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(74) Agent: **CHAPMAN, Kristin, L.**; S. C. JOHNSON
HOME STORAGE, INC., 1525 Howe Street, Racine,
Wisconsin 53403 (US).

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(71) Applicant (for all designated States except US): **S. C. JOHNSON HOME STORAGE, INC.** [US/US]; 1525 Howe Street, Racine, Wisconsin 53403 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **DAIS, Brian, C.** [US/US]; 1258 Cranbrook Drive, Saginaw, Michigan 48603 (US). **PAWLOSKI, James, C.** [US/US]; 3437 Pressler Court, Bay City, Michigan 48706 (US). **TRENT, John, S.** [US/US]; 1337 - 30th Court, Kenosha, Wisconsin 53144 (US). **SAAD, Zain, E., M.** [US/US]; 4233 Pleasant Lane, Racine, Wisconsin 53405 (US). **COLUCCI, Michael, J.** [US/US]; 2915 Nottingham Dr. E, Saginaw, Michigan 48603 (US).

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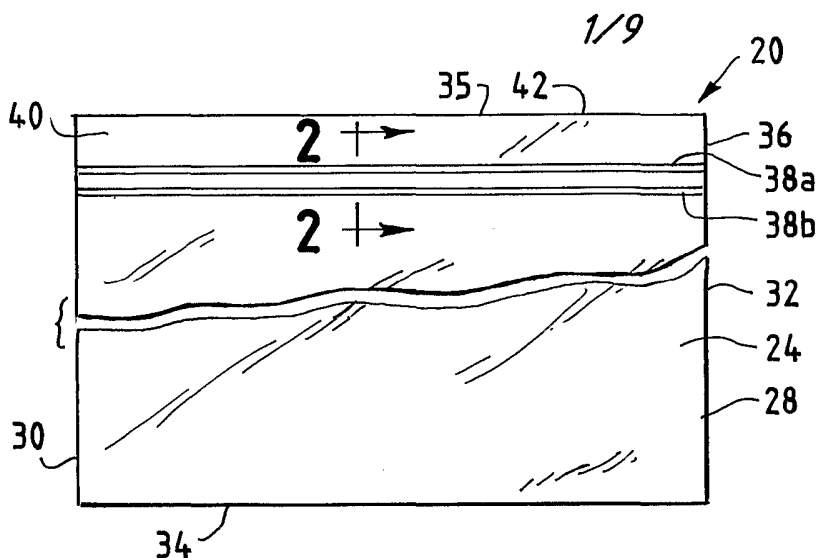
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(54) Title: CLOSURE DEVICE FOR A RECLOSABLE POUCH



(57) Abstract: A reclosable pouch includes a body portion having first and second opposing bag walls, wherein each bag wall has an internal side. First and second closure mechanisms are disposed on the internal sides of the first and second bag walls, wherein the closure mechanisms are parallel to one another and spaced apart between about 0.3 inch (7.62 mm) and about 0.6 inch (15.24 mm). The pouch further includes a venting mechanism.

CLOSURE DEVICE FOR A RECLOSABLE POUCH

REFERENCE REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

[0001] Not applicable

SEQUENTIAL LISTING

[0002] Not applicable

BACKGROUND

1. Technical Field

[0003] The present invention relates to closures for reclosable pouches, and more particularly, to such closures that include two closure mechanisms each having opposing closure elements.

2. Background Art

[0004] A thermoplastic bag for the storage of items typically includes a closure mechanism comprising male and female closure elements or profiles attached to an inner surface of a bag wall. In addition, thermoplastic bags are known having one or more pairs of ribs on outer surface(s) of the bag wall straddling at least one of the closure elements to guide a user's fingers when sealing the closure elements. Ribs have also been used on an internal surface of the thermoplastic bag closely spaced and adjacent the closure elements to assist in aligning the male and female closure elements when sealing the bag. Bags have also been developed that allow air or other gas transport through bag walls.

[0005] Hugues et al., U. S. Patent No. 4,672,723 discloses a stabilized reclosable extruded plastic fastener. The fastener comprises a female profile on one wall of an extruded film material and a male profile on an opposite wall of the film material. Alignment ribs are spaced alongside and integral with a base area of the male profile to facilitate alignment of the male profile with the female profile during closing of the fastener.

[0006] Fisher, U. S. Patent No. 4,736,496, owned by the assignee of the present application, discloses a wide-track integral thermoplastic closure for a reclosable thermoplastic container. The closure includes ribs on either side of an element of the closure to assist in guiding a user's fingers during closure of the thermoplastic container.

[0007] Tilman et al., U. S. Patent No. 4,929,487 discloses a thermoplastic bag having male and female fastener profiles and at least one alignment rib integral with the film and disposed on an outer surface of a bag wall opposite and aligned with the male profile. The rib functions to stiffen the area of film occupied by the male profile and facilitate the alignment of the male and female fastener profiles.

[0008] Porchia et al., U. S. Patent No. 5,012,561, also owned by the assignee of the present application, discloses a closure for reclosable thermoplastic containers. The closure comprises male and female closure elements, wherein the male closure element includes a male profile member and ribs disposed on either side of the male profile member and attached thereto by a base. The ribs are of a sufficient size and proximity to the male profile member so as to move together as a unit with the male profile member when the male and female closure elements are engaged or disengaged.

[0009] Dais et al., U. S. Patent No. 5,140,727, owned by the assignee of the present application, discloses a zipper for reclosable thermoplastic bags and a process and apparatus for making the same. The zipper comprises opposing longitudinally extending interlockable rib and groove profiles. The rib profile defines a bulbous head that is generally triangularly shaped in cross-section, a stem, and optionally, one or more ribs adjacent the stem.

[0010] Tilman, U. S. Patent No. 5,209,574 discloses a reclosable plastic bag having a sliderless zipper. The bag includes front and rear walls sealed along three edges to form a mouth or opening. Male and female profiles are attached to internal surfaces of the front and rear walls, respectively, wherein the male and female profiles are engageable to close the opening. Two ribs are provided on an outside surface of the front wall, one on each side of the male profile, to define a valley therebetween. Similarly, two additional ribs are formed on the outside surface of the rear wall, one on each side of female profile, to define a valley therebetween. The valleys act as finger guides for the user of the bag.

[0011] Scott et al., U. S. Patent No. 5,368,394 discloses a reclosable bag having a stabilizer wedge zipper. The reclosable bag comprises front and rear walls sealed along three

edges to form an opening. Male and female profiles are attached to internal faces of the walls. Each of the male and female profiles includes two stabilizer wedges that assist in transmitting forces to male and female profiles during opening of the bag.

[0012] Porchia et al., U.S. Patent No. 5,492,705, owned by the assignee of the present application, discloses a flexible film for storage bags used for packaging produce, such as vegetables and fruits. The film includes a plurality of holes therein to allow air transport through the film so that the produce can breathe at a controlled rate.

[0013] Saad et al., U.S. Patent No. 5,804,265, also owned by the assignee of the present application, discloses a multilayer freezer bag having at least an inner liner bag and an outer support bag. The inner liner bag and/or the outer support bag may include a plurality of holes through sidewalls thereof.

[0014] Dobreski et al, U.S. Patent No. 5,911,508 discloses a vented reclosable bag having a first reclosable slider closure and a second tamper evident partition disposed below the slider closure, wherein the tamper evident partition is not reclosable.

[0015] Tilman, U.S. Patent No. 6,231,236 discloses a resealable package having a venting structure. The package includes first and second reclosable closure mechanisms disposed at an end of the package, wherein the first closure mechanism is disposed between the second closure mechanism and the end of the package. The venting structure defines a gas-flow passageway between an interior of the package and an exterior of the package when the first closure mechanism is in a closed configuration and the second closure mechanism is in an open configuration.

[0016] Tomic et al., U.S. Patent No. 6,461,042 discloses a first resealable slider closure mechanism and a second resealable closure mechanism disposed below the first closure mechanism. Preferably, a slider of the first closure mechanism opens only the first closure mechanism but closes the first and second closure mechanisms.

[0017] Healy et al., U.S. Patent No. 6,461,043 discloses a side gusset bag with a slide zipper reclosable seal. The bag also includes a tamper evident seal disposed above the slide zipper seal and a venting feature disposed below the tamper evident seal.

[0018] Nelson, U.S. Patent Application Publication No. 2003/0066267 discloses a reclosable bag with a closure having extruded male and female interlocking profiles extending along opposite sides of an opening of the bag. The closure further includes an

extruded valve flange extending from one side of the closure to engage an opposing surface of the closure. One or more vent passages are disposed between the interlocking profiles and the valve flange or the female profile is segmented to allow air to escape from the bag.

[0019] Other thermoplastic bags have been developed having spaced multiple closure mechanisms. For example, a bag manufactured by Thai Griptech Company, Ltd. of Bangkok, Thailand, includes first and second spaced closure mechanisms disposed at a top portion of the bag. Each closure mechanism includes a male closure portion and a female closure portion, wherein the male closure portions are disposed on a first bag wall and the female closure portions are disposed on a second bag wall opposite the male closure portions. The first closure mechanism is disposed approximately 3/8ths inch from the second closure mechanism.

SUMMARY OF THE INVENTION

[0020] According to one aspect of the present invention, a reclosable pouch includes a body portion having first and second opposing bag walls, wherein each bag wall has an internal side. The pouch further includes first and second closure mechanisms disposed on the internal sides of the first and second bag walls, wherein the closure mechanisms are parallel to one another and spaced apart between about 0.3 inch (7.62 mm) and about 0.6 inch (15.24 mm). The pouch still further includes a venting mechanism.

[0021] According to another aspect of the present invention, a reclosable pouch includes a body portion having first and second opposing bag walls, wherein each bag wall has an internal side. The pouch further includes first and second closure mechanisms disposed on the internal sides of the first and second bag walls, wherein the closure mechanisms are parallel to one another and a plurality of holes extending through at least one of the first and second bag walls between the first and second closure mechanisms.

[0022] According to yet another aspect of the present invention, a reclosable pouch includes a body portion having first and second opposing bag walls, wherein each bag wall has an internal side. The pouch further includes a first reclosable closure mechanism disposed on the internal sides of the first and second bag walls, respectively, wherein the first closure mechanism includes a slider for opening and closing the first and second closure elements. Still further, the pouch includes a second reclosable closure mechanism disposed

on the internal sides of the first and second bag walls, respectively, wherein the second closure mechanism is spaced from the first closure mechanism such that the slider mechanism of the first closure mechanism does not open or close the second closure mechanism.

[0023] Other aspects and advantages of the present invention will become apparent upon consideration of the following detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

[0024] FIG. 1 is an elevational view of a first embodiment of a reclosable thermoplastic storage bag according to the present invention;

[0025] FIG. 2 is an enlarged, fragmentary, sectional view taken generally along the lines 2-2 of FIG. 1;

[0026] FIGS. 3 and 4 are views similar to FIG. 2 illustrating alternative closure mechanisms of the present invention;

[0027] FIG. 5 is an elevational view of a second embodiment of a reclosable thermoplastic storage bag with a first embodiment of a venting mechanism according to the present invention;

[0028] FIG. 6 is an enlarged, fragmentary, sectional view taken generally along the lines 6-6 of FIG. 5;

[0029] FIGS. 7A-7D are fragmentary isometric views of alternative embodiments of closure mechanisms including venting mechanisms of the present invention;

[0030] FIGS. 8A and 8B are fragmentary sectional views similar to FIG. 2 of alternative embodiments of closure mechanisms including venting mechanisms of the present invention;

[0031] FIGS. 8C and 8D are enlarged, fragmentary, sectional views taken generally along the lines 8C-8C and 8D-8D, respectively, of FIG. 5;

[0032] FIG. 9 is an elevational view of a third embodiment of a reclosable thermoplastic storage bag according to the present invention;

[0033] FIG. 10 is an enlarged, fragmentary, sectional view taken generally along the lines 10-10 of FIG. 9;

[0034] FIG. 11 is an elevational view of a fourth embodiment of a reclosable thermoplastic storage bag according to the present invention;

[0035] FIG. 12 is an enlarged, fragmentary, sectional view taken generally along the lines 12-12 of FIG. 11;

[0036] FIG. 13 is an elevational view of a fifth embodiment of reclosable thermoplastic storage bag according to the present invention;

[0037] FIGS. 14 and 15 are elevational views of embodiments of zipper tape according to the present invention;

[0038] FIG. 16 is an isometric view of an apparatus for producing bags of the present invention;

[0039] FIG. 17 is an enlarged, fragmentary isometric view of a portion of the apparatus of FIG. 16;

[0040] FIG. 18 is an enlarged end elevational view of the apparatus of FIGS. 16 and 17; and

[0041] FIG. 19 is a diagrammatic isometric view of an extrusion apparatus for extruding zipper tape incorporating the present invention;

DESCRIPTION OF THE PREFERRED EMBODIMENT(S)

[0042] Referring to FIG. 1, a reclosable pouch in the form of a thermoplastic storage bag 20 comprises first and second body portions 22, 24 joined to one another to form first and second bag walls 26, 28. The first and second bag walls 26, 28 are joined at first and second side portions 30, 32, respectively, and at a bottom portion 34. An opening 35 is disposed at a top portion 36 of the bag 20. First and second closure mechanisms 38a, 38b and two lips 40 are also disposed at the top portion 36 of the bag 20. The first closure mechanism 38a is disposed between the second closure mechanism 38b and an upper edge 42 of the top portion 36.

[0043] Referring to FIG. 2, male and female closure elements or portions 44a, 44b of the closure mechanism 38a are disposed on opposing internal sides or surfaces 46, 48 of the first and second body portions 22, 24, respectively. In addition, male and female elements or portions 50a, 50b of the closure mechanism 38b are disposed on the internal sides or surfaces 48, 46, respectively. Preferably, although not necessarily, the closure mechanism 38a is parallel to the closure mechanism 38b and the two are spaced from one another by a distance that is sufficiently large to allow each of the closure mechanisms to be individually opened or

closed, but still optionally allow the closure mechanisms to be opened and closed simultaneously. Typically, these results are accomplished by spacing the mechanisms 38a, 38b between about 0.2 inch (5.08 mm) and about 0.8 inch (20.32 mm) apart, more preferably between about 0.3 inch (7.62 mm) and about 0.6 inch (15.24 mm) and, most preferably, about 0.4 inch (10.16 mm), although a different spacing may instead be used.

[0044] Preferably, the closure elements or portions 44a, 44b, 50a, and 50b have a cross sectional shape and/or may be formed in accordance with the teachings of Geiger, et al. U. S. Patent No. 4,755, 248, Zieke et al., U. S. Patent No. 4,741,789, and/or Porchia et al., U. S. Patent No. 5,012,561, owned by the assignee of the present application and the disclosures of which are hereby incorporated by reference herein. Optionally, the first closure mechanism 38a exhibits a first closure characteristic and the second closure mechanism 38b exhibits a second closure characteristic different than the first closure characteristic. For example, either or both of the first and second closure mechanisms 38 may exhibit a relatively low level of resistance to bag opening forces but provide a high level of deformation so as to exhibit a clicking feel and/or sound when the bag is opened or closed. In addition, either or both of the first and second closure mechanisms 38 may exhibit a low level of deformation but provide a relatively high overall resistance to bag opening forces. Either or both of the male closure elements 44a, 50a may be symmetric or asymmetric about a longitudinal centerline thereof and either or both of the female closure elements 44b, 50b may be symmetric or asymmetric about a longitudinal centerline thereof. Thus, for example, either or both of the first and second closure mechanisms 38 may have an asymmetric configuration so that the closure mechanism 38 exhibits a first resistance to opening forces exerted on one side of the mechanism 38 and further exhibits a second, different resistance to opening forces exerted on another side of the mechanism 38.

[0045] FIG. 3 illustrates a further embodiment wherein like reference numbers denote structures common to the various embodiments. As seen in FIG. 3, the male closure elements 44a and 50a are disposed on the internal side or surface 46 and the female closure elements 44b and 50b are disposed on the internal side or surface 48.

[0046] As seen in FIG. 3, each male closure element 44a, 50a comprises an arrow-shaped engagement member 80, 82, respectively, and a base member 84, 86, respectively. Each female closure element 44b, 50b comprises a C-shaped profile member 90, 92, respectively,

joined to base members 94, 96, respectively. The base members 84, 86 are only slightly wider than the engagement members 80, 82 and the base members 94, 96 are only slightly wider than the side-to-side extent (as seen in FIG. 3) of the C-shaped profile members 90 and 92. The same is true of the embodiment of FIG. 2. In both of these embodiments relatively little resin is required to form the closure mechanisms 38. In fact, it is believed that only a minimal increase in resin is needed to produce the closure elements 38 compared to a standard bag design utilizing a single closure mechanism.

[0047] FIG. 4 illustrates yet another embodiment of the present invention wherein the closure mechanisms 38a, 38b are replaced by closure mechanisms 138a, 138b. The mechanism 138a includes male and female closure elements 144a, 144b and the mechanism 138b includes male and female closure elements 150a, 150b. The mechanisms 138a, 138b are identical, and hence, only the closure mechanism 138a will be discussed in detail. The male closure element 144a of the closure mechanism 138a comprises a base 154 integral with flanking side members 156 and 158 and an arrow-shaped engagement member 160 that extends from the base 154. A female closure element 144b comprises a base 162 with a C-shaped profile member 164 extending therefrom, wherein the female closure element 144b is adapted to receive the male closure element 144a when pressure is exerted on the closure elements by a user's finger(s) during closing of the bag. The side members 156 and 158 are of a sufficient size and proximity to the engagement member 160 such that the side members 156 and 158 move together with the member 160 when the members 160 and 164 are engaged and disengaged. The side members 156 and 158 also have a height that is less than the height of the engagement member 160, and the members 156 and 158 extend beyond tips 168 of the female profile member 164 when the engagement member 160 is engaged with the female profile member 164. Thus, at such time, the tips 168 of the female profile member 164 reside between the side members 156 and 158 and the male engagement member 160.

[0048] As in the previous embodiments, the male closure elements 144a, 150a may be disposed on the same bag wall or on different bag walls, as may the female closure elements 144b, 150b.

[0049] As should be evident by a comparison of FIGS. 3 and 4, the base members 84, 86, 94, and 96 of FIG. 3 are replaced by elongate members 180, 182, 184, 186, respectively, and hence, more resin is required to produce the closure mechanisms 138a, 138b as compared to

the closure mechanisms 38a, 38b. However, the elongate members 180-186 further promote guiding of the user's fingers and thumb during closing of the respective closure mechanism.

[0050] FIGS. 5 and 6 show a first embodiment of the venting mechanism of the present invention. The closure mechanisms 38a, 38b of FIGS. 5 and 6 may be identical or similar to any of the closure elements described above. The venting mechanism includes a plurality of holes 188 disposed in at least one of the first and second bag walls 26, 28 between the male and female closure elements 44a, 44b of the closure mechanism 38a and the male and female closure elements 50a, 50b of the closure mechanism 38b. The venting mechanism includes between about 1 hole and about 1000 holes per bag, and more preferably between about 10 holes and about 100 holes per bag, whether the hole(s) are disposed in a single bag wall between the closure mechanisms 38a, 38b or both bag walls. The diameter of the holes is between about 0.001 inch (0.0254 mm) and about 0.5 inch (12.7 mm), and more preferably between about 0.05 inch (1.27 mm) and about 0.2 inch (5.08 mm). The holes may be spaced randomly or in a pattern, but preferably are spaced in a line across a width of the bag 20.

[0051] To utilize a plurality of holes as a venting mechanism, a user may place produce or another product in an interior of the pouch 190 and seal the closure mechanism 38a, such that there is air communication between the interior of the pouch 190 and an exterior of the pouch 192 through the holes 188. If desired, the user may vent air in the pouch 192 outwardly through the holes 188 by squeezing the pouch 192. If the pouch is not to be made air tight, the closure mechanism 38b may be left non-occluded. Alternatively, if the user desires an air-tight pouch, the user may place a product in the interior of the pouch 190, seal the closure mechanism 38a, force any air in the interior of the pouch 190 out through the holes 188 in the manner noted above, and seal the closure mechanism 38b. Optionally, the user may place a product in the interior of the pouch 190, seal the closure mechanism 38b, and occlude or not occlude the closure mechanism 38a.

[0052] Further embodiments of the venting mechanism of the present invention are shown in FIGS. 7A-7D. In these embodiments, one or both of the male or female closure elements of either of the closure mechanisms 38a or 38b is segmented to allow passage of fluid, air, or another gas or gases therethrough. As seen in FIG. 7A, the male closure element 44a of the closure mechanism 38a is segmented and the female closure element 44b is solid. Conversely, in FIG. 7B, the female closure element 44b of the closure mechanism 38a is

segmented and the male closure element 44a is not. In either case, if the user prefers to utilize the venting mechanism, the user would place a product in an interior of the pouch 190 and occlude the closure mechanism 38a, thus capturing the product in the interior of the pouch 190 but allowing fluid communication between the interior of the pouch 190 and the exterior of the pouch 190 through the segmented closure element, whether it is the male or female closure element. To utilize the pouch as an air-tight pouch, the user may place a product in the pouch and seal the closure mechanism 38b either with or without occluding the closure mechanism 38a.

[0053] Optionally, as seen in FIG. 7C, the male closure element 50a of the closure mechanism 38b is segmented and the female closure element 50b is not. FIG. 7D further depicts the female closure element 50b of the closure mechanism 38b being segmented and the male closure element 50a being non-segmented. Either way, in order to utilize the venting mechanism, the user may place the product in the interior of the pouch 190 and occlude the closure mechanism 38b. To create an air-tight pouch, the user may optionally force any excess air from the pouch interior 190 out through the segmented closure mechanism 38b and seal the closure mechanism 38a. Alternatively, the user may simply place a product in the interior of the pouch 190 and seal the closure mechanism 38a. The segmentation of FIGS. 7A-7D may be utilized with any closure element disclosed herein or any other type of closure mechanism.

[0054] Depending on the use for the pouch, the closure mechanism 38a may also have male and female closure elements 44a, 44b that are both segmented and/or the closure mechanism 38b may have both male and female closure elements 50a, 50b that are segmented.

[0055] Alternative embodiments of the venting mechanism of the present invention are shown in FIGS. 8A-8D. In each of these embodiments one or both of the closure mechanisms 138 has either a deformed male closure member 189b or a deformed female closure member 189a. As seen in FIG. 8A, the female closure member 189a has been modified by increasing the side-to-side distance between opposed tips 168 of the female profile member 164 and/or the male closure member 160 has been modified by narrowing the side-to-side thickness of a stem portion 167 thereof. Either modification may be accomplished by removing or deforming material either during or after the extrusion process.

In any event, one or more spaces or gaps are interposed between the tips 168 of the female profile member 164 and the stem portion 167 when the closure members 189a, 189b are occluded. Fluid, air, or another gas may pass through the gaps as desired. In another embodiment, the male arrow-shaped profile member 160, as seen in FIG. 8B, may be deformed by displacing and/or removing portions thereof to create at least one gap that permits fluid communication from one lateral side of the closure element to an opposite lateral side of the closure element. More generally, one aspect of the present invention comprehends the formation or creation of a gap or other passage between the male and female closure members that allows fluid communication from one side of a closure mechanism 138 to another side of the closure mechanism 138. As a further example, the embodiment of FIGS. 8C and 8D includes at least one closure mechanism 138 having a gap 169a between one of the tips 168 of the female profile member 164 and the stem 167 of the male arrow-shaped profile member 160 at a first location across the width of the closure mechanism 138 (seen in FIG. 8C). The closure mechanism(s) 138 may further include another gap 169b between the other of the tips 168 of the female profile member 164 and the stem 167 at a second location across the width of the closure mechanism 138 (FIG. 8D). Fluid communication is provided between the gaps 169a, 169b due to a space 170 that exists between the external surfaces of the male profile member and the internal surfaces of the female profile member. If desirable or necessary, additional gaps similar or identical to the gaps 169 may be provided at other locations along the width of the pouch. The fluid communication across the closure element(s) 138 allows slow leaking of air through the profiles, therefore allowing some ventilation in the pouch.

[0056] As seen in the embodiments of FIGS. 9-14, a reclosable pouch 220 in the form of a thermoplastic bag includes first and second body portions 222, 224 joined to one another to form first and second bag walls 226, 228. The first and second bag walls 226, 228 are joined at first and second side portions 230, 232, respectively, and at a bottom portion 234. An opening 235 is disposed at a top portion 236 of the bag 220. First and second closure mechanisms 238a, 238b are disposed at the top portion 236 of the bag 220. The first closure mechanism 238a is disposed at an upper edge 242 of the top portion 236 of the bag 220 and includes a slider 243 disposed thereon for opening and closing the first closure mechanism 238a. The second closure mechanism 238b is disposed between the first closure mechanism

238a and the bottom portion 234 of the bag 220 and is of the type of closure mechanism that is closed by pressing and gliding one's fingers along the closure mechanism 238b and is opened by pulling the bag walls 226, 228 apart.

[0057] Referring to FIG. 10, the first closure mechanism 238a includes first and second upwardly facing hook-shaped closure elements 244a, 244b disposed on an internal side or surface 246 of the first body portion 222. Additionally, a flange portion 247 is disposed on the internal side 246 of the first body portion 222 above the first and second closure elements 244a, 244b. Third and fourth downwardly facing hook-shaped closure elements 244c, 244d are disposed on an internal side or surface 248 of the second body portion 224, wherein the third and fourth closure elements 244c, 244d interlock with the first and second closure elements 244a, 244b, respectively, to form the first closure mechanism 238a.

[0058] As with previous embodiments, the upwardly facing hook-shaped elements 244a, 244b may be disposed on the internal side 248 of the second body portion 224 and the downwardly facing hooked-shaped closure elements 244c, 244d may be disposed on the internal side 246 of the first body portion 222.

[0059] Preferably, the closure elements or portions 244a-244d have a cross sectional shape and/or may be formed in accordance with the teachings of this application.

Alternatively, or in addition, the closure elements or portions 244a-244d may have a cross sectional shape and/or may be formed in accordance with the teachings of Porchia et al. U.S. Patent No. 5,950,285, or Porchia et al. U.S. Patent No. 5,836,056, owned by the assignee of the present application and the disclosures of which are hereby incorporated by reference herein.

[0060] The slider 243 disposed on the first closure mechanism 238a includes a top portion 249 and first and second side walls 251a, 251b extending perpendicularly from first and second sides 253a, 253b of the top portion 249. The slider 243 further includes first and second slider feet 255a, 255b extending perpendicularly from the first and second side walls 251a, 251b, respectively, toward one another. When the slider is disposed on the first closure mechanism 238a, the slider feet 255a, 255b are disposed below first and second rails 257a, 257b extending from outer sides or surfaces 259a, 259b of the first and second body portions 222, 224, respectively. The rails 257a, 257b aid in retaining the slider on the bag 220 in a direction transverse to the direction of movement of the slider 243. As the slider 243

is moved across the bag in a first direction 261, the bag is opened and as the slider 243 is displaced across the bag in a second direction 263, the bag is closed. Preferably, the slider 243 may be formed in accordance with the teachings of Porchia et al. U.S. Patent No. 5,950,285, Porchia et al. U.S. Patent No. 5,836,056, Smith et al. U.S. Patent Design No. D422,909, Smith et al. U.S. Serial No. 10/458,316, or Smith et al. U.S. Serial No. 29/183,883, owned by the assignee of the present application and the disclosures of which are hereby incorporated by reference herein.

[0061] Preferably, although not necessarily, the bag 220 includes first and second end stops 265a, 265b, as seen in FIG. 9, disposed adjacent the first and second side portions 230, 232, respectively. The end stops 265a, 265b are either formed by heating and melting a portion of the closure mechanism 238a or each may comprises one or more clips or the like that are attached to the bag 220. The end stops 265a, 265b prevent removal of the slider 243 in the direction of movement of the slider 243.

[0062] Referring again to FIG. 10, the second closure mechanism 238b includes male and female closure elements or portions 268a, 268b disposed on the internal sides 246, 248 of the first and second body portions 222, 224, respectively. The male closure element 268a of the closure mechanism 238b comprises a base 270 integral with flanking side members 272 and 274 and a male arrow-shaped engagement member 276 that extends from the base 270. The female closure element 268b comprises a base 278 with a C-shaped profile member 280 extending therefrom, wherein the female closure element 268b is adapted to receive the male closure element 268a when pressure is exerted on the closure element 238b by a user's finger(s) during closing of the bag 220. The side members 272 and 274 are of sufficient size and proximity to the male engagement member 276 such that the side members 272 and 274 move together with the male engagement member 276 when the members 276 and 280 are engaged and disengaged. The side members 272 and 274 also have a height that is preferably less than the height of the male engagement member 276, and the side members 272 and 274 extend beyond tips 282 of the female profile member 280 when the male engagement member 276 is engaged with the female profile member 280. Thus, at such time, the tips 282 of the female profile member 280 reside in spaces between the side members 272 and 274 and the male engagement member 276.

[0063] As with previous embodiments, the male closure element 268a may be disposed on the internal side 248 of the second body portion 224 and the female closure element 268b may be disposed on the internal side 246 of the first body portion 222.

[0064] Preferably, the closure elements or portions 268a, 268b of the second closure mechanism 238b have a cross sectional shape and/or may be formed in accordance with the teachings of the present application. Alternatively, or in addition, the closure elements or portions 268a, 268b of the second closure mechanism 238b may have a cross sectional shape and/or may be formed in accordance with the teachings of Geiger et al. U.S. Patent No. 4,755,248, Zieke et al., U.S. Patent No. 4,741,789, and/or Porchia et al., U.S. Patent No. 5,012,561, owned by the assignee of the present application and the disclosures of which are hereby incorporated by reference herein.

[0065] To utilize the embodiment of FIGS. 9 and 10, when both closure mechanisms 238a, 238b are open, a user may place one or more products in an interior of the bag 220 and thereafter exert force on the outer surfaces 259a, 259b of the first and second body portions 222, 224, respectively, adjacent the male and female closure elements 268a, 268b of the second closure mechanism 238b, thereby forcing the male and female closure elements 268a, 268b into interlocking relation. The user may thereafter move the slider 243 in the second direction 263, thus interlocking the closure elements 244a-244d of the first closure mechanism 238a and closing the bag 220. Optionally, the user may only close the first closure mechanism 238a or the second closure mechanism 238b or the user may reverse the order in which he closes the closure mechanisms 238a, 238b.

[0066] FIGS. 11 and 12 depict an embodiment similar to that of FIGS. 9 and 10 having a venting mechanism. The venting mechanism includes a plurality of holes 288 disposed in at least one of the bag walls 226, 228 between the first and second closure mechanisms 238a, 238b. Preferably, the venting mechanism includes between about 1 hole and about 10,000 holes per bag, and more preferably between about 10 holes and about 100 holes per bag. The diameter of the holes is preferably between about 0.0005 inch (0.0127 mm) and about 0.5 inch (12.7 mm), and more preferably between about 0.01 inch (0.254 mm) and about 0.2 inch (5.08 mm), and most preferably about 0.02 inch (0.508 mm). The holes may be of any shape and size and the shape and/or size may vary or not vary from hole to hole. For example, the holes may all be circular in shape and may all have the same diameter or variable diameters.

Also, the holes may be spaced randomly or in a pattern, but preferably are spaced in a line across a width of the bag 220.

[0067] To utilize the embodiment of FIGS. 11 and 12, when both closure mechanisms 238a, 238b are open, a user may place one or more products in an interior 290 of the bag 220, and thereafter move the slider 243 in the second direction 263, thus interlocking the closure elements 244a-244d of the first closure mechanism 238a. At this time there is air communication between the interior 290 of the bag 220 and an exterior 292 of the bag 220 through the holes 288. Optionally, the user may then vent air in the bag 220 outwardly through the holes 288 by squeezing the bag 220. If the bag 220 is not to be made air tight, the second closure mechanism 238b may be left non-occluded. Alternatively, if the user desires an air-tight bag 220, the user may place a product in the interior 290 of the bag 220, seal the first closure mechanism 238a, force any air in the interior 290 of the bag 220 out through the holes 288 in the manner noted above, and seal the second closure mechanism 238b before air can reenter the bag 220. Optionally, the user may place a product in the interior 290 of the pouch 220, seal the second closure mechanism 238b, and occlude or not occlude the first closure mechanism 238a. Optionally, the embodiments of FIGS. 9-12 may include any of the other venting mechanisms disclosed herein.

[0068] FIG. 13 shows an embodiment similar to the embodiment of FIGS. 9 and 10 except that the slider 243 of FIG. 13 includes an extension member 294 protruding from one or both of the side walls 251a, 251b of the slider 243. The extension member 294 is in the shape of a finger and extends towards a bottom portion 234 of the bag 220. When a user moves the slider in the second direction 263 to close the first closure mechanism 238a, the extension member 294 may be pressed against the second closure mechanism 238b, thereby closing the second closure mechanism 238b as the slider 243 is sealing the first closure mechanism 238a. Optionally, the extension member 294 may be utilized in the embodiment of FIGS. 11 and 12. Still optionally, the extension member 294 may take any form or shape that would perform the function of closing the second closure mechanism 238b.

[0069] Another embodiment as shown in FIG. 14 comprises a zipper tape 300. The zipper tape 300 includes first and second thermoplastic strips 302, 304, wherein a first closure element 306 is disposed on the first strip 302 and a second closure element 308 is disposed on the second strip 304. The closure elements 306, 308 may be integral with or separately

deposited onto the strips 302, 304 and may be of any type described in the present application. A slider 343 is disposed on the closure elements 306, 308 for opening and closing the closure elements 306, 308, thereby forming a closure mechanism 310 at a first edge 311 of the strips 302, 304. The closure mechanism 310 is preferably similar to the closure mechanism 238a of FIGS. 9-14. Preferably, second edges 320 of the strips 302, 304 in the form of flange portions 321 are attached to top edges of a thermoplastic bag having a closure mechanism, such as the closure mechanism 238b described with respect to FIGS. 9-14. Optionally, the first bottom edge 320 of the zipper tape 300 may be attached to top edges of a folded thermoplastic sheet. In either case, the zipper tape 300 is attached by any suitable conventional process and apparatus. Optionally, the zipper tape 300 may include end stops 312, 314 that formed adjacent first and second edges 316, 318 of the strips 302, 304 either before or after the zipper tape 300 is attached to a thermoplastic bag or folded thermoplastic sheet. As discussed above, the end stops 312, 314 may be in the form of fused portions or one or more clips or the like that are attached to the zipper tape 300.

[0070] FIG. 15 depicts an embodiment of a zipper tape 300 similar to FIG. 14. The embodiment of FIG. 15 further includes a second closure mechanism 332 disposed below the closure mechanism 310. The second closure mechanism 332 includes male and female closure elements 334, 336 similar to the male and female closure elements 268a, 268b of FIGS. 9-14. The female closure element 336 receives the male closure element 334 when pressure is exerted on the closure elements 334, 336 by a user's finger(s). Second edges 338 of the strips 302, 304 in the form of flange portions 339 may be attached to top edges of a folded thermoplastic sheet by any suitable conventional process and apparatus.

[0071] Preferably, although not necessarily, the first closure mechanism 238a is parallel to the second closure mechanism 238b and the two are spaced from one another by a distance sufficiently large to allow the slider 243 of the first closure mechanism 238a to exert opening and closing forces only on the first closure mechanism 238a. Typically, these results are accomplished by spacing the first and second closure mechanisms 238a, 238b between about 0.5 inch (12.7 mm) and about 2 inches (50.8 mm) apart, more preferably between about 0.8 inch (20.32 mm) and about 1 inch (25.4 mm) apart, although a different spacing may instead be used. Optionally, the first and second closure mechanisms 238a, 238b may be spaced from one another by a distance sufficiently small to allow the slider 243 of the first

closure mechanism 238a to exert opening and/or closing forces on the second closure mechanism 238b.

[0072] In any of the embodiments disclosed herein, one or more gripping ribs (not shown) may be disposed on the internal surfaces 46, 48 or 246, 248 of the bag 20 or 220 between the closure mechanisms 38a, 38b or 238a, 238b and the top portion 36 or 236 of the bag 20 or 220, wherein the gripping ribs are integrally extruded with the walls of the bag. Any number of gripping ribs can be used, although space is necessary between adjacent ribs in order to facilitate a gripping action with a user's fingers. Any of the gripping ribs may be continuous or discontinuous. Preferably, if the gripping ribs are disposed between the closure mechanisms 38a, 38b or 238a, 238b and the bag walls 26, 28 or 226, 228 include holes 188 or 288 therein, the gripping ribs are discontinuous to allow air flow through the holes 188 or 288. In the embodiments of FIGS. 1-6, preferably about six or seven gripping ribs are disposed on each lip 40 of the bag 20.

[0073] Reclosable thermoplastic storage bags as described herein can be produced by any suitable bag-making process, such as a cast post applied process, a cast integral process, a blown process or any other process known in the art. It should be noted that the extrusion die(s) used to form the closure mechanisms and strip(s) must include a suitable number of profile plates to form such structures. In addition, an air nozzle may be provided in association with each female closure element that blows air into the opening of each C-shaped female profile member to open the member as it is being extruded. The air flow and/or velocity may be varied to obtain the desired deformation for venting purposes, as noted above. In addition, one or more cooling water jets may be provided to cool the male and female closure elements after they are extruded.

[0074] If desired, an alternative post applied process can be used to produce any of the bags disclosed herein, such as seen in FIGS. 16 and 17. Referring to such FIGS., the alternative post applied process utilizes an extrusion apparatus including a first extrusion slot die 400, a temperature-controlled driven casting roll 402, edge pinning devices or apparatus 404a, 404b, an air knife 406, second and third extrusion dies 408a, 408b (that are diagrammatically shown and which, together with the die 400, form the extrusion apparatus) and blowing apparatus 410a, 410b. The extrusion die 400 receives molten thermoplastic from an extruder (not shown) and deposits the thermoplastic in sheet form as a web 412 onto

the casting roll 402. The extrusion die 400 includes a slot opening (not shown) that optionally forms thickened areas 414, 416 at outside edge portions 418a, 418b of the resulting web 412 and a relatively thinner portion 420 intermediate the thickened areas 414, 416. The edge portions 418a, 418b are pinned to the casting roll 402 by the edge pinning devices 404a, 404b, respectively. The web 412 is then pinned across the entire width thereof (i.e., as a whole) to the casting roll 402 by the air knife 406.

[0075] After the web 412 is pinned to the casting roll 402, the male and female closure elements 44, 50, 144, 150, or 268a, 268b are formed on the web 412. Preferably, the extrusion dies 408a, 408b receive molten thermoplastic from separate extruders and extrude the male and female closure elements 44, 50, 144, 150, or 268a, 268b onto the thickened areas 414, 416. Alternatively, the separate extrusion dies 408a, 408b may be replaced by a single extrusion die having two outlets at which the male and female closure elements 44, 50, 144, 150, or 268a, 268b are simultaneously extruded onto the thickened areas 414, 416. As a still further alternative, each extrusion die 408a, 408b may be replaced by two or more extrusion dies that individually and separately extrude the closure elements 44, 50, 144, 150, or 268a, 268b. In any event, as seen in FIG. 18, the angle of a face 422 of each die 400 is at least initially disposed substantially parallel to a horizontal (as seen in FIG. 18) radial line 424 extending from the center of the casting roll 402. The position of the die 400 (or each die 400a, 400b individually if separate dies are used) may then be adjusted by moving the die left, right, up, or down (all as seen in FIG. 18) or the die may be tipped (i.e., angularly displaced) to adjust the angle of the die face 422 to obtain desirable results. The closure elements 44, 50, 144, 150, or 268a, 268b formed by the die(s) 408 may exit the die(s) 408 at a point coincident with a vertical tangent line 426 (FIG. 18) intersecting the surface of the casting roll 402 on the side of the casting roll 402 where the web 412 is first deposited thereon. Alternatively, the closure elements 44, 50, 144, 150, or 268a, 268b formed by the die(s) 408 may exit the die(s) 408 at a point displaced to the right or left (as seen in FIG. 18) of the tangent line 426. If the extrudate exits the die(s) 408 at a point displaced to the right of the line 426, some provision must be made at the initiation of production to attach the extrudate stream to the casting roll 402. Thereafter, production may commence, (provided that the exit of the die(s) 408 is not disposed too far to the right of the tangent line 426)

whereupon the melt strength of the extrude stream carries the stream into contact with the roll 402.

[0076] Once the molten thermoplastic from the die(s) 408 has been deposited onto the web 412, coolant is applied to the closure elements 44, 50, 144, 150, or 268a, 268b by coolant apparatus (not shown) to bring the temperature thereof below the melting point of the thermoplastic material forming the closure elements 44, 50, 144, 150, or 268a, 268b as quickly as possible. Preferably, the coolant comprises water or any other suitable cooling fluid and the coolant is applied to the material of the closure elements 44, 50, 144, 150, or 268a, 268b only after such material contacts the material of the web 412 so that adhesion thereto is optimized. The web 412 and the closure elements 44, 50, 144, 150, or 268a, 268b are maintained in contact with the temperature-controlled casting roll 402 for a period of time as the roll 402 is rotated so that the web 412 and closure elements 44, 50, 144, 150, or 268a, 268b are further cooled. The casting roll 402 should be maintained at a temperature below the melting point of the thermoplastic material(s) forming the web 412 and the closure elements 44, 50, 144, 150, or 268a, 268b, typically about 20-80 degrees Celsius.

[0077] If desired, any of the closure elements and/or strips and/or other associated structures of the above embodiments can be integrally extruded on internal surfaces of flanges as zipper tape that is subsequently post-applied to film in a bag production process. For example, the closure elements 44, 50, 144, 150, or 268a, 268b may be extruded with flanges as zipper tape portions 500, 502. In this embodiment, gripping ribs may also be formed on the zipper tape and the zipper tape may have relatively thicker portions at portions that ultimately form the top of the bag and relatively thinner portions at opposite portions where the zipper tape is to be joined to the film. For example, as seen in FIG. 19, zipper tape portions 500, 502 may be extruded separately by an extrusion die 504 into a water bath 506. If desired, more than one extrusion die may be employed for this purpose. The zipper tape portions 500, 502 extend about pulleys or rollers 508, 510, respectively, in the water bath 506 and may further extend about additional pulleys or rollers 512, 514 and 516, 518 out of the water bath 506. The zipper tape portions 500, 502 may thereafter pass through a dewatering station 520, where the water is removed therefrom, and the portions 500, 502 may be joined together (i.e., occluded) by nip rollers 522. The occluded portions 500, 502 may thereafter be stored on spools or reels or the occluded portions may be directly delivered to an in-line bag

manufacturing apparatus, where the portions 500, 502 are laminated or otherwise secured to bag film.

[0078] During or after the use of any suitable bag-making process to create pouches or partial pouches, holes may be created in the pouches between the closure mechanisms by any means known in the art. Such processes include punching, using lasers, burning holes in the thermoplastic with hot pins or needles, perforating, utilizing high pressure water jets, or using electrical arcs to create holes therein. Some of these processes are disclosed in detail in Dais et al., U.S. Patent No. 5,405,561, owned by the assignee of the present application and the disclosure of which is hereby incorporated by reference herein.

[0079] Alternatively, during or after the use of any suitable bag-making process to create pouches or bags, any of the closure elements may be segmented or deformed. Segmentation and deformation may be created using a lateral punching means or a deforming apparatus, respectively, as disclosed in Dais et al., U.S. Patent No. 5,140,727, owned by the assignee of the present application and the disclosure of which is hereby incorporated by reference herein. Optionally, deformation may be created by pulsing the extruder during extrusion of any of the closure elements or forcing water from a water jet onto any of the closure elements after extrusion thereof to effect deformation.

INDUSTRIAL APPLICABILITY

[0080] The pouch described herein advantageously can have an air-tight seal for products that should not be in substantial contact with air during storage thereof or can have a vented seal for products, such as fruits and vegetables, that are best stored in a manner that allows air and water vapor to circulate through the bag walls. In addition, the bag can be used to permit product stored therein to be treated with a gas before storage of the product. Still further, the pouch may also permit venting of steam when microwaving foods therein or to simply remove all excess air from the pouch prior to air tight sealing thereof.

[0081] The pouch of the present invention is provided with two closure mechanisms spaced apart a distance far enough wherein each closure mechanism can be sealed and unsealed individually or simultaneously. A venting mechanism is provided in the pouch either by disposing holes between the closure mechanisms, segmenting one or more of the

closure elements of one or more of the closure mechanisms, or deforming one or more of the closure elements of one or more of the closure mechanisms.

[0082] Numerous modifications to the present invention will be apparent to those skilled in the art in view of the foregoing description. Accordingly, this description is to be construed as illustrative only and is presented for the purpose of enabling those skilled in the art to make and use the invention and to teach the best mode of carrying out same. The exclusive rights to all modifications which come within the scope of the appended claims are reserved.

WE CLAIM:

1. A reclosable pouch, comprising:
a body portion having first and second opposing bag walls, wherein each bag wall has an internal side;
first and second closure mechanisms disposed on the internal sides of the first and second bag walls, wherein the closure mechanisms are parallel to one another and spaced apart between about 0.3 inch (7.62 mm) and about 0.6 inch (15.24 mm); and
a venting mechanism.
2. The reclosable pouch of claim 1, wherein the first closure mechanism is disposed between the second closure mechanism and an opening of the pouch.
3. The reclosable pouch of claim 2, wherein each of the closure mechanisms includes a male profile and a female profile.
4. The reclosable pouch of claim 3, wherein the venting mechanism includes a deformed male profile of the second closure mechanism.
5. The reclosable pouch of claim 3, wherein the venting mechanism includes a deformed female profile of the second closure mechanism.
6. The reclosable pouch of claim 3, wherein the venting mechanism includes a deformed male profile of the first closure mechanism.
7. The reclosable pouch of claim 3, wherein the venting mechanism includes a deformed female profile of the second closure mechanism.
8. The reclosable pouch of claim 3, wherein the venting mechanism comprises a segmented male profile of the second closure mechanism.

9. The reclosable pouch of claim 3, wherein the venting mechanism comprises a segmented female profile of the second closure mechanism.
10. The reclosable pouch of claim 3, wherein the venting mechanism comprises a segmented male profile of the first closure mechanism.
11. The reclosable pouch of claim 3, wherein the venting mechanism comprises a segmented female profile of the first closure mechanism.
12. The reclosable pouch of claim 3, wherein the venting mechanism includes a plurality of holes disposed in one of the first and second bag walls between the first and second closure mechanisms.
13. The reclosable pouch of claim 12, wherein the holes have diameters between about 0.001 inch (0.0254 mm) and about 0.5 inch (12.7 mm).
14. The reclosable pouch of claim 3, wherein the venting mechanism includes a plurality of holes disposed in both of the first and second bag walls between the first and second closure mechanisms.
15. The reclosable pouch of claim 14, wherein the holes have diameters between about 0.001 inch (0.0254 mm) and about 0.5 inch (12.7 mm).

16. A reclosable pouch, comprising:
a body portion having first and second opposing bag walls, wherein each bag wall has an internal side;
first and second closure mechanisms disposed on the internal sides of the first and second bag walls, wherein the closure mechanisms are parallel to one another; and
a plurality of holes extending through at least one of the first and second bag walls between the first and second closure mechanisms.
17. The reclosable pouch of claim 16, wherein the holes have diameters of between about 0.001 inch (0.0254 mm) and about 0.5 inch (12.7 mm).
18. The reclosable pouch of claim 16, wherein between about 1 and about 1000 holes are disposed in the bag walls.
19. The reclosable pouch of claim 16, wherein the first closure mechanism is disposed above the second closure mechanism.
20. The reclosable pouch of claim 19, wherein sealing the first closure mechanism creates a reclosable pouch with fluid communication between an inside of the pouch and an outside of the pouch.
21. The reclosable pouch of claim 19, wherein sealing the second closure mechanism creates a reclosable pouch with no fluid communication between an inside of the pouch and an outside of the pouch.

22. A reclosable pouch, comprising:
a body portion having first and second opposing bag walls, wherein each bag wall has an internal side;
a first reclosable closure mechanism disposed on the internal sides of the first and second bag walls, respectively, wherein the first closure mechanism includes a slider for opening and closing the first and second closure elements;
a second reclosable closure mechanism disposed on the internal sides of the first and second bag walls, respectively, wherein the second closure mechanism is spaced from the first closure mechanism such that the slider mechanism of the first closure mechanism does not open or close the second closure mechanism.
23. The reclosable pouch of claim 22, wherein the first closure mechanism is disposed at a top portion of the pouch.
24. The reclosable pouch of claim 23, wherein the second closure mechanism is disposed between the first closure mechanism and a bottom portion of the pouch.
25. The reclosable pouch of claim 24, wherein the slider includes an extension member extending towards the bottom portion of the pouch.
26. The reclosable pouch of claim 25, wherein the extension member extends over the second closure mechanism to aid in closing the second closure mechanism.
27. The reclosable pouch of claim 22, wherein the first and second closure mechanisms are preferably spaced preferably between about 0.5 inch (12.7 mm) and about 2 inches (50.8 mm) apart.
28. The reclosable pouch of claim 26, wherein the first and second closure mechanisms are more preferably spaced between about 0.8 inch (20.32 mm) and about 1 inch (25.4 mm) apart.

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29. The reclosable pouch of claim 28, wherein at least one hole extends through at least one of the first and second bag walls between the first and second closure mechanisms.

30. The reclosable pouch of claim 29, wherein a plurality of holes extend through at least one of the first and second bag walls between the first and second closure mechanisms.

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FIG. 1

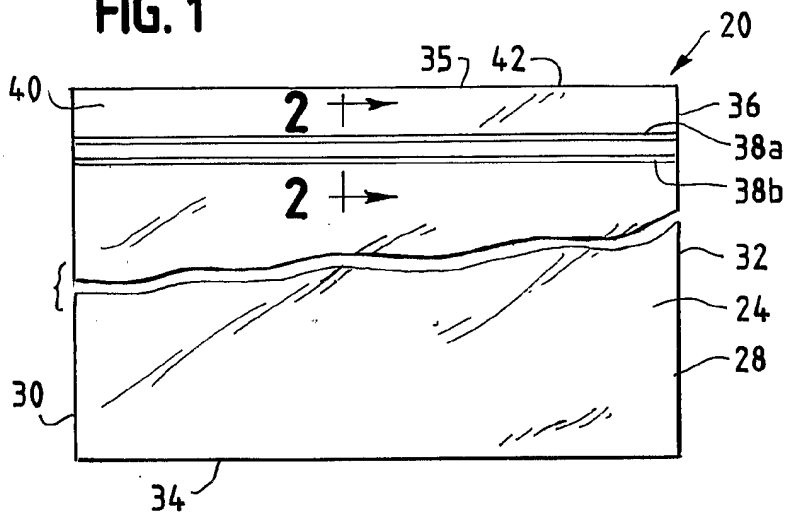


FIG. 2

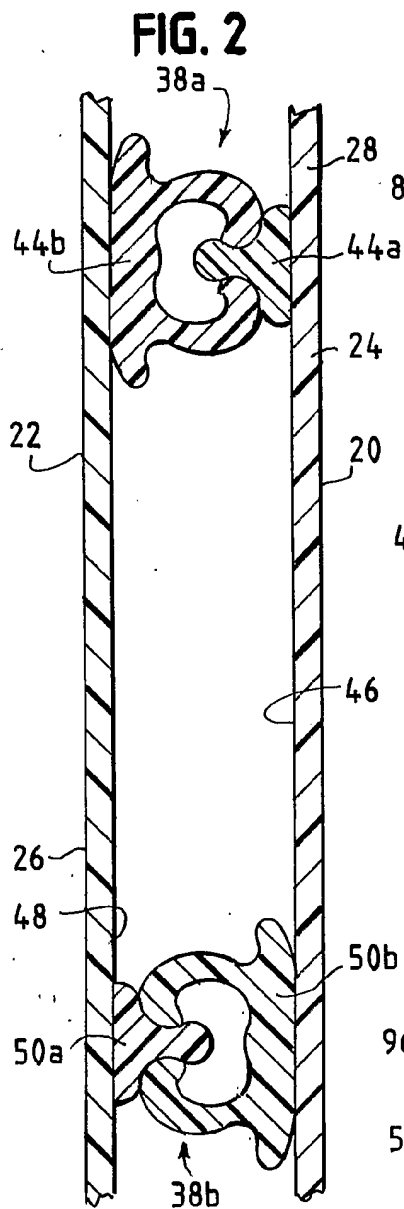


FIG. 3

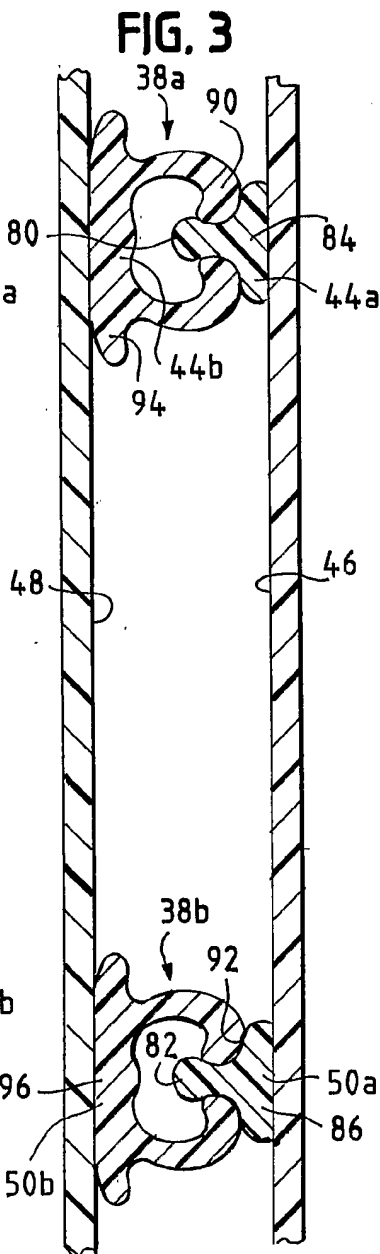
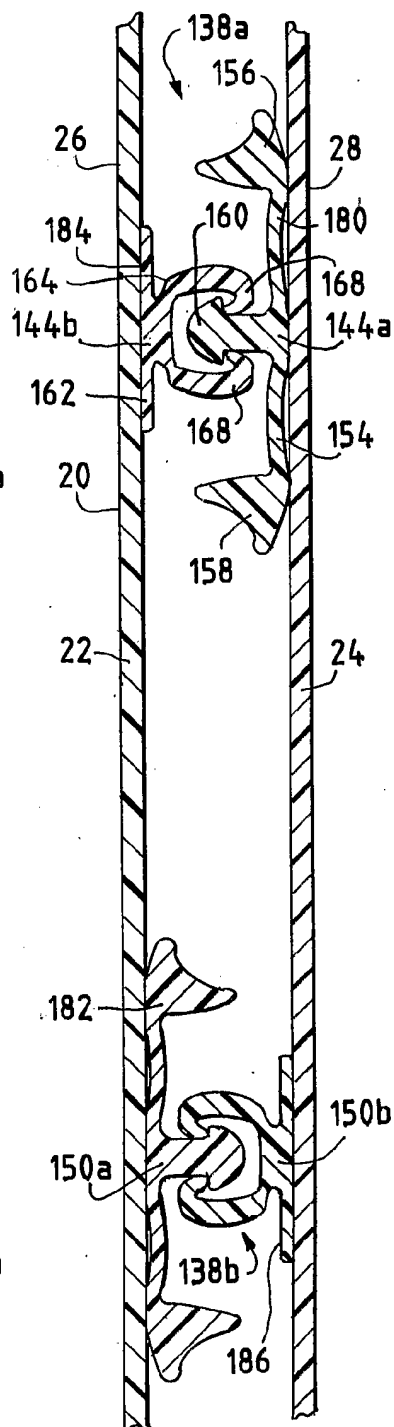


FIG. 4



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FIG. 5

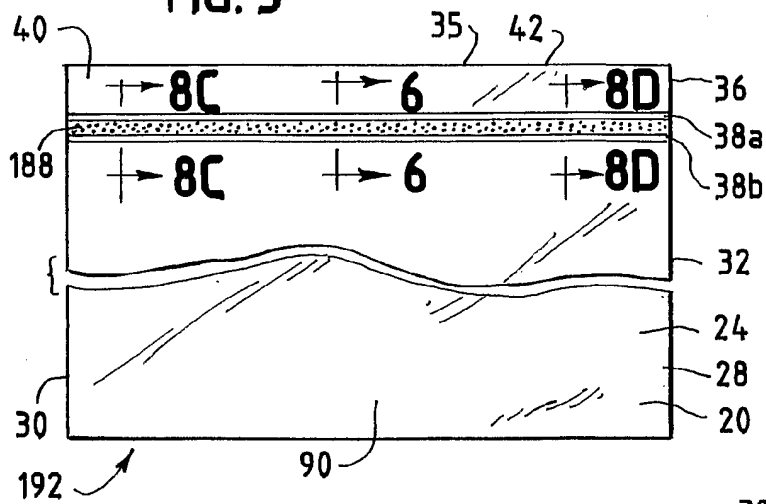


FIG. 6

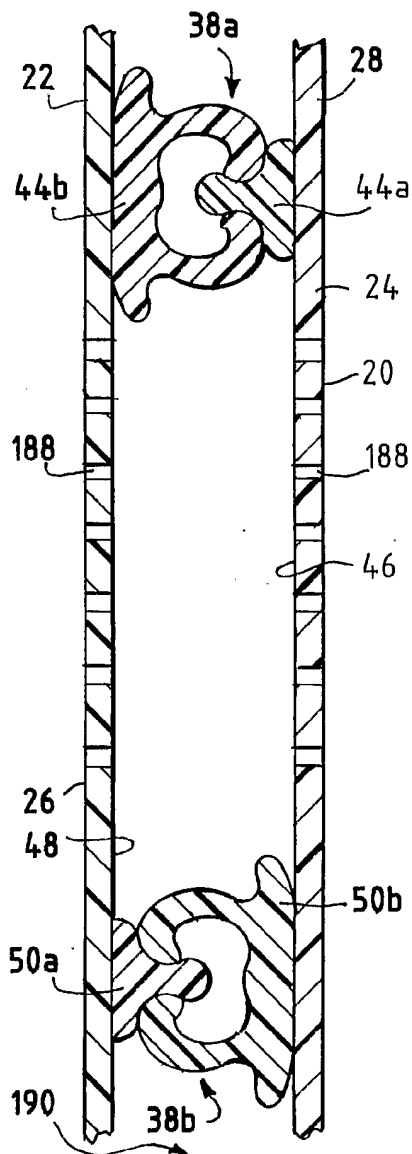


FIG. 7A

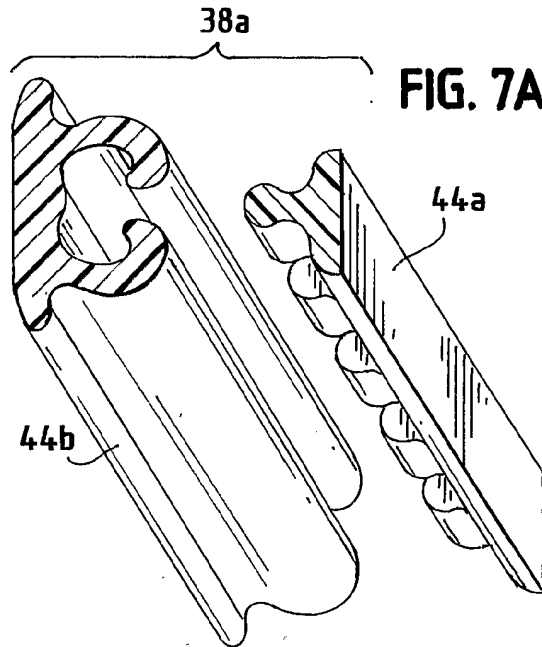
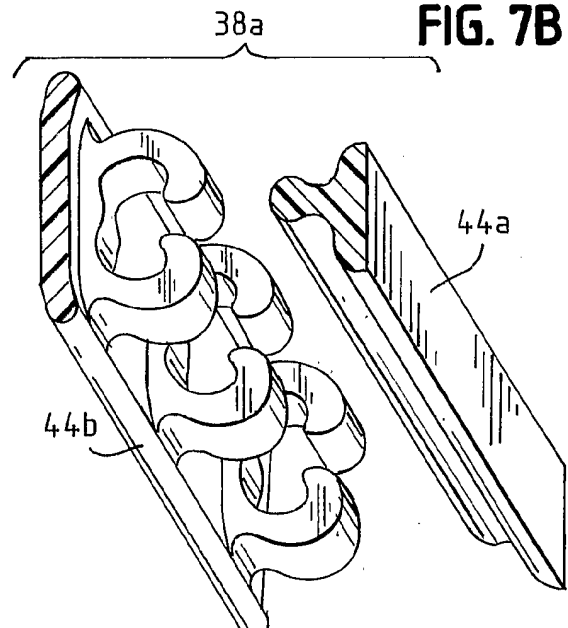


FIG. 7B



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FIG. 7C

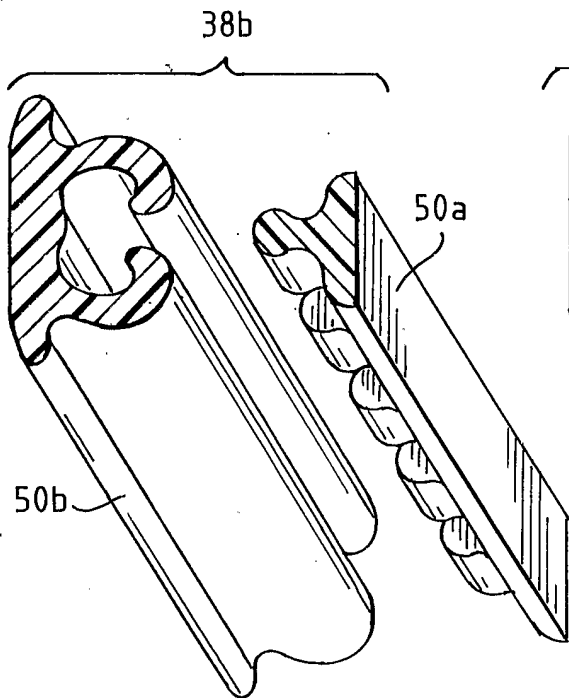


FIG. 7D

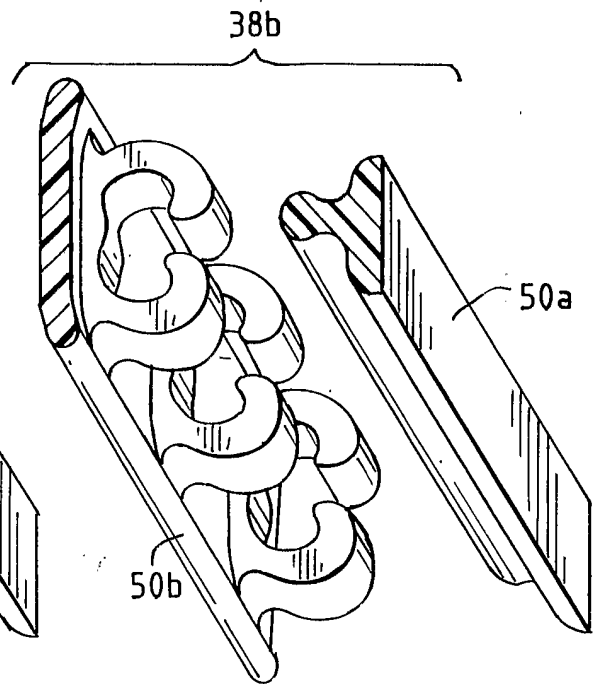


FIG. 8A

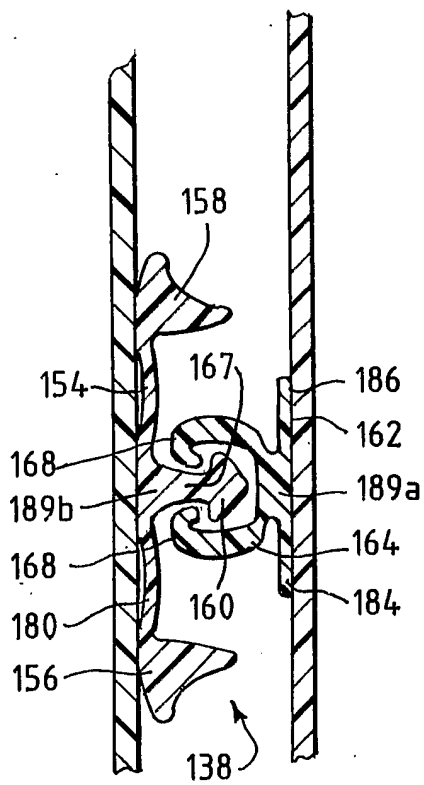


FIG. 8B

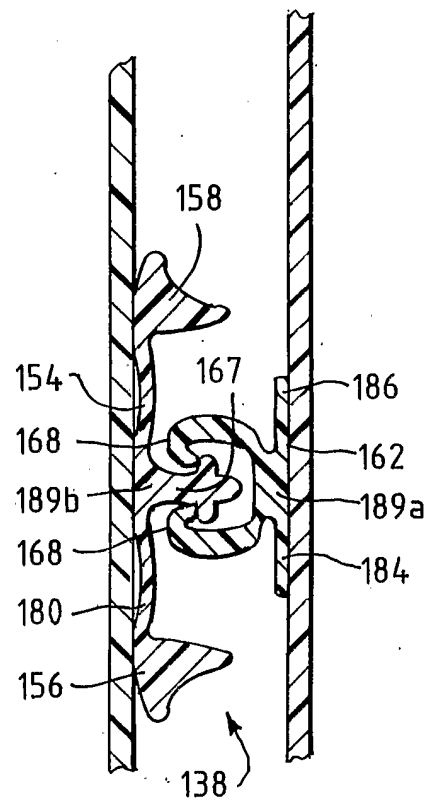


FIG. 8C

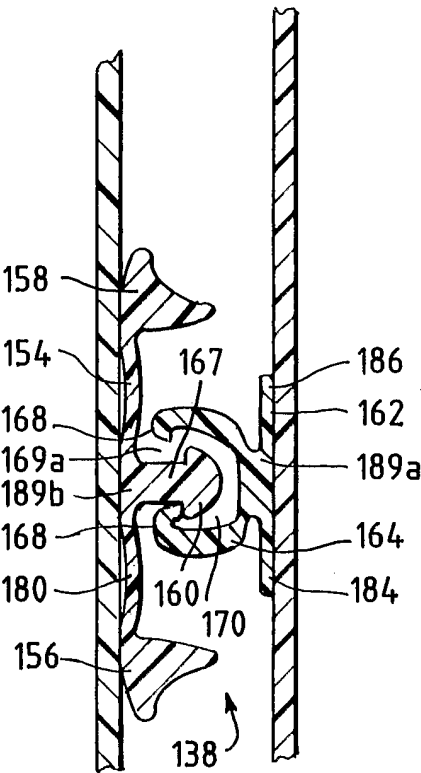


FIG. 8D

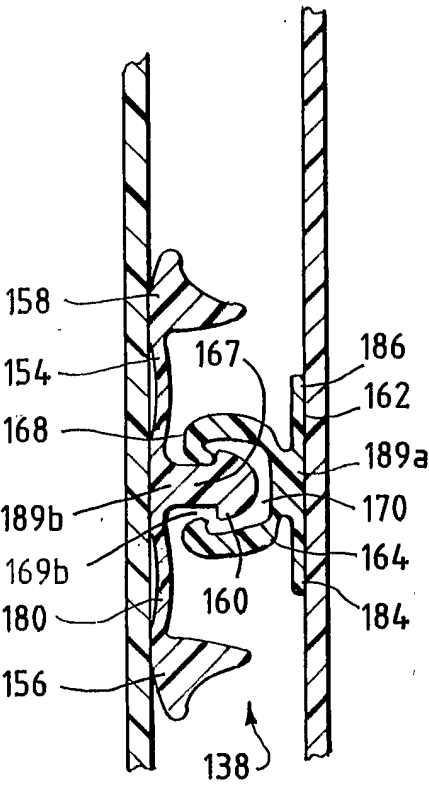
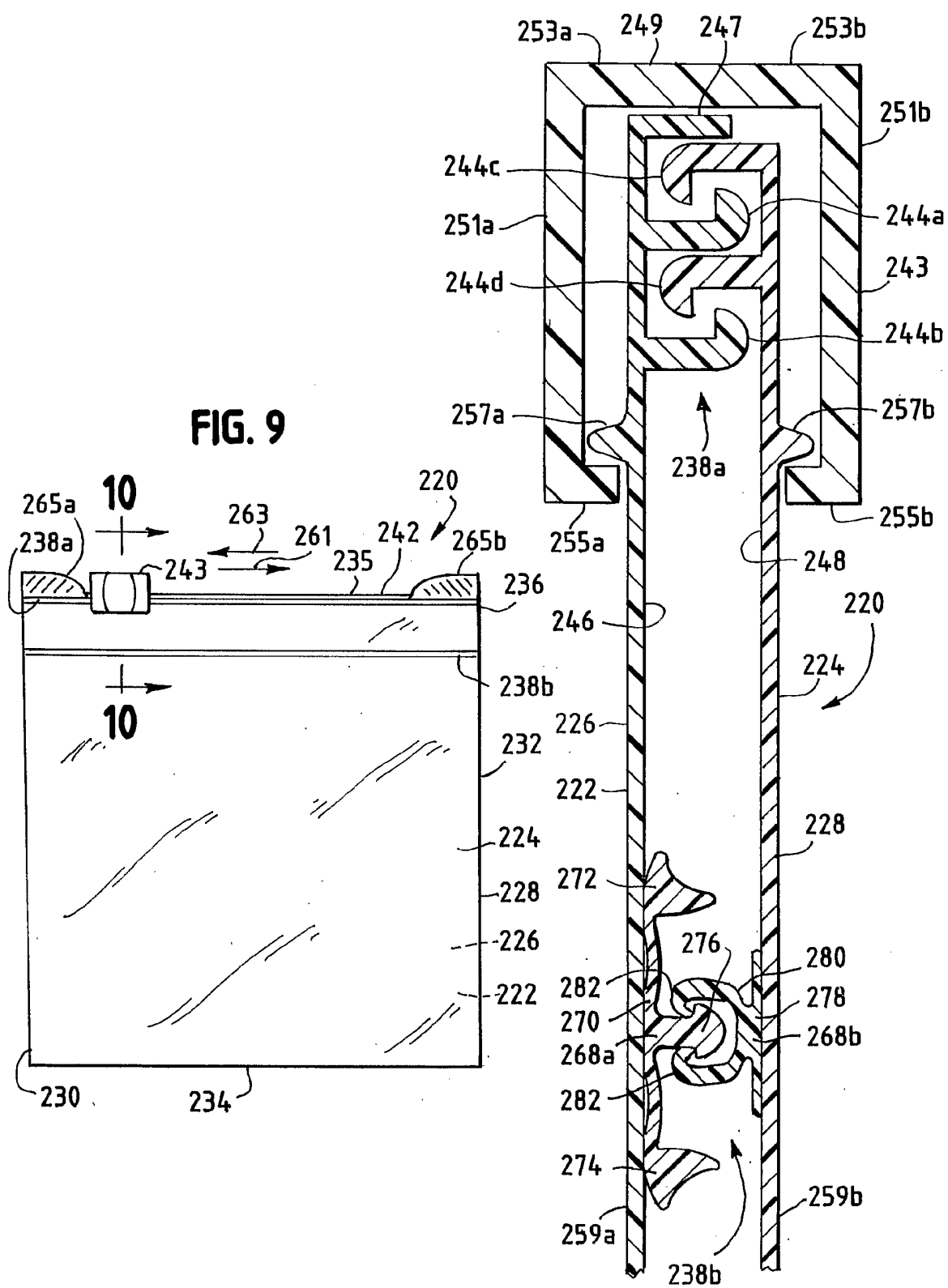


FIG. 10



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FIG. 12

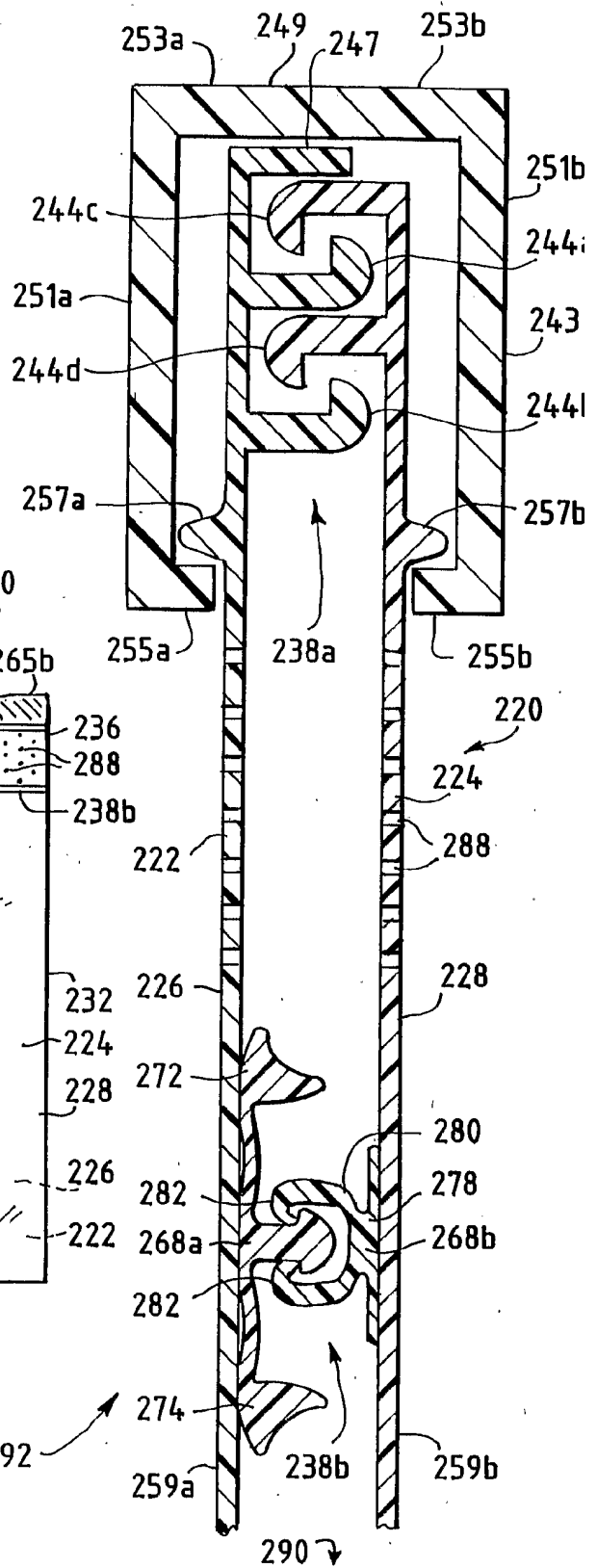
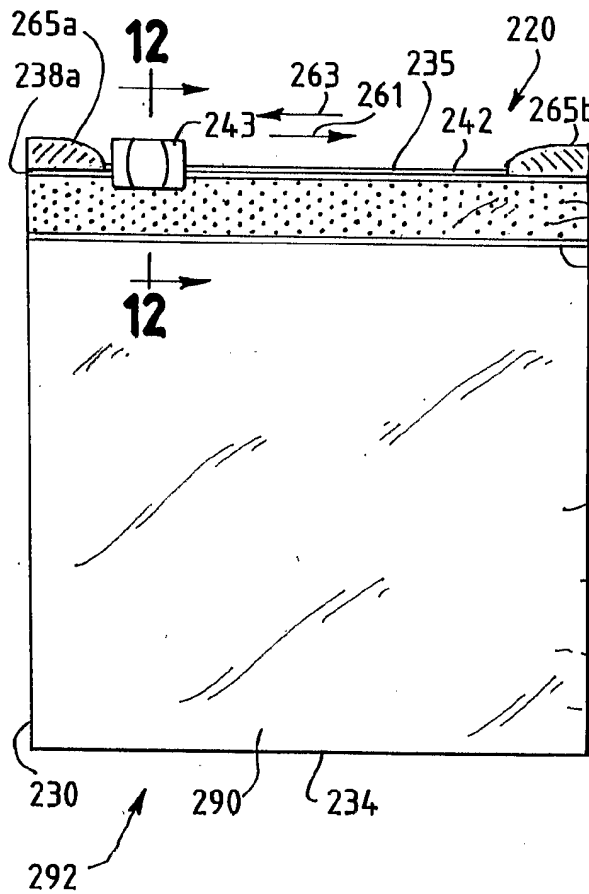
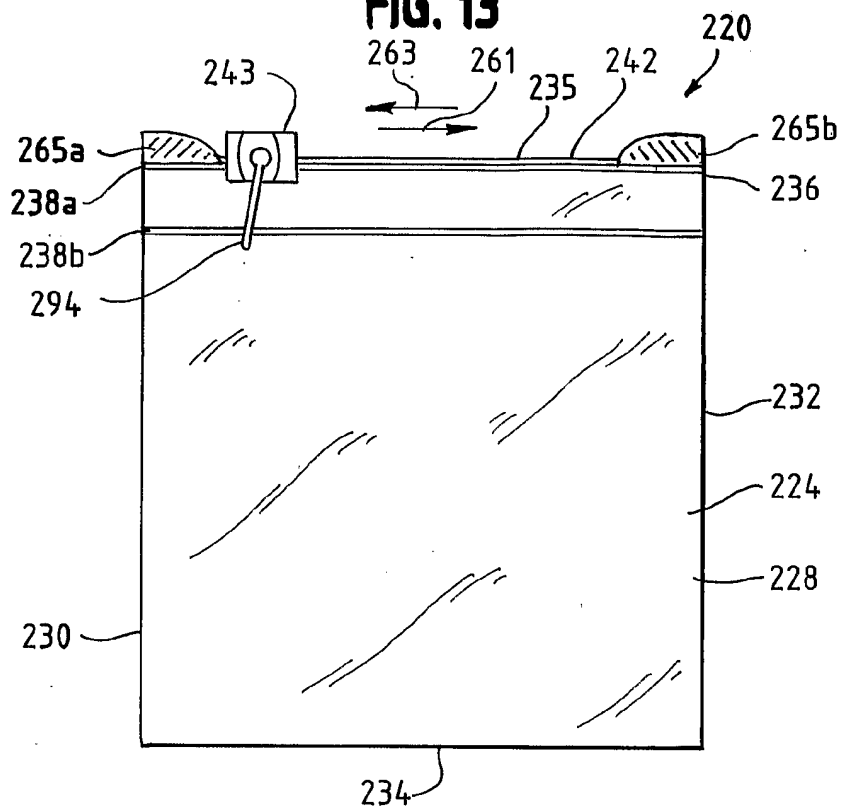
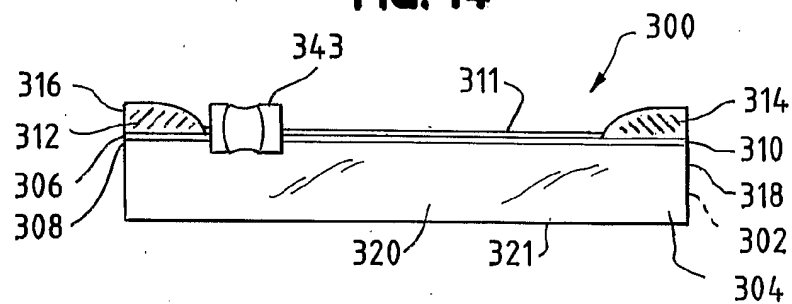
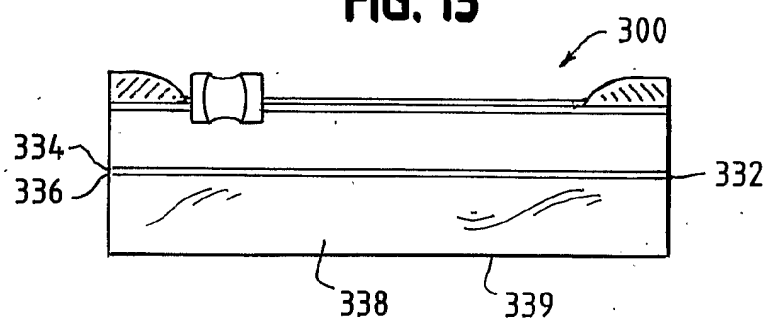


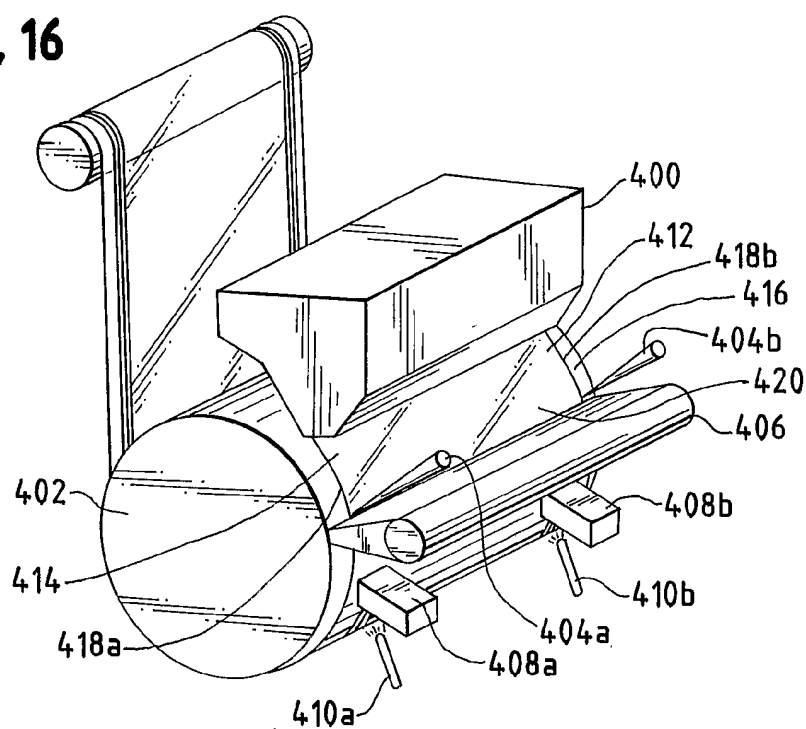
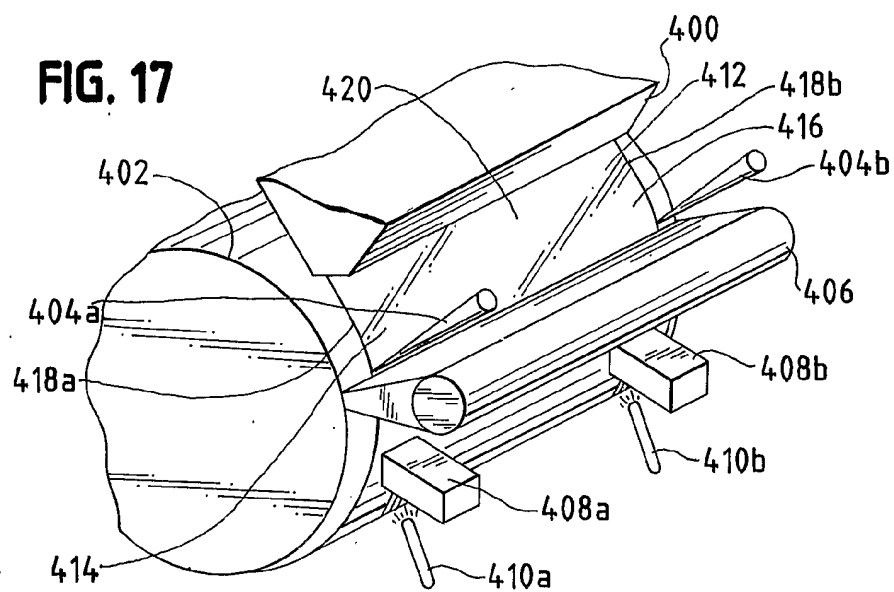
FIG. 11



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FIG. 13**FIG. 14****FIG. 15**

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FIG. 16**FIG. 17**

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FIG. 18

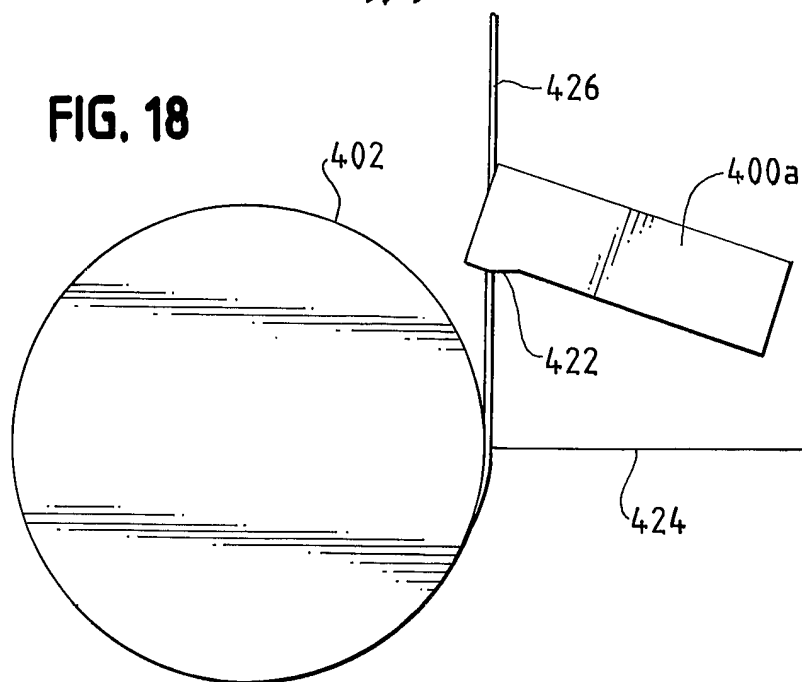


FIG. 19

