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

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
24 July 2008 (24.07.2008)

PCT

(10) International Publication Number
WO 2008/089006 A2

(51) International Patent Classification:
B65B 9/00 (2006.01) *B65D 30/22* (2006.01)
B65B 35/30 (2006.01) *B65D 30/16* (2006.01)

(21) International Application Number:
PCT/US2008/050633

(22) International Filing Date: 9 January 2008 (09.01.2008)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
11/622,121 11 January 2007 (11.01.2007) US

(63) Related by continuation (CON) or continuation-in-part (CIP) to earlier application:
US 11/622,121 (CIP)
Filed on 11 January 2007 (11.01.2007)

(71) Applicant *(for all designated States except US)*: **FRITO-LAY NORTH AMERICA, INC.** [US/US]; 7701 Legacy Drive, Plano, TX 75024-4099 (US).

(72) Inventors; and

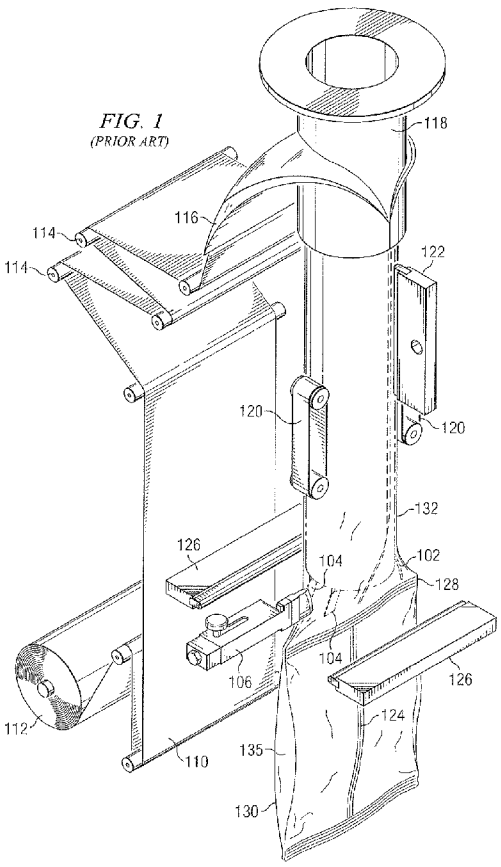
(75) Inventors/Applicants *(for US only)*: **BEZEK, Edward, Anthony** [US/US]; 2266 Cristal Falls Drive, Frisco, TX 75034 (US). **EDWARDS, Eduard** [US/US]; 2705 Petersburg Drive, Arlington, TX 76014 (US). **KNOERZER, Anthony, Robert** [US/US]; 6002 Bracknell, Parker, TX 75002 (US). **KOHL, Garrett, William** [US/US]; 902 Sonora Drive, Allen, TX 75013 (US). **RODGERS, Brad, Dewayne** [US/US]; 1859 Darnell Circle, Frisco, TX 75034 (US). **SAGEL, Joseph, Paul** [US/US]; 455 Craig Circle, Highland Village, TX 75077 (US). **TUCKER, Steven, Kenneth** [US/US]; 412 Ellen Avenue, Hurst, TX 76053 (US).

(74) Agent: **CAHOON, Colin, P.**; Carstens & Cahoon, LLP, P.O.Box 802334, Dallas, TX 75380 (US).

(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, 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,

[Continued on next page]

(54) Title: METHOD FOR MAKING A MULTI-COMPARTMENT MICROWAVABLE PACKAGE HAVING A PERMEABLE WALL BETWEEN COMPARTMENTS



(57) Abstract: A method for making a multi-compartment microwavable package having one or more open or closed compartments within the package, and method and apparatus for manufacturing the same, constructed by modification to existing vertical form, fill and seal packaging machines. The invention involves producing a multi-compartment bag having an internal permeable wall between compartments from a single sheet of flexible packaging film. A food product can be placed into the first compartment and steam pack can be placed into the second compartment.

WO 2008/089006 A2

MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US (patent), UZ, VC, VN, ZA, ZM, ZW.

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

— *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

— *of inventorship (Rule 4.17(iv))*

Published:

— *without international search report and to be republished upon receipt of that report*

METHOD FOR MAKING A MULTI-COMPARTMENT MICROWAVABLE PACKAGE HAVING A PERMEABLE WALL BETWEEN COMPARTMENTS

BACKGROUND OF THE INVENTION

[0001] Technical Field

[0002] The present invention relates to a method for making a microwavable package having a permeable compartment constructed using a modified vertical form, fill, and seal packaging machine, and the apparatus and method for making same, that provides for a single piece construction of the package. The invention allows for use of existing converter and packaging technology to produce a microwavable package having one or more permeable compartments with minimal increased cost and minimal modification.

[0003] Description of Related Art

[0004] Vertical form, fill, and seal packaging machines are commonly used in the snack food industry for forming, filling, and sealing bags of chips and other like products. One such packaging machine is seen diagrammatically in **Figure 1**. This drawing is simplified and does not show the cabinet and support structures that typically surround a machine, but it demonstrates the working of the machine well. Packaging film **110** is taken from a roll **112** of film and passed through tensioners **114** that keep it taut. The film then passes over a former **116**, which directs the film into a vertical tube around a product delivery cylinder **118**. As the tube is pulled downward by drive belts **120** the vertical tube of film is sealed along its length by a vertical sealer **122**, forming a back seal **124**. The machine then applies a pair of heat sealing jaws **126** against the tube to form a transverse seal **128**. This transverse seal **128** acts as the top seal on the bag **130** below the sealing jaws **126** and the bottom end seal on the bag **132** being filled and formed above the jaws **126**. After the transverse seal has been formed, a cut is made across the sealed area to separate the finished bag **130** below the seal **128** from the partially

completed bag **132** above the seal. The tube is then pushed downward to draw out another package length. Before the sealing jaws form each transverse seal, the product to be packaged is sent through the product delivery cylinder **118** and is held within the tube above the transverse seal **128**. The material that is fed into the form, fill and seal machine is typically a packaging film such as polypropylene, polyester, paper, polyolefin extrusions, adhesive laminates, and other such materials, or from layered combinations of the above. For many food products, where flavor retention is important, a metalized layer will form the inner most layer.

[0005] One modification to a vertical form, fill, and seal packaging machine is disclosed in U.S. Patent No. 6,722,106 ("the '106 Patent"), which is assigned to the same assignee as the present invention. The '106 Patent discloses a method for making a free standing package called a vertical stand up pouch. The modification uses two forming plates **104** and a tension bar **102** to hold the packaging film tube in tension from inside the tube. Tension is applied on the outside of the film and in the opposite direction of the tension provided by the forming plates **104** by a fixed or stationary tucker mechanism **106** positioned between the forming plates **104**. When the tucker bar **106** is properly positioned, it provides a crease or fold in the tube of the packaging film between the two forming plates **104**. This creates a gusset **135** that permits the package to stand upright on the gusset **135**. The crease is formed prior to formation of the transverse seal by the seal jaws **126**. Consequently, once the transverse seal is formed, the crease becomes an integral feature of one side of the package.

[0006] The vertical form and fill machine thereafter operates basically as previously described in the prior art, with the sealing jaws **126** forming a lower transverse seal (and upper transverse seal for the bag below), and product being introduced through the forming tube **101** into the sealed tube of packaging film which now has a crease on one side. The film is then pulled downward by moving belts **120** and the upper transverse seal is formed, thereby

completing the package. An example of the vertical stand up package formed is shown in **Figures 2***a* and **2***b*. The outside layer of packaging film show the graphics **179** oriented 90 degrees clockwise from graphics orientation normally present on a pillow pouch formed by a standard prior art vertical form, fill and seal machine. As shown in **Figure 2***b* the transverse seals **128** of the vertical stand up package are oriented vertically once the bag stands up on one end as shown in **Figure 2***b*. **Figure 2***a* shows the crease **176** that was formed by the tucker bar **106** and forming plates **104** shown in **Figure 1** to create a gusset **135** that permits the package to stand upright. Various modifications of the vertical stand up pouch, methods for making the pouch, and apparatuses for making the pouch are disclosed in U.S. Patents 6,729,109 and 6,679,034.

[0007] Another self standing flexible pouch is disclosed in U.S. Patent No. 6,679,630 also assigned to the same assignee as the present invention. **Figure 3***a* is cross-sectional view of the self standing flexible package disclosed in the '630 Patent. Referring to **Figure 3***a*, the '630 Patent teaches a package **70** having a flap **78** formed by creating a bend **84** in the film to form an inner portion of flap **78**. An opening **90** is formed between the inner and outer portions of the flap **78**. **Figure 3***b* shows a completed package **70** in a standing or display position. Referring to **Figures 3***a* **and 3***b*, as package **70** is shown standing, flap **78** extends outward and away from back forming pocket **80**. To enclose and retain any product within the package a back seal **124** seals the film tube and transverse end seals **128** seal the terminal ends of package **70**. The transverse seals **128** also serve to retain the flap **78** to the terminal ends of package **70**. Unfortunately, the '630 Patent requires the flap **78** to be manually drawn away from the back for the package **70** to stand erect with the use of a flap **78**. Thus, the package requires manual manipulation to stand up. In addition, because packages are typically opened at the transverse seals, product can spill out of the package after the package is opened, when the package is in the

stand up position. Thus, there is a need to provide a package having a compartment or pocket that permits the compartment to hold different contents than are held in the main portion of a package when the package stands erect. Consequently, a need exists for a vertical stand-up package having one or more open compartments that are accessible while the package is standing erect that minimizes the use of film. The prior art discloses other containers often associated with TV dinners having multi-compartment food containers where the compartments are adjacent and integrated into the container. Unfortunately, many of these food containers are made from more expensive thermoforming techniques. Consequently, a need exists for a multi-compartment food container that can be made from an economical modification of a vertical form, fill, and seal machine.

[008] Further, a need also exists for an economical method for making a multi-compartment container having a porous wall between the compartments. Such container can be useful for microwave oven applications.

SUMMARY OF THE INVENTION

[0009] The proposed invention involves producing a microwavable package having one or more permeable compartments constructed from a single sheet of material using a vertical form, fill, and seal machine modified with a spiral former, a first and second filling structure, and an optional gusseting mechanism. The former receives flexible packaging film and forms a tube having an overlap end and an inner end comprising a permeable portion. The overlap is sealed to the tube thereby causing the inner end to form an internal permeable compartment wall. The optional gusseting mechanism creates a vertical tuck along the length of the bag while it is being formed permitting the package to stand up once the transverse end seals are made. In one embodiment, two gussets are made to permit the package to expand upon microwave heating.

[0010] The method disclosed and the package formed as a consequence is a substantial improvement over prior art packages having a compartment. The method works on existing vertical form, fill, and seal machines requiring little modification. There are no jaw carriage modifications involved. The bag makers can be easily converted back to a pillow pouch configuration with a relatively few simple changes. A microwave safe film sheet having a permeable portion can easily be used in place of a traditional film sheet. The above as well as additional features and advantages of the present invention will become apparent in the following written detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] The novel features believed characteristic of the invention are set forth in the appended claims. The invention itself, however, as well as a preferred mode of use, further objectives and advantages thereof, will be best understood by reference to the following detailed description of illustrative embodiments when read in conjunction with the accompanying drawings, wherein:

[0012] **Figure 1** is a perspective view of a prior art form, fill, and seal machine.

[0013] **Figure 2*a* and 2*b*** are perspective views of prior art vertical stand-up packages.

[0014] **Figure 3*a*** is a cross-sectional view of a prior art package capable of self support having a pouch.

[0015] **Figure 3*b*** is a perspective view of a prior art package.

[0016] **Figure 4** is a perspective view of one embodiment of the present invention depicting a modified form, fill, and seal machine.

[0017] **Figure 5*a*** is a simplified top view of the dual delivery tube assembly of one embodiment of the present invention.

[0018] **Figure 5*b*** is a cut away perspective view of the package in accordance with one embodiment of the present invention.

[0019] **Figure 5*c*** is a cut-away side view of the package in accordance with one embodiment of the present invention.

[0020] **Figure 5*d*** depicts a cut away top view of one embodiment of the present invention having salsa poured into the compartment.

[0021] **Figure 6*a*** is a front view of one embodiment of the vertical stand-up package having a compartment.

[0022] **Figure 6*b*** is a perspective bottom view of the package depicted in **Figure 6*a***.

[0023] **Figure** 7*a* is a perspective view of a folding device adjacent the vertical form fill and seal machine along line 7A--7A of **Figure 4** in accordance with one embodiment of the present invention.

[0024] **Figure** 7*b* is a perspective view of the folding device depicted in **Figure** 7*a* along line 7B-7B of **Figure 4**

[0025] **Figure** 7*c* is a perspective view of a folding device depicted in **Figure** 7*a* along line 7C-7C of **Figure 4**.

[0026] **Figure 8***a* is a simplified top view of the multi-delivery tube assembly in accordance with one embodiment of the present invention.

[0027] **Figure 8***b* is a cut-away perspective view of the package made from the assembly depicted in **Figure 8***a*.

[0028] **Figure 9** is a perspective view of one embodiment of the present invention depicting a modified form, fill, and seal machine utilizing a permeable packaging film having a plurality of perforations disposed about a portion of the width and along the longitudinal axis of the film sheet.

[0029] **Figure 10***a* is a cut-away perspective view of the package made from the assembly depicted in **Figure 9**.

[0030] **Figure 10***b* depicts a cut away elevational view of a package made in accordance with one embodiment of the present invention.

DETAILED DESCRIPTION

[0031] **Figure 4** is a perspective view of one embodiment of the present invention depicting a modified form, fill, and seal machine. A spiral former **426** receives the packaging film **110** and directs the compartment terminal end **410** around a fill tube or first filling structure **418** to receive a first item **718**. The former **426** simultaneously directs the tube terminal end **622** (film overlap end) to overlap the compartment terminal end **410** (film inner end). Thus, in the embodiment shown, the spiral former **426** creates a tube having an enclosed channel in communication with a first filling structure **418** and an open channel in communication with a second filling structure **420**. The second filling structure **420** is adjacent the first filling structure **418** and situated so as to permit a second item **720** to be placed in the open channel. The open channel becomes the compartment when the package is sealed.

[0032] **Figure 5***a* is a simplified top view depicting the former and dual delivery tube assembly of one embodiment of the present invention. In the embodiment shown, an indention in the first filling structure **418** creates a channel for placement of the second filling structure **420**. This indention, however, is not required and is shown to be illustrative of one embodiment. The film tube comprises an inner compartment wall **640** bounded by a compartment terminal end **410** and a compartment seal end **422**.

[0033] Referring to **Figures 4** and **5***a*, as the film tube is pulled downward by drive belts **120**, the vertical tube terminal end **622** of film is sealed to the compartment seal end **422** by a vertical sealer **122**. The vertical sealer **122** can use heat seal or cold seal technology. The tube then passes over two forming plates **104** and a tension bar **102**. A tucker bar **106**, positioned between the forming plates **104**, provides a crease or fold in the tube of packaging film between the two forming plates **104**. The sealing jaws **126** then form a first end seal.

[0034] **Figure 5***b* is a cut away perspective view of the package in accordance with one embodiment of the present invention. Referring to **Figures 5***a* and **5***b*, the lap seal **522**, created by the vertical sealer **122**, has sealed the seal end **422** of the compartment wall **640** and the tube terminal end **622**. The compartment terminal end **410** of the compartment wall **640** is secured within the package by the first end seal **631** at the location generally depicted by numeral **412**. A compartment **620** is thereby formed that is bounded by an overlapped segment of film **520**, or overlap wall **520** of the tube, the lap seal **522** and the compartment wall **640**. The main portion **618** is bounded by the compartment wall **640** and the gusset **680**.

[0035] **Figure 5***c* is a cut-away side view of the package in accordance with one embodiment of the present invention. In the embodiment shown, the package **600** comprises two compartments **618 620** open to one another. A first item **718** rests in the main portion **618** of the package **600** while a second item **720** is disposed within the compartment portion **620** of the package **600**. The first and second items are separated by a compartment wall **640**. As shown by **Figure 5***c*, the package is formed by a single sheet of film formed into a tube having an overlap wall **520**. The terminal end **622** of the overlap wall **520** is sealed with a lap seal **522** to the compartment seal end **422** of the compartment wall **640**. It should be noted that the height of the compartment wall **640** can be adjusted as desired. Additionally, as will be discussed in greater detail below, the top of the compartment wall **640** can be sealed to the overlap wall **520** to form a closed compartment. Such embodiment could prove advantageous, for example, to permit placement of a liquid in either compartment or to prevent the compartments from sharing headspace.

[0036] Referring to **Figures 4**, **5***a*, and **5***b*, upon completion of the first end seal **631**, a first item **718** can be dropped through a first filling structure **418** in communication with the main portion **618** of the tube. Similarly, a second item **720** can be dropped through a second

filling structure **420** in communication with the compartment portion **620** of the tube. The items can be dropped simultaneously. Once the first item **718** and second item **720** have been placed in the package, a second end seal can be provided by the sealing jaws **126**.

[0037] **Figure 6***a* is a front view of one embodiment of the vertical stand up package having a compartment. **Figure 6***b* is a bottom perspective view of the package depicted in **Figure 6***a*. The flexible vertical stand up package **600** rests on the gusset **680** having a crease **676** and, unlike a standard pillow pouch package, the end seals **631** are oriented in a vertical direction. A score line **615** can facilitate opening the package by removing the top. In a preferred embodiment, the lap seal **522** is located adjacent the gusset **680** to provide additional stability for the stand up package **600**.

[0038] One advantage of the package formed by the present invention is that complementary items can be stored in the package. For example, in one embodiment the first item can comprise tortilla chips and the second item can comprise pre-packaged salsa. The salsa can be pre-packaged in a traditional pillow package by a prior art vertical form, fill, and seal machine similar to that depicted in **Figure 1**. The vertical stand up package can then be opened, the pre-packaged salsa can be retrieved from the open compartment, opened, and poured into the pouch from which it was retrieved. In an alternative embodiment, salsa or other liquid can be directly placed into a closed compartment.

[0039] **Figure 5***d* depicts a cut away top view of one embodiment of the present invention having salsa poured into the compartment **620**. Salsa, when poured into the compartment **620**, applies pressure at the compartment wall **640** and can press the compartment wall **640** in the direction of the arrows **623** shown in **Figure 5***c* and **Figure 5***d* to form a dipping well. Surprisingly, when the compartment terminal end **410** is folded over a portion of the compartment wall **640**, the integrity of the compartment **620** is enhanced and salsa, or other

product, is less likely to spill from the compartment **620** over the compartment wall **640** into the main portion **618** of the package. Thus, the present invention permits a consumer to purchase a package having chips and salsa, and to then use the package to consume the chips and salsa directly from the stand up package without the chips spilling out of the package or using (and potentially dirtying) a salsa dish. Such package can be ideal for picnics or anytime a ready-to-eat product is desired.

[0040] **Figure** 7*a* is a perspective view of a folding device adjacent the vertical form fill and seal machine along line 7A--7A of **Figure 4** in accordance with one embodiment of the present invention. **Figure** 7*b* is a perspective view of the folding device depicted in **Figure** 7*a* along line 7B-7B of **Figure 4**. **Figure** 7*c* is a perspective view of a folding device depicted in **Figure** 7*a* along line 7C-7C of **Figure 4**. Referring to **Figures 4**, **5***c*, 7*a*-7*c*, the rolled edge can be formed with a folding device **700** near the former **426** to permit a portion of the film which eventually becomes the compartment wall **640** terminal end **410** to fold over a portion of itself so as to provide a j-shaped rolled edge or fold having a trough **411** and a terminal end **410**. In the embodiment shown, the folding device **700** comprises a tucker bar **702** and a pair of rollers **704** **705**. The angle that the tucker bar **702** engages the film **110** can be adjusted to obtain the desired fold. In the embodiment shown, the v-shaped bottom roller **704** comprises a channel **706**. The top disc-shaped roller **705** is disposed within the channel **706**. The tucker bar **702**, positioned between the tensioner **114** and the pair of rollers **704** **705** provides a j-shaped fold having a terminal end **410** and a trough end **411**.

[0041] While the folding device **700** as shown comprises a tucker bar **702** and a pair of rollers **704** **705**, in one embodiment, the folding device **700** comprises the tucker bar **702**. In one embodiment, the trough end **411** of the fold passes through the channel **706** of the bottom v-shaped roller **704**. The outer edge of the disc-shaped top roller **705** is bounded on two sides by

the packaging film **110** as the packaging film **110** passes through the channel **706** of the bottom v-shaped roller **704**. In one embodiment, the former **426** comprises a gutter **710** mounted adjacent the edge of the former. The gutter **710** can be substantially perpendicular to the former edge.

[0042] **Figure 8***a* is a simplified top view of the multi-delivery tube assembly in accordance with one embodiment of the present invention. In the embodiment shown, extensions **160** are attached to the first filling structure **418**. As shown in **Figure 8***a*, the multi-delivery tube assembly comprises a first filling structure **418**, a second filling structure **420** and a third filling structure **421**. In addition, the multi-delivery tube assembly depicted in **Figure 8***a* comprises a first vertical sealer **122**, a second vertical sealer **124** and a third vertical sealer **126** for sealing portions of the overlap segment **520** of film to a portion of the inner compartment wall **640**.

[0043] **Figure 8***b* is a cut-away perspective view of the package made from the assembly depicted in **Figure 8***a*. As shown in the Figure, the overlap segment **520** comprises a first longitudinal seal **522**, a second longitudinal seal **524**, and a third longitudinal seal **526**. In the embodiment shown, the package comprises three compartments **618 620 621** closed from one another. In one embodiment, one or more of the longitudinal seals **522 524 526** comprises a cold seal. Cold seal technology is well known in the art and is widely used to close food packages having heat-sensitive foods such as chocolate bars where heat sealing of the package is not desirable. Cold seal adhesives are typically coated or printed onto a flexible packaging film to permit sealing of the package with pressure.

[0044] It should be noted that there are several potential embodiments of the present invention. For example, referring to **Figure 8***b*, in one embodiment if the third longitudinal seal **526** is omitted, the package can have a first compartment **618**, a sealed second compartment **620**

and a third open compartment **621**. Thus, a package having two compartments **618 621** open to one another and a closed compartment **620** can be produced.

[0045] Examples of package applications, such as complementary products that can be packaged together in the main portion and compartment include crackers and cheese, cake mix and pre-packaged icing, or ready to eat cereal, milk, and/or a utensil such as a spoon. A pre-packaged seasoning can be placed in the compartment portion and a dehydrated food, such as noodles, can be placed in the main portion. The seasoning can be removed, water added to the main portion **618**, the entire package can then be heated in a microwave, the seasoning can be added, and the consumer can consume the food product directly from the main portion **618** of the package.

[0046] Promotional items can be also placed in the compartment with product placed in the main portion of the package. Thus, a consumer desiring to immediately access the promotional item can easily do so without immersing one's hand and fingers in product. For example, a promotional coupon can be placed into compartment portion of the package while potato chips are placed into the main portion. A consumer may only want a portion of potato chips, but may want to also access the promotional coupon. The promotional coupon, in prior art packages having no compartment often falls to the bottom of the package. Thus, a consumer may be forced, in a prior art package, to dig with his or her hand through the potato chips in order to access the promotional coupon. The present invention, on the other hand, permits a consumer to simply reach directly into the compartment to retrieve the promotional coupon without contacting product. The food package need not be limited to shelf-stable food products. For example, the package of the present invention can be used to store cereal and pre-packaged milk in the refrigerated section of a grocery store.

[0047] **Figure 9** is a perspective view of one embodiment of the present invention depicting a modified form, fill, and seal machine utilizing a packaging film **910** having a permeable portion. In the embodiment shown, the permeable portion comprises a plurality of perforations **912**, wherein the perforations **912** are disposed about a portion of the width and along the longitudinal axis of the film sheet **910**. Of course, such embodiment is provided for purposes of illustration and not limitation. In one embodiment, the permeable portion can fracture open upon application of heat or physical stress. In one embodiment, the permeable portion is permeable to steam. A spiral former **426** receives the permeable packaging film **910** and directs the compartment terminal end (film inner end) **926** around a fill tube or first filling structure **418** to receive a first item **918**. In one embodiment, the first item **918** comprises a microwavable food product. In one embodiment, the microwavable food product comprises half-product pellets. Half product pellets are known in the art and gradually expand upon microwave heating to form puffed pieces. Examples of such half-products are disclosed in U.S. Patent Nos. 4,251,551 and 4,409,250.

[0048] The former **426** simultaneously directs the overlap end **922** to overlap the compartment terminal end **926**. **Figure 10***a* is a cut-away perspective view of the package made from the assembly depicted in **Figure 9**. Referring to **Figure 9** and **Figure 10***a*, the spiral former **426** creates a first tube (that eventually results in a first compartment **1018** as shown in **Fig. 10***a*) in communication with a first filling structure **418** and a second tube (that eventually results in a second compartment **1020** as shown in **Fig. 10***b*) in communication with a second filling structure **420**. The first and second tubes are separated by an inner permeable wall **1040**, wherein the inner permeable wall **1040** has a compartment terminal end **926** that terminates inside the first tube. The second tube is defined by an overlapped segment of film **1030** and the inner permeable compartment wall **1040**. The second filling structure **420** is adjacent the first

filling structure **418** and situated so as to permit a second item **920** to be placed in the second compartment **1020**. In one embodiment, the second item **920** comprises a steam pack assembly as disclosed in U.S. Patent Application Serial No. 11/185,402 filed on July 20, 2005, and assigned to the same assignee as the present invention.

[0049] As the film sheet **910** comprising two tubes is pulled downward by drive belts **120**, the compartment terminal end **922** and overlap end **926** are sealed with vertical sealers **122** **126** to seal the overlapped segment **1030** to the permeable compartment wall **1040**. In one embodiment, the tubes then pass over oppositely positioned forming plates **104** and tucker bars **106** to provide gussets **1080** in the package. Although the embodiment depicted in **Figure 9** shows equipment for a double gusseted package, such example is shown for purposes of illustration and not limitation. The package in accordance with various embodiments of the present invention can have no gussets, or can have one or more gussets. Referring back to **Figure 9**, upon completion of the longitudinal seals **1022** **1026**, the sealing jaws **126** can be used to make a first end seal. A first item **918** can then be placed into the first filling structure **418** in communication with the first tube and a second item **920** can be simultaneously placed through the second filling structure **420** in communication with the second tube. The film can be drawn downward by the drive belts **120** and a second transverse end seal can be used to make the first compartment **1018** and second compartment **1020**. As shown in **Figure 10***a*, each compartment comprises an inner permeable compartment wall **1040** bounded by a first longitudinal seal **1022** and a second longitudinal seal **1026**. In the embodiment shown, the package comprises two compartments **1018** **1020** closed from one another.

[0050] In one embodiment, one or more of the longitudinal seals **1022** **1026** comprises a cold seal. Cold seal technology is well known in the art and is widely used to close food packages having heat-sensitive foods such as chocolate bars where heat sealing of the package is

not desirable. Cold seal adhesives are typically coated or printed onto a flexible packaging film to permit sealing of the package with pressure.

[0051] **Figure 10***b* depicts a cut away elevational view of a package made in accordance with one embodiment of the present invention. As shown in **Figure 10***b*, the first item **918** comprises an expandable food pellet in the first compartment **1018** and the second item **920** comprises a steam pack in the second compartment **1020.** As shown two gussets **1080** can be provided to permit the first compartment **1018** to expand as the food product expands upon heating in a microwave. Even in the absence of food product expansion, the gussets **1080** can beneficially permit the first compartment **1018** to expand as steam generated by a steam pack in the second compartment **1020** through the perforations **912** in the inner permeable compartment wall **1040** and into the first compartment **1018**.

[0052] The are several advantages provided by the present invention. First, the present invention provides a way to keep a food product separate from a steam or flavor emitting source. Direct contact with the steam or flavor emitting source and the food product is undesirable because moisture (liquid) rather than steam (gas) can contact the food product. Similarly, any condensation that contacts the food product is also undesirable. Moisture or condensation in contact with some food products can make certain food products soggy. Similarly, in some food products including half-products, condensation can lead to hard areas within the cooked product and facilitate pieces of food "welding" undesirably together into larger, congealed pieces. Further, condensation can prevent optimal expansion of a half-product. Advantageously, the present invention provides a package having a porous barrier between steam source and the food product such that the source itself does not contact the food product, yet the volatilized components from the source are in communication with the food product. The present invention can be achieved with relatively inexpensive modification of existing form, fill, and seal

machinery to produce a package having an internal permeable wall between compartments. While the invention has been particularly shown and described with reference to a preferred embodiment, it will be understood by those skilled in the art that various changes in form and detail may be made therein without departing from the spirit and scope of the invention.

CLAIMS:

What is claimed is:

1. A method for making a microwavable package having a permeable wall between two compartments, said method comprising the steps of:

a) forming a sheet of film (910) into a first tube and a second tube wherein said first tube and said second tube are separated by an inner permeable compartment wall (1040) with a compartment wall terminal end (926) inside said first tube and wherein said second tube is defined by an overlapped segment of film (1030) and said inner permeable compartment wall (1040);

b) providing a first longitudinal seal (1022) and a second longitudinal seal (1026) to seal said overlapped segment (1030) to said inner permeable compartment wall (1040); and

c) providing a first transverse end seal and a second transverse end seal to make a first compartment (1018) and a second compartment (1020).

2. The method of Claim 1 further comprising the step of placing a food product into said first compartment (1018).

3. The method of Claim 1 further comprising the step of placing a steam pack into said second compartment (1020).

4. The method of Claim 1 further comprising the step of forming at least one gusset (1080) in said first tube (1018).

5. The method of Claim 1 wherein said inner permeable compartment wall (1040) comprises a plurality of perforations (912).

6. The method of Claim 1 wherein said inner permeable compartment wall (1040) fractures open upon application of heat or physical stress.

7. A method for making a microwavable package having at least two items, said method comprising the steps of:

a) overlapping a sheet of film having a plurality of perforations to form a first tube and a second tube separated by an inner permeable compartment wall (1040) having a terminal end (926);

b) sealing an overlap end (922) to said inner permeable compartment wall (1040) to form a first tube while sealing a compartment wall terminal end (926) to an overlapped segment of film (1030) to form a second tube;

c) providing a first transverse end seal by a pair of heat sealing jaws;

d) providing a first item through a first filling structure in communication with said first tube;

e) providing a second item through a second filling structure in communication with said second tube; and

f) providing a second transverse end seal by a pair of heat sealing jaws to make a first compartment (1018) and a second compartment (1020).

8. The method of Claim 7 wherein said first item comprises an expandable food product.

9. The method of Claim 7 wherein said second item comprises a steam pack.

10. The method of Claim 7 further comprising the step of providing at least one gusset in said first compartment.

11. The method of Claim 7 wherein said inner permeable compartment wall (1040) comprises a plurality of perforations (912).

12. The method of Claim 7 wherein said inner permeable compartment wall (1040) fractures open upon application of heat or physical stress.

13. A method for making a vertical stand up package having a compartment, said method comprising the steps of:

a) forming a sheet of film into a tube having an overlapped segment of film extending adjacent said tube to form a compartment having a compartment wall with a compartment wall terminal end inside said tube;

b) providing at least one longitudinal seal to seal said overlapped segment to said tube;

c) forming at least one gusset in said tube; and

d) providing transverse end seals.

14. The method of Claim 13 wherein step a) further comprises folding a portion of said compartment wall to form a j-shaped fold having a terminal end and a trough end.

15. The method of Claim 13 wherein said seal provided at step b) is adjacent said gusset formed by step c).

16. The method of Claim 13 wherein said compartment wall comprises perforations.

17. A vertical stand up package having at least one open or closed compartment made from the method of Claim 13.

18. A multi-compartment package, comprising:

a first compartment (1018);

a second compartment (1020), wherein said first compartment (1018) and said second compartment (1020) are separated by an inner permeable wall (1040) having a compartment terminal end (926), wherein said second compartment (1020) further comprises:

an overlap segment (1030) having an overlap end (922), wherein said overlap end (922) is sealed to said inner permeable wall (1040) by a first longitudinal seal (1022) and wherein said compartment terminal end (926) is sealed to said overlapped segment (1030) by a second longitudinal seal (1026);

wherein said first compartment (1018) and said second compartment (1020) have a first transverse seal, a second transverse seal, said first and said second transverse seals each extending across opposite edges of said first compartment (1018) and said second compartment (1020) and sealing all layers of said first compartment (1018) and said second compartment (1020) together; and

wherein said longitudinal seals (1022 1026) extend from said first transverse seal to said second transverse seal.

19. The multi-compartment package of Claim 18 wherein said package is made from a single sheet of film.

20. The multi-compartment package of Claim 18 wherein said first or said second longitudinal seals further comprise cold seals.

21. The multi-compartment package of Claim 18 wherein said first or said second compartments contain a food product.

22. The multi-compartment package of Claim 21 wherein said food product comprises an expandable food product.

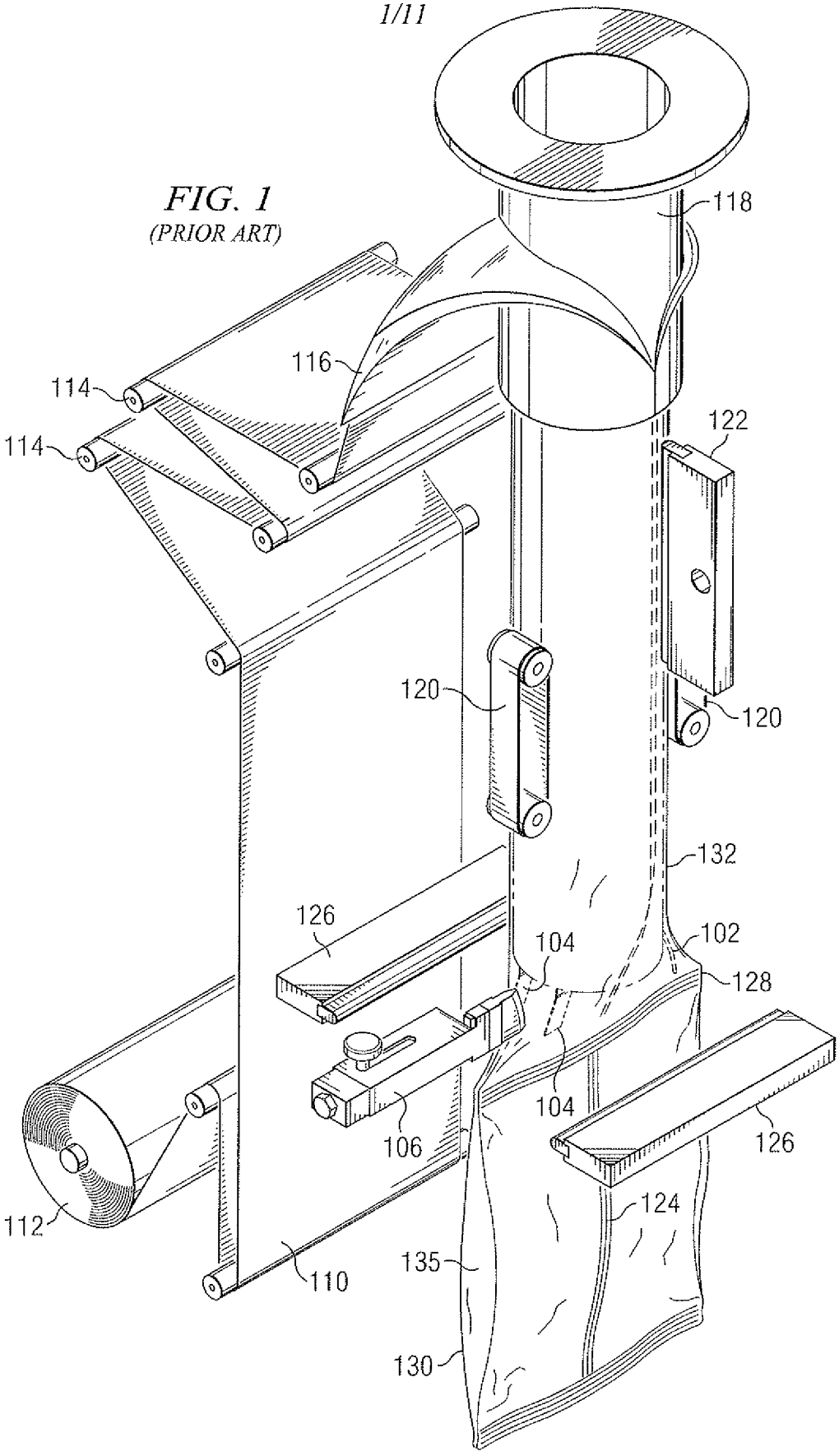
23. The multi-compartment package of Claim 18 wherein either of said first or said second compartments contain a steam pack.

24. The multi-compartment package of Claim 18 wherein said first compartment comprises at least one gusset.

25. The method of Claim 18 wherein said inner permeable compartment wall (1040) comprises a plurality of perforations (912).

26. The method of Claim 18 wherein said inner permeable compartment wall (1040) fractures open upon application of heat or physical stress.

FIG. 1
(PRIOR ART)



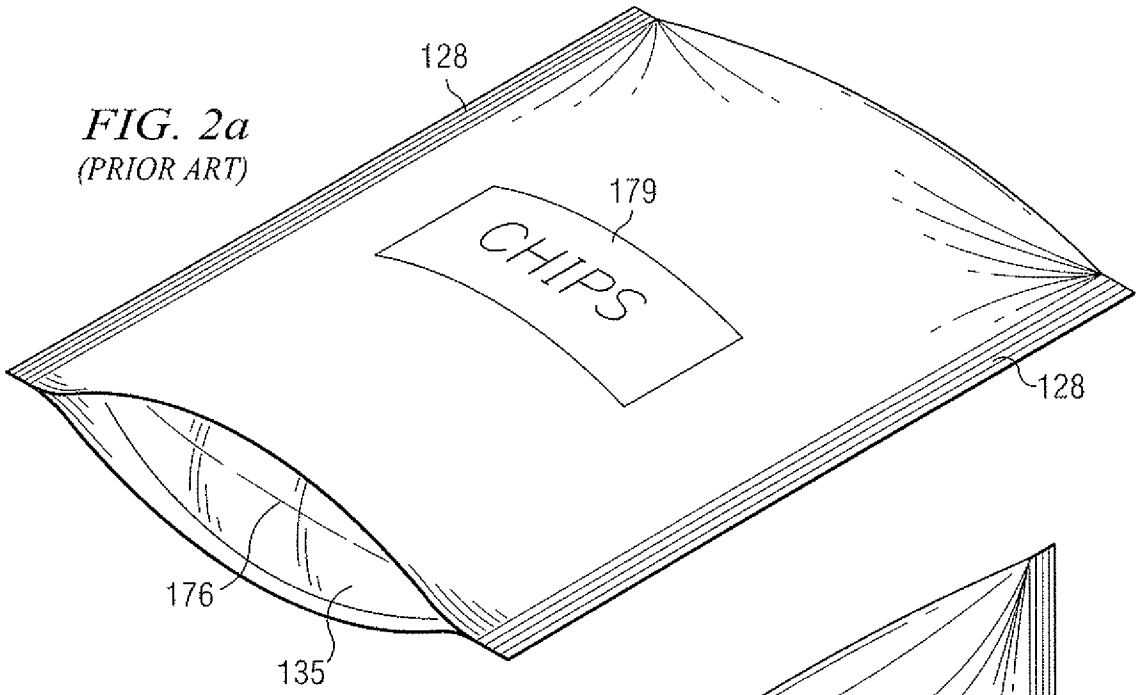


FIG. 2a
(PRIOR ART)

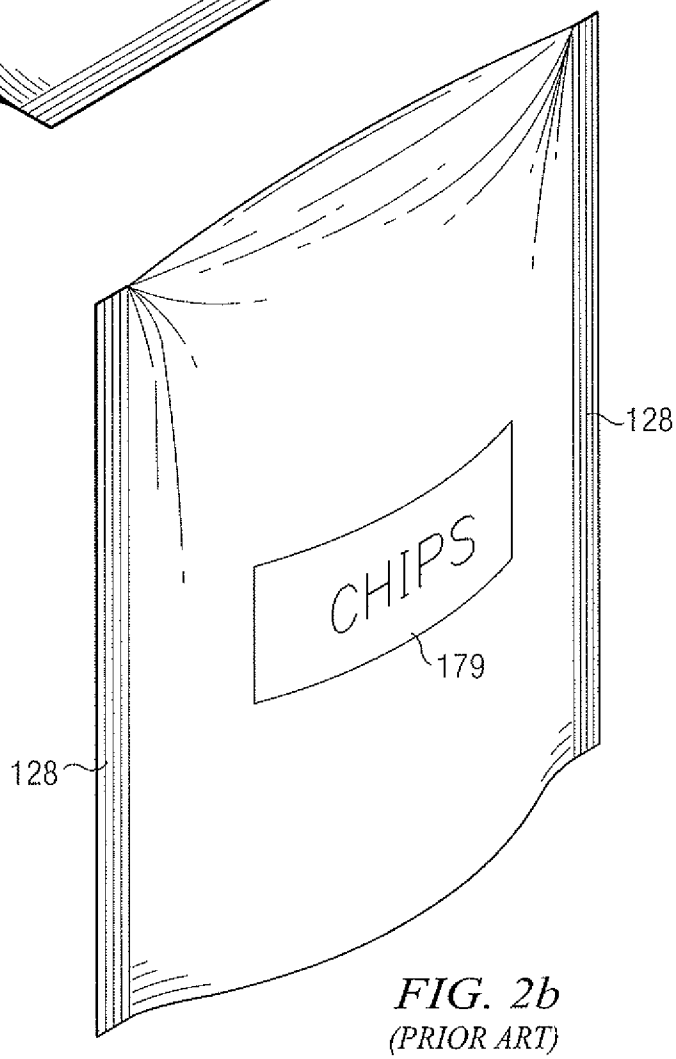


FIG. 2b
(PRIOR ART)

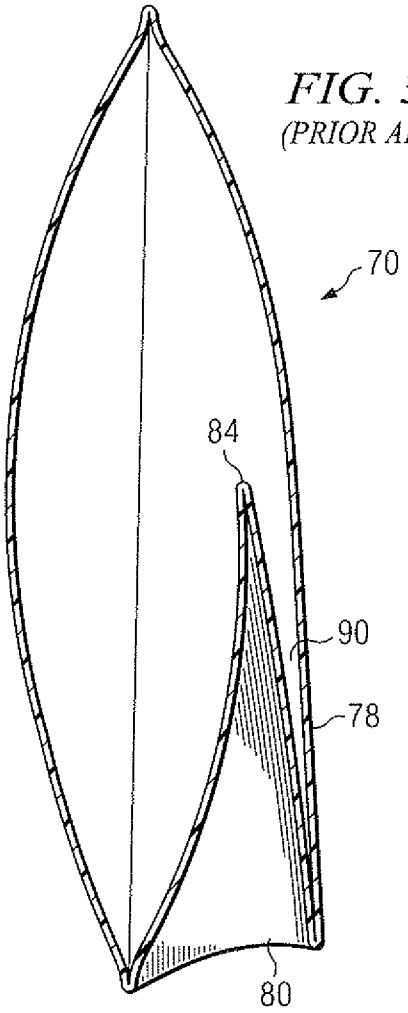


FIG. 3a
(PRIOR ART)

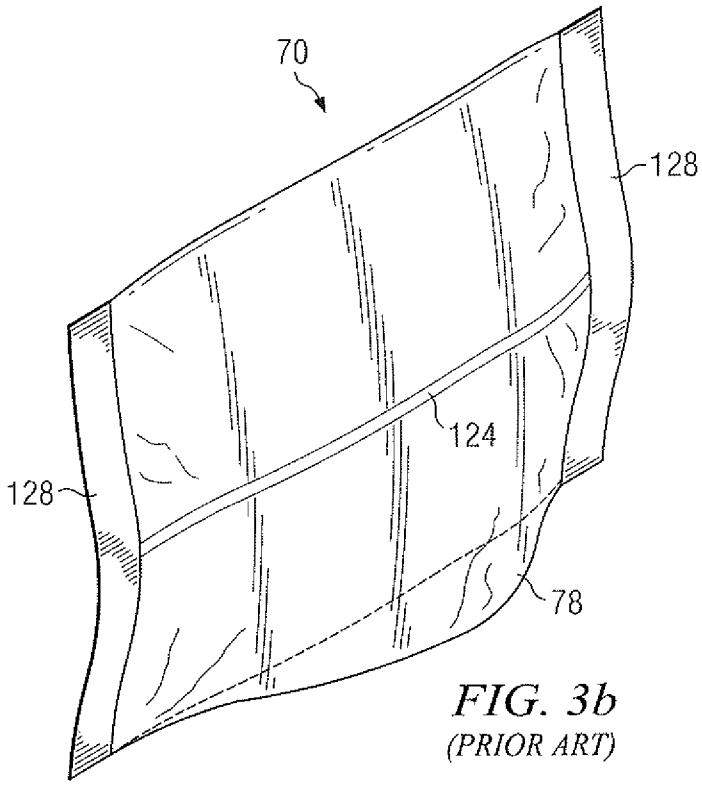
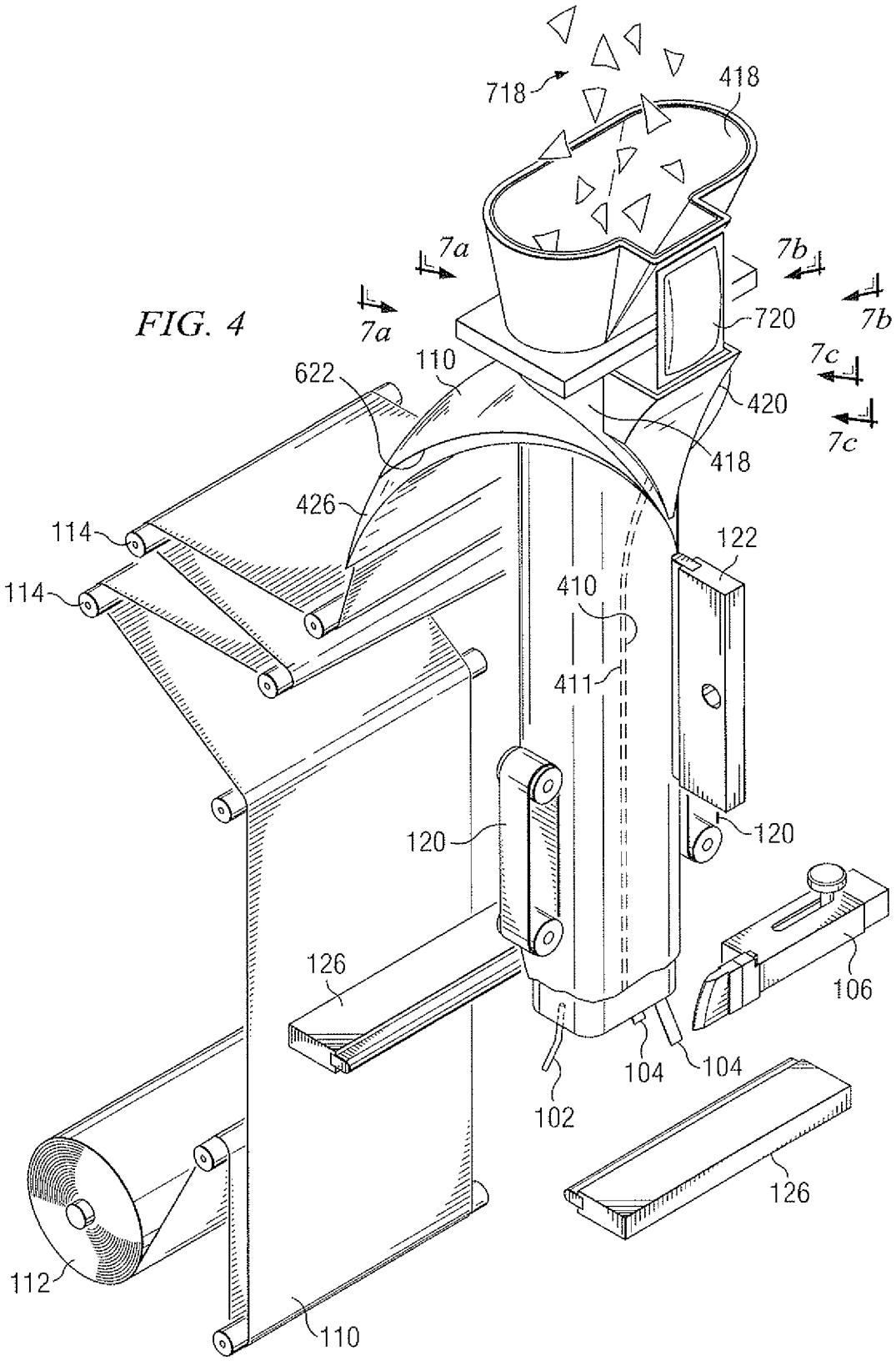


FIG. 3b
(PRIOR ART)

FIG. 4


718
418
7a
7b
7a
720
7b
7c
110
622
420
7c
418
426
114
122
114
410
411
120
120
126
106
104
104
102
126
112
110

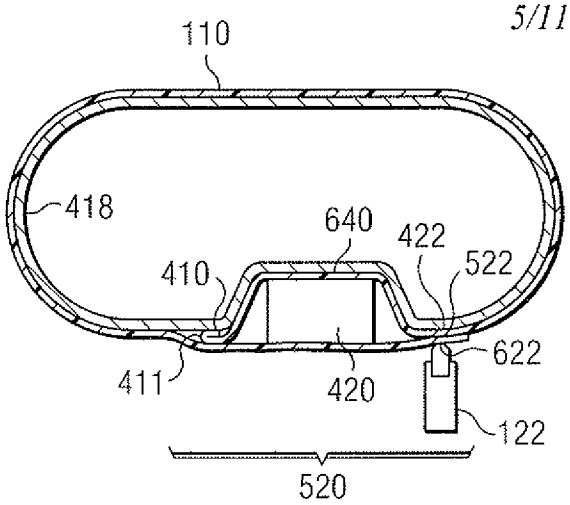


FIG. 5a

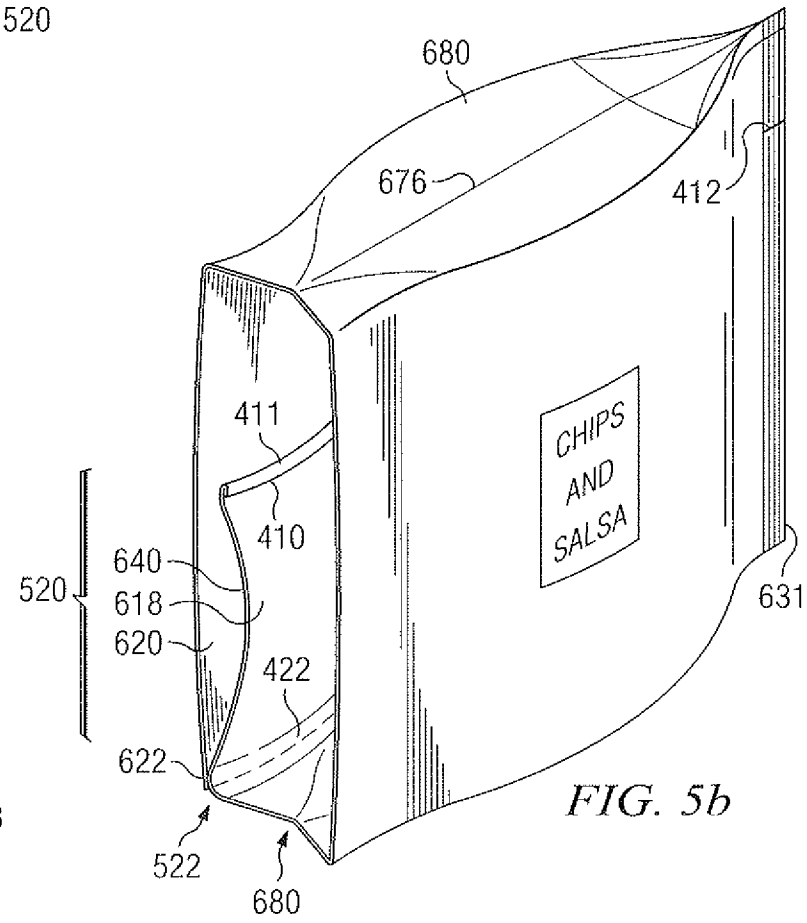


FIG. 5b

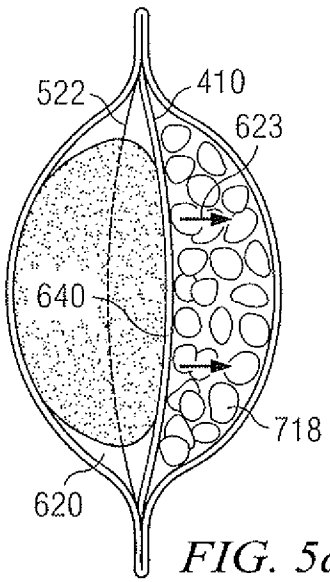


FIG. 5d

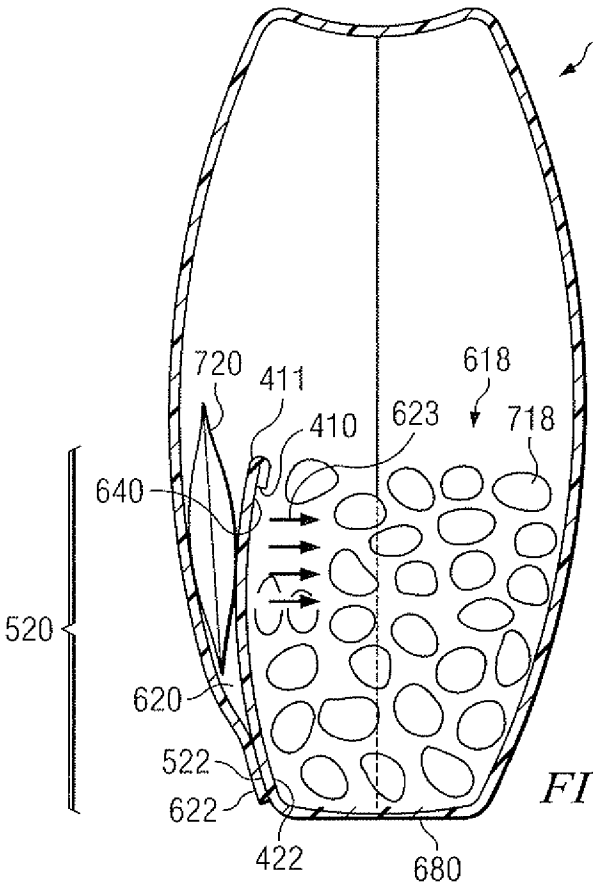

600
720
411
410
623
618
718
640
520
620
522
622
422
680

FIG. 5c

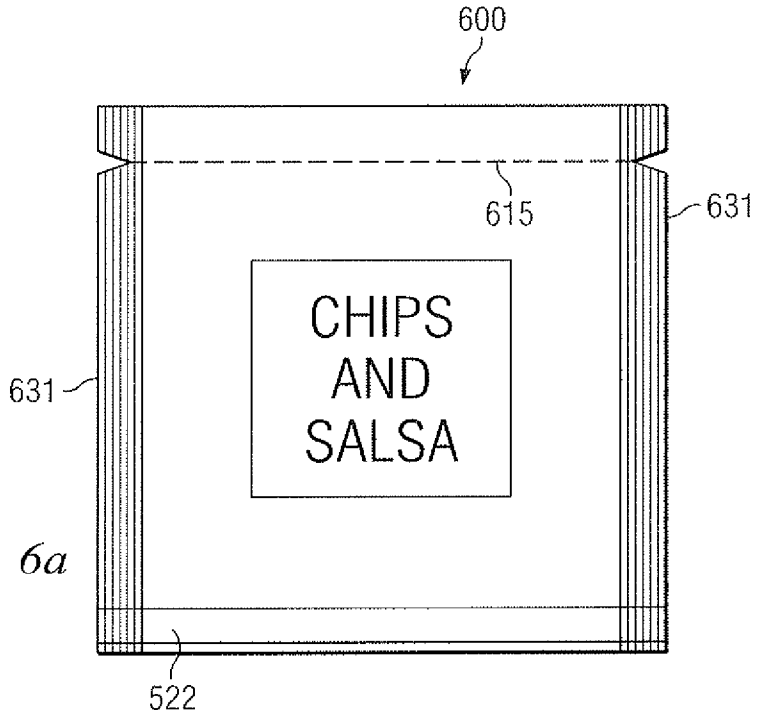

600
615
631
631
CHIPS
AND
SALSA
522

FIG. 6a

FIG. 6b

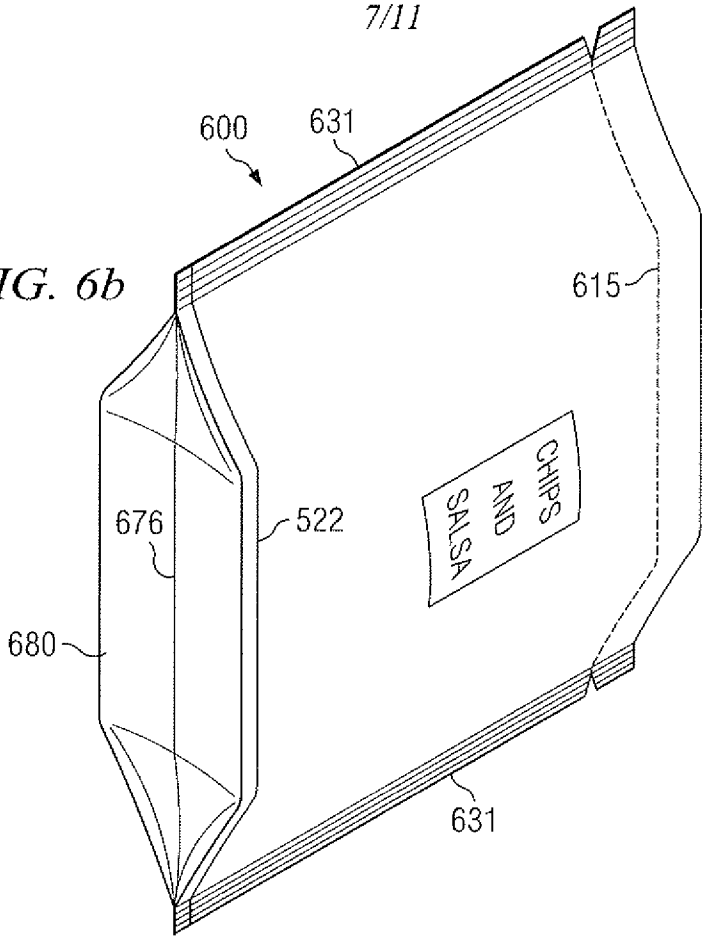
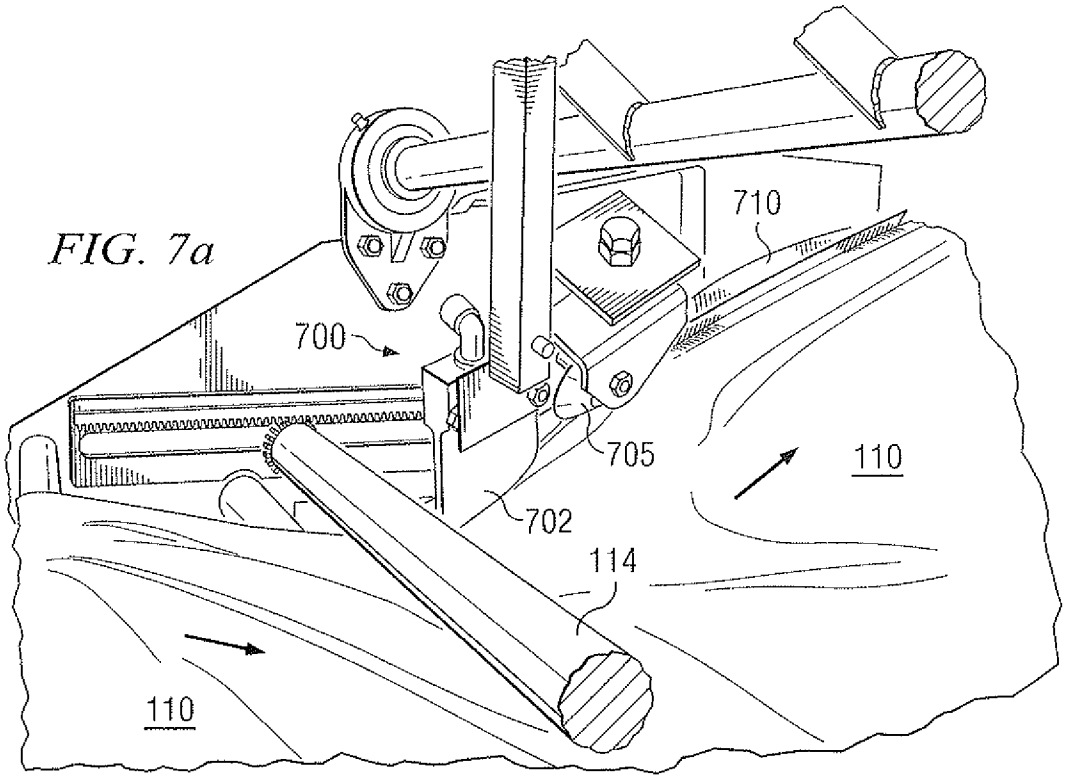

600
631
615
CHIPS AND SALSA
676
522
680
631

FIG. 7a


710
700
705
110
702
114
110

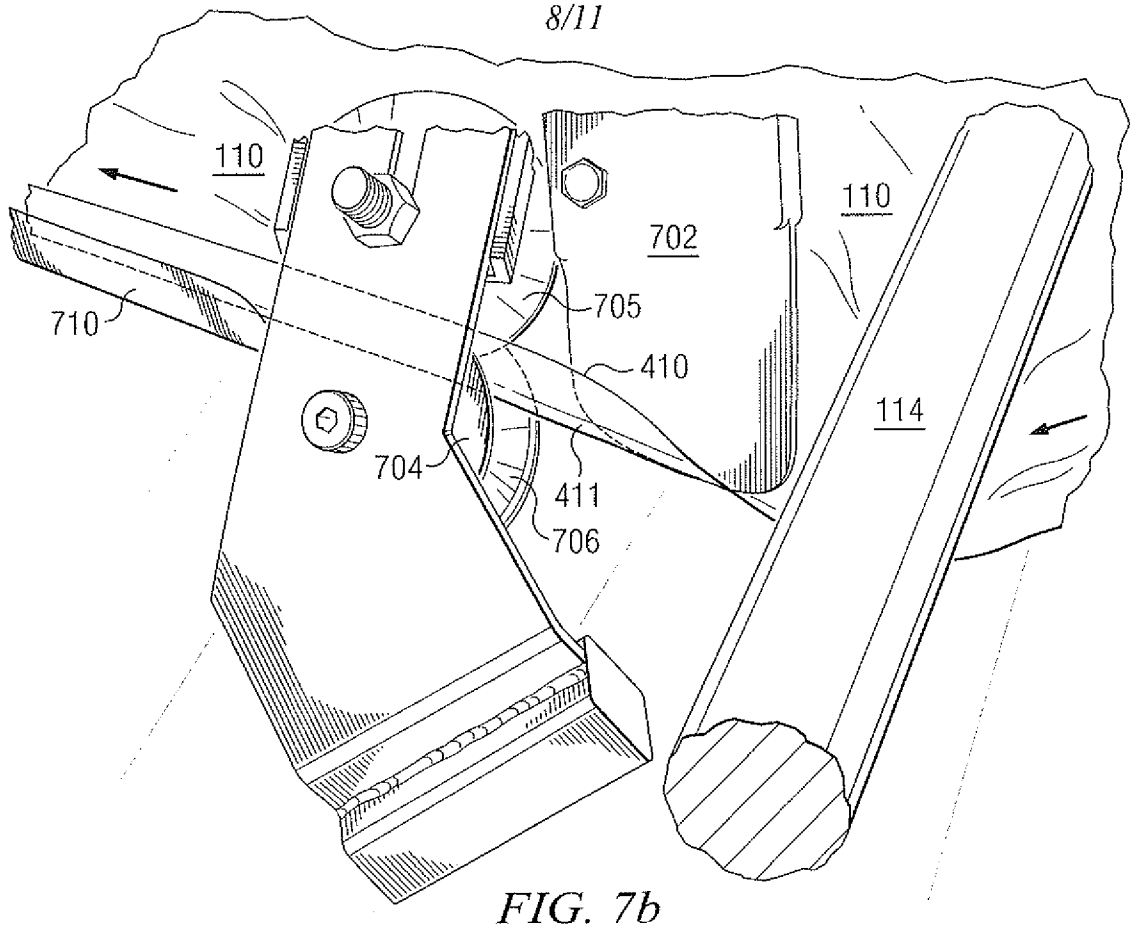

110
110
702
705
710
410
114
704
411
706

FIG. 7b

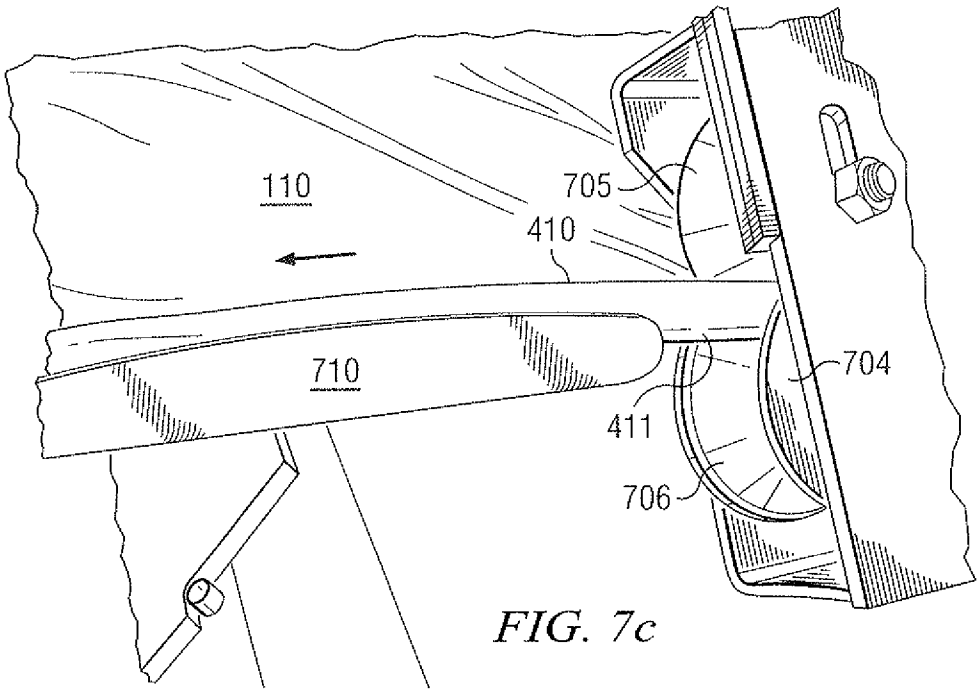

110
705
410
710
704
411
706

FIG. 7c

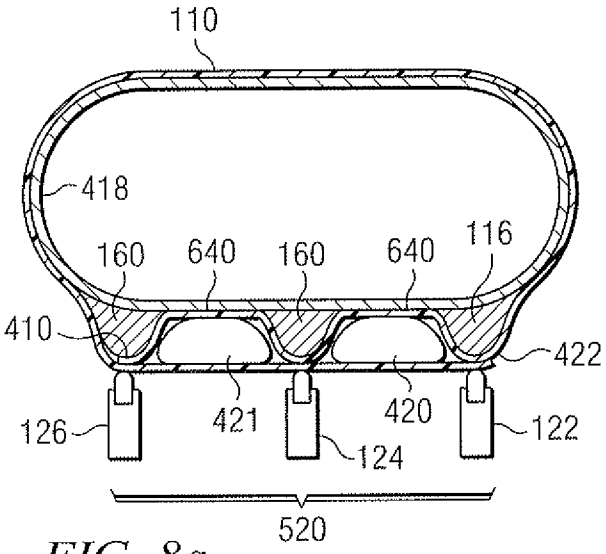

110
418
160
640
160
640
116
410
422
126
421
420
122
124
520

FIG. 8a

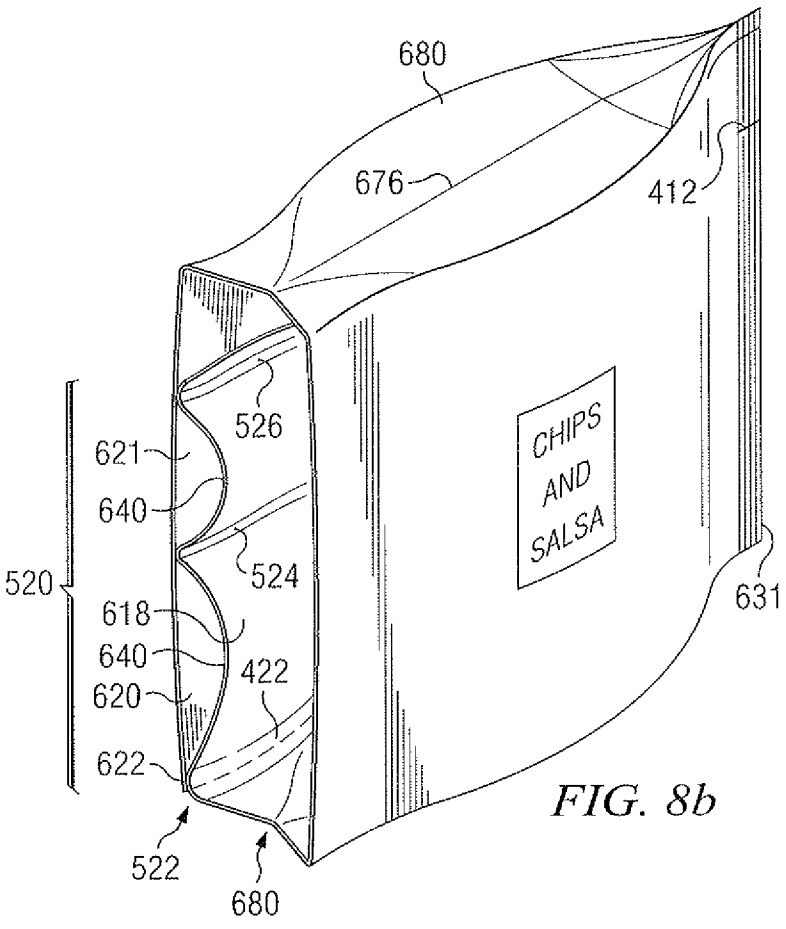
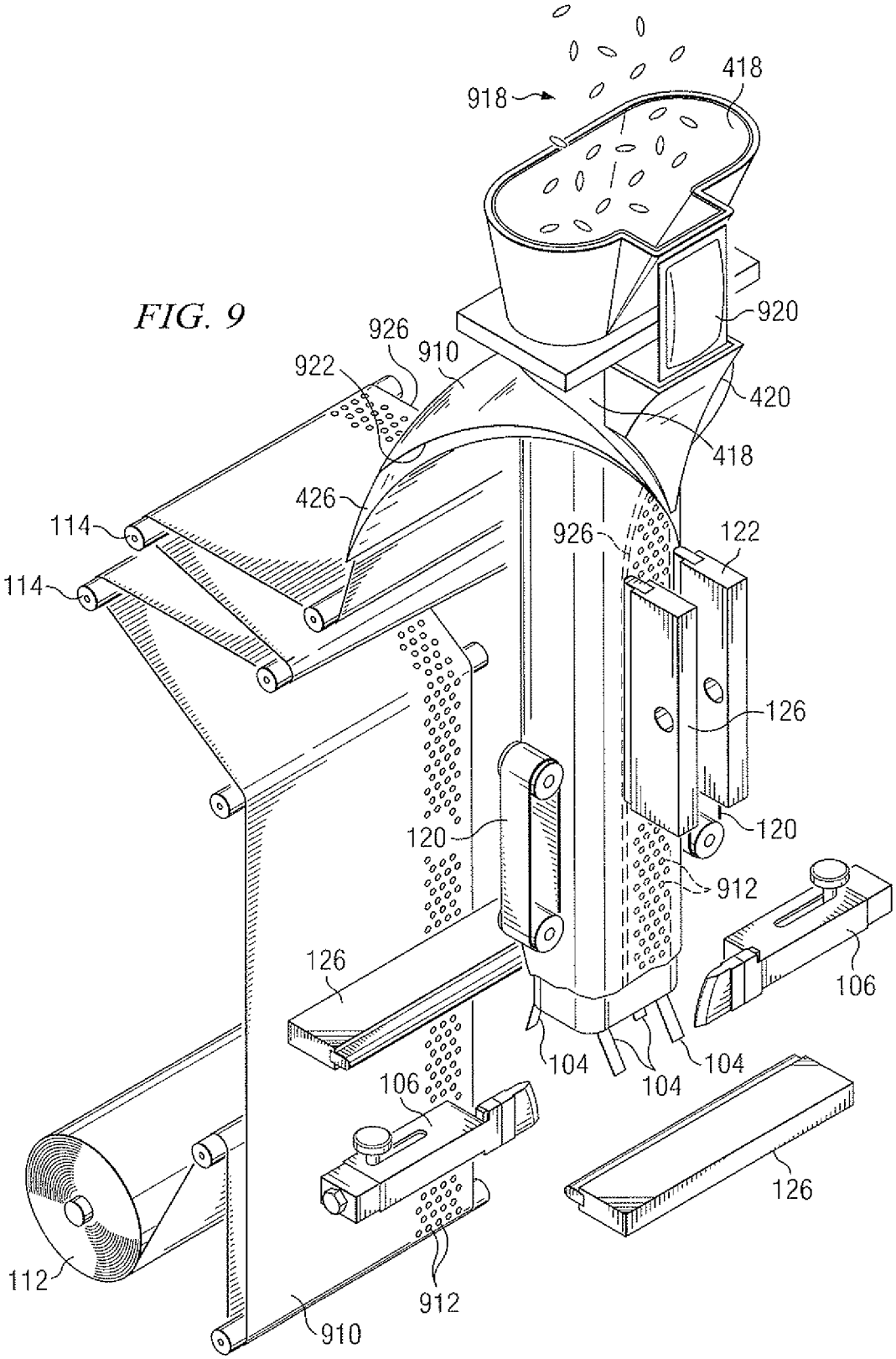

680
676
412
526
621
640
520
524
618
640
422
620
622
522
680
CHIPS
AND
SALSA
631

FIG. 8b

FIG. 9


418
918
920
926
910
922
420
418
426
114
114
926
122
126
120
120
912
126
106
104
104
104
106
126
112
912
910

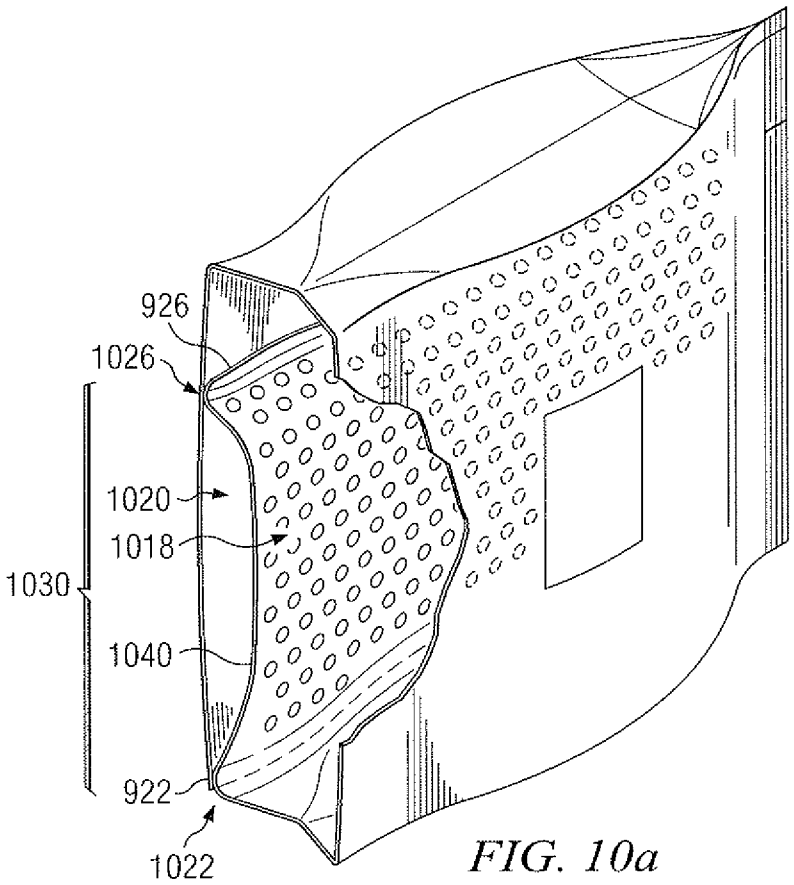


FIG. 10a

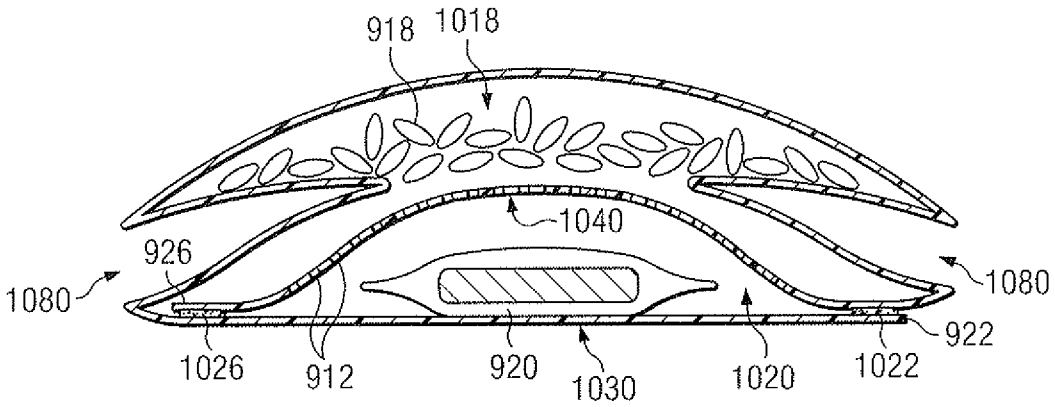


FIG. 10b