the embodiment shown, closure element 31b is positioned adjacent closure element 32b, and closure elements 31b and 32b are positioned such that the closure face away from each other. Thus, closure elements 31b and 32b are said to be aligned back-to-back.

Back-to-back alignment eases the ability for a consumer to interlock both closures 31 and 32 on both compartments 15 and 16 in a single motion. On the other

hand, closures 31 and 32 can be opened independently from one another, such that one compartment can be opened while the other compartment remains closed.

In one embodiment, the bag can be designed such that one closure will open preferentially. In other words, when the bag has two adjacent compartments with plastic zippers disposed across the tops thereof, the force required to open one of the plastic zippers can be modified to be greater than the force required to open the other plastic zipper. The opening force can be modified using any desired means. For example, the opening force of a plastic zipper can be modified by altering the profile geometry. Examples include making the groove of one groove profile bigger or making the rib of one rib profile thinner, or altering one or more of the radii of the various hooks in the closure. Alternatively, the opening force of a plastic zipper can be modified by changing the type of plastic to one that has different friction characteristics.

The compartments can be of equal size, although they need not be. Preferably, the compartments all have equal width, although the depths of the compartments can vary. For example, all of the compartments might have a 6.5 inch (16.51 cm) width and an 8 inch (20.32 cm) depth. Alternatively, all of the compartments might have a 6.5 inch (16.51 cm) width, while one compartment has an 8 inch (20.32 cm) depth and another compartment has a 6 inch (15.24 cm) depth.

The thicknesses of the layers of film can be equal or the thicknesses can vary. For example, if desired, all of layers 11, 12, 13 and 14 can have a thickness in the range of from 2.5 mils (0.0635 mm) to 5.0 mils (0.127 mm), which is a typical thickness of a ZIPLOC brand freezer bag. Alternatively, the layers can all have thicknesses in the range from 1.75 mils (0.0445 mm) to 2.7 mils (0.0686 mm), which is a typical thickness of a ZIPLOC brand storage bag, or the layers 11, 12, 13 and 14 can all have thicknesses in the range of from 1.0 mils (0.0254 mm) to 1.2 mils (0.0305 mm), which is a typical thickness of a ZIPLOC brand sandwich or snack bag. On the other hand, the layers 11, 12, 13 and 14 can all have different thicknesses, which can be any combination of the above thicknesses. Moreover, one or more of layers 11, 12, 13 and/or 14 can be even thinner, from 0.6 mils (0.0152 mm) to 1.2 mils (0.0305 mm). The desired thickness of the various layers depends upon the final use of the multicompartment bag. For example, thicker layers of film are general useful for longer term storage, whereas thinner film thicknesses are useful for items which will be used in the short term. Thinner layers also tend to cling to the packaged material better than thicker layers.

If desired, one or more of the layers can be microperforated. The term "microperforated" means that the film has small holes therein. Such a microperforated film makes the compartment suitable for storing produce therein, as the microperforated film allows the produce to breathe. Preferably, the microperforations, or holes, have a size in the range of from 200 microns to about 900 microns. If desired, different layers can have different patterns of microperforations therein. For example, layer 12 might have microperforations in the range of from 200 to 300 microns, while layer 13 can have microperforations of from 800 to 900 microns. Preferably, the density of the microperforations is from 100 microperforations to 500 microperforations per layer of film, for a 6.625 inch (16.83 cm) by 7 inch (17.78 cm) layer of film. The microperforations can be evenly dispersed across a layer or can be clustered in groups of several microperforations. Furthermore, different layers of film can have different patterns of microperforations. Generally, any combinations of patterns of microperforations can be used. The microperforations can be formed using any conventional method such as a hot needle perforator. More details about microperforated bags are described in U.S. Patent 5,492,705, incorporated herein by reference.

If desired, one or more of the layers can be embossed. Embossing creates a texture on the surface of the film. Embossing thus provides a visual cue to the consumer that one layer of film is different than the other layers, as the texture scatters the light differently, thereby changing the appearance of the film. Moreover, the textured surface adheres to the stored food better than a smooth surface does. Any combination of layers can be embossed.

The preferred method of making the bag of the present invention begins with an extrusion process well known in the art. The bag is made with a large extruded sheet of thermoplastic film. Fig. 4 illustrates an example of such an extruded sheet 40 that can be used to make the bag of the present invention. The sheet 40 comprises at least four panels 41, 42, 43 and 44, each panel representing a layer of film in the final bag. Thus, the panels 41, 42, 43 and 44 correspond to the layers 11, 12, 13 and 14 in the bag shown in Figs. 1-2. The panels 41, 42, 43 and 44 can be the same size, or the size of the panels can vary according to the desired size of the final compartments.

As shown, extruded sheet 40 contains profiles 31a, 31b, 32a and 32b integral therewith. However, if desired, profiles 31a, 31b, 32a and 32b can be post-applied, i.e., applied after the film is extruded, or profiles 31a, 31b, 32a and 32b can be attached to the sheet by laminating a zipper tape thereto. In one embodiment, a double-sided zipper tape

having profile 31b on one side thereof and profile 32b on the other side, can be laminated to the sheet. When the profiles are extruded integrally with sheet 40, preferably, profiles 31b and 32b are side by side on the sheet 40, so that when the sheet 40 is folded, as described below, the profiles 31b and 32b are back to back.

If desired, any or all of the panels 41, 42, 43 or 44 can be microperforated or embossed. In this manner, the final bag will have some or all layers which will be microperforated or embossed. Furthermore, if the final bag is to have layers of varying thicknesses, the extruder die lip can be designed such that the die gap varies, thereby forming an extruded sheet 40 that has multiple thicknesses. When the sheet 40 is folded, as described below, the layers will then have varying thicknesses.

Fig. 5 illustrates the manner in which the sheet 40 can be folded to make the bag of the present invention. The sheet 40 can be folded along lines 51, 52 and 53. The folds will form the bottom edges 17 and 18 along the fold lines 51 and 53, respectively.

The fold along line 52 will position the profiles 31b and 32b back to back. Fold line 52 is also the point at which the compartments 15 and 16 are joined. The fold along lines 51 and 53 enable the profiles 31a and 32a to be aligned with profiles 31b and 32b to close the compartments. Preferably, the extruded sheet is thinner proximate to the fold line 52, referred to herein as the "thinner section". The thinner section permits easier folding. More preferably, the thinner section is less than or equal to half as thick as the rest of the extruded sheet. Even more preferably, the thinner section is from 0.5 mils (0.0127 mm) to 2.0 mils (0.0508 mm) thick and yet even more preferably from 1.0 mils (0.0254 mm) to 1.5 mils thick (0.0381 mm). If the thinner section is too thin, the sheet will tear easily, whereas if the thinner section is too thick, the sheet will not fold easily. Preferably, the thinner section is 1/4 inch (6.35 mm) wide or less.

If desired, as the extruded sheet 40 is being folded, and adhesive can be disposed along the back of the sheet on either side of the fold line 52. In this manner, when the sheet 40 is folded, the compartments will be joined by the fold as well as by the adhesive disposed along the sheet. The adhesive allows better alignment of the zipper profiles, because profiles 31b and 32b will be held in place and free from movement with respect to one another. Normally, the compartments are also joined by the side seals.

After the sheet is folded and the adhesive is applied, the sheet is heat sealed along the edges of the bag. The heat sealing permeates all of the panels, or layers of the bag. The heat seal can be accomplished by use of a hot wire, a hot knife, or any other desired means. In this manner, the side edges of the compartments are formed.

If desired, the sheet can be corona-treated before being folded. Corona treating permits printing to be easily applied to the bag surface. For example, a stripe can be printed along the bottom of one or more of the compartments in order to give a visual cue to the consumer as to the location of the bottom of the compartment.

The following examples are not meant to limit the scope of the invention.

EXAMPLE 1

A multicompartment bag having two compartments is made. The first compartment has the dimensions 6.625 inches long (16.83 cm) by 7 inches wide (17.78 cm). The second compartment has the dimensions 4.75 inches long (12.06 cm) by 7 inches wide (17.78 cm).

Both of the sidewalls of the first compartment are 1.1 mils (0.028 mm) thick on average. Both of the sidewalls of the second compartment are 1.1 mils (0.028 mm) thick on average. A groove profile of a plastic zipper is disposed along the outer layer of the first compartment, formed by a cast integral extrusion process. Likewise, a groove profile of a plastic zipper is disposed along the outer layer of the second compartment, formed by a cast integral extrusion process. The rib profiles are aligned back-to-back along either side of a double-sided zipper tape, which is laminated to the top of the inner layer of the first compartment.

The two compartments are joined by a fold in the film between the two inner layers and by side seals along the side edges of the bag. The fold is about 0.5 inches (1.27 cm) below the plastic zipper when the zipper is closed. The laminated double-sided zipper tape extends upwardly from the fold such that the rib profiles on either side of the zipper tape can come into contact with and interlock with the groove profiles, thereby closing the compartments.

EXAMPLE 2

A multicompartment bag having two compartments is made. The first compartment has the dimensions 6.625 inches long (16.83 cm) by 7 inches wide (17.78 cm). The second compartment has the dimensions 4.75 inches long (12.06 cm) by 7 inches wide (17.78 cm).

Both of the sidewalls of the first compartment are 1.1 mils thick (0.028 mm) on average. Both of the sidewalls of the second compartment are 1.1 mils thick (0.028 mm) on average. A plastic zipper is disposed along the tops of both the first and second compartments.

The two compartments are joined by a fold in the film between the two inner layers and by an adhesive disposed between the two inner layers. In addition, the compartments are joined by side seals along the side edges of the bag.

EXAMPLE 3

A multicompartment bag having three compartments is made. The first compartment has the dimensions 8.5 inches long (21.59 cm) by 7 inches wide (17.78 cm). The second compartment is 6.625 inches long (16.83 cm) by 7 inches wide (17.78 cm). The third compartment is 4.75 inches long (12.06 cm) by 7 inches wide (17.78 cm).

The thicknesses of both of the sidewalls of the first compartment are 2.2 mils on average (0.056 mm). The thicknesses of both of the sidewalls of the second compartment are 1.1 mils on average (0.028 mm). The thicknesses of both of the sidewalls of the third compartment are 1.1 mils on average (0.028 mm).

A plastic zipper is disposed along the tops of both the first and second compartments. An adhesive closure is disposed along the top of the third compartment.

The compartments are joined by a fold in the film between adjacent layers and by an adhesive disposed between the adjacent layers. In addition, the compartments are joined by side seals along the side edges of the bag.

EXAMPLE 4

A multicompartment bag having two compartments is made. The first compartment has the dimensions 6.625 inches long (16.83 cm) by 7 inches wide (17.78 cm). The second compartment has the dimensions 4.75 inches long (12.06 cm) by 7 inches wide (17.78 cm).

The thicknesses of both of the sidewalls of the first compartment are 1.1 mils on average (0.028 mm). The thicknesses of both of the sidewalls of the second compartment are 1.1 mils on average (0.028 mm). A plastic zipper is disposed along the tops of both the first and second compartments.

The two compartments are joined by a fold in the film between the two inner layers and by an adhesive disposed between the two inner layers. In addition, the compartments are joined by side seals along the side edges of the bag.

The outer layer of the first compartment, which corresponds to layer 11 of Fig. 1, is microperforated. The microperforations have a diameter of 250 microns on average. There are 500 microperforations on the layer.

The outer layer of the second compartment, which corresponds to layer 14 of Fig. 1, is microperforated. The microperforations have a diameter of 850 microns on average. There are 100 microperforations on the layer.

EXAMPLE 5

A multicompartment bag having two compartments is made. The first compartment has the dimensions 6.625 inches long (16.83 cm) by 7 inches wide (17.78 cm). The second compartment also has the dimensions 6.625 inches long (16.83 cm) by 7 inches wide (17.78 cm).

The thickness of the outer sidewall of the first compartment is 3.5 mils on average (0.089 mm). The thickness of the inner sidewall of the first compartment is 0.8 mils on average (0.020 mm). Likewise, the thickness of the outer sidewall of the second compartment is 3.5 mils on average (0.089 mm), and the thickness of the inner sidewall of the second compartment is 0.8 mils on average (0.020 mm). A plastic zipper is disposed along the tops of both the first and second compartments.

The two compartments are joined by a fold in the film between the two inner layers and by an adhesive disposed between the two inner layers. In addition, the compartments are joined by side seals along the side edges of the bag.

The inner layers of both the first and second compartments are embossed. The pattern on the embossed layers appears to be a repeating diamond-shaped pattern.

While certain representative embodiments and details have been shown for purposes of illustrating the invention, it will be apparent to those skilled in the art that various changes in the methods and apparatus disclosed herein may be made without departing from the scope of the invention, which is defined in the appended claims.

1. A multicompartment reclosable thermoplastic bag comprising:

at least two compartments, each compartment having a top, a bottom edge, two opposing side edges, and two opposing sidewalls joined at the side edges and the bottom edge, each compartment having a closure across the top thereof, the closures being arranged back-to-back, the closures being aligned such that the center points of each closure are less than 1/2 inch (1.27 cm) away from each other,

wherein the compartments are attached together proximate the tops of the compartments, and the bottom edges of the compartments are free from being attached to each other.

2. The bag of Claim 1, wherein the compartments are attached together proximate to the tops by a folded section of plastic film, an adhesive, a heat seal, an ultrasonic seal, an extruded lamination, or a combination thereof.

3. The bag of Claim 1, wherein the closure on at least one of the compartments is a plastic zipper.

4. The bag of Claim 1, wherein the closure on at least one of the compartments is an adhesive closure.

5. The bag of Claim 1, wherein the closures on at least two adjacent compartments are plastic zippers.

6. The bag of Claim 5, wherein the opening force for one plastic zipper is greater than the opening force for the other plastic zipper.

7. The bag of Claim 5, wherein two profiles of the plastic zippers are aligned back-to-back on a double-sided zipper tape.

8. The bag of Claim 1, wherein the size of the compartments varies.

9. The bag of Claim 1, wherein the thicknesses of the sidewalls varies.

10. The bag of Claim 1, wherein at least one sidewall of a compartment contains microperforations.

11. A process for making a reclosable thermoplastic bag having a plurality of compartments, the process comprising the steps:

folding a sheet of film in accordion fashion into at least four panels a, b, c and d, , the panels being in series so that panel a is adjacent to panel b, panel b is adjacent to panel c, and panel c is adjacent to panel d;

applying a closure element to each panel such that all of the closure elements are aligned; and

sealing the sides of the four panels to form a bag having at least two compartments, so that the closure elements form a closure to close the compartments to the outside.

12. The process of Claim 11, wherein the closure elements are applied to the panels by extruding them integrally with the sheet of film, post-applying the closure elements to the sheet of film, or by laminating a zipper tape to the sheet of film.

13. The process of Claim 11, wherein the sides of the four panels are sealed by a hot wire seal, a hot knife seal, an ultrasonic seal, or an adhesive seal.

14. The process of Claim 11, wherein all of the panels are of the same size.

15. The process of Claim 11, wherein the panels vary in size.

16. The process of Claim 11, wherein the extruded sheet varies in thickness such that the panels vary in thickness.

17. The process of Claim 11, wherein the extruded sheet includes a thinner section where the sheet is folded.

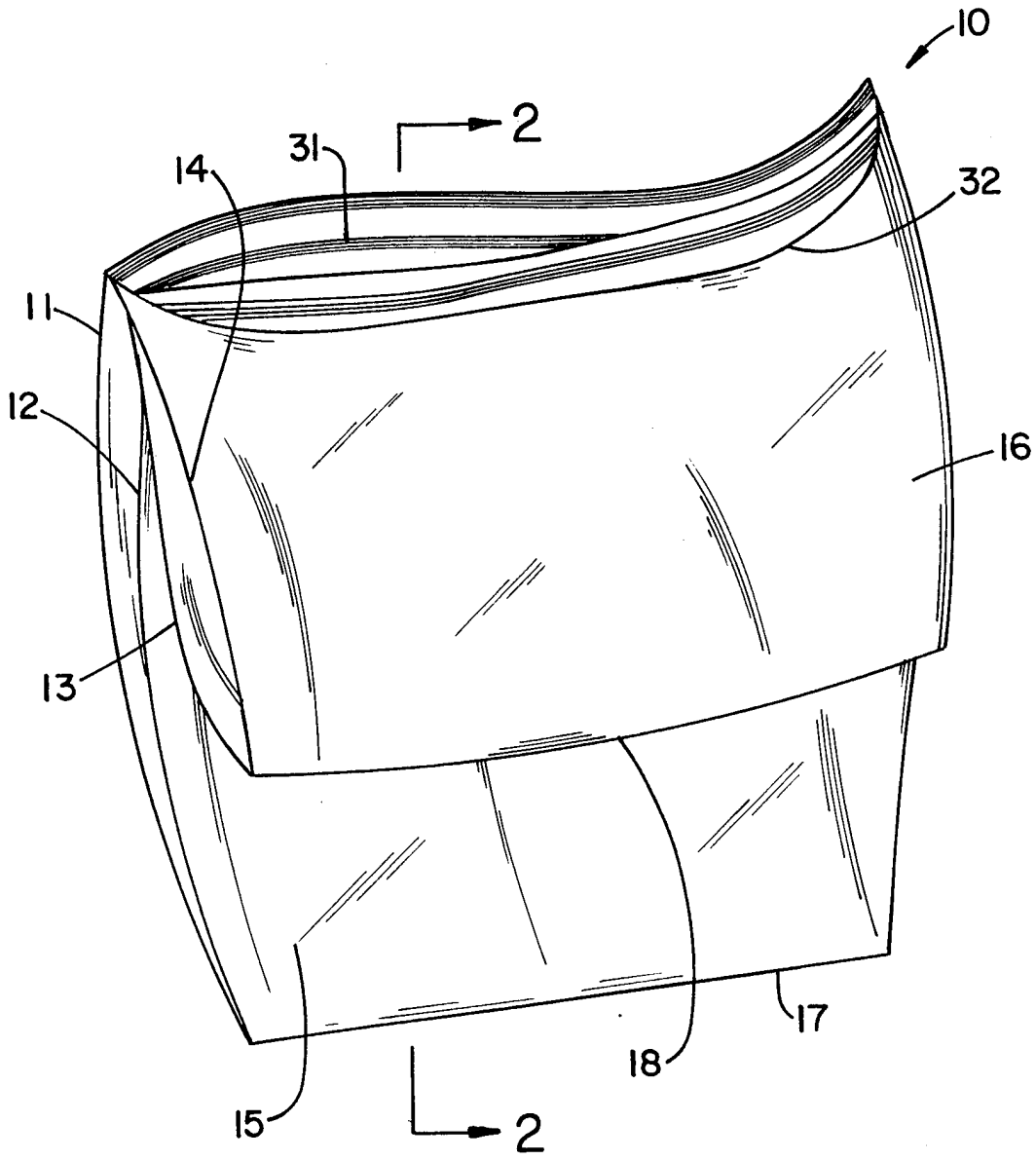

FIG. 1

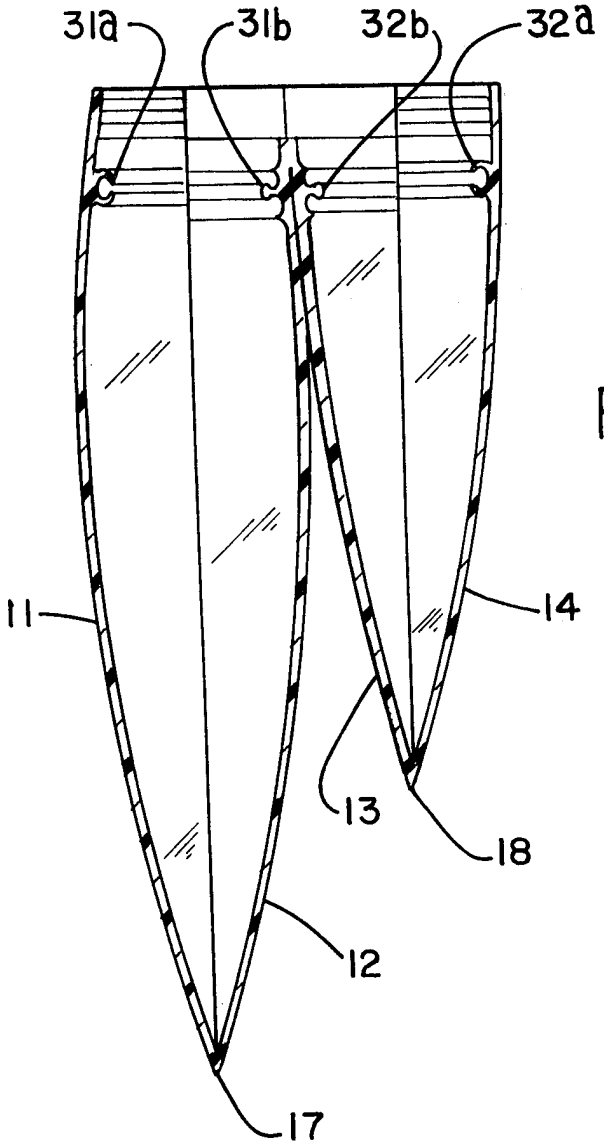

FIG. 2

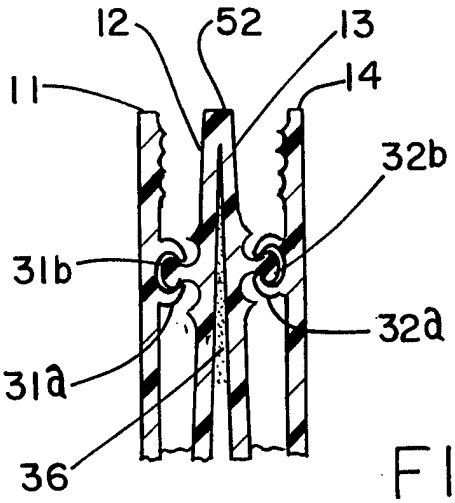

FIG. 3

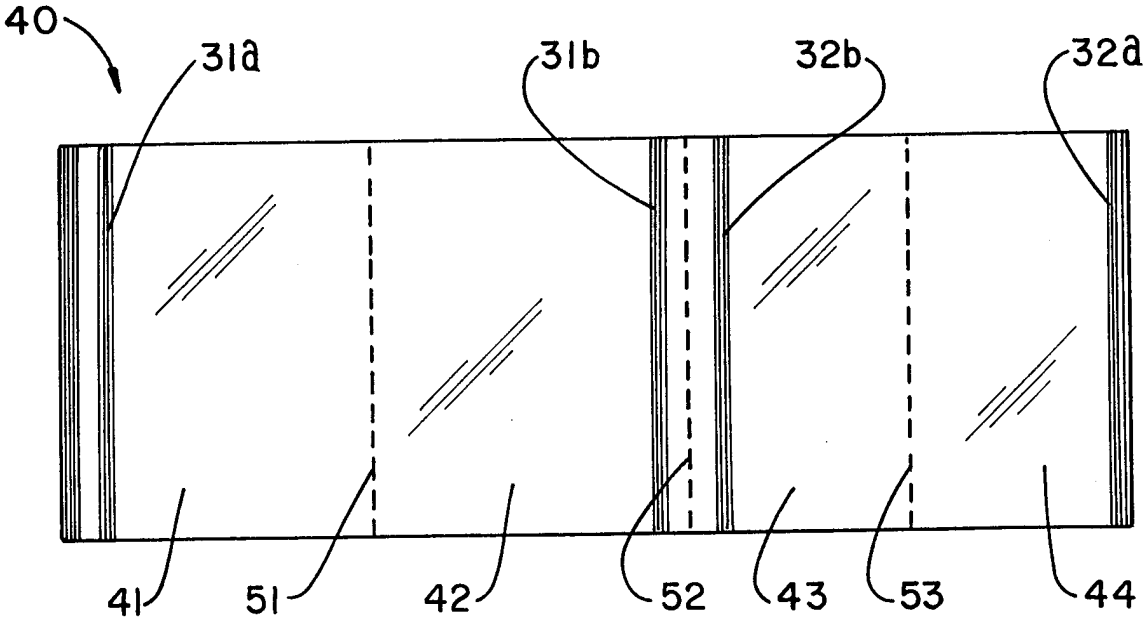
40
31a
31b
32b
32a
41
51
42
52
43
53
44

FIG. 4

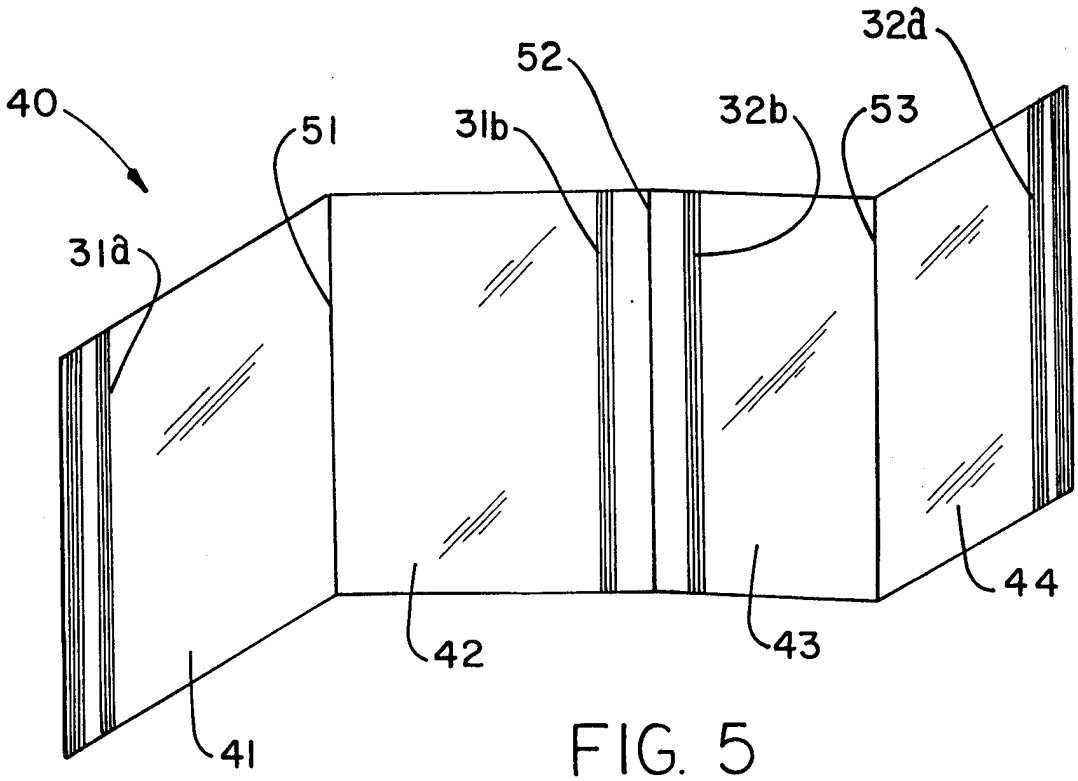
32a
52
40
51
31b
32b
53
31a
44
42
43
41

FIG. 5

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 98/00412

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 B65D30/22 B65D33/25 A44B19/16

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)
IPC 6 B65D A44B

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 practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5 024 536 A (HILL DIANE E) 18 June 1991 cited in the application see column 2, line 10 - column 2, line 63 see figures 7,8	1-6,8-10
A	---	7,11
Y	US 4 927 405 A (MARTIN KENNETH W ET AL) 22 May 1990 see column 2, line 41 - column 4, line 14 see figures 1-5	1-6,8-10
A	---	11
A	US 3 469 768 A (REPKO JOHN P) 30 September 1969 see column 2, line 13 - column 4, line 20 see figures 1-6	11

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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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"&" document member of the same patent family

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Date of the actual completion of the international search	Date of mailing of the international search report
29 April 1998	12/05/1998

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Farizon, P

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INTERNATIONAL SEARCH REPORT

Inte onal Application No
PCT/US 98/00412

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 23 08 436 A (POPP EUGEN) 22 August 1974 see page 16, line 31 - page 16, line 38 see figure 5	7
A	US 4 046 408 A (AUSNIT STEVEN) 6 September 1977 see column 5, line 35 - column 5, line 57 see figures 9,10	7
A	US 5 492 705 A (PORCHIA JOSE ET AL) 20 February 1996 cited in the application see abstract see figure 1	10

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INTERNATIONAL SEARCH REPORT

Information on patent family members

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