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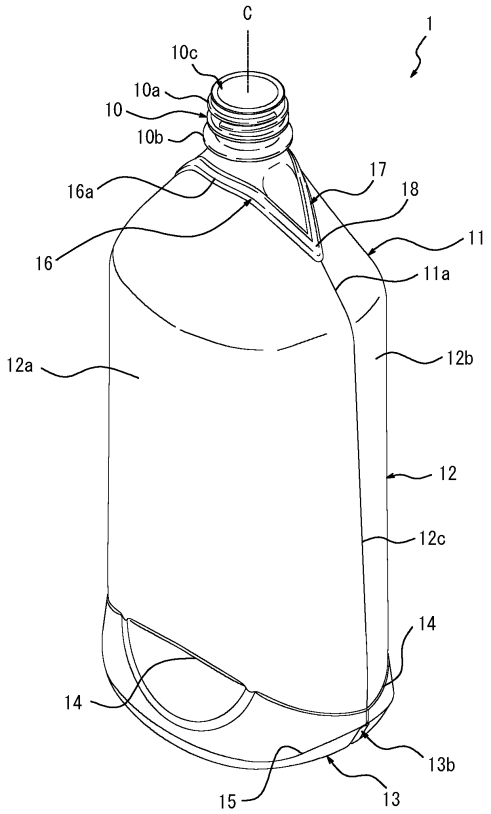
(54) SYNTHETIC RESIN CONTAINER

(57) Provided is a synthetic resin container (1) including a mouth (10), a shoulder (11), a body (12) and a bottom (13) and forming a space for accommodating contents, in which the shoulder (11) is provided with a pair of protruding ribs (16, 17) configured to be disposed opposite to each other on a front side and a rear side across a central axis line (C) of the container (1) and to be foldable when the shoulder (11) is flattened; the pair of protruding ribs (16, 17) are each formed into a curved shape with central portions (16a, 17a) protruded toward the mouth (10) side in a front view or a rear view; and both ends of one of the pair of protruding ribs (16, 17) are connected to both ends of another one of the pair of protruding rib (17), respectively, at intermediate positions of the shoulder (11).

FIG. 1



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Description

TECHNICAL FIELD

[0001] The present disclosure relates to a synthetic resin container that has a mouth, a shoulder, a body and a bottom and is foldable.

REARGROUND

[0002] Synthetic resin containers, representatives of which are polypropylene (PP) bottles and polyethylene terephthalate (PET) bottles, have been used as containers that contain a variety of contents such as beverages and toiletries including cosmetics, chemicals, detergents, shampoos or the like.

[0003] Such a container includes, for example, a cylindrical mouth, a shoulder continuous to the lower side of the mouth, a body continuous to the shoulder and a bottom that closes the lower end of the body, and can be formed by blow molding such as biaxial stretch blow molding in which a test tube shaped preform is used and extrusion blow molding in which a parison extruded into a tubular shape is used.

[0004] For example, Patent Literature 1 (PTL 1) discloses a blow molding method in which a cylindrical parison is placed in a mold for blow molding and a pressurized fluid is supplied into the parison to mold the parison into a container having a predetermined shape conforming to a cavity of the mold.

CITATION LIST

Patent Literature

[0005] PTL 1: JP3993759 (B2)

SUMMARY

(Technical Problem)

[0006] For example, as with the container disclosed in PTL 1, a container is proposed in which, after the contents are used up, the body of the container can be flattened and folded to reduce its volume when the container is discarded. When a container is configured to be foldable in the above described manner, it is possible to reduce not only the volume of the container when it is discarded but also the residual volume of the contents in the case where the container is used in particular for the contents with a high viscosity.

[0007] However, when a container molded through the above described blow molding is formed to be foldable, a shoulder tends to be formed relatively thick, and there is a difficulty in folding the shoulder.

[0008] It is therefore an object of the present disclosure to provide a synthetic resin container having a shoulder capable of being folded easily.

(Solution to Problem)

[0009] The disclosed synthetic resin container is a synthetic resin container configured to include a mouth, a shoulder, a body and a bottom and to form a space for accommodating contents, in which
the shoulder is provided with a pair of protruding ribs that are disposed opposite to each other on the front side and the rear side across a central axis line of the container and are foldable when the shoulder is flattened;
the pair of protruding ribs are respectively formed into a curved shape with a central portion projecting toward the mouth side in a front view or a rear view; and
both ends of one of the pair of protruding ribs connect to both ends of another one of protruding ribs, respectively, at intermediate positions of the shoulder.

[0010] It is to be noted that, in the disclosed synthetic resin container, it is preferable that the body has a flat shape with a width larger than a thickness.

[0011] In the disclosed synthetic resin container, it is preferable that the central portion of each of the protruding ribs is adjacent to a base end portion of the mouth.

[0012] In the disclosed synthetic resin container, it is preferable that a pair of connecting portions where the both ends of one of the protruding ribs are connected with the both ends of the another one of the protruding ribs, respectively, are each provided with a triangular flat plane.

(Advantageous Effect)

[0013] According to the present disclosure, a synthetic resin container having a shoulder capable of being folded easily can be provided.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] In the accompanying drawings:

FIG. 1 is a perspective view of a synthetic resin container according to an embodiment of the present disclosure;
FIG. 2 is a front view of the synthetic resin container in FIG. 1;
FIG. 3 is a side view of the synthetic resin container in FIG. 1;
FIG. 4 is a plan view of the synthetic resin container in FIG. 1;
FIG. 5 is a bottom view of the synthetic resin container in FIG. 1;
FIG. 6 is a side view illustrating the synthetic resin container in FIG. 1 being folded;
FIG. 7 is a perspective view of a synthetic resin container according to another embodiment of the present disclosure;
FIG. 8 is a front view of the synthetic resin container in FIG. 7;
FIG. 9 is a side view of the synthetic resin container

in FIG. 7;

FIG. 10 is a plan view of the synthetic resin container in FIG. 7;

FIG. 11 is a bottom view of the synthetic resin container in FIG. 7; and

FIG. 12 is a front view illustrating the synthetic resin container in FIG. 7 being folded.

DETAILED DESCRIPTION

[0015] The present disclosure will be described in more detail below with reference to the drawings.

[0016] A synthetic resin container 1 (hereinafter referred to also as a "container 1") according to an embodiment of the present disclosure illustrated in FIGS. 1 to 5 has a tubular mouth 10, a shoulder 11 continuous to the lower end of the mouth 10 and expanding radially outward, a body 12 continuous to the outer peripheral edge of the shoulder 11 and extending downward, and a bottom 13 continuous to the lower end of the body 12. The shoulder 11 is continuous to the lower side of the mouth 10 through a bent portion or a curved portion, and is configured such that an angle thereof relative to a central axis line C of the container 1 is different from that of the mouth 10. The body 12 is continuous to the lower side of the shoulder 11 through the bent portion or the curved portion, and is configured such that an angle thereof relative to the central axis line C is different from that of the shoulder 11. Inside the container 1 is a space for accommodating contents. It is to be noted that FIG. 2 is a front view of the container 1 viewed from one side in the short axis direction of the flat body 12, and FIG. 3 is a side view of the container 1 viewed from one side in the long axis direction of the body 12.

[0017] The mouth 10 is formed into a cylindrical shape, and its outer periphery is provided with a male thread 10a to which a cap or a dispensing plug is mounted. A neck ring 10b is provided under the male thread 10a, and the container 1 can be transferred by supporting the lower side of the neck ring 10b with a transfer apparatus, for example. Further, a top opening 10c of the mouth 10 is an outflow port for contents and can be closed by mounting a cap thereto.

[0018] The shoulder 11 connects the mouth 10 and the body 12, and has a diameter gradually expanding downward from the mouth 10 side to the body 12 side. It is to be noted that, in this example, although the shoulder 11 is formed from a substantially flat inclined surface in which a contour line is linear in the front view (see FIG. 2) and the side view (see FIG. 3), this is not restrictive, and may be formed into a dome shape swelling outward from the container 1, for example.

[0019] The shoulder 11 has a pair of protruding ribs 16 and 17 disposed opposite to each other on the front side and the rear side across the central axis line C. It is to be noted that, in this example, each central axis line of the mouth 10, the shoulder 11, the body 12 and the bottom 13 coincides with the central axis line C of the container 1. The protruding ribs 16 and 17 are formed such that they protrude from the outer surface of the shoulder 11 to the outside of the container, and recesses corresponding to the protruding ribs 16 and 17 are formed on the inner surface of the shoulder 11. Further, the protruding ribs 16 and 17 are each formed into a curved shape with central portions 16a and 17a each protruding toward the mouth 10 side (upper side). Both ends of one protruding rib 16 of the pair of protruding ribs 16 and 17 are connected to both ends of the other protruding rib 17, respectively, at each intermediate position of the shoulder 11. It is to be noted that the "intermediate position of the shoulder 11" refers to a position in the region between the end (upper end) on the mouth 10 side and the end (lower end) on the body 12 side of the shoulder 11. As illustrated in the perspective view of FIG. 1 and the side view of FIG. 3, connecting portions 18 connecting both ends of the protruding rib 16 and both ends of the protruding rib 17 are formed into a bent portion protruding downward in a side view.

[0020] Such a pair of protruding ribs 16 and 17 become a starting point for folding a wall surface of the shoulder 11 when the shoulder 11 is flattened with the body 12 in the thickness direction. That is, the shoulder 11 can be easily folded along the protruding ribs 16 and 17.

[0021] Respective central portions 16a and 17a of the pair of protruding ribs 16 and 17 are adjacent to the base end portion of the mouth 10. A portion of the shoulder 11 being adjacent to the base end portion of the mouth 10, that is, an upper end portion of the shoulder 11 tends to be formed thick and difficult to be deformed. However, the central portion 16a of the protruding rib 16, which is a starting point of folding, is disposed on the upper end portion, which allows for easy deformation and prevents the shoulder 11 from being formed thick.

[0022] As illustrated in a plan view of FIG. 4, the body 12 has a flat shape with a width (a length of the body 12 in the long axis direction) larger than a thickness (a length of the body 12 in the short axis direction). It is to be noted that, in a lateral cross-section of the body 12 perpendicular to the central axis line C, the short axis direction is defined as a thickness direction and the long axis direction perpendicular to the short axis direction is defined as a width direction. It is to be noted that, as for the body 12, the shoulder 11 and the bottom 13, a part thereof may include a portion that is not flat (a portion where the thickness and the width are the same), or the entire portion thereof may not be flat (a portion where the thickness and the width are the same). In FIG. 4, T represents the maximum thickness and W represents the maximum width of the body 12.

[0023] The body 12 has a front wall 12a and a rear wall 12b opposite to each other in the thickness direction across the central axis line C. Each boundary between the front wall 12a and the rear wall 12b is provided with a longitudinal folding line portion 12c that acts as a mountain crease when the body 12 is flattened. This enables the body 12 to be easily flattened in the thickness direc-

tion (short axis direction) such that the front wall 12a and the rear wall 12b are close to each other. It is to be noted that, in this example, each longitudinal folding line portion 11a continuous to each longitudinal folding line portion 12c is provided also to the shoulder 11, and the longitudinal folding line portion 11a acts as a mountain crease. Further, the longitudinal folding line portion 11a is connected to the end of the protruding ribs 16 and 17, which allows the body 12 and the shoulder 11 to be more easily flattened in the thickness direction. It is to be noted that, in this example, when the shoulder 11 and the body 12 are flattened in the thickness direction, the longitudinal folding line portion 12c and the longitudinal folding line portion 11a are displaced, as mountain creases, outward in the width direction. However, this is not restrictive, and the container 1 may be configured to be folded such that the longitudinal folding line portion 12c and the longitudinal folding line portion 11a are folded inward in the width direction. It is to be noted that, in this example, although the longitudinal folding line portion 12c and the longitudinal folding line portion 11a are formed into a protruding rib shape, they may be formed into a recessed groove.

[0024] The body 12 is provided with a lateral folding line portion 14 extending in the circumferential direction of the body 12. The lateral folding line portion 14 acts as a valley crease when the body 12 is flattened in the thickness direction, and can be a starting point for folding. It is to be noted that the lateral folding line portion 14 can act also as a mountain crease. It is to be noted that, in this example, although the lateral folding line portion 14 is formed into a recessed groove shape, it may be formed into a protruding rib shape.

[0025] In this example, the lateral folding line portion 14 is provided at the lower half portion (half portion on the bottom 13 side) of the body 12. The same lateral folding line portion 14 is provided to the front wall 12a and the rear wall 12b. A pair of lateral folding line portions 14 disposed opposite to each other in the thickness direction of the body 12 are connected to each other on the boundary between the front wall 12a and the rear wall 12b (longitudinal folding line portion 12c). It is to be noted that the lateral folding line portion 14 is not an essential component. The lateral folding line portion 14 may be provided on the upper half portion of the body 12, or a plurality of lateral folding line portions 14 may be provided at intervals in the height direction of the container 1. Further, the lateral folding line portion 14 may be provided such that it extends only over a part in the circumferential direction of the body 12. The lateral folding line portion 14 may be provided to only either the front wall 12a or the rear wall 12b. It is to be noted that, in the side view illustrated in FIG. 3, the lateral folding line portion 14 forms a recessed bent portion in the thickness direction of the body 12.

[0026] The bottom 13 closes the lower end of the tubular body 12 and forms a flat grounding surface (bottom surface) that can ground in the erecting posture illustrated in FIGS. 1 to 3. As illustrated in FIG. 5, a recess 13a dented inward of the container 1 is formed on the central portion of the bottom 13. In this example, the recess 13a is a substantially hemispherical curved surface. Further, on the bottom 13, a pair of grooves 13b extending in the width direction (long axis direction) are formed at the central position in the thickness direction. The grooves 13b extend from the bottom 13 to the lower portion of the body 12. The grooves 13b act as valley creases when the bottom 13 is folded. That is, the container 1 according to this example is configured such that the bottom 13 can be folded by folding a pair of grooves 13b to the inside of the container 1. In that case, the folding line portions 15 provided at the boundary between the body 12 and the bottom 13 act as mountain creases. It is to be noted that, in this example, each folding line portion 15 is provided on the front side and the rear side of the container 1. It is to be noted that the recess 13a, the grooves 13b and the folding line portions 15 are not essential components, and the shape of the bottom 13 can be changed appropriately.

[0027] In this context, the container 1 can be formed by the blow molding such as the biaxial stretch blow molding, for example. More specifically, a preform can be molded into a container having a predetermined shape conforming to an inner surface of a cavity of a mold by placing a body of a bottomed tubular shaped (test tube shaped) preform heated by a heater or the like, for example, to a predetermined temperature at which stretchability is achieved into a cavity of the mold and by supplying, at a predetermined pressure, gas or liquid into the preform through a nozzle. A preform can be obtained by injection molding, extrusion blow molding, extrusion molding or the like by using thermoplastic synthetic resins such as polypropylene (PP) and polyethylene terephthalate (PET) or the like as a raw material. The preform includes a bottomed tubular body and a mouth continuous to the body. The mouth is formed into a cylindrical shape, and the outer periphery thereof is integrally provided with a male thread. The body is formed into a test tube shape extending along the axis direction and having a circular cross-section, and is provided to the lower side of the mouth coaxially to and integrally with the mouth.

[0028] As described above, the container 1 according to this embodiment includes a pair of protruding ribs 16 and 17 disposed opposite to each other on the front side and the rear side of the shoulder 11 across the central axis line C. As illustrated in FIG. 6, when the shoulder 11 is flattened by sandwiching it between the front side and the rear side, a pair of protruding ribs 16 and 17 become a starting point for folding, and the shoulder 11 can be easily folded. Further, since the both ends of the pair of protruding ribs 16 and 17 are connected to the intermediate positions of the shoulder 11, respectively, the shoulder 11 can be easily folded up to the intermediate position of the shoulder 11. Therefore, according to the container 1 of this embodiment, the volume of the container 1 can be reduced for disposal, and in addition, when the container is used in particular for the contents having a high

viscosity, the contents remaining in the intermediate position of the shoulder 11 can also be squeezed out. In this manner the residual volume of the contents can be reduced. The container 1 according to this embodiment is suitable for a refill container used for refilling contents to a container dedicated for discharging the contents.

[0029] It is to be noted that, in the container 1 according to this embodiment, a longitudinal folding line portion 11a is provided at the lower side of each connecting portion 18 of the pair of protruding ribs 16 and 17, which further facilitates fold of the shoulder 11.

[0030] Further, in the container 1 according to this embodiment, the body 12 is formed into a flat shape having a width larger than a thickness, which allows for easy flattening of the body 12 and the shoulder 11 in the thickness direction. As a result, fold of the entire container 1 including the shoulder 11 is further facilitated. For the same reason, as with this embodiment, it is preferable that the shoulder 11 also has a flat shape like the body 12.

[0031] Further, in the container 1 according to this embodiment, respective central portions 16a and 17a of the protruding ribs 16 and 17 are adjacent to the base end portion of the mouth 10, and thus the shoulder 11 can be folded to near the base end portion of the mouth 10. Therefore, fold of the shoulder 11 can further improve the volume reduction effect and the residual volume reduction effect of contents.

[0032] Another embodiment of the present disclosure will be described with reference to FIGS. 7 to 12. It is to be noted that the parts having the same basic functions as those described above are assigned with the same reference signs in the drawing, and explanation thereof will be omitted.

[0033] In the container 2 illustrated in FIGS. 7 to 12, a triangular flat plane 21 is provided to each of a pair of connecting portions 18 that connect both ends of the protruding rib 16 and the both ends of the protruding rib 17, respectively. Each triangular flat plane 21 has two sides 21b and 21b that coincide with the protruding ribs 16 and 17, respectively, and an upper side 21a that connects ends of a pair of the sides 21b and 21b. Further, the container 2 is provided with longitudinal protruding ribs 22 each extending from the shoulder 11 to the body 12. Each longitudinal protruding rib 22 is formed such that it protrudes from the outer surface of the shoulder 11 or the body 12 to the outside the container, and a recess corresponding to the longitudinal protruding rib 22 is formed in the inner surface of the shoulder 11 or the body 12. Each longitudinal protruding rib 22 can act as a mountain crease or a valley crease when the shoulder 11 and the body 12 are flattened to fold the container 2. Two longitudinal protruding ribs 22 are disposed opposite to each other on the front side and the rear side, respectively. Each upper end of four longitudinal protruding ribs 22 is connected to the upper side 21a of the triangular flat plane 21. That is, respective upper ends of the four longitudinal protruding ribs 22 are configured to be connected to the protruding rib 16 or the protruding rib 17.

[0034] As illustrated in FIG. 12, in the container 2 according to this embodiment, the container 2 can be folded by flattening the shoulder 11 and the body 12 in the thickness direction (by sandwiching them between the front side and the rear side) while folding the longitudinal folding line portion 12c and the longitudinal folding line portion 11a to the inside of the container 2. In this case, the longitudinal folding line portion 12c and the longitudinal folding line portion 11a act as a valley crease and four longitudinal protruding ribs 22 act as a mountain crease. Further, the upper side 21a of the triangular flat plane 21 acts as a mountain crease, the two sides 21b other than the upper sides 21a act as a valley crease, and as a result the flat plane 21 is folded to the inside of the container 2. In this case, the container 2 can be folded while decreasing the width thereof. It is to be noted that, in this example, although the surface of the flat plane 21 is located at the same level as the protruding ribs 16 and 17 (is configured to be the same height), the surface of the flat plane 21 may be higher or lower than that of the protruding ribs 16 and 17. Further, instead of the triangular flat plane 21, only a protruding rib corresponding to the upper side 21a may be provided.

[0035] It is to be noted that, as illustrated in FIGS. 9 and 11, each of a pair of grooves 13b formed in the bottom 13 has a substantially V-shape. Each groove 13b having a substantially V-shape extends from the bottom 13 to the lower side of the body 12, and its top portion (bent portion) is located near the lower side of the body 12 (near each end in the width direction in the bottom diagram illustrated in FIG. 11). Each groove 13b acts as a valley crease when the bottom 13 is folded while the longitudinal folding line portion 12c is folded to the inside of the container 2.

[0036] It is to be noted that, as with the above described embodiment, the container 2 according to this embodiment can be folded by flattening the shoulder 11 and the body 12. That is, the container 2 can be folded such that the longitudinal folding line portion 12c of the body 12 and the longitudinal folding line portion 11a of the shoulder 11 are displaced to the outside of the container 2 in the width direction.

[0037] As described above, the shoulder 11 can be folded easily also in the container 2 according to this embodiment.

[0038] The above description are mere embodiments of the present disclosure, and various changes may be made in the scope of claim. For example, instead of the male thread 10a of the mouth 10, a protrusion may be provided for undercut engagement with a cap or the like. In this case, a cap or the like may be plugged into the mouth 10. Further, in the container 1 according to this example, the shoulder 11, the body 12 and the bottom 13 are symmetrical in the thickness direction (symmetrical back and forth), and are symmetrical in the width direction (symmetrical right and left). However, this is not restrictive, and all or any one of the shoulder 11, the body 12 and the bottom 13 may be asymmetrical back and

forth or asymmetrical right and left. Further, the bottom 13 may be configured such that it does not form a grounding surface that can ground when the container 1 is in an erecting posture, and it may be formed into a hemispherical curved surface that expands downward.

REFERENCE SIGNS LIST

[0039]

1, 2	synthetic resin container
10	mouth
10a	male thread
10b	neck ring
10c	top opening
11	shoulder
11a	longitudinal folding line portion
12	body
12a	front face wall
12b	rear face wall
12c	longitudinal folding line portion
13	bottom
14	lateral folding line portion
15	folding line portion
16, 17	protruding rib
16a, 17a	central portion
18	connecting portion
21	flat plane
21a	upper side
22	longitudinal protruding rib
C	central axis line

Claims

1. A synthetic resin container comprising a mouth, a shoulder, a body and a bottom and forming a space for accommodating contents, wherein,
the shoulder is provided with a pair of protruding ribs configured to be disposed opposite to each other on a front side and a rear side across a central axis line of the container and to be foldable when the shoulder is flattened;
each of the pair of protruding ribs is formed into a curved shape in which a central portion protrudes toward the mouth side in a front view or a rear view; and
both ends of one of the pair of protruding ribs are connected to both ends of another one of the pair of protruding ribs, respectively, at intermediate positions of the shoulder.

2. The synthetic resin container according to claim 1, wherein the body has a flat shape with a width larger than a thickness.

3. The synthetic resin container according to claim 1 or 2, wherein respective central portions of the protruding ribs are adjacent to a base end portion of the mouth.

4. The synthetic resin container according to any one of claims 1 to 3, wherein a triangle flat plane is provided to each of a pair of connecting portions where the both ends of one of the protruding ribs are connected with the both ends of the another one of the protruding ribs, respectively.

FIG. 1

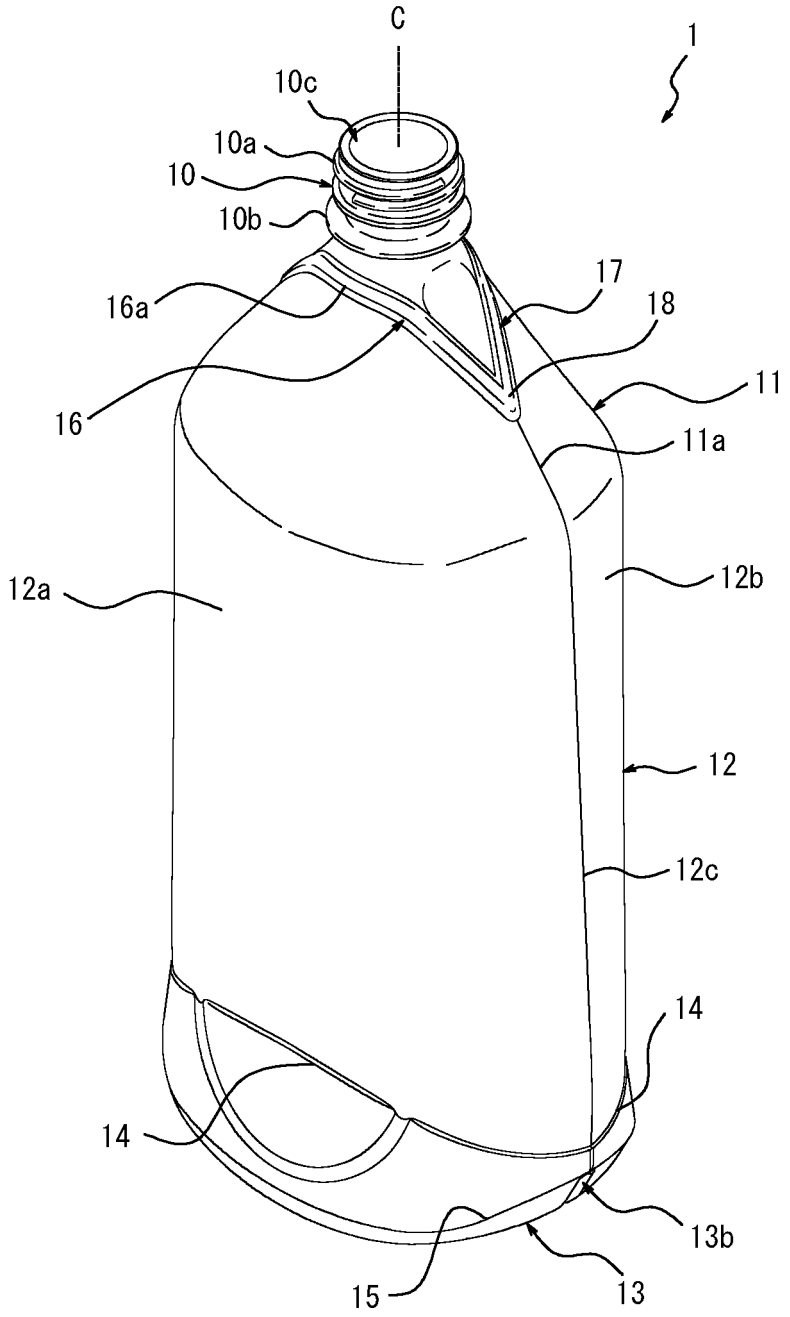


FIG. 2

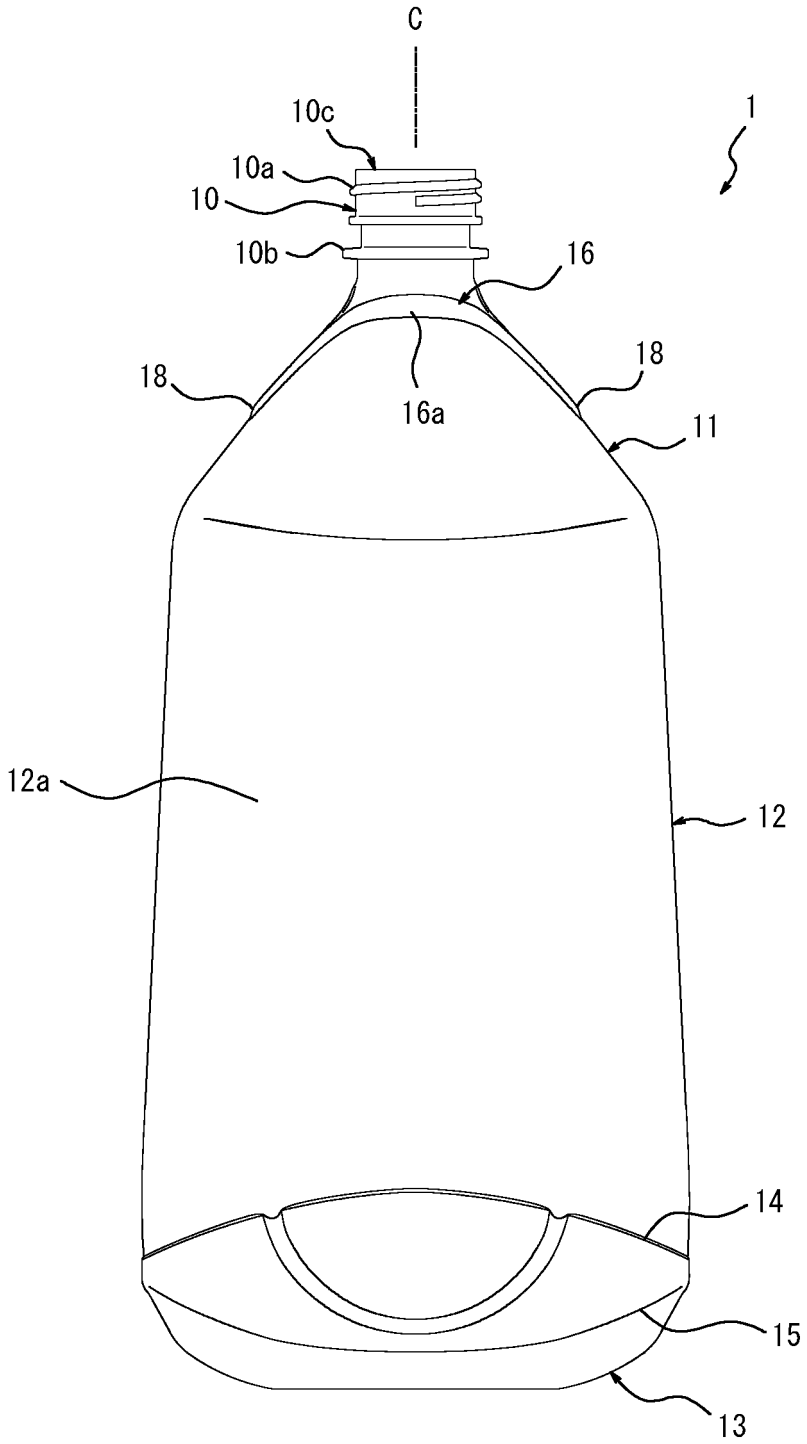


FIG. 3

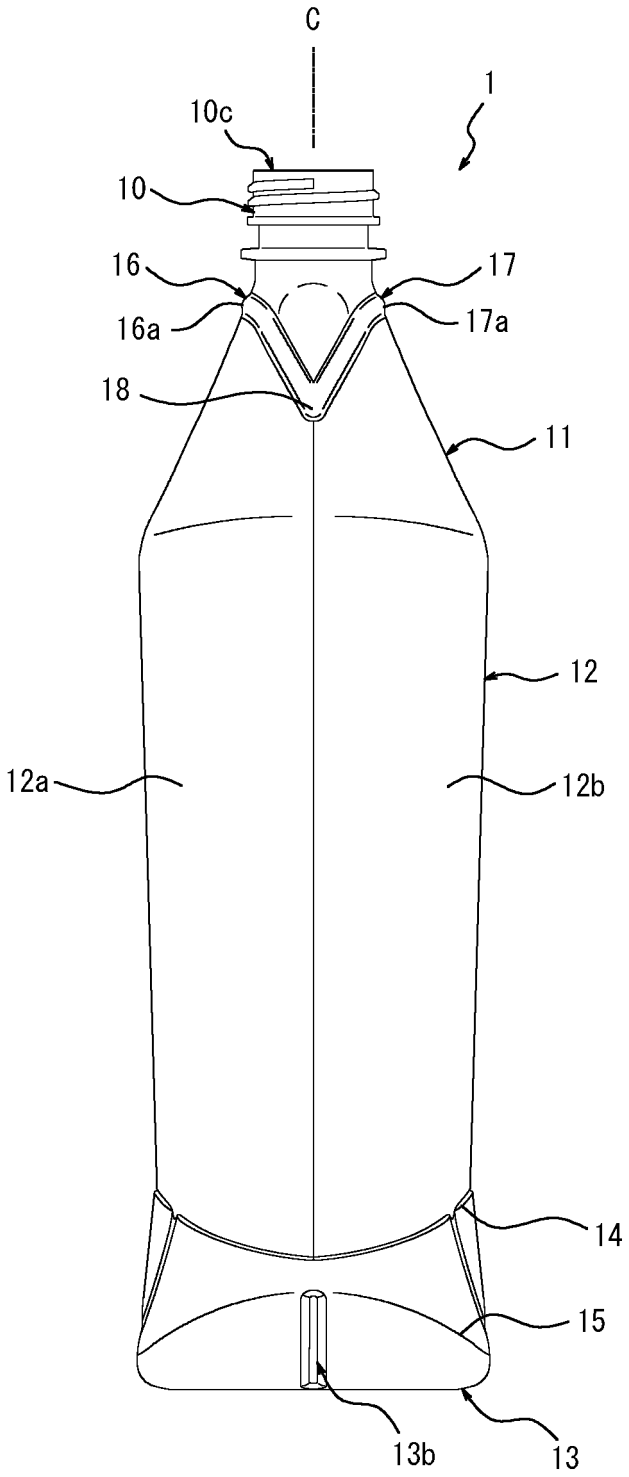
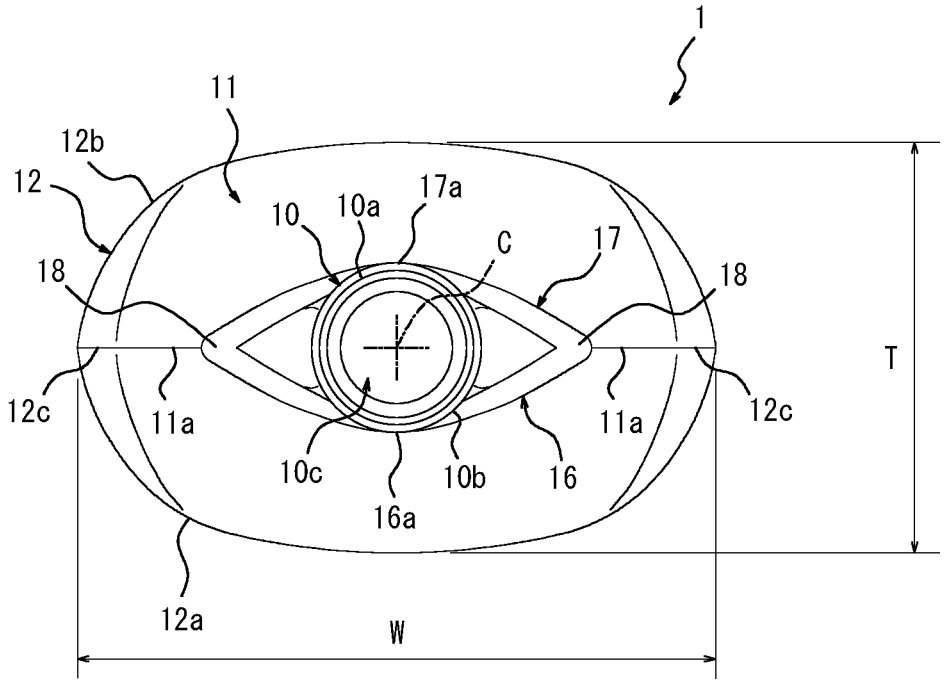


FIG. 4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11
12b
12
10
10a
17a
C
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12c
11a
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T
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16
12a
W

FIG. 5

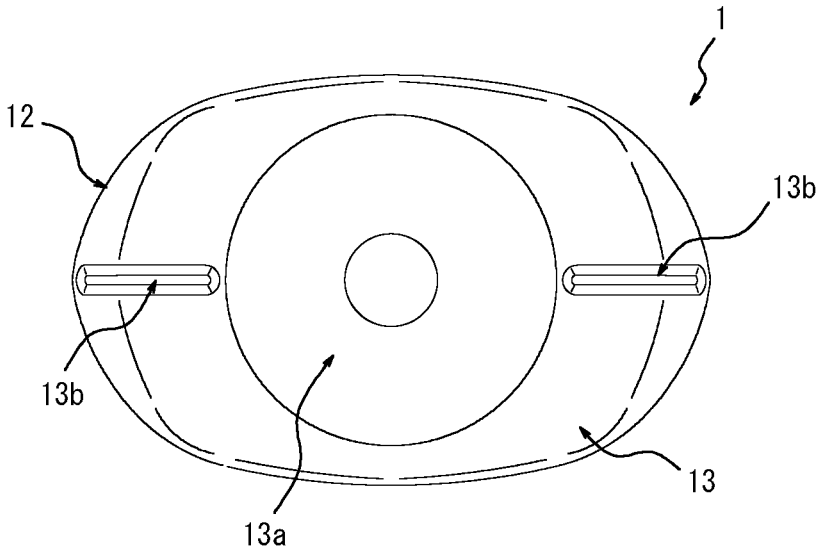
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FIG. 6

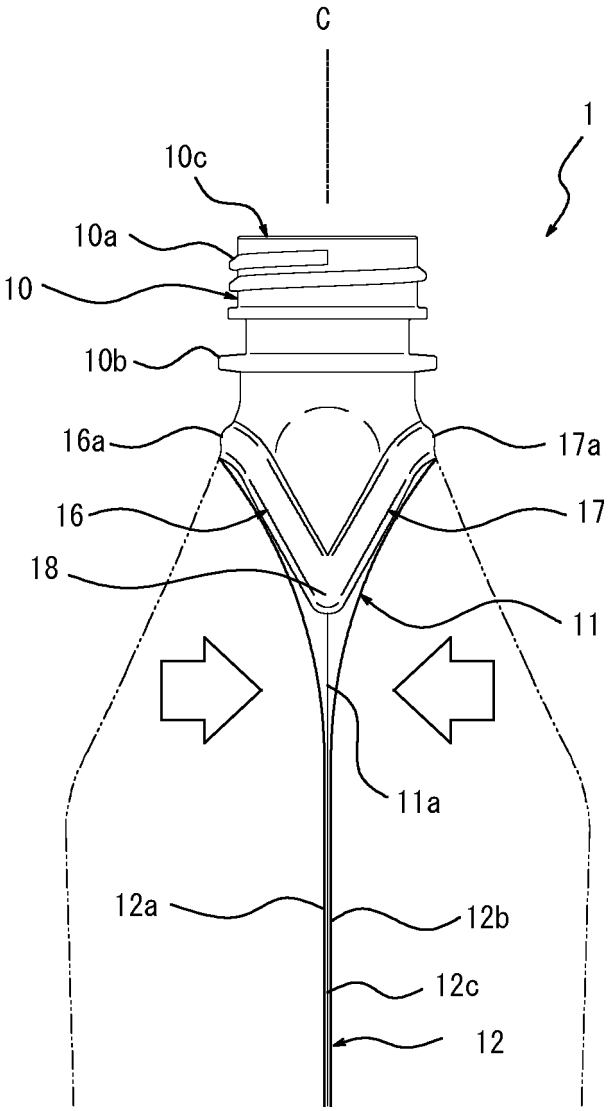

FIG. 7

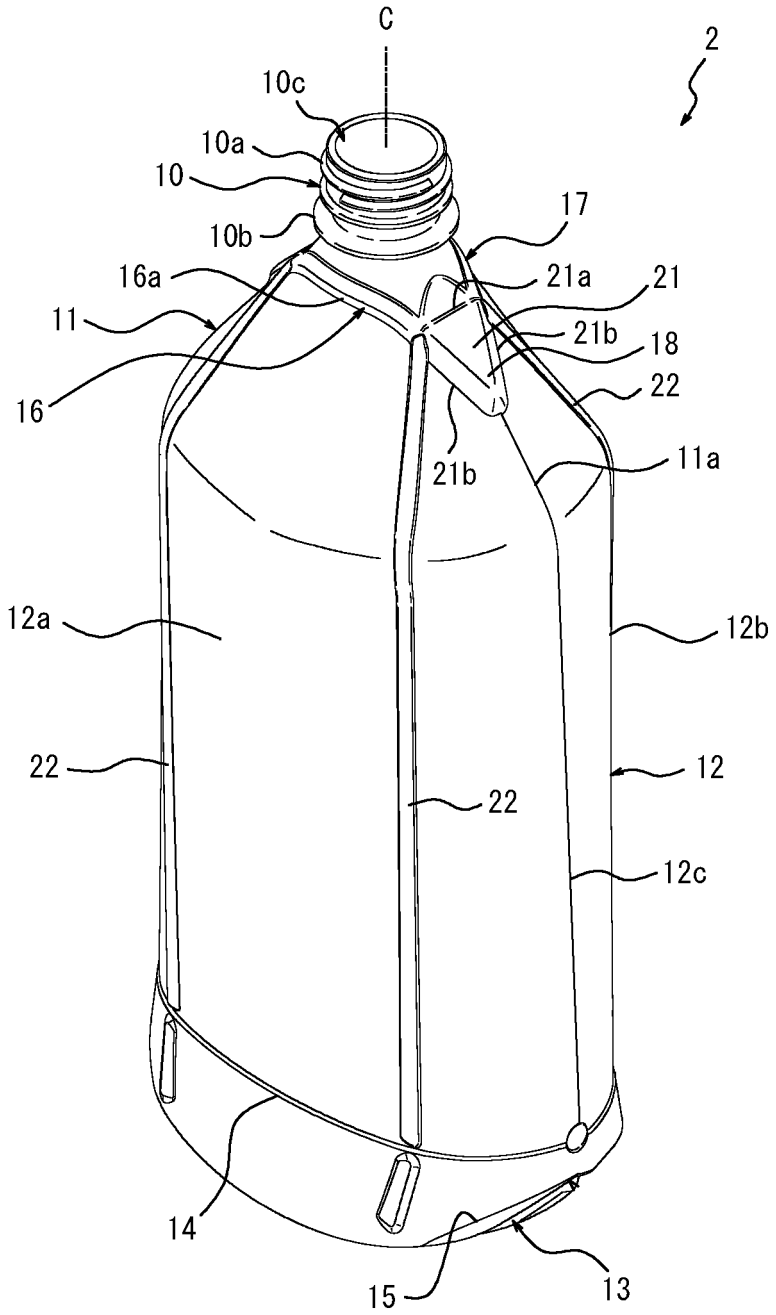
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FIG. 8

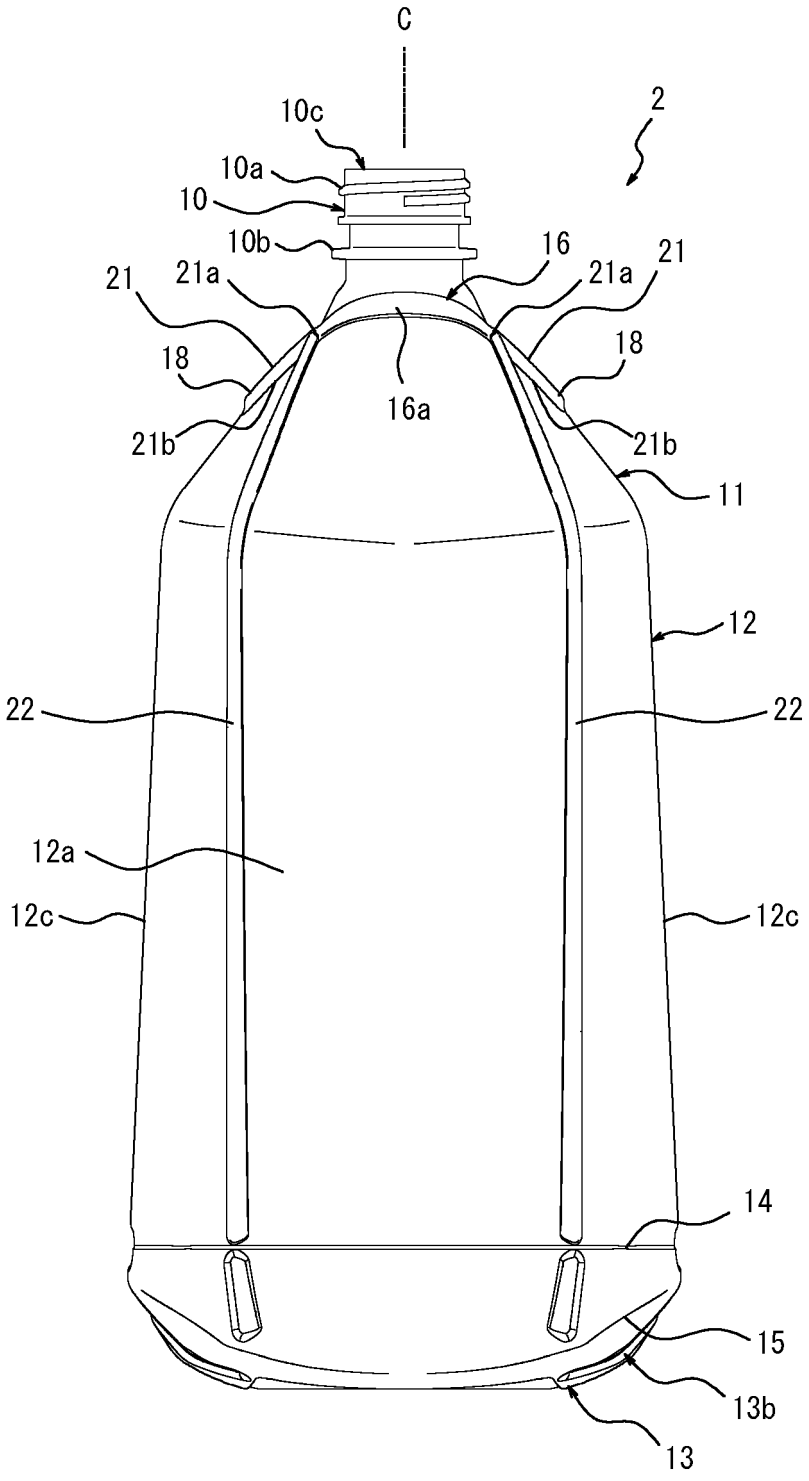
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FIG. 9

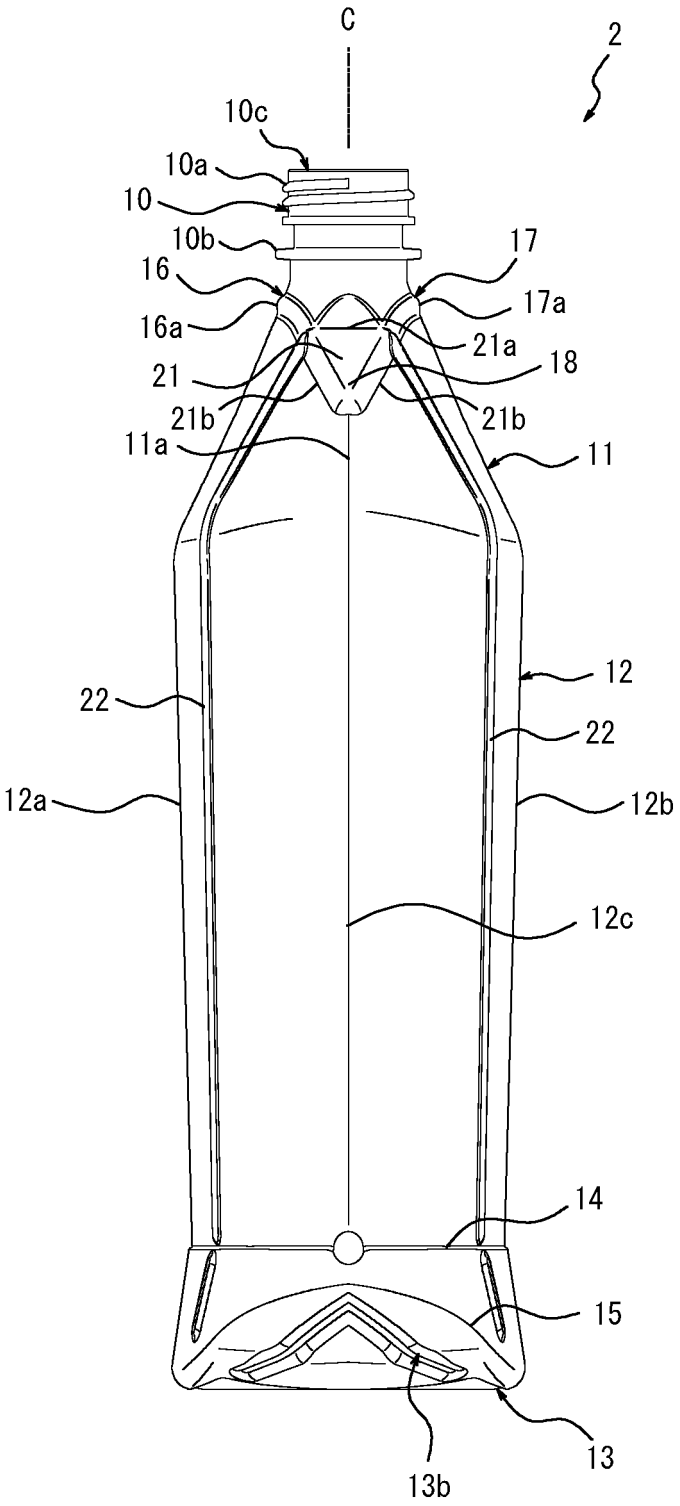
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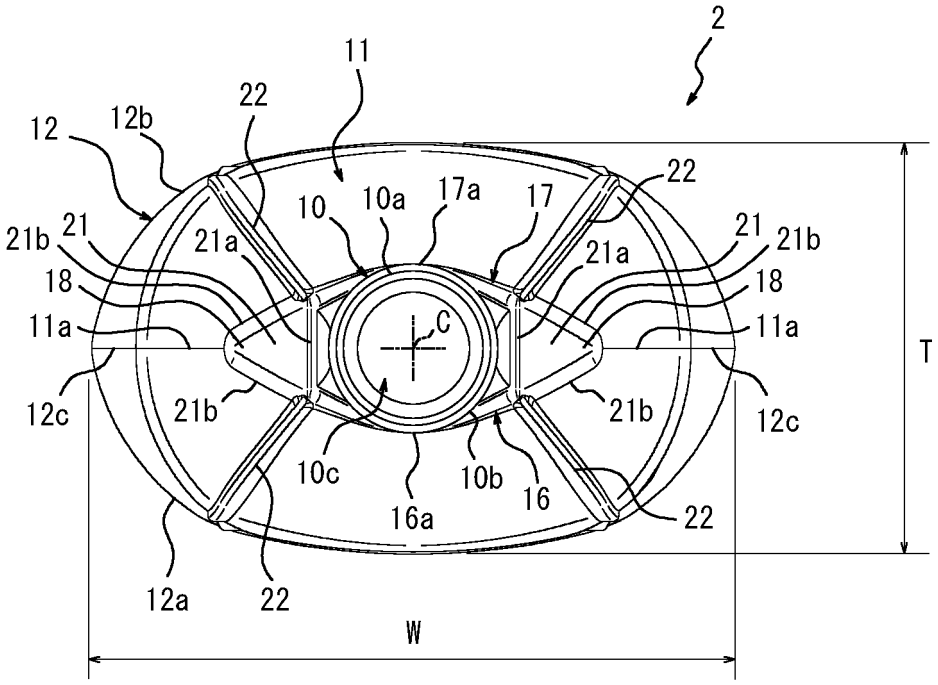
FIG. 10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21b
21b
12c
10c
10b
16
16a
22
12a
22
W

FIG. 11

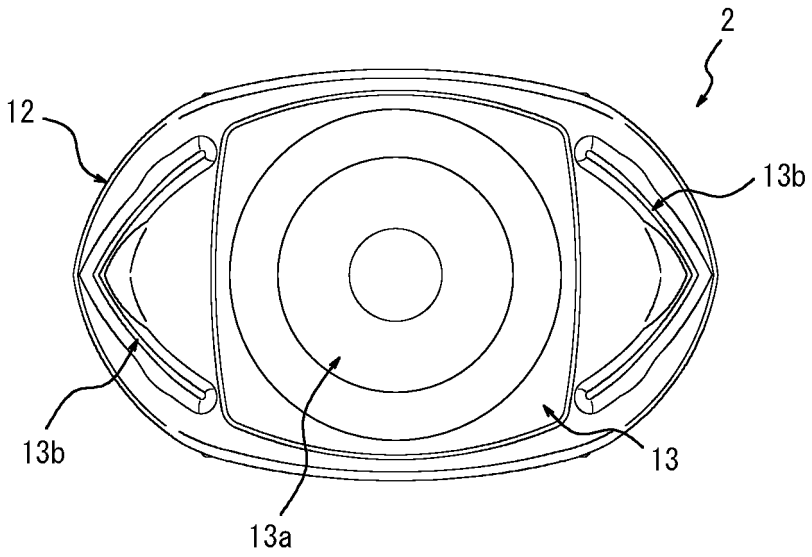
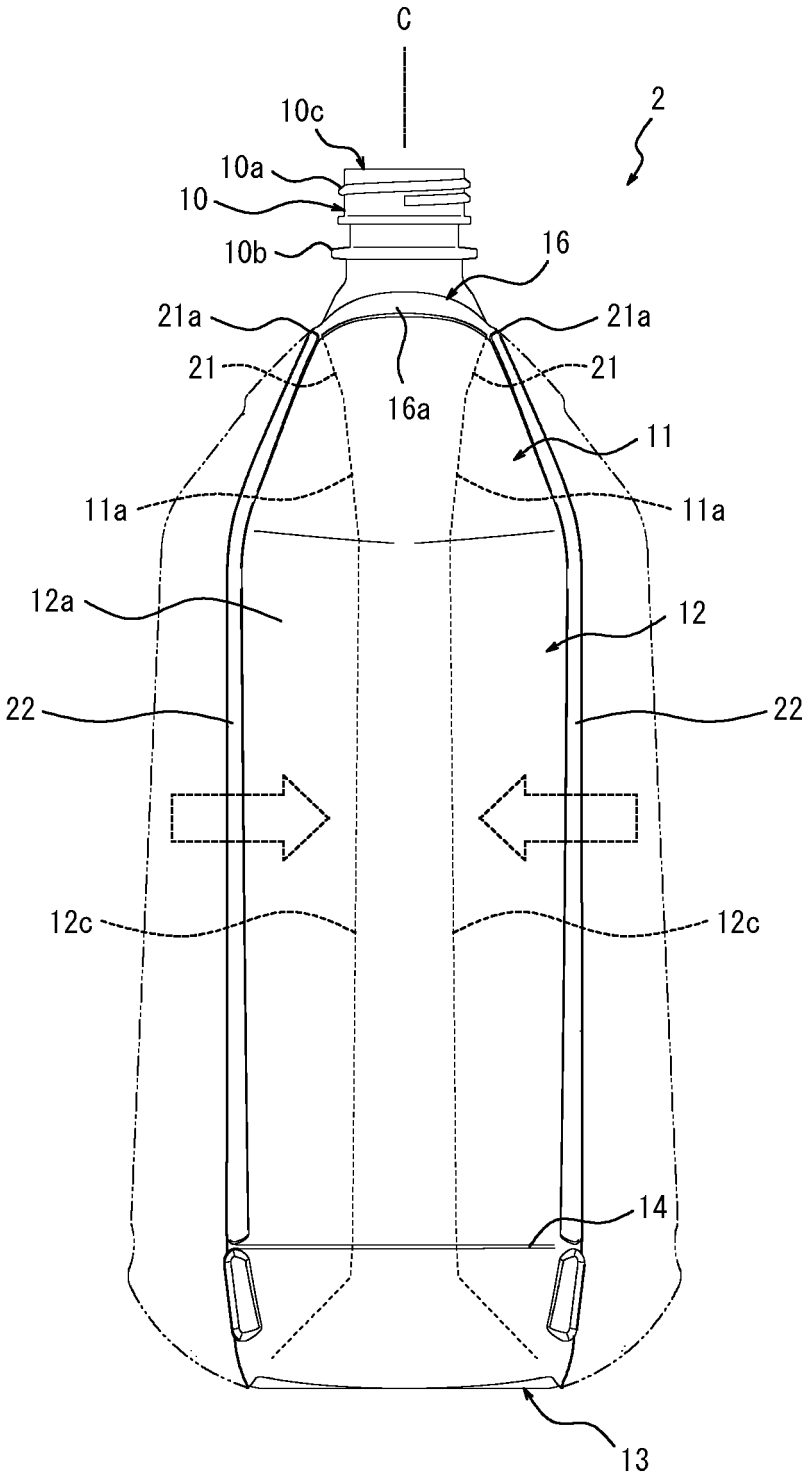

2
12
13b
13b
13
13a

FIG. 12


C
2
10c
10a
10
10b
16
21a
21a
21
21
16a
11
11a
11a
12a
12
22
22
12c
12c
14
13

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2018/021383

A. CLASSIFICATION OF SUBJECT MATTER
Int.Cl. B65D1/02(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)
Int.Cl. B65D1/02

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

Published examined utility model applications of Japan	1922-1996
Published unexamined utility model applications of Japan	1971-2018
Registered utility model specifications of Japan	1996-2018
Published registered utility model applications of Japan	1994-2018

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	JP 2000-272616 A (ASAHI SOFT DRINKS CO., LTD.) 03 October 2000, paragraphs [0036]-[0052], [0054], [0055], [0058], [0064], fig. 1-5, 7, 8, 10 (Family: none)	1, 3 1-4
Y	US 5255808 A (SUPERMATIC KUNSTSTOFF AG) 26 October 1993, column 5, lines 17-43, fig. 15-18 & EP 511596 A1	1-4

☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
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"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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"&" document member of the same patent family

Date of the actual completion of the international search 06.08.2018	Date of mailing of the international search report 14.08.2018
Name and mailing address of the ISA/ Japan Patent Office 3-4-3, Kasumigaseki, Chiyoda-ku, Tokyo 100-8915, Japan	Authorized officer Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2018/021383

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP 2000-62009 A (TOPPAN PRINTING CO., LTD.) 29 February 2000, paragraphs [0010], [0011], [0013]-[0020], fig. 1, 2, 5, 8, 9 (Family: none)	1-4
Y	JP 8-72843 A (TOYO SEIKAN CO., LTD.) 19 March 1996, paragraphs [0027]-[0045], fig. 1-11 (Family: none)	4
A	JP 11-105930 A (TOPPAN PRINTING CO., LTD.) 20 April 1999, paragraphs [0018]-[0020], fig. 1, 2 (Family: none)	1-4

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 3993759 B **[0005]**