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(54) **CLOSURE FOR A CONTAINER**

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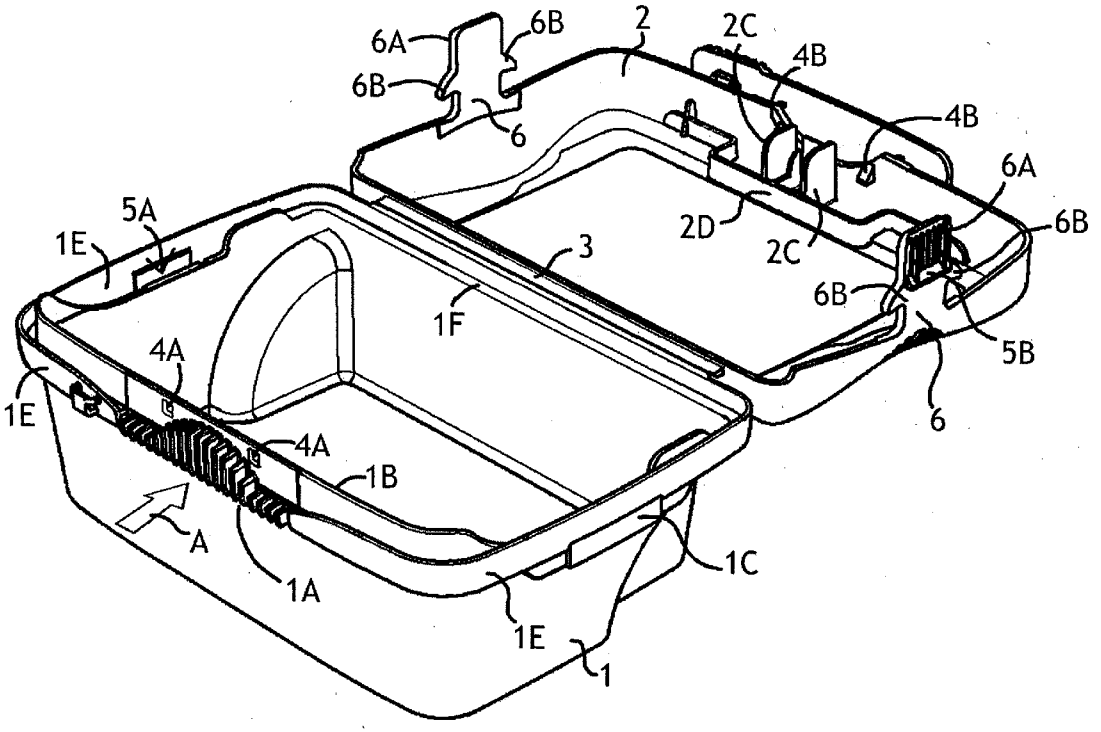
(57) **ABSTRACT**

A closure for a container, the closure having a base portion (**1**) which defines an opening and a lid portion (**2**) which is moveable away from and towards the opening to open and close the container, a first fastener (**4**A, **4**B) for releasably securing the lid and base portions (**1**, **2**) together in a closed position, and second fasteners (**5**A, **6**B) for irreversibly securing the lid and base portions (**1**, **2**) in a closed position prior to disposal of the container so the closure cannot be re-opened without substantial change thereto.



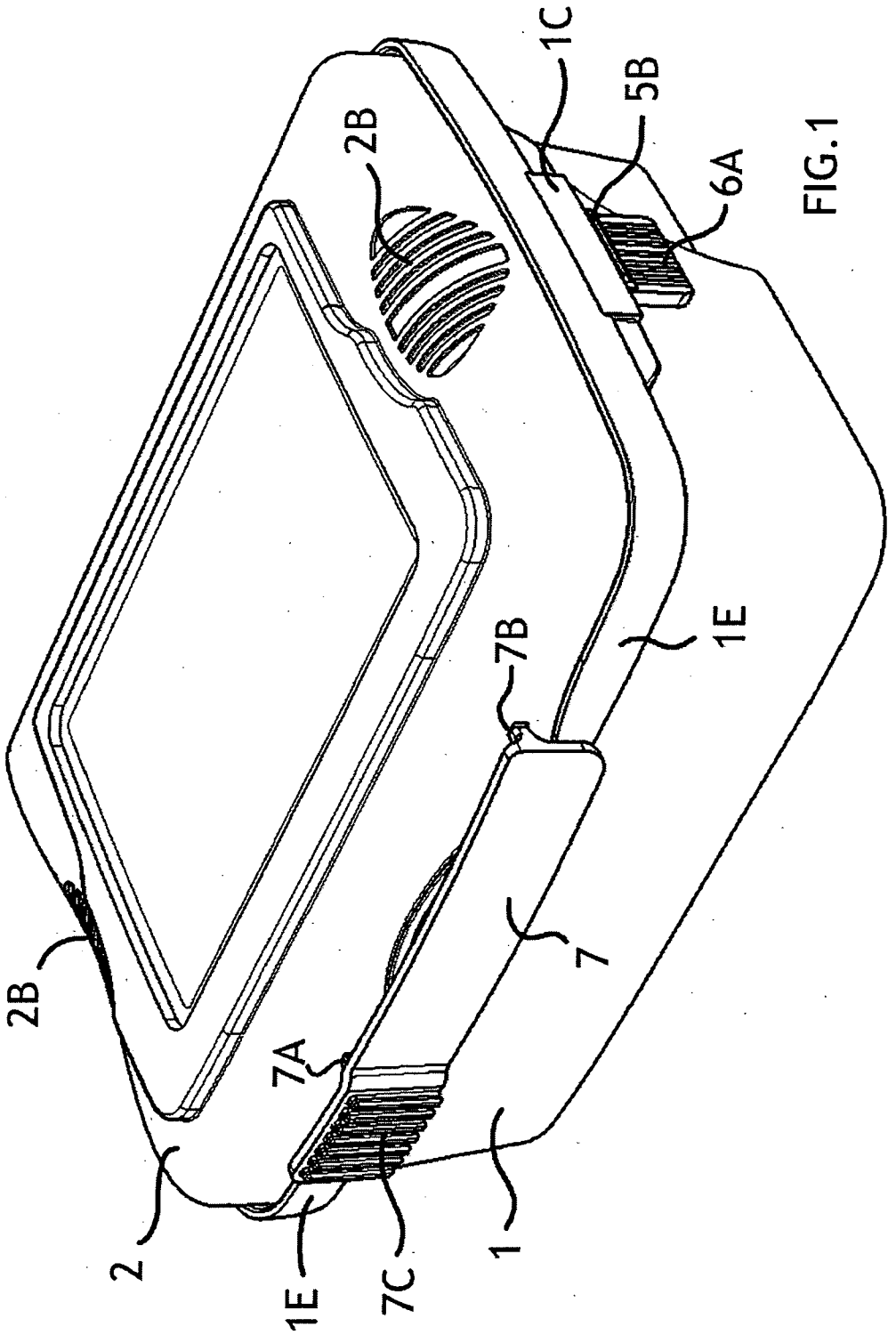


FIG. 1

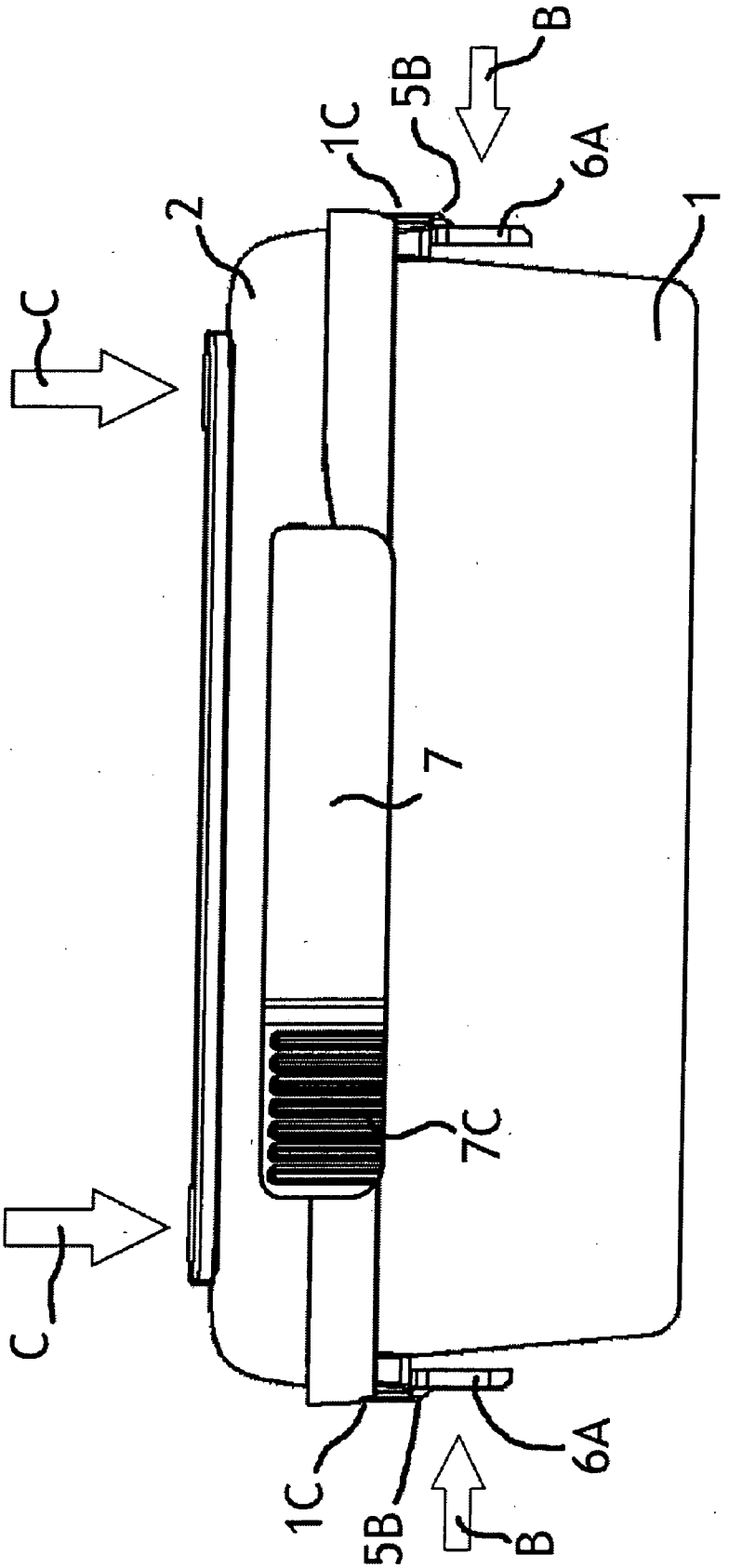


FIG.2

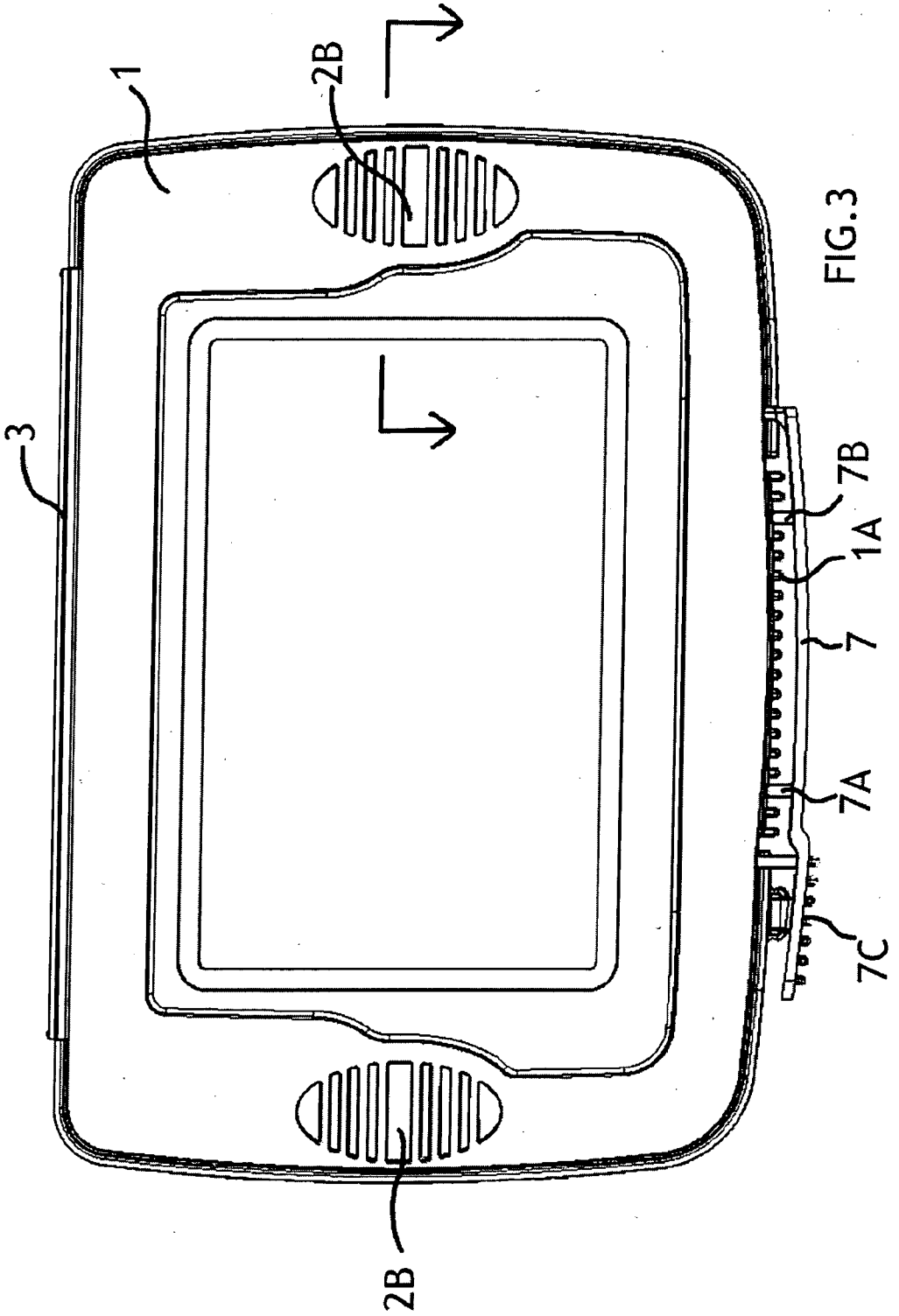


FIG.3

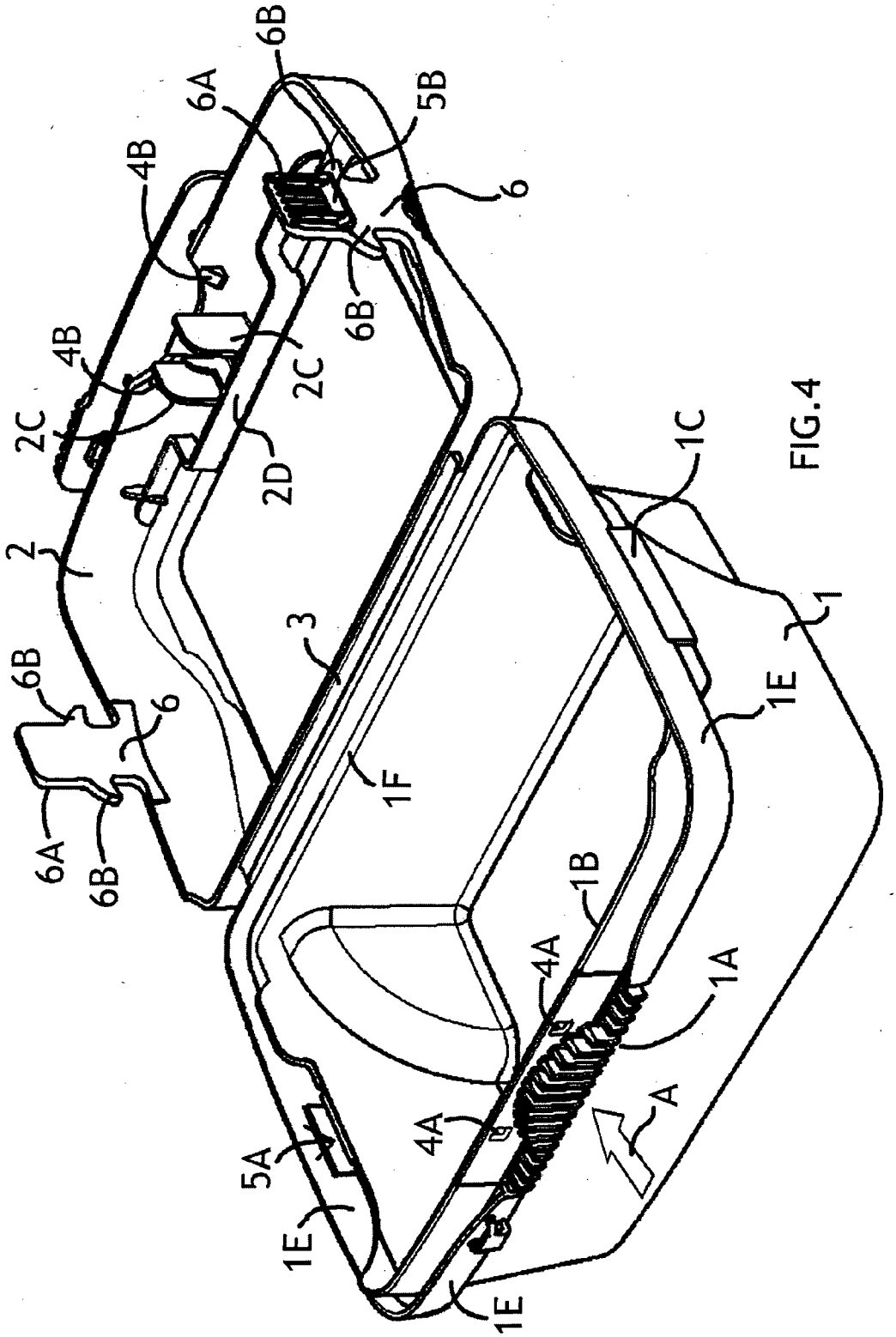

6B
6A
5B
4B
6
6B
4B
2C
2C
2D
2
6B
6
6A
6B
3
1C
1
1E
1F
1B
4A
1A
A
4A
5A
1E
1E

FIG.4

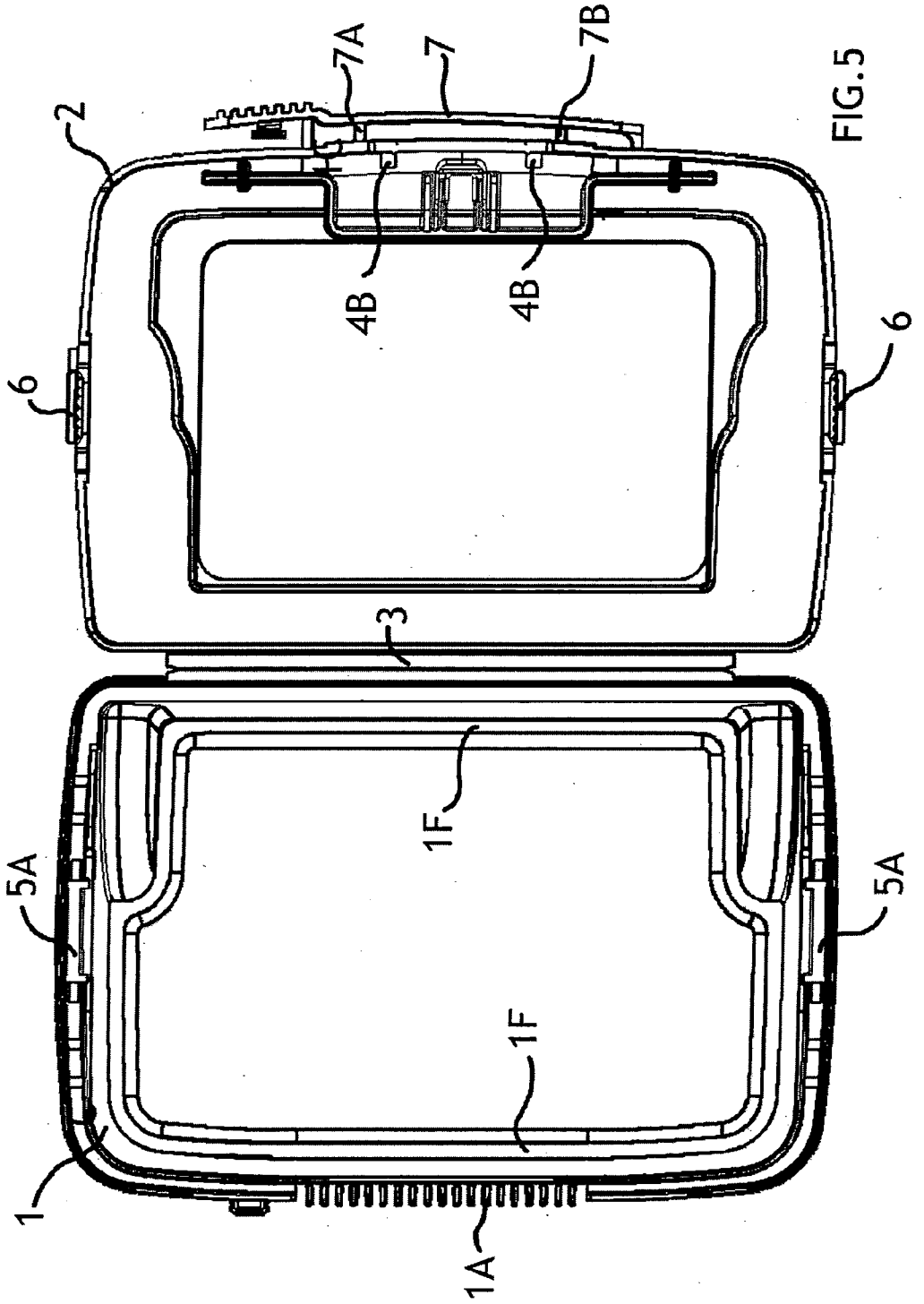


FIG.5

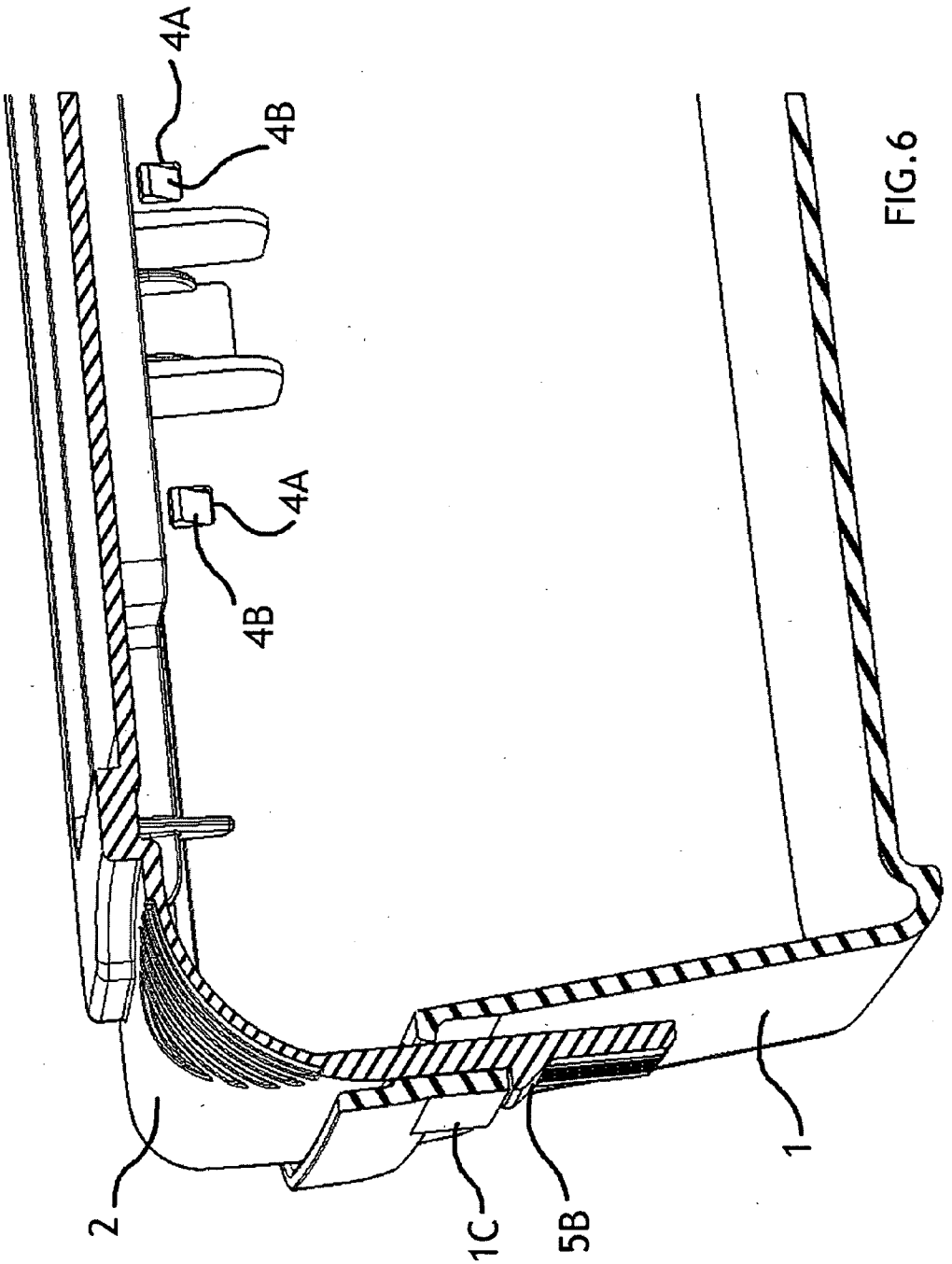


FIG.6

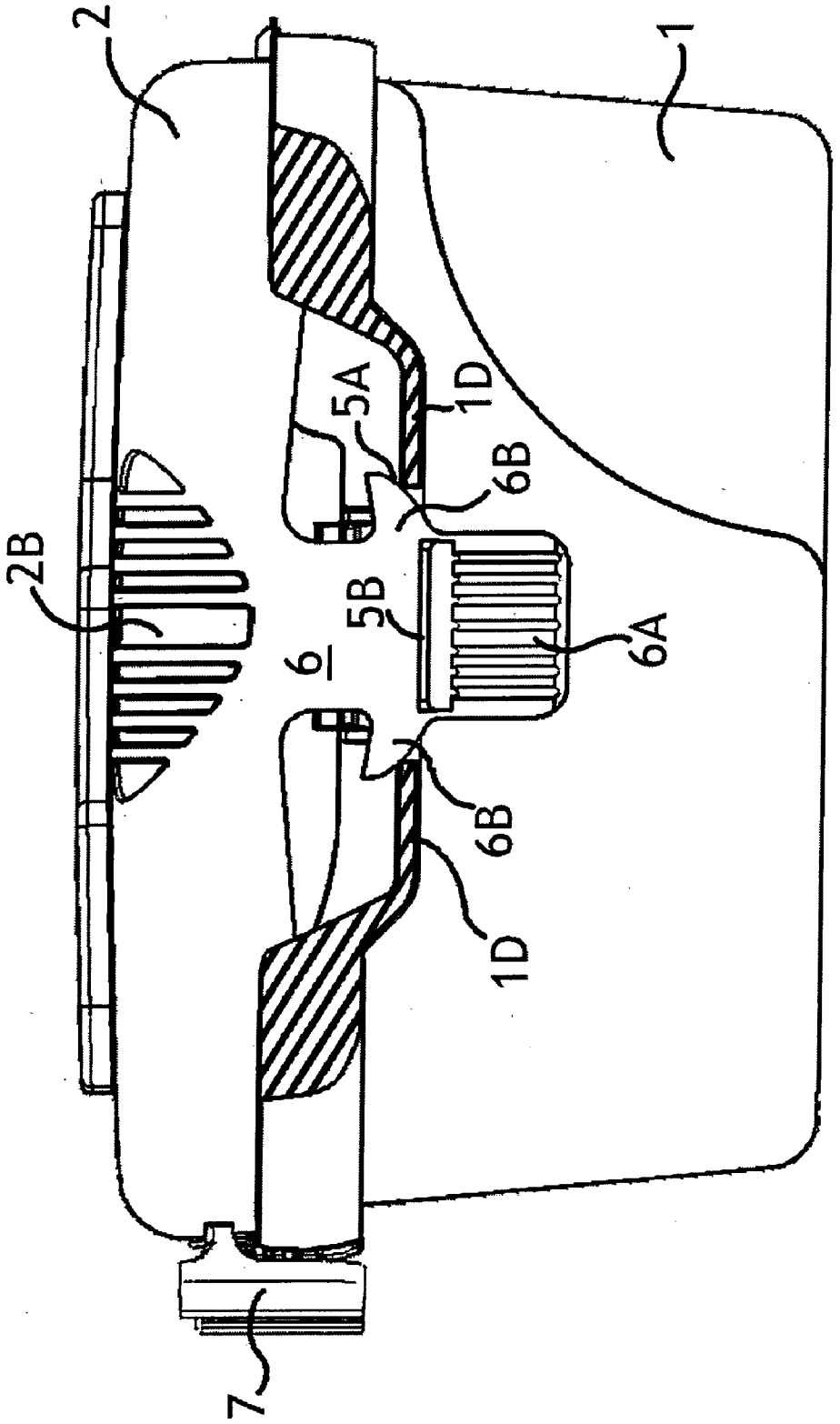


FIG.7A

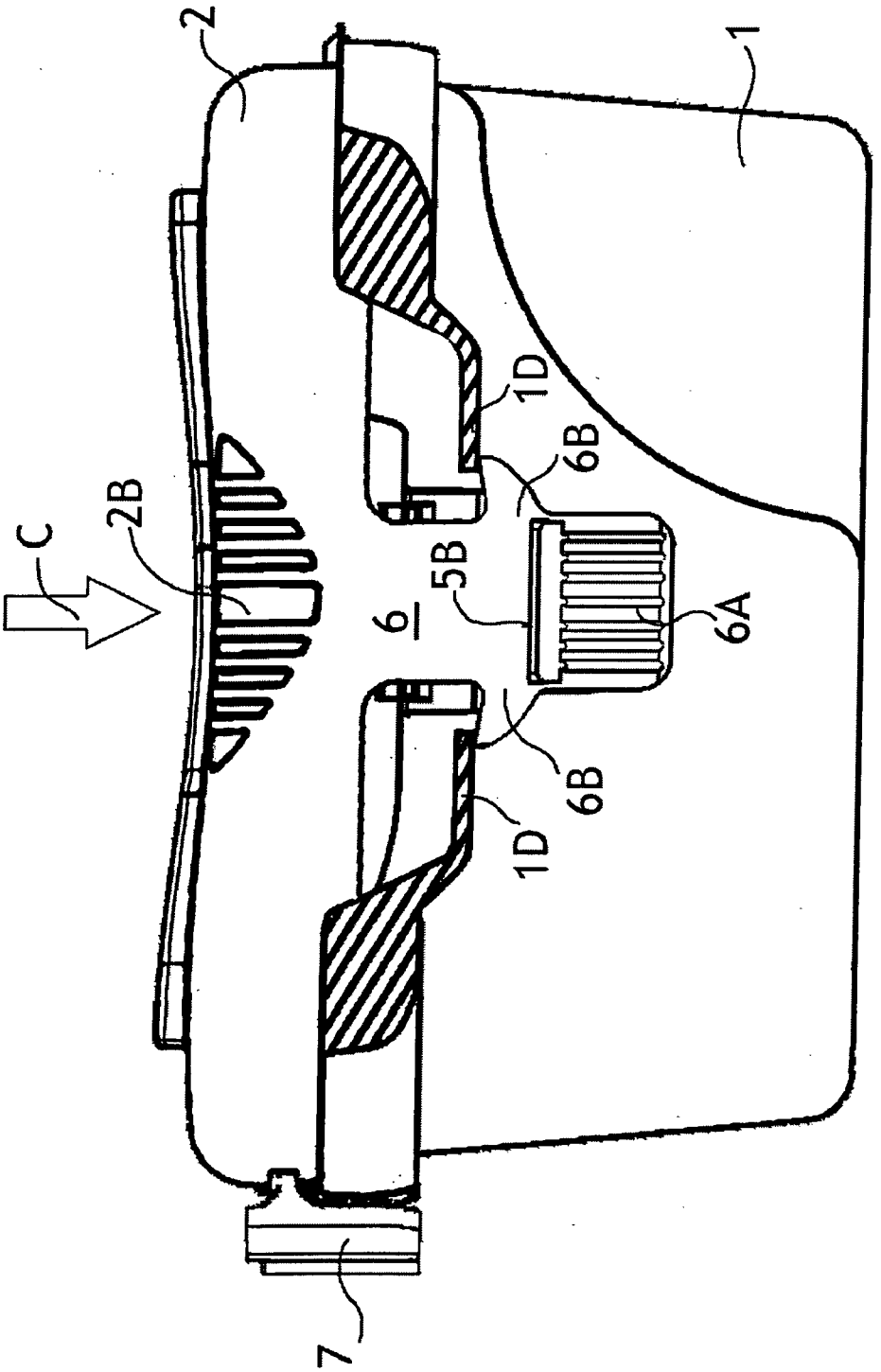


FIG.7B

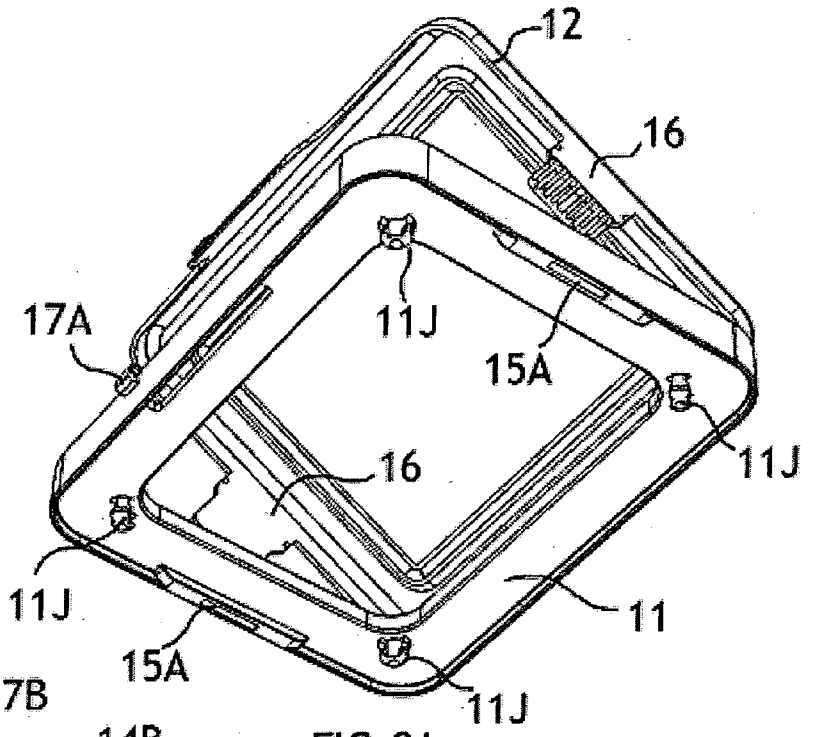


FIG.8A

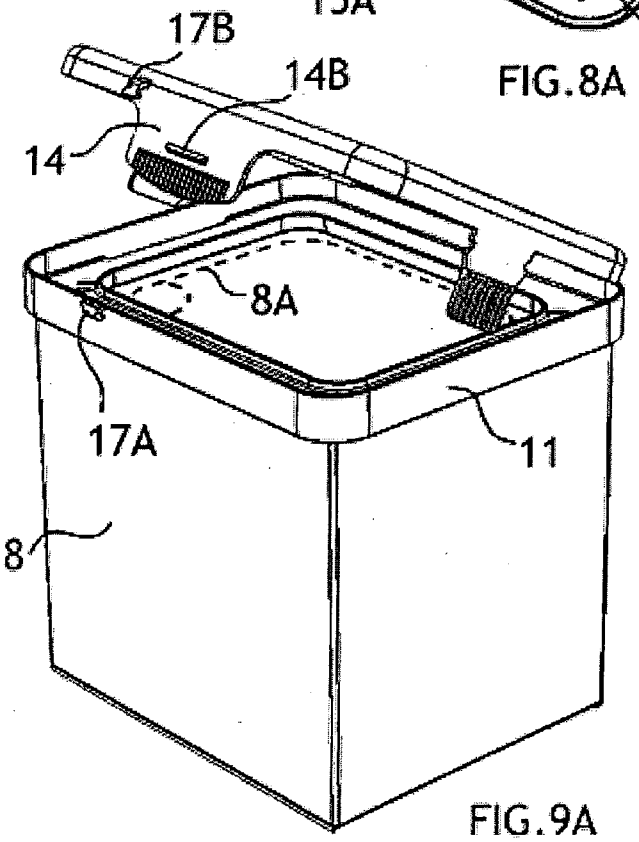


FIG.9A

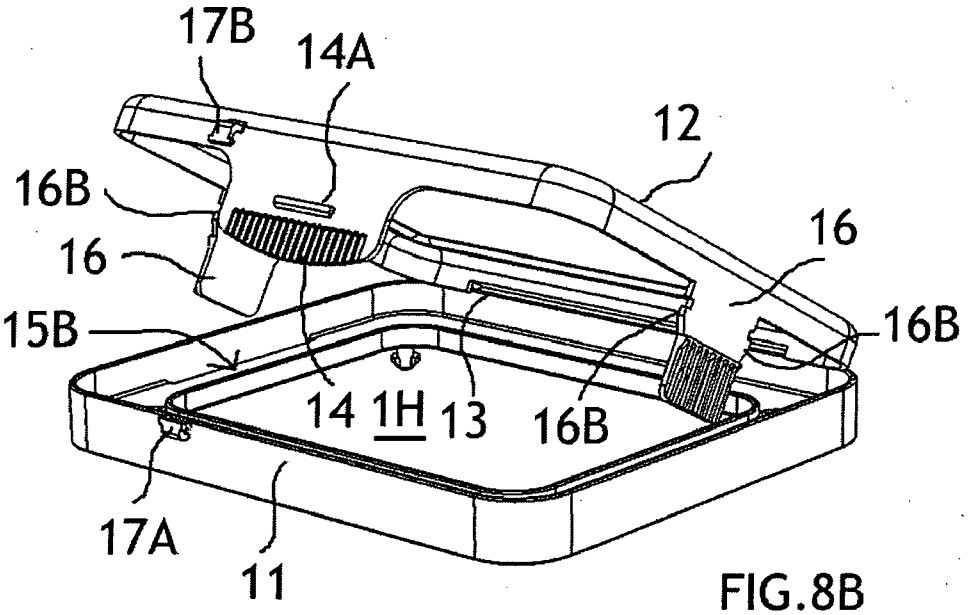

17B
14A
12
16B
16
16
15B
16B
14
1H
13
16B
17A
11

FIG.8B

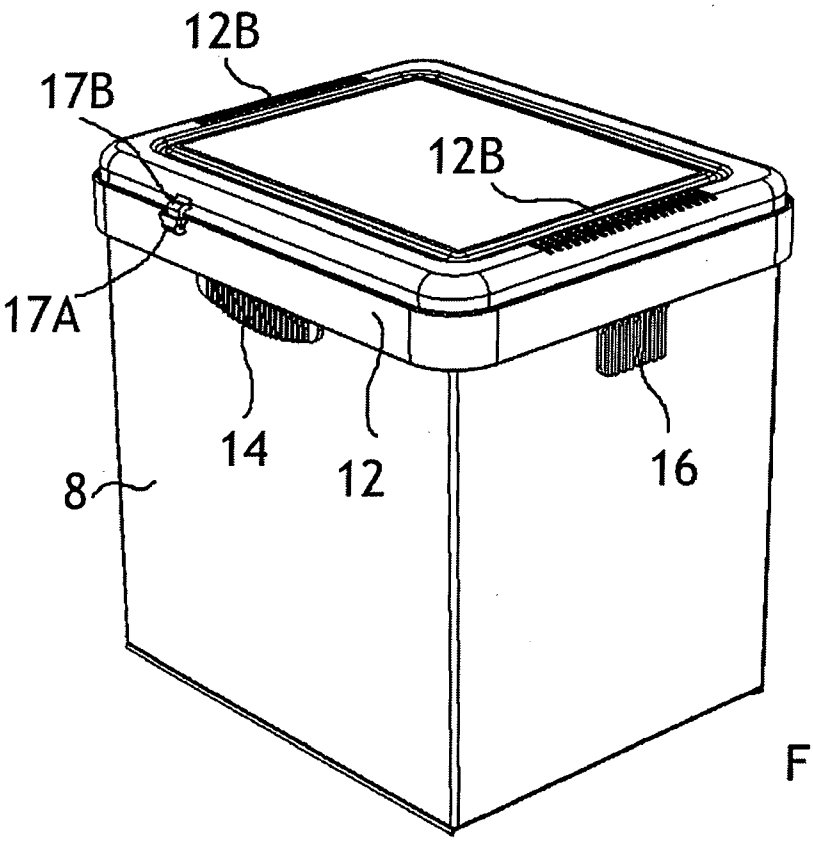

12B
17B
12B
17A
14
12
16
8

FIG.9B

CLOSURE FOR A CONTAINER

TECHNICAL FIELD

[0001] This invention relates to a closure for a container with a base portion and a lid portion moveable between open and closed positions with fastening means for permanently securing the lid portion in the closed position.

BACKGROUND ART

[0002] Containers for receiving articles such as sharps (used syringes, etc.) in hospitals are known and some of these are arranged so that they can be locked closed prior to incineration.

[0003] The present invention aims to provide closure means with fastening means which may be used in a variety of situations.

SUMMARY OF INVENTION

[0004] According to a first aspect of the invention, there is provided a closure for a container, the closure comprising a base portion defining an opening and a lid portion which is moveable away from and towards said opening so as to open and close the closure, releasable fastening means for releasably securing the lid and base portions together in a closed position, and further fastening means for irreversibly securing the lid and base portions in a closed position prior to disposal of the container such that the closure cannot be re-opened without substantial damage thereto.

[0005] The releasable fastening means enables the closure to be opened and closed during a first stage of its life cycle. In a preferred embodiment, the releasable fastening means are child resistant so the contents of the container are accessible to an adult user but difficult for a young child to access (either intentionally or inadvertently). The further fastening means enables the closure to be permanently secured in the closed position prior to disposal of the container and its contents. This enables the container to be permanently secured in a second stage of its life cycle.

[0006] It should be noted that the further fastening means is such that once actuated the closure cannot be re-opened without substantial damage thereto. This is a contrast to tamper-evident means which is designed to enable the contents of a container to be accessed whilst causing only minor damage to the closure (to provide the tamper evidence).

[0007] Preferred and optional features of the invention will be apparent from the following description and from the subsidiary claims of the specification.

BRIEF DESCRIPTION OF DRAWINGS

[0008] The invention will now be further described, merely by way of example, with reference to the accompanying drawings, in which:—

[0009] FIG. **1** is a perspective view of a container having a closure according to a first embodiment of the invention, shown in the closed position;

[0010] FIG. **2** is a front view of the container of FIG. **1**;

[0011] FIG. **3** is a plan view of the container shown in FIG. **1**;

[0012] FIG. **4** is a perspective view of the container of FIG. **1**, shown in an open position;

[0013] FIG. **5** is a plan view of the container shown in FIG. **4**;

[0014] FIG. **6** is a perspective, sectional view (along line AA of FIG. **3**) of part of the container shown in the preceding Figures;

[0015] FIG. **7**A is an end view of the container shown in FIG. **1** in an initial closed position and FIG. **7**B is a corresponding view in a final closed position (after being permanently locked shut ready for disposal);

[0016] FIGS. **8**A and **8**B are perspective views from beneath and above, respectively, of a second embodiment of a closure according to the present invention; and

[0017] FIGS. **9**A and **9**B are perspective views of the closure of FIG. **8** (in open and closed positions, respectively) fitted to a container.

DESCRIPTION OF PREFERRED EMBODIMENTS

[0018] The container shown in FIGS. **1-7** illustrate a plastics container (typically formed by a one-piece injection moulding) having a base portion **1** and a lid portion **2**. The lid portion is moveable between a closed position (shown in FIG. **1**) and an open position (shown in FIG. **4**) by rotation about a hinge **3** (see FIGS. **3** and **4**) joining the lid and base portions.

[0019] The lid and base portions have child resistant fastening means for releasably holding them in the closed position, although in other embodiments (for use in other applications) the child resistant fastening means may be replaced by simple, releasable fastening means.

[0020] The embodiment shown has first fastening means on the front opening edges of the base and lid portion **1**,**2** which comprises a pair of apertures **4**A in the base portion **1** and a pair of first projections **4**B (see FIGS. **4**) on the lid portion **2** for engaging in said apertures **4**A. It also has second fastening means at each side of the container which each comprise a second projection **5**B carried by an arm **6** extending from a side of the lid portion **2** and a slot **5**A provided at the side of the base portion **1** for receiving and retaining projection **5**B, the slot **5**A being in a part **1**C of the base portion **1**. The function and operation of the first and second fastening means will be described in further detail below.

[0021] In the closed position (as shown in FIGS. **1** and **6**), the projections **4**B engage within the apertures **4**A so as to prevent the lid portion **2** being opened. To release the first fastening means, pressure is applied in the direction of arrow A (see FIG. **4**) to pressure pad **1**A, which comprises a series of ribs projecting from a front face of the base portion **1**. This flexes the front wall **1**B of the base portion **1** inwards so the apertures **4**A are moved inwards to disengage from the projections **4**B.

[0022] In the closed position, the projections **5**B also engage under the parts **1**C of the base portion defining the slot **5**A (as shown in FIG. **6**) to prevent the lid portion **2** moving to the open position. To release the second fastening means, pressure is applied in the direction of arrows B (see FIG. **2**) to pressure pads **6**A at the distal ends of arms **6**. This flexes the arms **6** inwards so the projections **5**A disengage from said parts **1**C.

[0023] In order to open the lid portion **2**, it is necessary to simultaneously apply pressure in directions A and B to the first and second fastening means as only when each of the projections **4**B and **5**B have disengaged from the base portion **1**, is it possible to swing the lid portion **2** away from the base portion **1**. The need to apply pressure in at least two different places and in two directions provides the fastening means with a degree of child resistance. In the preferred embodiment

shown, the second fastening means is provided at each side of the container so pressure has to be applied to three separate areas. Furthermore, if the container is of appropriate size, the two pressure pads **6**A are spaced apart a distance greater than the typical hand span of a young child so the child cannot simultaneously apply pressure to both pads **6**A with one hand. To achieve this, the pads **6**A should, typically, be spaced apart by 80 mm or more, and preferably 100 mm or more.

[0024] As shown in the Figures, the container is also provided with a tear-off band **7** to provide tamper evidence. The band **7** is connected to the lid portion **1** by rupturable connections **7**A,**7**B so as to cover the pressure pad **1**A and has a gripping portion **7**C at one end thereof. Pressure cannot thus be applied to the pad **1**A (without also applying pressure to the lid portion **1**) until the band **7** has been moved or torn away by rupturing one or more of the connections **7**A,**7**B.

[0025] So, to open the container, it is necessary to first remove the tamper band **7** and then simultaneously apply pressure to each of the pressure pads **1**A and **6**A to disengage both the first and second fastening means. Once the container has been opened in this manner, it can be closed again, whereupon the first and second fastening means re-engage to hold it closed. To re-open, it is again necessary to simultaneously apply pressure to each of the pressure pads **1**A and **6**A.

[0026] The container shown may be used to house a variety of articles or materials which may be potentially harmful, e.g. to a child, hence the provision of child resistant fastening means. The container is also designed to house said article or material after it has been used and is ready for disposal. The container thus has further non-releasable fastening means (described further below) which can be engaged when the lid is in the closed position so that the container is then permanently locked closed so the contents are securely contained thereby reducing the risk of the contents causing harm when the article is disposed of.

[0027] As example of an article provided in such a container is an inhaler used by a person with asthma. Such inhalers may contain chemicals which are potentially harmful. The container provides three levels of security for such an article in different stages of its life cycle as follows:

[0028] (i) prior to use, the inhaler is contained and the tamper evident band **7** indicates that the container has not been opened. The child-resistant feature means also reduce the risk that the container is opened by a child.

[0029] (ii) once the container has been opened by a user, the child-resistant features continue to reduce the risk that a child will access the contents.

[0030] (iii) at the end of its serviceable use, the inhaler can be disposed of by placing it in the container and permanently locking the container so the contents are inaccessible to a child (or to anyone else) other than by destroying the container. This is of particular importance if, at the end of its life cycle, the article still contains potentially harmful material (as is the case with some inhalers).

[0031] In the illustrated embodiment, the further fastening means is provided by lateral projections **6**B on each of the arms **6** in conjunction with the slot **5**A in each side of the base portion **1**.

[0032] As shown in FIG. **7**A, the lateral projections **6**B normally lie above parts **1**D of the base portion between which the slot **5**A (through which the pressure pad **6**A and projection **5**B pass) is defined. Thus, when the lid is opened and closed to the position shown in FIG. **7**A in the manner described above in relation to FIGS. **1**-**6**, the projections **6**B move with the arms **6** and do not interfere with the opening and closing of the lid portion **2**.

[0033] However, when it is desired to lock the container permanently prior to disposal (with the article or other material enclosed therein), downward pressure is applied to pressure pads **2**B on each side of the lid portion **2** in direction C (see FIG. **7**B). Sufficient downward pressure in the direction C, flexes (or crushes) part of the lid portion **2** downward relative to the base portion **1** causing the projections **6**B to be forced through the slots **5**A so as to engage the underside of the parts **1**D of the base portion. Projections **6**B are positioned further from the distal end of arms **6** than the projections **6**A. The engagement between the projections **6**B of the arms **6** and the base portion **1** is irreversible (other than by breaking the container) so it is permanently locked in the closed position shown in FIG. **7**B. It will be appreciated that even if pressure is applied in direction A and B described above, the lid portion **2** remains irreversibly secured to the base portion **1** by the one-way snap-fit engagement of the projections **6**B therewith.

[0034] As illustrated, the projections **6**B are relatively substantial and they are rigidly attached to the arms **6**. In addition, the arms **6** are solid and the projections **6**B are substantially rigid and are unable to flex so the distance between them cannot be reduced. Insertion of the projections **6**B into the slots **5**A thus requires the parts **1**D of the base portion **1** forming said slots to be resiliently deformable in order to allow the projections **6**B to pass therethrough to the position shown in FIG. **7**B.

[0035] It will also be appreciated that actuation of the further fastening means requires a deliberate force to be applied to the pressure pads **2**B in the direction C so there is little risk that the further fastening means will be accidentally actuated when the closure means is opened and closed at earlier stages of its life cycle.

[0036] Although the embodiment described has two arms **6** forming said further fastening means, in other arrangements one arm may suffice to irreversibly secure the lid portion in the closed position. In other arrangements, more than two such arms may be provided.

[0037] As shown in FIGS. **4** and **5**, the base portion **1** is provided with a false wall **1**E along the sides and front thereof within which the front and side walls of the lid portion **2** nest when in the closed position. The edge of the lid portion **2** thus overlaps with and is concealed behind the fake wall **1**E making it difficult to access and thus reducing the risk that the lid portion could be pried open.

[0038] The lower edge of the fake wall **1**E also appears as a dummy edge of the lid portion **2**. Upward pressure applied to this edge to try to open the lid portion **2**, would clearly have no effect as the wall **1**E is part of the base portion **1**. As the edge of the lid portion **2** overlaps front wall **1**B of the base portion, the latter also prevents the front of the lid portion being crushed inwards.

[0039] As shown in FIGS. **4** and **5**, the lid portion **2** is also provided with two ribs **2**C which lie perpendicular to (but are spaced from) the front wall of the lid portion **2**. These help prevent the lid portion from flexing or bowing upwards when pressure is applied to pressure pad **1**A in direction A (although they do not prevent the front wall of the base portion **1** from moving inwards to disengage from apertures **4**A).

[0040] The lid portion **2** is also provided with an internal wall **2**D (see FIGS. **4** and **5**). This also helps prevent the lid portion **2** deforming when pressure is applied to pressure pad **1**A (or to pressure pads **6**A).

[0041] The interior of the base portion **1** and/or of the lid portion are preferably shaped to house the product to be located therein, e.g. by the provision of ribs, divider walls or other locating means. The base portion may also be provided with a flat surface **1**F (see FIGS. **4** and **5**) extending around the interior thereof adjacent the upper edge of the base portion **1** so that a foil may be applied thereto if it is desired to seal the contents within the base portion.

[0042] The base portion **1** and lid portion **2** are also preferably shaped so that empty containers in the open position shown in FIG. **4** can nest within each other for stacking.

[0043] FIGS. **8-9** illustrate a second embodiment of closure means according to the invention comprising a base portion **11** and a lid portion **12** joined by a hinge portion **13**. A first difference between this embodiment and that described above is that the base portion comprises a frame portion **11** surrounding an opening **1**H therein. The frame portion **11** is arranged to be secured to a container **8** (as shown in FIG. **9**) by means of press-fit fasteners, or studs, **11**J on the underside thereof which fit into apertures (not shown) in the container **8**. Alternatively, the frame portion **11** can be secured to a container by other means, e.g. welding or adhesive.

[0044] The closure means can thus be formed separately from the container. This provides more flexibility in the design of the container **8**, e.g. it can be formed of a different material and/or different shape and/or different size containers can be used with the same closure means. The container may, for example, be vacuum-formed whereas the closure means may be formed by injection moulding. In other cases, the container (or at least part of it) may be formed of a flexible material, e.g. in the form of a bag.

[0045] The closure means used in the second embodiment comprises arms **16** with projections **16**B similar to those of the first embodiment for irreversibly fitting into slots **15**A in the frame portion **11**. The closure means used in the second embodiment may also have child resistant fastening means and the further fastening means as described above in relation to FIGS. **1-7**. However, in the closure means shown in FIGS. **8** and **9**, the child resistant fastener is replaced by a simple releasable fastener. Thus, first fastening means in the first edge of the closure (opposite the hinge portion **13**) comprises a tab **14** with a projection **14**A for providing a releasable, snap-fit or friction fit with part of the frame portion **11**. Second releasable fastening means are not, however, provided on the arms **16**. Thus, in this embodiment, to open the lid portion, it is merely necessary to press tab **14** inwards so as to disengage projection **14**A from the frame portion **11** so the lid portion is free to be pivoted about the hinge portion **13** to an open position.

[0046] The closure means shown in FIGS. **8** and **9** is also provided with tamper evident means in the form of interlocking hook-portions **17**A and **17**B on the frame portion **11** and lid portion **12**, respectively. When the lid portion **12** is first opened, inter-engagement between hook-portions **17**A and **17**B is released by irreversible deformation of one or both hook-portions (either directly or indirectly, eg by applying sufficient opening force to the lid portion so as to break or deform one of the hook-portions). Thereafter, the lid portion **12** can be releasably fastened in the closed position and re-opened multiple times by means of the releasable fastener **14**A.

[0047] At a later stage in the life cycle of the container, the lid portion can be irreversibly closed by pressing down on pressure pads **12**B so as to flex or crush parts of the lid portion **12** towards the frame portion **11** so that the arms **16** and the projections **16**B are irreversibly engaged with slots **15**A in the frame portion **11** (in a similar manner to that described in the earlier embodiment). The contents of the container cannot then be accessed without substantially damaging the container whereby the contents are securely enclosed during a final stage of the container's life cycle, e.g. disposal and/or incineration.

[0048] It will be appreciated that a closure of the type described in relation to FIG. **8** (as well as a version provided with child features) can be fitted to a wide variety of containers, the frame portion being fitted thereto so that the opening **1**H therein is aligned with an opening (or other aperture) in the container. Such a container may be used to house a variety of articles, e.g. used syringes (or other sharps), chemicals (e.g. such as those used in gardening or horticulture), poisons, knife blades, small batteries, unused pharmaceuticals, etc.

[0049] If desired, the opening in the container **8** may initially be closed, or sealed, e.g. by a tear-off panel **8**A (as illustrated by the dashed lines in FIG. **9**A).

[0050] The lid and base portions (or the lid and frame portion) are preferably formed as a one-piece moulding so they are joined by a hinge portion. However, they may also be formed separately, ie as a two-piece moulding.

[0051] The closure means described above thus has different forms of fastening means for use in different stages of the product life cycle and, in particular, releasable fastening means (which in some embodiments may be child resistant) and irreversible fastening means for permanently closing the closure for disposal. In addition, tamper evident means may be provided to indicate whether the closure has been initially opened. Preferably, these fastening means are of relatively simple design and, in a preferred arrangement, suitable for forming by injection moulding (preferably in a one-piece or two-piece moulding).

1. A closure for a container, the closure comprising a base portion defining an opening and a lid portion which is moveable away from and towards said opening so as to open and close the closure, releasable fastening means for releasably securing the lid and base portions together in a closed position, and further fastening means for irreversibly securing the lid and base portions in a closed position prior to disposal of the container such that the closure cannot be re-opened without substantial change thereto.

2. A closure as claimed in claim **1** in which said further fastening means provides an irreversible snap-fit between parts of the base portion and lid portion to prevent the closure being re-opened.

3. A closure as claimed in claim **1** in which said further fastening means comprises an arm projecting from the lid portion and a slot or aperture in the base portion for irreversibly receiving said arm.

4. A closure as claimed in claim **3** in which said arm has one or more substantially rigid projections and parts of the base portion forming said slot or aperture are resiliently deformable so as to be able to receive said projection(s) when forced therein.

5. A closure as claimed in claim **1** in which, when in the closed position, one or more parts of the lid portion have to be flexed or crushed towards the base portion in order to actuate said further fastening means.

6. A closure as claimed in claim **1** in which the releasable fastening means comprises at least first and second fasteners so that the releasable fastening means is child resistant.

7. A closure as claimed in claim **6** in which the first and second fasteners have to be released simultaneously to allow the lid portion to be moved to an open position.

8. A closure as claimed in claim **6** in which pressure is applied in a first direction to release the first fastener and in a second direction to release the second fastener.

9. A closure as claimed in claim **6** in which the second fastener comprises parts which are spaced apart by a distance of at least 80 mm, and preferably at least 100 mm, so they are too far apart to be simultaneously pressed by a small child's hand.

10. A closure as claimed in claim **1** in which the lid portion is attached to the base portion by a hinge.

11. A closure as claimed in claims **6** in which the first fastener is provided on a front side of the container opposite the hinge and the second fastener is provided on one or both side faces of the container between the front side and the hinge.

12. A closure as claimed in claim **11** in which the first fastener comprises at least one projection on the lid portion which is engageable in an aperture or slot in the base portion, or vice versa.

13. A closure as claimed in claim **11** in which said second fastener comprises a second projection on said arm which is releasably engageable with part of the base portion, said second projection being nearer to the distal end of said arm than said one or more substantially rigid projections.

14. A closure as claimed in claim **1** having tamper-evident means.

15. A closure as claimed in claim **14** in which said tamper evident means covers or conceals at least part of the releasable fastening means.

16. A closure as claimed in claim **1** comprising a one piece plastic moulding.

17. A closure as claimed in claim **1** in which the base portion comprises a frame portion surrounding said opening, the frame portion being adapted for mounting to a container so that said opening is aligned with an opening in said container.

* * * * *