



(51) International Patent Classification:

B65D 5/20 (2006.01) *B65D 71/12* (2006.01)
B65D 85/20 (2006.01) *A47K 10/16* (2006.01)
B65D 17/28 (2006.01) *A47K 10/24* (2006.01)

(21) International Application Number:

PCT/US2017/044313

(22) International Filing Date:

28 July 2017 (28.07.2017)

(25) Filing Language:

English

(26) Publication Language:

English

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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, BN, BR, BW, BY, BZ,
CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO,
DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN,
HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP,
KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME,
MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ,
OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA,
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.

(54) Title: SEMI-RIGID TISSUE PACKAGE

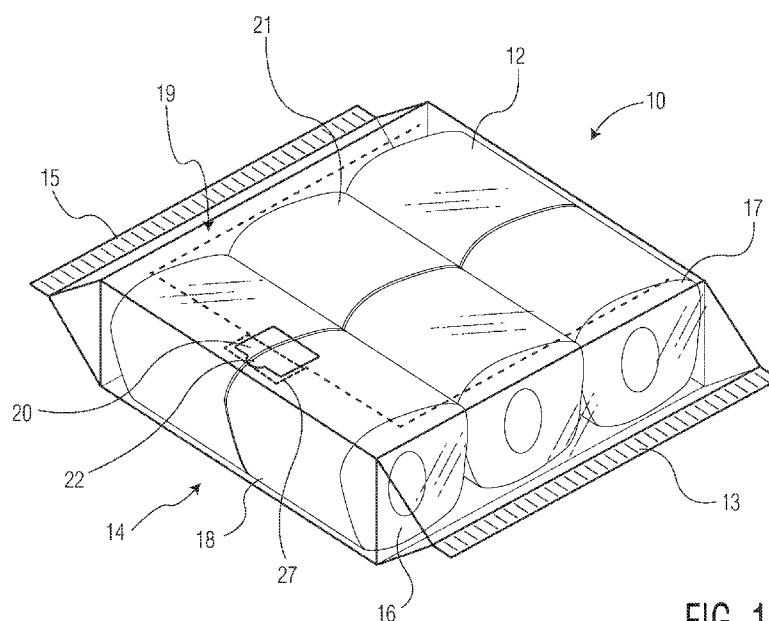


FIG. 1

(57) Abstract: The present package for rolled tissue products is formed from a semi-rigid film having a bending stiffness greater than about 20.0 mgf that when folded and sealed provides the package with distinct, planar walls that provide a clear view of the tissue products and may be printed with brand indicia. The package can be provided with a resealable flap that provides easy and convenient repeated access to the tissue products. Also, after products have been dispensed, the package maintains its form and integrity, which is not only visually pleasing, but also permits the package to be stacked even after it has been opened and tissue products have been dispensed. The package rigidity is provided by the material and package configuration and does not require a container or the like to retain the product and provide stability to the package.



(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, ST, 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, KM, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

- *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*

Published:

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

SEMI-RIGID TISSUE PACKAGE

BACKGROUND OF THE INVENTION

Rolled products, particularly rolled tissue products, such as paper towels, toilet tissue, disposable shop towels, and wipes, for example, are sometimes packaged and shipped in bundles comprising a plurality of rolls. The bundled packages often have two or more rolls stacked in a side-by-side fashion with another two or more rolls. Often, to provide the bundle with structural integrity, the rolled products are arranged in a vertical, stacked configuration (i.e., a longitudinal axis of each core of each roll is generally vertical). The group of vertically oriented rolls is then processed through a bundler which applies an overwrap. The overwrap is sealed with a gusset seal on the leading and trailing sides of the group of rolled products. Arranging rolls in this manner allows for stacking of packages and the arrangement of stacks on pallets for shipping and display.

While conventional gusset seals offer many advantages on bundled packages of tissue products, such as improved sealing and handling, they often require folds and creases of multiple layers of the overwrap that may result in poor visual appearance on the outer perimeter of the bundle. Further, the fold and creases may block visual aspects of the individually wrapped packages contained therein. The folds and creases may also cover up or distort valuable branding information on the individually wrapped packages. Furthermore, the folds and creases can inhibit the full use of all the package face areas for advertising or branding.

Thus, there is a need for packages comprising two or more rolled products, where the gusset seal does not significantly interfere with visibility of the individual rolled tissue products or branding indicia on the individually wrapped packages enclosed therein. There is also a need for a package having gussets that do not interfere with branding indicia on one or more faces of the package.

Not only do conventional overwrapped bundles have gussets and creases that can negatively affect the visual aesthetics of the package and limit the surface area of the package that may be printed, but the gussets and seals are typically not resalable and must be permanently ruptured to access and dispense the rolled tissue products. Further, the overwrap is typically flexible and becomes deformed after dispensing of a product, resulting in a package that cannot be stacked and has poor aesthetics.

Thus, there is also a need for packages comprising two or more rolled products, where the package is resealable and maintains its form and integrity after a product has been dispensed.

SUMMARY OF THE INVENTION

The present invention solves many of the problems of prior art overwrapped bundles of tissue products. The present package is formed from a semi-rigid film, that when sealed and folded provides the package with distinct, planar walls that provide a clear view of the package contents and that are amenable to printing with brand indicia. Further, the semi-rigid film and package configuration provides a package that can be provided with a resealable flap that provides easy and convenient repeated access to the package contents. Also, after products have been dispensed, the package maintains its form and integrity, which is not only visually pleasing, but also permits the package to be stacked even after it has been opened and rolled products have been dispensed.

Accordingly, in one embodiment the present invention provides a package for tissue products comprising a bottom wall, a top wall, opposite sidewalls, and opposite end walls, wherein the package includes a flap which is movable between a closed position and an open position to facilitate access to the package interior, and which may comprise portions of the top wall and an adjoining sidewall of the package. The package is preferably made of a semi-rigid plastic material that is bendable so as to permit the flap to bend as it is moved between a closed and an open position, but which allows the package to retain its shape even after all of the products have been dispensed. In this manner the invention provides a package that does not depend upon a separate container, such as a frame, carrier, carton, or the like, to retain and protect the package contents and provide structural integrity to the package.

In certain embodiments the package may be configured so that when the flap is in an open position, the tissue product is accessible from the side as well as the top, which permits a user to grasp a larger portion of the product, particularly when the package is full, or near full and a portion of the product is retained by a portion of the package beyond the opening. Further, permitting access from two faces of the package, such as from the top wall and an adjoining sidewall, permits the product to be removed without undue distortion.

In other embodiments the present invention provides a unitary package formed from a single piece of semi-rigid plastic film having bending stiffness from about 20.0 to about 60.0 mgf and more preferably from about 25.0 to about 50.0 mgf. The single piece of semi-rigid plastic film is folded and sealed to form the package. The package contents are accessed and removed from the package by a flap that is integrally formed with the package top wall by forming a line of weakness in the single piece of semi-rigid plastic film used to form the package.

In still other embodiments the present invention provides a package for tissue products comprising a bottom wall, a top wall with an opening disposed thereon, opposite sidewalls, and opposite end walls, wherein the package includes a flap covering the opening. The flap may be formed entirely

of a separate piece of material and be separable from the package or may comprise portions of the top wall to prevent the flap from being completely removed from the package. The flap may be peelably and resealably sealed along one or more edges. An opening is provided in the package walls underlying the flap. The opening underlying the flap is preferably sized so as to permit the tissue products to be
5 dispensed without deforming. The opening may be formed by cutting the film used to form the package or may be made by providing a line of weakness in the top wall beneath the flap and the flap may be adhered to the top wall so that as the flap is pulled open, portions of the top wall are pulled away with the flap. The line of weakness may extend about the entire periphery of the opening or may extend only about a portion of the opening, so that the portions of the top wall and sidewall which are pulled away
10 when the flap is opened are not completely disconnected from the adjoining package material, but remain connected thereto.

In other embodiments to open the package the flap may be provided with a label that is peeled away from the package material on one side of the line of weakness. As the label is peeled away the package material is parted at the line of weakness to provide the opening. The line of weakness may
15 extend along the upper edge of one of the sidewalls where it meets the top wall and then along the top wall so that an opening is formed along two faces of the package.

BRIEF DESCRIPTION OF DRAWINGS

FIG. 1 is a perspective view of a package according to one embodiment of the invention;
FIG. 2 is a plan view of the package of FIG. 1;
20 FIG. 3 is a front view of the package of FIG. 1 in an open configuration;
FIG. 4 is a plan view of a package according to another embodiment of the present invention;
FIG. 5 is a frontal view of the package of FIG. 4 in an open configuration;
FIG. 6 is a perspective view of a package according to still another embodiment of the invention;
FIG. 7 is front view of the package of FIG. 6; and
25 FIG. 8 is front view of a sheet of plastic film useful for forming the package of FIG. 6.

DETAILED DESCRIPTION

The present invention generally provides a semi-rigid package for storing and dispensing tissue products and more particularly rolled tissue products, such as paper towels, toilet tissue, disposable shop towels, and wipes, for example. Unlike prior art rolled tissue product packaging, which typically
30 comprise thin, flexible films that are easily deformed and have little structural integrity, particularly after

one or more products have been dispensed, the present package is formed from a semi-rigid material that provides the package with structural integrity, even when the products have been dispensed. Further, the present package provides a flap that allows easy access to the contents of the package and protects the products when the package is not in use.

- 5 The invention is generally embodied in a package for tissue products comprising a bottom wall, a top wall, opposite sidewalls and opposite end walls. The package is preferably formed from a web of semi-rigid plastic material, more particularly a plastic material having a bending stiffness greater than about 20.0 and more preferably greater than about 25.0 and still more preferably greater than about 30.0 mgf, such as from about 20.0 to about 60.0 mgf and more preferably from about 25.0 to about 50.0 mgf.
- 10 As used herein, "bending resistance" means the resistance measured in the machine direction (MD) of the material via a Gurley resistance test as set forth in TAPPI Standard Test T 543 om-11 (Bending Resistance of Paper (Gurley type tester)), and reported in milligrams of force. A suitable testing apparatus is a Gurley Digital Resistance Tester, model 4171-D manufactured by Teledyne Gurley, a business having offices in Troy, N.Y., U.S.A. A specimen is cut from a wipes dispenser and tested in
- 15 accordance with the above-referenced TAPPI test. Although the length and width dimensions of the specimen that is cut and tested may be adjusted to accommodate the size or nature of a sample as noted in section 6 of the procedure, the force measurement for any given sample size is normalized to correspond to a 50.8 mm (2 in) by 63.5 mm (2.5 in) sample size, as set forth in TAPPI Standard Test 543 om-11, including the use of the correct specified conversion factor depending on the test parameters
- 20 used. The table below sets forth the bending stiffness, as measured in the MD, for various materials, including those useful in the present invention, and also provides the specimen size, weight and mounting position for each material tested in accordance with TAPPI Standard Test 543 om-11.

TABLE 1

Sample	Weight (g)	Weight Distance from Pivot (in.)	Sample Width (in.)	Sample Length (in.)	Bending Stiffness (mgf)
Cottonelle* Gentle Care Overwrap Film	5	1	2	1	2.38
Pampers* Baby Fresh* Soft Pack 72 ct.	5	2	1	1	14.40
Huggies* Natural Care Soft Pack 32 ct.	5	1	1	1	8.01
3.5 mil OPET/PE Coex	25	2	2	1	35.03
6.0 mil HDPE laminate	5	2	1	1	21.24

- 25 The semi-rigid material allows the package to retain its shape even after all of the products have been dispensed. In this manner the invention provides a package that does not depend upon a separate container, such as a frame, carrier, carton, or the like, to retain and protect the package contents and provide structural integrity to the package. Rather than rely upon a container to retain and hold the package contents, the present package contents, such as rolls of tissue, are in direct contact with the

walls of the package which reduces packaging cost and complexity and permits for easy dispensing of the product.

While the stiffness of the film material is significant to ensure that the package retains its shape even after all of the contents have been dispensed, the thickness of the semi-rigid film may vary.

5 Generally, stiffness is a function of both the film's modulus and its thickness. Thus, a thinner film may be used so long as the film's modulus is sufficiently high to provide a stiffness greater than at least about 20.0 mgf, from about 20.0 to about 50.0 mgf and more preferably from about 25.0 to about 40.0 mgf. In certain preferred embodiments the film should be thin enough so it can be easily folded and manipulated to form the instant package, yet thick enough to provide the necessary structural integrity and barrier
10 properties to protect and preserve the rolled tissue products contained therein. Thus, in certain preferred embodiments, the film has a thickness of at least about 50 microns, and more preferably at least about 60 microns and still more preferably at least about 75 microns, such as from about 50 to about 200 microns and still more preferably from about 70 to about 100 microns. Caliper is measured according to Tappi Test Method T 411 om-15 and typically has units of mils or microns.

15 Like the thickness, the modulus of the film is preferably sufficiently high so as to provide the film with sufficient stiffness to resist collapse of the package when the contents are dispensed, such as a bending stiffness greater than about 20.0 mgf and more preferably greater than about 25.0 mgf and still more preferably greater than about 30.0 mgf, such as from about 20.0 to about 60.0 mgf and more preferably from about 25.0 to about 50.0 mgf. Films having the foregoing stiffness are desirable not only
20 for their ability to resist collapse after products have been dispensed from the package, but are readily bendable and sufficiently flexible to be folded and shaped into a package without additional processing steps such as scoring, cutting and the like.

In addition to being sufficiently stiff to maintain the integrity of the package after dispensing of the products, yet sufficiently pliable to permit bending and folding, the packaging film may have a
25 modulus greater than about 350 MPa and more preferably greater than about 450 MPa, such as from about 350 to about 1250 MPa and more preferably from about 450 MPa to about 750 MPa. In certain preferred embodiments the film has a thickness from 70 to about 100 microns and a modulus from about 450 to about 750 MPa. The secant modulus is the ratio of stress to corresponding strain at a strain of 1.0 percent, that is, the slope of the straight line that joins the origin and a point on the actual stress-strain curve at a strain of 1.0 percent. Secant modulus is measured according to ASTM D790 and has
30 units of megapascals (MPa, pounds per square inch).

The film may comprise one or more plastic resins such as polyethylene (LDPE, LLPE, VLDPE, HDPE, MDPE), polypropylene, polyethylene terephthalate, nylon, other vinyl polymers and copolymers

such as those made from vinyl acetate, vinyl alcohol, vinyl chloride, and so forth. In some embodiments, the film may comprise combinations of two or more of the foregoing synthetic resins. For example, blends of two or more resins can be used to form a single layer film, or even a multiple layer film. In particularly preferred embodiments the film is a multi-layer film composed of two or more layers of the foregoing resins bonded together by any known technique such as co-extrusion ("coex"), laminating with or without an adhesive, coating, or the like. For example, the film may comprise coextruded polyethylene/polypropylene laminated to polyethylene terephthalate (PET) or PET laminated to LDPE (low density polyethylene). In other embodiments the film may comprise coextruded polyethylene (PE) and oriented polyethylene terephthalate (oPET).

The film is preferably amenable to sealing so as to form one or more sealed edges when folded into a package. In certain embodiments the film may be heat sealable. For example, the film may comprise a thermoplastic resin that is rendered tacky when heated allowing two portions of the film brought into facing arrangement with one another to be bonded. In other embodiments portions of the film brought into facing relation with one another may be bonded using an adhesive bonding layer or coating. The preferred adhesive coatings are those based upon thermoplastic resins whereby the coating is non-tacky at room temperature but becomes tacky and adhesive when heated, such as a coating of polyethylene resin or acrylic resin.

In certain embodiments the package film may comprise a laminated film having one or more layers which respond to heat and pressure by forming a seal of variable strength, with the strength of the seal depending in part on the magnitude of the heat transfer and pressure applied. Thus, when the film is folded upon itself, such as a transverse end seal, a peelable seal region may be provided adjacent a permanent seal region by varying the heat transfer, pressure and width of application between the two regions.

With reference now to the figures, the package 10 comprises a unitary piece of film 17 folded to form a top wall 12, a bottom wall 14, a pair of sidewalls 16, and a pair of end walls 18. The package preferably contains a tissue product comprising a plurality of rolled tissue products, such as rolls of bath tissue 30 disposed in the interior of the package. The film may be folded in any number of different configurations to form a four-sided package. For example, the package may be manufactured by folding the film in a horizontal wrapping operation by continuously wrapping a web of film about the rolled tissue products with marginal longitudinal opposite edges of the web brought together to form a longitudinal seal beneath the product, and with transverse end seals formed at the ends of the package to define end walls.

In other embodiments, such as that illustrated in FIGS. 1-3, a single unitary piece of film 17 may be folded and sealed to form a package 10 having a pair of opposed transverse edge seals 13, 15 and a longitudinal seal (not illustrated in FIG. 1) disposed on the bottom wall 14. Depending on the properties of the film, the seals may be either heat seals or cold seals and may be either permanent seals or resealable seals. In a particularly preferred embodiment all of the edges, the transverse edge seals and the longitudinal bottom seal, are permanently heat sealed. While the embodiment illustrated in FIGS. 1-3 comprises a pair of opposed transverse edge seals and a longitudinal seal disposed along the bottom wall, the film may be orientated and wrapped about the package contents such that the opposed sealed edges are oriented in the longitudinal direction of the package and the bottom seal is oriented in the transverse direction of the package.

With continued reference to FIGS. 1-3, the top wall 12 comprises a flap 21 that may be separated from the top wall 12 to provide access to the rolled tissue products 30 in the package. The flap 21 is defined by a line of weakness 19 disposed on the top wall 12. The line of weakness may be produced using methods including but not limited to scoring, perforating, chemical treatment, preferably laser scoring, laser perforation, mechanical scoring, mechanical perforation, embossing methods, or combinations thereof. As depicted in FIG. 1, the line of weakness 19 forming the flap 21 extends along only a portion of its perimeter, such as three sides, leaving the fourth side attached to the top wall 12. The attached fourth side may form a living hinge which allows the flap 21 to be moved between a closed and open position. When a user separates the flap 21 from the top wall 12 by fracturing the film 17 along the line of weakness 19 an opening is formed in the top wall of the package to permit a user to access and dispense the tissue products 30.

In other embodiments the flap may be formed entirely of a separate piece of material and be separable from the package. The flap may be peelably and resealably sealed along one or more edges. An opening is provided in the package walls underlying the flap. The opening underlying the flap is preferably sized so as to permit the tissue products to be dispensed without deforming. The opening may be formed by cutting the film used to form the package or may be made by providing a line of weakness in the top wall beneath the flap and the flap may be adhered to the top wall so that as the flap is pulled open, portions of the top wall are pulled away with the flap. The line of weakness may extend about the entire periphery of the opening or may extend only about a portion of the opening, so that the only a portion of the top wall is pulled away when the flap is opened. In this manner the flap is not completely disconnected from the adjoining top wall, but remains connected thereto.

During manufacture of the package, the web is preferably pre-cut with a die-cut perforation or otherwise provided with a line of weakness corresponding to the desired shape of the opening. In other

embodiments, the flap may be applied as a separate piece to the web after the line of weakness defining the opening has been disposed on the web. Where the flap is applied as a separate piece, it is preferably a label having adhesive covering one side thereof. The label is applied to the web to cover the die-cut perforation or other line of weakness. As the web advances, the label is folded with the underlying substrate, and remains in position.

As illustrated in FIG. 3, when flap 21 is pulled back from the top wall 12, it forms a dispensing opening through which the rolled tissue products 30 may be dispensed. A portion of flap 21 remains attached to the top wall 12 along one of its edges. Preferably the size of the opening 19 and hence the size of flap 21 is at least around 30 percent of the surface area of film 17 and advantageously at least 50 percent of the surface area of film 17 so as to more easily gain access to the rolled tissue products contained within container 10.

Alternatively, the flap may have a line of weakness disposed completely around its perimeter on all sides so as to be completely separable from the film when removed by the user to form the dispensing opening. However, it is believed that it may be more desirable to have the line of weakness extend about only a portion of the periphery of the opening, so that the package material within the line of weakness remains connected to adjacent package material along one edge of the flap. This may eliminate the need for a permanent seal to be formed at this location, in that the strength of the package material remaining intact will prevent the flap from being entirely removed from the underlying package material. In accordance with this feature, the line of weakness 19 illustrated in FIGS. 1-3 is not a closed curve extending about the entire periphery of the opening.

In certain embodiments, such as that illustrated in FIGS. 1-3, a sealing label 20 may be affixed to the flap 21 to seal the flap in a closed position when the package 10 is not in use. Advantageously, the sealing label 20 is permanently affixed to the flap 21 using an appropriate first adhesive and resealably attached to the top wall 12 using a second adhesive. As shown in FIG. 1, the sealing label 20 covers a portion of the top wall 12, which generally defines a sealing area 27. The sealing area 27 terminates prior to any side 16, 18 of the package 10. Thus, in the embodiment illustrated in FIGS. 1-3, the sealing area 27 does not extend to any of the sides of the package and the package opening is entirely disposed on the top wall 12 of the package 10.

Opening of the package may be facilitated by providing the sealing label 20 with a tab 22. The tab 22 extends from a portion of the sealing label 20 and is preferably not attached to the top wall 12, but rather hangs free from the package so as to be readily grasped by a user. In this manner the tab 22 can be grasped by a user's fingers and thumb and pulled to initiate removal of the label 20 and subsequently the flap 21. Further, the tab 22 may facilitate closing of the container, providing an adhesive

free surface for the user to grasp and position to the label 20 for proper sealing and securing of the flap 21. The size of tab and its shape may be optimized for functionality. For example, in certain embodiments the tab is semicircular and has a surface area from about 1 to about 10 percent, and more preferably from about 2 to about 5 percent, total surface area of sealing label.

5 The sealing label 20 may be removably adhered to the top wall 12 by applying an adhesive to the underside thereof. The sealing label 20 may then be brought in contact with the top 12 to seal the package 10. Advantageously, adhesive provides a removable seal between the sealing label 20 and the top 12. In those embodiments where the sealing label is provided with a tab, adhesive is preferably not applied to the tab. Alternatively, if adhesive is applied to the tab, a deadening agent, either a chemical
10 or a layer of material, is applied to the top wall to prevent the tab portion from adhering to the top of the package.

FIGS. 4 and 5 illustrate a second embodiment of the invention comprising a package 10 which has a top wall 12, a bottom wall (not illustrated), a pair of sidewalls 16 and a pair of end walls 18. The package contains a plurality of rolled tissue products 30. The end walls comprise extensions of the top,
15 bottom and sidewalls which are brought together at a transverse end seal 27 on each end wall 18 with extensions 29 of the sidewalls 16 being folded inward at the ends of the package 10. The pair of sidewalls 16 are separated from the bottom and top walls a pair of longitudinal edge seals 23, 25. In this manner the side and top walls of the back are substantially planar and well suited for receiving product indicia. Further, the edge seals 23, 25 may further enhance the rigidity of the package 10 to further facilitate its
20 retention of shape once its contents have been dispensed.

To facilitate access to the tissue product 30 in the package 10 while also enabling the package to be resealed, a single opening is formed in adjacent portions of the top wall 12 and one of the end walls 18. The opening may be covered by a flap 21 having a sealing label 20 extending about a portion of its periphery. A tab 22 is left unsealed to facilitate initiation of opening of the package. The width of
25 the flap 21 is approximately equal to the width of the opening (OW, illustrated in FIG. 3). In particularly preferred embodiments, such as that illustrated in FIG. 3, the shape of the flap 21 and the opening are substantially similar and preferably the opening has an opening width (OW) about 90 to about 110 percent and more preferably from about 95 to about 105 percent of the width of the rolled tissue products (RW).

30 While in certain embodiments it may be preferable that the opening and flap be of similar shape and dimensions, the invention is not so limited. In other embodiments an opening is provided in the package walls underlying the flap where the opening has a width less than the width of the flap. In such embodiments the opening underlying the flap is preferably sized so as to permit the tissue products to

be dispensed without deforming and the flap is sized to form a seal between the flap and top wall along a portion of the opening perimeter. The opening may be formed by cutting the film used to form the package or may be made by providing a line of weakness in the top wall beneath the flap and the flap may be adhered to the top wall so that as the flap is pulled open, portions of the top wall are pulled away with the flap. The line of weakness may extend about the entire periphery of the opening or may extend only about a portion of the opening, so that the portions of the top wall and sidewall which are pulled away when the flap is opened are not completely disconnected from the adjoining package material, but remain connected thereto.

With reference now to FIGS. 6 and 7, yet another embodiment of a package according to the present invention is illustrated. The package comprises a top wall 12, a bottom wall 14, a pair of sidewalls 16 and a pair of end walls 18. The pair of end walls 18 comprises a folded and sealed closure which will be described in further detail below. The top wall 12, bottom wall 14, sidewalls 16 and end walls 18 are all integral portions of a single sheet semi-rigid film material 17.

The sidewalls 16 comprise permanent longitudinal side seams 40, 42, 44, 46. One of the longitudinal side seam 44 is formed by bringing the marginal edges 41, 43 of the sheet material 17 into sealing engagement with each other. The other longitudinal side seams 40, 42 and 46 are formed by folding the sheet material 17 into facing arrangement with itself and sealing. The longitudinal side seams 40, 42, 44, 46 are preferably permanently secured to one another via any conventional sealing technique known in the art, such as heat sealing or welding. The end walls 18 of the package are also preferably sealed to close the package. In certain embodiments the end walls are also sealed closed, for example, along permanent transverse end seal 29.

The package of the embodiment illustrated in FIGS. 6 and 7 may be manufactured by folding a single sheet of semi-rigid material, such as the sheet illustrated in FIG. 8. The sheet may have a rectangular shape with parallel edges 41, 43 that are brought together and sealed to form a permanent edge seal (illustrated as longitudinal seal 44 in FIGS. 6 and 7) and form a tube like structure (not illustrated). The width of the permanent edge seal may vary, however, in certain embodiments the width may be from about 2 to about 10 mm. Additional permanent seals are then formed to transform the tube into a parallelepiped package with the permanent seal lines 40, 42, 44, 46 forming four substantially square corners of package 10. Opposing side walls 16 of the parallelepiped are tucked at the bottom edge and the first end seal is formed to seal a first end wall of the package.

Prior to forming the second transverse end seal, the package is in the shape of a rectangular box with an open end through which rolled tissue products may be inserted to fill the package. After filling with tissue products, the opposing side walls are tucked at the top edge and the package is sealed

parallel to the top edge of the upper end of the package to form the second end and seal the second end wall of the package.

While the invention has been described in detail with respect to the specific aspects thereof, it will be appreciated that those skilled in the art, upon attaining an understanding of the foregoing, may readily conceive of alterations to, variations of, and equivalents to these aspects. Accordingly, the scope of the present invention should be assessed as that of the appended claims and the following embodiments:

First embodiment: A semi-rigid package and plurality of rolled tissue products disposed within the package, said package comprising a single sheet of semi-rigid material having a bending stiffness from about 20.0 to about 60.0 mgf folded to form a bottom wall, a top wall, opposite sidewalls, and opposite end walls, a line of weakness disposed along the top wall and an end wall to define a flap and wherein each of the plurality of rolled tissue products contact the top wall, bottom wall, and at least one sidewall.

Second embodiment: The semi-rigid package of the first embodiment wherein the flap is resealably secured to a portion of an end wall.

Third embodiment: The semi-rigid package of the first or second embodiment comprising a sealing label permanently affixed to the flap and resealably attached to a portion of an end wall.

Fourth embodiment: The semi-rigid package of the any one of the first through third embodiments wherein the sealing label comprises a tab and wherein the tab is not attached to an end wall.

Fifth embodiment: The semi-rigid package of the any one of the first through fourth embodiments wherein the semi-rigid material has a caliper greater than about 70 microns.

Sixth embodiment: The semi-rigid package of any one of the first through fifth embodiments wherein the semi-rigid material has a secant modulus greater than about 450 MPa.

Seventh embodiment: The semi-rigid package of any one of the first through sixth embodiments wherein the semi-rigid material comprises two or more coextruded polymer layers wherein one of the extruded polymer layers comprises oriented polyethylene terephthalate, the material having a caliper from about 70 to about 100 microns and a secant modulus from about 450 to about 750 MPa.

Eight embodiment: A semi-rigid package of tissue products having a longitudinal and transverse direction, the package comprising: (a) a unitary semi-rigid film having a stiffness greater than about 20.0 mgf folded into a package having a bottom wall, a top wall, opposite sidewalls, and opposite end walls,

the walls defining an interior space; (b) first and second permanent transverse end seals sealing opposite end walls; (c) a first pair of longitudinal edge seals sealing the top wall and opposite sidewalls; (d) a second pair of longitudinal edge seals sealing the bottom wall and opposite sidewalls; (e) a flap disposed on the top wall; and (f) a plurality of tissue products disposed in the interior space of the package.

- 5 Ninth embodiment: The package of the eighth embodiment wherein the unitary semi-rigid film comprises first and second longitudinal edges that are folded together and sealed to form one of the first pair of longitudinal edge seals sealing top wall and opposite sidewalls.

Tenth embodiment: The package of the eighth or ninth embodiment comprising a line of weakness disposed along the top wall and an end wall to define the flap.

- 10 Eleventh embodiment: The package of any one of the eighth through tenth embodiments wherein the flap is resealably secured to a portion of an end wall.

Twelfth embodiment: The package of any one of the eighth through eleventh embodiments further comprising a sealing label permanently affixed to the flap and resealably attached to a portion of the top wall or an end wall.

- 15 Thirteenth Embodiment: The package of any one of the eighth through twelfth embodiments wherein the semi-rigid material has a caliper from about 70 to about 100 microns and a secant modulus from about 450 to about 750 MPa.

- Fourteenth embodiment: The package of any one of the eighth through thirteenth embodiments wherein the bottom wall, top wall and sidewalls are substantially planar and do not comprise a transverse
20 seal.

- Fifteenth embodiment: The package of any one of the eighth through fourteenth embodiments wherein the tissue products comprise rolled tissue products consisting of a web of tissue spirally wound around a core having a longitudinal axis, the longitudinal core axis arranged substantially parallel to the longitudinal direction of the package and wherein each of the plurality of tissue products contacts the top
25 wall and bottom wall and at least one sidewall.

Sixteenth embodiment: The package of any one of the eighth through fifteenth embodiments wherein semi-rigid film having a stiffness from about 20.0 to about 60.0 mgf.

Seventeenth embodiment: The package of any one of the eighth through fifteenth embodiments wherein semi-rigid film having a stiffness from about 25.0 to about 50.0 mgf.

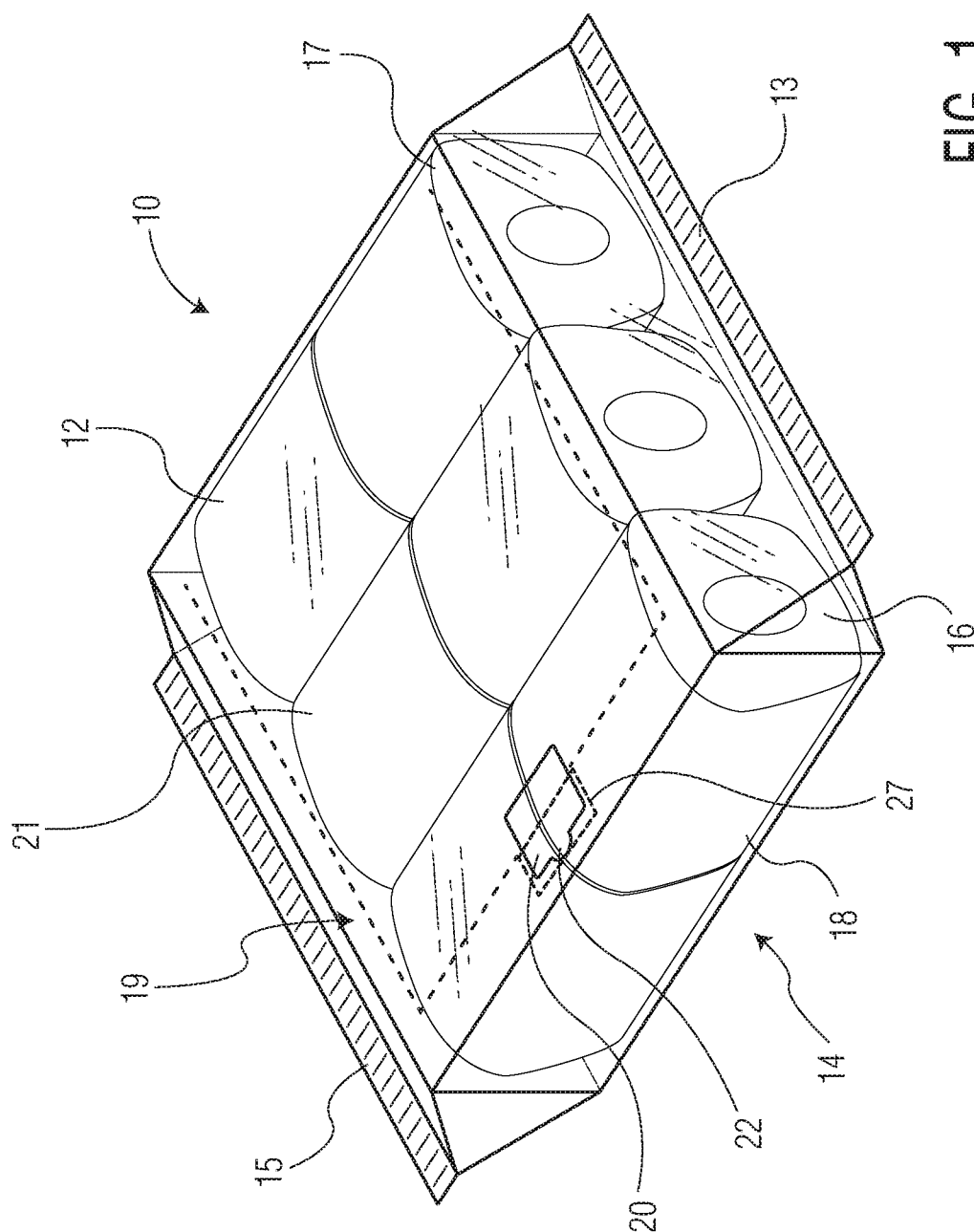
- 30 Eighteenth embodiment: The package of any one of the eighth through fifteenth embodiments wherein semi-rigid film having a stiffness from about 30.0 to about 40.0 mgf.

WHAT IS CLAIMED IS:

1. A semi-rigid package and plurality of rolled tissue products disposed within the package, said package comprising a single sheet of semi-rigid material having a bending stiffness greater than about 20.0 mgf folded to form a bottom wall, a top wall, opposite sidewalls, and opposite end walls, a
5 line of weakness disposed along the top wall and an end wall to define a flap and wherein each of the plurality of rolled tissue products contact the top wall, bottom wall, and at least one sidewall.
2. The semi-rigid package of claim 1 wherein the flap is resealably secured to a portion of an end wall.
3. The semi-rigid package of claim 1 further comprising a sealing label permanently affixed
10 to the flap and resealably attached to a portion of an end wall.
4. The package of claim 3 wherein the sealing label comprises a tab and wherein the tab is not attached to an end wall.
5. The semi-rigid package of claim 1 wherein the semi-rigid material has a caliper greater than about 70 microns.
- 15 6. The semi-rigid package of claim 1 wherein the semi-rigid material has a secant modulus greater than about 450 MPa.
7. The semi-rigid package of claim 1 wherein the semi-rigid material comprises two or more coextruded polymer layers wherein one of the extruded polymer layers comprises oriented polyethylene terephthalate, the material having a caliper from about 70 to about 100 microns and a
20 secant modulus from about 450 to about 750 MPa.
8. A semi-rigid package of tissue products having a longitudinal and transverse direction, the package comprising:
 - a. a unitary semi-rigid film having a stiffness from about 20 to about 60 mgf folded into a
25 package having a bottom wall, a top wall, opposite sidewalls, and opposite end walls, the walls defining an interior space;
 - b. first and second permanent transverse end seals sealing opposite end walls;
 - c. a first pair of longitudinal edge seals sealing top wall and opposite sidewalls;
 - d. a second pair of longitudinal edge seals sealing bottom wall and opposite sidewalls;
 - e. a flap disposed on the top wall; and
 - 30 f. a plurality of tissue products disposed in the interior space of the package.

9. The package of claim 8 wherein the unitary semi-rigid film comprises first and second longitudinal edges that are folded together and sealed to form one of the first pair of longitudinal edge seals sealing top wall and opposite sidewalls.
10. The package of claim 8 further comprising a line of weakness disposed along the top
5 wall and an end wall to define the flap
11. The package of claim 10 wherein the flap is resealably secured to a portion of an end wall.
12. The package of claim 8 further comprising a sealing label permanently affixed to the flap and resealably attached to a portion of the top wall or an end wall.
- 10 13. The package of claim 12 wherein the sealing label comprises a tab and wherein the tab is not attached to an end wall.
14. The semi-rigid package of claim 8 wherein the semi-rigid material has a caliper from about 70 to about 100 microns.
- 15 15. The semi-rigid package of claim 8 wherein the semi-rigid material has a secant modulus from about 450 to about 750 MPa.
16. The semi-rigid package of claim 8 wherein the semi-rigid material comprises two or more coextruded polymer layers wherein one of the extruded polymer layers comprises oriented polyethylene terephthalate, the material having a caliper from about 70 to about 100 microns and a secant modulus from about 450 to about 750 MPa.
- 20 17. The semi-rigid package of claim 8 wherein the bottom wall, top wall and sidewalls are substantially planar and do not comprise a transverse seal.
18. The package of claim 8 wherein the tissue products comprise rolled tissue products consisting of a web of tissue spirally wound around a core having a longitudinal axis, the longitudinal core axis arranged substantially parallel to the longitudinal direction of the package.
- 25 19. The package of claim 8 wherein the tissue products comprise rolled tissue products consisting of a web of tissue spirally around a core having a longitudinal axis, the longitudinal core axis arranged substantially perpendicular to the longitudinal direction of the package.
20. The package of claim 8 wherein each of the plurality of tissue products contacts the top wall and bottom wall and at least one sidewall.

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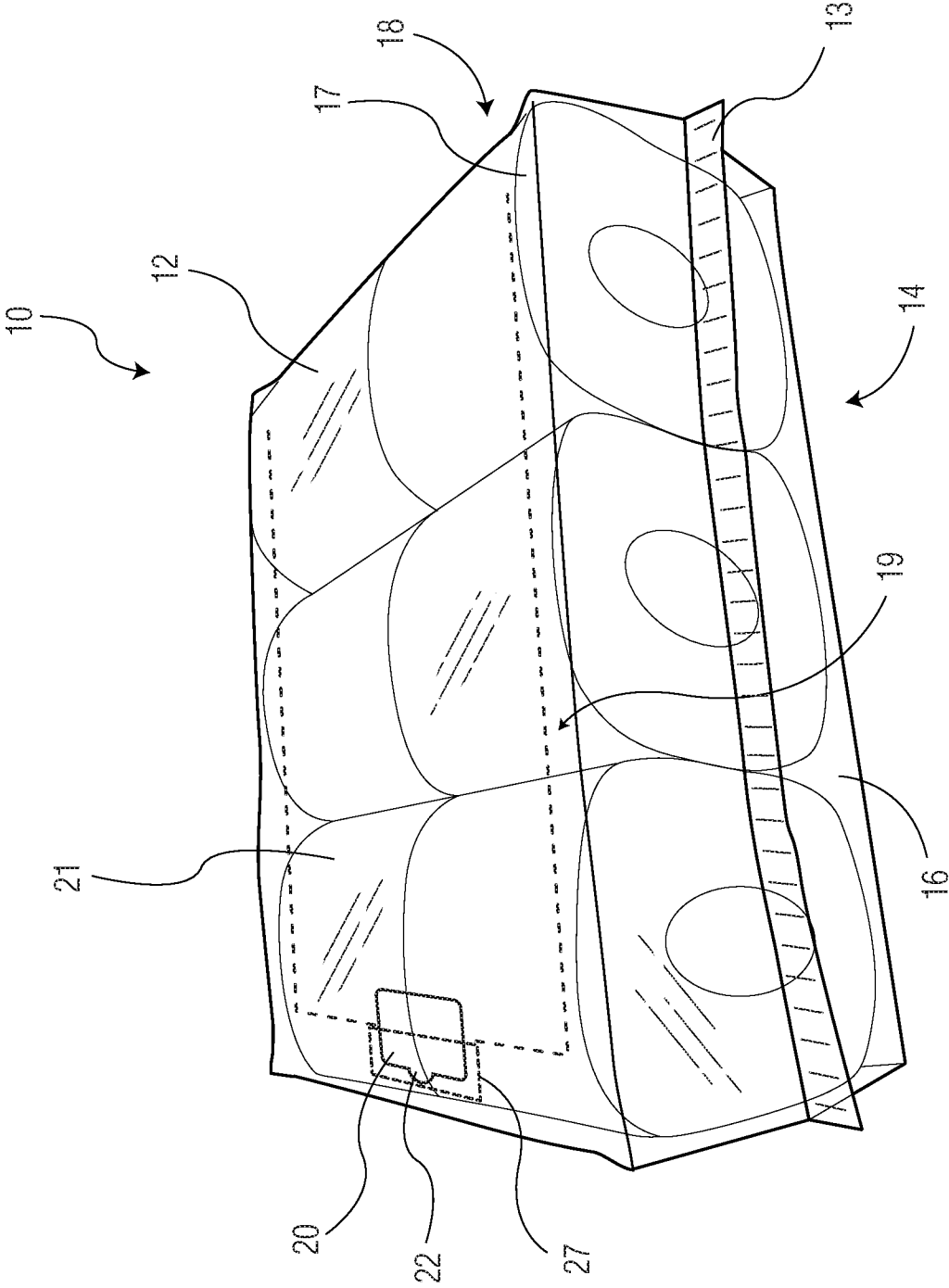


FIG. 2

3/7

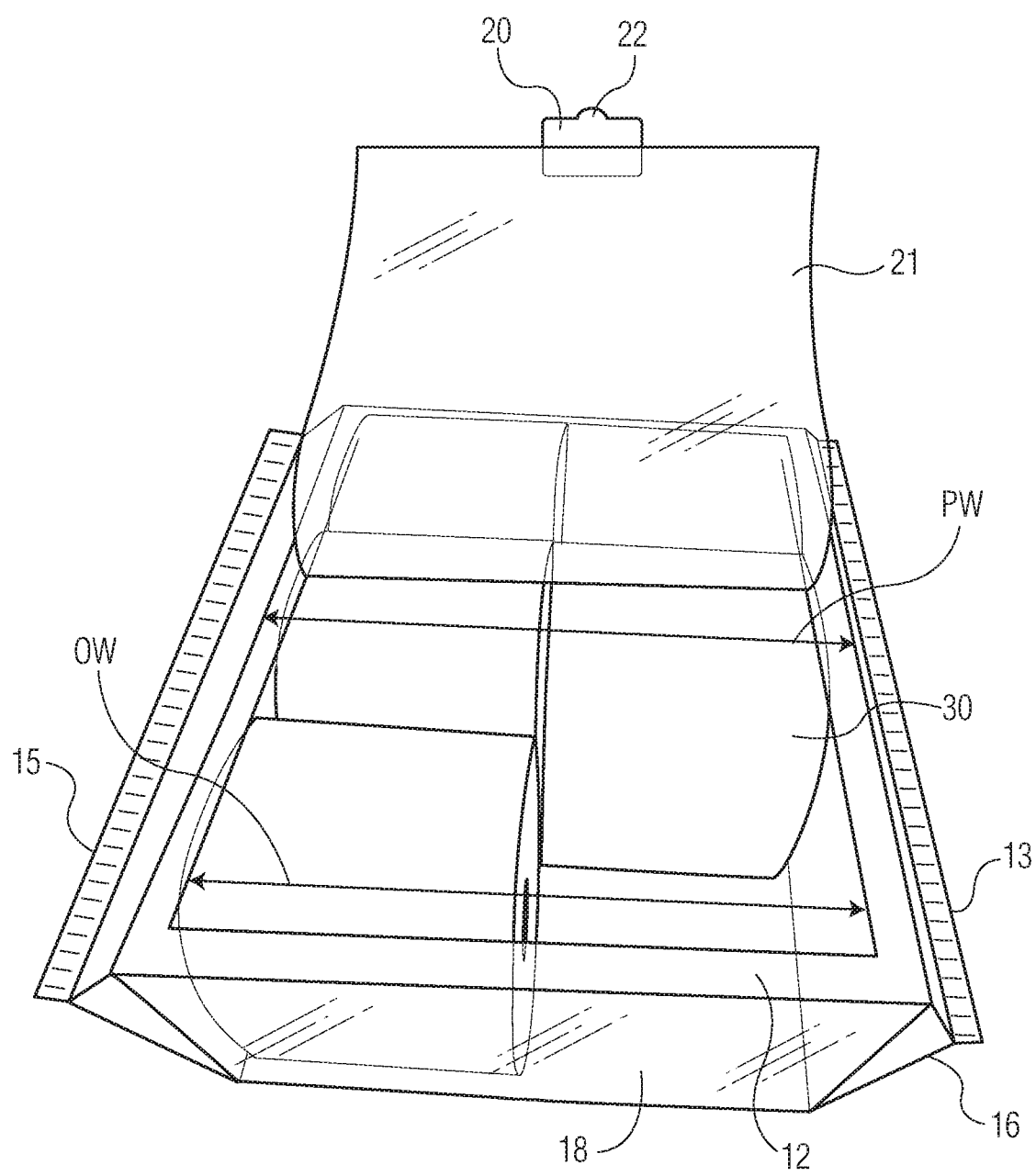


FIG. 3

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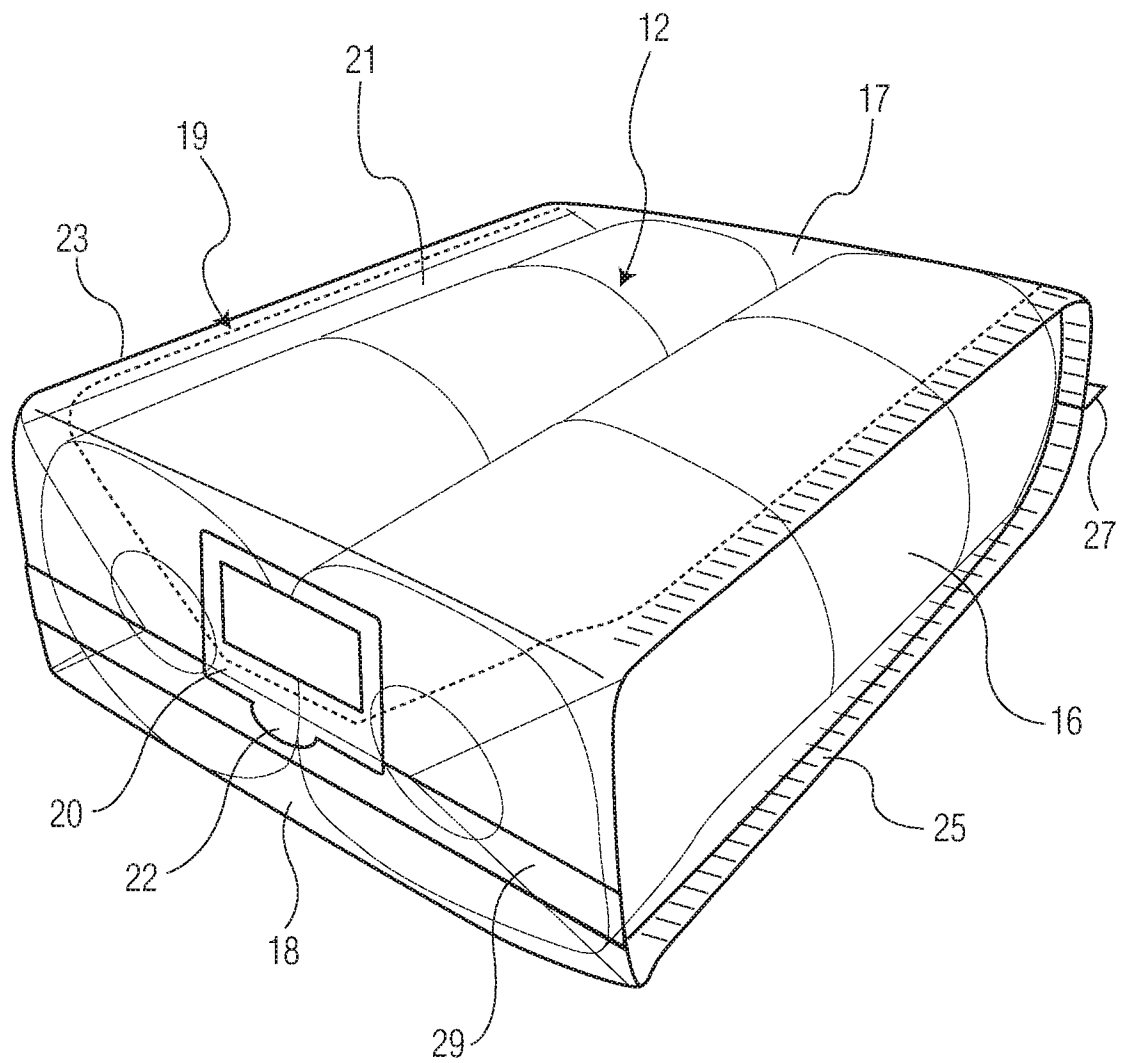


FIG. 4

5/7

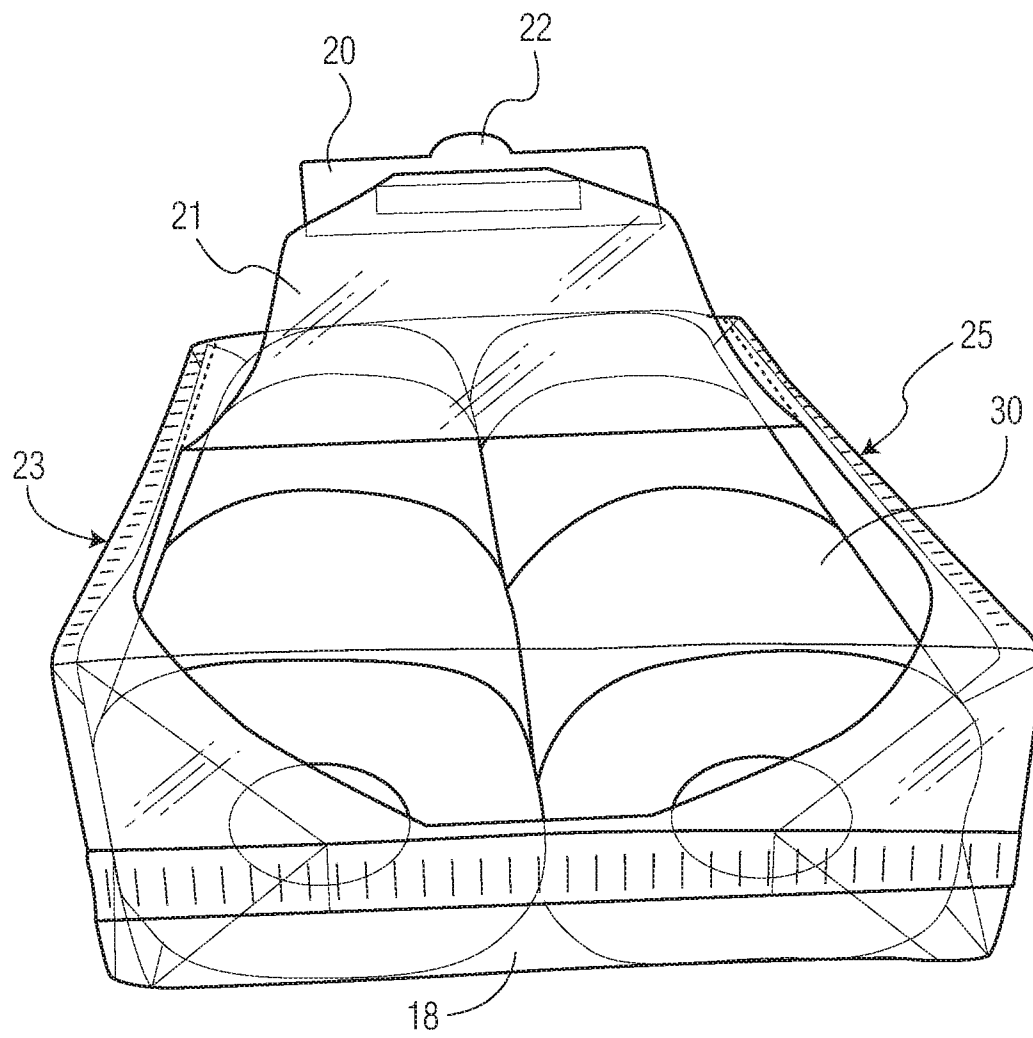


FIG. 5

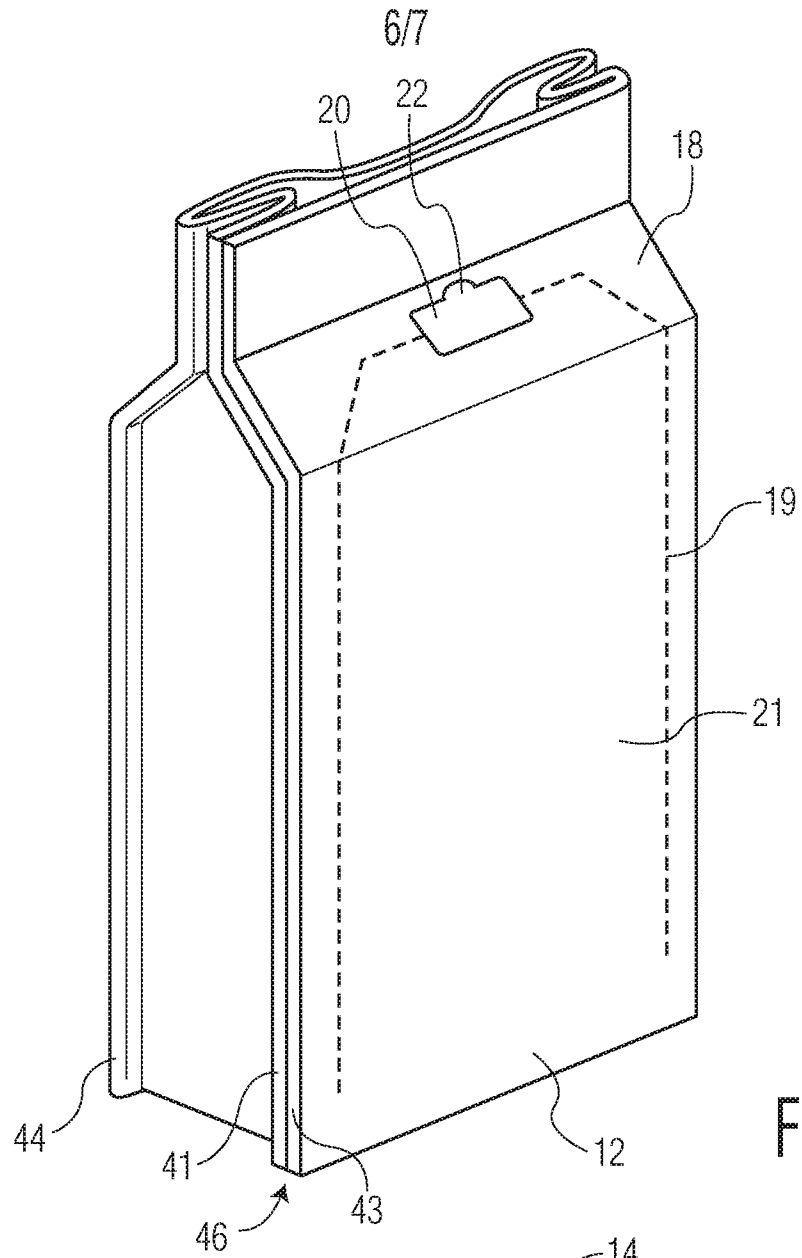


FIG. 6

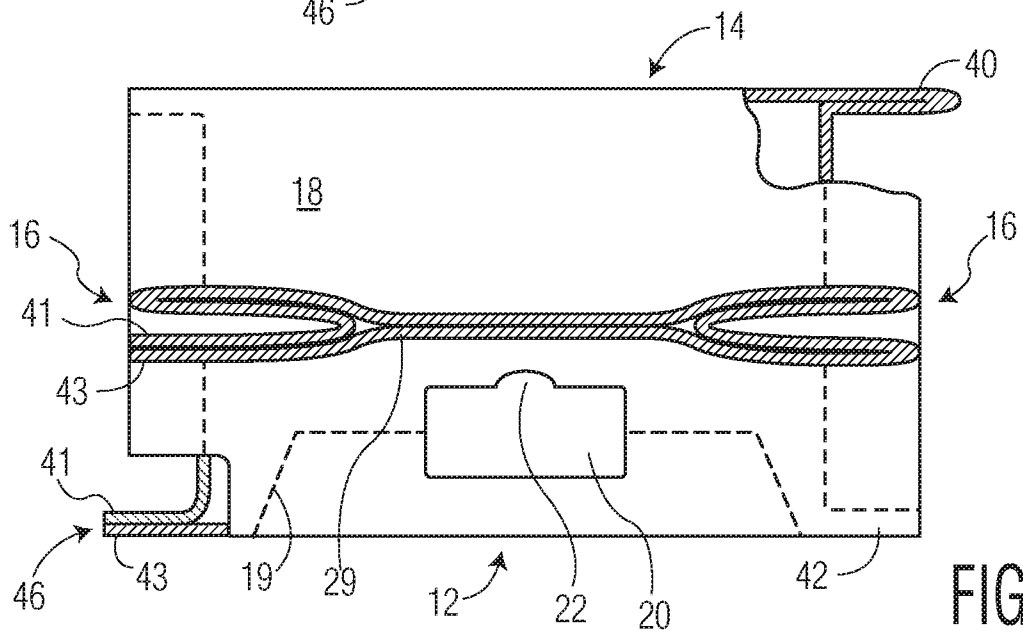


FIG. 7

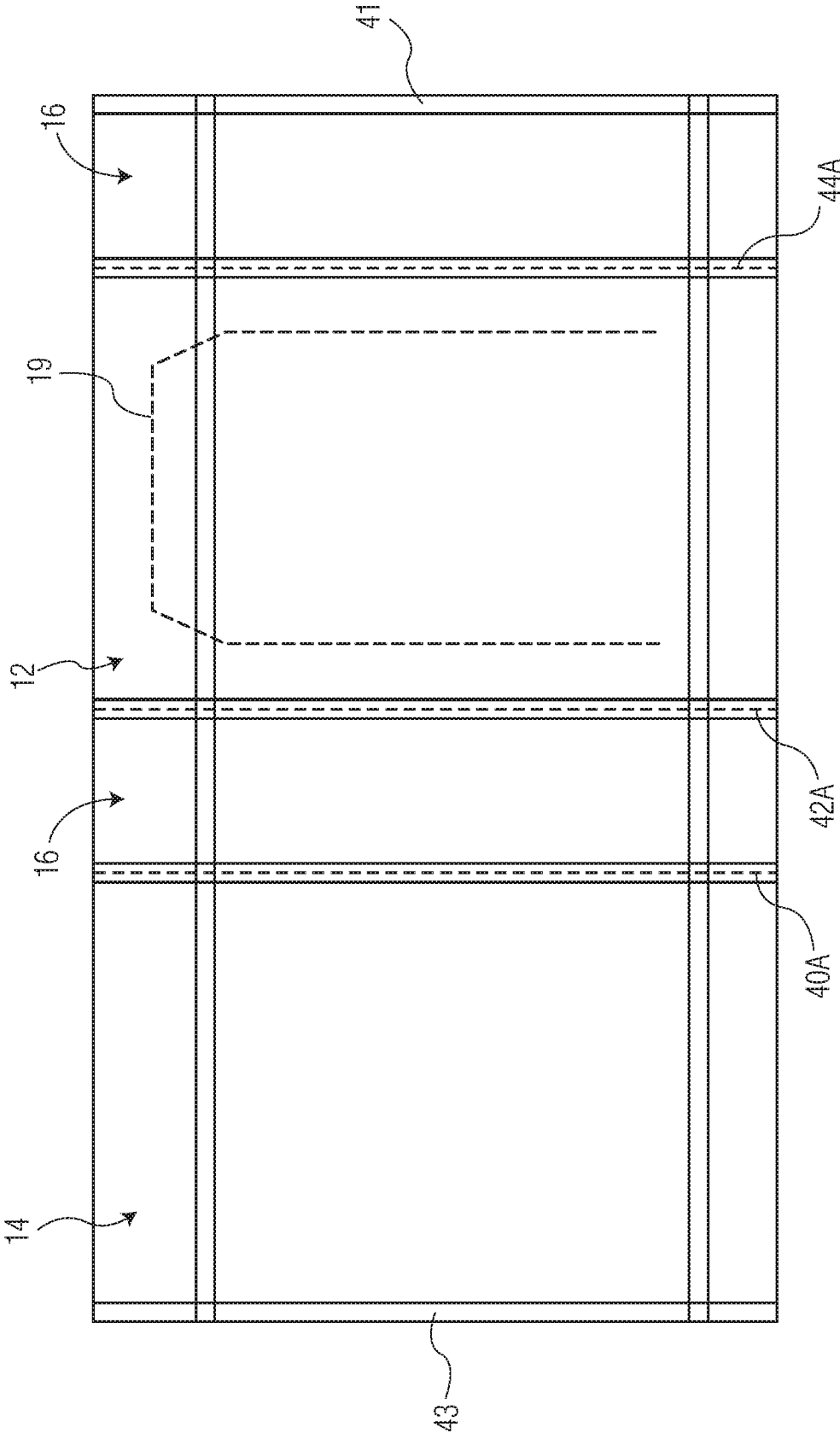


FIG. 8

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2017/044313

A. CLASSIFICATION OF SUBJECT MATTER

See Supplemental Box

According to International Patent Classification (IPC)

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B65D, A47K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

FAMPAT: semi-rigid, package, paper towel, toilet tissue, wipe, rolled, seal, flap, and similar terms.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2006/0243739 A1 (SHERMAN C. E. ET AL.) 2 November 2006 paragraphs [0001], [0031], [0041], figures 1A, 1B, 4	1-7
X	US 2015/0023614 A1 (COBLER C. A.) 22 January 2015 paragraphs [0007], [0008], [0010], [0030], [0033], [0035]; figures 1, 13	1-20
X	CN 1194933 A (UNI-CHARM CORP) 7 October 1998 entire document, in particular, page 5 second last paragraph-page 7 paragraph 2, figures 1, 2, 4 of the original non-English language document (a machine translation is enclosed only for your reference)	8-17, 20
A	US 2012/0312713 A1 (BANDO T. ET AL.) 13 December 2012 entire document, in particular, paragraph [0050]	7, 16
A	US 5040685 A (FOCKE H. ET AL.) 20 August 1991 entire document, in particular, figures 1-3	2-4, 10-13

☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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"&" document member of the same patent family

Date of the actual completion of the international search

06/10/2017

(day/month/year)

Date of mailing of the international search report

10/10/2017

(day/month/year)

Name and mailing address of the ISA/SG



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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2017/044313

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 2113470 A1 (DELICARTA S.P.A.) 4 November 2009 entire document	
A	US 4595093 A (ECKSTEIN J. H.) 17 June 1986 entire document	
A	US 2011/0048994 A1 (EILERT D. ET AL.) 3 March 2011 entire document	

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2017/044313

Note: This Annex lists known patent family members relating to the patent documents cited in this International Search Report. This Authority is in no way liable for these particulars which are merely given for the purpose of information.

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2006/0243739 A1	02/11/2006	AU 2006241505 (A1) EP 1874170 (A1) KR 20080002885 (A) MX 2007013519 (A) WO 2006118648 (A1)	09/11/2006 09/01/2008 04/01/2008 11/01/2008 09/11/2006
US 2015/0023614 A1	22/01/2015	CA 2851679 (A1)	18/01/2015
CN 1194933 A	07/10/1998	ID 17769 (A) JPH 10167355 (A) MY 125595 (A) SG 71064 (A1) TW 376374 (B)	29/01/1998 23/06/1998 30/08/2006 21/03/2000 11/12/1999
US 2012/0312713 A1	13/12/2012	CN 102762464 (A) EP 2537776 (A1) JP 2011168322 (A) KR 20120137483 (A) MX 2012009643 (A) MY 159801 (A) TW 201144183 (A) WO 2011102234 (A1)	31/10/2012 26/12/2012 01/09/2011 21/12/2012 07/09/2012 31/01/2017 16/12/2011 25/08/2011
US 5040685 A	20/08/1991	AT 105809 (T) BR 9002636 (A) CA 2018224 (A1) DD 294909 (A5) DE 3918325 (A1) EP 0401621 (A1) ES 2054146 (T3) JPH03133765 (A) US 5165545 (A)	15/06/1994 20/08/1991 05/12/1990 17/10/1991 06/12/1990 12/12/1990 01/08/1994 06/06/1991 24/11/1992
EP 2113470 A1	04/11/2009	CY 1113316 (T1) DK 2113470 (T3) ES 2394143 (T3) HRP 20120891 (T1) ITF I20080086 (A1) PT 2113470 (E) SI 2113470 (T1)	13/04/2016 12/11/2012 22/01/2013 30/11/2012 29/10/2009 03/12/2012 31/01/2013
US 4595093 A	17/06/1986	NONE	NONE
US 2011/0048994 A1	03/03/2011	AU 2008280227 (A1) CO 6260122 (A2) EP 2017192 (A1) EP 2170726 (A1) WO 2009013165 (A1)	29/01/2009 22/03/2011 21/01/2009 07/04/2010 29/01/2009

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2017/044313

Supplemental Box

(Classification of Subject Matter)

Int. Cl.

B65D 5/20 (2006.01)

B65D 85/20 (2006.01)

B65D 17/28 (2006.01)

B65D 71/12 (2006.01)

A47K 10/16 (2006.01)

A47K 10/24 (2006.01)