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(54) Seal

(57) A seal is suitable for use with a sealable product which includes a fastener and a sealing device for securing said fastener. Said sealing device comprises a locking housing having a lock opening with shoulders at each side thereof, a tab cover connected to the fastener and engageable with the locking housing. The seal comprises: a head, and a pair of parallel inner legs, separated by a channel. Each inner leg includes a first, wide portion adjacent said head and narrowing on an outer edge distal said channel to form a second, narrow portion. An outer leg extends from an end the inner leg, distal said first wide portion, the outer leg extends away from said channel and towards said first wide portion. The outer leg is resiliently deformable towards said narrow portion of said inner leg, and includes at an end proximal to, and extending outside of a width of, said wide portion of said inner leg, a surface, positioned for latching engagement behind a respective said shoulder. The seal is characterised in that said first wide portion of each inner leg includes a region of weakness which is selectively fracturable and in that each of said pair of inner legs is resiliently deformable into said channel.

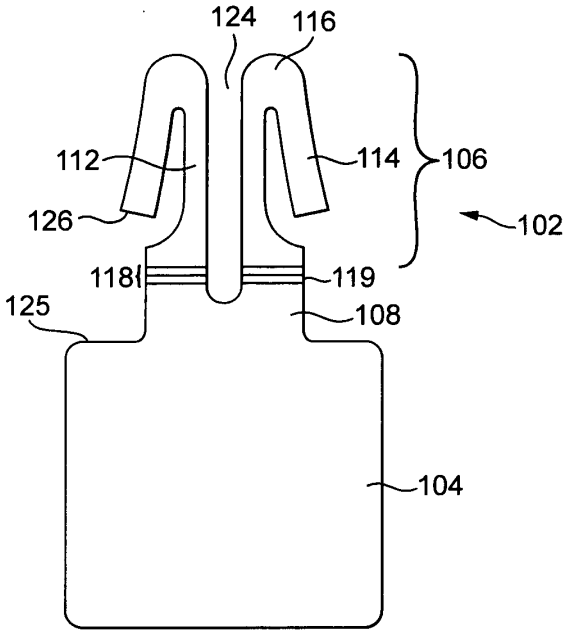

FIG. 3(a)

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Description

[0001] The present invention relates to an improved seal for a security device, for example a security device being particularly adapted for use for example in sealing reusable mailing pouches, or other arrangements.

[0002] Re-usable security envelopes for securely transferring mail are well known. Typically they comprise a sealable bag, a fastening means and a security device. The bag is made from durable material such as a plastics or canvas material and the fastening means typically comprises a fastener which is movable between an open position, which allows access to the interior of the bag, and a closed position in which the bag is sealed to prevent access to the bag's interior and any contents therein. The security device typically comprises a fixed locking housing and a seal means of locking the fastening means thereto. In use, articles to be securely mailed are placed in the bag and the fastener moved to the closed position. Attached to the bag adjacent to the closed position of the fastener is the fixed locking housing to which the fastener may be detachably engaged by means of a tab attached to the fastener.

[0003] To discourage tampering whilst the bag is in transit, it is known to provide a security seal that locks the tab and therefore the fastener to the locking housing. In order to access the contents of the bag, the seal must be broken, thereby releasing the tab from the locking housing and permitting the fastener to be moved to an open position. Any damage to the seal, tab, locking housing or fastener provides an indication of tampering during transit. The seal is designed for single use; however while it must be sufficiently durable to withstand rough handling during the period of transit it will also generally include a point of weakness so that excessive force is not required to break it.

[0004] An early prior art seal is shown in figure 2 of this application and described in GB1424680. The seal of GB1424680 can be seen to be arrow shaped, with a body portion and an arrowhead portion including two barbs.

[0005] Another prior art seal is shown in WO02/16215. Again the seal is arrow shaped, but this time the head portion is wider and includes an indent at the end of the head part as well as two barbs.

[0006] Yet another prior art seal is disclosed in EP1547932 which again includes a body portion and a head portion, the head being arrow shaped and comprising two barbs. This head also includes a longitudingal groove along the head part In addition to an indent at its tip.

[0007] Two further prior art seals are described in EP1701327, the first (shown in figures 1a-2 is described as a conventional seal of the type shown in GB1424680 and WO02/16215. It can be seen to have a head, which is arrow shaped with two barbs, and a body. Between the head and the body is a neck portion including a line of weakness. EP1701327 also shows a rather different seal which includes two head parts each having inwardly facing barbs. Unlike the seals described above, which are used with locking housings including an opening with shoulders at each side to engage the barbs, this second seal is used in a housing which includes a T-shaped or hammer-head shaped projection which effectively splits the housing into two separate chambers, one for each head.

[0008] GB2420743 discloses a rather different shaped arrowhead seal in which instead of resilient barbs extending from an arrow-shaped head, a pair of triangular legs are provided. However, the market favours seals with resilient barbs because they lock in position more easily.

[0009] Known security seals suffer from a number of disadvantages. For instance, the broken seal tends to become stuck in the locking housing, thereby causing difficulty when the locking housing is next used.

[0010] The present invention seeks to address this problem and provide an improved tamper evident seal which provides robust engagement between the tab and locking house, protects the fastener, and permits easy removal of the broken seal.

[0011] Accordingly there is provided a seal for a sealable product which includes a fastener and a sealing device for securing said fastener, in which said sealing device comprises a locking housing having a lock opening with shoulders at each side thereof, a tab cover connected to the fastener and engageable with the locking housing, wherein said seal comprises:

a head, and
a pair of parallel inner legs, separated by a channel, each inner leg including a first, wide portion adjacent said head and narrowing on an outer edge distal said channel to form a second, narrow portion, from an end of which, distal said first wide portion, extends, away from said channel and towards said first wide portion, an outer leg resiliently deformable towards said narrow portion of said inner leg, and including at an end proximal to, and extending outside of a width of, said wide portion of said inner leg, a surface, positioned for latching engagement behind a respective said shoulder; characterised in that said first wide portion of each inner leg includes a region of weakness which is selectively fracturable and in that each of said pair of inner legs is resiliently deformable into said channel.

[0012] When the seal is broken, because each leg includes a region of weakness which is selectively fracturable instead of a single neck/head portion which is broken at a line of weakness, the break results in two separate pieces (the legs) remaining in the locking housing. Because there are two separate pieces inside the housing, the legs can be removed relatively easily compared to removal of a fractured head, which can easily become stuck in the housing and sometimes requires tools (for example a piece of wire) to enable removal.

[0013] Moreover, because each of said pair of inner legs is resiliently deformable into said channel, a stronger, more rigid, material may be used, while achieving sufficient overall inward deformation (by both inner and outer legs) that engagement behind the shoulders of the housing is possible. This is particularly advantageous because a more rigid material can be more robust and therefore, longer legs, which are advantageous in terms of ease of removal, can be used despite their relative fragility which has led to a prejudice among customers towards seals with a single relatively wide head having two barbs depending from it, such as those of GB1424680, WO02/16215 and EP1547932. One object of this invention is to provide a seal that can be used with the same chambers as the seals of WO02/16215 and EP1547932 and preferred seals according to this invention are suitable for use with such containers.

[0014] Preferably a platform is provided between the body portion and the legs.

[0015] The presence of a platform in the seal, joining the head and legs together, has the particular advantage that legs can be shorter. The longer the legs the more vulnerable they are to unintentional snapping during careless or rushed handling and use, and so platform renders the seal more robust.

[0016] Preferably the head includes a body portion having shoulders and the end of the channel, which separates the legs, extends at least in line with the shoulders. While disadvantageous in terms of robustness, this is particularly effective in ensuring that the legs break off separately and are easily removed. Even more preferably the end of the channel extends beyond the shoulder into the body portion.

[0017] Preferably the channel is wider than the narrow portion of the legs. When the legs have been broken off in the chamber, a wide channel provides room for the two legs to move towards each other and thereby easily fall out of the opening in the locking housing.

[0018] More preferably the widthwise distance between the outermost part of the surface positioned for latching engagement behind a respective said shoulder, and the width of said wide portion of said inner leg is defined as "x" and the width of the channel is defined as "y"; and $y>2x$. x is effectively the maximum distance by which each end of the outer leg can overlap with the shoulders of the locking housing. Accordingly, by ensuring that the width of the channel is greater than twice that distance, when the legs break off they will move towards each other enough to allow very easy removal through the opening.

[0019] Preferably the seal further comprises a ledge extending away from the seal in a direction perpendicular to the plane of the head. More preferably, the ledge extends across the width of both legs.

[0020] Preferably said seal, including said body and legs, is planar in shape. A planar shape suits "arrow seal" housings

[0021] Preferably each outer leg is adapted to resiliently deflect towards a respective inner leg when inserted into the lock opening thereby reducing the distance between respective outer and inner legs.

[0022] Preferably said region of weakness is defined by a trough extending between an outside edge of said wider portion towards said channel. A trough is a simple weakening mechanism and particularly effective for breaking when the body portion is pulled upward from its seat, but not breaking due to lateral movement

[0023] Preferably said trough is V-shaped. This allows easy removal of the seal from a tool.

[0024] Preferably said trough is formed on an upper and a lower surface of said wider portion.

[0025] Alternatively said region of weakness is defined by at least one opening positioned in said wider portion of each inner leg.

[0026] Alternatively said region of weakness is defined by a trough and at least one opening.

[0027] Preferably, with said seal inserted into said locking housing, at least a portion of said fastener is covered by the seal.

[0028] Preferably the seal is adapted to fracture into at least three component parts. Specifically, as mentioned above, the seal may fracture into the body part, and two leg parts (each leg part including inner and outer legs).

[0029] Preferred embodiments of the present invention will now be described by way of example only and with reference to the accompanying drawings in which:

Figure 1 shows a prior art seal,
Figure 2 shows a prior art lock and seal,
Figure 3(a) shows a plan view of a first side of a seal in accordance with a first embodiment of the present invention,
Figure 3(b) shows a plan view of a first side of a seal in accordance with a second embodiment of the present invention;
Figure 4 shows a plan view of a second side of the seal of Figure 3(a),
Figure 5 shows a plan view of a first side of a seal in accordance with a third embodiment of the present invention;
Figure 6 shows a plan view of a second side of the seal of Figure 5;
Figure 7(a) shows a plan view of one side of a seal in accordance with a fourth embodiment of the present invention;
Figure 7(b) shows a perspective view of the seal of Figure 7(a),
Figure 7(c) shows a side view of the seal of Figure 7(a), and
Figure 7(d) shows a second side of a strip of seals in accordance with the fourth embodiment of the present invention.
Figure 8 is a plan view of a fifth embodiment

[0030] Figure 1 shows a prior art seal 2 comprising a

head portion 4 connected to a tail portion 6, via a frangible joining member 8. Head portion 4 is shown as a generally rectangular, planar body, but examples include curved sides or any other suitable shape. Tail portion 6 extends in the plane of head portion 4 and comprises shaft 10. From end 12 of shaft 10 distal head portion 4 extends a pair of fingers 14, one either side of shaft 10 in the plane of head portion 4, each finger 14 lying parallel to shaft 10 and extending back towards head 4. Each finger 14 is resiliently deformable, at least in the plane of the head 104, and has a length which is slightly shorter than the length of shaft 10, end 16 of each finger 14 stopping short of frangible joining member 8.

[0031] End 12 of shaft 10 includes an optional indentation 18, and the shaft may include a central trough (not shown) on one side extending form end 12 to, or close to, frangible joining member 8. Such an indentation and/or trough may be used for positioning purposes.

[0032] Frangible joining member 8 comprises a platform extending away from and in the plane of the head portion, narrower than the head portion and including a region 20 which has less material than is generally present in the rest of the seal. The presence of thinner portion 20 in the frangible joining member 8 provides a weak area of the seal at which the head portion may be detached from the tail portion.

[0033] Figure 2 shows a prior art locking housing and seal, in which a prior art seal 50 is adapted to engage with the locking housing 52 through opening 54.

[0034] Figure 3(a) shows a first side of a seal 102 in accordance with a first, preferred embodiment of the present invention. As can be seen from Figure 3(a) the seal includes a head 104 connected to a pair of legs 106 via a joining member 108. Head 104 is a generally rectangular, planar body, but it is contemplated that the body may have rounded corners, be generally circular or have some other suitable shape.

[0035] Joining member 108 comprises a platform integral with but narrower than head 104, which extends away from and in the plane of head 104.

[0036] It is contemplated that legs 106 are integral with head 104 and platform 108 and extend substantially in the plane of head 104, and platform 108, from respective regions on an edge of platform 108 distal head 104. Each leg 106 comprises a first part 112 extending away from platform 108 and a second part 114 extending from an end 116 of first part 112 distal platform 108 back towards platform 108. The second part 114 of a first of the pair of legs extends away from the first part 112 of the second of the pair of legs, and vice versa. As can be seen from Figure 3, each leg 106 forms the shape of an elongate hook.

[0037] First part 112 of legs 106 have a first width adjacent platform 108, an external edge of each leg aligned with an external edge of platform 108, and a second, reduced width towards end 116 of first part 112, the second portion 114 of each leg being positioned partially within the space provided by the narrowed first portion. Legs 106 are resiliently axially and laterally deformable about the gap 124 between the pair of legs 106.

[0038] The first, wider portion of the first part 112 of each leg 110 includes a V-shaped indentation 118 along the width of the leg. This indentation provides for a line 119 along the width of the leg, at the point of the 'V', at which the material is at its thinnest. This provides a weak point at which any force exerted on the leg will be focussed and where the legs may be snapped off providing a clean break. Alternatively the V-shaped indentation may extend along only a portion of the width of the leg, being positioned intermediate two end walls (not shown).

[0039] In addition the weakened section may optionally or alternatively include an opening 122, in accordance with a second embodiment of the present invention, as seen in Figure 3(b). The presence of the indentation and/or opening provides a frangible portion of each leg at which the leg may be detached from platform 108.

[0040] The presence of platform 108 in the seal, joining head 104 and legs 106 together, has the particular advantage that legs 106 can be shorter. The longer the legs 106 the more vulnerable they are to unintentional snapping during careless or rushed handling and use, and so platform 108 renders the seal more robust.

[0041] Figure 4 shows the seal of Figure 3(a) from the opposite side.

[0042] Figure 5 shows a first side of a seal 102 in accordance with a third embodiment of the present invention. The seal of Figure 5 is similar to the seal of Figure 3, a difference being in the width of platform 108, which extends beyond an outer edge of the first, wider part of each leg 106. Such an extended width may provide for an even more robust seal than the arrangement of Figure 3

[0043] Figure 6 shows the seal of Figure 5 from the opposite side, with optional openings 122. The openings as shown are circular, but may be any suitable shape.

[0044] Figure 7(a) shows a back view of a seal in accordance with a fourth embodiment of the present invention. In particular, Figure 7(a) shows a short ledge 150 positioned on joining member 108 adjacent head 104 and extending away from joining member 108 in a direction perpendicular to the plane of the head 104, legs 106 and joining member 108.

[0045] It is contemplated that ledge 150 extends across the width of joining member 108 in particular across the width of both legs 112 and gap 124and extends away from joining member 108 to a distance approximately the same as the length of the first, wider, portion of each leg.

[0046] Figure 7(b) shows a perspective view of the seal of Figure 7(a), showing ledge 150 positioned on a back surface of a seal, with ledge 150 extending away from the back surface of the seal in a direction perpendicular to the plane of the seal.

[0047] Figure 7(c) shows a side view of the seal of Figures 7(a) and (b).

[0048] Figure 7(d) shows a back view of a strip of the

seals of Figures 7(a) - (c).

[0049] A seal in accordance with the present invention may be used in any one of many well-known locking housings, for example the locking housing 52 in Figure 2.

[0050] Seals may be moulded in one piece from plastics using conventional injection moulding techniques.

[0051] In use, once a fastener tab 54 of an engagement means 56, such as for example a zip, has been placed over chamber 58 of such a locking housing 52, revealing a narrow entry way 60 into chamber 58 above the fastener tab 54, legs 106 may be inserted into the chamber 58, over tab 54 and through narrow entry way 60, to lock the tab in place. In order to fit through narrow entry way 60 each leg 106 of the pair may flex towards the other leg of the pair, into the gap 124 between them, and each second part 114 may flex towards first part 112. Legs 106 may proceed into chamber 58 until end 116 of each leg bumps against the internal wall of the chamber 58 distal entry way 60, or until shoulder 125 of head 104 bumps against external wall 62 of chamber 58 adjacent entry way 60.

[0052] Once fully entered into chamber 58 legs 106 return to their rest position, an arrangement in which second parts 114 extend beyond the width of entry way 60. If head 104 is then urged away from chamber 58 to withdraw seal 102 from chamber 58 through entry way 60, ends 126 of respective second parts 114 engage with respective shoulders provided within chamber 58 on either side of entry way 60, latching the seal in place.

[0053] Tab 54 of zip 56 may only be released by breaking seal 102, for example by snapping the legs at weak point 119. With the seal removed, tab 54 may then be disengaged from chamber 58 and the zip or fastener may be opened to allow access to the contents of the bag. With legs 106 detached from head 104, legs 106 remain loose in chamber 58. Individual legs 106 are sufficiently small to easily be removed from chamber 58, for example legs 110 readily fall out from chamber 58.

[0054] While the arrangements of Figures 3 - 7 provide for a tamper-evident seal, it may be argued that access into the chamber 58 might be achievable by, for example, inserting a pin or other narrow implement into narrow entry way 60 over the top of, or along the side of, the seal. Ledge 150 is provided to prevent this, and to make it evident that no such access has been possible. Legs 106 of a seal in accordance with the fourth embodiment, as shown in Figures 7(a) to 7(c), may be inserted into chamber 58 through narrow entry way 60, with the side of the seal upon which ledge 150 is mounted facing away from the zip 56 and tab 54.

[0055] With legs 106 fully entered into chamber 58, ledge 150 rests against narrow entry way 60 preventing access to the chamber by any means.

[0056] As with embodiments 1 to 3, tab 54 of zip 56 may be released by breaking seal 102 by snapping the legs 106 at weak point 119. During this process ledge 150 is urged against the locking housing, asserting even more force on the weakened point 119 of legs 106, efficiently breaking the seal.

[0057] In the fifth preferred embodiment, as shown in figure 8, the seal includes a head 204 connected to a pair of legs 206, in this case there is no joining member. Head 204 is again a generally rectangular, planar body, but it is contemplated that the body may have rounded corners, be generally circular or have some other suitable shape.

[0058] It is contemplated that legs 206 are integral with head 204 and extend substantially in the plane of head 204, from respective regions on a distal edge of the head 204. Each leg 206 comprises a first part 212 extending away from the head 204 and a second part 214 extending from an end 216 of first part 212 distal the head 204 back towards the head 204. The second part 214 of a first of the pair of legs extends away from the first part 212 of the second of the pair of legs, and vice versa. As can be seen from Figure 8, each leg 206 forms the shape of an elongate hook.

[0059] As in the other embodiments, first parts 212 of legs 206 have a first width adjacent head 204, an external edge of each leg aligned with an external edge of head 204, and a second, reduced width towards end 216 of first part 212, the second portion 214 of each leg being positioned partially within the space provided by the narrowed first portion. Legs 206 are resiliently axially and laterally deformable about the channel 224 between the pair of legs 206.

[0060] The first, wider portion of the first part 212 of each leg 216 includes a V-shaped indentation 218 along the width of the leg. This indentation provides for a line 219 along the width of the leg, at the point of the 'V', at which the material is at its thinnest. This provides a weak point at which any force exerted on the leg will be focussed and where the legs may be snapped off providing a clean break. Alternatively the V-shaped indentation may extend along only a portion of the width of the leg, being positioned intermediate two end walls (not shown).

[0061] In addition the weakened section may optionally or alternatively include an opening 222. The presence of the indentation and/or opening provides a frangible portion of each leg at which the leg may be detached from the head 204.

[0062] In addition to the absence of a platform portion of the head, in contrast to the earlier embodiments, the channel 224 of the fifth embodiment extends into the body portion forming a cutout 230 set back from the shoulders 232 of the body portion of the head. It is essential that the channel extends past the point of weakness in order that the legs break off separately; to ensure that the legs break off separately it is preferred that the channel extends at least parallel with the shoulders 232; and most preferred that as shown the channel extends into the body portion.

[0063] The invention is not restricted to details of the foregoing embodiments. For example weakened region 118 may be weakened by other means, for example the weakened region may comprise a channel or trough, which includes less material than that generally present

in the rest of the leg 106, but without weakened line 119. The channel or trough may extend along the whole width of each leg or extend along only part of each leg, intermediate end walls (not shown). In addition the weakened region may include a series of openings rather than the one present in Figures, or the V section or channel may not extend along the entire width of the first thicker portion of first part 112. The V section may be present on only one side of the seal, as shown in Figures 3 to 6, or may be present on both sides of the seal. If present on both sides of the sea the points of respective V sections may match or may be slightly offset, one from the other. The depth of legs 106, from the first side shown in Figures 3 and 5, to the second side shown in Figures 4 and 6, may be less than the depth of the head 104, rendering the legs more flexible. Ledge 150 may have a length that is different from the length of the first, wider portion of each leg, for example, it may be longer. In addition, ledge 150 may be positioned in a slightly different position on the seal, and may be wider or narrower.

[0064] The head may further include beading on a planar surface (not shown) to thicken the head, or may alternatively or additionally include a single thicker portion, for example a central circular thicker portion shown on Figure 8. Including such thicker portions to the seal head provides for a more robust seal and also assists in suitable positioning of the seal on entry into locking chambers.

[0065] Use of the seal is described in relation to the prior art locking housing of Figure 2, however use with suitable alternative locking housings is contemplated and falls within the scope of the present disclosure.

Claims

1. A seal for a sealable product which includes a fastener and a sealing device for securing said fastener, in which said sealing device comprises a locking housing having a lock opening with shoulders at each side thereof, a tab cover connected to the fastener and engageable with the locking housing, wherein said seal comprises:

   a head, and
   a pair of parallel inner legs, separated by a channel,
   each inner leg including a first, wide portion adjacent said head and narrowing on an outer edge distal said channel to form a second, narrow portion, from an end of which, distal said first wide portion, extends, away from said channel and towards said first wide portion, an outer leg resiliently deformable towards said narrow portion of said inner leg, and including at an end proximal to, and extending outside of a width of, said wide portion of said inner leg, a surface, positioned for latching engagement behind a respective said shoulder; **characterised in that** said first wide portion of each inner leg includes a region of weakness which is selectively fracturable and **in that** each of said pair of inner legs is resiliently deformable into said channel.

2. A seal as claimed in claim 1 wherein said seal is planar in shape.

3. A seal according to claim 1 or 2 wherein each outer leg is adapted to resiliently deflect towards a respective inner leg when inserted into the lock opening thereby reducing the distance between respective outer and inner legs.

4. A seal as claimed in any of the preceding claims wherein said region of weakness is defined by a trough formed on an upper and/or a lower surface of said wider portion extending between an outside edge of said wider portion towards said channel.

5. A seal as claimed in claim 4 wherein said trough is V-shaped.

6. A seal as claimed in any of claims 1 to 3 wherein said region of weakness is defined by at least one opening positioned in said wider portion of each inner leg.

7. A seal as claimed in any of claims 1 to 6 wherein said region of weakness is defined by a trough and at least one opening.

8. A seal as claimed in any of the preceding claims wherein, with said seal inserted into said locking housing, at least a portion of said fastener is covered by the seal.

9. A seal as claimed in any of the preceding claims wherein the seal is adapted to fracture into at least three component parts.

10. A seal as claimed in any of the preceding claims wherein the channel is wider than the narrow portion of the legs.

11. A seal as claimed in any of the preceding claims wherein the widthwise distance of the surface, positioned for latching engagement behind a respective said shoulder at the end proximal to, and extending outside of a width of, said wide portion of said inner leg is defined as x and the width of the channel is defined as y; and $y>2x$.

12. A seal as claimed in any of the preceding claims wherein the head includes a body portion having shoulders and the end of the channel, which separates the legs, extends at least in line with the shoul-

ders.

13. A seal as claimed in claim 11 wherein the end of the channel extends beyond the shoulder into the body portion.

14. A seal as claimed in any of claims 1-12 wherein the head includes a platform provided between the body portion and the legs

15. A seal according to any of the preceding claims further comprising a ledge extending away from the seal in a direction perpendicular to the plane of the head.

16. A seal according to claim 14 wherein the ledge extends across the width of both legs.

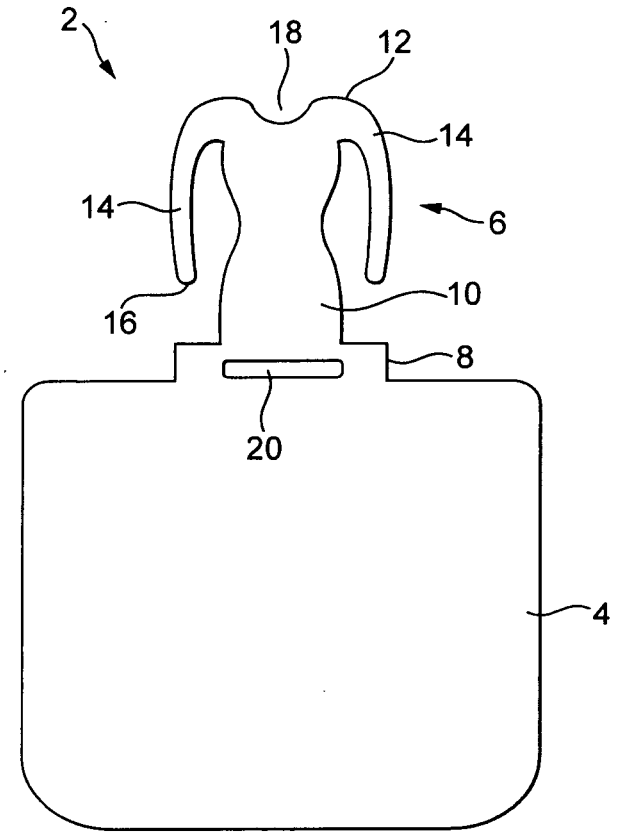

FIG. 1
(PRIOR ART)

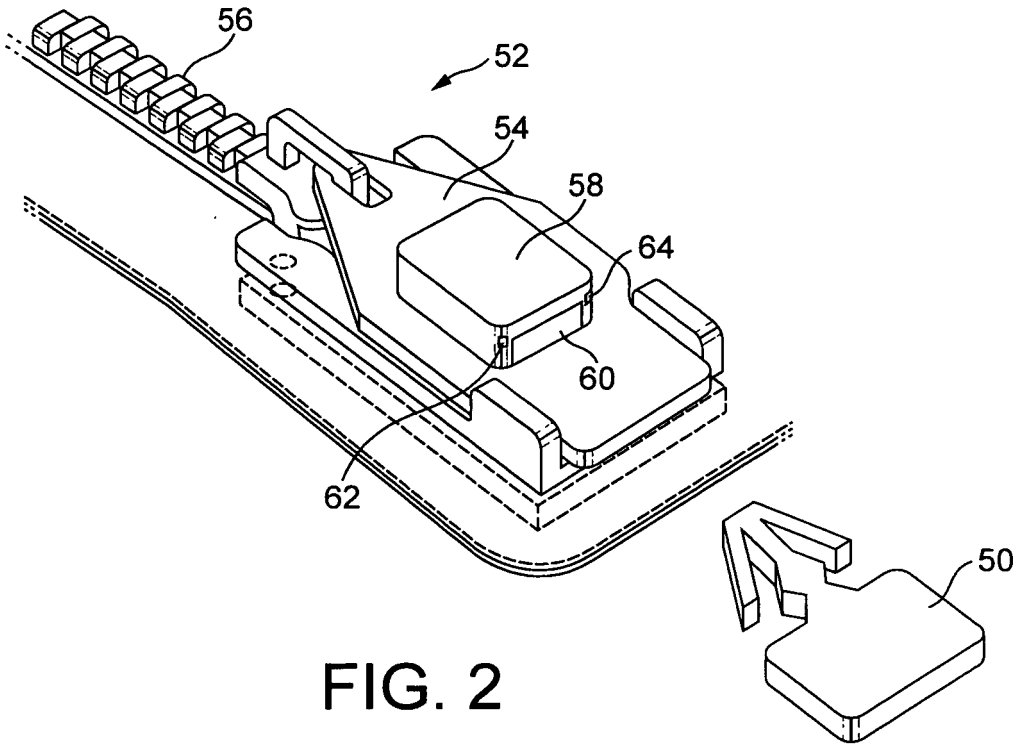

FIG. 2

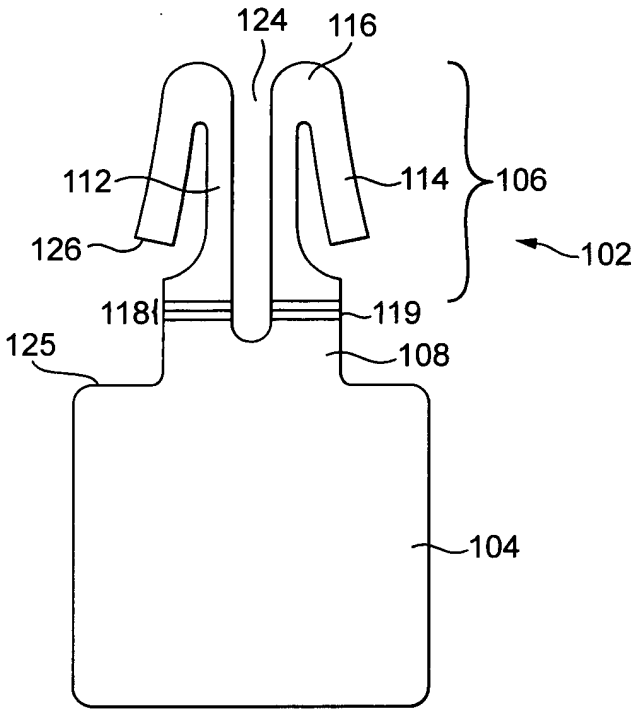
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FIG. 3(a)

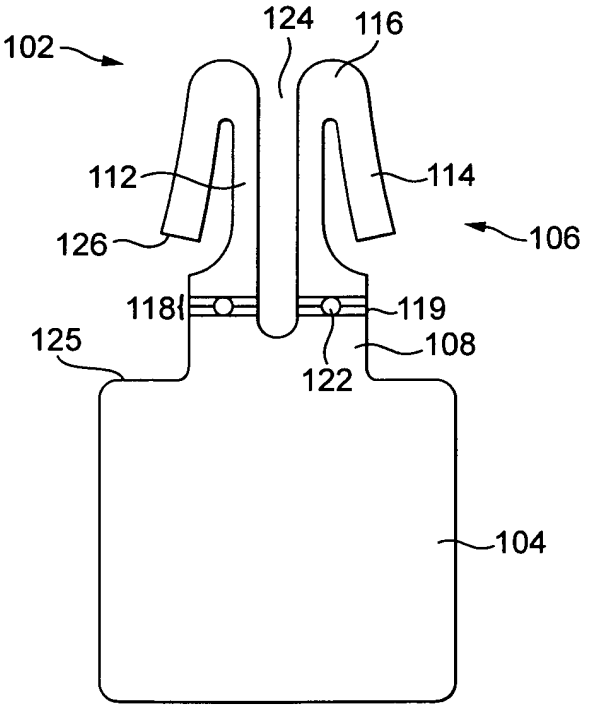
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FIG. 3(b)

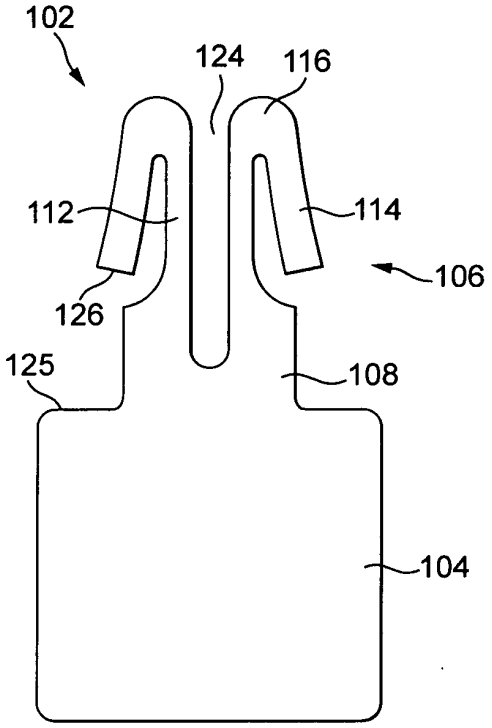
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FIG. 4

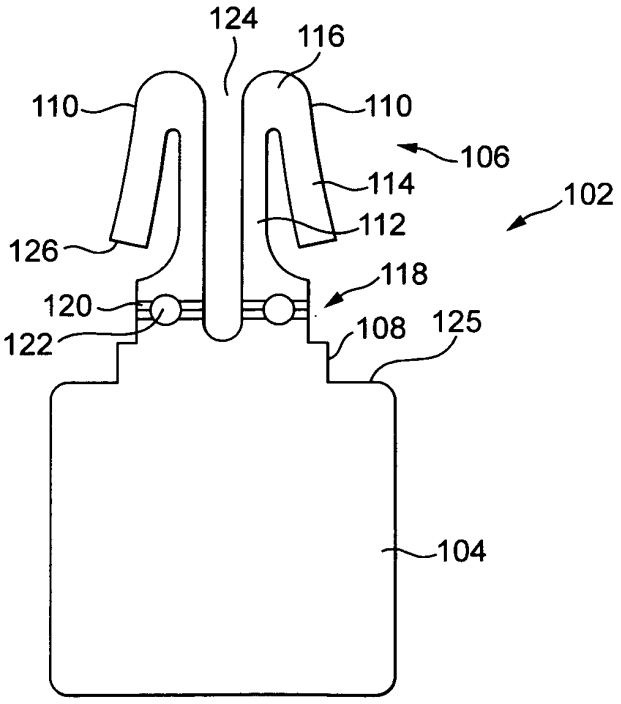
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FIG. 5

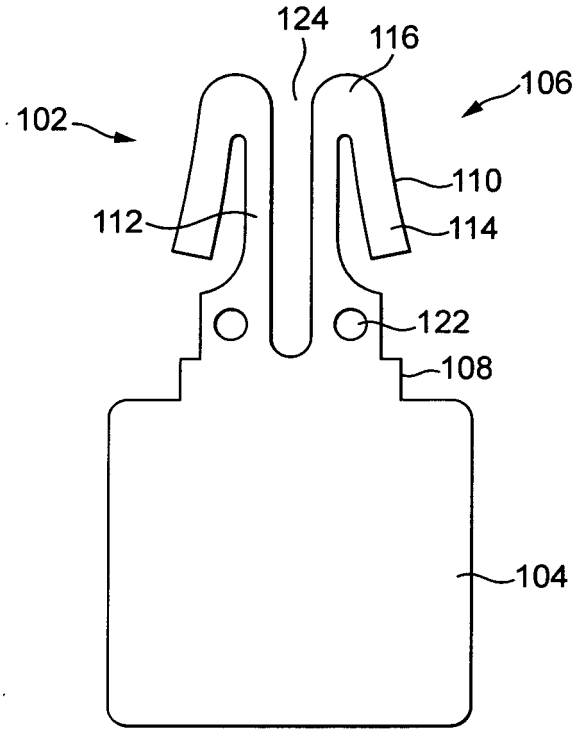

FIG. 6

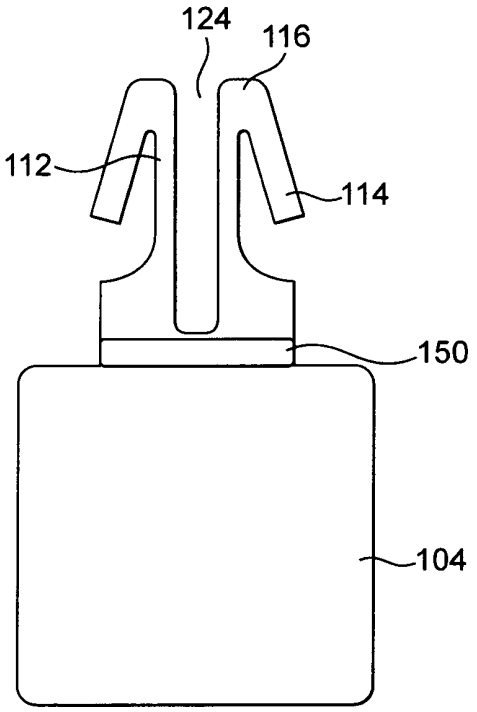

FIG. 7(a)

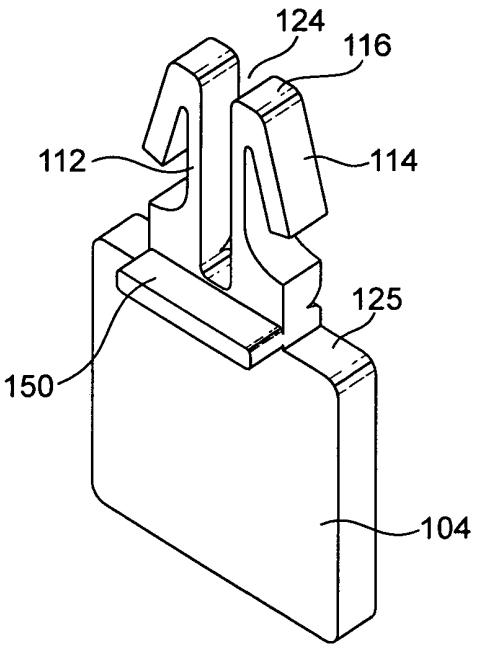

FIG. 7(b)

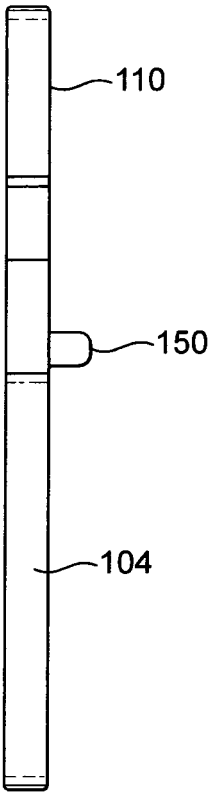

FIG. 7(c)

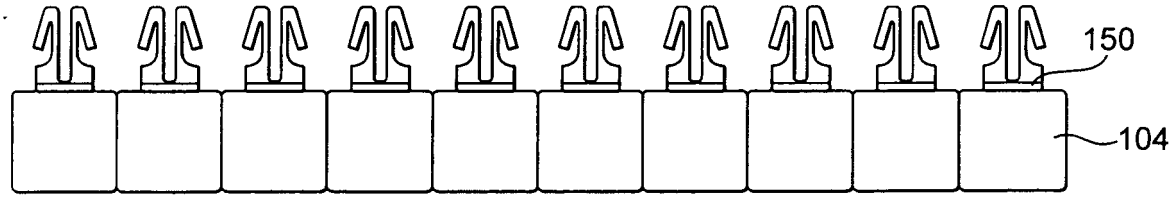

FIG. 7(d)

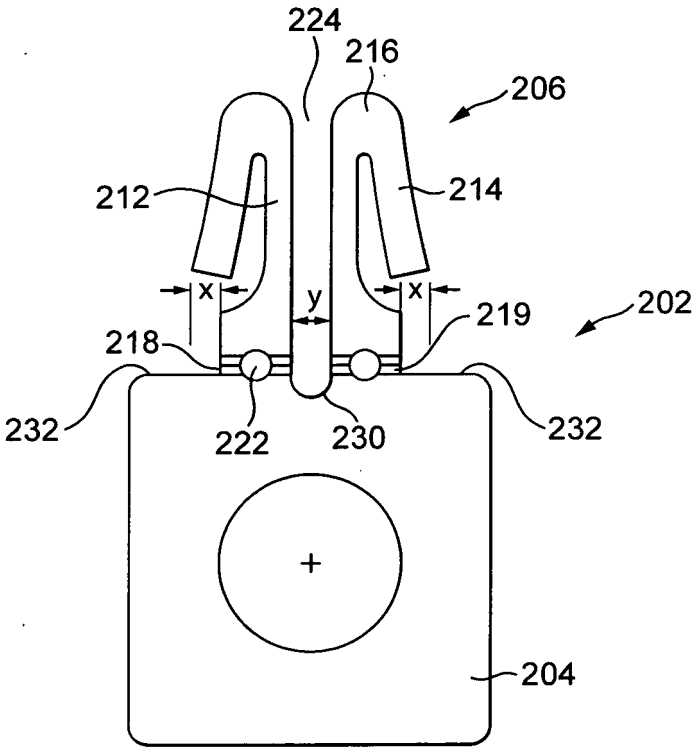

FIG. 8

REFERENCES CITED IN THE DESCRIPTION

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