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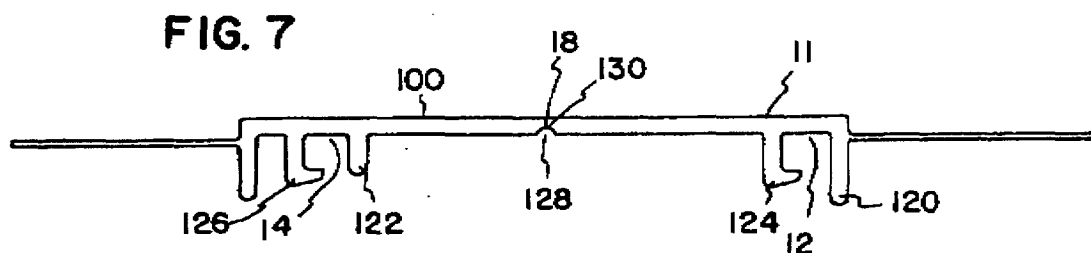
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(54) **Reclosable tamper-evident closure arrangement**

(57) Reclosable closure arrangements suitable for use with packages, such as food and non-food packages, include a zipper (11), a slider device, and a tamper-evident structure positioned above the zipper (11). The zipper (11) includes first and second closure profiles (12,14) that are releasably engageable with each other. The first and second closure profiles (12,14) are interconnected by a fold area (100) including the tamper-evident structure (18). The fold area (100) can have a variety

of configurations such as a C-channel, an inverted V, an M, and an inverted U. Moreover, the tamper-evident structure (18) included therein can be a variety of constructions such as an area of weakness (132), a peel seal (146), and a solid fold (166). The slider device (16) is mounted to the zipper (11) and slides relative to the zipper (11) to control interlocking and disengaging between the closure profiles (12,14). In some embodiments, packages including the described closure arrangement may be hermetically sealed.



Description

Field

[0001] This disclosure generally relates to closure arrangements for packages. In particular, this disclosure relates to closure arrangements having a tamper-evident structure and reclosable profiles.

Background

[0002] Many packaging applications use resealable containers to store various types of articles and materials. These packages may be used to store and ship food products, non-food consumer goods, medical supplies, waste materials, and many other articles.

[0003] Resealable packages are convenient in that they can be closed and resealed after the initial opening to preserve the enclosed contents. The need to locate a storage container for the unused portion of the products in the package is thus avoided. As such, providing products in resealable packages appreciably enhances the marketability of those products.

[0004] Some perishable goods are sold to consumers in the form of a reclosable package. For example, cheese or meat products can be packaged in a bag with reclosable closure profiles such that after opening the package, it can be reclosed. It is desirable that these packages be hermetically sealed to prevent spoilage. It is also desirable that these packages include tamper-evident structures to inform the consumer whether the package previously has been opened.

[0005] WO 98/05567 to St. Phillips et al., incorporated herein by reference, shows the use of a one-time breakable preferential area of weakness located below reclosable profiles on a package.

[0006] U.S. Patent No. 4,782,951 to Griesbach et al., incorporated herein by reference, shows the use of a peel seal and reclosable profiles on a package.

[0007] Other U.S. Patents show the use of a peel seal in combination with reclosable profiles. Some of these patents include U.S. Pat. No. 4,925,316 to VanErden et al.; U.S. Pat. No. 4,923,309 to VanErden et al.; U.S. Pat. No. 5,456,928 to Hustad et al.; and U.S. Pat. No. 5,425,825 to Rasko et al.; each of these patents being incorporated herein by reference.

[0008] Improvements in closure arrangements are desirable.

Summary of the Disclosure

[0009] The present disclosure describes closure arrangements for reclosable packages. In one embodiment, a reclosable package includes a closure arrangement having a zipper, a slider device, and a tamper-evident structure positioned above the zipper. The zipper includes first and second closure profiles that are releasably engageable with each other. The first and second

closure profiles are interconnected with a fold area including the tamper-evident structure. The slider device is mounted to the upper and slides relative to the zipper to control interlocking and disengaging between the closure profiles.

[0010] The fold area may be in a variety of configurations. In one embodiment, the fold area is configured as a C-channel. In another embodiment, the fold area is configured as an inverted V. In yet another embodiment, the fold area is configured as an M. In still another embodiment, the fold area is configured as an inverted U.

[0011] The tamper-evident structure may have a variety of constructions. In one embodiment, the structure is an area of weakness. In another embodiment, the structure is a peel seal. In still another embodiment, the structure is a solid fold.

Brief Description of the Drawings

[0012]

FIG. 1 is a perspective view of a first embodiment of a flexible, reclosable package, according to principles of this disclosure;

FIG. 2 is an enlarged, perspective view of one embodiment of a slider device suitable for use with a closure arrangement of the invention;

FIG. 3 is another perspective view of the slider device depicted in FIG. 2;

FIG. 4 is bottom plan view of the slider device depicted in FIG. 2;

FIG. 5 is a cross-sectional view of the slider device depicted in FIGS 2-4 taken along the line 5-5 of FIG. 4;

FIG. 6 is an enlarged, schematic, cross-sectional view of one embodiment of the closure arrangement depicted in FIG. 1 taken along the line 6-6 of FIG. 1, which shows reclosable profiles, a slider device, and a tamper-evident structure;

FIG. 7 is an enlarged, schematic, cross-sectional view of the zipper depicted in FIG. 6 in an unfolded configuration;

FIG. 8 is a fragmented, top view of the unfolded zipper configuration depicted in FIG. 7;

FIG. 9 is a fragmented, top view of another embodiment of an unfolded zipper configuration analogous to the view depicted in FIG. 8;

FIG. 10 is a fragmented, top view of another embodiment of an unfolded zipper configuration analogous to the view depicted in FIG. 8;

FIG. 11 is an enlarged, schematic, cross-sectional view of another embodiment of a closure arrangement analogous to the view depicted in FIG. 6;

FIG. 12 is an enlarged, schematic, cross-sectional view of another embodiment of a closure arrangement analogous to the view depicted in FIG. 6;

FIG. 13 is an enlarged, schematic, cross-sectional view of another embodiment of a closure arrange-

ment analogous to the view depicted in FIG. 6; and FIG. 14 is another embodiment of a closure arrangement analogous to the view depicted in FIG. 6.

Detailed Description

[0013] Attention is directed to FIG. 1. FIG. 1 illustrates an example packaging arrangement in the form of a re-sealable, flexible package 10 having a closure arrangement 8. The closure arrangement 8 includes a zipper 11 with first and second closure profiles 12, 14; a slider device 16 to open and close the profiles 12, 14; and a tamper-evident structure 18 located above the zipper 11.

[0014] The tamper-evident structure 18 signals to the consumer whether the package has been opened previously. One advantage of having the tamper-evident structure 18 located above, instead of below, the zipper 11 is that the consumer is able to identify whether the package 10 previously has been opened prior to opening the zipper 11.

[0015] The flexible package 10 includes first and second opposed panel sections 20, 22 made from a flexible, polymeric film. For some manufacturing applications, the first and second panel sections 20, 22 are heat sealed together along two edges 24, 26 and meet at a fold line in order to form a three-edged containment section for a product within the interior of the package 10. The fold line comprises the bottom edge 28. Alternatively, two separate panel sections 20, 22 of polymeric film may be used and heat sealed together along the two edges 24, 26 and at the bottom 28. Access is provided to the interior of the package 10 through a mouth 30.

[0016] The zipper 11 can include a variety of configurations and structures. For example, the zipper 11 can be constructed according to U.S. Patent Nos. 4,240,241; 4,246,288; or 4,437,293; each of which is incorporated by reference herein.

[0017] The slider device 16 can include a variety of configurations and structures. One particular example of a suitable slider device 16 is illustrated in more detail in FIGS. 2-5. The slider device 16 includes a top wall 50 and a pair of side walls 52, 54 extending from the wall 50 such that the walls 52, 54 form a generally C-shaped channel. The slider device 16 also includes a spreader or plow 56 extending or projecting from the wall 50. In the embodiment illustrated, the plow 56 comprises first and second angled wedges 58, 60 separated by a gap 62.

[0018] FIG. 5 illustrates a cross-section taken along the line 5-5 of FIG. 4. First and second hook constructions 70, 72 are viewable in FIG. 5. First and second hook constructions 70, 72 help to permit the slider device 16 to slide along the zipper 11 without becoming disengaged from the package 10.

[0019] FIG. 6 illustrates a cross-sectional view of the closure arrangement 8 taken along the 6-6 line of FIG.

1. FIG. 6 generally shows package 10 including first and second opposed panel sections 20, 22, zipper 11, tamper-evident structure 18, and slider device 16. The zipper 11 has first and second closure profiles 12, 14. The first and second closure profiles 12, 14 are releasably engageable with each other to provide a reclosable seal to the package. The first and second closure profiles 12, 14 are connected through a fold area 100 having tamper-evident structure 18.

[0020] The first closure profile 12 has a first depending fin or flange 102 extending therefrom, while the second closure profile 14 has a second depending fin or flange 104 extending therefrom. If the zipper 11 is formed separately from the panel sections 20, 22, the first and second fins 36, 40 are thermally fused to inner surfaces of the respective first and second panel sections 20, 22. Alternatively, the zipper 11 may be extruded with the panel sections 20, 22 such that the first fin 36 is integrally formed with the first panel section 20, and the second fin 40 is integrally formed with the second panel section 22.

[0021] FIG. 7 illustrates the zipper 11 depicted in FIG. 6 in an unfolded configuration. The zipper 11 has first and second closure profiles 12, 14 respectively including first and second posts 120, 122 and first and second closure members with a hook 124, 126. The first and second closure profiles 12, 14 are interconnected with the fold area 100 which extends from the first closure member with a hook 124 to the second post 122. The fold area 100 has a fold point 128 suitable for providing a tamper-evident structure 18. In this embodiment, the fold point 128 is the midpoint 130 of the fold area 100. In other embodiments, the fold point 128 need not be the midpoint 130 of the fold area 100 but may be located, for example, to the right or left of the midpoint 130 of the fold area 100, between the first closure member with a hook 124 and the midpoint 130 of the fold area 100, or between the second post 122 and the midpoint 130 of the fold area 100.

[0022] The tamper-evident structure 18 located within the fold area 100 can be a variety of constructions. For example, the tamper-evident structure 18 may be a peel seal, an area of weakness, or a solid fold or web that requires cutting to open. By "peel seal", it is meant that the bonding strength between the layers forming the peel seal is less than the bonding strength of other layers in the package 10, so that when a pulling force is applied, the layers forming the peel seal will break or peel apart before other portions of package 10. Peel seals are known in the packaging art, and examples of peel seals that may be useable with the package of the present disclosure are taught in U.S. Patent Nos. 4,923,309; 4,925,316; 5,425,825; 5,456,928; 5,470,156; and 5,733,636, the disclosures of which are incorporated herein by reference.

[0023] FIG. 8 illustrates a top view of the zipper in the unfolded configuration depicted in FIG. 7. In this embodiment, the fold area 100 has a tamper-evident structure

18 constructed from an area of weakness 132 created by a perforated line 134 along the fold point 128. In other embodiments, an area of weakness is created by, for example, a scored or thinned line. A scored line is created by making a uniform crease approximately along the fold point 128 of the fold area 100. A thinned line is created by coextruding the fold area 100 with less material approximately along the fold point 128 of the fold area 100. In another embodiment, the area of weakness is created by forming the fold area 100 out of a highly oriented material that has a tendency to split approximately along the fold point 128 of the fold area 100.

[0024] FIG. 9 illustrates a top view of another embodiment of an unfolded zipper analogous to the view depicted in FIG. 8. The embodiment shown in FIG. 9 also has a fold area 140, a fold point 142, and a tamper-evident structure 144. However, the tamper-evident structure 144 differs from the structure 18 shown in FIG. 8. In FIG. 9, the tamper-evident structure 144 is constructed from a peel seal 146 formed along the fold point 142. The peel seal 146 is formed by methods known in the art.

[0025] Another embodiment of an unfolded zipper analogous to the view depicted in FIG. 8 is illustrated in FIG. 10. The embodiment shown in FIG. 10 also has a fold area 160, a fold point 162, and a tamper-evident structure 164. The tamper-evident structure 164 differs, however, from the structure 18 shown in FIG. 8. In FIG. 10, the tamper-evident structure 164 is constructed from a solid fold 166 formed along the fold point 162. The solid fold 166 is formed by methods known in the art.

[0026] The fold area 100 interconnecting the first and second closure profiles may have a variety of configurations. For example, as illustrated in FIG. 6, the fold area 100 is configured as a C-channel or a rectangle lacking a fourth side.

[0027] FIG. 11 illustrates a cross-sectional view of another embodiment of a closure arrangement 181 analogous to the view depicted in FIG. 6. FIG. 11 has structures analogous to those shown in FIG. 6 including package 10, zipper 11, tamper-evident structure 18, slider device 16, and fold area 100. Accordingly, FIG. 11 shows a package 180, a zipper 182, a tamper-evident structure 184, a slider device 186, and a fold area 188 interconnecting first and second closure profiles 190, 192. In this embodiment, the fold area 188 is configured as an inverted or upside-down V.

[0028] FIG. 12 illustrates a cross-sectional view of another embodiment of a closure arrangement 211 analogous to the view depicted in FIG. 6. FIG. 12 shows a package 210, a zipper 212, a tamper-evident structure 214, a slider device 216, and a fold area 218 interconnecting first and second closure profiles 220, 222. In this embodiment, the fold area 218 is configured as an M.

[0029] FIG. 13 illustrates still another embodiment of a closure arrangement 241 analogous to the view depicted in FIG. 6. FIG. 13 shows a package 240, a zipper 242, a tamper-evident structure 244, a slider device 246,

and a fold area 248 interconnecting first and second closure profiles 250, 252. In this embodiment, the fold area 248 is configured as an inverted or upside-down U.

[0030] To initially open the mouth of the reclosable package, the slider device 16 is slid relative to the zipper 11 from a position where the first and second closure profiles 12, 14 are interlocked to a position where the first and second closure profiles 12, 14 are disengaged. The method used to disrupt the tamper-evident structure 18, 144, 164 will depend on the type of tamper-evident structure used. For example, as in the embodiment shown in FIG. 9, when the tamper-evident structure 144 is peel seal 146, the peel seal 146 may be disrupted by applying a force pulling first and second opposed panel sections 20, 22 in directions opposite each other. Moreover, as in the embodiment shown in FIG. 8, when the tamper-evident structure 18 is area of weakness 132 created by perforated line 134, the area of weakness 132 will be disrupted by applying a pulling force as described above, by applying a force pushing or punching down the area of weakness toward the product contained within the package 10, or by cutting the area of weakness. As another example, when the tamper-evident structure 164 is a solid fold 166 as shown in the embodiment in FIG. 10, the fold 166 may be disrupted by cutting the fold 166. To close the mouth 30, the slider device 16 is moved in the opposite direction.

[0031] The packages having reclosable closure arrangements of the invention may be hermetically sealed. For example, FIG. 14 illustrates another embodiment of a closure arrangement 271 analogous to the view depicted in FIG. 6. The embodiment in FIG. 14 has structures analogous to the embodiment in FIG. 6 including package 10, zipper 11, slider device 16, tamper-evident structure 18, and fold area 100. Accordingly, the embodiment depicted in FIG. 14 shows a package 270, a zipper 272, a slider device 274, a tamper-evident structure 276, and a fold area 278. Moreover, the embodiment in FIG. 14 has an oxygen-impermeable material 280 positioned between the slider device 274 and the zipper 272 and attached to the zipper 272 and fold area 278. The oxygen-impermeable material 280 may be attached to the zipper 272 and fold area 278 by, for example, an adhesive, heat seal, and the like. Oxygen-impermeable materials suitable for use with closure arrangements of the invention are known in the art.

[0032] Other embodiments of the invention may be hermetically sealed according to known methods.

[0033] The above specification and examples are believed to provide a complete description of the manufacture and use of particular embodiments of the invention. Many embodiments of the invention can be made without departing from the spirit and scope of the invention.

Claims

1. A reclosable zipper arrangement, comprising:

- (a) first and second closure profiles, said first and second closure profiles being releasably engageable with each other;
 (b) a fold area interconnecting said first and second closure profiles; 5
 (c) a tamper-evident structure oriented along said fold area; and
 (d) a slider device constructed and arranged to slide relative to said first and second closure profiles to control interlocking and disengaging between said first and second closure profiles. 10
2. A reclosable zipper arrangement according to claim 1, wherein said fold area is configured as one selected from the group consisting of: a C-channel; an inverted V; an M; and an inverted U. 15
3. A reclosable zipper arrangement according to any one of claims 1 and 2 wherein said tamper-evident structure is a peel seal. 20
4. A reclosable zipper arrangement according to any one of claims 1-3, wherein said tamper-evident structure is an area of weakness. 25
5. A reclosable zipper arrangement according to any one of claims 1-4, wherein said tamper-evident structure is a solid fold. 30
6. A reclosable zipper arrangement according to any one of claims 1-5, further comprising an oxygen-impermeable material positioned between said slider device and said first and second closure profiles and being attached to said first and second closure profiles and said fold area. 35
7. A reclosable package comprising a reclosable zipper arrangement according to claim 1; the reclosable package comprising: 40
- (a) a package surrounding wall having a mouth and a bottom edge; and
 (b) said zipper arrangement extending along said mouth to selectively open and close said mouth. 45
8. A method of using a reclosable package according to claim 7; the method comprising steps of: 50
- (a) providing a package having first and second opposed panel sections secured together along a fold line comprising a bottom edge; a zipper arrangement extending along a mouth opposite the fold line, the zipper arrangement having first and second closure profiles, and the first and second closure profiles being releasably engageable with each other; the first and second closure profiles being interconnected 55
- with a fold area, the first and second closure profiles being positioned between the fold line and the fold area; the fold area comprising a tamper-evident structure along a fold point; and a slider device constructed and arranged to slide relative to the zipper to control interlocking and disengaging between the first and second closure profiles;
 (b) moving the slider device along the mouth a first direction to open the package; and
 (c) disrupting the tamper-evident seal.
9. The method according to claim 8, further comprising:
 (a) moving the slider device along the mouth in a second direction to close the package.
10. The method according to any one of claims 8 and 9, wherein the step of providing a package further comprises the tamper-evident structure being a peel seal.
11. The method according to any one of claims 8 and 9, wherein the step of providing a package further comprises the tamper-evident structure being an area of weakness.
12. The method according to any one of claims 8 and 9, wherein the step of providing a package further comprises the tamper-evident structure being a solid fold.
13. A method of constructing a reclosable package of claim 7; the method comprising steps of:
 (a) forming a package surrounding wall having first and second opposed panel sections; and a mouth between the first and second opposed panel sections; the package surrounding wall having a bottom edge;
 (b) forming a zipper extending along the mouth opposite the first fold line, the zipper having first and second closure profiles, and the first and second closure profiles being releasably engageable with each other; the first and second closure profiles being interconnected with a fold area, the first and second closure profiles being positioned between the fold line and the fold area;
 (c) forming a tamper-evident structure along a fold point of the fold area; and
 (d) engaging a slider device constructed and arranged to slide relative to the zipper to control interlocking and disengaging between the first and second closure profiles.
14. The method according to claim 13, wherein the step of forming a zipper includes forming the fold area

as one from the group consisting of: a C-channel,
an inverted V; an M; and an inverted U.

15. The method according to any one of claims 13 and 14, wherein the step of forming a tamper-evident structure includes forming one from the group consisting of: an area of weakness; a peel seal ; and a solid fold. 5

16. The method according to any one of claims 13-15 further comprising: 10

- (a) positioning an oxygen-impermeable material between the slider device and the zipper; and
(b) attaching the oxygen-impermeable material to the zipper and the fold area. 15

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FIG. 1

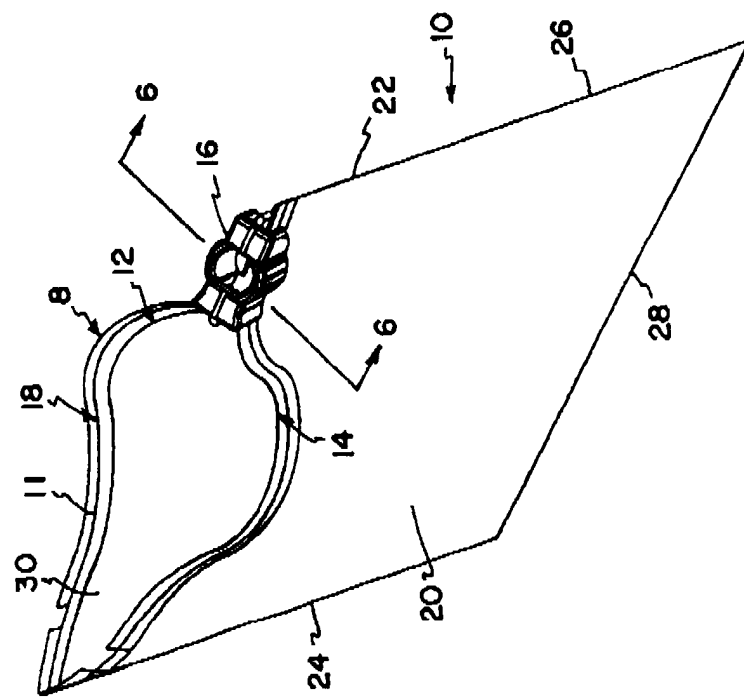


FIG. 2

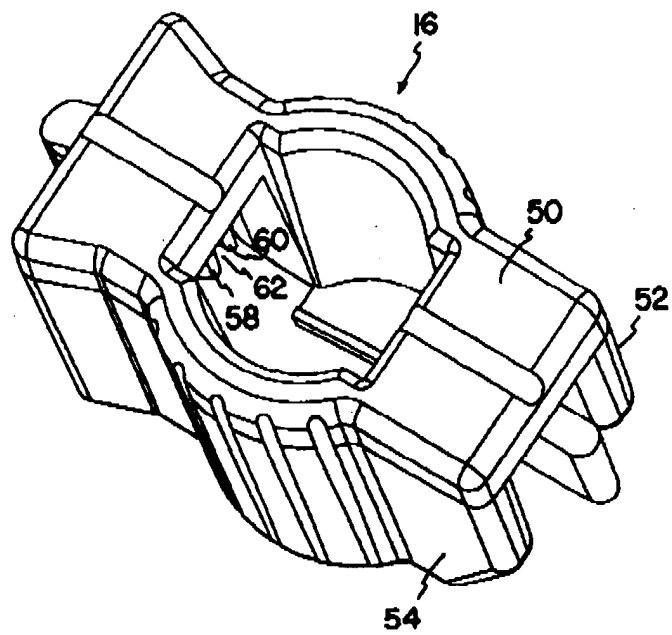


FIG. 3

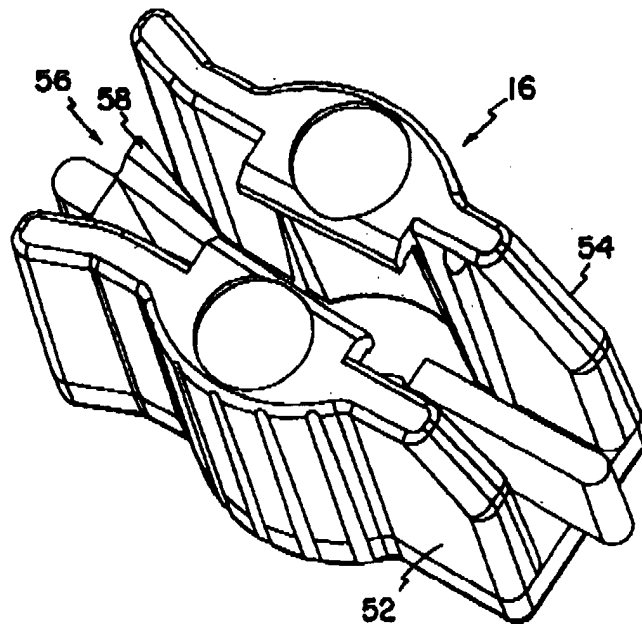


FIG. 4

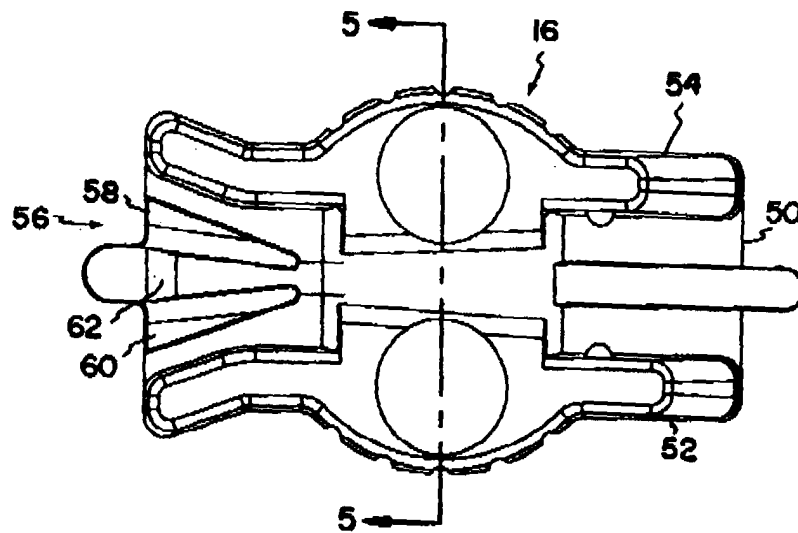


FIG. 5

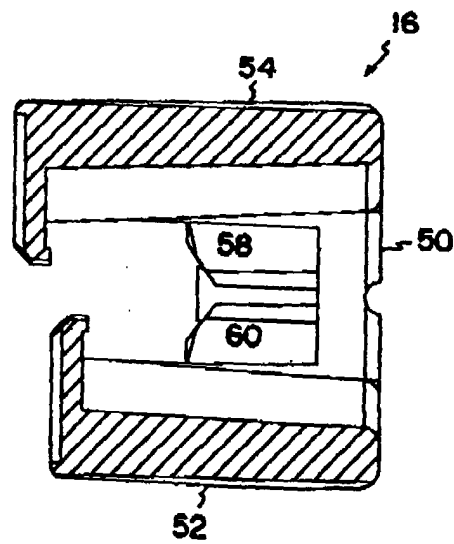


FIG. 6

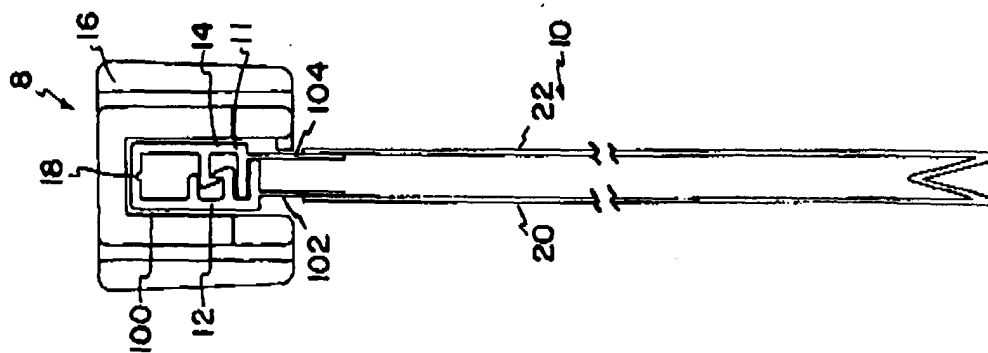


FIG. 7

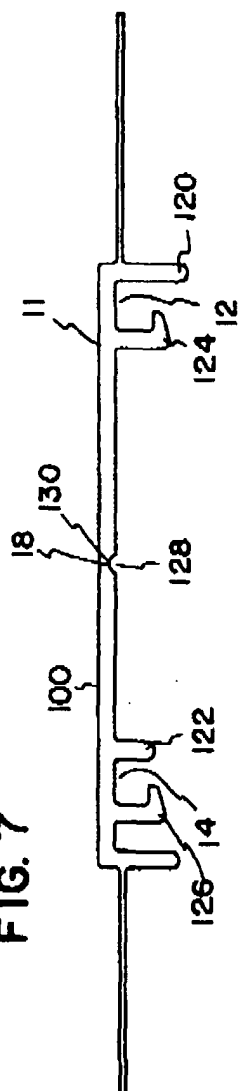


FIG. 8

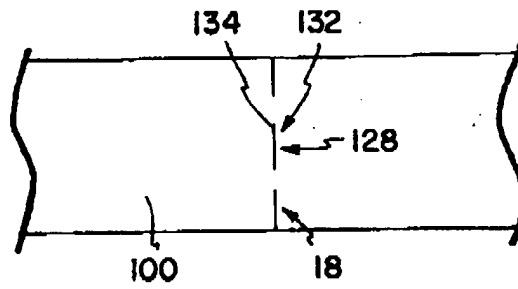


FIG. 9

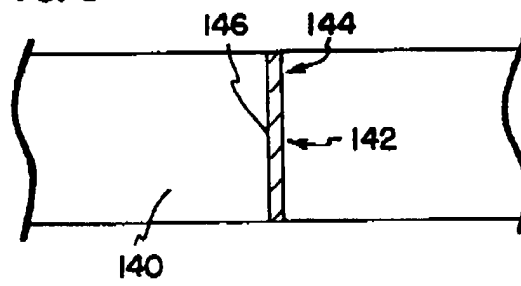
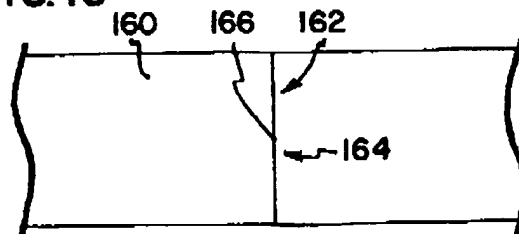
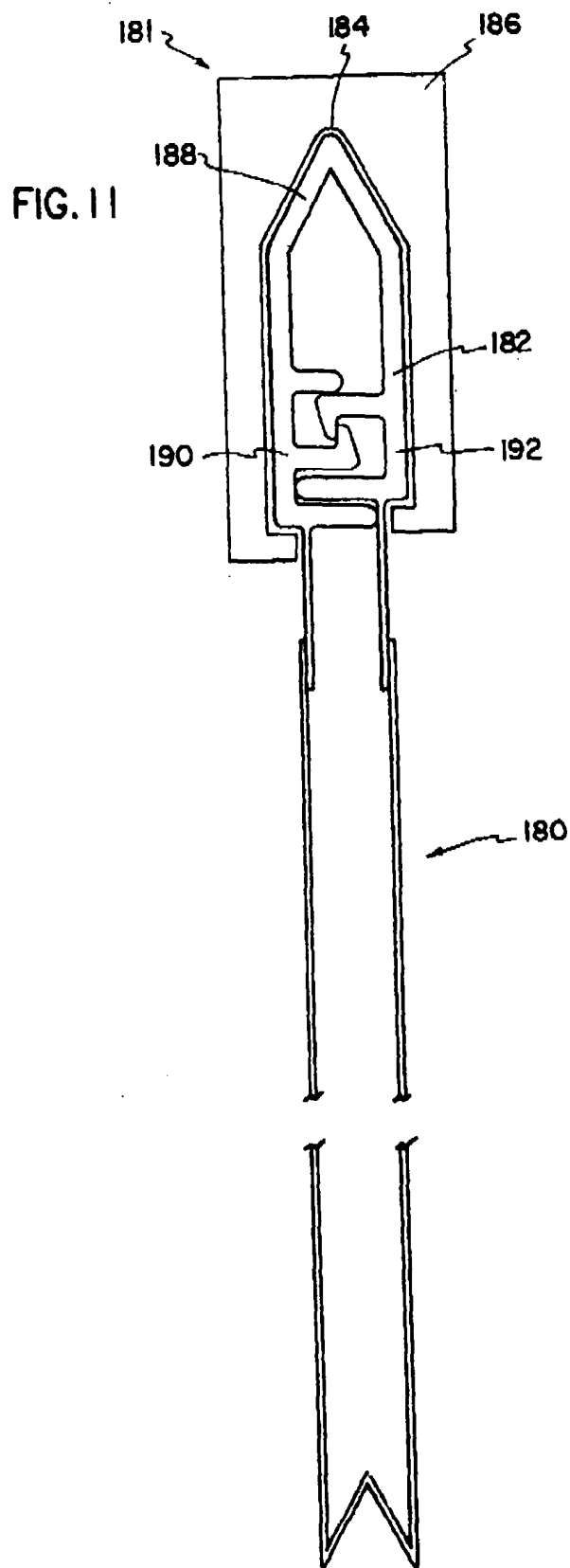
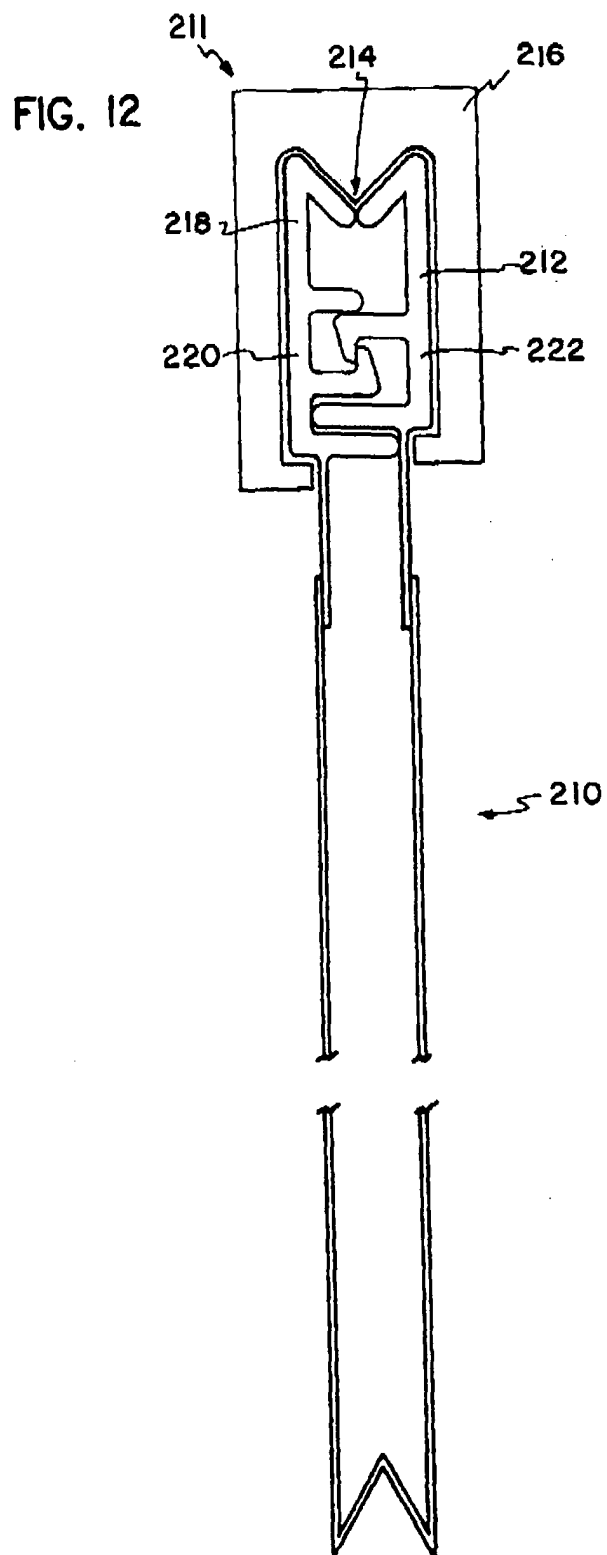
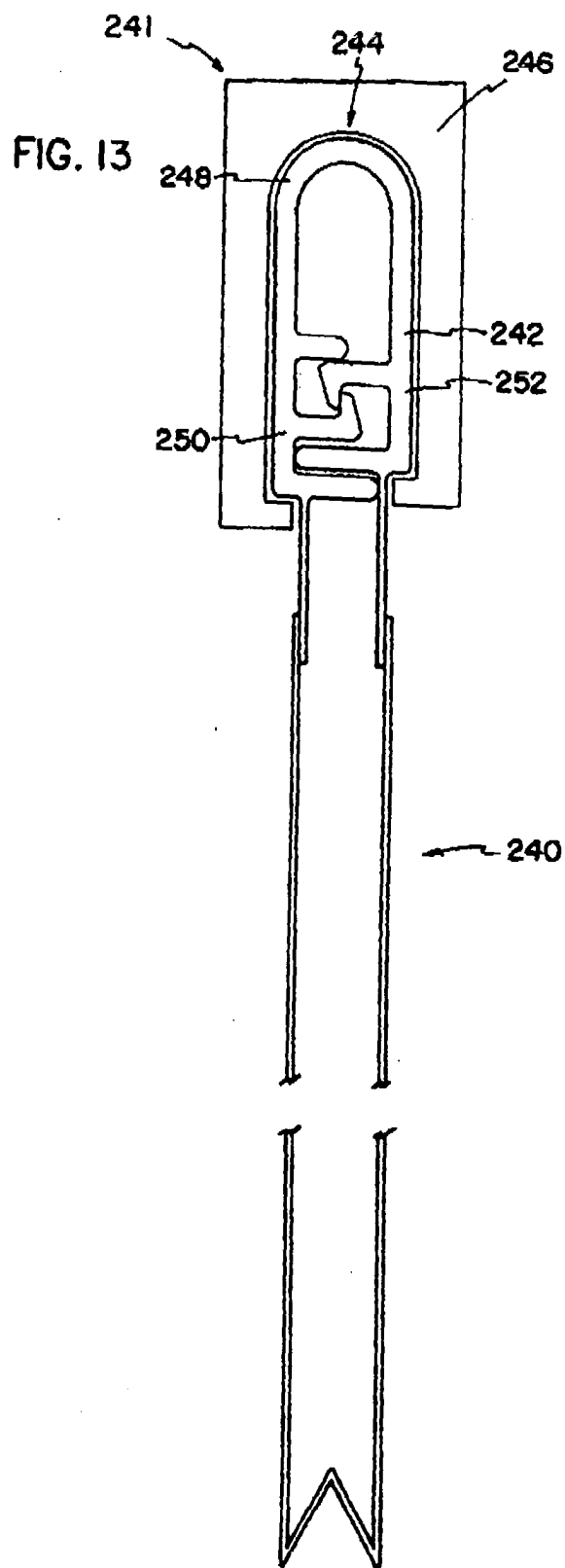


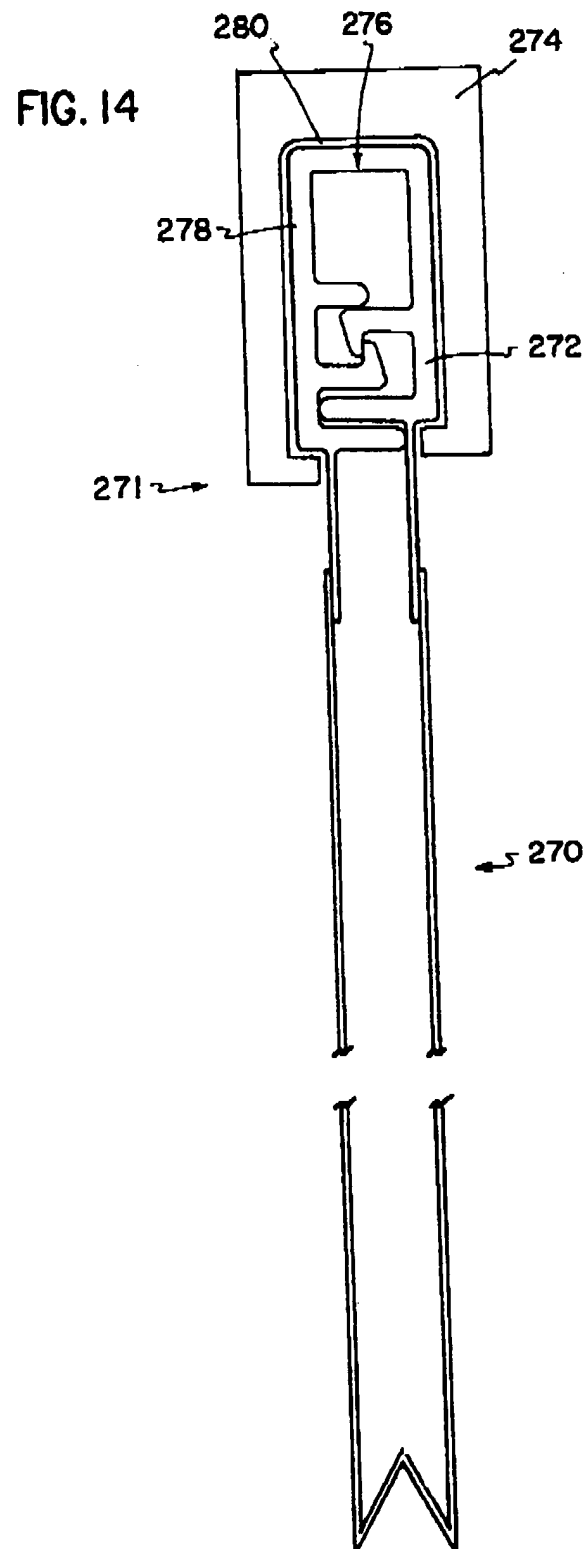
FIG. 10













European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 00 46 0033

DOCUMENTS CONSIDERED TO BE RELEVANT			
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The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 14 August 2000	Examiner Sundell, O
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EPO FORM 1503 03/82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 00 46 0033

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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