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An agency of Industry Canada

CA 2835260 A1 2012/11/15

(21) 2 835 260

(12) DEMANDE DE BREVET CANADIEN
CANADIAN PATENT APPLICATION

(13) A1

(86) Date de dépôt PCT/PCT Filing Date: 2012/05/07
(87) Date publication PCT/PCT Publication Date: 2012/11/15
(85) Entrée phase nationale/National Entry: 2013/11/05
(86) N° demande PCT/PCT Application No.: US 2012/036750
(87) N° publication PCT/PCT Publication No.: 2012/154655
(30) Priorité/Priority: 2011/05/08 (US61/483,732)

(51) Cl.Int./Int.Cl. *B65D 75/00* (2006.01), *B65B 61/02* (2006.01), *B65D 75/58* (2006.01)

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(54) Titre : EMBALLAGE DE TYPE FILM FLEXIBLE REFERMABLE ET PROCEDES DE FABRICATION
(54) Title: RECLOSABLE FLEXIBLE FILM PACKAGING AND METHODS OF MANUFACTURE

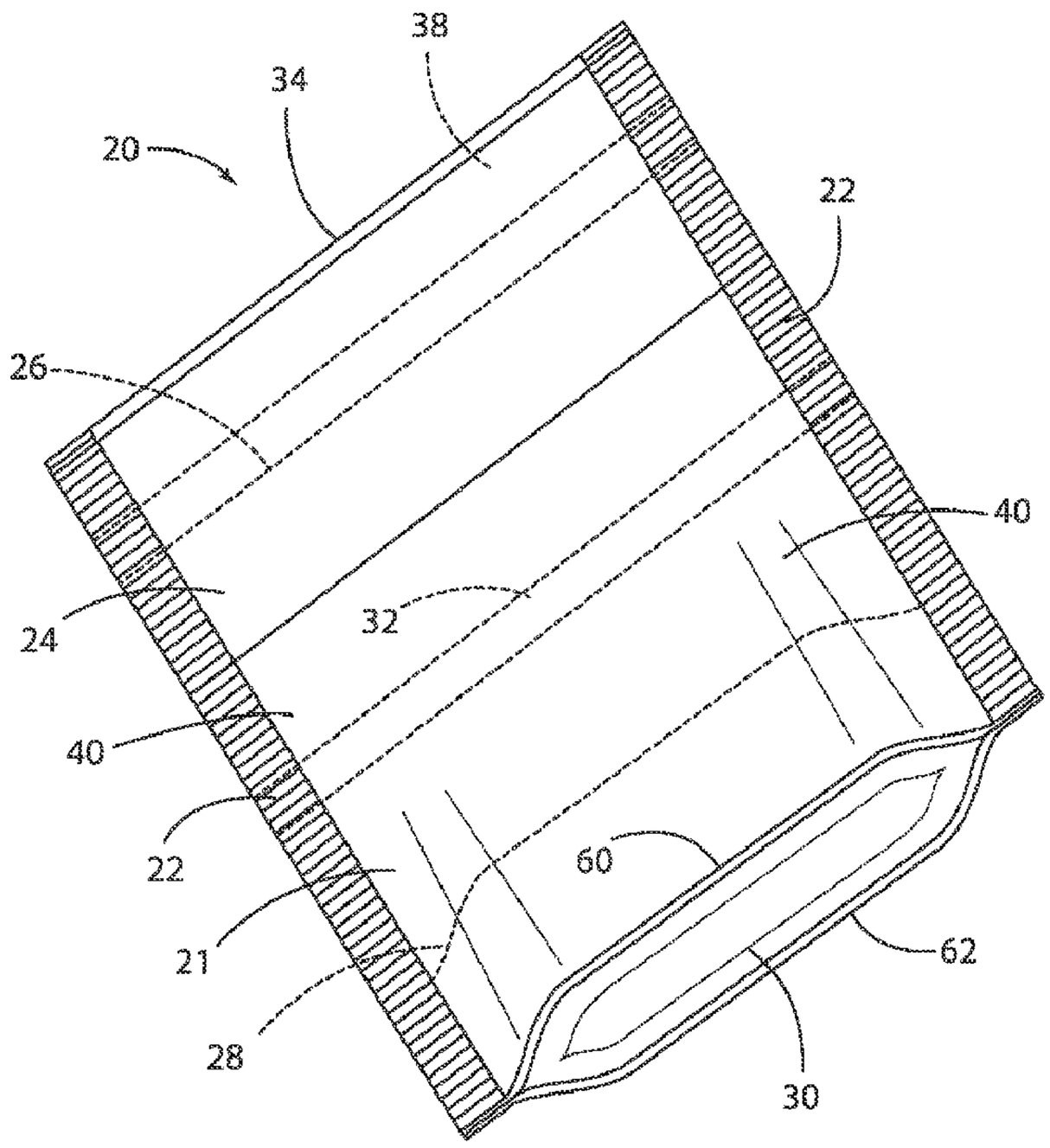

FIG. 1

(57) Abrégé/Abstract:
A reclosable flexible package can have a flexible film forming a body defining an interior contents cavity and having a first pair of opposing edge portions forming a first edge seal, a second pair of opposing edge portions forming a second edge seal, and a third

(21) 2 835 260

(13) A1

(57) Abrégé(suite)/Abstract(continued):
pair of opposing edge portions forming a fin seal extending from the first edge seal to the second edge seal; the body having a first side portion having the fin seal and a second side portion generally opposite the first side portion; a score formed in the flexible film at the second side portion defining an opening to the contents cavity upon initial rupturing; a closure layer covering the score and a portion of the second side portion around the score; a resealable adhesive being between the closure layer and the flexible film; and the closure layer on the second side portion being capable of at least partial removal from the flexible film to rupture the score and form an opening.

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
15 November 2012 (15.11.2012)

WIPO | PCT

(10) International Publication Number
WO 2012/154655 A1

(51) International Patent Classification:
B65D 75/00 (2006.01) *B65B 61/02* (2006.01)
B65D 75/58 (2006.01)

(21) International Application Number:
PCT/US2012/036750

(22) International Filing Date:
7 May 2012 (07.05.2012)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
61/483,732 8 May 2011 (08.05.2011) US

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(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

[Continued on next page]

(54) Title: RECLOSABLE FLEXIBLE FILM PACKAGING AND METHODS OF MANUFACTURE

(57) Abstract: A reclosable flexible package can have a flexible film forming a body defining an interior contents cavity and having a first pair of opposing edge portions forming a first edge seal, a second pair of opposing edge portions forming a second edge seal, and a third pair of opposing edge portions forming a fin seal extending from the first edge seal to the second edge seal; the body having a first side portion having the fin seal and a second side portion generally opposite the first side portion; a score formed in the flexible film at the second side portion defining an opening to the contents cavity upon initial rupturing; a closure layer covering the score and a portion of the second side portion around the score; a resealable adhesive being between the closure layer and the flexible film; and the closure layer on the second side portion being capable of at least partial removal from the flexible film to rupture the score and form an opening.

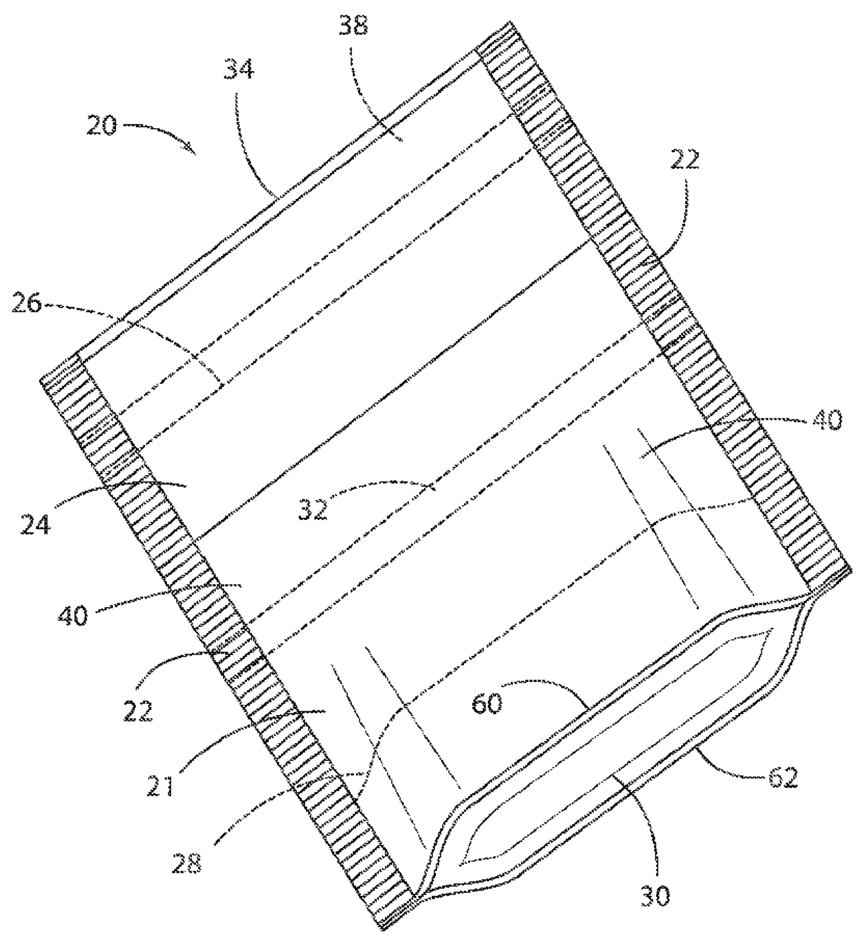

FIG. 1

WO 2012/154655 A1

WO 2012/154655 A1

Published:

— *with international search report (Art. 21(3))*

RECLOSABLE FLEXIBLE FILM PACKAGING AND METHODS OF MANUFACTURE

Related Applications

[0001] This application claims the benefit of United States Provisional Patent Application Number 61/483,732, filed 8 May 2011, which is incorporated herein by reference in its entirety.

Field

[0002] The present products and methods relate generally to flexible packaging and, in particular, to flexible packaging having a reclosable opening.

Background

[0003] Flexible packaging is often used to retain and seal products for shipping and storage. It is commonly used for a variety of consumer products, including food products (e.g., cracker sleeves, chewing gum sticks, chocolate bars, cookies, and the like). By one approach, the package may be a film laminate and take the shape of the products contained therein. Packages can be formed by a plurality of walls sealed to form an interior cavity. Examples can include flow-wrap packaging, three-sided seals, form-filled seal, and the like.

[0004] Flow-wrap type flexible film packaging can use a continuous film (web) to envelop product during assembly. In one configuration, flow-wrap (also known as horizontal or vertical fin-seal or lap-seal wrap, end-seal wrap, horizontal bagging and pillow-pouch packaging) can position a film, such as polyethylene or polypropylene, adjacent a product, wrap the film around the product, form a seal from the ends of the

film, then form seals at either side of the product. The seals can be permanent and provide some level of structural integrity. Flexible film packages have many other advantages. They can be manufactured at substantially lower cost than rigid containers, are light-weight resulting in reduced transportation costs, and pack easier resulting in less storage space.

[0005] Despite these advantages, flexible packaging can sometimes be difficult to open and is typically not suitable when a user wants to reclose/reseal a package after its initial opening, such as when there is more product within the package than for a single use. Attempts are known in the art to provide some measure of reclosure of flexible packaging using discreet closure layers (labels) that require precise label placement (registration) on the package over a configured opening in the film (See generally, U.S. Pat. 5,725,311 to Ponsi).

Summary

[0006] Accordingly, provided herein are embodiments for an easy open vertical formed gusseted flexible flow-wrap package film/web having a closure layer/label laminated above a score (tear) line in the flow-wrap film, which defines a package opening. A resealable adhesive between the film and label can allow easy opening and reclosing or resealing, while maintaining package integrity.

[0007] In one embodiment, a package can have a flexible film forming a body defining an interior contents cavity and having a first pair of opposing edge portions forming a first edge seal, a second pair of opposing edge portions forming a second edge seal, and a third pair of opposing edge portions forming a fin seal extending from the first

edge seal to the second edge seal; the body having a first side portion having the fin seal and a second side portion generally opposite the first side portion; a score formed in the flexible film at the second side portion defining an opening to the contents cavity upon initial rupturing; a closure layer covering the score and a portion of the second side portion around the score; a resealable adhesive being between the closure layer and the flexible film; and the closure layer on the second side portion being capable of at least partial removal from the flexible film to rupture the score and form an opening.

[0008] In some embodiments, the resealable adhesive can have a predetermined affinity between the closure layer and the flexible film such that the score ruptures upon removal of the closure layer from a portion of the second side portion.

[0009] In some embodiments, the closure layer can extend from the first edge seal to the second edge seal and generally parallel to the fin seal. In some embodiments the closure layer can include a tack free gripping portion to remove the closure layer from at least a portion of the second side. The tack free gripping portion can be a deadener applied to the resealable adhesive, a portion of the closure layer adhered to itself with the resealable adhesive, void of resealable adhesive, or the like. In some embodiments, the closure layer can be a bi-axially oriented polypropylene having a thickness in a range of about 1.2 mils to 5 mils.

[0010] In some embodiments, the score can be arcuate or include a pair of terminal ends configured to resist further rupturing of the flexible film. In some embodiments the terminal ends can be configured as 'smiles'.

[0011] In some embodiments flexible film for the package can be a laminate structure. In some embodiments, the laminate can be formed from polyethylene terephthalate and

oriented polypropylene having a thickness in a range of about 1.5 to 2.5 mils. In other embodiments, the flexible film laminate can be formed from polyethylene terephthalate having a thickness in a range of about 0.4 to 1.0 mils and oriented polypropylene having a thickness in a range of about 0.6 to 1.2 mils.

[0012] In some embodiments, the package can have a gusset in a third edge of the film. In some embodiments the score formed in the flexible film at the second side portion of the package can be on a top half of the second side portion, and the third edge can be on a bottom half of the second side portion. In some embodiments, the gusset can be the flexible film folded into the interior contents cavity to form two opposing gusset sides extending inwardly from the first side portion and the second side portion toward the vertical center of the package.

[0013] In some embodiments, the score can be disposed partially through a thickness of the flexible film or alternately through an entire thickness of the flexible film. In some embodiments the resealable adhesive can be a pressure sensitive adhesive (PSA).

[0014] In other embodiments the package can be a flexible film having two opposing edge portions forming a longitudinal seal extending from a first side seal to a second side seal, the side seals forming a front package panel and a rear package panel, the longitudinal seal disposed on the rear panel; a score in the flexible film front panel oriented generally parallel to the longitudinal seal that defines a package opening upon initial rupturing; an elongated closure layer extending within the edge portions from the first side seal to the second side seal and over the score; a resealable adhesive being between the flexible film and the elongated closure layer; the elongated closure layer having a tack free gripping portion to remove at least a portion of the elongated closure

layer from the flexible film to form the package opening; and the package having a blind fold to define a package top and a pair of folds directed to a package interior forming a gusset to define a package bottom.

[0015] In some embodiments, the film can be a printed laminate comprising a co-extruded polypropylene laminated to a heat sealable polypropylene; and the elongated closure layer can be a BOPP bi-axially oriented polypropylene.

[0016] In other embodiments, methods for forming a vertical stand-up pouch having a substantially symmetrical bottom gusset, can have the steps of tensioning a film roll; continuously scoring the film roll on a surface directed to an interior of the package; laminating a continuous closure layer on an exterior surface of the package over the film with a resealable adhesive; forming the film around a product delivery chamber; sealing opposite longitudinal edges of the film to form a longitudinal seal; forming a gusset to the film directed to a bottom of the package; sealing the film to create a package side seal; cutting the package side seal to separate the film; and supplying product into the product delivery chamber into the unsealed film.

[0017] In some embodiments, methods can include the step of deadening a portion of the resealable adhesive before laminating to the film. In some embodiments, the longitudinal seal can be a fin seal. In one approach, the step of sealing the film can be performed by a pair of heated reciprocal heating bars to a film having a heat sealable layer on the interior surface of the film.

Brief Description Of The Drawings

[0018] Fig. 1 illustrates a perspective view of an exemplary gusseted vertical form filled bag of the present embodiments;

[0019] Fig. 2 illustrates a front view of view of an exemplary gusseted vertical form filled bag of the present embodiments;

[0020] Fig. 3 illustrates a sectional view of an exemplary gusseted vertical form filled bag of the present embodiments taken along section line III—III of Fig. 2;

[0021] Fig. 4 illustrates a sectional view of an exemplary gusseted vertical form filled bag of the present embodiments taken along section line IV—IV of Fig. 2;

[0022] Fig. 5 illustrates a rear view of an exemplary gusseted vertical form filled bag of the present embodiments;

[0023] Fig. 6 illustrates a perspective view of an open exemplary gusseted vertical form filled bag of the present embodiments;

[0024] Fig. 7 illustrates a sectional view of an open exemplary gusseted vertical form filled bag of the present embodiments taken along section line VII—VII of Fig. 6;

[0025] Fig. 8 illustrates a front view of an exemplary gusseted vertical form filled bag of the present embodiments according to another approach using a laminated film;

[0026] Figs. 9-14 illustrate alternate score line and label embodiments of exemplary gusseted vertical form filled bags of the present embodiments;

[0027] Fig. 15 illustrates a section of a roll of blanks for use in forming an exemplary gusseted vertical form filled bag of the present embodiments;

[0028] Fig. 16 illustrates a partial perspective view illustrating an apparatus configured to form and fill and seal an exemplary gusseted vertical form filled bag of the present embodiments; and

[0029] Fig. 17 illustrates a sectional view of an exemplary gusseted vertical form filled bag of the present embodiments taken along section line XVII—XVII of Fig. 8.

Detailed Description of the Present Embodiments

[0030] Provided herein are various embodiments of an easily opened and reclosable package having in some embodiments a front and back panel formed by a flexible film web substrate having a closure layer or label substrate disposed thereon and a gusset. The label can be applied continuously to the film. In some embodiments the label can be top cut to form a shaped continuous label or even a discrete label package from a continuously applied label. In some embodiments, a film laminate having top and bottom cuts can be used to form a package opening and reclose feature. The reclosable packages can be easily opened and reclosed while maintaining package integrity. By one approach, the reclosable packages are formed with a flexible film laminated with a continuous label by a resealable adhesive. In one configuration, an illustrative four-sided package is comprised of a folded web of flexible film that forms the front and back panels having four peripheral edges - one folded edge, two sealed edges, and one gusseted edge. It is noted that various configurations are possible for the number of peripheral edges and the number of sealed, folded and gusseted peripheral edges within the scope of the present embodiments.

[0031] The flexible film packages may have at least a partial, initial seal against ambient atmosphere and are easily openable and reclosable. More particularly, the initial seal, which is present prior to initial opening of the flexible film package, may provide at least a partial barrier against ambient atmosphere including gas and moisture for an extended period of time. For example, the initial seal of the flexible film package may provide a light barrier and also a gas (oxygen) and moisture barrier for at least 6 to

8 months prior to initial opening. In some applications, a gas and moisture barrier may be desired for even longer periods of time prior to initial opening. Further, the flexible film packages are generally reclosable such that the shelf life of food products contained therein is not unnecessarily shortened due to exposure to the ambient atmosphere once the flexible film package is initially opened. Thus, the flexible film packages may have a reclose feature that provides a reclosable seal that is present subsequent to initial opening of the package. While the present disclosure is described for food product applications, it also can be applied to non-food, medical, pharmaceutical, industrial packaging applications and the like.

[0032] In one approach, the flexible film package is generally configured to accommodate multiple servings of a food product. Thus, the reclosing characteristics of the flexible film package help contain product and/or retain freshness or shelf-life of a food product retained within the package subsequent to initial opening. The seals of the flexible film package, such as, for example, a fin or lap seal, and any ends seals (including top, bottom, and side seals) can be hermetic (and also may have varying degrees of hermeticity such as partial or substantial hermetic seals) to help retain the shelf-life of any products contained therein. The seals may be formed by a variety of processes such as, for example, hot seal, cold seal, or low-tack seal processes, and combinations thereof. Any reclosable seals of the flexible package, such as that formed around the package opening, can be formed, in part, by a resealable adhesive located/laminated between the flexible film and the closure layer. This reclosable seal feature can be formed by a variety of manufacturing processes. It is noted that the term resealable adhesive as used herein can include any number of the adhesives capable

of resealing and/or reclosing the closure layer and flexible film together, such as a pressure sensitive adhesive, a cold seal, a heat seal, a cohesive adhesive, a low tack adhesive, and the like.

[0033] The flexible film packages may have a variety of configurations, including, for example, a bag, a pouch, or other shapes such as a cylindrical shape, a column shape, or a generally square or rectangular shape, among others. The flexible film package may have squared edges such as those found on a primarily rectangular-shaped package or may have more curvilinear-shaped edges such as those found on more circular or ovoid-shaped packages. Further, the flexible film package may be formed around the food product such as a package having a sleeve configuration that is wrapped around a discrete stack or stacks of food products. In other applications, the flexible film packages may be fully or partially formed and then filled with the food products, which may be helpful for various discrete food products, and in some configurations can be referred to as vertical formed filled and sealed (VFFS) bags. It is noted though that other embodiments of the present design can allow for Horizontal Form Filled and Sealed (HFFS) flow wrapped products. In some configurations a VFFS bag can be gusseted to provide expansion to retain product. Various configurations may be easily opened and resealed while maintaining package integrity. In some bag configurations having a bottom gusset, the bag can stand on the gusset.

[0034] By one approach, a flexible film roll may have two opposing edge portions that meet to form a horizontal seal (relative to a top opening of the package) extending between a first side seal to a second side seal across the back of the package. The flexible film can have a score that can be ruptured to define an opening across the front

panel of the package. In one illustrative embodiment, an elongated closure layer (such as a continuous label) extends over the film score from a first side seal to a second side seal and within the opposing edge portions that meet to form the horizontal seal. A resealable adhesive may be provided between the flexible film and the elongated closure layer to hold the closure layer in place and seal it to the front of the package. On a surface of the continuous label facing the flexible film web, the continuous label may have an adhesive-free area (e.g., along all or a portion of the first edge) to provide a pull tab to facilitate easy opening of the package. Further, such adhesive-free pull tab may be disposed on a side of the package with the score line such that the adhesive-free pull tab is disposed proximate the package opening or flap.

[0035] By one approach, the package configuration and shape may be primarily influenced by the products contained within the package, in part, due to the flexibility of the laminate film. In another configuration, the flexible film may be configured as a flow-wrap or overwrap around a support structure, such as an internal rigid support or product tray. In another approach, package configuration and shape can be primarily influenced by a gusseted side of the package opposite the package opening.

[0036] In the art, some stand-up pouches have a tear notch or scored film near the top of the package to begin propagation of a tear in the film to expose a zipper joining adjacent film sides. For the consumer, opening this type of package is a two step process, and the opening process generates a separated piece of package film to throw away. A zipper configuration can cause some disadvantages in that it can tend to self reclose due to its rigidity and the process used to seal it on a package. In other words adjacent film sides tend to close towards each other rather than maintaining an opening

to allow a consumer to easily access product. Zippers can also require a thick sealant web to provide caulkability around the zipper in the seal area to minimize leaks. Further, zippers can require a higher gauge film to support the zipper structure, requiring extra weight and material to form the package. In the present embodiments, given that a zipper is not needed, a thinner gauge film can be used, thus further reducing cost, waste, and materials. For example typical zipper package applications can use a tri-lamination film of 3 plus mils gauge in thickness. In this instance, the sealant alone can be 1.5 mils thick. In contrast, for illustrative purposes, the present film can be in the range of about 1.2 to 5 mils, and preferably in the range of about 1.5 to 2.5 mils. Accordingly, this can represent an approximately 50 percent reduction of package materials over zipper packaging.

[0037] Provided herein are specific package embodiments in the form of a flexible reclosable stand-up pouch. The stand-up feature can be provided by gusseting one side (here the bottom) of the package when the package is vertically formed filled and sealed. In some embodiments, the film can be slit, then covered by a continuous label tape laminated to the film by a resealable adhesive. The continuous label can preferably have a non-adhesive portion to provide a peel tab.

[0038] One of the advantages of some embodiments is that the package tends to stay open to facilitate access to the contents. In some embodiments, the package does not require a thick sealant layer because the reseal feature is on the outside of the film. Other advantages of some embodiments are that they can provide for immediate consumption of food products. For example, in some embodiments, the flexible film package is easy to open, easy to reclose, allows hand to mouth consumption, provides

an opening big enough to accommodate a typical adult consumer's hand, and has resealable adhesive exposed only on one side. Consumers often position snack bags and pouches in a car cup holder or on a desk, or carry them while walking. When some embodiments of the pouch are opened, they will retain an opening until a user closes it by pressing the exposed resealable adhesive against the adjacent side of the opening. In some embodiments, the exposed resealable adhesive area can be easily folded down out of the way to help avoid contact with users' fingers, and to prevent portions of particulate product or product crumbs from being retained on the adhesive and compromising its effectiveness.

[0039] A method for producing flexible film packages described herein may include forming a score in a portion of a continuous web of flexible film having a horizontal axis and then applying a continuous substrate such as a closure layer (continuous label) along the package horizontal axis with a resealable adhesive. By one approach, the continuous closure layer may be continuously applied over a partial width of the continuous web of flexible film. The method also may include forming a continuous horizontal seal from two edges of the continuous web of flexible material that are brought together, and forming a first side seal and a second side seal. In one approach, an adhesive-free grasping portion may be formed at or adjacent a first (e.g., top) end of the flexible package. The flexible packages may be formed in off-line and in-line processes and also may be formed in both horizontal and vertical form-fill-seal operations, among others.

[0040] As used herein, continuous application of the label, flexible film, or adhesives indicates that the application of these is uninterrupted along the direction of application.

Further, as used herein, a continuous package label may extend the entire length or width of the package and is uninterrupted from one edge of the package to an opposing edge. Alternatively, a discrete package label covers only a portion of the width and length of the package and does not extend across the entire width or length of the package. By one approach, a continuous label web may be continuously applied to a film web, which is then formed into packages having a continuous package label. By another approach, a discrete package label may be applied in a continuous application such that a continuous label web is applied to a film web. In such a configuration, a label cut, such as a top cut, may be formed in the continuously applied label web. The label cut may define a shaped package label and the portion of the continuously applied label that does not form the shaped package label (i.e., the unused label matrix) may be removed from the flexible film web. Thus, a portion of the continuously applied label web may be removed from the film web to thereby form discrete package labels disposed on the film web.

[0041] A method of packaging products in a series of packages may include feeding a continuous film web having longitudinal edges and a predetermined width between the longitudinal edges. The method also may include merging a continuous substrate with the continuous film web across less than the entire predetermined width. By one approach, the continuous film web may be scored to define what will become an opening in the film web when the substrate is removed from the continuous film web and an adhesive, such as a resealable adhesive that provides a degree of releasability and reclosablility, is provided between the continuous substrate and the continuous film web. If performed in-line, the method may provide products in a series for packaging,

and the continuous film web and substrate may be wrapped around the products. Further, a longitudinal seal, such as a fin or lap seal, may be provided by joining longitudinal edges of the continuous film web (which as described becomes a horizontal fin or lap seal parallel to a top opening of the package), and leading and trailing side seals may be provided between adjacent packages of the series.

[0042] The series of flexible packages 20 may be formed in-line just before the film is being wrapped around a product or may be formed off-line well before the products are packaged. For example, a laminate structure may be prepared prior to being brought to the packaging line to fill the packages with products. In another configuration, the laminate may be formed in-line with the packaging operation such that the laminate is formed around or just before the product is packaged.

[0043] As used herein, the flexible film may be a flexible sheet of material rolled or formed as a blank and made of a laminate or co-extruded film structures, with cast or blown film layers and the like. By one approach, the flexible film may include a laminate having several layers of material. The laminate structure may include, for example, one or more layers to provide strength and toughness, and one or more layers to provide oxygen and/or moisture barrier properties.

[0044] The laminate may include, e.g., a polyethylene terephthalate (PET) layer and/or an oriented polypropylene (OPP) layer, and/or other materials. Other layers may include a polyethylene (PE) layer, a polypropylene (PP) layer, a polylactic acid (PLA) layer, and a metalized layer, such as a metalized oriented polypropylene (MET OPP) layer, to note but a few options. In some embodiments, the flexible film can be a printed laminate such as a co-extruded polypropylene laminated to a heat sealable

polypropylene. These different layers may have a variety of thicknesses and densities. Furthermore, the flexible film may be a combination of several of the above-mentioned film structures. By another approach, the film may include a single layer polymer. The components of the flexible film laminate may be joined by adhesives or by extrusion processes.

[0045] If a PET layer is used in the flexible film laminate, the PET layer may impact the rigidity of the laminate. More particularly, the PET layer may have different degrees of stiffness from flexible to semi-rigid, depending on the thickness of the PET layer. A PET layer may be incorporated into the laminate because it is relatively lightweight and strong and can have a high transparency if desired. The PET layer also may be useful as an oxygen (gas) and moisture barrier. In addition, an OPP layer may further strengthen the flexible film and enhance its barrier properties.

[0046] The flexible film package may include a score that will define a package opening when ruptured. The term "score" as used herein may describe any type of mechanically-formed or cut score line, a laser-formed score, or any other scoring means that would compromise the integrity of the film without rupturing it (e.g., a line of weakness). A score may be disposed partially through the depth of the flexible film, or it may be a die cut through the entire depth of the film. If partially cut through the film, the score also may be formed on either or both sides of the flexible film such that the score may be cut into the exterior or interior surface of the flexible film, or both. In one example, the score is made into the flexible film from the interior surface of the flexible film and extends through the flexible film and substantially through the resealable adhesive. In addition, the score may also be a discontinuous line such as a set of

perforations, which also may be either partially through the depth of the flexible film or completely through the entire depth of the flexible film.

[0047] By one approach, the elongated closure layer can be disposed or continuously applied upon the flexible film. In some embodiments the closure layer can be over the score such that there are generally no disruptions in the elongated closure layer, and no portions where the flexible film lacks the elongated closure layer along one axis of the film. The elongated closure layer may comprise a label such as a discrete label with a backing, a release liner or a linerless label. The label can be a bi-axially oriented polypropylene (BOPP) having a thickness in a range of about 1.2 mils to 5 mils, to note one option. In another configuration, the elongated closure layer may include a second flexible film with resealable adhesive disposed between the first flexible film and the second flexible film. As discussed below, the resealable adhesive may be an interstitial layer to a laminated film structure such that the resealable adhesive is laminated between the first and second flexible film layers. In yet another configuration, the elongated closure layer may comprise a tape that is continuously applied over the flexible film along the longitudinal axis of a continuous roll of film.

[0048] The package opening is preferably reclosable such that at least a partial seal is obtained around the opening. In some configurations the reclosable/resealable opening may be substantially hermetic prior to initial opening. The resealable adhesive between the flexible film and the elongated closure layer helps produce the reclosing characteristics of the package opening. The resealable adhesive may be suitable for resealing in a variety of conditions, such as room temperature and refrigerated conditions.

[0049] Referring initially to FIG. 1, an illustrative flexible package 20 is shown. As shown, flexible package 20 is formed from a film 21 having side seals 22 that join a front package panel 40 and rear package panel (back panel) 42; a continuous closure layer 24 (shown here as a continuous label) extends the entire width of package 20; a score line (shown here as a continuous score line) 26; a gusset 30 formed by a gusset fold 28 (See Figs., 2-5 and 7-8) and front panel gusset fold 60 and rear panel gusset fold 62; a top fold line 34; a fin seal 32 (See, Fig. 5); and product 36 (See Fig. 4 and 6). The continuous closure layer 24 is laminated to film 21 by a resealable adhesive 44 (See figs., 3-4, 7 and 16). In the embodiment as illustrated, a portion of the continuous closure layer 24 does not have a resealable adhesive 44 exposed to film 21 to form a pull tab or tack free gripping portion.

[0050] This non-resealable adhesive gripping region 38 of the continuous closure layer 24 can be formed by a variety of means. For example, a second deadening label (as shown in Figs. 3 and 4) may be applied to resealable adhesive 44. Alternately, a coating or other adhesive deadening means, such as an ink coating or heat inactivation, may be applied to select areas of the adhesive side of label by an adhesive deactivating device in-line or prior to forming the package in a label roll. Further, such adhesive deactivation may be done in a pattern-applied approach and, indeed, the adhesive application may also be pattern-applied. The adhesive deactivating process can also include an adhesive coating applicator, which can be positioned anywhere along the line before being laminated to film. Adhesive coating applicator can apply adhesive in either a machine direction or even zone applied, such as in a transverse direction. In the instance of a zone application of an adhesive, the adhesive coating step can be

eliminated. Accordingly, neither deadening label, nor an adhesive deadening device would be needed if the adhesive on label 24 is pattern applied so as to have a portion free of adhesive.

[0051] In any event, the non-resealable adhesive region 38 of continuous closure layer 24 is not laminated to film 21 and can allow a user to slide a finger therebetween to form a peel tab (See e.g., Fig. 3). In use, the peel tab formed by non-resealable adhesive area 38 can be gripped by one of the user's hands while the top fold 34 is gripped by the other hand. The user may then pull the tab 38 away from the top fold 34, thereby peeling the continuous closure layer 24 from an upper portion 41 of the front panel, rupturing the front panel along score line 26 to provide an opening 48 for the user to gain access to the products contained therein as shown in Figs. 6 and 7. The portion of the film of the front panel not pulled by closure layer 24 (top portion 41) may then be pushed back so that products may be manually withdrawn between upper portion 41 and the peelable closure layer 24. Closure layer 24 may subsequently be used to reclose a lower portion 43 of the front panel with the top portion 41 to help provide containment for the food product. The adhesive seal between the peelable closure layer 24 and upper portion 41 may be resealable so that, if desired by the consumer, the package may be reclosed or resealed by pressing the closure layer 24 and upper portion 41 back together after initial opening, and if an appropriate adhesive is used, and if the adhesive remains effective, the package may then be reopened and reclosed multiple times.

[0052] The continuous flexible film web 21 has a width and a longitudinal axis along the width of the packages formed therefrom. An elongated or continuous closure layer

24 is continuously laminated along the horizontal width of the package blanks to a portion of the width of the continuous flexible film web 21. For example, the continuous closure layer 24 may be laminated substantially along the entire longitudinal axis of the continuous flexible film web 21, so that it will extend across the entire width of the package 20. Although a continuously applied label may be employed, a discrete label can also be used, such as closure layer (label) 24i shown in Fig. 14. A resealable adhesive 44 (which is shown as exposed in Figs. 7 and 13) is laminated between the continuous flexible film web 21 and the continuous closure layer 24. The resealable adhesive 44, like the continuous closure layer 24, may be continuously laminated between the continuous flexible film web 21 and the continuous closure layer 24 so that there are no areas without the resealable adhesive between the two layers except for the non-resealable adhesive tab 38. A line of weakness or frangible region, such as a score line 26 may be formed in the continuous flexible film web 21 to form a pre-configured opening in the front panel 40 when the continuous closure layer 24 is pulled away from the upper portion 41 of the front panel.

[0053] More specifically, score 26 can be formed into the flexible film 21 and may define the package opening 48 once the flexible film package 20 (FIG. 1) is initially opened. As mentioned above, score 26 may be formed in a variety of operations, including, for example, mechanically-formed, laser-formed, or any other forming operation that compromises the integrity of the film without rupturing it. Score 26 may be formed on the interior or exterior surface of the flexible film. In addition, score 26 may be disposed partially through the thickness of the flexible film (a partial depth score line) or through the entire flexible film thickness (a full depth score line). Score 26 may

be formed before the continuous closure layer 24 is applied to or merged with the flexible film 21 or after elongated continuous closure layer 24 is applied to flexible film 21. If score 26 is formed subsequent to application of continuous closure layer 24, score 26 may be formed through the flexible film 21 (from the interior surface) and into resealable adhesive 44. In one approach, score 26 may be formed through flexible film 21, the resealable adhesive 44 and into continuous closure layer 24.

[0054] In some embodiments, film 21 may be pre-scored to define the tear lines to create an opening on a vertical formed and filled package as the label is pulled out from the package. Pre-scored means that the film is scored as it is rolled to form a film roll of package blanks prior to forming and filling. Score 26 may maintain the seal of the flexible film package prior to opening, such that the flexible film 12 is not completely scored through the entire depth. Alternatively, the score 26 may extend through the flexible film 21 such that the continuous closure layer 24 substantially provides the seal prior to initial opening of the flexible package.

[0055] A variety of score configurations are anticipated and a few examples are provided herein for exemplary purposes. The particular score configuration employed for a given flexible film package may depend on the products being packaged, whether a structural support is being incorporated into the flexible film package, and the manufacturing equipment available, among other concerns. By one approach, score 26 defines a package opening that permits hand access by a user to the entire contents of the package within the flexible film package upon initial opening of the package. In one approach, when the elongated closure layer 24 is peeled to the end of the score 26 to expose the entire score 26, it is anticipated that a user may access (i.e., remove from

the package) any of at least seventy percent of the product within the package. This gives the consumer access to a substantial portion of the products within the flexible film package just after initial opening.

[0056] FIG. 1 illustrates the score line 26 as a straight continuous score. Figures 9 through 14 illustrate addition types of score line configurations. Other types of continuous score lines are shown in Figs. 12 and 13. Alternate non-continuous score lines are shown in Figs. 9, 10, 11 and 14. 'Smiles' 50 can help prevent the score 26 from propagating or continuing to tear the flexible film 21 (See e.g., Fig. 11). Also, package integrity features (PIFs) 52 can be added as shown in Fig. 13. In this instance the film tears the PIFs on initial opening to indicate that it has been previously opened.

[0057] Figs. 8 and 17 provide a front view and cross-sectional view respectively according to one approach where film 21 is a laminated film. In this approach, package 20 package can form a label from a laminated film 21. In this embodiment, film 21 can be at least two polymer film layers attached with a resealable adhesive 88. A first film layer (outer layer) can have a top cut score to form a label, while a second film layer (directed to the interior of the package) may have a score to define an opening. Scoring can occur before or after laminating film layers, but preferably after lamination. In this instance, overall film thickness can be in the range of about 1.8 to 3 mils, and preferably about 2.1 mils. Specifically, in this approach a film top cut 82 provides an opening score line to form a package flap 86. Area 84 may be a non-resealable adhesive area and score line 86 is a bottom cut of the laminate to define a package opening. Fig. 17 shows a sectional view of 21 showing a resealable adhesive layer 88 laminating two layers of film 21.

[0058] In the embodiment such as shown in Fig. 1, flexible film web 21, may be a laminate with several layers of material, including, for example, a PET layer, an OPP layer, a PE layer, a MET OPP layer, a PP layer, and/or a PLA layer, to note a few options. These layers may be joined by adhesives or by an extrusion process. In some embodiments, the flexible film can be a printed laminate such as a co-extruded polypropylene laminated to a heat sealable polypropylene. Alternatively, the flexible film web 21 may be a single layer polymer. Since the flexible film package is at least partially hermetically sealed, the flexible film web preferably provides a gas and moisture barrier. Generally, the flexible film web 21 may be about 0.012 mm and 0.25 mm in thickness. In one illustrative embodiment, the flexible film web 21 may be about 0.05 mm to about 0.18 mm in thickness. The thickness of the film may be a function of the desired barrier to gas, moisture, and light, along with the level of desired structural integrity, the desired depth of score line, and the available manufacturing equipment.

[0059] Flexible film web 21 may be a heat sealable copolymer. In some configurations, the heat sealable polymer forms a seal between 50 and 300 degrees Celsius. Flexible film web 21 also may be a pressure sealing film. In one configuration, the pressure sealing film forms a seal between a pressure of about 0.7 and 7.0 kg/cm. By one approach, the pressure sealing film forms a seal at about 5.6 kg/cm.

[0060] In addition to the various laminate layers mentioned above, additional laminate layers such as sealants, stiffeners, ink, release layers, also may be incorporated into the laminate structure. For example, a sealant layer can be added to facilitate the formation of seals that enclose the product. By one approach, the sealant layer may be oriented on the film surface directed to the interior of the package (interior-facing surface). The

sealant layer may be a variety of polymer sealants, such as a heat activated polymer sealant layer like ethylene vinyl acetate (EVA), ionomer plastic (such as that sold under the trade name SURLYN by DuPont), metallocene, and organoclay, among others. In addition, cold sealant and pressure sealants also may be used with the configurations disclosed herein. If the products within the flexible film package are food products, then it is noted that food grade sealants would be employed.

[0061] In one configuration, stiffeners may be added to flexible film 21 to increase the stiffness of the film. These stiffeners may be in addition to the stiffness adjustments that can be made by changing the thicknesses or densities of the previously mentioned laminate layers. These stiffeners can be added as a component of the extruded film or as a separate layer. For example, a laminate layer such as a polyamide polymer (e.g., nylon) may be included in the laminate film structure of flexible film web 21. By one approach, nylon may be added as a laminate layer that is held to the remainder of the film structure by an adhesive. Further, in one configuration, the nylon layer may be positioned in between other layers such that the other flexible film layers are attached on each side of the nylon layer (i.e., a tie layer). In one example, the nylon layer can comprise about eight percent of the film thickness or about 0.004 mm. In some embodiments, the film may be a laminate of polyethylene terephthalate and oriented polypropylene having a thickness in a range of about 1.5 to 2.5 mils. More specifically, in another approach the film may be a laminate of polyethylene terephthalate having a thickness in a range of about 0.4 to 1.0 mils and oriented polypropylene having a thickness in a range of about 0.6 to 1.2 mils.

[0062] As noted, an ink layer may be formed into the laminate as an additional laminate layer. For example, one specific laminate can include ink and a primer disposed between other film layers such as a PET layer and an OPP layer. Other additional layers may include a metalized layer, as noted above, and a release layer.

[0063] By one approach, closure layer 24 is continuously applied along the flexible film 21 such that continuous closure layer 24 extends from one side seal to another side seal once the flexible film package 20 is formed. Furthermore, closure layer 24 extends only partially over the width of the flexible film 21 that forms the film package 20. It is also contemplated, however, that continuous closure layer 24 may extend the entire width of a package but only be partially disposed over the height of the flexible film 21. More particularly, continuous closure layer 24 preferably does not extend both the entire width and the entire height of the package. Continuous closure layer 24 can be partially disposed in either direction (i.e., the length or height) and continuously disposed in the other of the directions. In one approach, closure layer 24 is continuously applied along one axis of the flexible film and is only partially applied along the axis normal to the continuously applied axis. Thus, the flexible film packages 20 may have an elongated closure 24 that runs the entire length of the package and over only a portion of the width or an elongated closure layer 24 that runs the entire width of the package and over only a portion of the length of the package.

[0064] Figs. 3, 4 and 7 show cross sections of the flexible film along line section line III-III in Fig. 2, section line IV-IV in Fig. 2, and section line VII-VII in Fig. 6 respectively. These figures illustrate a resealable adhesive 44 between the flexible film 21 and the closure layer 24 (though resealable adhesive 44 is exposed in fig. 7).

[0065] Closure layer 24, which is laminated to the flexible film 21 and covers score 26, permits easy manual opening of the flexible package 20. In one embodiment, closure layer 24 can be formed such that the flexible package 20 has a peel tab or tab portion 38 (See e.g., Fig. 14). More particularly, a tab portion 38 may be formed by closure layer 24 in an unsealed area of closure layer 24 extending to the top fold line 34, allowing a user to grasp and peel open the upper layer of the peelable seal, i.e., the elongated closure layer 14.

[0066] In one approach, side seals 22 and fin seal 32 are film-to-film seals and may be considered primary seals and are oftentimes permanent or destructive seals. Closure layer 24 also forms a seal with the flexible package 20 and may be considered a secondary seal. The secondary seal is reclosable and generally is not destructive. In one illustrative embodiment, the peel force required to separate the primary seals (primary peel force) is higher than the peel force required to separate the secondary seals (secondary peel force).

[0067] In one example, the flexible film package 20 has primary seals including side seals 22 and longitudinal fin seal 32, along with a secondary seal formed from closure layer 24 over the width of the flexible film package 20. The secondary seal is formed, in part, by the resealable adhesive 44 disposed between the closure layer (a continuous label) 24 and the flexible film 21. In use, package 20 can be opened by a user by grasping the tab portion 38 (FIG. 1) and pull outward from the package to separate the continuous closure layer 24 from the flexible film 21 to expose package opening 48. By one approach, the primary seal has a peel force that is 200-300 grams/inch^2 higher than

the peel force of the secondary seal. In another configuration, the difference in peel forces may be between 100-400 grams/inch^2.

[0068] The resealable adhesive 44, which is disposed or applied between the flexible film 21 and closure layer 24, may have a variety of strengths and compositions. By one approach, the resealable adhesive has a higher bonding strength than the strength required to tear or separate score 26. In such a configuration, a user may pull outward or downward relative to the top of the package, to expose package opening 48, remove the desired amount of product, and then reclose the package using the resealable material. A user need only pinch the front panel 40 and back panel 42 in the direction 64 as indicated in Fig. 7. By one approach, the resealable adhesives may have a variety of thicknesses. For example, the resealable adhesive could be between about 0.2 mils to 1 mil thick and, may be even thicker.

[0069] Fig. 15 shows exemplary blanks from a roll of film 21 for use in forming a package 20. In one configuration, flexible film 21 has a first edge portion 54 and a second edge portion 56. The edge portions 54, 56 may be brought together and formed into a longitudinal seal, such as fin seal 32 extending from a first side seal 22 to a second side seal 22 as shown in Fig. 5. The longitudinal seal also may include a lap seal. It is also noted though that the package may be configured such that the longitudinal seal runs along the height of the package as well. This would be in lieu of top fold line 34. A separation cut 58 line region (see Fig. 15) is shown to define the edges of side seals 22 of package 20. See below discussion associated with Fig. 16.

[0070] As shown in Fig. 15, a closure layer 24 is continuously laminated to film 21 in the machine direction. Prior to lamination of closure layer 24, a non-resealable

adhesive area (tab 38) is formed. Score 26 may be cut into film 21 prior to or after lamination with closure layer 24, but preferably after lamination. Fold lines 62 and 34 show where back panel 42 is formed. Fold lines 60, 62 and 28 show where folds are positioned to form a package gusset 30. Fold lines 60 and 34 show where front panel 40 is formed.

[0071] Turning now to FIG. 16, there is shown diagrammatic illustration of one approach to forming a package 20. In this approach, package 20 is prepared using a modified vertical form, fill and seal package machine for forming, filling, and sealing bags of chips, cookies, and other like products and is generally shown at 100. Packaging machine 100 shown in Fig. 16 is simplified for ease of understanding and does not show, support structures and control systems that typically surround this type of machine. Nevertheless, Fig. 16 is provided to generally demonstrate one example of a working machine to form packages of some of the present embodiments. Desired methods to manufacture the flexible pouches may affect the particular seals, folds, and various other features of particular flexible pouches. A variety of manufacturing methods are available to commercially produce the flexible pouches and Fig. 16 provides but one such example.

[0072] As shown in Fig. 16, a film 21 package blanks (such as shown in Fig. 15) are taken from a film roll 102 and passed through a tensioner 104 to keep the film taut. Film 21 passes through tensioner 104 pulled by drive belts (not shown) in the direction shown at 112. A scoring device 122 can score the film to form score line 26. It is also noted that score line configurations as described herein could also be pre-applied to the film roll 102 during its manufacture as well as after applying a continuous label.

[0073] In any event, at tensioner 104, label 24 is laminated to the film by a resealable adhesive 44 that is preferably pre-applied to the label roll 114. Thus, as film 21 is passed through tensioner 104, a closure layer 24 (label) is continuously applied from a label roll 114. Label roll 114 as shown can be a linerless roll, but label rolls with liners could also be used. It is also noted that in other approaches, label 24 need not be a continuous label, but can be indexed and discretely applied during forming of the package, or pre-applied to film roll 102 during the manufacture of film role.

[0074] Prior to lamination of the label to the film, label 24 has a portion of the resealable adhesive deadened, covered, or removed at deadened. The deadened resealable adhesive area of the label is used to provide a peel tab 38 to allow a user to pull the label from the formed package. As shown for this approach a resealable adhesive deadening device 116 can be used. Deadening device 116 can be configured to operate in a variety of ways such as folding a portion of the label over itself, apply a deadening agent, apply a print layer, or in embodiments using labels with liners to strip away the liner to expose a portion of the label and to retain the liner in the tab portion. In some embodiments, device 116 could also be used to apply resealable adhesive to a label without resealable adhesive and leave a portion of the label unapplied.

[0075] Next, the packaging machine 100 can pull the scored film/label laminate over a forming shoulder 120 such as a forming collar and mandrel to provide it with a tubular shape. Opposite longitudinal edges (see 32 in Fig. 15) of the film may be brought together around a product fill tube 106. The longitudinal edges are sealed, such as by a seal tool 108, to form a fin seal, or overlapped to form a lap seal. In this configuration, the fin seal 32 is used to form a fin seal running parallel to the top of the package. In

this instance, the film may have a heat activated layer to the side of the film directed to the interior of the package and seal tool 108 continuously forms a heat seal.

[0076] Gusset 30 of the preferred flexible package can be formed at a gusseting device 118, which forms the film with the gusset fold 28 and the fold lines 60 and 62 of the package front and rear panels respectively.

[0077] Side seals 22 for package 20 can next be formed by a reciprocating sealing tool 110, which may include a pair of reciprocating sealing bars. The reciprocating sealing bars can be heat sealing bars maintained at a desired temperature to apply heat and pressure to the front and rear walls of the film. The film in this instance would have a heat sealable layer as described above on the film surface directed to the interior of the package. The heat seal bars 110 are brought together on opposite sides of the gusseted tubular web so that heat is conductively transferred to the film from both sides while pressure is applied. The sealing bars may be used in an intermittent or continuous operation. In an intermittent operation, the film is stopped while the sealing bars engage the film. In a continuous operation, the sealing bars may move vertically at the machine speed as they engage the film. In addition, sealing tool 110 may contain a reciprocating knife which acts to separate the bottom pouch from the upper pouch along cut line 58. Once the operation is complete and the upper pouch with one side seal formed can be has been filled with product 36 on the side where the second side seal will be formed in the next machine cycle. Accordingly, the upper pouch advances downward and becomes the bottom pouch in the next machine cycle. In addition to sealing the pouches, the sealing tool 110 may also be used to impart other desired package folds.

[0078] Thus, the sealing tool 110 may perform a variety of functions simultaneously, including: creating the bottom seal of the pouch that is about to be filled with product; and having a reciprocating knife or cutting tool which separates the pouch that was just filled from the following one which is about to be filled. Accordingly, after a bottom seal (and any optional fold) is formed in the flexible pouch, the partially formed flexible pouch can then be filled with food product, which is introduced into the pouch via the fill tube 106.

[0079] There are a variety of alternative steps to those described in this vertical FFS operation. Also, high speed techniques may be employed instead of application of heat and pressure by heat seal bars as described above. For example, RF energy, ultrasonic energy or other techniques may be employed to form the edge and fin seals.

[0080] While preferred embodiments have been described in detail, variations and modifications can be effected within the configurations described herein.

Claims

I CLAIM:

1. A package comprising:

a flexible film forming a body defining an interior contents cavity and having a first pair of opposing edge portions forming a first edge seal, a second pair of opposing edge portions forming a second edge seal, and a third pair of opposing edge portions forming a fin seal extending from the first edge seal to the second edge seal;

the body having a first side portion having the fin seal and a second side portion generally opposite the first side portion;

a score formed in the flexible film at the second side portion defining an opening to the contents cavity upon initial rupturing;

a closure layer covering the score and a portion of the second side portion around the score;

a resealable adhesive being between the closure layer and the flexible film; and

the closure layer on the second side portion being capable of at least partial removal from the flexible film to rupture the score and form an opening.

2. The package of claim 1, wherein the resealable adhesive has a predetermined affinity between the closure layer and the flexible film such that the score ruptures upon removal of the closure layer from a portion of the second side portion.

3. The package of claims 1 or 2, wherein the closure layer extends from the first edge seal to the second edge seal and generally parallel to the fin seal.

4. The package of any of the preceding claims, wherein the score is arcuate.

5. The package of any of claims 1 to 3, wherein the score includes a pair of terminal ends configured to resist further rupturing of the flexible film.

6. The package of claim 5, wherein the terminal ends are configured as 'smiles'.

7. The package of any of the preceding claims, wherein the closure layer includes a tack free gripping portion to remove the closure layer from at least a portion of the second side.

8. The package of claim 7, wherein the tack free gripping portion includes a deadener on the resealable adhesive.

9. The package of claim 7, wherein the tack free gripping portion includes a portion of the closure layer adhered to itself with the resealable adhesive.

10. The package of claim 7, wherein the tack free gripping portion is void of resealable adhesive.

11. The package of any of the preceding claims, wherein the flexible film comprises a laminate structure.

12. The package of claim 11, wherein the flexible film comprises a laminate of polyethylene terephthalate and oriented polypropylene having a thickness in a range of about 1.5 to 2.5 mils.

13. The package of claim 11, wherein the flexible film comprises a laminate of polyethylene terephthalate having a thickness in a range of about 0.4 to 1.0 mils and oriented polypropylene having a thickness in a range of about 0.6 to 1.2 mils.

14. The package of any of the preceding claims, wherein the closure layer is a bi-axially oriented polypropylene having a thickness in a range of about 1.2 mils to 5 mils.

15. The package of any of the preceding claims, further including a gusset in a third edge of the film.

16. The package of claim 15, wherein the score formed in the flexible film at the second side portion of the package is on a top half of the second side portion, and the third edge is on a bottom half of the second side portion.

17. The package of claim 15, wherein the gusset is the flexible film folded into the interior contents cavity to form two opposing gusset sides extending inwardly from the first side portion and the second side portion toward the vertical center of the package.

18. The package of any of the preceding claims, wherein the score is disposed partially through a thickness of the flexible film.

19. The package of any of claims 1 to 17, wherein the score is disposed through an entire thickness of the flexible film.

20. The package of any of the preceding claims, wherein the resealable adhesive is a pressure sensitive adhesive.

21. A flexible film package comprising:

a flexible film having two opposing edge portions forming a longitudinal seal extending from a first side seal to a second side seal, the side seals forming a front package panel and a rear package panel, the longitudinal seal disposed on the rear panel;

a score in the flexible film front panel oriented generally parallel to the longitudinal seal that defines a package opening upon initial rupturing;

an elongated closure layer extending within the edge portions from the first side seal to the second side seal and over the score;

a resealable adhesive being between the flexible film and the elongated closure layer;

the elongated closure layer having a tack free gripping portion to remove at least a portion of the elongated closure layer from the flexible film to form the package opening; and

the package having a blind fold to define a package top and a pair of folds directed to a package interior forming a gusset to define a package bottom.

22. The package of claim 21, wherein the film is a printed laminate comprising a co-extruded polypropylene laminated to a heat sealable polypropylene; and the elongated closure layer is a BOPP bi-axially oriented polypropylene.

23. A method for making a vertical stand-up pouch having a substantially symmetrical bottom gusset, comprising the steps of:

tensioning a film roll;

continuously scoring the film roll on a surface directed to an interior the package;

laminating a continuous closure layer on an exterior surface of the package over the film with a resealable adhesive;

forming the film around a product delivery chamber;

sealing opposite longitudinal edges of the film to form a longitudinal seal;

forming a gusset to the film directed to a bottom of the package;

sealing the film to create a package side seal;

cutting the package side seal to separate the film; and

supplying product into the product delivery chamber into the unsealed film.

24. The method of claim 23, further comprising the step of deadening a portion of the resealable adhesive before laminating to the film.

25. The method of claims 23 or 24, wherein the longitudinal seal is a fin seal.

26. The method of any of claims 23 to 25, wherein sealing the film is performed by a pair of heated reciprocal heating bars to a film having a heat sealable layer on the interior surface of the film.

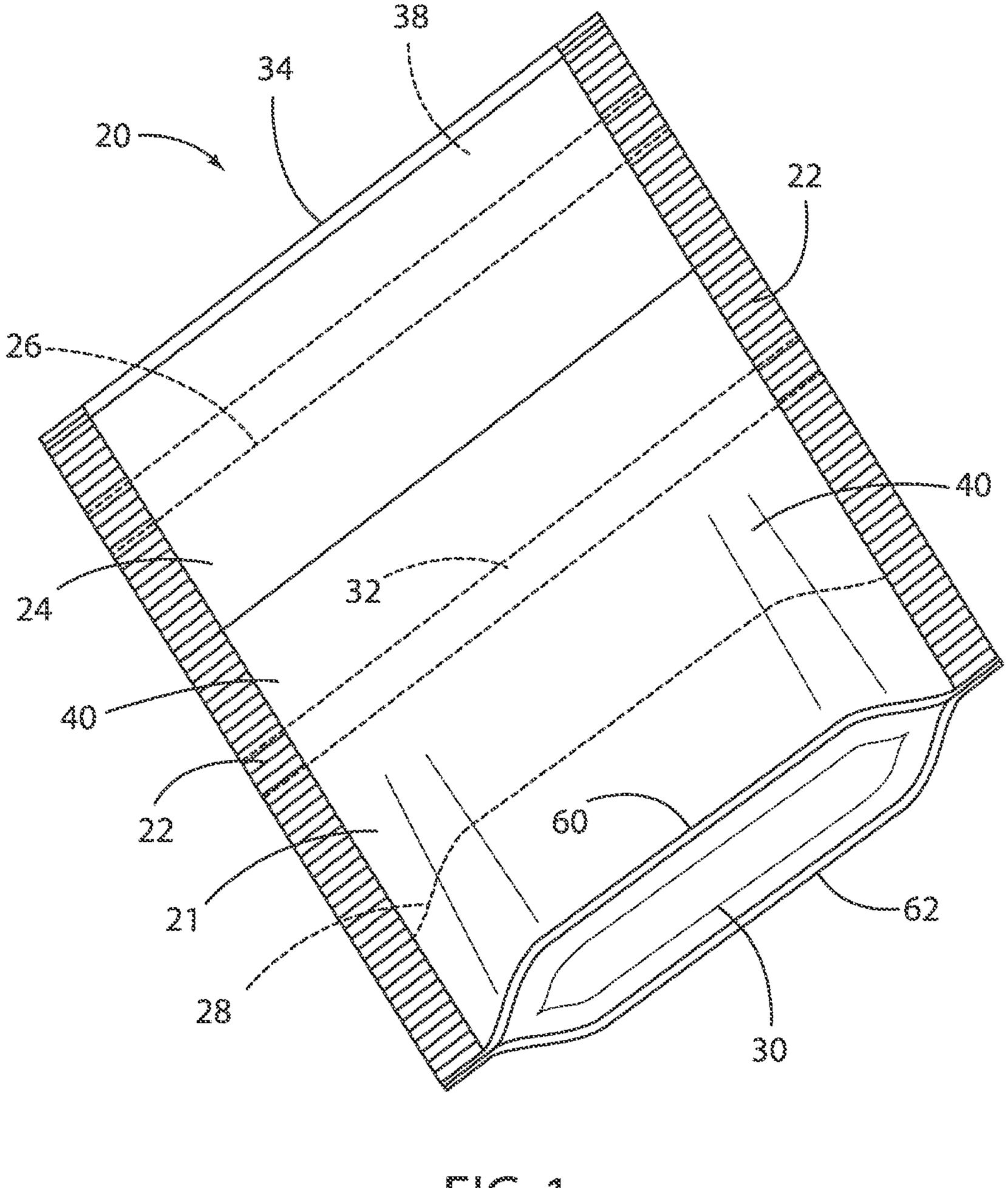

FIG. 1

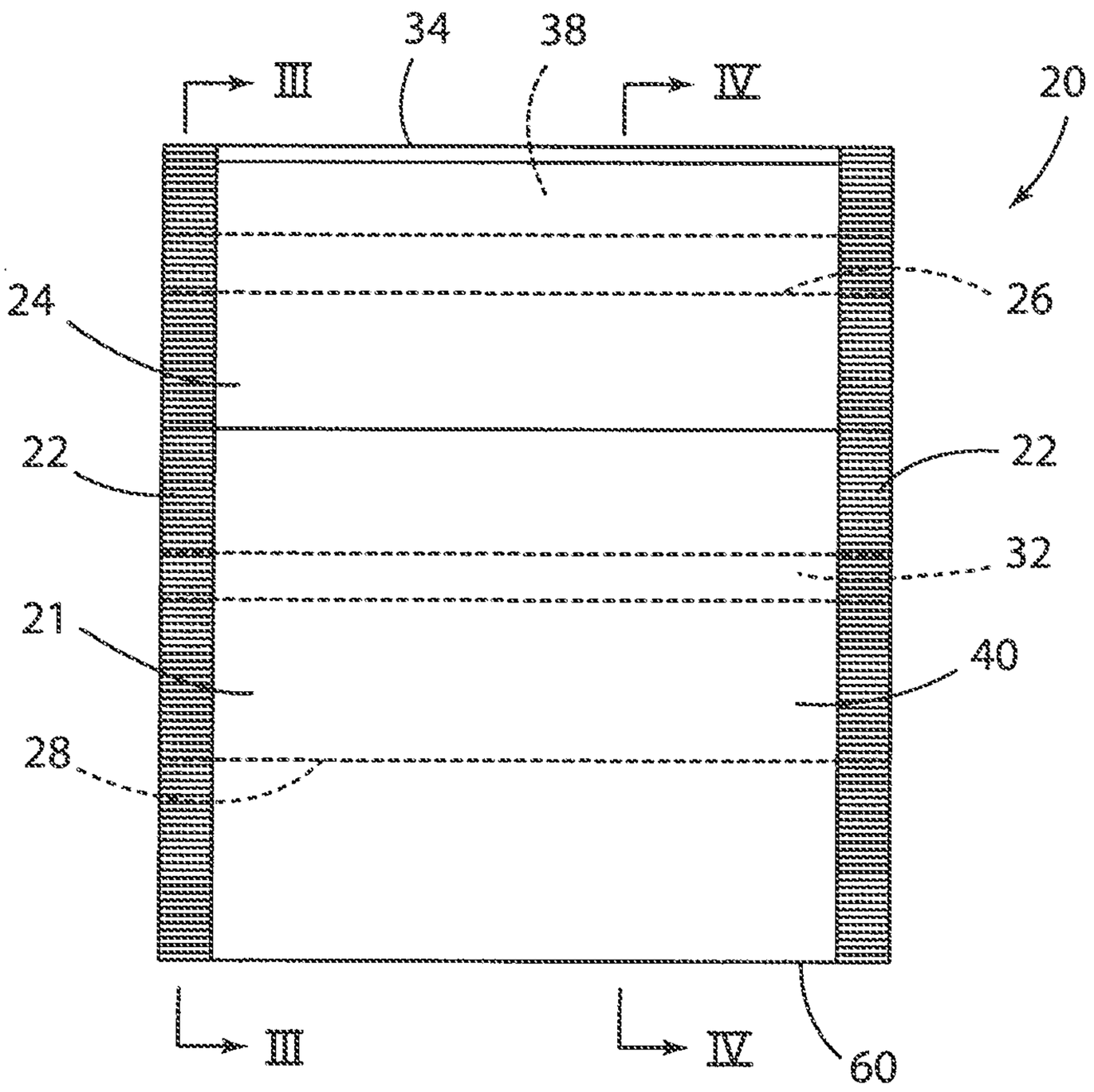

FIG. 2

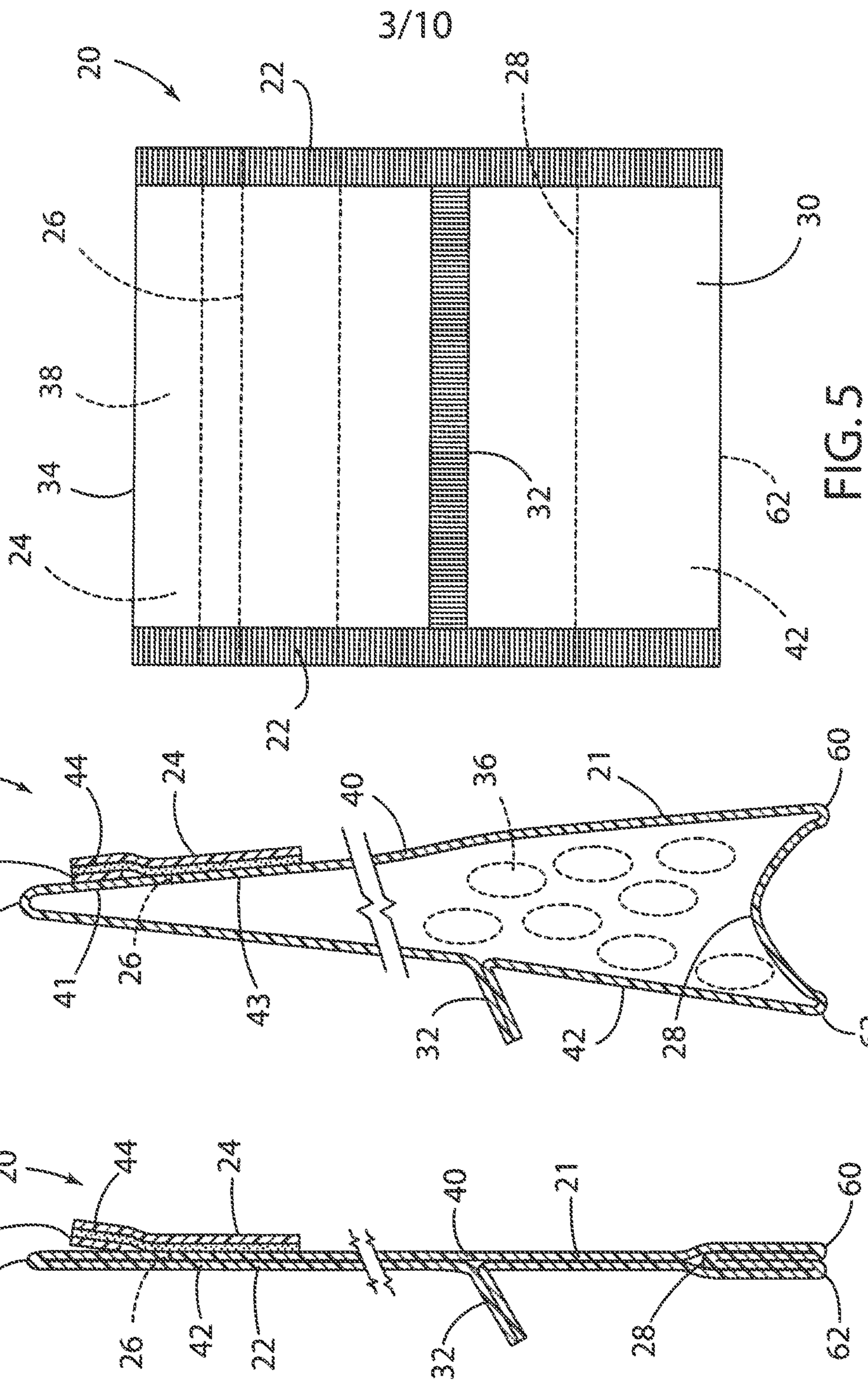

FIG. 5

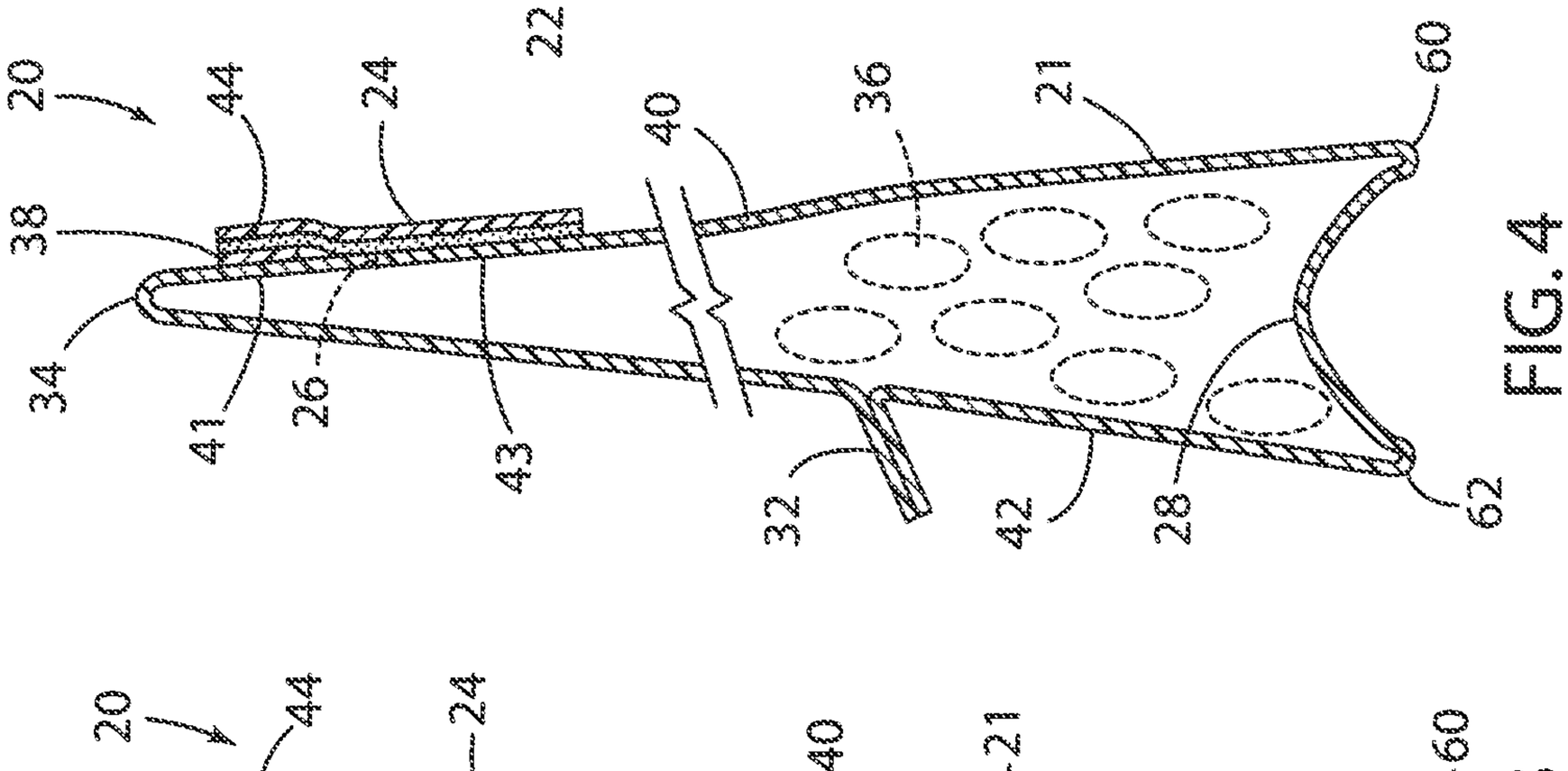

FIG. 4

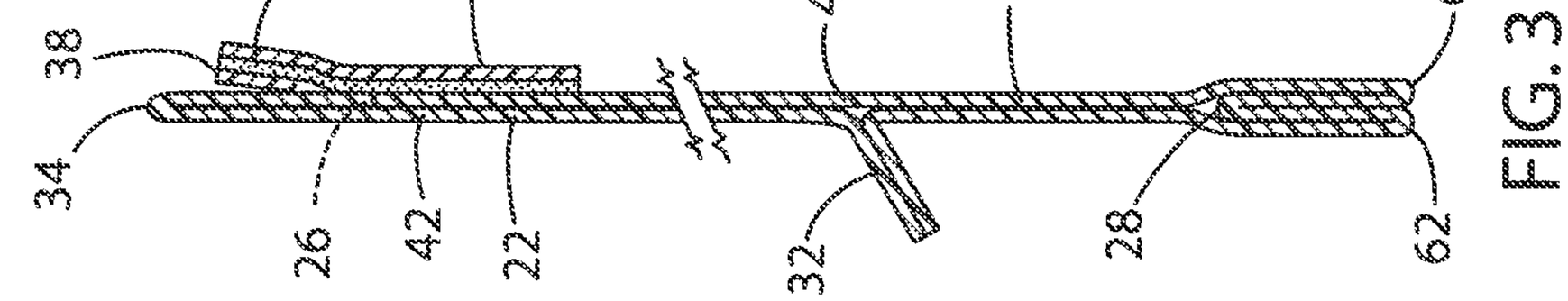

FIG. 3

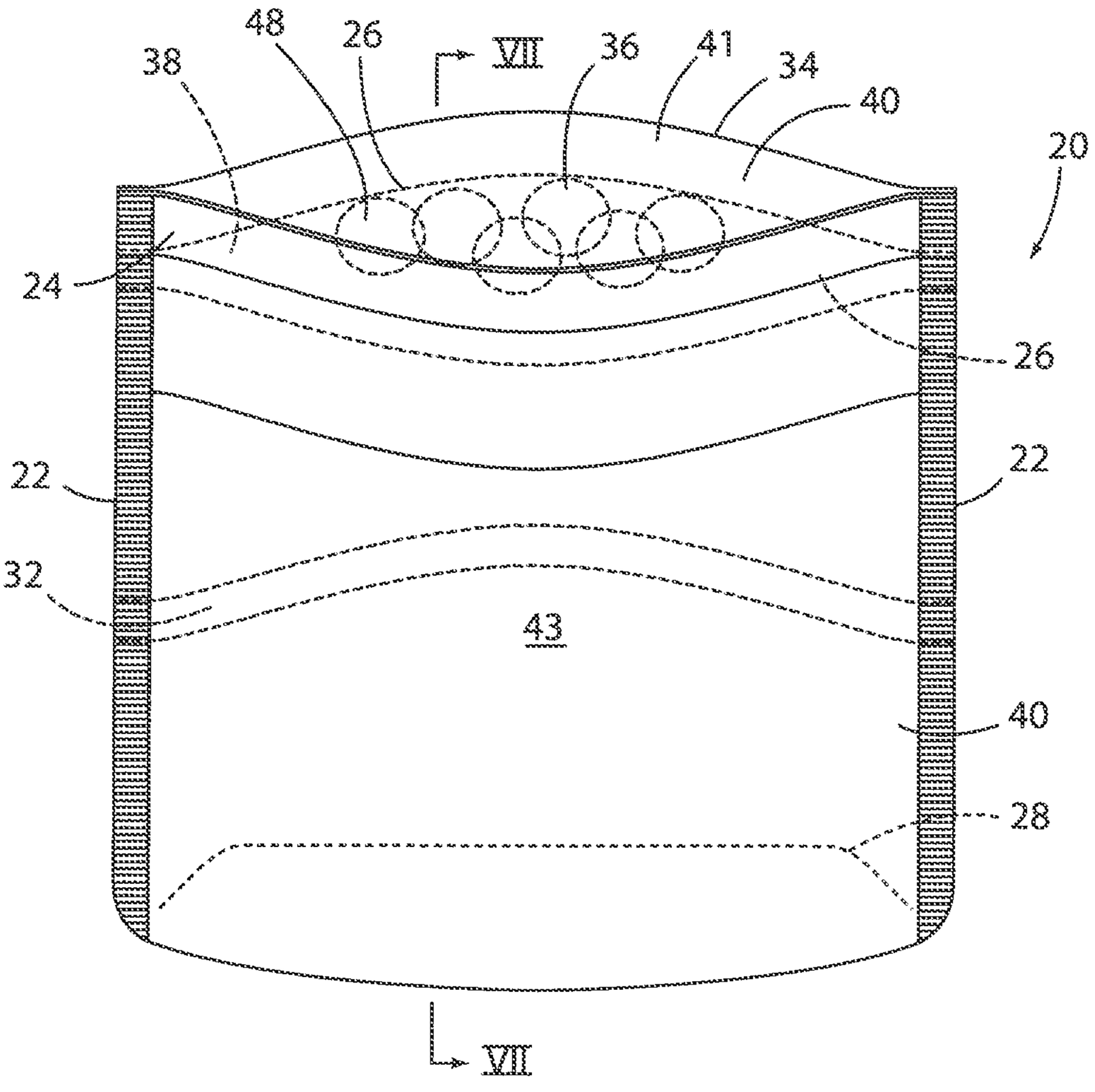

FIG. 6

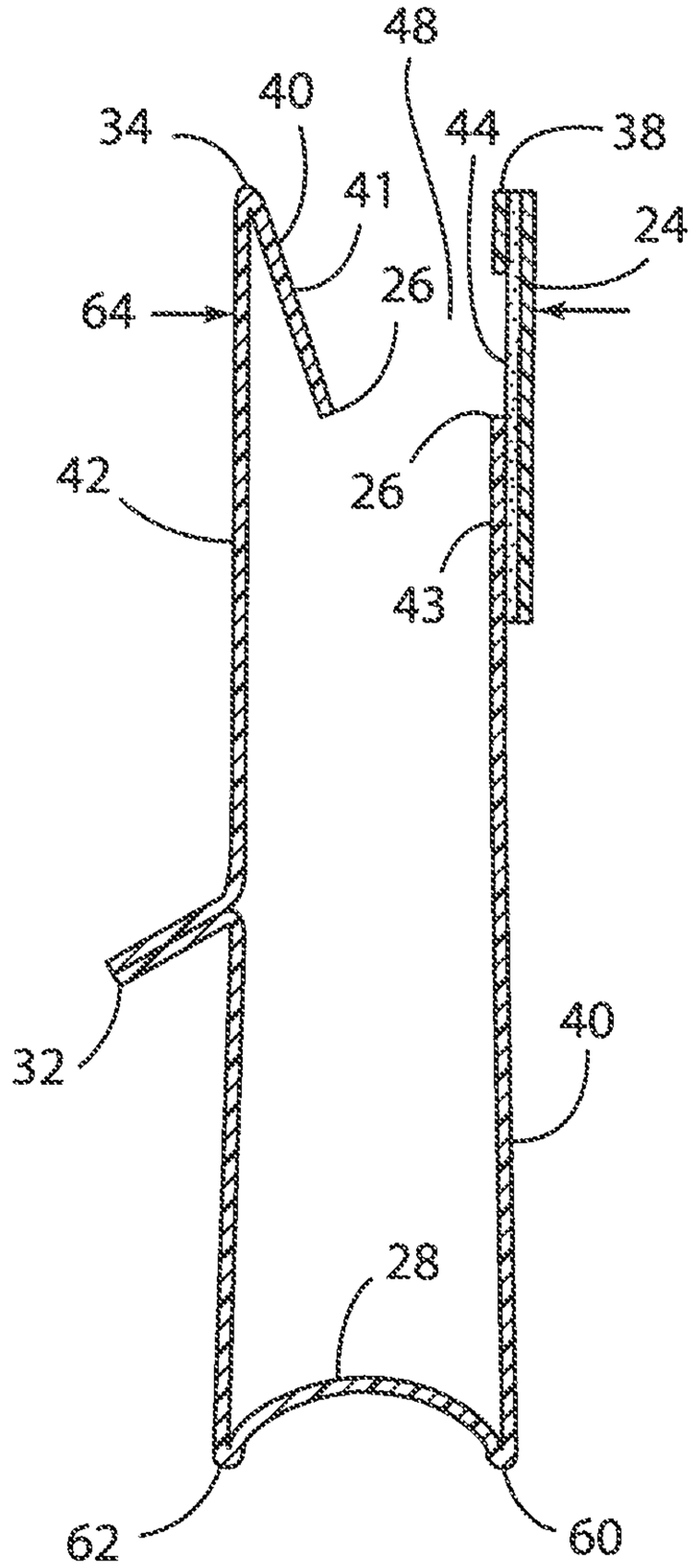

FIG. 7

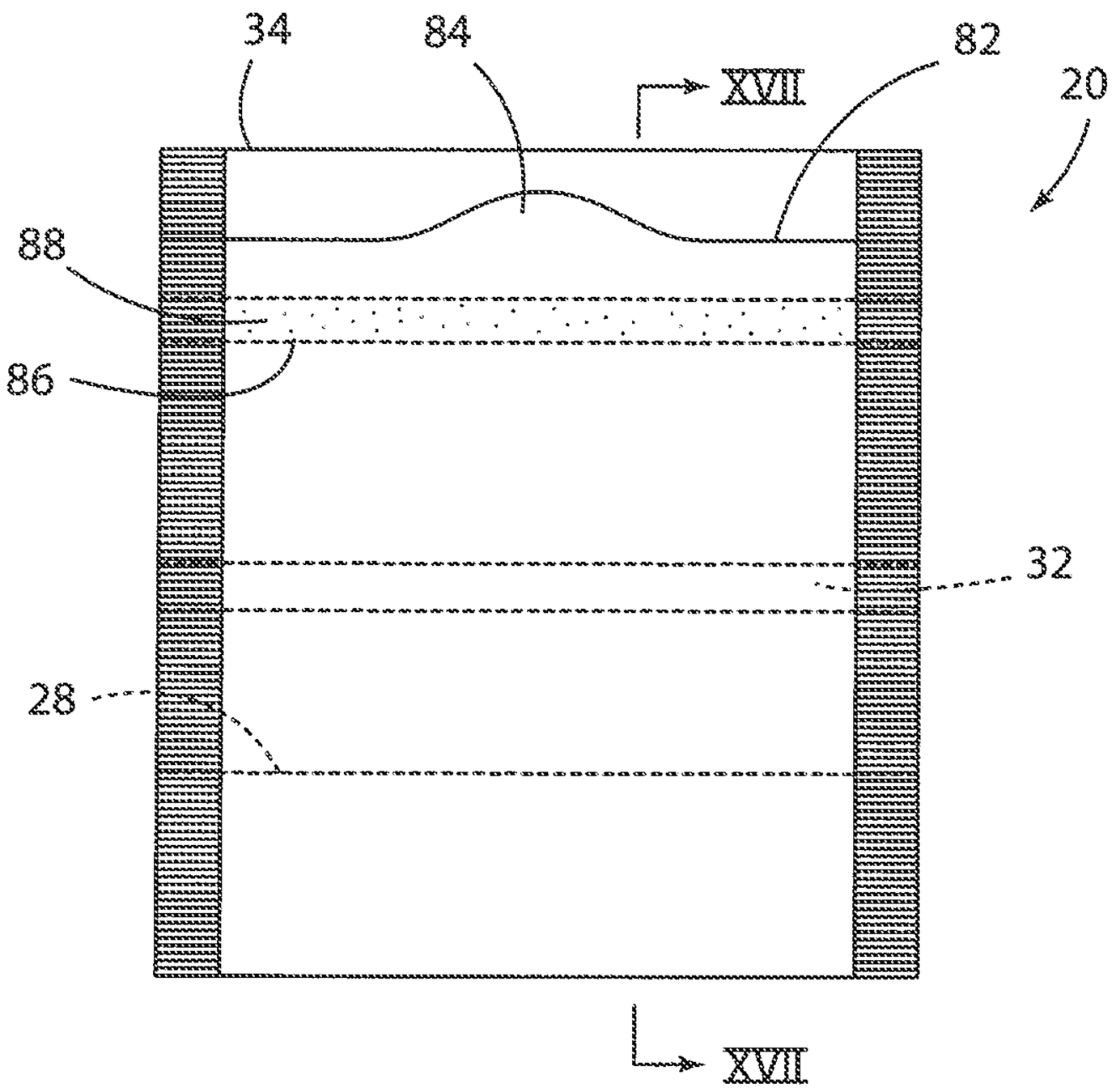

FIG. 8

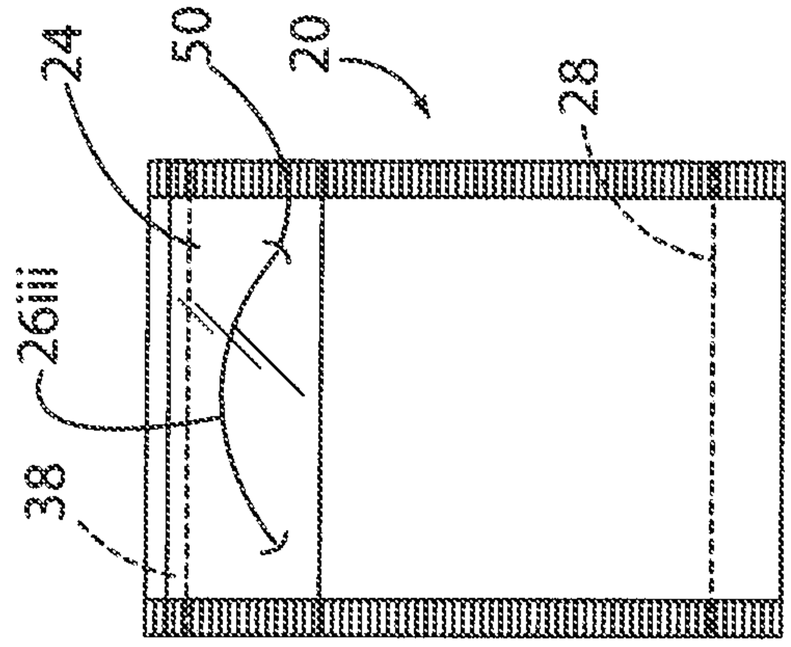

FIG. 11

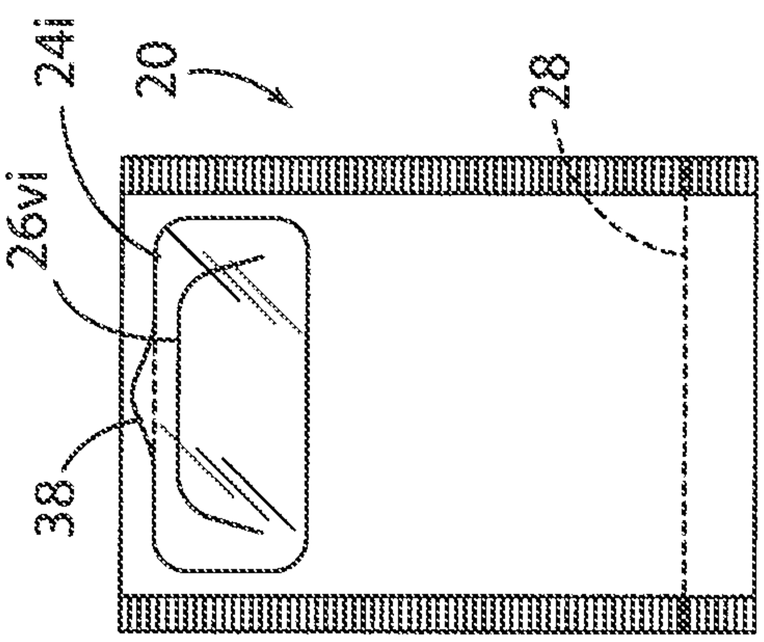

FIG. 14

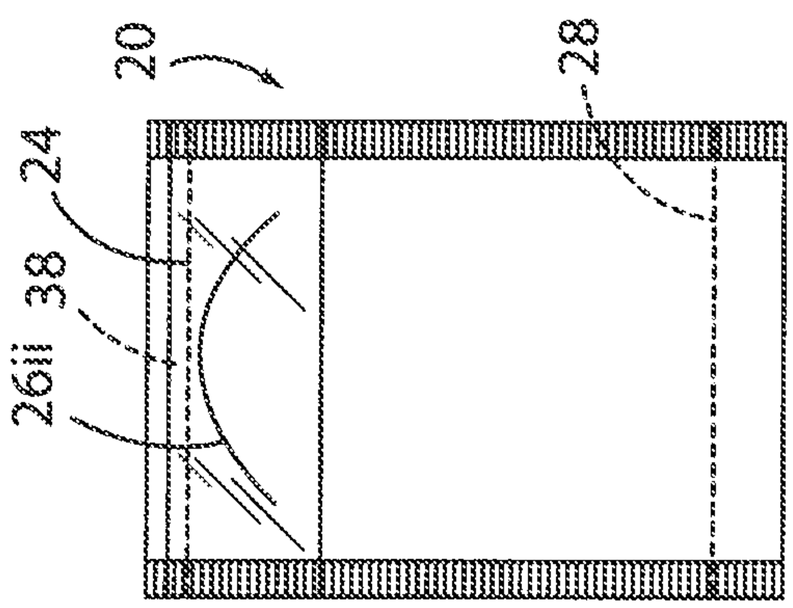

FIG. 10

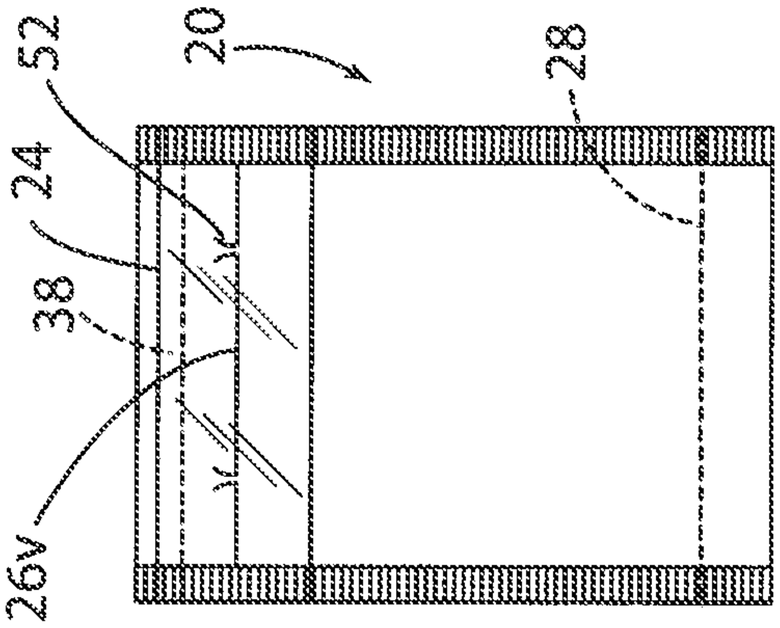

FIG. 13

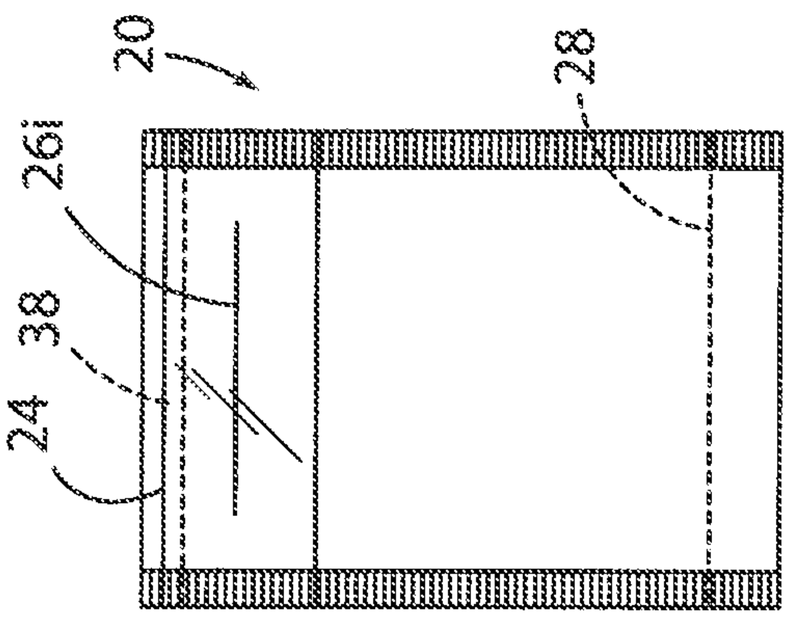

FIG. 9

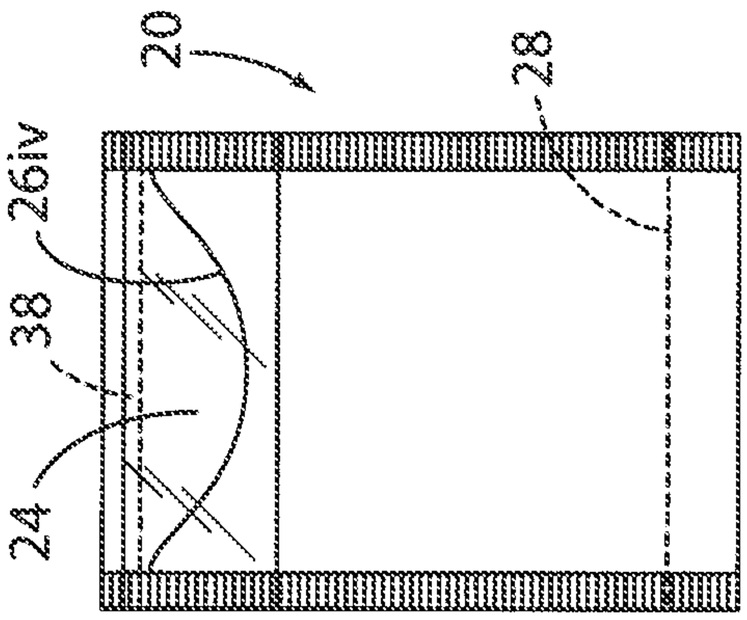

FIG. 12

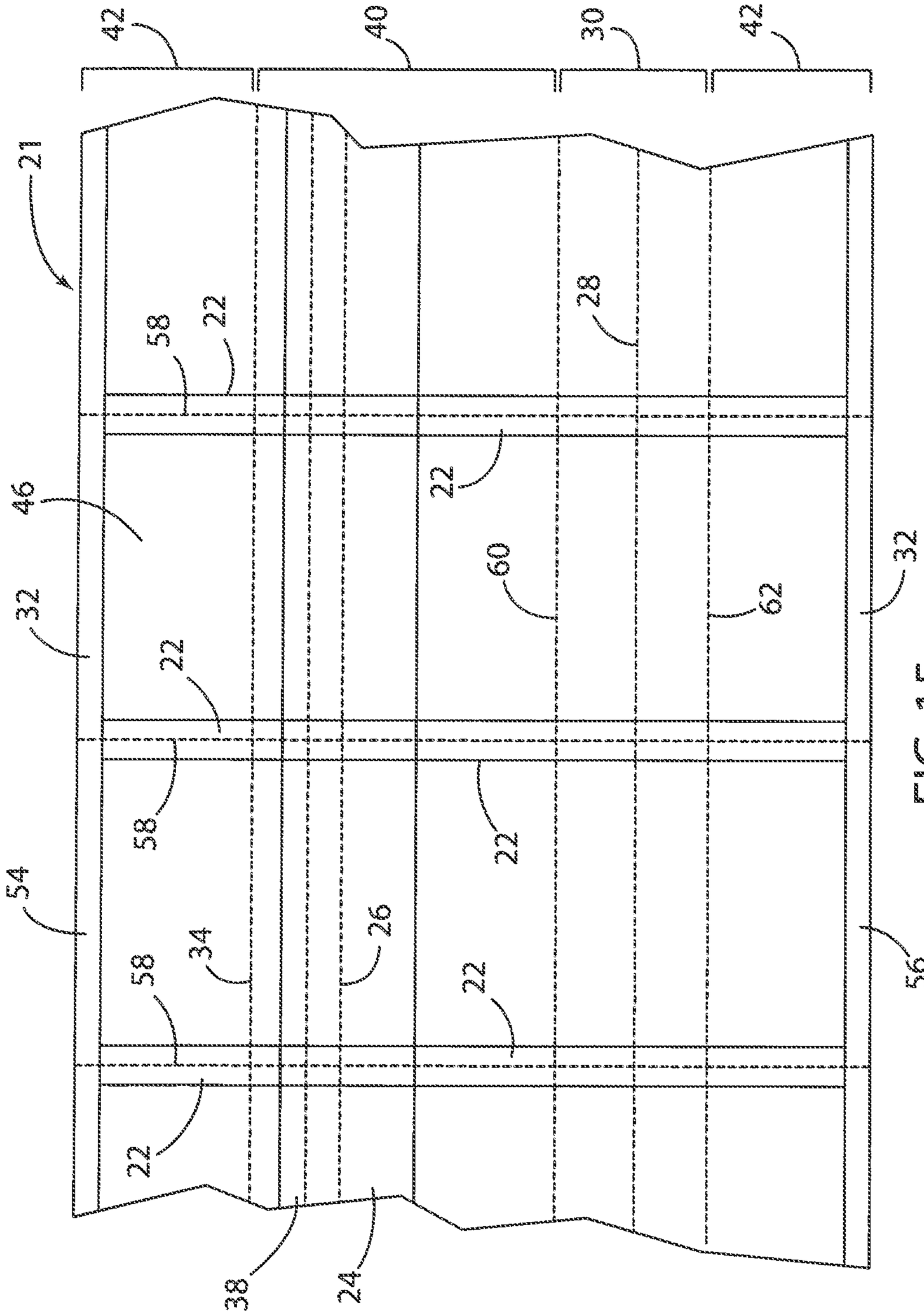
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FIG. 15

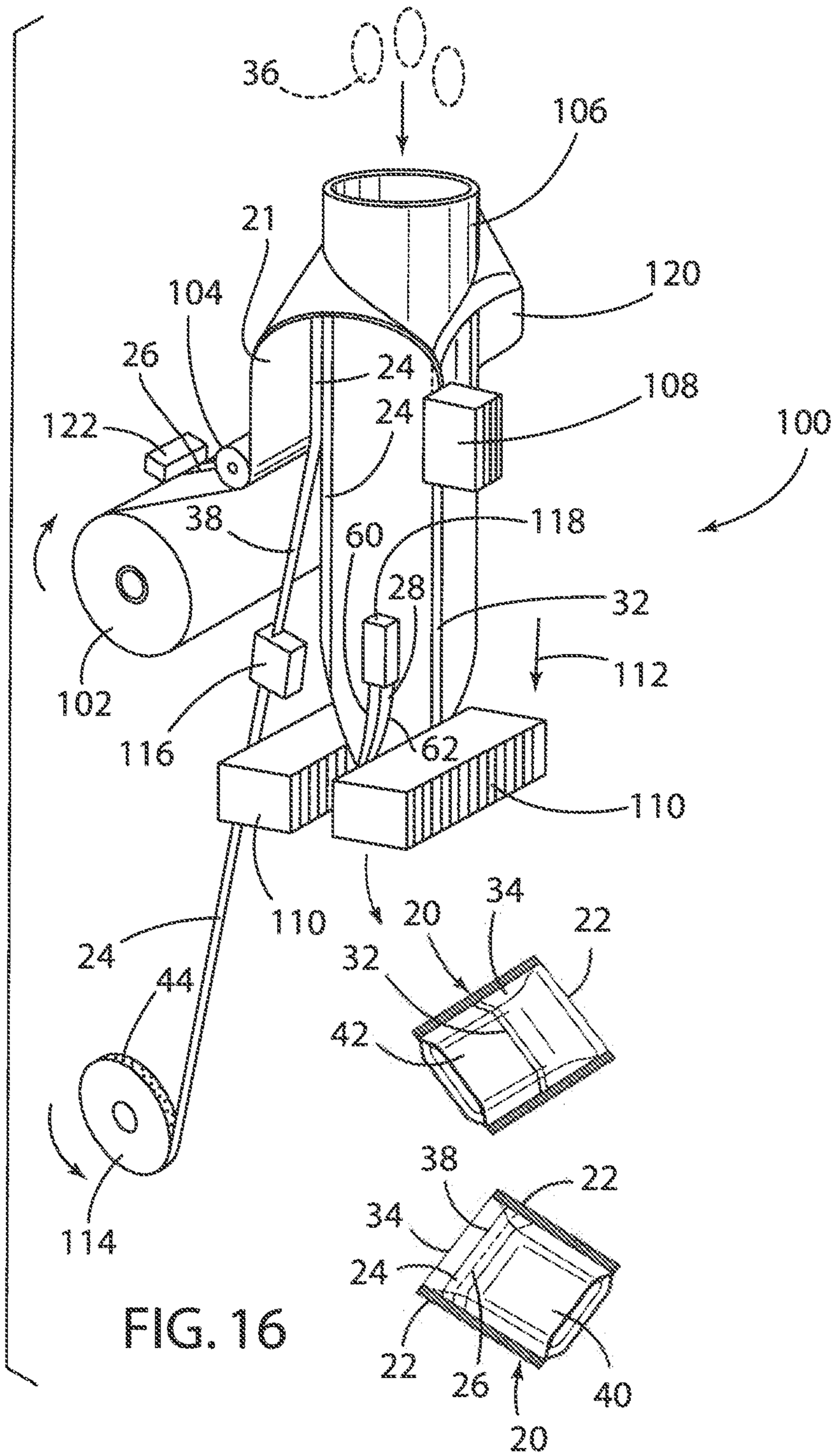
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FIG. 16

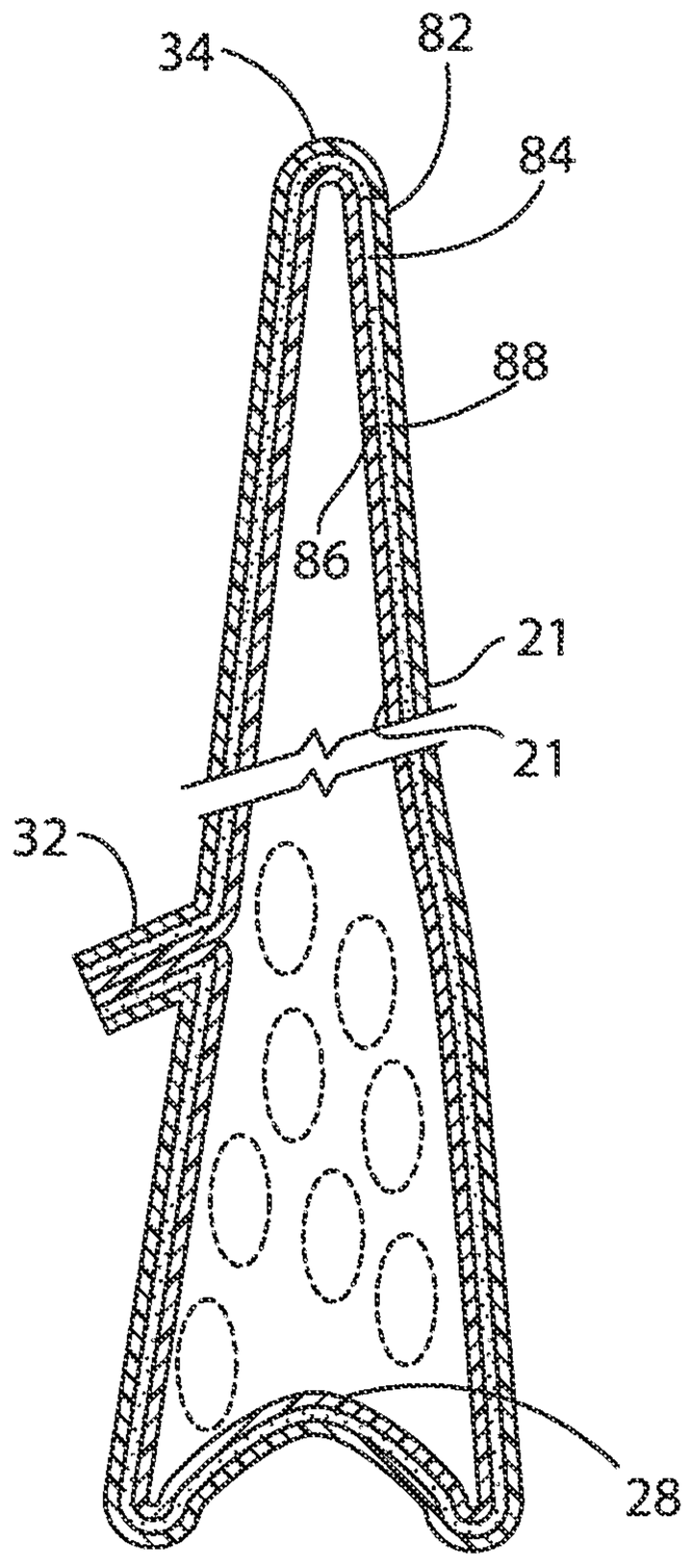

FIG. 17

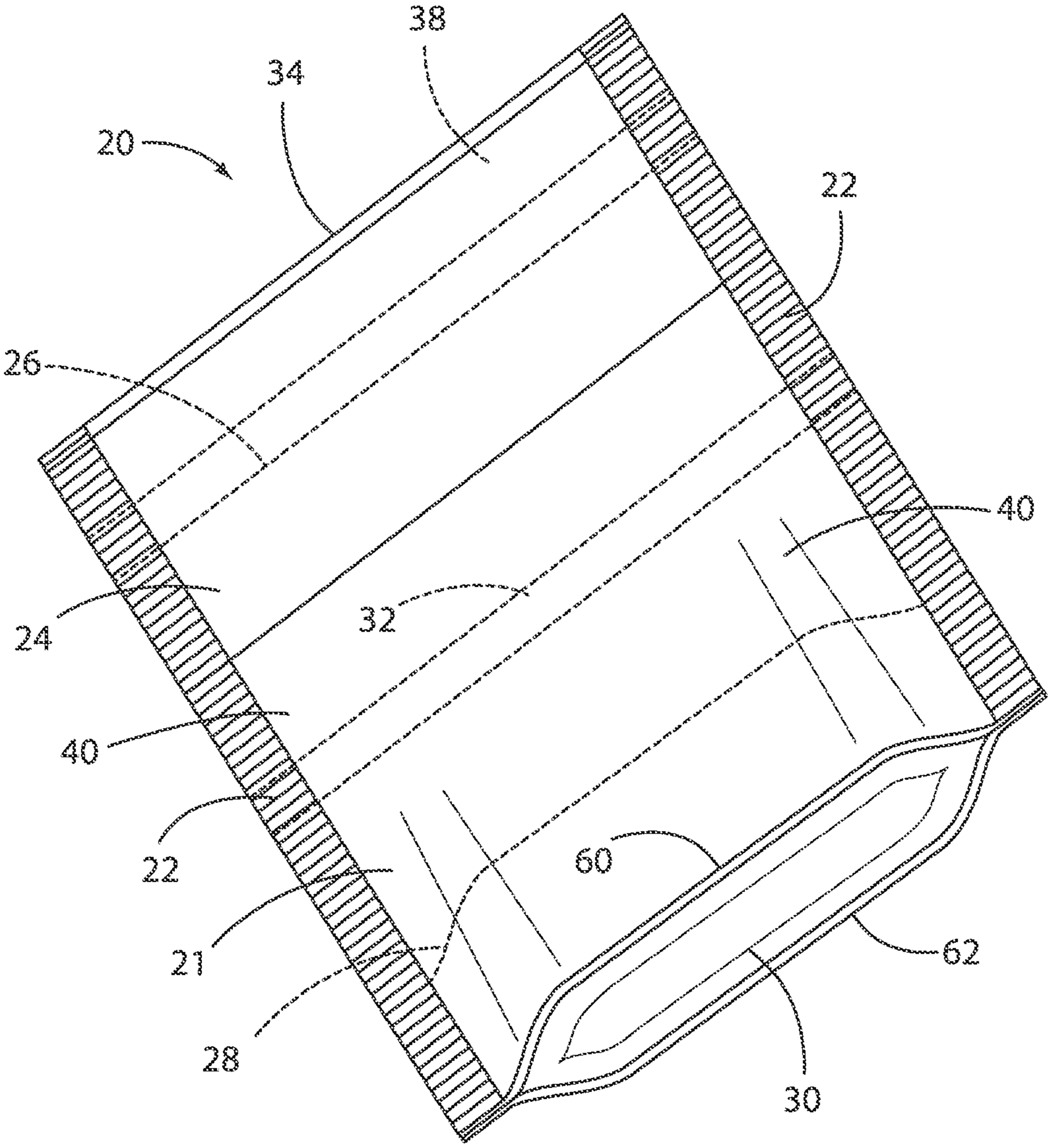

FIG. 1