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(54) **Title:** CONTAINER ASSEMBLY

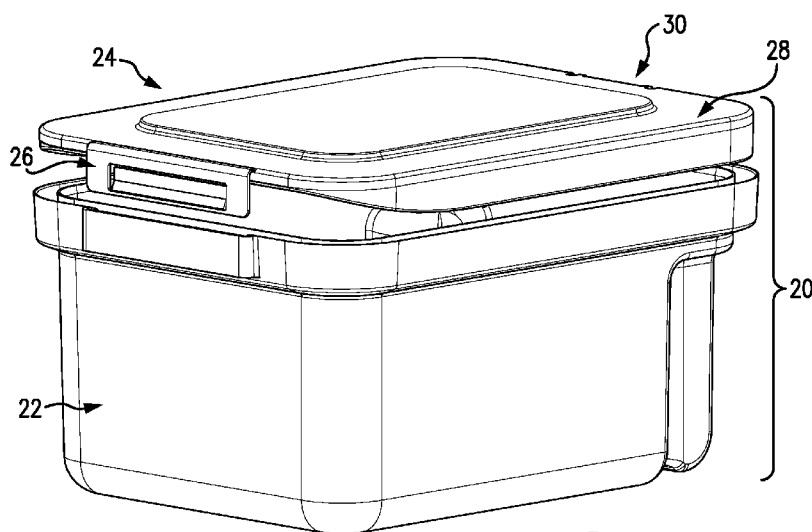


FIG. 2

(57) **Abstract:** A container comprises: a tub (22) having a bottom (50) and four sides (56, 58, 60, 62), adjacent said sides joined at junctions; and a closure (24). The closure comprises: a lid (28); a living hinge member (26) unitarily formed with the lid and coupling the lid to the tub so as to allow the lid to shift between a closed condition and an open condition, the living hinge having an insertion portion (222) received in a pocket (82) of the tub.

CONTAINER ASSEMBLY

CROSS-REFERENCE TO RELATED APPLICATION

5 [0001] Benefit is claimed of US Patent Application No. 62/106,686, filed January 22, 2015, and entitled "Container Assembly", the disclosure of which is incorporated by reference herein in its entirety as if set forth at length.

BACKGROUND OF THE INVENTION

10 [0002] The invention relates to dispensing containers. More particularly, the invention relates to molded plastic tub containers.

[0003] Molded plastic tub containers are used for a variety of purposes including containing food powders, detergent or other powders, or non-powder products.

SUMMARY OF THE INVENTION

15 [0004] In one aspect, a container comprises: a tub having a bottom and four sides, adjacent said sides joined at junctions; and a closure. The closure comprises: a lid; a living hinge member unitarily formed with the lid and coupling the lid to the tub so as to allow the lid to shift between a closed condition and an open condition, the living hinge having an insertion portion received in
20 a portion of the tub.

[0005] In one or more embodiments of any of the other embodiments, the insertion portion comprises: a frame having an opening; and a portion extending upward from a junction with a lower portion of the frame and having an upper portion engaged to a complementary portion of
25 the pocket.

[0006] In one or more embodiments of any of the other embodiments, the complementary portion is an underside of an outward projection and an upper surface of the projection is captured against a lower edge of an upper portion of the frame.

30 [0007] In one or more embodiments of any of the other embodiments, the frame is transversely elongate.

[0008] In one or more embodiments of any of the other embodiments, the pocket is open-bottomed.

5 [0009] In one or more embodiments of any of the other embodiments, the container is of generally rectangular footprint.

[0010] In one or more embodiments of any of the other embodiments, the closure is unitarily molded as a single plastic piece.

10

[0011] In one or more embodiments of any of the other embodiments, the tub is unitarily molded as a single plastic piece.

[0012] In one or more embodiments of any of the other embodiments, the container further
15 comprises a latch having a first portion on the lid and a second portion on the tub, the first portion releasably mateable to the first portion to retain the lid in the closed condition and releasable to allow the lid to shift to the open condition.

[0013] In one or more embodiments of any of the other embodiments, the latch first portion
20 comprises an upward projection received in a downwardly-open channel of the second portion in the closed condition.

[0014] In one or more embodiments of any of the other embodiments, a method for making
25 the container comprises: molding the lid; molding the tub; and inserting the insertion portion of the living hinge into the receiving portion of the tub.

[0015] In one or more embodiments of any of the other embodiments, the inserting causes a flexing of a pawl of the living hinge member followed by a relaxation of the pawl into a backlocked condition in the pocket.

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[0016] In one or more embodiments of any of the other embodiments, the method further comprises, prior to the inserting, bending the hinge member from an as molded condition.

[0017] In one or more embodiments of any of the other embodiments, the bending is by at least 60°.

5 **[0018]** In one or more embodiments of any of the other embodiments, the bending puts an at least temporary set in the hinge of at least 60°.

[0019] The details of one or more embodiments of the invention are set forth in the accompanying drawings and the description below. Other features, objects, and advantages of
10 the invention will be apparent from the description and drawings, and from the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] FIG. 1 is a view of a container in a closed condition.

[0021] FIG. 2 is a view of the container with lid exploded vertically away.

[0022] FIG. 3 is a central vertical longitudinal sectional view of the container taken along
5 line 3-3 of FIG. 1.

[0023] FIG. 3A is an enlarged view of a hinge area of the container of FIG. 3, taken along
line 3A-3A.

[0024] FIG. 3B is an enlarged view of a latch area of the container of FIG. 3, taken along
line 3B-3B.

10 [0025] FIG. 4 is a top view of the lid in an as-molded condition.

[0026] FIG. 5 is a right side view of the as-molded lid, a left side view being a mirror image
thereof.

[0027] FIG. 6 is a front view of the as-molded lid.

[0028] FIG. 7 is a view of the lid with bent hinge.

15 [0029] FIG. 8 is a right side view of the lid of FIG. 7.

[0030] FIG. 9 is a view of a body of the container.

[0031] FIG. 10 is a front view of the body.

[0032] FIG. 11 is a top view of the body.

[0033] FIG. 12 is a right side view of the body, a left side view being a mirror image thereof.

20

[0034] Like reference numbers and designations in the various drawings indicate like
elements. Various of the drawings include artifacts of computer aided design (CAD) such as
stitching lines which may be unseen in the actual container but help illustrate shape.

DETAILED DESCRIPTION

[0035] FIGS. 1-3 show an exemplary container assembly 20 having a body (tub) 22 and a closure 24. The exemplary body 22 and closure 24 are each unitarily-molded as a single piece (e.g., injection molded polypropylene). The closure 24 comprises a lid/cover 28 portion
5 connected to the body by a living hinge member 26 (FIG. 3A). A latch 30 (FIG. 3B) may be formed on the lid and frame (e.g., including a button 32 of the frame and a clasp 34 of the lid). The latch may be a child-resistant latch.

[0036] FIG. 3 shows the exemplary container interior 38 as containing contents 40. In one
10 example the contents are laundry detergent pods (e.g., liquid or gel detergent encapsulated between sheets of water-soluble outer skin).

[0037] FIGS. 9-12 show the tub/body 22 in an as-molded condition (but after removal of
15 molding gates, flash, and the like). The exemplary tub has a base 50 (FIG. 10) and a sidewall 52 extending upward from the base to a rim 54. The exemplary tub is of slightly rounded rectangular planform so that, for ease of reference, the four sides are a front 56 (FIG. 10), a back 58 (FIG. 9), a left side/end 60 (FIG. 10), and a right side/end 62 (from the point of view of the container rather than someone facing the container). Near the rim 54, the sidewall branches with
20 an inner wall as a continuation of a main portion of the sidewall and an outer wall 64 extending upward from a junction therewith. The outer wall 64 (FIG. 9) extends to a rim 66 and defines a channel 68 between the inner wall and outer wall.

[0038] The outer wall and/or inner wall may bear features for cooperating with the closure
25 24. As is discussed further below, these features include a wall 80 extending outward from the outer sidewall 64 to define an open-bottom slot or pocket 82 along the rear/back of the body 22 for receiving an insertion portion of the living hinge member 26. These cooperating features also include detent features 86 (FIG. 9) for cooperating with complementary features of the lid portion 28.

[0039] The sides 56, 58, 60, 62 of the sidewall 52 meet at generally vertical junctions/corners
30 of the sidewall 52. The exemplary sidewall 52 has a pair of finger reliefs 72 and 74 (FIG. 10)

extending along the front corners. These allow gripping by the user (e.g., between thumb and forefinger).

[0040] FIGS. 4-6 show the cover 28 in an as-molded condition. FIGS. 7 and 8 show the cover with the hinge insertion portion bent downward. The cover 28 extends upward from a lower rim 200 (FIG. 5). In the exemplary embodiment, the cover includes a wall portion 202 extending upward from the rim 200 to a shoulder 204. A top web 206 extends across from the shoulder to enclose the cover. The hinge member 26 extends from the shoulder along a rear end of the lid. As is discussed further below, the hinge includes a reduced thickness flexible portion 220 between the shoulder 204 and an insertion portion 222 for receipt in the pocket 82. The insertion portion 222 comprises a frame 230 (FIG. 4) having a pair of sides or arms 232, 234 and a transverse lower portion 236 joining the two. An opening or aperture 238 is defined between the lower portion 236, an upper portion 240, and the side portions 232, 234. A pawl or barb portion 250 extends from a root at the lower portion 236 to a free end 252.

[0041] In the as-molded condition, the insertion portion 222 sticks generally straight out parallel to but offset from the web 206 upper surface. The pawl 250 extends back toward the flexible portion 220. The pawl 250 has a proximal portion 260 (FIG. 5) joining the frame and extending partially downward and inward therefrom in the as-molded condition and a distal portion 262 extending to the end 252. After molding, the insertion portion 222 may be bent 90° (to the FIG. 7 and 8 condition) about an approximate transverse axis of the portion 220 for insertion into the pocket. This transverse axis effectively forms a hinge axis when the cover is installed.

[0042] FIG. 3A shows the hinge insertion portion 222 installed. FIGS. 3, 3A, and 3B reflect artifacts of computer modelling in that some features are shown overlapping due to the software's inability to model the deformations they experience.

[0043] In FIG. 3A, the free end 252 of the pawl forms an upper edge in this orientation captured beneath the underside of an outward projection 270 at the upper edge of a slightly vertically recessed portion of the outer sidewall 64. An upper surface of the projection 270 abuts the edge (lower edge in installed condition) of the frame upper portion 240. Accordingly, it can

be seen that when the hinge insertion portion 222 is inserted via downward movement, the lower portion 236 initially passes between a rear end 276 of the projection 270 and a forward face of the wall 80. Further downward movement brings the rear end 276 into contact with the adjacent face of the pawl along the proximal portion 260. This produces a force on the pawl flexing the pawl rearward to allow the insertion portion 222 to pass further downward. Eventually, the free end 252 of the pawl passes just below the projection 270 and snaps forward captured in the notch between the underside of the projection 270 and the outer surface of the outer sidewall 64. At this point, the lower edge of the now downwardly-directed frame upper portion 240 abuts the top surface of the projection 270 to prevent further downward movement. In this way, the pawl becomes backlocked to prevent nondestructive removal of the lid absent manipulation from below such as with a tool. FIG. 3 shows an approximate hinge axis 500. As noted above, the hinging may be about multiple parallel instantaneous axes of rotation about the location shown depending upon the state of opening/closing.

[0044] As noted above, the hinge may be pre-bent to ease assembly. In one example, the hinge is bent to take an at least temporary set of 90° (the FIG. 7 and 8 condition) so that a horizontally-oriented lid may be shifted straight downward to install, simultaneously inserting the hinge member and latching the latch. Depending on the product involved, this may be pre-filling or post-filling of the contents.

[0045] Bending may be greater than 90° to provide the 90° set after partial relaxation when the bending moment is removed. More broadly, exemplary bending and the exemplary set are at least 60° or at least 80°.

[0046] The backlocking of the insertion portion 222 with the projection may have one or more of several advantages. Relative to closures using a frame to mount to the tub, material consumption may be reduced in that the projection and wall 80 may involve less material than the frame. The retention of the insertion portion 222 to the tub may be stronger than the frame to the tub, thus improving child-resistance.

[0047] To complement that child-resistance, the latching mechanism may be child-resistant. FIG. 3B shows the clasp 34 as having a flower forward tab 320 for user thumb depression.

Behind the tab, an upward projection 324 is received in a downwardly-open channel 326 at the top end of the button 32 (shown overlapping rather than captured due to computer modeling in relaxed conditions). A lower end of the button 32 merges with the body sidewall. Capturing of the clasp projection 324 by the channel 326 resists inward depressing of the button 370.

- 5 Downward pressing of the tab 320 with sufficient force can sufficiently downwardly flex (e.g., twist or rack) sidewalls 328 of the clasp to downwardly shift the projection 324 fully out of the channel 326 or sufficiently out of the channel to allow the button 32 to be depressed, so that the channel 326 no longer blocks upward movement of the projection 324. Thus, with the button 32 depressed, the container may be hinged open.

10

[0048] One or more embodiments of the present invention have been described.

Nevertheless, it will be understood that various modifications may be made without departing from the spirit and scope of the invention. For example, when implemented in the modification of an existing container configuration, details of the existing configuration or its use may

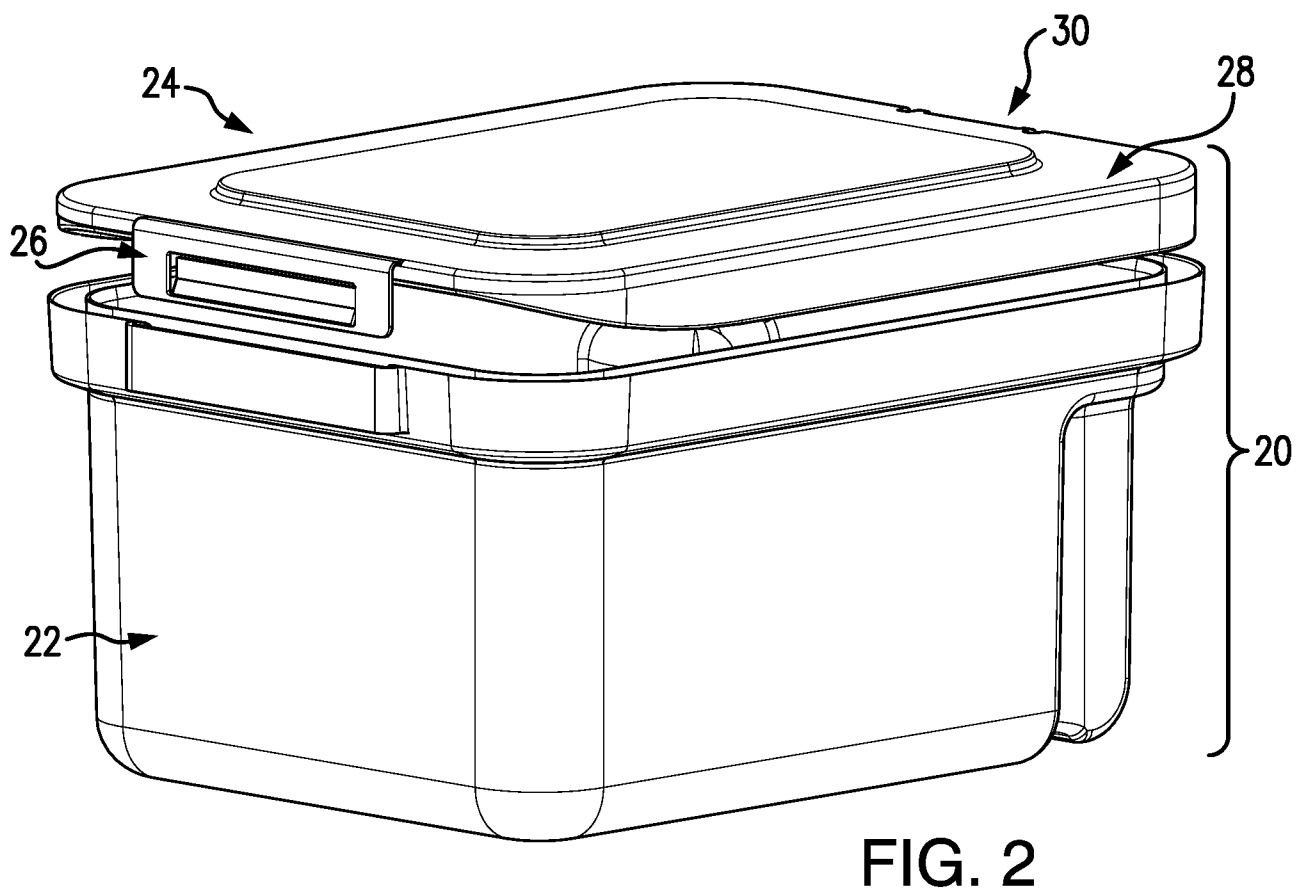
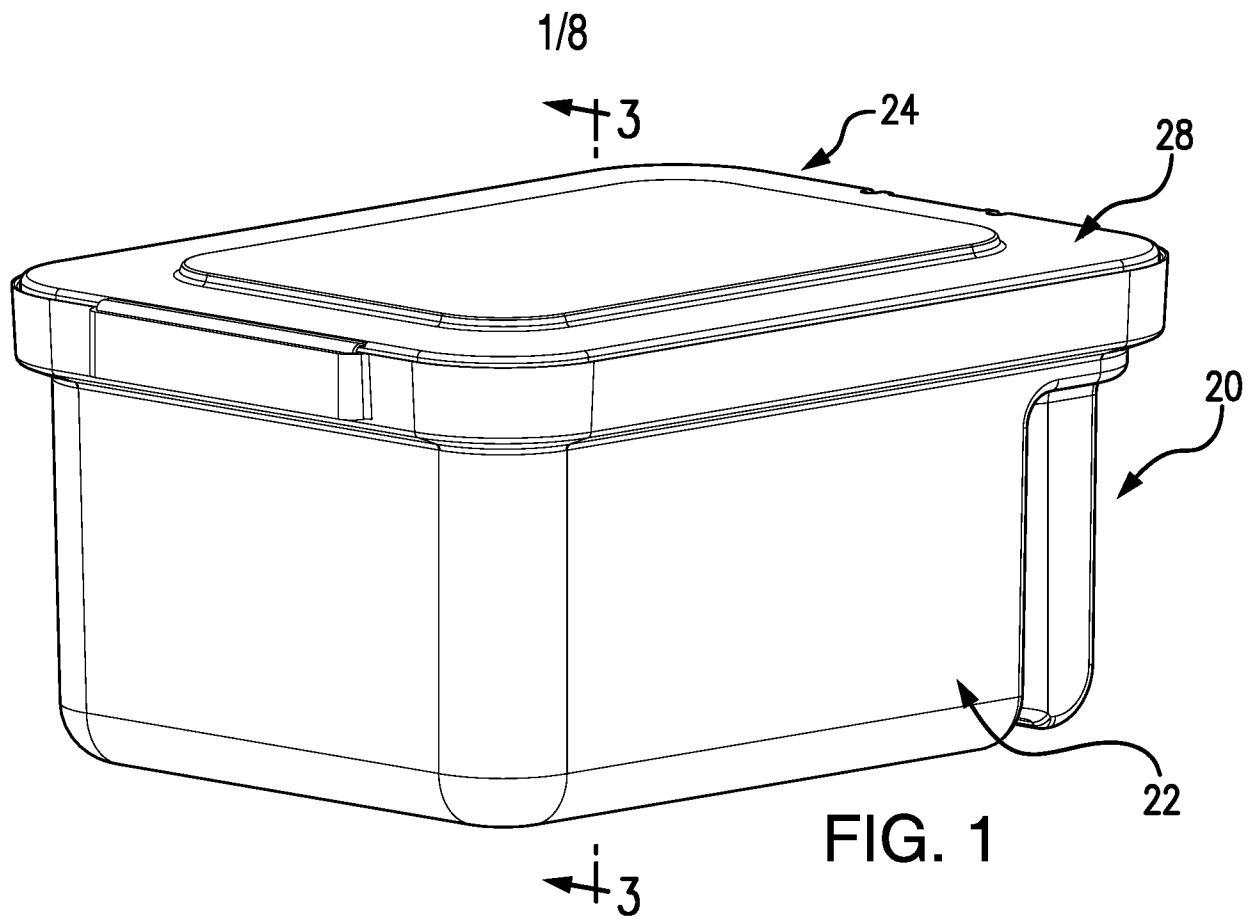
- 15 influence details of any particular implementation. Accordingly, other embodiments are within the scope of the following claims.

CLAIMS

What is claimed is:

1. A container (20) comprising:
5 a tub (22) having a bottom (50) and four sides (56, 58, 60, 62), adjacent said sides joined at junctions; and
a closure (24) comprising:
a lid (28);
a living hinge member (26) unitarily formed with the lid and coupling the lid to
10 the tub so as to allow the lid to shift between a closed condition and an open condition, the living hinge having an insertion portion (222) received in a pocket (82) of the tub.
2. The container of claim 1 wherein the insertion portion comprises:
a frame (230) having an opening (238); and
15 a portion (250) extending upward from a junction with a lower portion (236) of the frame and having an upper portion (252) engaged to a complementary portion of the pocket.
3. The container of claim 2 wherein:
the complementary portion is an underside of an outward projection (270) and an upper
20 surface of the projection is captured against a lower edge of an upper portion (240) of the frame.
4. The container of claim 2 wherein:
the frame is transversely elongate.
- 25 5. The container of claim 1 wherein:
the pocket is open-bottomed.
6. The container of claim 1 wherein:
the container is of generally rectangular footprint.
- 30 7. The container of claim 1 wherein:
the closure is unitarily molded as a single plastic piece.

8. The container of claim 1 wherein:
the tub is unitarily molded as a single plastic piece.
- 5 9. The container of claim 1 further comprising:
a latch (30) having a first portion (34) on the lid and a second portion (32) on the tub, the
first portion releasably mateable to the first portion to retain the lid in the closed condition and
releasable to allow the lid to shift to the open condition.
- 10 10. The container of claim 9 wherein:
the latch first portion comprises an upward projection (324) received in a
downwardly-open channel (326) of the second portion in the closed condition.
11. A method for making the container of claim 1, the method comprising:
15 molding the lid;
molding the tub; and
inserting the insertion portion of the living hinge into the receiving portion of the tub.
12. The method of claim 11 wherein:
20 the inserting causes a flexing of a pawl (250) of the living hinge member followed by a
relaxation of the pawl into a backlocked condition in the pocket.
13. The method of claim 11 further comprising:
prior to the inserting, bending the hinge member from an as molded condition.
25
14. The method of claim 13 wherein:
the bending is by at least 60°.
15. The method of claim 13 wherein:
30 the bending puts an at least temporary set in the hinge of at least 60°.



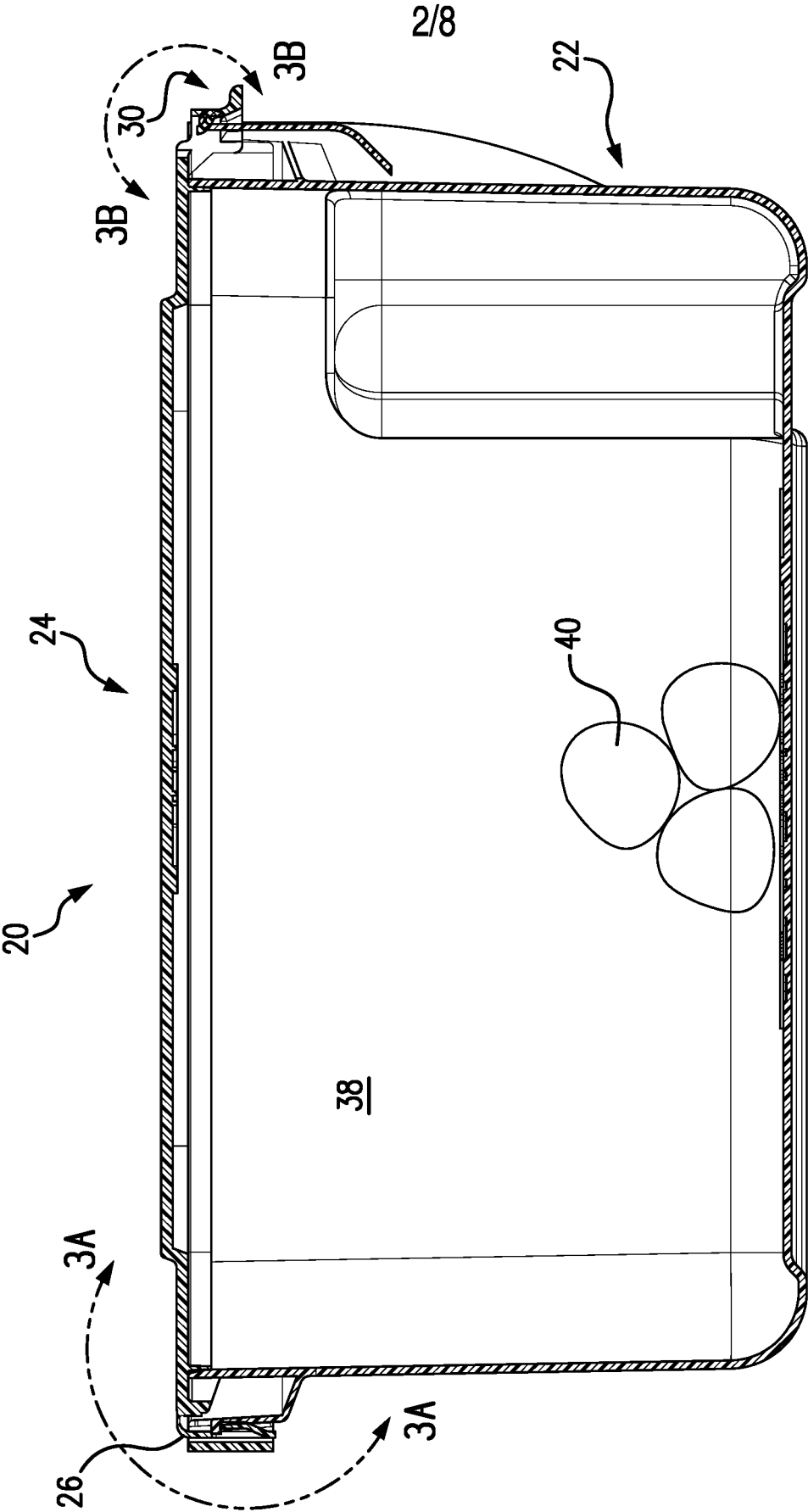


FIG. 3

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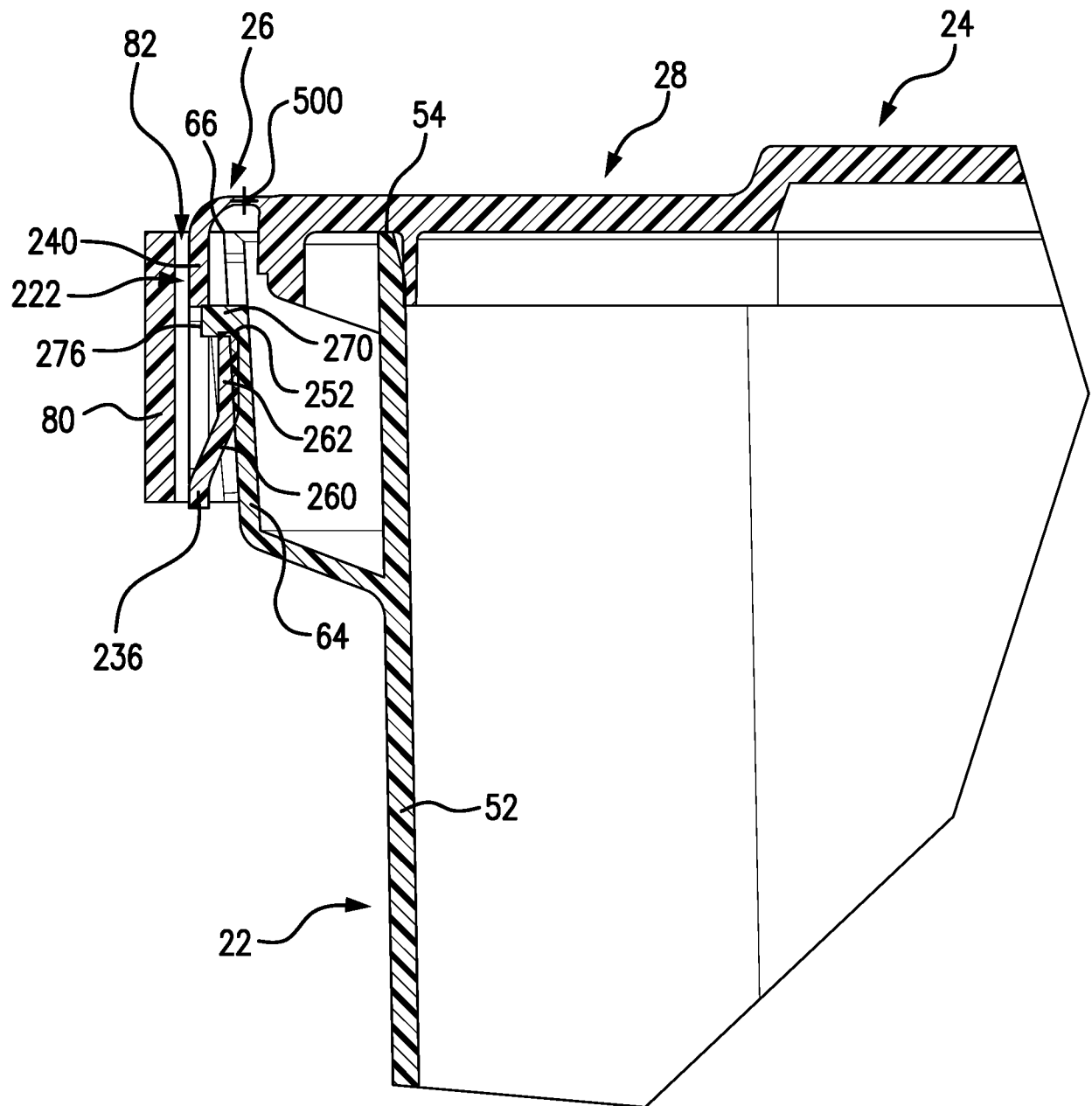


FIG. 3A

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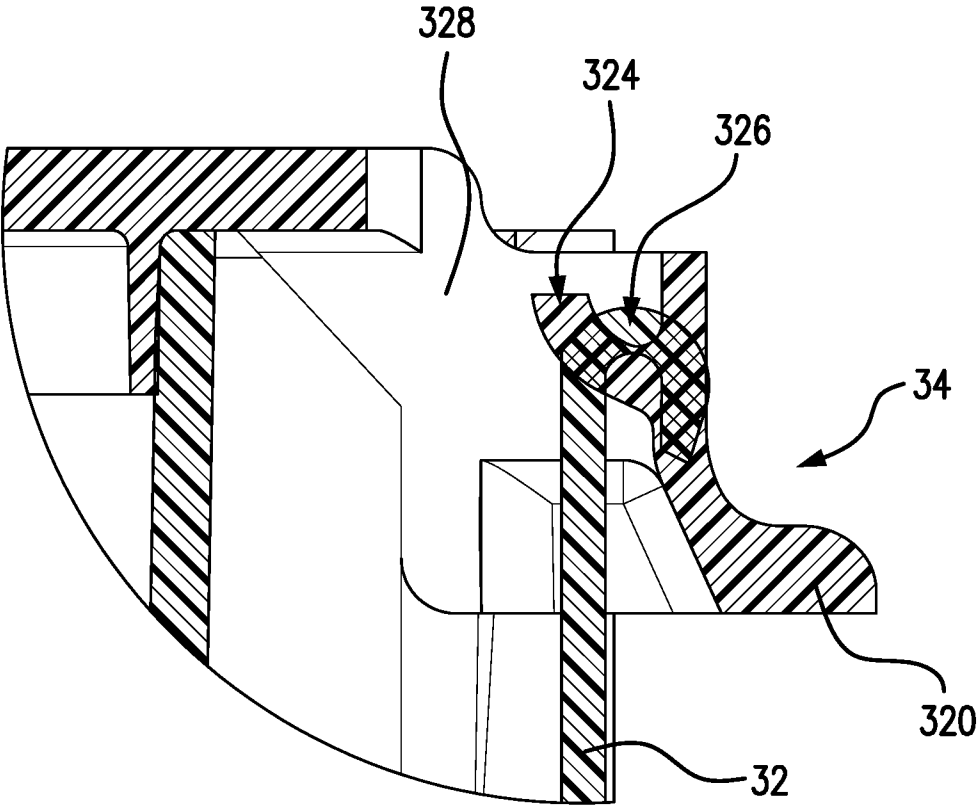


FIG. 3B

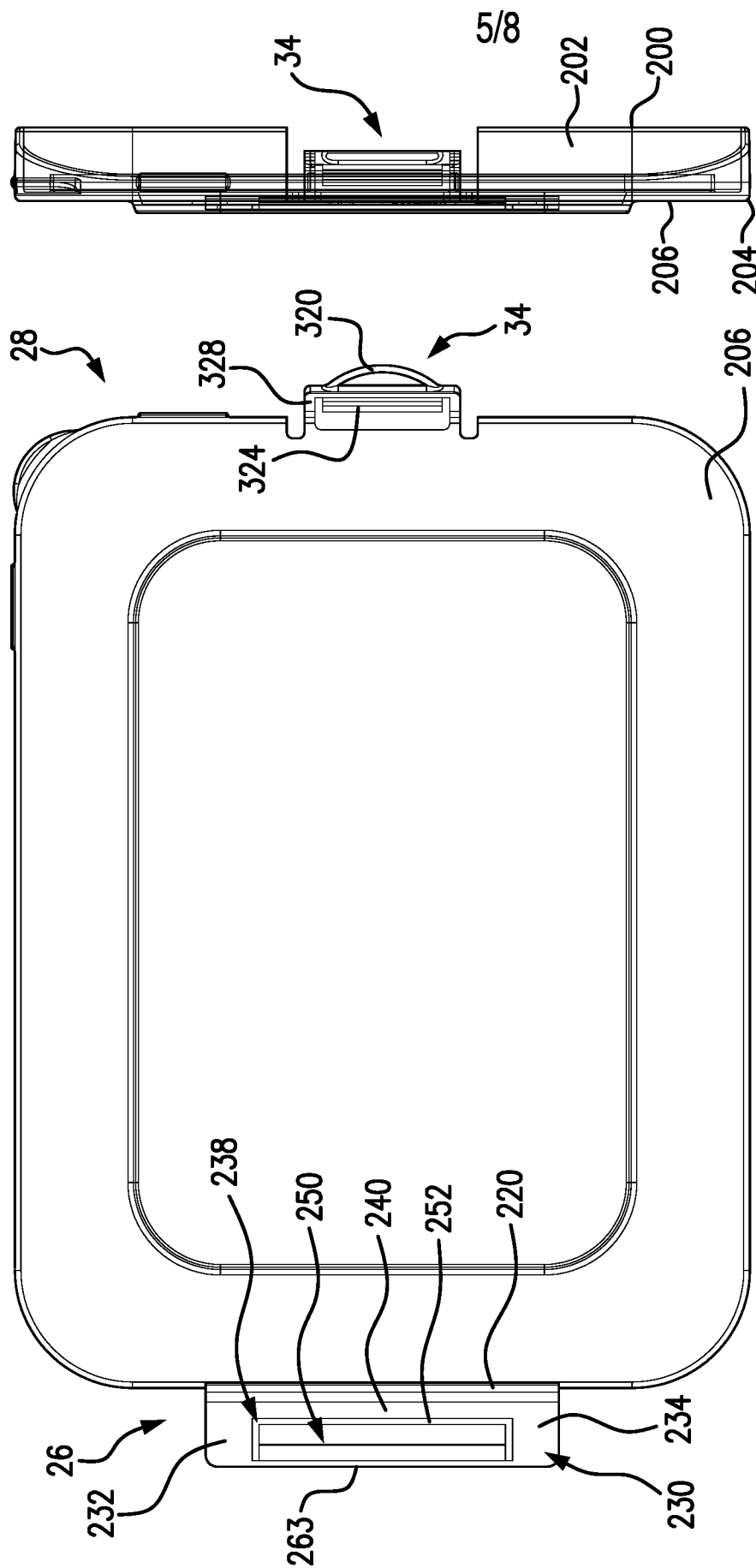


Fig. 6

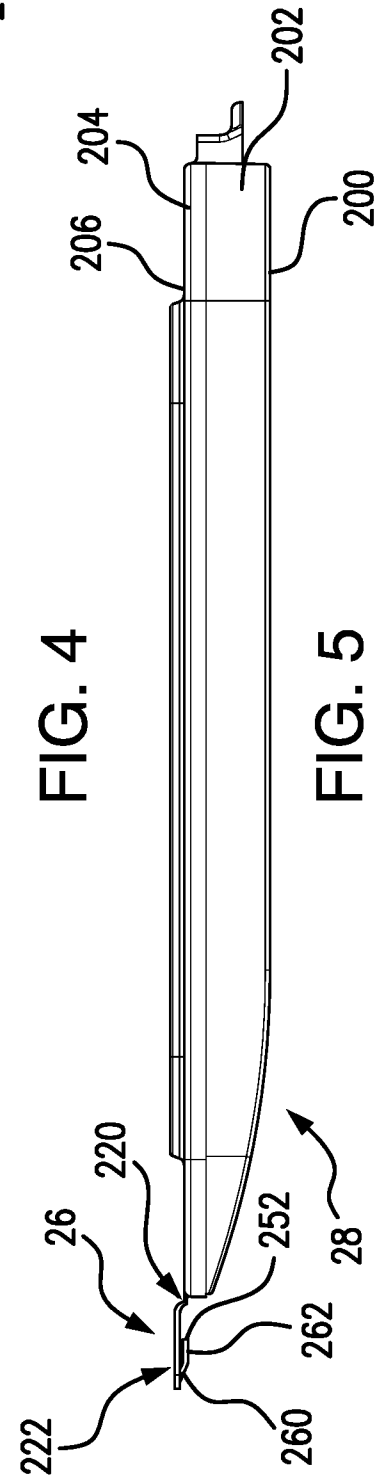


FIG. 4

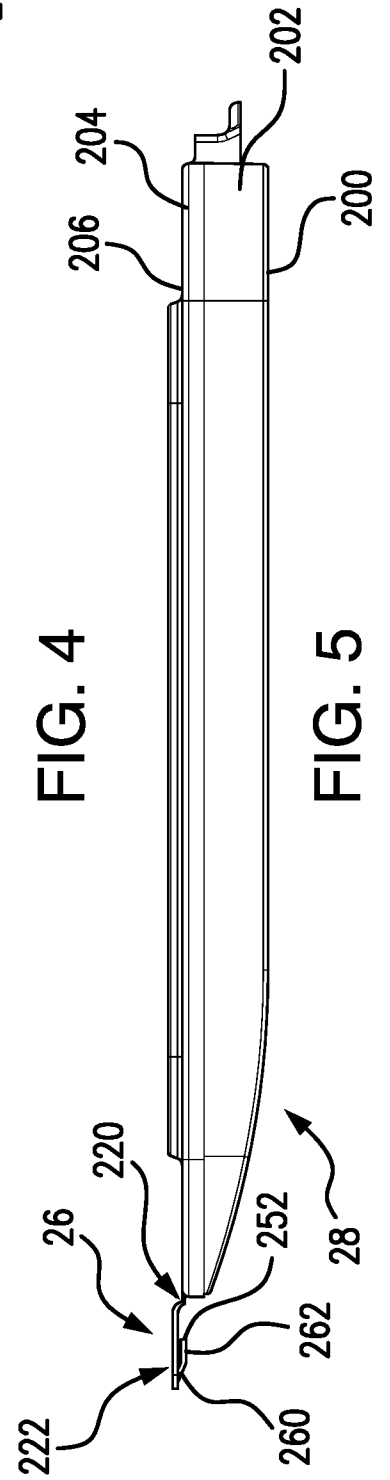
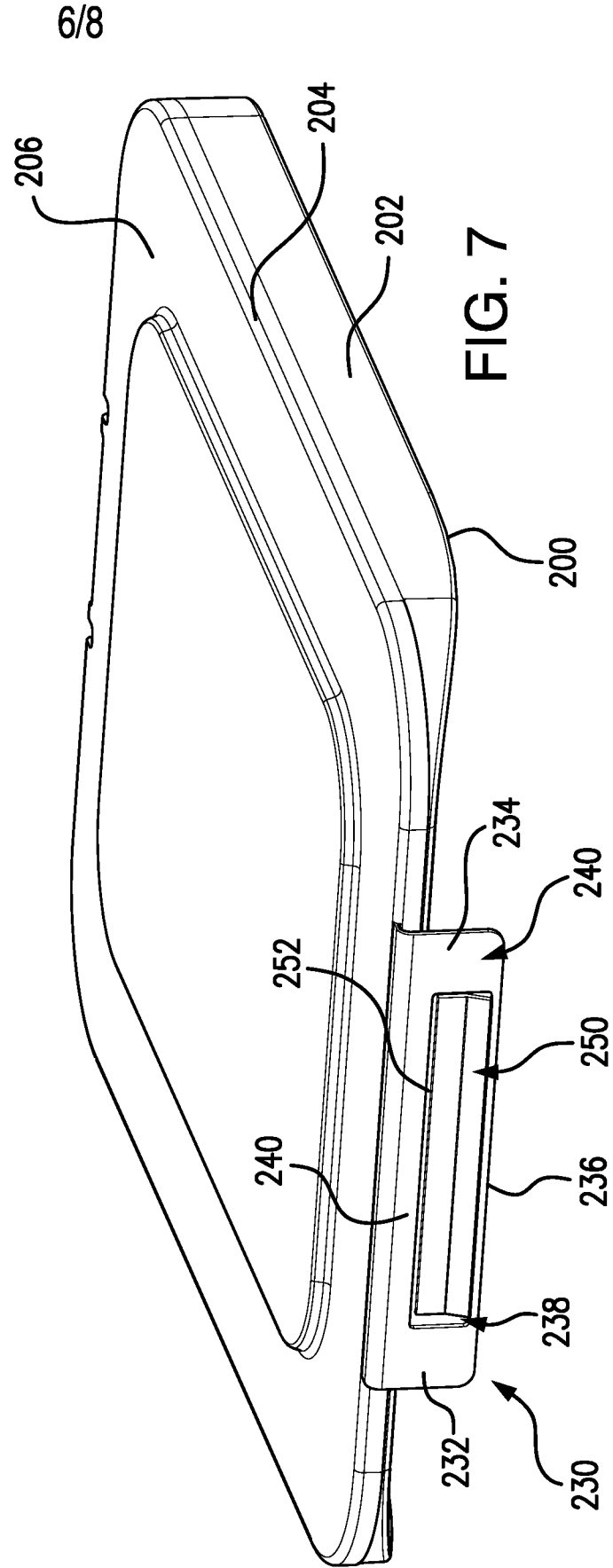
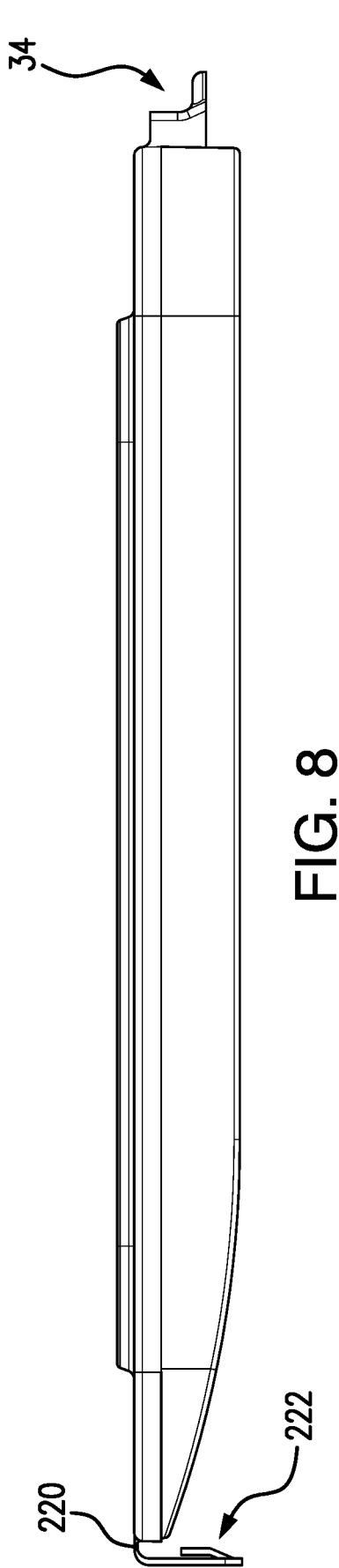
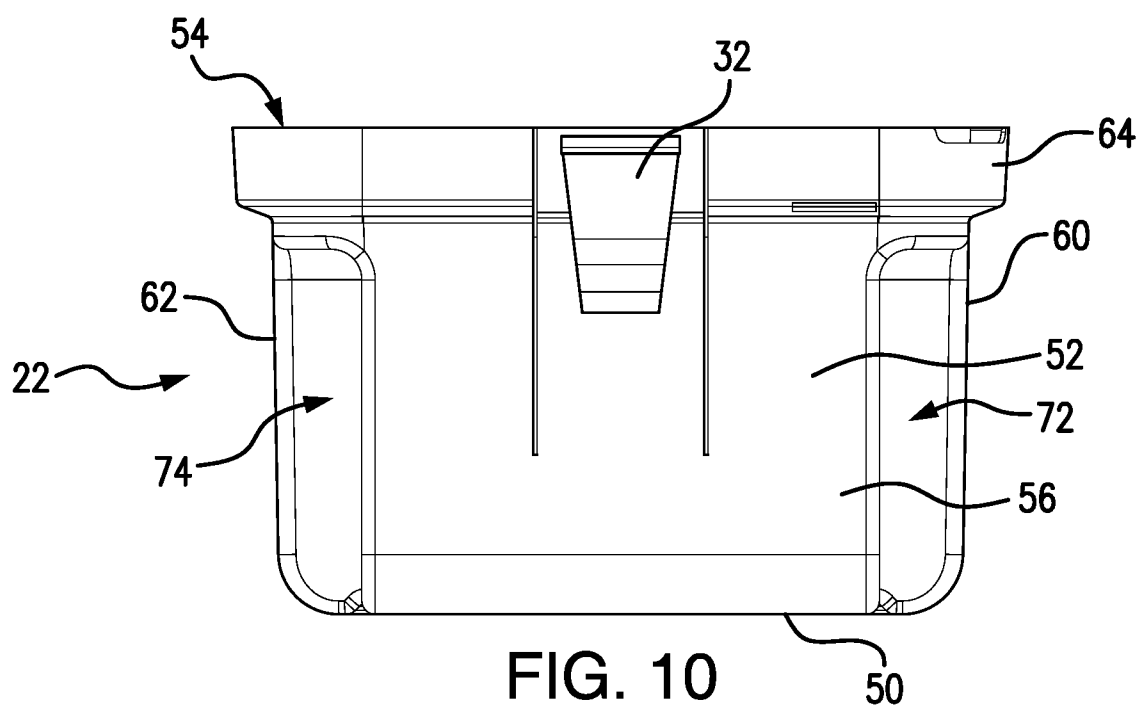
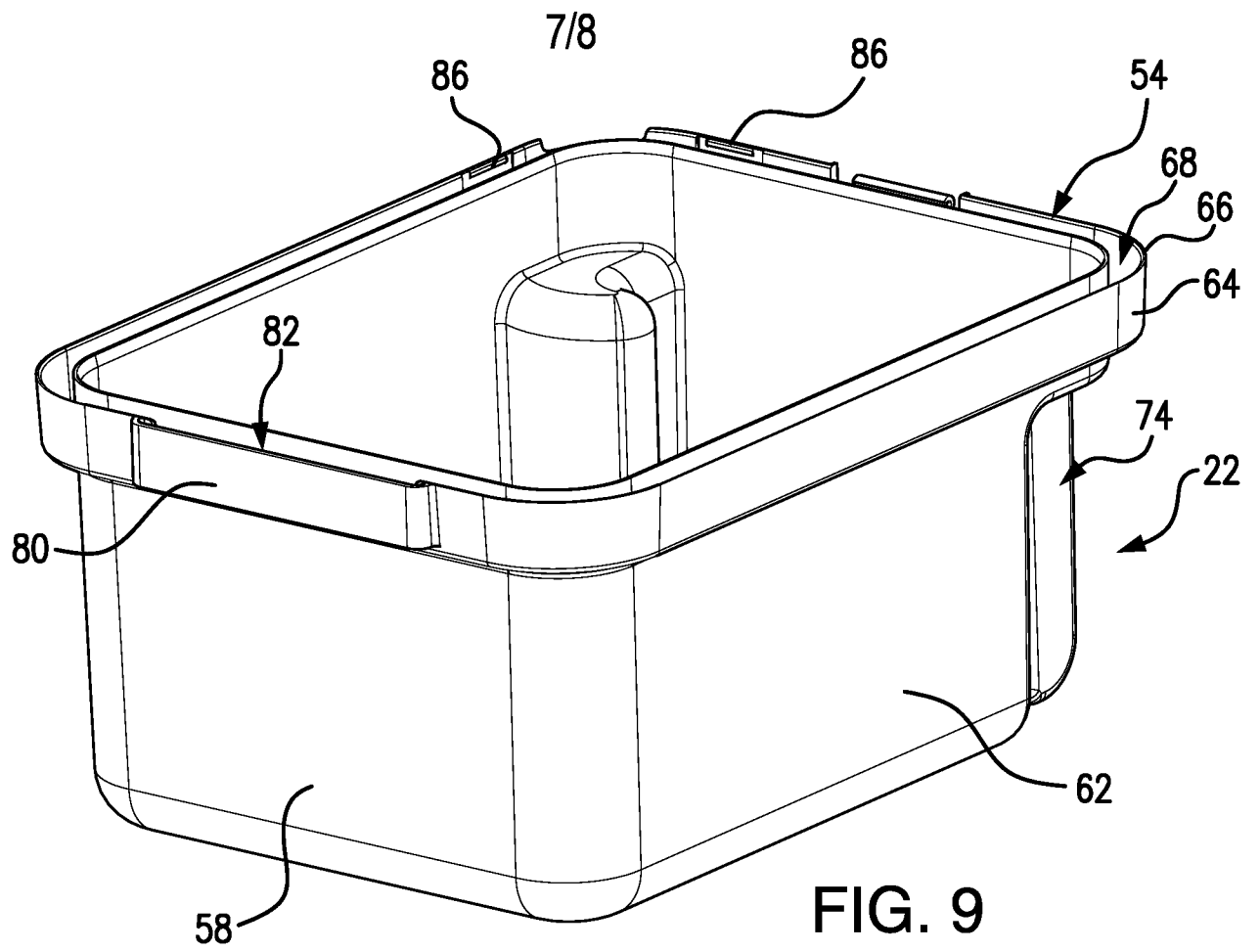
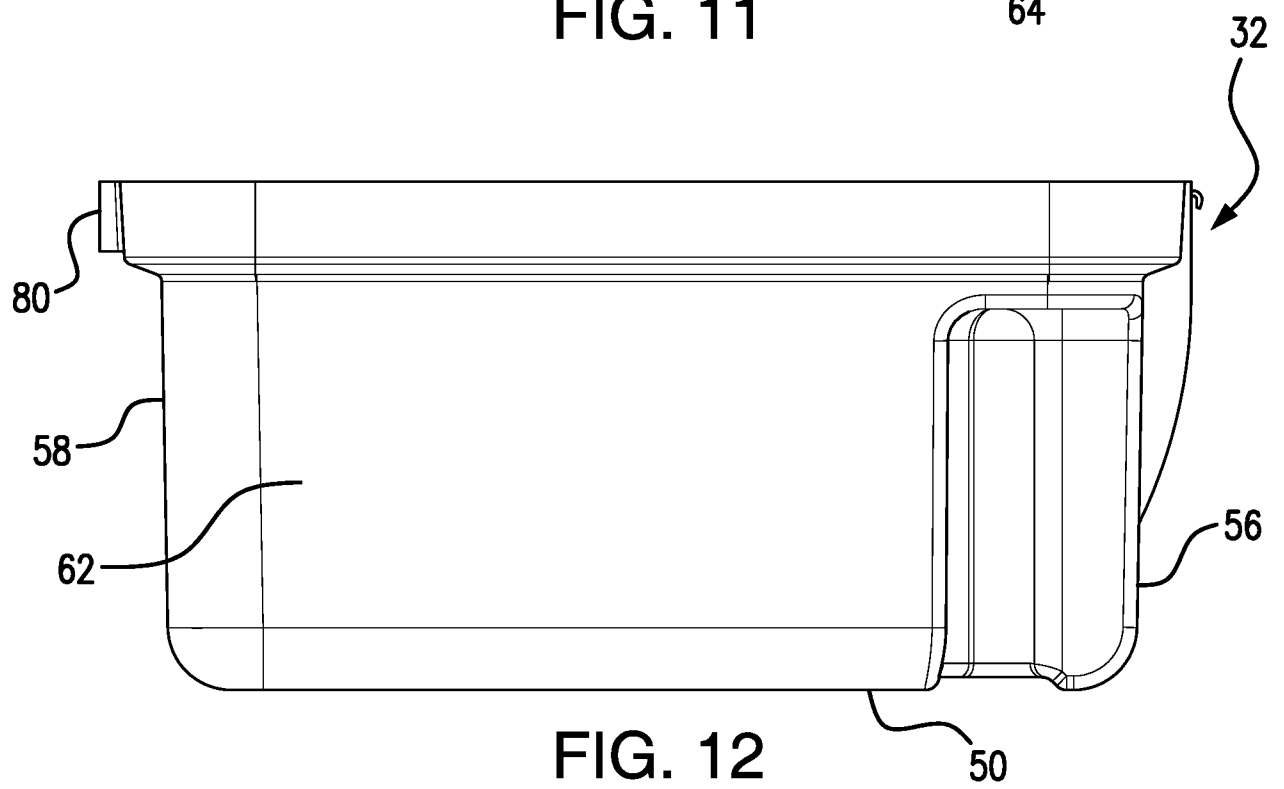
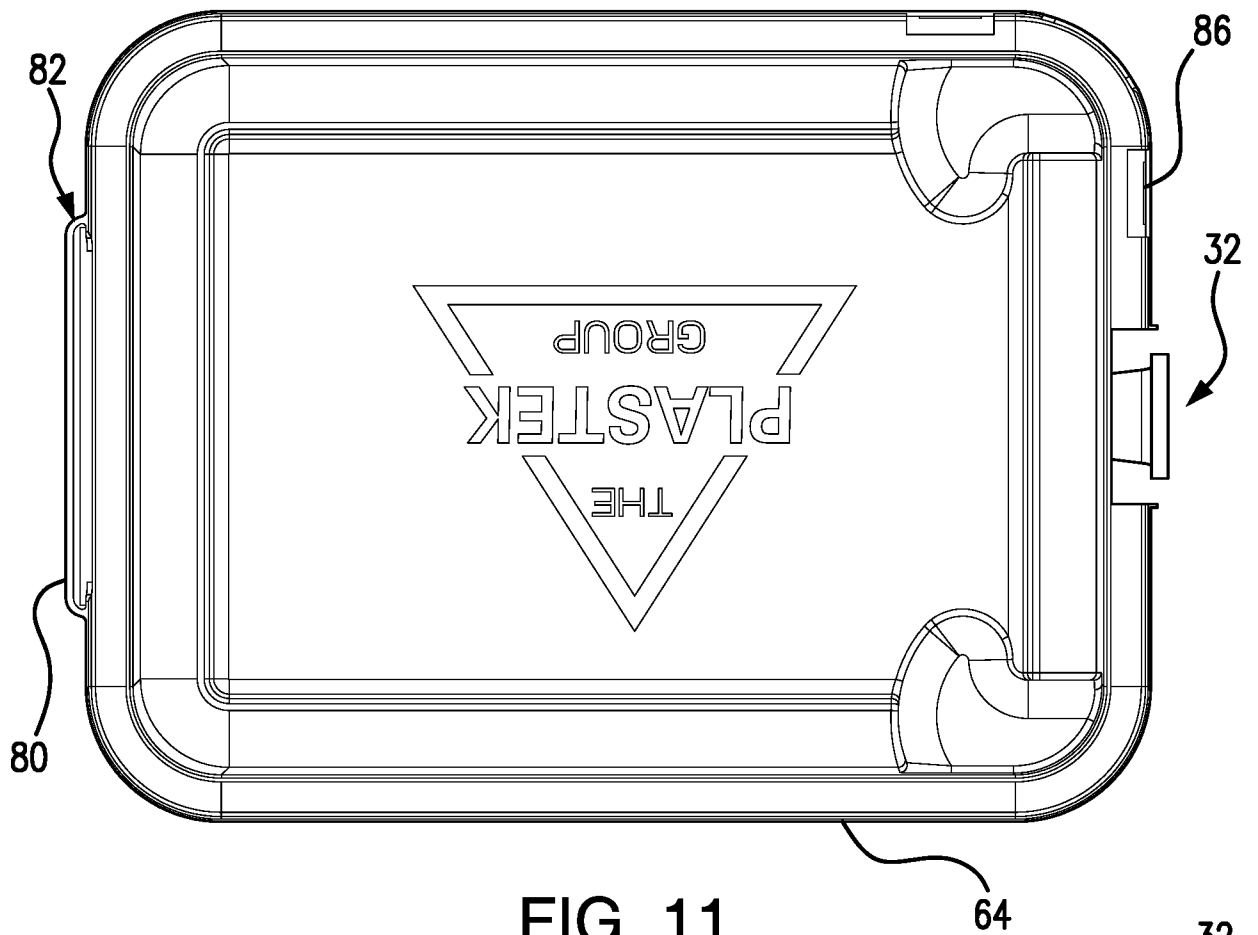


FIG. 5





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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2016/014073**A. CLASSIFICATION OF SUBJECT MATTER****B65D 43/02(2006.01)i, B65D 1/22(2006.01)i, C08L 101/00(2006.01)i**

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)

B65D 43/02; B65D 8/00; B65D 55/00; B65D 43/16; B65D 8/04; B65D 77/20; B65D 43/24; B65D 1/22; C08L 101/00

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

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

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

eKOMPASS(KIPO internal) & keywords: container, tub, closure, lid, living hinge member, insertion portion, and pocket

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1574449 A1 (ARLA FOODS AMBA) 14 September 2005	1,5-15
Y	See paragraphs [0007]-[0008], [0010], [0016], claims 1, 16 and figures 1a-6c.	2-4
Y	JP 07-020035 Y2 (YOSHINO KOGYOSHO CO., LTD.) 10 May 1995 See column 3, line 31 - column 4, line 23 and figures 1-3.	2-4
A	EP 1529731 A1 (MAGIC PRODUCTION GROUP (M.P.G.) S.A.) 11 May 2005 See abstract, claims 1-2 and figures 1-2.	1-15
A	US 4863048 A (IIZUKA et al.) 05 September 1989 See abstract, claims 1-2 and figures 1-2.	1-15
A	US 2012-0211506 A1 (CERVENY et al.) 23 August 2012 See abstract, claims 1-2 and figures 1, 7.	1-15



Further documents are listed in the continuation of Box C.



See patent family annex.

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Date of the actual completion of the international search

24 May 2016 (24.05.2016)

Date of mailing of the international search report

24 May 2016 (24.05.2016)

Name and mailing address of the ISA/KR

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2016/014073

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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