



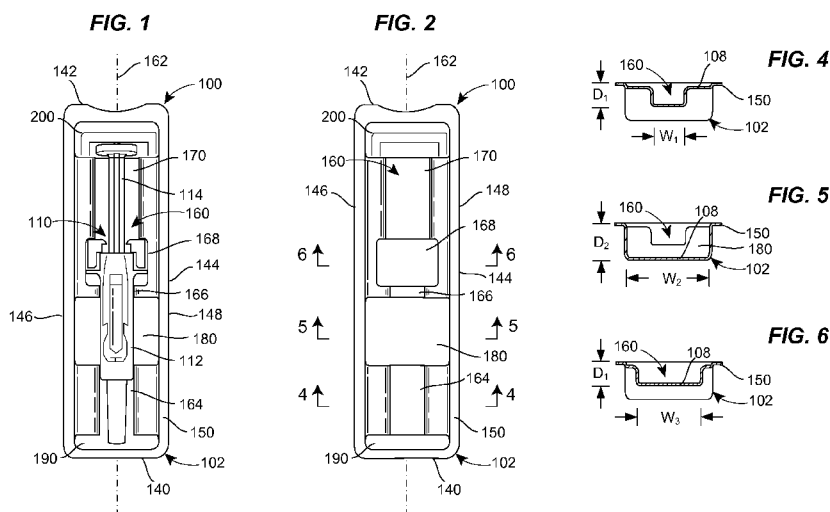
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(54) **Title:** BLISTER PACK

(57) **Abstract:** A blister pack has a cover sheet, and a blister with first and second ends in a longitudinal direction, a midpoint between the first and second ends, and first and second sides in a lateral direction. The blister has a rim in a plane in the longitudinal and lateral directions that is attached to the cover sheet, a longitudinal channel that is recessed from the first plane in a vertical direction and has a first cavity, and a gripping cavity that is recessed farther from the first plane than the first cavity is, is wider than the first cavity is, and is disposed closer to the midpoint than the first cavity is. The lengths of the cavities exceed two-thirds of the length of a medical device body, and the lengths of the cavities each are greater than one quarter of the length of the body.

BLISTER PACK

Background

[0001] This patent is directed to a blister pack, and, in particular, to a blister pack for use with medical devices. The medical device may be a syringe with a needle guard, for example.

Summary

[0002] According to an aspect of the present disclosure, a blister pack for a medical device having a body and a plunger rod depending from the body is provided. The blister pack has a cover sheet, and a blister having first and second opposite ends in a longitudinal direction, a midpoint equally spaced between the first and second opposite ends, and first and second opposite sides in a lateral direction. The blister has a rim disposed about a periphery of the blister in a first plane that extends in the longitudinal direction and the lateral direction, wherein the rim attaches to the cover sheet, a longitudinal channel that is recessed from the first plane in a vertical direction and has a first cavity, and a gripping cavity that is recessed farther from the first plane than the first cavity is in the vertical direction, is wider than the first cavity is in the lateral direction, and is disposed closer to the midpoint than the first cavity is. The length of the first cavity and the gripping cavity exceed two-thirds of the length of the medical device body, and the length of the first cavity and the length of the gripping cavity each are greater than one quarter of the length of the medical device body.

[0003] According to another aspect of the present disclosure, a kit has a medical device having a body and a plunger rod depending from the body and a blister pack. The blister pack has a cover sheet, and a blister having first and second opposite ends in a longitudinal direction, a midpoint equally spaced between the first and second opposite ends, and first and second opposite sides in a lateral direction. The blister has a rim disposed about a periphery of the blister in a first plane that extends in the longitudinal direction and the lateral direction, wherein the rim attaches to the cover sheet, a longitudinal channel that is recessed from the first plane in a vertical direction and has a first cavity, and a gripping cavity that is recessed farther from the first plane than the first cavity is in the vertical direction, is wider than the first cavity is in the lateral direction, and is disposed closer to the midpoint than the first cavity is. The length of the first cavity and the gripping cavity exceed two-thirds of the length of the

medical device body, and the length of the first cavity and the length of the gripping cavity each are greater than one quarter of the length of the medical device body.

Brief Description of the Drawings

[0004] It is believed that the disclosure will be more fully understood from the following description taken in conjunction with the accompanying drawings. Some of the figures may have been simplified by the omission of selected elements for the purpose of more clearly showing other elements. Such omissions of elements in some figures are not necessarily indicative of the presence or absence of particular elements in any of the exemplary embodiments, except as may be explicitly delineated in the corresponding written description. None of the drawings are necessarily to scale.

[0005] Fig. 1 is a plan view of the blister pack according to the present disclosure in a kit with a medical device defined by a pre-filled syringe and an automatic needle guard, a cover sheet of the blister pack removed to better visualize the blister and the medical device;

[0006] Fig. 2 is a plan view of the blister pack of Fig. 1 with the medical device and cover sheet removed therefrom;

[0007] Fig. 3 is a plan view of the blister pack of Fig 1 with the cover sheet attached to the blister;

[0008] Fig. 4 is a cross-sectional view of the blister taken along line 4-4 in Fig. 2;

[0009] Fig. 5 is a cross-sectional view of the blister taken along line 5-5 in Fig. 2;

[0010] Fig. 6 is a cross-sectional view of the blister taken along line 6-6 in Fig. 2;

[0011] Fig. 7 is a fragmentary, enlarged, plan view of a blister pack according to a further embodiment; and

[0012] Fig. 8 is a plan view of a blister pack according to an alternative embodiment with the cover sheet attached to the blister.

Detailed Description of Various Embodiments

[0013] Referring first to Figs. 1-3, a blister pack 100 (which may also be referred to as blister packaging or a blister tray) according to the present disclosure is illustrated. The blister pack 100 includes the blister 102 (which may also be referred to as the bottom web), as illustrated in Figs. 1 and 2, and a cover sheet 104 (which may also be referred to as a cover, lid, lid sheet, or top web), as illustrated in Fig. 3. The cover sheet 104 has been removed in Figs. 1 and 2 to better visualize the blister

102. The blister 102 has a wall 108 (best seen in cross-section in Figs. 4-6) that may be shaped to define the various features described below. The wall 108 may be shaped by thermo-forming, vacuum-molding, pressing or otherwise forming a stiff sheet of a plastic material, such as polycarbonate, polyethylene, polypropylene, or polystyrene. The wall 108 may be transparent, translucent or opaque.

[0014] As illustrated in Fig. 1, the blister pack 100 is designed for use with a medical device 110 having a body 112 and a plunger rod 114, and with the medical device 110 may define a kit. The medical device 110 may be defined in part by a syringe, e.g., a pre-filled syringe. The pre-filled syringe may contain a medicament, drug product, or pharmaceutical, for example. The syringe may be disposed within a needle guard. According to certain embodiments, the needle guard may be an automatic needle guard, such as the X100L passive needle guard manufactured and sold by Safety Syringe Inc. (Carlsbad, California), although the present disclosure is not limited to this particular pre-filled syringe/needle guard combination. According to such an embodiment, the plunger rod 114 is defined by the plunger rod of the pre-filled syringe, while the body includes that portion of the device other than the plunger rod 114 (i.e., the needle guard, the barrel of the pre-filled syringe, the needle and the associated needle cover).

[0015] The blister 102 has first and second opposite ends 140, 142 in a longitudinal direction, and a midpoint 144 equally spaced between the first and second opposite ends 140, 142. The blister 102 also has first and second opposite sides 146, 148 in a lateral direction. As illustrated, a length between the first and second opposite ends 140, 142 is greater than a width between the first and second opposite sides 146, 148. While the blister 102 has a generally rectangular shape as illustrated, the blister 102 is not limited to such a shape; variants may include blisters with an oval shape, for example. Alternatively, the length and width may be approximately equal, or the width may be greater than the length.

[0016] The blister 102 has a rim 150. The rim 150 is disposed about a periphery of the blister 102 in a first plane that extends in the longitudinal direction and the lateral direction. Compare Figs. 1 and 2 with Figs. 4-6. The cover sheet 104 is attached to the rim 150 (as illustrated in Fig. 3) in accordance with the material used for the cover sheet 104 and the blister 102; according to certain embodiments, the cover sheet 104 may be attached to the rim 150 using a heat seal.

[0017] An alternative embodiment has been illustrated in Fig. 8, with features in common with the embodiment of Figs. 1-6 numbered similarly, but differentiated with a prime. According to this embodiment, a blister 102' has a rim 150' with a slightly different shape than that illustrated in Figs. 1-6. The rim 150' is still disposed about a periphery of the blister 102' in a first plane that extends in the longitudinal direction and the lateral direction, but the rim 150' extends further inward at the end 140' of the blister 102'. The cover sheet 104' is attached to the rim 150' (using a heat seal, for example), except over a section of the rim 150' at the end 140' so as to define a corner peel 152. The corner peel 152 may be gripped by the user and pulled away from the blister 102' to facilitate removal of the cover sheet 104' from the blister 102'.

[0018] According to either embodiment, the blister 102 has a longitudinal channel 160 that runs between the opposite ends 140, 142 of the blister 102. As illustrated, the longitudinal channel 160 lies along a longitudinal axis 162 of the blister 102 (see Fig. 2) equally distant from the sides 146, 148. However, according to other embodiments, the channel 160 may lie along axes that are not equally distant from the sides 146, 148, but may instead lie along an axis that is closer to one side 146, 148 than the other side 146, 148. Furthermore, while the axis 162 is roughly parallel to the sides 146, 148, according to other embodiments, the axis 162 may be at an angle to the sides 146, 148.

[0019] The longitudinal channel 160 is recessed from the first plane (described above) in a vertical direction to a uniform depth, which is to say that the distance the channel 160 is recessed in the vertical direction is relatively constant along the length of the channel 160 in the longitudinal direction. For example, with reference to Figs. 4 and 6, it can be seen that the section of the channel 160 at different points has a depth, D_1 , that is approximately the same (i.e., within 10%). This would also be the case if a section was examined at a point on either side of the section at line 4-4, for example. This description of the relative depth may not apply to all embodiments, and it may be possible for an embodiment to include cavities of the channel 160 that are not approximately the same (i.e., not within 10%, but instead with a greater than 10% difference). Further, as a consequence of the shape of the channel 160 being relatively rectangular in cross-section at the sections illustrated in Figs. 4 and 6, the channel also has a uniform depth in the lateral direction. However, when the channel

160 is described as having a uniform depth without reference to the lateral direction, this is relative to the lowest point in the channel 160 along its length in the longitudinal direction. As such, even if the channel 160 were semi-circular in cross-section, it may be possible to describe it as having a uniform depth in the longitudinal direction (although the depth in the lateral direction may vary).

[0020] The longitudinal channel 160, as illustrated in Figs. 1 and 2, may be defined by several cavities 164, 166, 168, 170, which cavities may be separated from each other by other cavities or spaces (e.g., cavity 180). Each cavity 164, 166, 168, 170 may be described as having a uniform width in the lateral direction within each such cavity (e.g., W_1 for cavity 164 in Fig. 4, or W_3 for cavity 168 in Fig. 6), which is to say that the distance between opposite lateral surfaces of that particular cavity of the channel 160 is relatively constant along the length of the cavity of the channel 160 in the longitudinal direction. Again, because of the relatively rectangular cross-section of the channel (see Figs. 4 and 6), the width is relatively uniform in the vertical direction as well for each cavity 164, 166, 168, 170 of the channel 160. However, even if the cavities were semicircular in cross-section, for example, it would still be possible to discuss the cavity as having a uniform width if the distance between opposite lateral sides of the cavity of the channel 160 were relatively constant along the length of the cavity of the channel 160 (in the longitudinal direction).

[0021] As mentioned above, the blister 102 may include cavities in addition to the channel 160. For example, a gripping cavity 180 is included between cavities 164, 166 of the channel 160. The gripping cavity 180 is recessed further from the first plane in the vertical direction than the longitudinal channel 160, as illustrated in Fig. 5 (i.e., with a depth D_2). The gripping cavity 180 is also wider than the longitudinal channel 160 in the lateral direction. Compare Figs. 4 (W_1) with Fig. 5 (W_2). In fact, the cavity 180 may have a depth and a width equal to or greater than an adult human fingertip such that an adult fingertip could be disposed therein with the medical device 110 disposed therethrough, while the cavities 164, 166, 168 may have a depth and a width approximately the same as that of the medical device 110, such that when the medical device 110 is disposed therein, an adult human fingertip could not also be disposed therein as well.

[0022] The cavity 164 of the longitudinal channel 160 and the gripping cavity 180 cooperate to guide the removal of the medical device 110 from the blister 102. In particular, the cavity 164 of the channel 160 and the cavity 180 are disposed along the blister 102 and sized (relative to each other and the remainder of the channel 160 and cavities defined by the blister 102) so that the user will grasp the medical device 110 at a particular point along the body 112 of the medical device 110.

[0023] Guiding the user to grasp the medical device 110 along the body 112 of the device 110 may provide certain advantages. For example, guiding the user to grasp the body 112 of the medical device 110 may assist in preventing premature activation of the needle guard, especially where the needle guard is automatic. That is, the needle guard may include a spring that causes the cover of the needle guard to extend over and around the needle once the medicament, drug product, etc. has been injected into the patient. By grasping the body 112 of the device 110, the user may avoid grasping other parts of the device 110 which could cause this automatic deployment of the cover.

[0024] To guide the user, the cavity 180 is disposed closer to the midpoint 144 of the blister 102 than the cavity 164 of the longitudinal channel 160, as seen in Figs. 1 and 2. Furthermore, the length of the cavity 164 of the longitudinal channel 160 and the gripping cavity 180 exceeds two-thirds of the length of the body 112 (i.e., the portion of the device 110 excluding the plunger rod 114). In fact, according to certain embodiments, the length of the cavity 164 of the longitudinal channel 160 and the length of the gripping cavity 180 each are greater than one quarter of the length of the medical device body 112. As a consequence, the cavity 180 may be disposed at or about the midpoint of the body 112 of the medical device 110, and the relative widths of the channel cavity 164 and the cavity 180 are such that the user will grasp the medical device 110 in the cavity 180, rather than at one of the ends of the medical device body 112.

[0025] According to certain embodiments, such as illustrated, the length of the cavity 164 of the longitudinal channel 160 and the length of the gripping cavity 180 may exceed three-quarters of the length of the medical device body 112. In addition or separately, the length of the cavity 164 of the longitudinal channel 160 and the length of the gripping cavity 180 may each be greater than one third of the length of the medical device body 112. Further, according to certain embodiments, such as is

illustrated, the length of the cavity 164 of the longitudinal channel 160 and the length of the gripping cavity 180 are equal.

[0026] To further facilitate and guide the action of the user, the width of the gripping cavity may be uniform and may be maximized. For example, as illustrated, the gripping cavity 180 extends from the rim 150 at the first side 146 of the blister 102 to the rim 150 on the second side 148 of the blister 102 in the lateral direction. As such, the width of the cavity 180 is approximately three times wider than the width of the cavities 164, 166 of the channel 160.

[0027] As seen in Figs. 1 and 2, the gripping cavity 180 is disposed between the cavity 164 of the channel 160 and the cavity 166 of the channel 160, the cavities 164, 166 having substantially the same width in the lateral direction, which width is less than the width of the gripping cavity 180 in the lateral direction. Moreover, the cavity 166 is adjacent the cavity 168, which receives the remainder of the body 112 of the medical device. Like the cavities 164, 166, the cavity 168 has a width that is less than the width of the gripping cavity 180 in the lateral direction. In fact, the cavities 164, 166, 168 of the channel 160 are sized such that they approximate the width of the medical device 110 in the lateral direction, which is to say that the width of the cavities 164, 166, 168 does not exceed the width of the medical device 110 to such an extent that the user may place his or her fingers in the space between the wall 108 and the medical device 110 and grip around and about the medical device 110 in these cavities 164, 166, 168.

[0028] The blister 102 may include cavities in addition to the gripping cavity 180. For example, in the embodiment shown, at least one additional cavity 190 may be disposed at the first end 140 of the blister, while another cavity 200 is disposed at the second end 142. These cavities 190, 200 may be similar in depth and width to the gripping cavity 180. That is, the cavities 190, 200 are recessed further from the first plane in the vertical direction than the longitudinal channel 160, and are wider than the longitudinal channel 160 in a lateral direction. However, unlike the cavity 180, the cavities 190, 200 are disposed closer to the one of the first and second opposite ends 140, 142 of the blister 102 than to the midpoint 144 of the blister 102.

[0029] According to another embodiment, the cavity 200 may be replaced with a cavity 250, as illustrated in Fig. 7. According to such an embodiment, the cavity 170 of the channel 160 may be foreshortened or eliminated, and the length of the cavity

250 increased relative to the length of the cavity 200 (in the longitudinal direction). Such an embodiment may be used, for example, with a medical device in the form of a syringe and needle guard, wherein the syringe is a pre-filled syringe. As illustrated in Fig. 1, the blister 102 may accommodate a pre-filled syringe that is almost completely filled, causing the plunger rod 114 to be substantially displaced relative to the barrel of the syringe, and thus the body 112. As illustrated in Fig. 7, the blister may accommodate a variety of pre-filled syringes, which syringes may or may not be almost completely filled; that is, the amount of medicament contained in the pre-filled syringe may vary causing the rod 114 to extend to various lengths from the body 114, and still be accommodated by the blister. It will be further recognized that the remainder of the embodiment of Fig. 7 may in all other respects be identical to that illustrated in Figs. 1-6.

[0030] During packaging, the medical device 110 is disposed in the channel 160 until the device 110 lies within the channel 160. The cover sheet 104 may then be applied to the blister 102 so as to cover the medical device 110. The cover sheet 104 is then joined or secured to the blister 104 to prevent its removal.

[0031] During use, the cover sheet 104 is removed from the blister 102 (for example, by gripping the corner peel 152 and pulling the cover sheet 104' from the blister 102', as in the embodiment of Fig. 8). The user then grasps the medical device 110 by placing his or her fingers in the cavity 180 and then around the device 110. Grasping the body 112 of the medical device 110, the user then removes the medical device 110 from the channel 160.

[0032] As will be recognized, the devices according to the present disclosure may have one or more advantages relative to conventional technology, any one or more of which may be present in a particular embodiment in accordance with the features of the present disclosure included in that embodiment. Other advantages not specifically listed herein may also be recognized as well.

[0033] Although the preceding text sets forth a detailed description of different embodiments of the invention, it should be understood that the legal scope of the invention is defined by the words of the claims set forth at the end of this patent. The detailed description is to be construed as exemplary only and does not describe every possible embodiment of the invention because describing every possible embodiment would be impractical, if not impossible. Numerous alternative embodiments could be

implemented, using either current technology or technology developed after the filing date of this patent, that would still fall within the scope of the claims defining the invention.

[0034] It should also be understood that, unless a term is expressly defined in this patent using the sentence “As used herein, the term ‘_____’ is hereby defined to mean...” or a similar sentence, there is no intent to limit the meaning of that term, either expressly or by implication, beyond its plain or ordinary meaning, and such term should not be interpreted to be limited in scope based on any statement made in any section of this patent (other than the language of the claims). To the extent that any term recited in the claims at the end of this patent is referred to in this patent in a manner consistent with a single meaning, that is done for the sake of clarity only so as to not confuse the reader, and it is not intended that such claim term be limited, by implication or otherwise, to that single meaning. Finally, unless a claim element is defined by reciting the word “means” and a function without the recital of any structure, it is not intended that the scope of any claim element be interpreted based on the application of 35 U.S.C. §112, sixth paragraph.

I claim:

1. A blister pack for a medical device having a body and a plunger rod depending from the body, the blister pack comprising:
 - (a) a cover sheet; and
 - (b) a blister having first and second opposite ends in a longitudinal direction, a midpoint equally spaced between the first and second opposite ends, and first and second opposite sides in a lateral direction, wherein the blister comprises:
 - (i) a rim disposed about a periphery of the blister in a first plane that extends in the longitudinal direction and the lateral direction, wherein the rim attaches to the cover sheet,
 - (ii) a longitudinal channel that is recessed from the first plane in a vertical direction and has a first cavity,
 - (iii) a gripping cavity that is recessed farther from the first plane than the first cavity is in the vertical direction, is wider than the first cavity is in the lateral direction, and is disposed closer to the midpoint than the first cavity is,
 - (iv) the length of the first cavity and the gripping cavity exceed two-thirds of the length of the medical device body, and
 - (v) the length of the first cavity and the length of the gripping cavity each are greater than one quarter of the length of the medical device body.
2. The blister pack according to claim 1, wherein the length of the first cavity of the longitudinal channel and the length of the gripping cavity exceeds three-quarters of the length of the medical device body.

3. The blister pack according to claim 2, wherein the length of the first cavity and the length of the gripping cavity are each greater than one third of the length of the medical device body.

4. The blister pack according to claim 3, wherein the length of the first cavity and the length of the gripping cavity are equal.

5. The blister pack according to any preceding claim, wherein a length between the first and second opposite ends is greater than a width between the first and second opposite sides.

6. The blister pack according to any preceding claim, wherein the first cavity has a uniform depth in the vertical direction and a uniform width in the lateral direction.

7. The blister pack according to any preceding claim, wherein:
the first cavity has a depth in the vertical direction and a width in the lateral direction such that an adult human fingertip could not also be disposed therein with the medical device disposed therethrough; and

the gripping cavity has a depth in the vertical direction and a width in the lateral direction such that an adult human fingertip could be disposed therein with the medical device disposed therethrough.

8. The blister pack according to any preceding claim, wherein the gripping cavity extends from the rim at the first side of the blister to the rim on the second side of the blister in the lateral direction.

9. The blister pack according to any preceding claim, wherein the blister includes at least one additional cavity, wherein the at least one additional cavity is

recessed farther from the first plane than the first cavity is in the vertical direction, is wider than the first cavity is in a lateral direction, and is disposed closer to the one of the first and second opposite ends of the blister than the midpoint of the blister.

10. A kit comprising:

- (1) a medical device having a body and a plunger rod depending from the body; and
- (2) a blister pack in which the medical device is disposed, the blister pack comprising:

- (a) a cover sheet; and

- (b) a blister having first and second opposite ends in a longitudinal direction, a midpoint equally spaced between the first and second opposite ends, and first and second opposite sides in a lateral direction, wherein the blister comprises:

- (i) a rim disposed about a periphery of the blister in a first plane that extends in the longitudinal direction and the lateral direction, wherein the rim attaches to the cover sheet,
 - (ii) a longitudinal channel that is recessed from the first plane in a vertical direction and has a first cavity,
 - (iii) a gripping cavity that is recessed farther from the first plane than the first cavity is in the vertical direction, is wider than the first cavity is in the lateral direction, and is disposed closer to the midpoint than the first cavity is,
 - (iv) the length of the first cavity and the gripping cavity exceed two-thirds of the length of the medical device body, and
 - (v) the length of the first cavity and the length of the gripping cavity are each greater than one quarter of the length of the medical device body.

11. The kit according to claim 10, wherein the device is a syringe disposed in a needle guard.

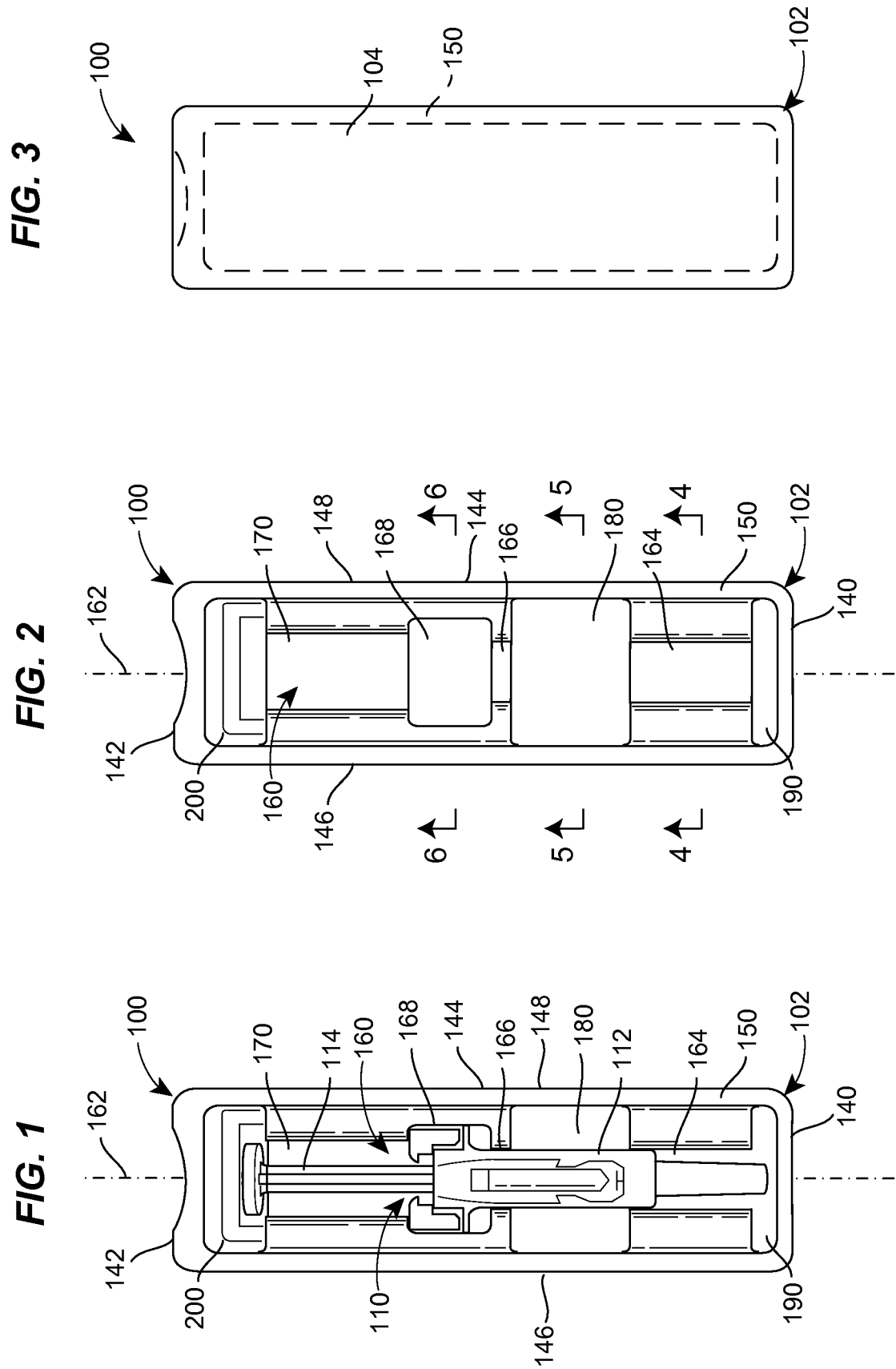
12. The kit according to claim 11, wherein the syringe is a pre-filled syringe and the needle guard is an automatic needle guard.

13. The kit according to claim 12, wherein the pre-filled syringe contains a medicament.

14. The kit according to claim 10, wherein:

the first cavity has a depth in the vertical direction and a width in the lateral direction such that an adult human fingertip could not also be disposed therein with the medical device disposed therethrough; and

the gripping cavity has a depth in the vertical direction and a width in the lateral direction such that an adult human fingertip could be disposed therein with the medical device disposed therethrough.



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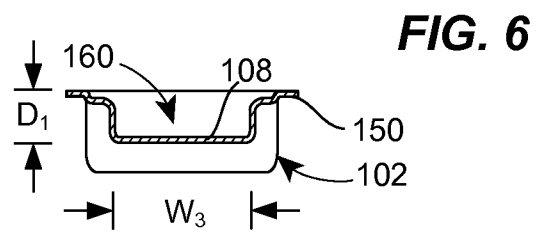
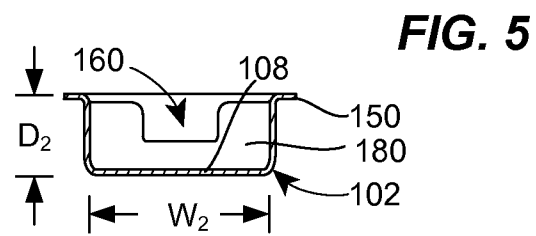
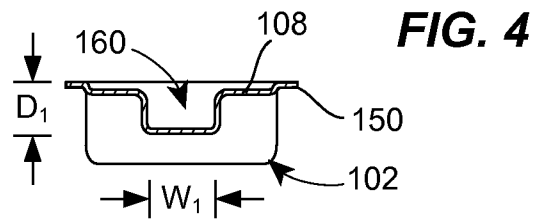


FIG. 7

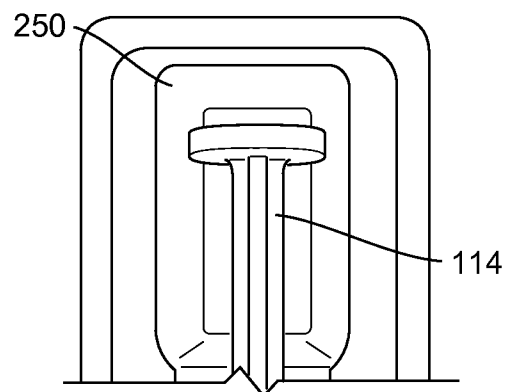
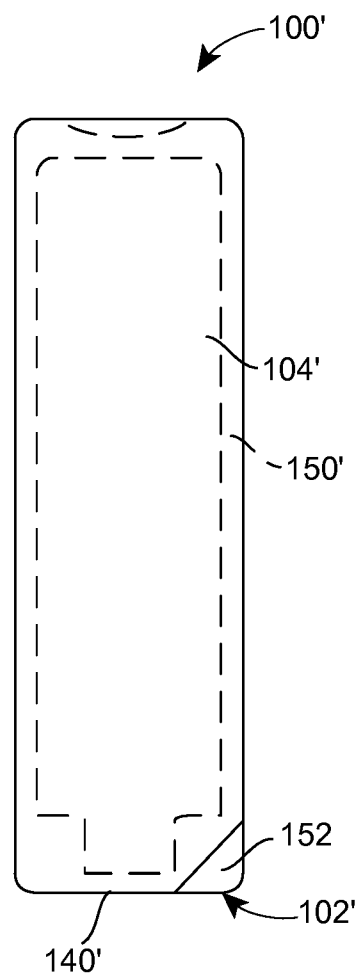


FIG. 8



INTERNATIONAL SEARCH REPORT

International application No

PCT/US2013/047258

A. CLASSIFICATION OF SUBJECT MATTER

INV. A61M5/00 B65D75/36
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A61M B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP H08 207960 A (DENKI KAGAKU KOGYO KK; DENKA SEIKEN KK) 13 August 1996 (1996-08-13)	1-11,14
Y	paragraphs [0004], [0010], [0014], [0025] abstract; claim 1; figures 1, 2, 5	12,13
X	JP H11 334757 A (SHISEIDO CO LTD; YAMATO ESURON KK) 7 December 1999 (1999-12-07) figures 1, 6, 15	1,5-8,10
Y	WO 03/045480 A1 (NOVO NORDISK AS [DK]) 5 June 2003 (2003-06-05) abstract	12,13



Further documents are listed in the continuation of Box C.



See patent family annex.

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP H08207960 A	13-08-1996	JP 3373967 B2 JP H08207960 A	04-02-2003 13-08-1996
JP H11334757 A	07-12-1999	JP 4098905 B2 JP H11334757 A	11-06-2008 07-12-1999
WO 03045480 A1	05-06-2003	AT 316395 T AT 420687 T AU 2002365290 A1 CA 2468243 A1 CN 1596138 A DE 60208933 T2 DK 1448256 T3 DK 1557191 T3 EP 1448256 A1 EP 1557191 A2 ES 2257597 T3 ES 2320558 T3 JP 4603262 B2 JP 2005510308 A PL 196617 B1 PT 1448256 E RU 2312679 C2 US 2003120209 A1 US 2005065476 A1 US 2005107740 A1 US 2009227950 A1 US 2011021988 A1 WO 03045480 A1 ZA 200403370 A	15-02-2006 15-01-2009 10-06-2003 05-06-2003 16-03-2005 26-10-2006 29-05-2006 04-05-2009 25-08-2004 27-07-2005 01-08-2006 25-05-2009 22-12-2010 21-04-2005 31-01-2008 30-06-2006 20-12-2007 26-06-2003 24-03-2005 19-05-2005 10-09-2009 27-01-2011 05-06-2003 04-05-2005