



(11)

EP 4 530 212 A2

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
02.04.2025 Bulletin 2025/14

(51) International Patent Classification (IPC):
B65D 33/25^(2006.01) **B65D 77/32^(2006.01)**

(21) Application number: **24198311.3**

(52) Cooperative Patent Classification (CPC):
B65D 33/2533; B65D 33/2575; B65D 77/32

(22) Date of filing: **03.09.2024**

(84) Designated Contracting States:
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
 GR HR HU IE IS IT LI LT LU LV MC ME MK MT NL
 NO PL PT RO RS SE SI SK SM TR**
 Designated Extension States:
BA
 Designated Validation States:
GE KH MA MD TN

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(30) Priority: 07.09.2023 US 202363581107 P
23.08.2024 US 202418814239

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(54) ZIPPER ASSEMBLY AND METHOD OF MANUFACTURING THE SAME

(57) A zipper assembly (700) for a resealable enclosure can include an elongated flange (308) having a panel side and an opposite facing side. The panel side can be coupled with an inner surface of a panel of the resealable enclosure. The zipper assembly can include an interlocking element (214) protruding from the flange. The interlocking element can be shaped to mate with another interlocking element (216) of another flange (310) to close the enclosure and shaped to be pulled apart to open the enclosure. The zipper assembly also can include a tear strip (306) disposed in the flange. The tear strip can be pulled to tear through the panel of the resealable enclosure to provide access to the zipper assembly inside the enclosure. The flange can include protruding rails (706, 708) that outwardly project from the flange and the tear strip is positioned between said rails.

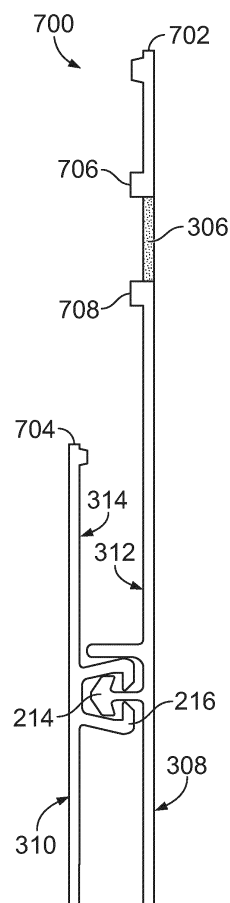


FIG. 7

Description

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to U.S. Provisional Application No. 63/581,107 (filed 07-September-2023), the entire disclosure of which is incorporated herein by reference.

BACKGROUND

Technical Field.

[0002] The subject matter described herein relates to zipper assemblies of resealable enclosures having tear strips that tear open the enclosures with the zipper assemblies enabling repeated sealing and opening of the enclosures.

Discussion of Art.

[0003] Many enclosures include recloseable zipper assemblies to allow users to repeatedly open and close the enclosures. For example, plastic bags may have zipper assemblies with opposing profiles formed from intermeshing or interlocking elements. These elements may be bodies having complimentary or matching shapes to allow the profiles to interlock with each other to close the enclosure. A user may pull the profiles away from each other with sufficient force to separate the elements to open the enclosure. The zipper assemblies can be coupled with the enclosures by attaching opposite sides of the profiles with panels of the enclosures.

[0004] Some enclosures have tear strips that extend across front walls or panels of the enclosures. The tear strips may include tabs or other ends that can be gripped and pulled by the user to tear through the front walls or panels and provide openings in these walls or panels to allow the users access to the zipper assemblies. The users can then pull open the zipper assemblies to access contents inside the enclosures. Some known tear strips can be formed to directly contact (e.g., lie upon) the flanges of the zipper assemblies. These tear strips may be co-extruded with the zipper assemblies and without any adhesive, peel seal material, heat seal material, or any other material between the tear strips and flanges of the zipper assemblies (where the flanges can be heat sealed to the walls or panels of the enclosures).

[0005] Some tear strips may be difficult for users to separate from the zipper assemblies and/or to pull the tear strips to tear the panels of enclosures (and not the flanges). It may be advantageous to have a tear strip and a zipper assembly that differ from those that are currently available.

BRIEF DESCRIPTION

[0006] A zipper assembly for a resealable enclosure

can include an elongated flange having a panel side and an opposite facing side. The panel side can be coupled with an inner surface of a panel of the resealable enclosure. The zipper assembly can include an interlocking element protruding from the flange. The interlocking element can be shaped to mate with another interlocking element of another flange to close the enclosure and shaped to be pulled apart to open the enclosure. The zipper assembly also can include a tear strip disposed in the flange. The tear strip can be pulled to tear through the panel of the resealable enclosure to provide access to the zipper assembly inside the enclosure. The tear strip can have a larger thickness than the flange between the panel side and the facing side of the flange.

[0007] Optionally, the flange can include a recess with an interconnecting web extending across the recess. The tear strip can be disposed in the recess of the flange on the interconnecting web.

[0008] Optionally, the panel side of the flange can include elongated ribs of an adhesive material that is configured to adhere the flange to the panel of the resealable enclosure.

[0009] Optionally, the flange can include protruding rails that project from one or more of the panel side or the facing side of the flange. The tear strip can be disposed in the flange between the protruding rails.

[0010] Optionally, the zipper assembly can include one or more additional tear strips above and/or below the other tear strip. The additional tear strip(s) can limit pulling of the other tear strip from tearing the flange to an upper edge of the flange and/or to the interlocking element.

[0011] Optionally, the zipper assembly may have two flanges of equal or different widths.

[0012] Optionally, the flange may have a single flange with a bend between opposite edges of the flange.

[0013] Optionally, the zipper assembly may have two flanges sealed together above the tear strip and the interlocking elements.

[0014] Optionally, a zipper assembly may include a combination of two or more of the features described above.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] The inventive subject matter may be understood from reading the following description of non-limiting embodiments, with reference to the attached drawings, wherein below:

Figure 1 illustrates a perspective view of one example of a resealable enclosure;

Figure 2 illustrates a cross-sectional view of one example of a zipper assembly;

Figure 3 illustrates a cross-sectional view of another example of a zipper assembly;

Figure 4 illustrates a cross-sectional view of another example of a zipper assembly;

Figure 5 illustrates a cross-sectional view of another example of a zipper assembly;

Figure 6 illustrates a cross-sectional view of another example of a zipper assembly;

Figure 7 illustrates a cross-sectional view of another example of a zipper assembly;

Figure 8 illustrates a cross-sectional view of another example of a zipper assembly;

Figure 9 illustrates a cross-sectional view of another example of a zipper assembly;

Figure 10 illustrates a cross-sectional view of another example of a zipper assembly;

Figure 11 illustrates a cross-sectional view of another example of a zipper assembly;

Figure 12 illustrates a cross-sectional view of another example of a zipper assembly;

Figure 13 illustrates a cross-sectional view of another example of a zipper assembly;

Figure 14 illustrates a cross-sectional view of another example of a zipper assembly;

Figure 15 illustrates a cross-sectional view of another example of a zipper assembly; and

Figure 16 illustrates a cross-sectional view of another example of a zipper assembly.

DETAILED DESCRIPTION

[0016] Embodiments set forth herein include enclosures having zipper assemblies with tear strips. The enclosure can define an interior cavity where the content is stored. The enclosure may be initially opened by pulling the tear strip and at least partially separating the tear strip from the zipper assembly and the enclosure. The tear strip can tear an access opening through a front wall or panel of the enclosure. This opening can allow a user to access the zipper assembly located between the front panel or wall and an opposing rear panel or wall. The zipper assembly can have first and second zipper segments with interlocking bodies that mate with each other to close the enclosure, separate from each other to allow a user to access the interior of the enclosure, and then mate with each other again to close the enclosure.

[0017] In some embodiments, a peel seal material is applied to a surface of the zipper assembly that interfaces

with the walls or panels of the enclosure. The peel seal material may comprise a polymeric material. For example, the peel seal material may comprise at least one of polyethylene (including a polyethylene copolymer), polypropylene, ionomers, amorphous polyester, vinyl acetate, polybutylene, or nylon EVOH. Other examples of peel seal material include polystyrene, polyethylene, polypropylene, poly(lactic acid), poly(vinyl chloride), polyamide-6, poly(ethylene naphthalate), poly(ethylene terephthalate), poly(m-xylylene adipamide), poly(vinyl alcohol), ethylene vinyl alcohol, and poly(vinylidene chloride).

[0018] The zipper assembly may be at least partially formed from polypropylene (PP) or high-density polyethylene HDPE. Optionally, the zipper assembly, or parts thereof (e.g., tear strip) may be made from a cyclic olefin copolymer (COC) resin that can provide higher strength and stiffness when compared with PP, HDPE, or other known materials. Providing greater strength and stiffness to the tear strip can enable the use of stronger materials in the layers of the pouch that may not otherwise be used for sealed packaging. Furthermore, the use of COC in the tear strip can allow for more consistent and reliable bag opening by the consumer.

[0019] Figure 1 illustrates a perspective view of one example of a resealable enclosure 100. The enclosure 100 can include a front (or first) panel, wall, or sidewall 102 and an opposing back (or second) panel, wall, or sidewall 104. The first and second panels 102, 104 can be formed by folding a larger panel or wall and sealing other edges to form the enclosure or can be formed by sealing three of the four edges of the panels 102, 104. In Figure 1, a tear strip 106 has been pulled away from the front panel 102, thereby separating or tearing the front panel 102 into a first section 112 (or top front section) and a second section 114 (or bottom front section). With the tear strip 106, the first and second sections 112, 114 can provide an access opening 124 into space between the panels 102, 104 to access a zipper assembly of the enclosure.

[0020] The panels 102, 104 can be discrete sections of a flexible material. In some embodiments, the discrete sections may be provided by different webs (or films) of the flexible material. Discrete sections are not portions of the same piece of flexible material. Discrete sections are typically cut from different webs or cut from the same web at different times. For example, the front panel 102 may be obtained from a first continuous web of flexible material, the back panel 104 may be obtained from a different second continuous web of the same flexible material. Yet in some embodiments, the front and back panels 102, 104 may be formed by folding the same sheet of material onto itself.

[0021] In the illustrated embodiment, the front panel 102 and the back panel 104 are directly attached to each other along a sealed frame 120. The sealed frame 120 can include corresponding edges of the front and back panels 102, 104 being sealed to one another. As shown,

the sealed frame 120 can extend along a perimeter of the enclosure 100.

[0022] Figure 2 illustrates a cross-sectional view of one example of a zipper assembly 200. The zipper assembly 200 may be elongated in directions extending into and out of the plane or page of Figure 2. These directions may be oriented along the width of the enclosure 100. The zipper assembly 200 may be coupled with inside or inner surfaces of the front and/or back panels 102 and/or 104 of the enclosure 100 shown in Figure 1 (e.g., the surfaces that face each other inside the enclosure 100). The zipper assembly 200 may be below the opening formed by the tear strip 106 such that, once the opening is formed by the tear strip 106, the user or consumer can reach into the opening, pull the zipper assembly 200 apart, access the contents of the enclosure 100 that are beneath the zipper assembly 200, and then re-seal the enclosure 100 by pressing the opposing parts of the zipper assembly 200 toward each other and together.

[0023] The zipper assembly 200 includes opposing flanges 202, 204, or base parts, that face each other and that are sealed to the inner surfaces of the front and back panels 102, 104 of the enclosure 100. Each flange 202, 204 can have a first or panel side 206, 208 that faces and is sealed to a different one of the panels 102, 104 (e.g., by an adhesive such as the heat seal material), and a second or facing side 210, 212 that faces away from the panel 102 or 104 to which the flange 202, 204 is coupled but faces toward the facing side 210 or 212 of the other flange 202 or 204. Portions of the facing sides 210, 212 of the flanges 202, 204 and the tear strip 106 can receive the peel seal material.

[0024] Each of the flanges 202, 204 includes an interlocking body 214, 216 protruding from the facing side 210, 212 of that flange 202, 204. The interlocking body 214 can be referred to as a male interlocking body and the interlocking body 216 may be referred to as a female interlocking body. The female interlocking body 216 receives the male interlocking body 214 to close the zipper assembly 200 (and the enclosure 100). The male interlocking body 214 may be pulled out of the female interlocking body 216 to open the zipper assembly 200 (and the enclosure 100).

[0025] The flange 202 having the male interlocking body 214 may be wider (or taller in the perspective of Figure 2) than the flange 204 having the female interlocking body 216. Alternatively, the flange 204 having the female interlocking body 216 may be wider (or taller in the perspective of Figure 2) than the flange 202 having the male interlocking body 214. The wider or taller flange 202 or 204 may provide for improved feel or indication to the user or consumer as to which side of the enclosure 100 has the tear strip 106. Alternatively, the flanges 202, 204 may have the same or nearly the same (e.g., within manufacturing tolerances) width or height.

[0026] The flange 202 is shown as including the tear strip 106, but alternatively, the flange 204 may have the tear strip 106. The tear strip 106 can be provided in the

flange 202, 204 that is wider or taller than the other flange 204, 202, or can be provided in the flange 202, 204 that is narrower or shorter than the other flange 204, 202. Alternatively, the tear strip 106 can be in either flange 202, 204 having the same width or height as the other flange 204, 202 (e.g., within manufacturing tolerances). The flanges 202, 204 may be formed from PP, low density polyethylene (LDPE), or HDPE in one example. The tear strip 106 can be formed from PP, HDPE, or COC.

[0027] As shown, the tear strip 106 is thicker than the flange 202. For example, the tear strip 106 can have an inner side or surface 218 and an opposite panel side or surface 220. The shortest distance from the inner side 218 to the panel side 220 (e.g., the distance measured in or along a direction that is perpendicular to the inner side 218 and the panel side 220) may be the thickness of the tear strip 106. This distance may be larger or longer than the shortest distance measured from the facing side 210 of the flange 202 to the panel side 206 of the flange 202 (e.g., measured in a direction that is perpendicular to the facing side 210 and the panel side 206).

[0028] The inner side 218 of the tear strip 106 may be coextensive or coplanar with the facing side 210 of the flange 202, as shown in Figure 2. As a result, the panel side 220 of the tear strip 106 may project or protrude from the panel side 206 of the flange 202. Alternatively, the inner side 218 of the tear strip 106 may project or protrude from the facing side 210 of the flange 202 with the panel side 220 of the tear strip 106 being coplanar or coextensive with the panel side 206 of the flange 202.

[0029] The thicker tear strip 106 (thicker than the flange 202) can help prevent the tear strip 106 from tearing or breaking. That is, the tear strip 106 may be harder or tougher to tear than a thinner tear strip 106 (e.g., a tear strip that is as thick as, or is thinner than, the flange 202). This can prevent the tear strip 106 from breaking while a user is pulling on the tear strip 106 to tear through the panel 102 of the enclosure 100.

[0030] Figure 3 illustrates a cross-sectional view of another example of a zipper assembly 300. The zipper assembly 300 can represent or be used in place of the zipper assembly 200 in the enclosure 100 shown in Figure 1. The zipper assembly 300 can include a tear strip 306 that represents the tear strip 106 shown in Figure 1.

[0031] The zipper assembly 300 includes opposing flanges 302, 304, or base parts, that face each other and that are sealed to the inner surfaces of the front and back panels 102, 104 of the enclosure 100. Each flange 302, 304 can have a panel side 308, 310 that faces and is sealed to a different one of the panels 102, 104 and a facing side 312, 314 that faces away from the panel 102 or 104 to which the flange 302, 304 is coupled but faces toward the facing side 312 or 314 of the other flange 302 or 304. Portions of the facing sides 312, 314 of the flanges 302, 304 and the tear strip 306 can receive the peel seal material. Each of the flanges 302, 304 includes an interlocking body 214, 216 described above protruding from

the facing side 312, 314 of that flange 302, 304.

[0032] The flange 302 having the male interlocking body 214 may be wider (or taller in the perspective of Figure 3) than the flange 304 having the female interlocking body 216. Alternatively, the flange 304 having the female interlocking body 216 may be wider (or taller in the perspective of Figure 3) than the flange 302 having the male interlocking body 214. Alternatively, the flanges 302, 304 may have the same or nearly the same (e.g., within manufacturing tolerances) width or height.

[0033] The flange 302 is shown as including the tear strip 306, but alternatively, the flange 304 may have the tear strip 306. The tear strip 306 can be provided in the flange 302, 304 that is wider or taller than the other flange 304, 302, or can be provided in the flange 302, 304 that is narrower or shorter than the other flange 304, 302. Alternatively, the tear strip 306 can be in either flange 302, 304 having the same width or height as the other flange 304, 302 (e.g., within manufacturing tolerances). The flanges 302, 304 may be formed from PP or HDPE in one example. The tear strip 306 can be formed from PP, HDPE, or COC.

[0034] The tear strip 306 may be thinner than the flange 302. Alternatively, the tear strip 306 may be thicker than the flange 302, similar or identical to the tear strip 106. The flange 302 can include a recess 316 in which the tear strip 306 is disposed. The flange 302 can include a thin portion or connecting web 318 within this recess 316. The tear strip 306 can be on the thin portion 318 of the recess 316. For example, the thin portion 318 of the flange 302 may be thinner than the remainder of the flange 302. The tear strip 306 may directly contact the thin portion 318 of the flange 302 or may be spaced apart and from the thin portion 318 (e.g., by an adhesive or other material). The thin portion 318 may be sufficiently thin that the tear strip 306 does not project beyond the panel side 308 of the flange 302. Stated differently, the combined thickness of the tear strip 306 and the thin portion 318 of the flange 302 may be thinner or no thicker than the thickness of the flange 302 (e.g., in locations between a gap 322 and the interlocking element or member 214).

[0035] Gaps 320, 322 may be between the tear strip 306 and the flange 302 between opposite edges 324, 326 of the tear strip 306 and opposing edges 328, 330 of the flange 302 that border or are on opposite sides of the recess 316. The thin portion 318 can help support the tear strip 306 and the gaps 320, 322 can allow for the tear strip 306 to be more easily separated from the flange 302 (e.g., relative to the flange 302 not having the gaps 320, 322).

[0036] Figure 4 illustrates a cross-sectional view of another example of a zipper assembly 400. The zipper assembly 400 can represent or be used in place of the zipper assembly 200 and/or 300 in the enclosure 100 shown in Figure 1. The zipper assembly 400 may be coupled with inside or inner surfaces of the front and/or back panels 102 and/or 104 of the enclosure 100. The zipper assembly 400 can include a tear strip 406 that represents the tear strip 106 shown in Figure 1. The

zipper assembly 400 may be opened below the opening formed by the tear strip 406 such that, once the opening is formed by the tear strip 406, the user or consumer can reach into the opening, pull the zipper assembly 400 apart, access the contents of the enclosure 100 that are beneath the zipper assembly 400, and then re-seal the enclosure 100 by pressing the opposing parts of the zipper assembly 400 toward each other and together.

[0037] The zipper assembly 400 includes opposing flanges 402, 404, or base parts, that face each other and that are sealed to the inner surfaces of the front and back panels 102, 104 of the enclosure 100. Each flange 402, 404 can have the panel side 308, 310 that faces and is sealed to a different one of the panels 102, 104 and the facing side 312, 314 that faces away from the panel 102 or 104 to which the flange 402, 404 is coupled but faces toward the facing side 312 or 314 of the other flange 402 or 404. Each of the flanges 402, 404 includes the interlocking body 214, 216 described above protruding from the facing side 312, 314 of that flange 402, 404.

[0038] The flange 402 is shown as including the tear strip 406, but alternatively, the flange 404 may have the tear strip 406. Similar to the tear strip 306 shown in Figure 3, the tear strip 406 may be thinner than the flange 402. Alternatively, the tear strip 406 may be thicker than the flange 402. The flange 402 can include the thin portion or connecting web 318 described above. The tear strip 406 can be on the thin portion 318 of the flange 402. The tear strip 406 may directly contact the thin portion 318 of the flange 402 or may be spaced apart and from the thin portion 318. The thin portion 318 may be sufficiently thin that the tear strip 406 does not project beyond the panel side 308 of the flange 402. The thin portion or connecting web 318 may extend from one edge of the flange 402 that is outside the gaps 320, 322 to another edge of the flange 402 that is outside the gaps 320, 322.

[0039] The gaps 320, 322 may be between the tear strip 406 and the flange 402. One difference between the zipper assembly 300 and the zipper assembly 400 is the presence of portions 408, 410 of the flange 402 between the tear strip 406 and the gaps 320, 322. The small portions 408, 410 can represent segments or sections of the flange 402 that are not as wide as the tear strip 406 or the remainder of the flange 402 outside of the gaps 320, 322. The small portions 408, 410 of the flange 402 can help keep the tear strip 406 located between the gaps 320, 322 during manufacturing of the zipper assembly 400. The thin portion 318 can help support the tear strip 406 and the gaps 320, 322 can allow for the tear strip 406 to be more easily separated from the flange 402 (e.g., relative to the flange 402 not having the gaps 320, 322).

[0040] Figure 5 illustrates a cross-sectional view of another example of a zipper assembly 500. The zipper assembly 500 can represent or be used in place of the zipper assembly 200, 300, and/or 400 in the enclosure 100 shown in Figure 1. The zipper assembly 500 may be coupled with inside or inner surfaces of the front and/or back panels 102 and/or 104 of the enclosure 100. The

zipper assembly 500 can include the tear strip 306 described above. The zipper assembly 500 may be opened below the opening formed by the tear strip, as described above.

[0041] The zipper assembly 500 includes opposing flanges 502, 504, or base parts, that face each other and that are sealed to the inner surfaces of the front and back panels 102, 104 of the enclosure 100. Each flange 502, 504 can have the panel side 308, 310 that faces and is sealed to a different one of the panels 102, 104 and the facing side 312, 314 that faces away from the panel 102 or 104 to which the flange 502, 504 is coupled but faces toward the facing side 312 or 314 of the other flange 502 or 504. Each of the flanges 502, 504 includes the interlocking body 214, 216 described above protruding from the facing side 312, 314 of that flange 502, 504.

[0042] The flange 502 is shown as including the tear strip 306, but alternatively, the flange 504 may have the tear strip 306. The tear strip 306 may be the same thickness as the flange 502, may be thinner than the flange 502, or may be thicker than the flange 502. The zipper assembly 500 may not include the gaps between the flange 502 and the tear strip 306 and/or may not include the thin portion or connecting web described above.

[0043] The panel side 308 of the flange 502 having the tear strip 306 may include elongated ribs 506. The ribs 506 may be elongated in or parallel to the direction in which the zipper assembly 500 and flanges 502, 504 are elongated (e.g., into and out of the page or plane of Figure 5). The ribs 506 may be parallel to each other or may be oriented transverse to each other. The ribs 506 can be formed from material(s) that differs from the material(s) that the flanges 502, 504 and/or the tear strip 306 are formed. For example, the ribs 506 may be formed from an adhesive, such as the heat seal material that seals the zipper assembly 500 to the panels 102, 104 of the enclosure 100. For example, heat and pressure can be applied to the flanges 502, 504 and/or the panels 102, 104 to change the phase or melt the ribs 506 into the adhesive that fixes the flange 502 of the zipper assembly 500 to the panel 102 or 104 of the enclosure 100.

[0044] Figure 6 illustrates a cross-sectional view of another example of a zipper assembly 600. The zipper assembly 600 can represent or be used in place of the zipper assembly 200, 300, 400, and/or 500 in the enclosure 100 shown in Figure 1. The zipper assembly 600 may be coupled with inside or inner surfaces of the front and/or back panels 102 and/or 104 of the enclosure 100. The zipper assembly 600 can include the tear strip 306 described above. The zipper assembly 600 may be opened below the opening formed by the tear strip, as described above.

[0045] The zipper assembly 600 includes opposing flanges 602, 604, or base parts, that face each other and that are sealed to the inner surfaces of the front and back panels 102, 104 of the enclosure 100. Each flange 602, 604 can have the panel side 308, 310 that faces and

is sealed to a different one of the panels 102, 104 and the facing side 312, 314 that faces away from the panel 102 or 104 to which the flange 602, 604 is coupled but faces toward the facing side 312 or 314 of the other flange 602 or 604. Each of the flanges 602, 604 includes the interlocking body 214, 216 described above protruding from the facing side 312, 314 of that flange 602, 604.

[0046] The flange 602 is shown as including the tear strip 306, but alternatively, the flange 604 may have the tear strip 306. The tear strip 306 may be the same thickness as the majority of the flange 602, may be thinner than the majority of the flange 602, or may be thicker than the majority of the flange 602. The zipper assembly 600 may not include the gaps between the flange 602 and the tear strip 306 and/or may not include the thin portion or connecting web described above. Alternatively, the zipper assembly 600 may include the gaps and/or the thin portion or connecting web.

[0047] The flange 602 having the tear strip 306 may include protruding portions or rails 606, 608 that extend or protrude from the panel side 308 of the flange 602. The protruding portions 606, 608 may be disposed on opposite sides of the opposite edges of the tear strip 306. The protruding portions 606, 608 may be thicker than the rest of the flange 602 (but for the interlocking element or body 214 and/or 216) and the tear strip 306 but may only protrude from the panel side 308 of the flange 602. The protruding portions 606, 608 may have a small width relative to the rest of the flange 602. The widths of different components may be measured along distances extending along or parallel to the panel sides 308, 310 and/or the facing sides 312, 314. The width of each of the protruding portions 606, 608 may be smaller than the width of the tear strip 306, smaller than the rest of the flange 602, 604, and/or smaller than the width of each of the interlocking bodies 214, 216.

[0048] The protruding portions 606, 608 may contact the tear strip 306. For example, the opposite edges of the tear strip 306 may directly abut the protruding portions 606, 608 without any other materials or components between the tear strip 306 and the protruding portions 606, 608. Alternatively, one or more materials (e.g., peel seal material, heat seal material, another adhesive, etc.) and/or gaps may be present between the edges of the tear strip 306 and the protruding portions 606, 608.

[0049] The protruding portions 606, 608 may be stronger or stiffer than the remainder of the flange 602. For example, the protruding portions 606, 608 may be more difficult or require more force to tear than the flange 602. The protruding portions 606, 608 can both help guide pulling of the tear strip 306 in locations between the protruding portions 606, 608 and prevent the tear strip 306 from tearing the flange 602.

[0050] Figure 7 illustrates a cross-sectional view of another example of a zipper assembly 700. The zipper assembly 700 can represent or be used in place of the zipper assembly 200, 300, 400, 500, and/or 600 in the enclosure 100 shown in Figure 1. The zipper assembly

700 may be coupled with inside or inner surfaces of the front and/or back panels 102 and/or 104 of the enclosure 100. The zipper assembly 700 can include the tear strip 306 described above. The zipper assembly 700 may be opened below the opening formed by the tear strip, as described above.

[0051] The zipper assembly 700 includes opposing flanges 702, 704, or base parts, that face each other and that are sealed to the inner surfaces of the front and back panels 102, 104 of the enclosure 100. Each flange 702, 704 can have the panel side 308, 310 that faces and is sealed to a different one of the panels 102, 104 and the facing side 312, 314 that faces away from the panel 102 or 104 to which the flange 702, 704 is coupled but faces toward the facing side 312 or 314 of the other flange 702 or 704. Each of the flanges 702, 704 includes the interlocking body 214, 216 described above protruding from the facing side 312, 314 of that flange 702, 704.

[0052] The flange 702 is shown as including the tear strip 306, but alternatively, the flange 704 may have the tear strip 306. The tear strip 306 may be the same thickness as the majority of the flange 702, may be thinner than the majority of the flange 702, or may be thicker than the majority of the flange 702. The zipper assembly 700 may not include the gaps between the flange 702 and the tear strip 306 and/or may not include the thin portion or connecting web described above. Alternatively, the zipper assembly 700 may include the gaps and/or the thin portion or connecting web.

[0053] The flange 702 having the tear strip 306 may include protruding portions or rails 706, 708 that extend or protrude from the facing side 312 of the flange 702. The protruding portions 706, 708 may be disposed on opposite sides of the opposite edges of the tear strip 306. The protruding portions 706, 708 may be thicker than the rest of the flange 702 (but for the interlocking element or body 214 and/or 216) and the tear strip 306 but may only protrude from the facing side 312 of the flange 702. The protruding portions 706, 708 may have a small width relative to the rest of the flange 702. The width of each of the protruding portions 706, 708 may be smaller than the width of the tear strip 306, smaller than the rest of the flange 702, 704, and/or smaller than the width of each of the interlocking bodies 214, 216.

[0054] The protruding portions 706, 708 may contact the tear strip 306. For example, the opposite edges of the tear strip 306 may directly abut the protruding portions 706, 708 without any other materials or components between the tear strip 306 and the protruding portions 706, 708. Alternatively, one or more materials (e.g., peel seal material, heat seal material, another adhesive, etc.) and/or gaps may be present between the edges of the tear strip 306 and the protruding portions 706, 708.

[0055] The protruding portions 706, 708 may be stronger or stiffer than the remainder of the flange 702. For example, the protruding portions 706, 708 may be more difficult or require more force to tear than the flange 702. The protruding portions 706, 708 can both help guide

pulling of the tear strip 306 in locations between the protruding portions 706, 708 and prevent the tear strip 306 from tearing the flange 702.

[0056] Figure 8 illustrates a cross-sectional view of another example of a zipper assembly 800. The zipper assembly 800 can represent or be used in place of the zipper assembly 200, 300, 400, 500, 600, and/or 700 in the enclosure 100 shown in Figure 1. The zipper assembly 800 may be coupled with inside or inner surfaces of the front and/or back panels 102 and/or 104 of the enclosure 100. The zipper assembly 800 can include the tear strip 306 described above. The zipper assembly 800 may be opened below the opening formed by the tear strip, as described above.

[0057] The zipper assembly 800 includes opposing flanges 802, 804, or base parts, that face each other and that are sealed to the inner surfaces of the front and back panels 102, 104 of the enclosure 100. Each flange 802, 804 can have the panel side 308, 310 that faces and is sealed to a different one of the panels 102, 104 and the facing side 312, 314 that faces away from the panel 102 or 104 to which the flange 802, 804 is coupled but faces toward the facing side 312 or 314 of the other flange 802 or 804. Each of the flanges 802, 804 includes the interlocking body 214, 216 described above protruding from the facing side 312, 314 of that flange 802, 804.

[0058] The flange 802 is shown as including the tear strip 306, but alternatively, the flange 804 may have the tear strip 306. The tear strip 306 may be the same thickness as the majority of the flange 802, may be thinner than the majority of the flange 802, or may be thicker than the majority of the flange 802. The zipper assembly 800 may not include the gaps between the flange 802 and the tear strip 306 and/or may not include the thin portion or connecting web described above. Alternatively, the zipper assembly 800 may include the gaps and/or the thin portion or connecting web.

[0059] The flange 802 having the tear strip 306 may include protruding portions or rails 806, 808 that extend or protrude from the facing side 312 and from the panel side 308 of the flange 802. The protruding portions 806, 808 may be disposed on opposite sides of the opposite edges of the tear strip 306. The protruding portions 806, 808 may be thicker than the rest of the flange 802 (but for the interlocking element or body 214 and/or 216) and the tear strip 306 and may protrude from both the facing side 312 and the panel side 308 of the flange 802 in opposite directions. The protruding portions 806, 808 may have a small width relative to the rest of the flange 802. The width of each of the protruding portions 806, 808 may be smaller than the width of the tear strip 306, smaller than the rest of the flange 802, 804, and/or smaller than the width of each of the interlocking bodies 214, 216.

[0060] The protruding portions 806, 808 may contact the tear strip 306. For example, the opposite edges of the tear strip 306 may directly abut the protruding portions 806, 808 without any other materials or components between the tear strip 306 and the protruding portions

806, 808. Alternatively, one or more materials (e.g., peel seal material, heat seal material, another adhesive, etc.) and/or gaps may be present between the edges of the tear strip 306 and the protruding portions 806, 808.

[0061] The protruding portions 806, 808 may be stronger or stiffer than the remainder of the flange 802. For example, the protruding portions 806, 808 may be more difficult or require more force to tear than the flange 802. The protruding portions 806, 808 can both help guide pulling of the tear strip 306 in locations between the protruding portions 806, 808 and prevent the tear strip 306 from tearing the flange 802.

[0062] Figure 9 illustrates a cross-sectional view of another example of a zipper assembly 900. The zipper assembly 900 can represent or be used in place of the zipper assembly 200, 300, 400, 500, 600, 700, and/or 800 in the enclosure 100 shown in Figure 1. The zipper assembly 900 may be coupled with inside or inner surfaces of the front and/or back panels 102 and/or 104 of the enclosure 100. The zipper assembly 900 can include the tear strip 306 described above. The zipper assembly 900 may be opened below the opening formed by the tear strip, as described above.

[0063] The zipper assembly 900 includes opposing flanges 902, 904, or base parts, that face each other and that are sealed to the inner surfaces of the front and back panels 102, 104 of the enclosure 100. Each flange 902, 904 can have the panel side 308, 310 that faces and is sealed to a different one of the panels 102, 104 and the facing side 312, 314 that faces away from the panel 102 or 104 to which the flange 902, 904 is coupled but faces toward the facing side 312 or 314 of the other flange 902 or 904. Each of the flanges 902, 904 includes the interlocking body 214, 216 described above protruding from the facing side 312, 314 of that flange 902, 904.

[0064] The flange 902 is shown as including the tear strip 306, but alternatively, the flange 904 may have the tear strip 306. The tear strip 306 may be thicker than the majority of the flange 902. The zipper assembly 900 may not include the gaps between the flange 902 and the tear strip 306 and/or may not include the thin portion or connecting web described above. Alternatively, the zipper assembly 900 may include the gaps and/or the thin portion or connecting web.

[0065] The flange 902 having the tear strip 306 may include protruding portions or rails 906, 908 that extend or protrude from the panel side 308 of the flange 902. The protruding portions 906, 908 may be disposed on opposite sides of the opposite edges of the tear strip 306. The protruding portions 906, 908 may be the same thickness as the tear strip 306 such that the opposite sides of the tear strip 306 and the opposite sides of the protruding portions 906, 908 are coextensive or coplanar with each other.

[0066] The protruding portions 906, 908 may contact the tear strip 306. For example, the opposite edges of the tear strip 306 may directly abut the protruding portions 906, 908 without any other materials or components

between the tear strip 306 and the protruding portions 906, 908. Alternatively, one or more materials (e.g., peel seal material, heat seal material, another adhesive, etc.) and/or gaps may be present between the edges of the tear strip 306 and the protruding portions 906, 908.

[0067] The protruding portions 906, 908 may be stronger or stiffer than the remainder of the flange 902. For example, the protruding portions 906, 908 may be more difficult or require more force to tear than the flange 902.

The protruding portions 906, 908 can both help guide pulling of the tear strip 306 in locations between the protruding portions 906, 908 and prevent the tear strip 306 from tearing the flange 902. The protruding portions 906, 908 having the same thickness as the tear strip 306 may assist in preventing the tear strip 306 from catching on the protruding portions 906, 908 as the tear strip 306 is pulled, especially if the tear strip 306 is pulled at an angle toward the protruding portion 906 or the protruding portion 908.

[0068] Figure 10 illustrates a cross-sectional view of another example of a zipper assembly 1000. The zipper assembly 1000 can represent or be used in place of the zipper assembly 200, 300, 400, 500, 600, 700, 800, and/or 900 in the enclosure 100 shown in Figure 1.

The zipper assembly 1000 may be coupled with inside or inner surfaces of the front and/or back panels 102 and/or 104 of the enclosure 100. The zipper assembly 1000 can include the tear strip 306 described above. The zipper assembly 1000 may be opened below the opening formed by the tear strip, as described above.

[0069] The zipper assembly 1000 includes opposing flanges 1002, 1004, or base parts, that face each other and that are sealed to the inner surfaces of the front and back panels 102, 104 of the enclosure 100. Each flange 1002, 1004 can have the panel side 308, 310 that faces and is sealed to a different one of the panels 102, 104 and the facing side 312, 314 that faces away from the panel 102 or 104 to which the flange 1002, 1004 is coupled but faces toward the facing side 312 or 314 of the other flange 1002 or 1004. Each of the flanges 1002, 1004 includes the interlocking body 214, 216 described above protruding from the facing side 312, 314 of that flange 1002, 1004.

[0070] The flange 1002 is shown as including the tear strip 306, but alternatively, the flange 1004 may have the tear strip 306. The zipper assembly 1000 may not include the gaps between the flange 1002 and the tear strip 306 and/or may not include the thin portion or connecting web described above. Alternatively, the zipper assembly 1000 may include the gaps and/or the thin portion or connecting web.

[0071] The flange 1002 having the tear strip 306 may include angled protruding portions or rails 1006, 1008 that extend or protrude from the panel side 308 of the flange 902. The protruding portions 1006, 1008 may be disposed on opposite sides of the opposite edges of the tear strip 306. The protruding portions 1006, 1008 may be the same thickness as the tear strip 306 such that the

opposite sides of the tear strip 306 and the opposite sides of the protruding portions 1006, 1008 are coextensive or coplanar with each other.

[0072] The protruding portions 1006, 1008 may be tapered in shape such that the protruding portions 1006, 1008 are different thicknesses in different locations. For example, the protruding portion 1006 may have an angled surface 1010 that is oriented at an acute angle relative to the panel side 308 of the flange 1002. The protruding portion 1006 may be part of the panel side 308 and that is angled so that the flange 1002 is thinner at or closer to the tear strip 306 and thicker at or farther from the tear strip 306 (e.g., at an upper edge 1012 of the flange 1002). The protruding portion 1008 may have angled surfaces 1014, 1016 that also are oriented at acute angles to the panel side 308 of the flange 1002. The angled surfaces 1014, 1016 may intersect each other between the tear strip 306 and the interlocking element or body 214 (or 216). The angled surfaces 1014, 1016 may be positioned such that the flange 1002 is thinner at or closer to the tear strip 306, is thicker or thickest in locations farther from the tear strip 306 up to an intersection 1018 of the angled surfaces 1014, 1016, and becomes thinner in locations that are farther from this intersection and closer to the interlocking element or body 214 (or 216).

[0073] The protruding portions 1006, 1008 may contact the tear strip 306. For example, the opposite edges of the tear strip 306 may directly abut the protruding portions 1006, 1008 without any other materials or components between the tear strip 306 and the protruding portions 1006, 1008. Alternatively, one or more materials (e.g., peel seal material, heat seal material, another adhesive, etc.) and/or gaps may be present between the edges of the tear strip 306 and the protruding portions 1006, 1008.

[0074] The protruding portions 1006, 1008 may be stronger or stiffer than the remainder of the flange 1002. For example, the protruding portions 1006, 1008 may be more difficult or require more force to tear than the flange 1002. The protruding portions 1006, 1008 can both help guide pulling of the tear strip 306 in locations between the protruding portions 1006, 1008 and prevent the tear strip 306 from tearing the flange 1002. The protruding portions 1006, 1008 having the angled surfaces 1010, 1014, 1016 that are parts of the panel side 308 may assist users in locating or feeling where the tear strip 306 is located.

[0075] Figure 11 illustrates a cross-sectional view of another example of a zipper assembly 1100. The zipper assembly 1100 can represent or be used in place of the zipper assembly 200, 300, 400, 500, 600, 700, 800, 900, and/or 1000 in the enclosure 100 shown in Figure 1. The zipper assembly 1100 may be coupled with inside or inner surfaces of the front and/or back panels 102 and/or 104 of the enclosure 100. The zipper assembly 1100 can include the tear strip 306 described above. The zipper assembly 1100 may be opened below the opening formed by the tear strip, as described above.

[0076] The zipper assembly 1100 includes opposing flanges 1102, 1104, or base parts, that face each other and that are sealed to the inner surfaces of the front and back panels 102, 104 of the enclosure 100. Each flange 1102, 1104 can have the panel side 308, 310 that faces and is sealed to a different one of the panels 102, 104 and the facing side 312, 314 that faces away from the panel 102 or 104 to which the flange 1102, 1104 is coupled but faces toward the facing side 312 or 314 of the other flange 1102 or 1104. Each of the flanges 1102, 1104 includes the interlocking body 214, 216 described above protruding from the facing side 312, 314 of that flange 1102, 1104.

[0077] The flange 1102 is shown as including the tear strip 306, but alternatively, the flange 1104 may have the tear strip 306. The zipper assembly 1100 may not include the gaps between the flange 1102 and the tear strip 306 and/or may not include the thin portion or connecting web described above. Alternatively, the zipper assembly 1100 may include the gaps and/or the thin portion or connecting web.

[0078] The flange 1102 having the tear strip 306 may include an additional tear strip 1106. The additional tear strip 1106 and the tear strip 306 may be spaced apart from each other and not contact each other. For example, a segment or section 1108 of the flange 1102 may be disposed between the tear strips 306, 1106. The additional tear strip 1106 may not have an exposed end, tab, or portion that is pulled by a user to tear an opening through the panel 102 of the enclosure 100. Instead, the additional tear strip 1106 may remain in the flange 1102 to help prevent the tear strip 306 from tearing through the flange 1102. For example, the additional tear strip 1106 may be tougher or stronger than the flange 1102 such that, if pulling on the tear strip 306 begins tearing through the segment 1108 of the flange 1102, the additional tear strip 1106 can stop the tear from continuing or propagating through the remainder of the flange 1102 (e.g., up to an upper edge 1110 of the flange 1102).

[0079] Figure 12 illustrates a cross-sectional view of another example of a zipper assembly 1200. The zipper assembly 1200 can represent or be used in place of the zipper assembly 200, 300, 400, 500, 600, 700, 800, 900, 1000, and/or 1100 in the enclosure 100 shown in Figure 1. The zipper assembly 1200 may be coupled with inside or inner surfaces of the front and/or back panels 102 and/or 104 of the enclosure 100. The zipper assembly 1200 can include the tear strip 306 described above. The zipper assembly 1200 may be opened below the opening formed by the tear strip, as described above.

[0080] The zipper assembly 1200 includes opposing flanges 1202, 1204, or base parts, that face each other and that are sealed to the inner surfaces of the front and back panels 102, 104 of the enclosure 100. Each flange 1202, 1204 can have the panel side 308, 310 that faces and is sealed to a different one of the panels 102, 104 and the facing side 312, 314 that faces away from the panel 102 or 104 to which the flange 1202, 1204 is coupled but faces toward the facing side 312 or 314 of the other flange

1202 or 1204. Each of the flanges 1202, 1204 includes the interlocking body 214, 216 described above protruding from the facing side 312, 314 of that flange 1202, 1204.

[0081] The flange 1202 is shown as including the tear strip 306, but alternatively, the flange 1204 may have the tear strip 306. The zipper assembly 1200 may not include the gaps between the flange 1202 and the tear strip 306 and/or may not include the thin portion or connecting web described above. Alternatively, the zipper assembly 1200 may include the gaps and/or the thin portion or connecting web.

[0082] The flange 1202 having the tear strip 306 may include the additional tear strip 1106 described above, as well as another additional tear strip 1206. The tear strips 306, 1106, 1206 may be spaced apart from each other and not contact each other. For example, the flange segment or section 1208 described above may be disposed between the tear strips 306, 1106, and another flange segment or section 1208 may be disposed between the tear strips 306, 1206. The additional tear strip 1106 may be referred to an upper tear strip, the additional tear strip 1206 may be referred to as a lower tear strip, and the tear strip 306 can be referred to as an intermediate, middle, or actionable tear strip. The upper tear strip 1106 is above the tear strip 306 between the tear strip 306 and the upper edge 1110 of the flange 1202. The upper tear strip 1106 is farther from the interlocking bodies or elements 214, 216 than the lower tear strip 1206. The lower tear strip 1206 is below the tear strip 306 between the tear strip 306 and the interlocking bodies or elements 214, 216. The lower tear strip 1206 is farther from the upper edge 1110 of the flange 1202.

[0083] Like the upper tear strip 1106, the lower tear strip 1206 may not have an exposed end, tab, or portion that is pulled by a user to tear an opening through the panel 102 of the enclosure 100. Instead, the lower tear strip 1206 may remain in the flange 1202 to help prevent the tear strip 306 from tearing through the flange 1202. For example, the lower tear strip 1206 may be tougher or stronger than the flange 1202 such that, if pulling on the tear strip 306 begins tearing through the lower segment 1208 of the flange 1202, the lower tear strip 1206 can stop the tear from continuing or propagating through the remainder of the flange 1202 (e.g., down to or toward the interlocking bodies 214, 216). The upper tear strip 1106 similarly can prevent the tear strip 306 from tearing into the upper segment 1108 of the flange 1202, as described above.

[0084] Figure 13 illustrates a cross-sectional view of another example of a zipper assembly 1300. The zipper assembly 1300 can represent or be used in place of the zipper assembly 200, 300, 400, 500, 600, 700, 800, 900, 1000, 1100, and/or 1200 in the enclosure 100 shown in Figure 1. The zipper assembly 1300 may be coupled with inside or inner surfaces of the front and/or back panels 102 and/or 104 of the enclosure 100. The zipper assembly 1300 can include the tear strip 306 described above.

The zipper assembly 1300 may be opened below the opening formed by the tear strip, as described above.

[0085] The zipper assembly 1300 includes opposing flanges 1302, 1304, or base parts, that face each other and that are sealed to the inner surfaces of the front and back panels 102, 104 of the enclosure 100. Each flange 1302, 1304 can have the panel side 308, 310 that faces and is sealed to a different one of the panels 102, 104 and the facing side 312, 314 that faces away from the panel 102 or 104 to which the flange 1302, 1304 is coupled but faces toward the facing side 312 or 314 of the other flange 1302 or 1304. Each of the flanges 1302, 1304 includes the interlocking body 214, 216 described above protruding from the facing side 312, 314 of that flange 1302, 1304.

[0086] The flange 1302 is shown as including the tear strip 306, but alternatively, the flange 1304 may have the tear strip 306. The zipper assembly 1300 may not include the gaps between the flange 1302 and the tear strip 306 and/or may not include the thin portion or connecting web described above. Alternatively, the zipper assembly 1300 may include the gaps and/or the thin portion or connecting web.

[0087] In contrast to the zipper assemblies 200, 300, 400, 500, 600, 700, 800, 900, 1000, 1100, and/or 1200, the flanges 1302, 1304 of the zipper assembly 1300 may be of equal or approximately equal width (e.g., within manufacturing tolerances). For example, the flange 1302 may extend along a width dimension from an upper edge 1306 to an opposite lower edge 1308 and the flange 1304 may extend along the width dimension from an upper edge 1310 to an opposite lower edge 1312. The distance along the width dimension from the upper edge 1306 to the lower edge 1308 of the flange 1302 and the distance along the width dimension from the upper edge 1310 to the lower edge 1312 of the flange 1304 may be the same or approximately the same within manufacturing tolerances. These equal sized flanges 1302, 1304 may help protect the tear strip 306 from the side of the flange 1304 not having the tear strip 306. Additionally, the equal sized flanges 1302, 1304 may provide for a heftier feel in a header section or top section of the enclosure 100 (when compared with other zipper assemblies not having flanges of equal height or width).

[0088] Figure 14 illustrates a cross-sectional view of another example of a zipper assembly 1400. The zipper assembly 1400 can represent or be used in place of the zipper assembly 200, 300, 400, 500, 600, 700, 800, 900, 1000, 1100, 1200, and/or 1300 in the enclosure 100 shown in Figure 1. The zipper assembly 1400 may be coupled with inside or inner surfaces of the front and/or back panels 102 and/or 104 of the enclosure 100. The zipper assembly 1400 can include the tear strip 306 described above. The zipper assembly 1400 may be opened below the opening formed by the tear strip, as described above.

[0089] In contrast to other zipper assemblies, the zipper assembly 1400 may include a single flange or base

part 1402. The single flange 1402 may be sealed to the inner surfaces of the front and back panels 102, 104 of the enclosure 100. The flange 1402 can have a single panel side 1408 that faces and is sealed to the panels 102, 104. The flange 1402 may include a single facing side 1412 that faces inward and toward itself. As shown, the flange 1402 extends from one edge 1404 to another edge 1406 with a bend 1414 in the flange 1402 midway or approximately midway between the edges 1404, 1406.

[0090] The facing side 1412 of the panel 1402 can include the interlocking bodies 214, 216 described above protruding from the facing side 1412. The flange 1402 includes the tear strip 306 between the bend 1414 and the interlocking bodies 214, 216. The zipper assembly 1400 may not include the gaps between the flange 1402 and the tear strip 306 and/or may not include the thin portion or connecting web described above. Alternatively, the zipper assembly 1400 may include the gaps and/or the thin portion or connecting web.

[0091] The single flange 1402 with the bend 1414 can provide increased resistance to unintended or undesirable entrance into the enclosure 100 through the top of the zipper assembly 1400 when compared to other zipper assemblies formed from separate flanges. For example, the flange 1402 extending through and over the interlocking bodies 214, 216 at the bend 1414 can provide an additional barrier to entry into the space between the segments of the flange 1402 that oppose each other beneath the bend 1414 (relative to zipper assemblies with separate flanges).

[0092] Figure 15 illustrates a cross-sectional view of another example of a zipper assembly 1500. The zipper assembly 1500 can represent or be used in place of the zipper assembly 200, 300, 400, 500, 600, 700, 800, 900, 1000, 1100, 1200, 1300, and/or 1400 in the enclosure 100 shown in Figure 1. The zipper assembly 1500 may be coupled with inside or inner surfaces of the front and/or back panels 102 and/or 104 of the enclosure 100. The zipper assembly 1500 can include the tear strip 306 described above. The zipper assembly 1500 may be opened below the opening formed by the tear strip, as described above.

[0093] The zipper assembly 1500 includes opposing flanges 1502, 1504, or base parts, that face each other and that are sealed to the inner surfaces of the front and back panels 102, 104 of the enclosure 100. Each flange 1502, 1504 can have the panel side 308, 310 that faces and is sealed to a different one of the panels 102, 104 and the facing side 312, 314 that faces away from the panel 102 or 104 to which the flange 1502, 1504 is coupled but faces toward the facing side 312 or 314 of the other flange 1502 or 1504. Each of the flanges 1502, 1504 includes the interlocking body 214, 216 described above protruding from the facing side 312, 314 of that flange 1502, 1504.

[0094] The flange 1502 is shown as including the tear strip 306, but alternatively, the flange 1504 may have the tear strip 306. The zipper assembly 1500 may not include

the gaps between the flange 1502 and the tear strip 306 and/or may not include the thin portion or connecting web described above. Alternatively, the zipper assembly 1500 may include the gaps and/or the thin portion or connecting web.

[0095] The flanges 1502, 1504 may be of equal or approximately equal width like the flanges 1302, 1304 of the zipper assembly 1300 shown in Figure 13. In contrast to the zipper assembly 1300, the flanges 1502, 1504 may be sealed to each other at or near upper edges 1508, 1510 of the flanges 1302, 1304 using a seal 1506, such as an adhesive (e.g., a heat seal material). The opposite lower edges 1512, 1514 of the flanges 1502, 1504 may remain separate. These equal sized flanges 1502, 1504 may help protect the tear strip 306 from the side of the flange 1504 not having the tear strip 306. Additionally, the equal sized flanges 1502, 1504 may provide for a heftier feel in a header section or top section of the enclosure 100 (when compared with other zipper assemblies not having flanges of equal height or width).

[0096] The seal 1506 between the flanges 1502, 1504 can provide increased resistance to unintended or undesirable entrance into the enclosure 100 through the top of the zipper assembly 1500 when compared to other zipper assemblies formed from separate flanges. For example, the seal 1506 can provide an additional barrier to entry into the space between the flanges 1502, 1504 (relative to zipper assemblies with separate flanges).

[0097] Figure 16 illustrates a cross-sectional view of another example of a zipper assembly 1600. The zipper assembly 1600 can represent or be used in place of the zipper assembly 200, 300, 400, 500, 600, 700, 800, 900, 1000, 1100, 1200, 1300, 1400, and/or 1500 in the enclosure 100 shown in Figure 1. The zipper assembly 1600 may be coupled with inside or inner surfaces of the front and/or back panels 102 and/or 104 of the enclosure 100. The zipper assembly 1600 can include the tear strip 306 described above. The zipper assembly 1600 may be opened below the opening formed by the tear strip, as described above.

[0098] The zipper assembly 1600 includes opposing flanges 1602, 1604, or base parts, that face each other and that are sealed to the inner surfaces of the front and/or back panels 102 and/or 104 of the enclosure 100. For example, each flange 1602, 1604 may be sealed to the inner surface of a different panel 102, 104, or both flanges 1602, 1604 may be sealed to one panel 102 or 104, and only the other flange (e.g., flange 1602) is sealed to the other panel 104 or 102. Each flange 1602, 1604 can have a panel side 1608, 1610 that faces and is sealed to a different one of the panels 102, 104 and a facing side 1612, 1614 that faces away from the panel 102 or 104 to which the flange 1602, 1604 is coupled but faces toward the facing side 1612 or 1614 of the other flange 1602 or 1604. Each of the flanges 1602, 1604 includes the interlocking body 214, 216 described above protruding from the facing side 1612, 1614 of that flange 1602, 1604.

[0099] The flange 1602 is shown as including the tear strip 306, but alternatively, the flange 1604 may have the tear strip 306. The flange 1602 includes the gaps 320, 322 between the tear strip 306 and the flange 1602 between the opposite edges 324, 326 of the tear strip 106 and the opposing edges 328, 330 of the flange 1602 that border or are on opposite sides of the gaps 320, 322. For example, the edge 324 of the tear strip 106 can face the edge 328 of the flange 1602 and the edge 326 of the tear strip 106 can face the edge 330 of the flange 1602.

[0100] Peel seal material 1616 can be placed into the gaps 320, 322. The peel seal material 1616 may fill the gaps 320, 322 such that there is no material (including no air) other than the peel seal material 1616 between the edge 328 and the edge 324 and between the edge 326 and the edge 330. The peel seal material 1616 may fill the gaps 320, 322 to help separate the tear strip 306 from the flange 1602. Pulling the tear strip 306 may tear through the peel seal material 1616 in the gaps 320, 322 without tearing the tear strip 306 or the flange 1602. The peel seal material 1616 may be adhered to the edges 328, 324, 326, 330 such that tearing the tear strip 306 through the peel seal material 1616 may leave scum, or residue, of the peel seal material 1616 on one or more, or all, of the edges 328, 324, 326, 330. The peel seal material 1616 can provide paths of reduced resistance for the tear strip 306 to tear through. This can cause the tear strip 306 to only tear through the peel seal material 1616 and the panel 102, but not the flange 1602, as the peel seal material 1616 may be mechanically or structurally weaker than the flange 1602.

[0101] The flange 1602 may include the protruding portions or rails 606, 608 described above. These protruding portions or rails 606, 608 can extend or protrude from the panel side 1608 of the flange 1602. The protruding portions 606, 608 may be disposed on opposite sides of the opposite edges 324, 326 of the tear strip 306 and on opposite sides of the opposite edges 328, 330 of the flange 1602. For example, the protruding portions 606, 608 of the flange 1602 may be outside of the gaps 320, 322 and the tear strip 306, with each of the gaps 320, 322 between one of the protruding portions 606 or 608 and the tear strip 306.

[0102] The protruding portions 606, 608 may be thicker than the rest of the flange 1602 (but for the interlocking element or body 214 and/or 216) and the tear strip 306 but may only protrude from the panel side 1608 of the flange 1602. The protruding portions 606, 608 may have a small width relative to the rest of the flange 1602. The width of each of the protruding portions 606, 608 may be smaller than the width of the tear strip 306, smaller than the rest of the flange 1602, 1604, and/or smaller than the width of each of the interlocking bodies 214, 216. Outer surfaces of the protruding portions 606, 608 may include outer layers 1618. These outer surfaces may be the surfaces of the protruding portions 606, 608 that are farthest from the panel side 1608 of the flange 1602. The outer layers 1618 may include the same material used to form the tear strip

306 adhered or sealed to the outer surfaces. This can provide a stiff surface that resists tearing. For example, combining the increased thickness of the protruding portions 606, 608 with the increased stiffness of the tear strip material as the outer layer 1618 (e.g., stiffer than the flange 1602 and peel seal material 1616) can cause the zipper assembly 1600 to preferentially tear the through the peel seal material 1616, and not the flange 1602, when the tear strip 306 is pulled. This can help prevent errant tears through the flange 1602 from reaching the interlocking bodies 214, 216 or the top of the enclosure 100.

[0103] A method for forming one or more of the zipper assemblies described herein can be performed by extruding the flange(s) and the tear strip. The flange(s) and tear strip can be co-extruded together or at the same time. This can ensure that the tear strip and the flange(s) are spaced apart from each other and do not contact each other. A peel seal material can be applied to the facing sides of the flange(s). With respect to the tear strip, the peel seal material may extend over the tear strip such that the peel seal material is torn with the panel 102 or 104 when the tear strip 306 is used to tear the panel 102 or 104. A heat seal material may be applied to the opposite sides of the flange(s) and tear strip. The flange(s) and tear strip may then be adhered to the inner surface of the panels of the enclosure using the heat seal material as an adhesive. The zipper assembly is then adhered to the enclosure and the enclosure may be sealed (along the top edge of the panels) to enclose the zipper assembly within the panels of the enclosure. A hole or other opening can be provided in the front panel of the enclosure to allow a user to grasp the tear strip and pull the tear strip through the front panel of the enclosure. This also can tear through the peel seal material in the gaps. Scum or residue of the peel seal material and/or heat seal material may be left on the flange(s) and/or tear strip. The user can then access the zipper assembly through an opening created by tearing the front panel using the tear strip.

[0104] The zipper assemblies described herein may be coupled to inside surfaces of the panels of the enclosures. In one example, each flange of a zipper assembly may be coupled with the inside surface of a different panel of the enclosure (e.g., one flange is adhered to the inside surface of the front panel while the other flange is adhered to the inside surface of the back panel). Optionally, both flanges of a zipper assembly may be coupled with the inside surface of the same panel. For example, one flange may be taller than the other flange and portions of the surfaces of each flange that face the inside surface of the same panel may be adhered to that surface of the same panel. The flange that is taller also may be adhered to the inside surface of the other panel.

[0105] The features of the zipper assemblies described herein may be mixed and matched with each other. For example, two or more of the thicker tear strip 106, the thinner tear strip 306, the gaps 320, 322 in the flange, the interconnecting web 318 in the flange, the

flange portions 408, 410, the elongated ribs 506, the protruding portions 606, 608 and/or 706, 708 and/or 806, 808 and/or 906, 908, the thicker tear strip 306, the angled surfaces 1010, 1014, 1016, the additional tear strip(s) 1106 and/or 1206, the flange 1306 having a same height as the other flange 1310, the flange 1402 having the bend 1414, the flanges 1506, 1510 that are sealed together, the peel seal material 1616, and/or the protruding portions 606, 608 having the outer layer 1618 may be combined in different combinations even if not shown herein.

[0106] In one example, a zipper assembly for a resealable enclosure includes an elongated flange having opposite first and second sides. The first side and/or the second is configured to be coupled with an inner surface of a panel of the resealable enclosure. The flange includes protruding rails that outwardly project from the first side or the second side of the flange. The zipper assembly also includes an interlocking element protruding from the flange and shaped to mate with another interlocking element of another flange to close the enclosure and shaped to be pulled apart to open the enclosure. The zipper assembly includes a tear strip between the protruding rails. The tear strip can be pulled to tear through the panel of the resealable enclosure to provide access to the zipper assembly inside the enclosure.

[0107] The protruding rails can project from the first side of the flange that is configured to be coupled with the inner surface of the panel of the resealable enclosure. The protruding rails and the interlocking element can project from the second side of the flange. The protruding rails can project from both the first side and from the second side of the flange. The tear strip can be thinner than the protruding rails of the flange. Alternatively, the tear strip and the protruding rails of the flange can have an equivalent thickness.

[0108] The protruding rails can include one or more surfaces that are oriented at an acute angle relative to the panel side of the flange. The one or more surfaces can include a first angled surface extending from an upper edge of the tear strip to an upper edge of the flange and at least a second angled surface extending from a lower edge of the tear strip toward the interlocking element. The flange can be tapered in shape in the protruding rails such that the flange is thinner at the upper edge of the tear strip and at the lower edge of the tear strip than at the upper edge of the flange or in a location between the interlocking element and the lower edge of the tear strip.

[0109] The flange can include gaps located (a) between the protruding rails and (b) between opposite edges of the tear strip and the flange. These gaps can be filled with a peel seal material. Outer surfaces of the protruding rails can include an outer layer formed from a same material as the tear strip.

[0110] In another example, another zipper assembly for a resealable enclosure can include an elongated flange having opposite first and second sides. At least one of these sides can be coupled with an inner surface of

a panel of the resealable enclosure. The zipper assembly can include an interlocking element protruding from the flange and shaped to mate with another interlocking element of another flange to close the enclosure and shaped to be pulled apart to open the enclosure. The zipper assembly includes a tear strip that can be pulled to tear through the panel of the resealable enclosure to provide access to the zipper assembly inside the enclosure. The tear strip can be located between opposing edges of the flange with gaps between each of the opposite edges and the tear strip.

[0111] The flange can include a recess with an interconnecting web extending across the recess from one of the opposing edges of the flange to another of the opposing edges of the flange. The flange can include flange portions on opposite sides of the tear strip that are spaced apart from the opposing edges of the flange by the gaps. A peel seal material may be disposed in the gaps.

[0112] In another example, another zipper assembly for a resealable enclosure includes an elongated flange configured to be coupled with an inner surface of a panel of the resealable enclosure, and an interlocking element protruding from the flange. The interlocking element can be shaped to mate with another interlocking element of another flange to close the enclosure and shaped to be pulled apart to open the enclosure. The zipper assembly can include a first tear strip coupled with the flange and that can be pulled to tear through the panel of the resealable enclosure to provide access to the zipper assembly inside the enclosure. The zipper assembly can include a second tear strip coupled with the flange with the first tear strip between the second tear strip and the interlocking element.

[0113] The second tear strip can limit pulling of the first tear strip from tearing the flange to an upper edge of the flange. The zipper assembly also can include a third tear strip coupled with the flange between the first tear strip and the interlocking element. The third tear strip can limit pulling of the first tear strip from tearing the flange to the interlocking element. The flange can include a panel side configured to be coupled with the inner surface of the panel. The panel side of the flange can include elongated ribs of an adhesive material that adhere the flange to the inner surface of the panel.

[0114] The singular forms "a," "an," and "the" include plural references unless the context clearly dictates otherwise. "Optional" or "optionally" means that the subsequently described event or circumstance may or may not occur, and that the description may include instances where the event occurs and instances where it does not. Approximating language, as used herein throughout the specification and claims, may be applied to modify any quantitative representation that could permissibly vary without resulting in a change in the basic function to which it may be related. Accordingly, a value modified by a term or terms, such as "about," "substantially," and "approximately," may not be limited to the precise value specified. In at least some instances, the approximating language

may correspond to the precision of an instrument for measuring the value.

[0115] This written description uses examples to disclose the embodiments, including the best mode, and to enable a person of ordinary skill in the art to practice the embodiments, including making and using any devices or systems and performing any incorporated methods. The claims define the patentable scope of the disclosure, and include other examples that occur to those of ordinary skill in the art. Such other examples are intended to be within the scope of the claims if they have structural elements that do not differ from the literal language of the claims, or if they include equivalent structural elements with insubstantial differences from the literal language of the claims.

[0116] Certain embodiments of the invention are described in the following clauses:

Clause 1. A zipper assembly for a resealable enclosure, the zipper assembly comprising:

an elongated flange having opposite first and second sides, at least one of the first side or the second configured to be coupled with an inner surface of a panel of the resealable enclosure, the flange including protruding rails that outwardly project from the first side or the second side of the flange;

an interlocking element protruding from the flange, the interlocking element shaped to mate with another interlocking element of another flange to close the enclosure and shaped to be pulled apart to open the enclosure; and

a tear strip between the protruding rails, the tear strip configured to be pulled to tear through the panel of the resealable enclosure to provide access to the zipper assembly inside the enclosure.

Clause 2. The zipper assembly of clause 1, wherein the protruding rails project from the first side of the flange that is configured to be coupled with the inner surface of the panel of the resealable enclosure.

Clause 3. The zipper assembly of clause 1, wherein the protruding rails and the interlocking element project from the second side of the flange.

Clause 4. The zipper assembly of clause 1, wherein the protruding rails project from both the first side and from the second side of the flange.

Clause 5. The zipper assembly of clause 1, wherein the tear strip is thinner than the protruding rails of the flange.

Clause 6. The zipper assembly of clause 1, wherein the tear strip and the protruding rails of the flange have an equivalent thickness.

Clause 7. The zipper assembly of clause 1, wherein the protruding rails include one or more surfaces that are oriented at an acute angle relative to the panel side of the flange.

Clause 8. The zipper assembly of clause 7, wherein the one or more surfaces include a first angled surface extending from an upper edge of the tear strip to an upper edge of the flange and at least a second angled surface extending from a lower edge of the tear strip toward the interlocking element.

Clause 9. The zipper assembly of clause 8, wherein the flange is tapered in shape in the protruding rails such that the flange is thinner at the upper edge of the tear strip and at the lower edge of the tear strip than at the upper edge of the flange or in a location between the interlocking element and the lower edge of the tear strip.

Clause 10. The zipper assembly of clause 1, wherein the flange includes gaps located (a) between the protruding rails and (b) between opposite edges of the tear strip and the flange, the gaps filled with a peel seal material.

Clause 11. The zipper assembly of clause 10, wherein outer surfaces of the protruding rails include an outer layer formed from a same material as the tear strip.

Clause 12. A zipper assembly for a resealable enclosure, the zipper assembly comprising:

an elongated flange having a first side and an opposite second side, at least one of the first side or the second side configured to be coupled with an inner surface of a panel of the resealable enclosure;

an interlocking element protruding from the flange, the interlocking element shaped to mate with another interlocking element of another flange to close the enclosure and shaped to be pulled apart to open the enclosure; and

a tear strip configured to be pulled to tear through the panel of the resealable enclosure to provide access to the zipper assembly inside the enclosure, the tear strip located between opposing edges of the flange with gaps between each of the opposite edges and the tear strip.

Clause 13. The zipper assembly of clause 12, where-

in the flange includes a recess with an interconnecting web extending across the recess from one of the opposing edges of the flange to another of the opposing edges of the flange.

Clause 14. The zipper assembly of clause 12, wherein the flange includes flange portions on opposite sides of the tear strip that are spaced apart from the opposing edges of the flange by the gaps.

Clause 15. The zipper assembly of clause 12, further comprising peel seal material in the gaps.

Clause 16. A zipper assembly for a resealable enclosure, the zipper assembly comprising:

an elongated flange configured to be coupled with an inner surface of a panel of the resealable enclosure;

an interlocking element protruding from the flange, the interlocking element shaped to mate with another interlocking element of another flange to close the enclosure and shaped to be pulled apart to open the enclosure;

a first tear strip coupled with the flange, the tear strip configured to be pulled to tear through the panel of the resealable enclosure to provide access to the zipper assembly inside the enclosure; and

a second tear strip coupled with the flange with the first tear strip between the second tear strip and the interlocking element.

Clause 17. The zipper assembly of clause 16, wherein the second tear strip is configured to limit pulling of the first tear strip from tearing the flange to an upper edge of the flange.

Clause 18. The zipper assembly of clause 16, further comprising a third tear strip coupled with the flange between the first tear strip and the interlocking element.

Clause 19. The zipper assembly of clause 18, wherein the third tear strip is configured to limit pulling of the first tear strip from tearing the flange to the interlocking element.

Clause 20. The zipper assembly of clause 16, wherein the flange includes a panel side configured to be coupled with the inner surface of the panel, the panel side of the flange including elongated ribs of an adhesive material that adhere the flange to the inner surface of the panel.

Claims

1. A zipper assembly for a resealable enclosure, the zipper assembly comprising:

an elongated flange having opposite first and second sides, at least one of the first side or the second configured to be coupled with an inner surface of a panel of the resealable enclosure, the flange including protruding rails that outwardly project from the first side or the second side of the flange;
an interlocking element protruding from the flange, the interlocking element shaped to mate with another interlocking element of another flange to close the enclosure and shaped to be pulled apart to open the enclosure; and
a tear strip between the protruding rails, the tear strip configured to be pulled to tear through the panel of the resealable enclosure to provide access to the zipper assembly inside the enclosure.

2. The zipper assembly of claim 1, wherein the protruding rails project from the first side of the flange that is configured to be coupled with the inner surface of the panel of the resealable enclosure.

3. The zipper assembly of claim 1, wherein the protruding rails and the interlocking element project from the second side of the flange, or wherein the protruding rails project from both the first side and from the second side of the flange.

4. The zipper assembly of claim 1, wherein the tear strip is thinner than the protruding rails of the flange, or wherein the tear strip and the protruding rails of the flange have an equivalent thickness.

5. The zipper assembly of claim 1, wherein the protruding rails include one or more surfaces that are oriented at an acute angle relative to the panel side of the flange.

6. The zipper assembly of claim 5, wherein the one or more surfaces include a first angled surface extending from an upper edge of the tear strip to an upper edge of the flange and at least a second angled surface extending from a lower edge of the tear strip toward the interlocking element, and optionally wherein the flange is tapered in shape in the protruding rails such that the flange is thinner at the upper edge of the tear strip and at the lower edge of the tear strip than at the upper edge of the flange or in a location between the interlocking element and the lower edge of the tear strip.

7. The zipper assembly of claim 1, wherein the flange

includes gaps located (a) between the protruding rails and (b) between opposite edges of the tear strip and the flange, the gaps filled with a peel seal material, and optionally

wherein outer surfaces of the protruding rails include an outer layer formed from a same material as the tear strip.

8. A zipper assembly for a resealable enclosure, the zipper assembly comprising:

an elongated flange having a first side and an opposite second side, at least one of the first side or the second side configured to be coupled with an inner surface of a panel of the resealable enclosure;

an interlocking element protruding from the flange, the interlocking element shaped to mate with another interlocking element of another flange to close the enclosure and shaped to be pulled apart to open the enclosure; and a tear strip configured to be pulled to tear through the panel of the resealable enclosure to provide access to the zipper assembly inside the enclosure, the tear strip located between opposing edges of the flange with gaps between each of the opposite edges and the tear strip.

9. The zipper assembly of claim 8, wherein the flange includes a recess with an interconnecting web extending across the recess from one of the opposing edges of the flange to another of the opposing edges of the flange.
10. The zipper assembly of claim 8, wherein the flange includes flange portions on opposite sides of the tear strip that are spaced apart from the opposing edges of the flange by the gaps.
11. The zipper assembly of claim 8, further comprising peel seal material in the gaps.
12. A zipper assembly for a resealable enclosure, the zipper assembly comprising:

an elongated flange configured to be coupled with an inner surface of a panel of the resealable enclosure;

an interlocking element protruding from the flange, the interlocking element shaped to mate with another interlocking element of another flange to close the enclosure and shaped to be pulled apart to open the enclosure;

a first tear strip coupled with the flange, the tear strip configured to be pulled to tear through the panel of the resealable enclosure to provide access to the zipper assembly inside the enclosure; and

a second tear strip coupled with the flange with the first tear strip between the second tear strip and the interlocking element.

13. The zipper assembly of claim 12, wherein the second tear strip is configured to limit pulling of the first tear strip from tearing the flange to an upper edge of the flange.
14. The zipper assembly of claim 12, further comprising a third tear strip coupled with the flange between the first tear strip and the interlocking element, and optionally wherein the third tear strip is configured to limit pulling of the first tear strip from tearing the flange to the interlocking element.
15. The zipper assembly of claim 12, wherein the flange includes a panel side configured to be coupled with the inner surface of the panel, the panel side of the flange including elongated ribs of an adhesive material that adhere the flange to the inner surface of the panel.

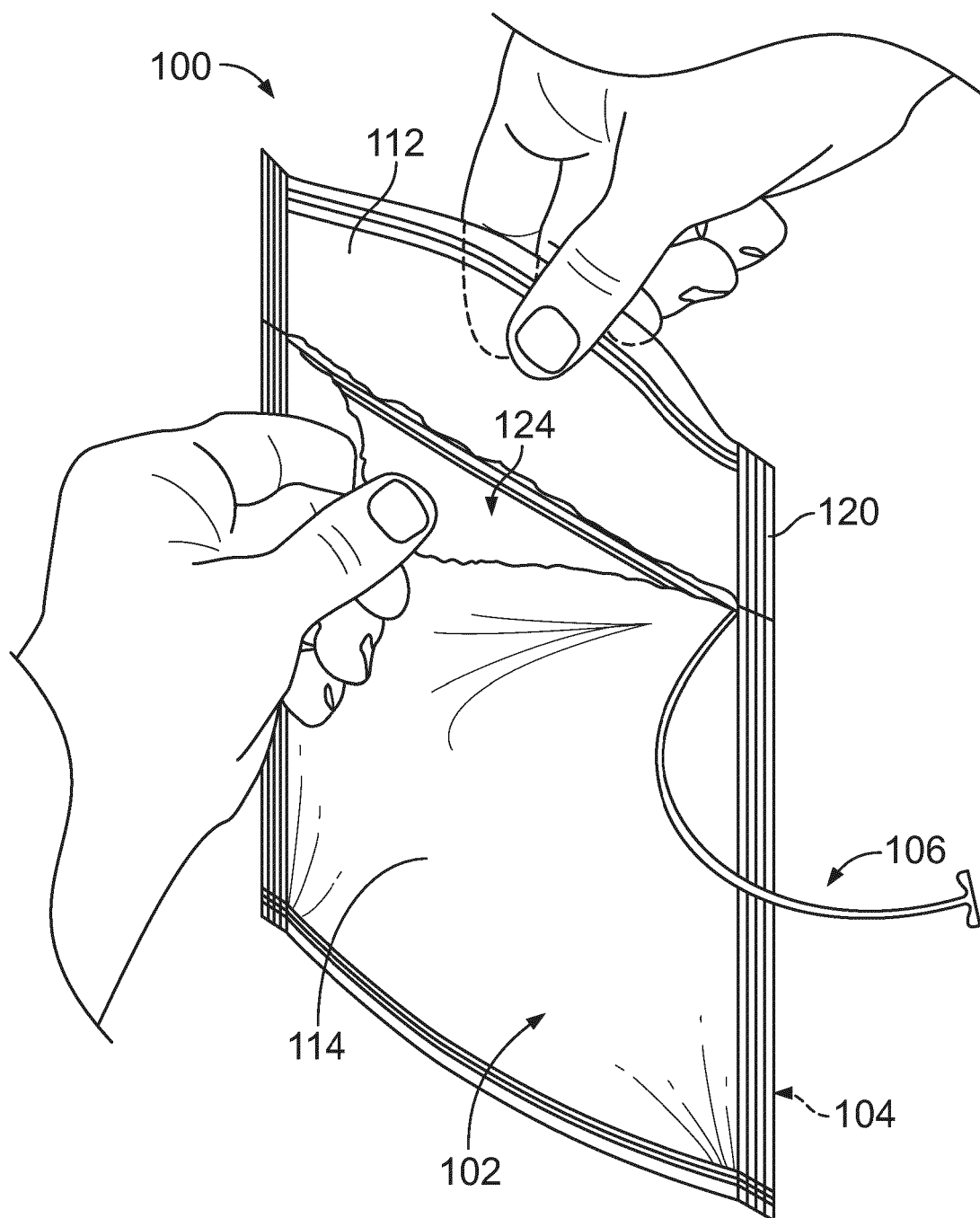


FIG. 1

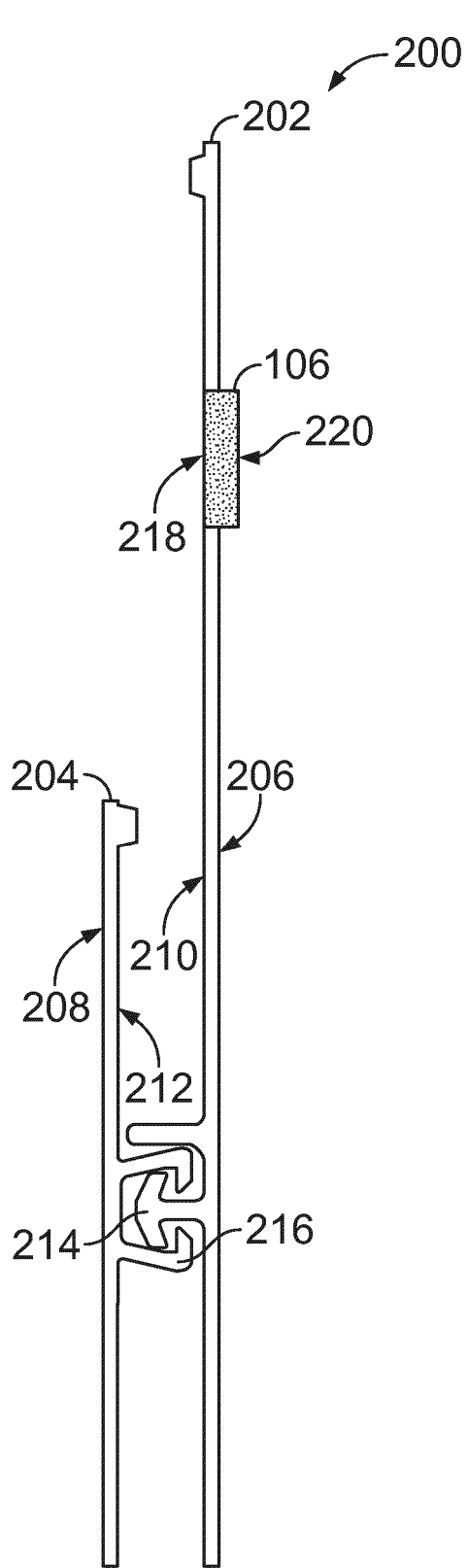


FIG. 2

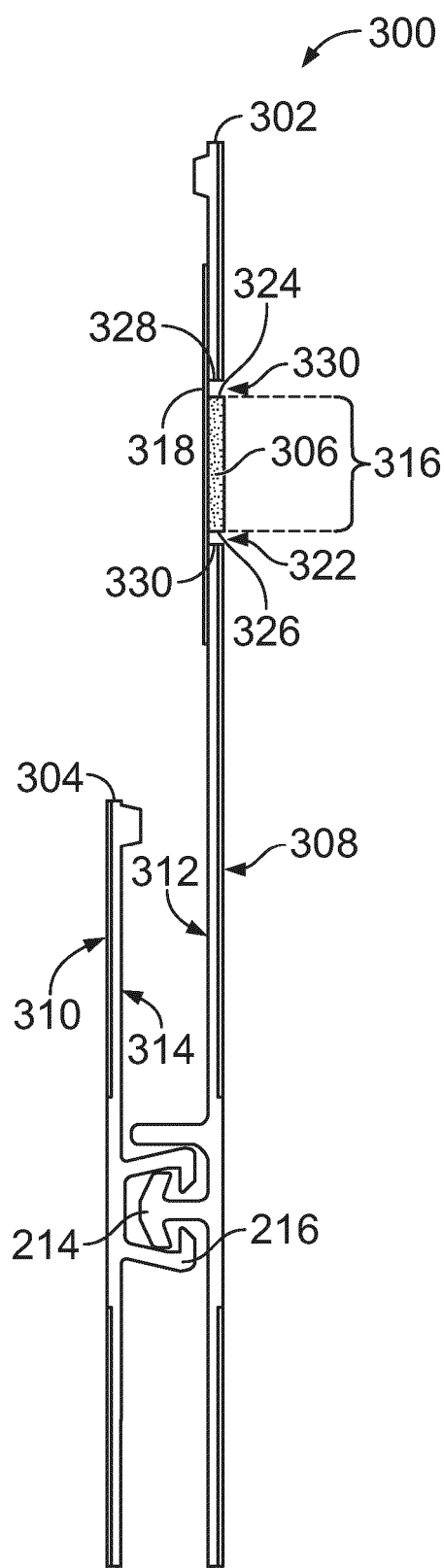


FIG. 3

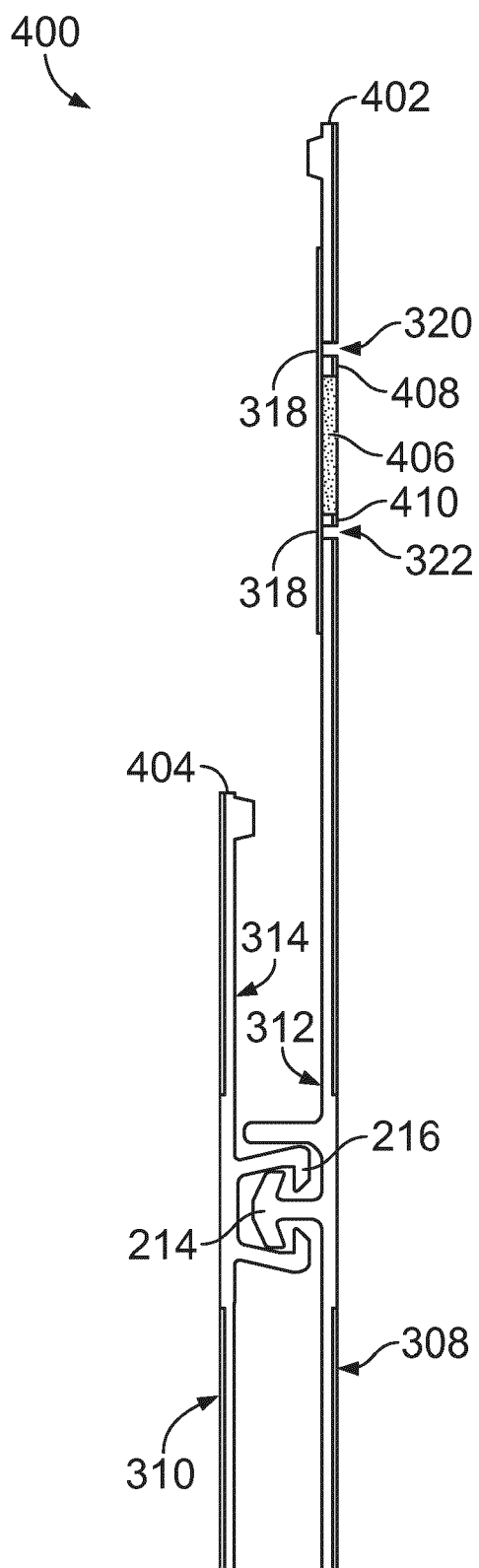


FIG. 4

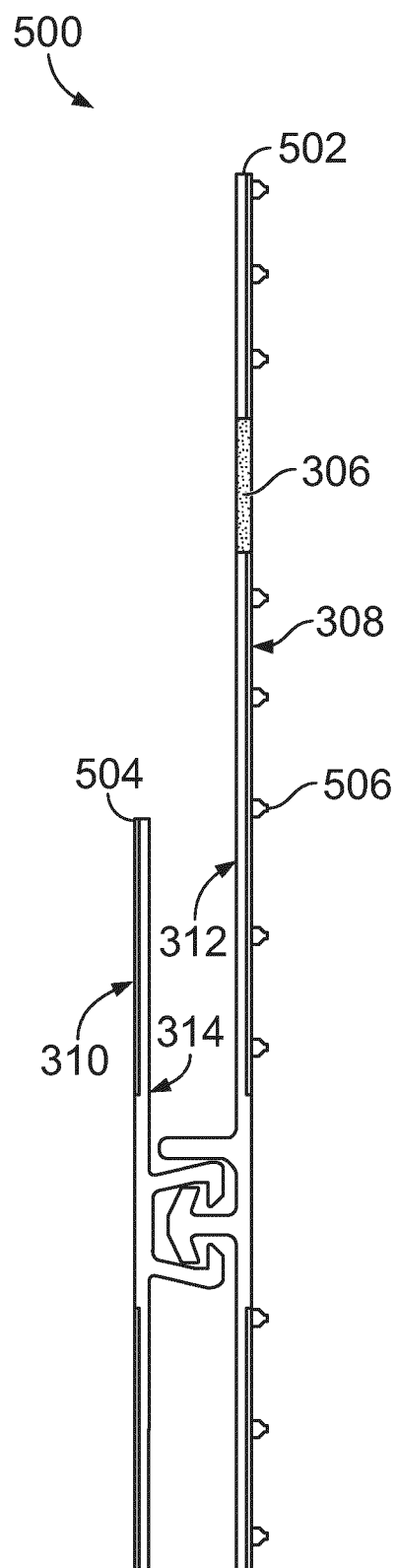


FIG. 5

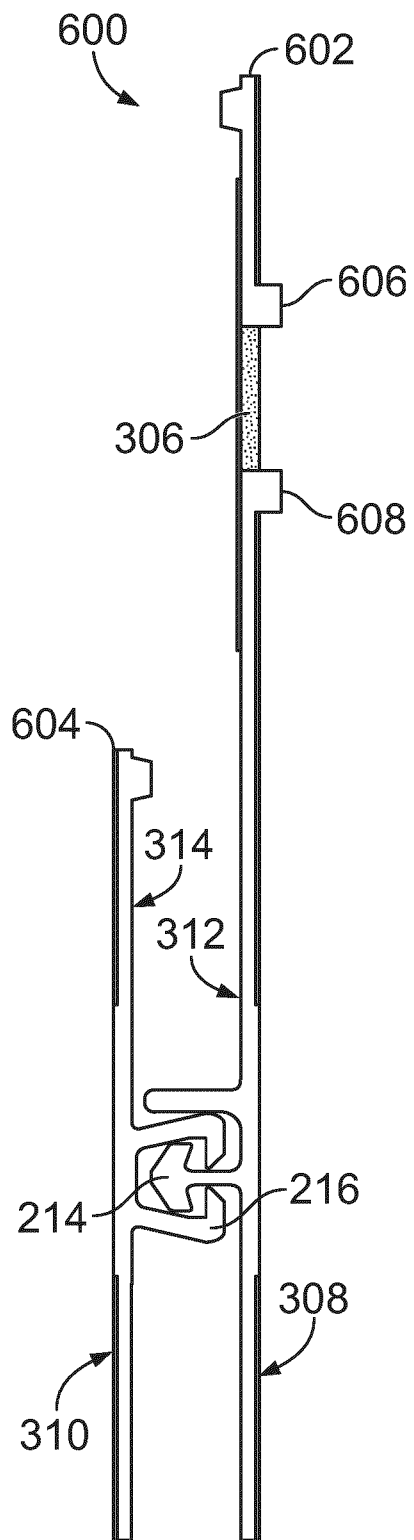


FIG. 6

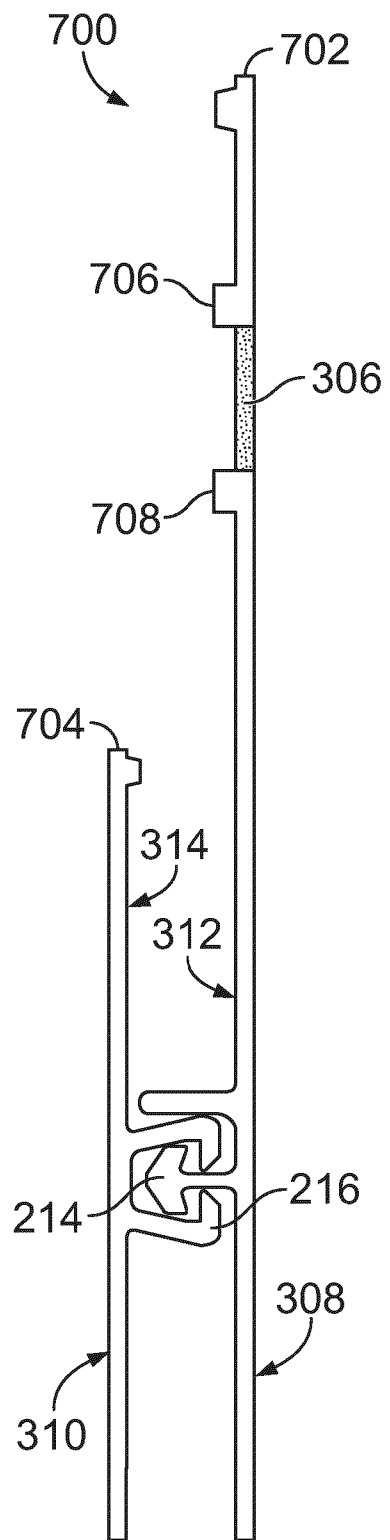


FIG. 7

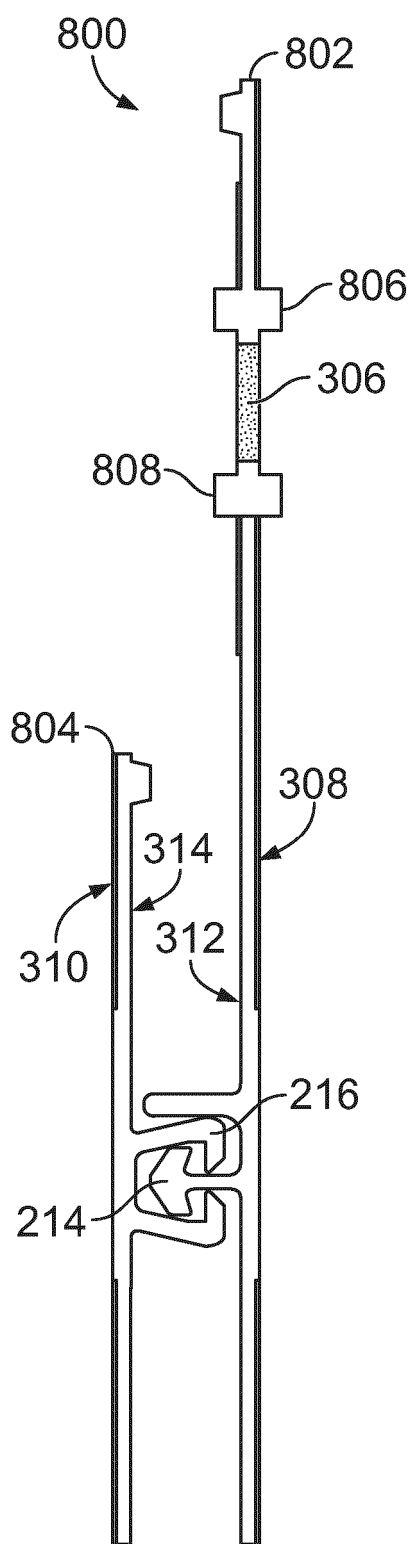


FIG. 8

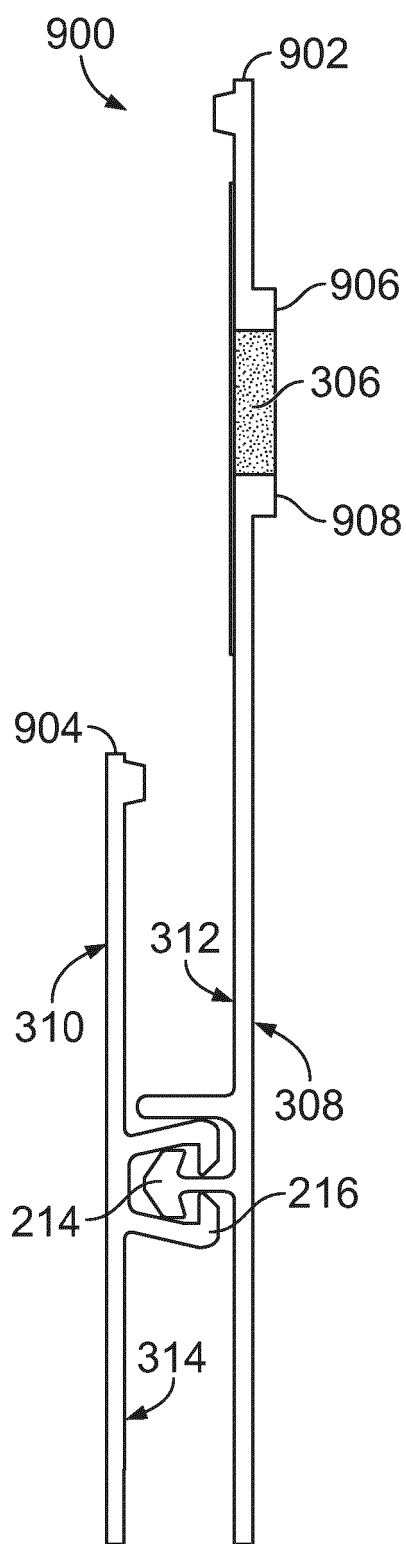


FIG. 9

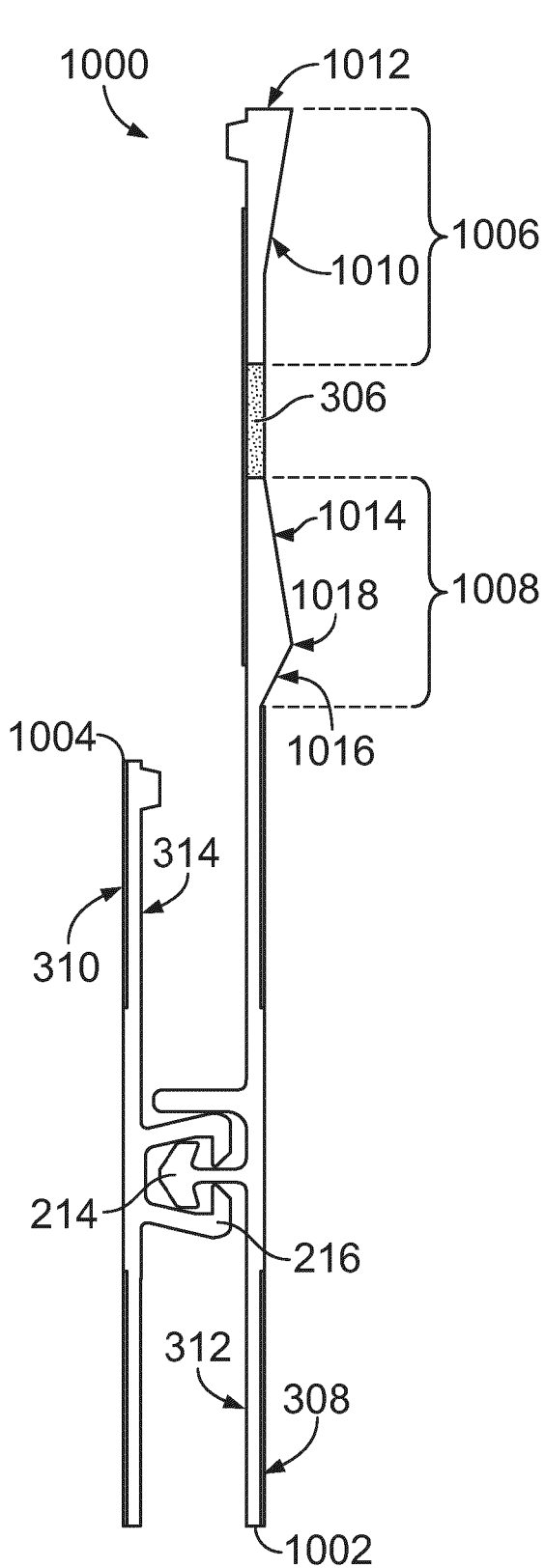


FIG. 10

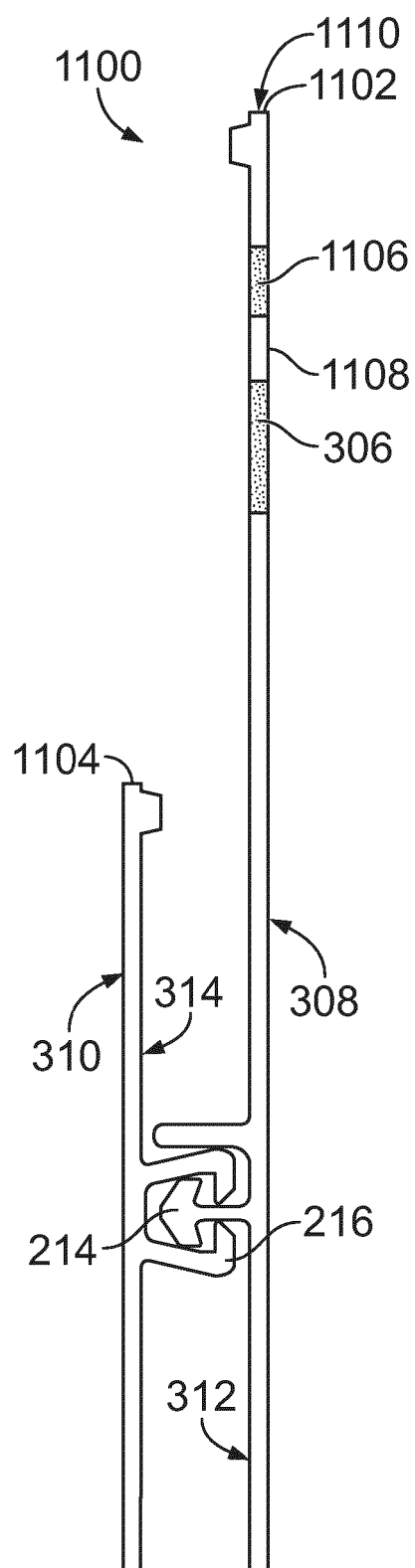


FIG. 11

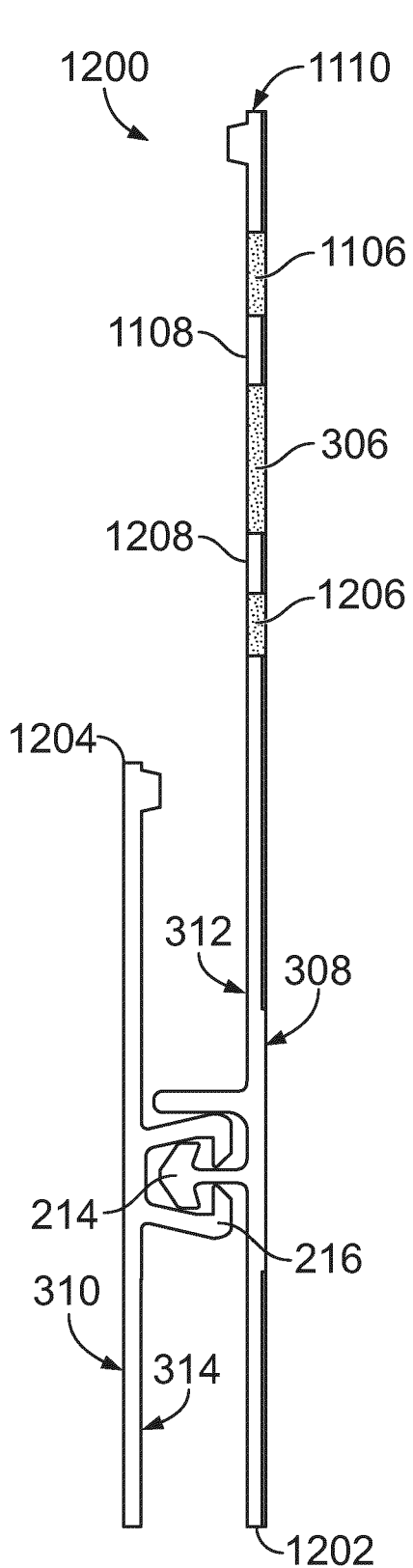


FIG. 12

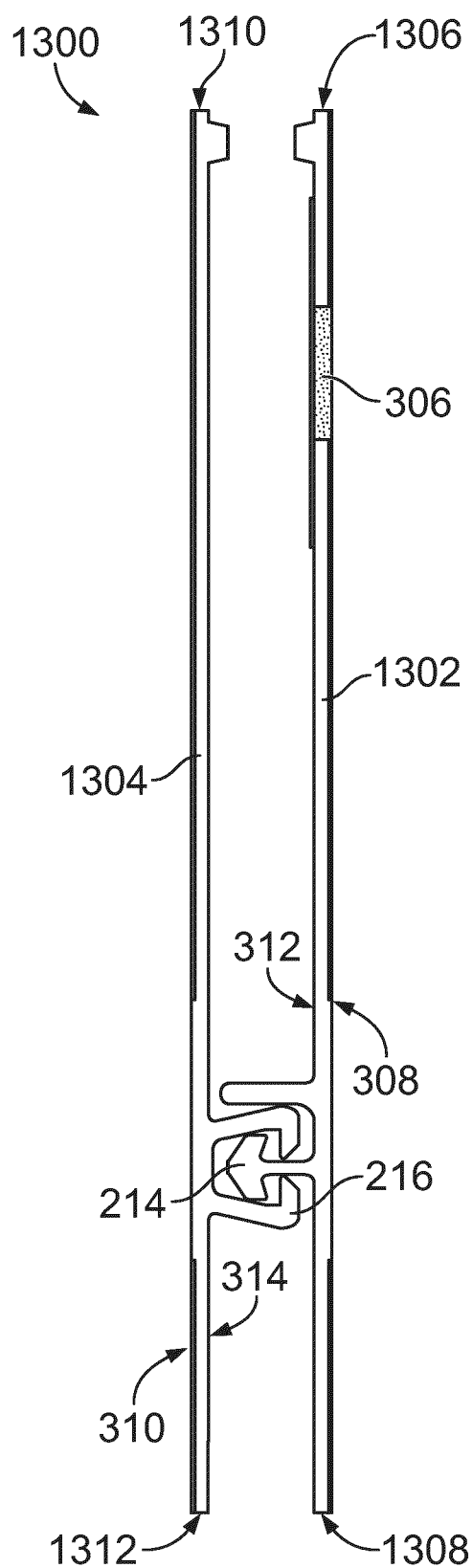


FIG. 13

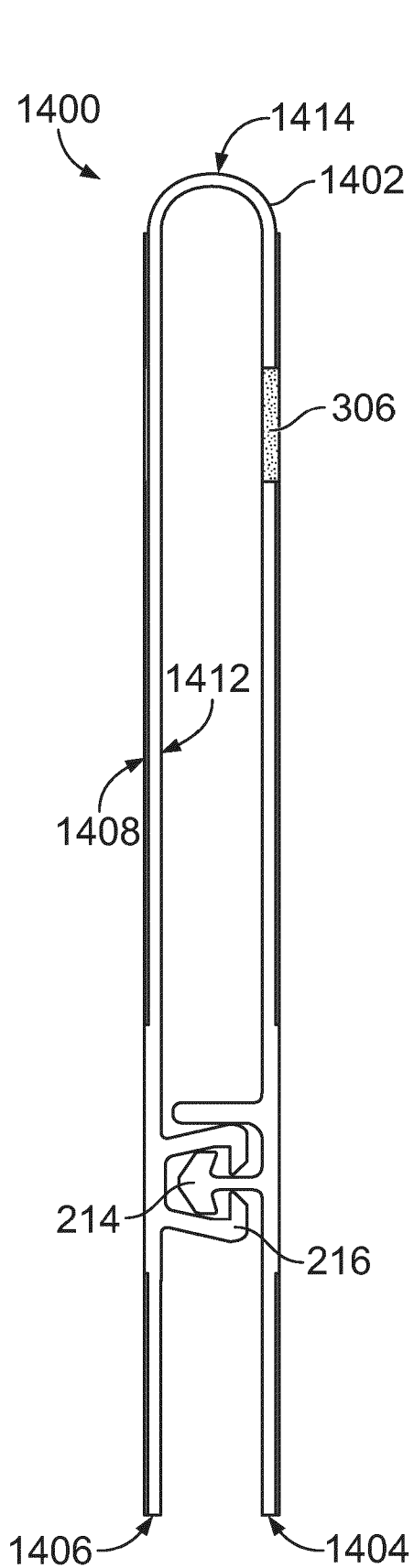


FIG. 14

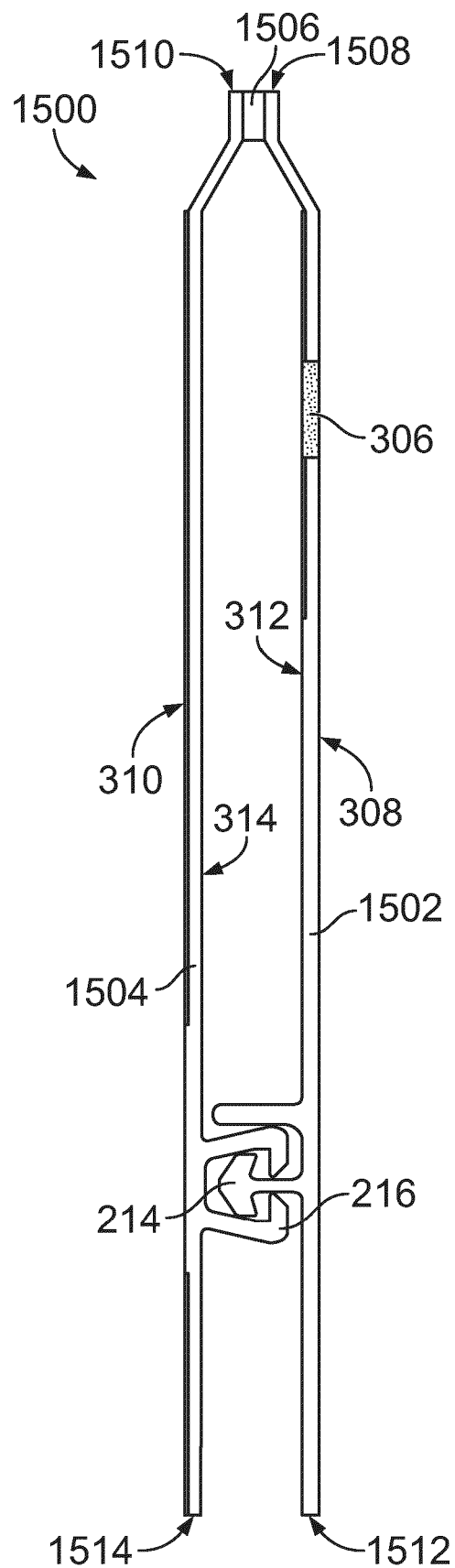


FIG. 15

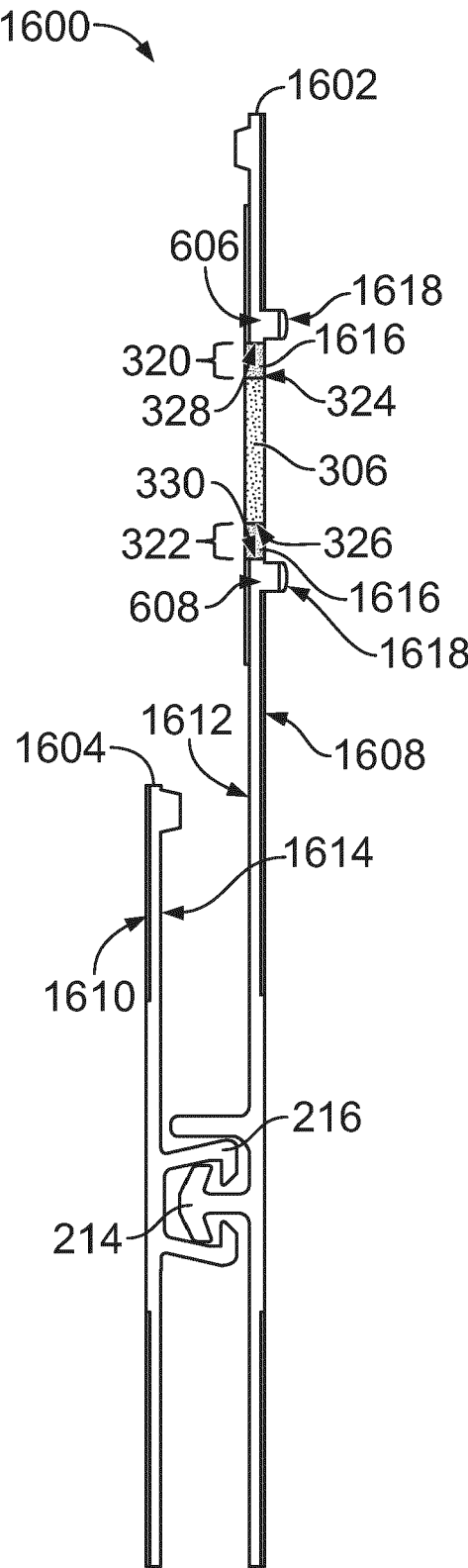


FIG. 16

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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