[19]	INTELLECTUAL PROPERTY PHILIPPINES			
[12]	INVENTION PUBLICATION			
[11]	Publication Number:	12016501859	Document Code:	B1
[22]	Publication Date:	19/12/2016		
[21]	Application Number:	12016501859	Document Code:	A
[22]	Date Filed:	22/9/2016		
[54]	Title:	MEDICAL FLUID CONTAINER		
[71]	Applicant(s):	OTSUKA PHARMA FACTORY INC		
[72]	Inventor(s):	TATEISHI ISAMU BABA SHINJI		
[30]	Priority Data:	25/3/2014 JP20140062486		
[51]	International Class 8:	A61J 1/05 20060101AFI20170724BHPH; B65D 51/18 20060101ALI20170724BHPH;		
[57]	Abstract:	A medical fluid container of the present invention includes a container main body which is integrally molded by a blow-fill-seal method, a rubber plug which is disposed on a top surface of a mouth portion of the container main body, and an outer frame material which covers the rubber plug and the mouth portion, and which has a receiving surface that the mouth portion touches, and has a pressure bonding portion pressed in a direction of a bottom portion of the container main body against the mouth portion, and the rubber plug includes a plug main body covering a part of the top surface of the mouth portion, and a flanged portion extended between the pressure bonding portion and the mouth protion from a lower outer circumference of the plug main body.		

DESCRIPTION

Title of Invention: MEDICAL FLUID CONTAINER

Technical Field

The present invention relates to a medical fluid container which has a container main body molded by a blow-fill-seal method, and a cap attached to a mouth portion of the container main body.

Background Art

Conventionally, a plastic bottle molded by a blow-fill-seal (BFS) method has been known as a container for medical fluid for transfusion, etc. In a blow-fill-seal method, molding of a bottle, filling of a medical fluid, and weld-sealing of the bottle are successively performed in a common metallic mold. This method is suitable for mass production of bottles, which makes it possible to achieve cost reduction.

Citation List

Patent Literature

Patent Literature 1: Japanese Patent Application Publication No. 50-36290.

Patent Literature 2: European Patent No. 0364783.

Summary of The Invention

Technical Problem

In general, a cap is attached to a mouth portion

of a BFS bottle. The cap is attached such that, for example, a rubber plug is disposed on a top surface of the bottle, and after the rubber plug and the mouth portion of the bottle are covered with an outer frame material, the outer frame material and the bottle are welded.

However, as shown in FIG. 1 of Patent Literature 1 and FIG. 1 of Patent Literature 2, conventionally, the rubber plug (Reference sign 6 in Patent Literature 1, Reference sign 5 in Patent Literature 2) has a size covering substantially the entire surface of the top surface of the bottle. For cost reduction, miniaturization of a rubber plug has been required.

Further, because the rubber plug has substantially the same thickness overall, it is difficult to crimp the peripheral edge portion of the rubber plug between the bottle and the outer frame material with sufficient strength. This insufficient crimping may cause liquid leakage at the time of stabbing of a needle into the rubber plug.

An object of the present invention is to provide a medical fluid container for which cost reduction is achieved by miniaturization of a rubber plug, and which is capable of preventing liquid leakage from the periphery of the rubber plug at the time of needle- stabbing.

Solution to Problem

A medical fluid container according to one embodiment of the present invention includes a container main

body which is integrally molded by a blow-fill-seal method, a rubber plug which is disposed on a top surface of a mouth portion of the container main body, and an outer frame material covering the rubber plug and the mouth portion, the outer frame material having a receiving surface that the mouth portion touches and having a pressure bonding portion pressed in a direction of a bottom portion of the container main body against the mouth portion, and the rubber plug includes a plug main body covering a part of the top surface of the mouth portion, and a flanged portion extended between the pressure bonding portion and the mouth portion from a lower outer circumference of the plug main body.

In accordance with this configuration, because the part of the rubber plug pressed between the mouth portion and the outer frame material is the flanged portion which is relatively thinner than the plug main body, it is possible to press the flanged portion of the rubber plug between the mouth portion and the outer frame material (pressure bonding portion) with sufficient strength. As a result, it is possible to securely hold the rubber plug with the flanged portion. Accordingly, it is possible to keep the rubber plug from moving, and the top surface of the mouth portion from being pressed to greatly warp due to the movement at the time of needle-stabbing into the plug main body. Thereby, it is possible to prevent an unnecessary liquid leakage path from being defined

in the outer frame material, which makes it possible to prevent liquid leakage from occurring from the periphery of the rubber plug.

Further, because it is possible to reduce a usage amount of a rubber material for the flanged portion, to miniaturize the plug main body, it is possible to achieve cost reduction according to at least the reduction of the usage amount.

In the one embodiment of the present invention, the plug main body of the rubber plug covers a central portion of the top surface of the mouth portion, and the flanged portion of the rubber plug is defined as an annular shape over the entire circumference of the plug main body so as to cover a peripheral edge portion of the top surface of the mouth portion.

In accordance with this configuration, the rubber plug is uniformly pressed over the entire circumference of the peripheral edge portion with sufficient strength. Thereby, it is possible to prevent liquid leakage at any point of the periphery of the rubber plug.

In the one embodiment of the present invention, the outer frame material has a protrusion embedded in an upper surface of the plug main body of the rubber plug.

In accordance with this configuration, because it is possible to apply pressure on the rubber plug downward so as to correspond to a protruded amount of the protrusion of

the outer frame material, it is possible to more satisfactorily prevent liquid leakage.

In the one embodiment of the present invention, the protrusion of the outer frame material is defined as an annular shape.

In accordance with this configuration, it is possible to define downward application of pressure of an amount corresponding to the protruded amount of the protrusion of the outer frame material over the entire circumference of the rubber plug.

In the one embodiment of the present invention, the plug main body of the rubber plug has a protrusion deformed by pressing force by the outer frame material.

In accordance with this configuration, because it is possible to apply pressure on the rubber plug downward by a length corresponding to a protruded amount of the protrusion of the plug main body, it is possible to more satisfactorily prevent liquid leakage.

In the one embodiment of the present invention, the outer frame material includes an annular-shaped plate portion serving as the pressure bonding portion which faces the peripheral edge portion of the top surface of the mouth portion across the flanged portion of the rubber plug, an upper portion which is integrally connected to an inner circumferential portion of the annular-shaped plate portion, and covers the

plug main body, and a lower portion which is integrally connected to an outer circumferential portion of the annular-shaped plate portion, and covers the mouth portion.

In accordance with this configuration, because the portions (the upper portion and the lower portion) which cover the rubber plug and the mouth portion and the pressure bonding portion (the annular-shaped plate portion) are clearly sectioned, it is possible to improve the workability at the time of pressing the flanged portion.

In the one embodiment of the present invention, the flanged portion of the rubber plug is extended up to an inner circumference surface of a lower portion of the outer frame material.

In accordance with this configuration, because it is possible to increase the pressure bonding area of the rubber plug, it is possible to improve the bonding strength of the rubber plug.

In the one embodiment of the present invention, the mouth portion includes a flanged portion which is defined over the entire circumference at a position distant downward from the top surface, and the lower portion of the outer frame material is welded to the flanged portion of the mouth portion.

In accordance with this configuration, because the outer frame material is fixed to the mouth portion, it is possible to satisfactorily maintain a state in which the rubber

plug is pressed.

In the one embodiment of the present invention, the lower portion of the outer frame material includes a flanged portion defined over its entire circumference, and the flanged portion of the mouth portion is welded to a lower surface of the flanged portion of the outer frame material.

In the one embodiment of the present invention, a depth h_2 of the lower portion of the outer frame material is less than a sum of a height h_1 from the flanged portion of the mouth portion and a thickness T_4 of the flanged portion of the rubber plug.

In accordance with this configuration, it is possible to satisfactorily press the flanged portion of the rubber plug.

In the one embodiment of the present invention, the flanged portion of the rubber plug has a thickness of 0.2mm to 3mm.

In the one embodiment of the present invention, the outer frame material includes a pull ring for opening up its upper portion.

Brief Description of The Drawings

[FIG. 1] FIG. 1 is a schematic perspective view of a medical fluid bottle according to one embodiment of the present invention.

[FIG. 2] FIG. 2 is a schematic cross-sectional view of a configuration around a mouth portion of the medical fluid bottle of FIG. 1.

[FIG. 3] FIG. 3 is a schematic bottom view of an outer frame material.

[FIG. 4] FIG. 4 is a diagram illustrating a part of processes of attaching a cap to the mouth portion.

[FIG. 5] FIG. 5 is a diagram illustrating a following process of FIG. 4.

[FIG. 6] FIG. 6 is a diagram illustrating a following process of FIG. 5.

[FIG. 7] FIGs. 7A and 7B are diagrams illustrating a usage state of the medical fluid bottle of FIG. 1. FIG. 7A illustrates a state in which a needle is stabbed into the rubber plug, and FIG. 7B illustrates a state in which the medical fluid bottle is set upside down.

[FIG. 8] FIGs. 8A and 8B are diagrams illustrating a usage state of the medical fluid bottle according to a reference example. FIG. 8A illustrates a state in which a needle is stabbed into the rubber plug, and FIG. 8B illustrates a state in which the medical fluid bottle is set upside down.

[FIG. 9] FIGs. 9A and 9B are diagrams illustrating a modification example of the rubber plug. FIG. 9A illustrates a state before a cap is attached, and FIG. 9B illustrates a state after the cap is attached.

[FIG. 10] FIG. 10 is a diagram illustrating a modification example of the cap.

Detailed description of The Embodiments

One embodiment of the present invention will be described in detail with reference to the accompanying drawings.

FIG. 1 is a schematic perspective view of a medical fluid bottle 1 according to one embodiment of the present invention. FIG. 2 is a schematic cross-sectional view of a configuration around a mouth portion 5 of the medical fluid bottle 1 of FIG. 1. FIG. 3 is a typical bottom view of an outer frame material 13.

The medical fluid bottle 1 as an example of a medical fluid bottle of the present invention includes a plastic bottle main body 2 as an example of a container main body of the present invention, and a cap 3.

The plastic bottle main body 2 integrally includes a barrel portion 4 in which a medical fluid is contained, and the mouth portion 5 which is disposed on a top portion thereof. The cap 3 is attached to the mouth portion 5.

The plastic bottle main body 2 integrally having the barrel portion 4 and the mouth portion 5 can be made by a blow-fill-seal (BFS) method.

For example, first, a parison is made by extrusion

molding of a material of the plastic bottle main body 2.

A material to be used is not restricted in particular as long as it is plastic. For example, polyolefin-based resins such as polyethylene, polypropylene, poly(4-methylpentene), and polytetrafluoroethylene, polycyclic olefin-based resins such as ethylene-tetracyclodecene copolymer, etc., can be cited as examples. Preferably, polypropylene and polycyclic olefin-based resins can be cited as examples. Polyolefin-based resins such as polyethylene or polypropylene have low elution behavior with respect to various medical fluids, and also commodity plastics. Therefore, it is possible to prevent elution of impurities into a medical fluid, and it is possible to achieve cost reduction of the plastic bottle main body 2.

Further, a material to be used may be used singularly or two or more types may be mixed and used. Further, the plastic bottle main body 2 may be defined as a single layer structure, or may be defined as a multilayered structure in which a plurality of resins are laminated.

Next, the obtained parison is sandwiched by a split mold, to define the barrel portion 4 (blow process), and the inside of the barrel portion 4 is filled with a medical fluid (filling process).

Next, it is sandwiched by a split mold, to define

the mouth portion 5, and the open end of the mouth portion 5 is sealed up (sealing process), thereby obtaining the plastic bottle main body 2 in which the medical fluid is contained.

The respective portions of the plastic bottle main body 2 will be described in more detail.

The barrel portion 4 is defined as an ellipsoidal bottle shape and the upper portion is tapered. A scale 6 for showing an amount of medical fluid is provided along a depth direction of the plastic bottle main body 2 on the outer circumference surface of the barrel portion 4. A suspension attachment 7 for hooking the medical fluid bottle 1 to use is defined on the bottom portion of the barrel portion 4. The suspension attachment 7 is, for example, defined as a fin shape protruding from the flat bottom portion of the barrel portion 4.

The mouth portion 5 is integrally connected to the barrel portion 4 via a neck portion 8 of the plastic bottle main body 2. The mouth portion 5 includes a substantially cylindrically-shaped tubular portion 9 and an annular plate shaped flange portion 10 (flanged portion) which is defined over the entire circumference on the lower outer circumference of the tubular portion 9.

The open end of the tubular portion 9 is blocked by a top portion thin film 11 defined by the sealing process. This top portion thin film 11 defines a top surface of the

plastic bottle main body 2. The top portion thin film 11 is a portion which is defined to be thinner than the tubular portion 9 and the flange portion 10, so as to have flexibility. For example, as shown in FIG. 2, respective thicknesses T_1 and T_2 of the tubular portion 9 and the flange portion 10 are approximately 1.0mm to 2.0mm. Meanwhile, a thickness T_3 of the top portion thin film 11 is approximately 0.3mm to 0.6mm. This thickness difference is generated because the plastic bottle main body 2 is made by a blow-fill-seal method.

The cap 3 includes a rubber plug 12 and an outer frame material 13.

The rubber plug 12 is defined as a hat shape integrally including the columnar-shaped plug main body 14, and the annular plate shaped flange portion 15 which is defined over the entire circumference of the lower outer circumference of the plug main body 14.

Concave portions 16 and 17 are respectively defined in the central portions of the upper surface and the lower surface of the plug main body 14. The concave portion 16 and the concave portion 17 face each other, and the plug main body 14 is selectively made thinner at this position. By stabbing a needle into the concave portion 16, it is possible to easily define a through hole in the rubber plug 12.

As a size of the plug main body 14, for example, a height H_1 is 3mm to 7mm, and a diameter D_1 is 15mm to 25mm.

In the case where a ratio of the height H_1 with respect to the diameter D_1 (H_1/D_1) is relatively low, the shape of the plug main body 14 may be defined as a disk shape. On the other side, as a side of the flange portion 15, for example, a thickness T_4 is 0.2mm to 3mm, and a diameter D_2 is 25mm to 40mm. From this, an extended width W_1 of the flange portion 15 is, for example, 5mm to 15mm.

In addition, as a material of the rubber plug 12, synthetic rubber such as butyl rubber and isoprene rubber, thermoplastic elastomer such as olefin-based elastomer and styrene-based elastomer can be cited. In particular, in the case where the rubber plug 12 is defined by injection molding, thermoplastic elastomer is preferably used.

The outer frame material 13 integrally includes a cylindrically-shaped mouth portion housing portion 18 (lower portion), a cylindrically-shaped rubber plug housing portion 19 (upper portion) which has a diameter smaller than that of the mouth portion housing portion 18, and an annular plate shaped stepped portion 20 (pressure bonding portion) which connects the upper end of the mouth portion housing portion 18 and the lower end of the rubber plug housing portion 19. That is, the outer frame material 13 has a two-step structure in which the rubber plug housing portion 19 is placed on the mouth portion housing portion 18 via the stepped portion 20.

An annular plate shaped flange portion 21 is

integrally defined over the entire circumference on the lower outer circumference of the mouth portion housing portion 18.

A protrusion 22 protruding downward in the axis direction of the rubber plug housing portion 19 is defined on the upper wall of the rubber plug housing portion 19. The protrusion 22 is defined as a ring shape with, for example, a thickness of approximately 0.5mm to 2mm, and a height of approximately 1mm to 3mm.

Further, the inner region surrounded by the protrusion 22 on the upper wall of the rubber plug housing portion 19 is a detachable pull ring 23. A user pulls and detaches the pull ring 23, to unseal the outer frame material 13, thereby it is possible to expose the upper surface of the rubber plug 12.

The stepped portion 20 is connected respectively vertically to the inner circumference of the mouth portion housing portion 18 and the outer circumference of the rubber plug housing portion 19 so as to show its horizontal surface vertical to the axis direction of the mouth portion housing portion 18 and the rubber plug housing portion 19.

In addition, as a material of the outer frame material 13, for example, thermoplastic resin is preferable. In detail, this is not restricted in particular, and for example, polyolefin (preferably, polyethylene, polypropylene, etc.) can be cited.

Next, a method of attaching the cap 3 to the mouth portion 5 will be described.

FIGs. 4 to 6 are diagrams illustrating the processes of attaching the cap 3 to the mouth portion 5 successively.

First, as shown in FIG. 4, the cap 3 is assembled by fitting the plug main body 14 of the rubber plug 12 into the rubber plug housing portion 19 of the outer frame material 13. A diameter of the rubber plug 12 (the diameter D_2 of the flange portion 15) may be substantially the same as an inner diameter D_3 of the mouth portion housing portion 18. That is, in the assembled cap 3, the outer circumference of the flange portion 15 of the rubber plug 12 may reach the inner circumference surface of the mouth portion housing portion 18. Because it is possible to increase the crimping area of the flange portion 15 of the rubber plug 12 in accordance with this configuration, it is possible to improve the crimping grade of the rubber plug 12. Further, in this state, the protrusion 22 of the rubber plug housing portion 19 may not cave in the upper surface of the plug main body 14.

Next, after the position of the cap 3 with respect to the mouth portion 5 of the plastic bottle main body 2 is adjusted, the mouth portion 5 of the plastic bottle main body 2 is covered with the cap 3.

Then, as shown in FIG. 5, the plastic bottle main body 2 is pushed in until the flange portion 21 (flanged

portion) of the outer frame material 13 is made to touch the flange portion 10 of the mouth portion 5. The mouth portion 5 and the outer frame material 13 are fixed by friction between a protrusion 31 provided to the tubular portion 9 and the inner circumference surface of the mouth portion housing portion 18. Meanwhile, the lower surface of the flange portion 21 of the outer frame material 13 and the flange portion 10 of the mouth portion 5 are preferably welded to be fixed. As a welding method, a publicly-known method such as heat sealing, ultrasonic welding, or high-frequency welding may be adopted. In addition, in order to crimp the flange portion 15 of the rubber plug 12, it is necessary to adjust the height h_1 of the mouth portion 5 and the depth h_2 of the mouth portion housing portion 18. That is, the depth h_2 is required to be slightly shorter than a sum that a thickness T_4 of the flange portion 15 of the rubber plug 12 is added to the height h_1. Thereby, the central portion of the top portion thin film 11 of the mouth portion 5 is covered with the plug main body 14 of the rubber plug 12, and the peripheral edge portion thereof is covered with the flange portion 15 of the rubber plug 12. At this time, because the stepped portion 20 is defined horizontally to the axis direction of the mouth portion housing portion 18 and the rubber plug housing portion 19, the outer frame material 13 becomes a definitive two-step structure. Because it is possible to easily apply power along the axis direction by

pressing the stepped portion 20, it is possible to improve the workability at the time of crimping the flange portion 15.

Further, the rubber plug 12 as well is pushed in by pushing in the plastic bottle main body 2. Thereby, the protrusion 22 of the rubber plug housing portion 19 caves in the peripheral edge portion of the upper surface of the plug main body 14, so as to be embedded in the upper surface.

Next, as shown in FIG. 6, in order to fix the cap 3 to the mouth portion 5, the mouth portion 5 and the outer frame material 13 are welded. In this embodiment, the flange portion 10 of the mouth portion 5 and the lower surface of the flange portion 21 of the outer frame material 13 are welded.

The attachment of the cap 3 is completed through the above-described processes.

FIGs. 7A and 7B are diagrams illustrating a usage state of the medical fluid bottle 1 of FIG. 1. FIG. 7A illustrates a state in which a needle 24 is stabbed into the rubber plug 12, and FIG. 7B illustrates a state in which the medical fluid bottle 1 is set upside down. FIGs. 8A and 8B are diagrams illustrating a usage state of a medical fluid bottle 25 according to a reference example. FIG. 8A illustrates a state in which the needle 24 is stabbed into the rubber plug 12, and FIG. 8B illustrates a state in which the medical fluid bottle 25 is set upside down. FIGs. 7A and 7B, and FIGs. 8A and 8B both show the state in which the pull ring

23 is detached, and an opening 26 is defined in the outer frame material 13. Further, in FIGs. 8A and 8B, the same reference signs are denoted to the portions corresponding to the respective portions shown in FIGs. 7A and 7B.

First, the medical fluid bottle 1 and the medical fluid bottle 25 are different in the point that the medical fluid bottle 25 does not include the stepped portion 20 of the outer frame material 13, and the rubber plug housing portion 19 is defined so as to have a diameter which is substantially the same as (slightly smaller than) that of the mouth portion housing portion 18. Further, the both bottles are different in the point that the medical fluid bottle 25 does not include the flange portion 15 of the rubber plug 12. Accordingly, in the medical fluid bottle 25, the rubber plug 12 (the plug main body 14) with a diameter D_4 which is substantially the same as the diameter D_2 of the flange portion 15 of the rubber plug 12 of the medical fluid bottle 1 is defined so as to have a uniform thickness. Further, the tubular portion 9 directly touches the rubber plug housing portion 19. Therefore, the rubber plug 12 of the medical fluid bottle 25 may be considered as, rather than being crimped between the mouth portion 5 and the outer frame material 13, being housed in the space partitioned by the top portion thin film 11 of the mouth portion 5 and the rubber plug housing portion 19 of the outer frame material 13.

It will be described whether or not liquid leakage occurs in the case where the both medical fluid bottles 1, 25 having such differences are used.

In accordance with the medical fluid bottle 1 of FIG. 7A and FIG. 7B, the portion of the rubber plug 12 crimped by the mouth portion 5 and the outer frame material 13 is the flange portion 15 which is relatively thinner than the plug main body 14. Therefore, it is possible to crimp the flange portion 15 of the rubber plug 12 between the tubular portion 9 and the top portion thin film 11 of the mouth portion 5, and the stepped portion 20 of the outer frame material 13 with sufficient strength. As a result, it is possible to securely hold the rubber plug 12 with the flange portion 15.

Accordingly, as shown in FIG. 7, when the needle 24 is stabbed into the plug main body 14, to define the through hole 27, it is possible to keep the rubber plug 12 from moving to the inside of the mouth portion 5, and the top portion thin film 11 from being pressed by the rubber plug 12 to greatly warp due to the movement.

Thereby, as shown in FIG. 7B, it is possible to satisfactorily maintain the closely-attached state of the rubber plug 12 and the top portion thin film 11 at the time of using the medical fluid bottle 1 upside down, which makes it possible to prevent an unnecessary liquid leakage path from being defined in the outer frame material 13. As a result,

it is possible to prevent the liquid from leaking out of the opening 26 via the periphery of the rubber plug 12.

Moreover, pressure is applied on the rubber plug 12 so as to correspond to the protruded amount of the protrusion 22 due to embedding of the protrusion 22 of the outer frame material 13 in the upper surface of the plug main body 14. Thereby, the liquid leaked out by any chance is blocked, and as a result, it is possible to effectively prevent liquid leakage.

Further, because it is possible to reduce a usage amount of a rubber material for the upper portion of the flange portion 15 due to the rubber plug 12 being defined as a hat shape to miniaturize the plug main body 14, it is possible to achieve cost reduction according to at least the reduction of the usage amount.

In contrast thereto, in accordance with the medical fluid bottle 25 of FIG. 8A and FIG. 8B, the stepped portion 20 (the outer frame material 13) and the flange portion 15 (the rubber plug 12) are not included. As a result, the crimping grade of the rubber plug 12 is lower than that of the medical fluid bottle 1 of FIG. 7A and FIG. 7B.

Accordingly, as shown in FIG. 8A, when the needle 24 is stabbed into the plug main body 14 to define the through hole 27, the rubber plug 12 is warped and moves to the inside of the mouth portion 5, and the top portion thin film 11 is

pressed by the rubber plug 12 to greatly warp due to the movement.

Therefore, as shown in FIG. 8B, at the time of using the medical fluid bottle 1 upside down, large gaps 28, 29 are generated between the rubber plug 12 and the top portion thin film 11, and between the rubber plug 12 and the outer frame material 13 (the rubber plug housing portion 19). As a result, when liquid leakage occurs from the through hole 27, there are concerns that the liquid easily runs through these gaps 28, 29 as liquid leakage paths, to be leaked from the opening 26. Further, because the rubber plug 12 is overall defined to have the thickness (height H_1) of the rubber main body 14, the unit price of the rubber plug 12 becomes higher than that of the medical fluid bottle 1.

As described above, from the comparison between FIGs. 7A and 7B and FIGs. 8A and 8B, it is clear that, in accordance with the medical fluid bottle 1, it is possible to achieve cost reduction by miniaturization of the rubber plug 12, and to prevent liquid leakage from the periphery of the rubber plug 12 at the time of needle-stabbing.

The embodiment of the present invention has been described above. Meanwhile, the present invention may be implemented in another mode.

The outer peripheral edge of the flange portion 15 of the rubber plug 12 may not necessarily reach the inner

circumference surface of the mouth portion housing portion 18.

Further, blocking of the liquid at the upper surface of the plug main body 14 may be, as shown in FIG. 9A, defined by a protrusion 30 defined on the upper surface of the plug main body 14. This protrusion 30 may be, as shown in FIG. 9B, crushed to be deformed by the outer frame material 13 in a state after the cap 3 is attached.

Further, the protrusion s 22, 30 may be omitted in the medical fluid bottle 1.

Further, the stepped portion 20 connecting the mouth portion housing portion 18 and the rubber plug housing portion 19 may be, as shown in FIG. 10, provided so as to show a plane inclined to the axis direction of the housing portions 18, 19. In this configuration as well, because it is possible to satisfactorily crimp the flange portion 15 of the rubber plug 12 between the stepped portion 20 and the mouth portion 5, it is possible to sufficiently exert the aforementioned effects.

Further, as a shape of the plastic bottle main body 2, in addition to the aforementioned ellipsoidal bottle shape, various bottle shapes such as a precise circle bottle shape, and a square bottle shape may be adopted.

Further, as a member which protects the rubber plug 12 before use, and is detached in order to expose the rubber plug 12 in use, in addition to the aforementioned pull ring

23, a protective film, etc., may be adopted.

In addition, various design changes may be applied within the range of matters described in the scope of claims.

This application corresponds to Japanese Patent Application No. 2014-62486, filed March 25, 2014, and the disclosure of which is incorporated by reference herein in its entirety.

Reference Signs List

1 Medical fluid bottle

2 Plastic bottle main body

3 Cap

4 Barrel portion

5 Mouth portion

9 Tubular portion

10 Flange portion

11 Top portion thin film

12 Rubber plug

13 Outer frame material

14 Plug main body

15 Flange portion

18 Mouth portion housing portion

19 Rubber plug housing portion

20 Stepped portion

21 Flange portion

22 Protrusion

23 Pull ring

24 Needle

25 Medical fluid bottle

26 Opening

27 Through hole

28 Gap

29 Gap

30 Protrusion

CLAIMS

[Claim 1]

A medical fluid container comprising:

a container main body which includes a mouth portion whose open end is blocked as a top surface;

a rubber plug which is disposed on a top surface of the mouth portion of the container main body; and

an outer frame material covering the rubber plug and the mouth portion, the outer frame material having a receiving surface that the mouth portion touches and having a pressure bonding portion pressed in a direction of a bottom portion of the container main body against the mouth portion, wherein

the rubber plug includes a plug main body covering a part of the top surface of the mouth portion, and a flanged portion extended between the pressure bonding portion and the mouth portion from a lower outer circumference of the plug main body.

[Claim 2]

The medical fluid container according to Claim 1, wherein

the plug main body of the rubber plug covers a central portion of the top surface of the mouth portion, and

the flanged portion of the rubber plug is defined as an annular shape over the entire circumference of the plug main body so as to cover a peripheral edge portion of the top surface

of the mouth portion.

[Claim 3]

The medical fluid container according to Claim 1 or Claim 2, wherein the outer frame material has a protrusion embedded in an upper surface of the plug main body of the rubber plug.

[Claim 4]

The medical fluid container according to Claim 3, wherein the protrusion of the outer frame material is defined as an annular shape.

[Claim 5]

The medical fluid container according to Claim 1 or Claim 2, wherein the plug main body of the rubber plug has a protrusion deformed by pressing force by the outer frame material.

[Claim 6]

The medical fluid container according to Claim 1 or Claim 2 wherein

the outer frame material includes

an annular-shaped plate portion serving as the pressure bonding portion which faces the peripheral edge portion of the top surface of the mouth portion across the flanged portion of the rubber plug,

an upper portion which is integrally connected to an inner

circumferential portion of the annular-shaped plate portion, and covers the plug main body, and

a lower portion which is integrally connected to an outer circumferential portion of the annular-shaped plate portion, and covers the mouth portion.

[Claim 7]

The medical fluid container according to Claims 6, wherein the flanged portion of the rubber plug is extended up to an inner circumference surface of a lower portion of the outer frame material.

[Claim 8]

The medical fluid container according to Claim 6, wherein the mouth portion includes a flanged portion which is defined over the entire circumference at a position distant downward from the top surface, and the lower portion of the outer frame material is welded to the flanged portion of the mouth portion.

[Claim 9]

The medical fluid container according to Claim 8, wherein the lower portion of the outer frame material includes a flanged portion defined over its entire circumference, and the flanged portion of the mouth portion is welded to a lower surface of the flanged portion of the outer frame

material.

[Claim 10]

The medical fluid container according to Claim 9, wherein a depth h_2 of the lower portion of the outer frame material is less than a sum of a height h_1 from the flanged portion of the mouth portion and a thickness T_4 of the flanged portion of the rubber plug.

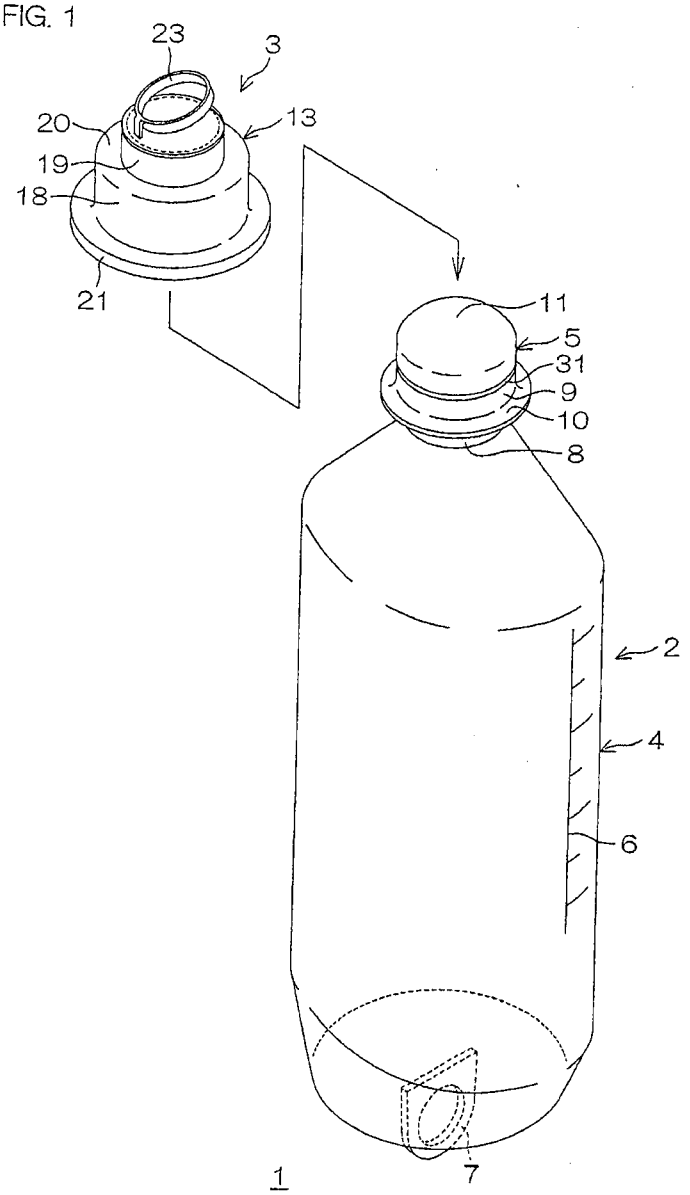
[Claim 11]

The medical fluid container according to Claim 1 or Claim 2 wherein the flanged portion of the rubber plug has a thickness of 0.2mm to 3mm.

[Claim 12]

The medical fluid container according to Claim 1 or Claim 2 wherein the outer frame material includes a pull ring for opening up its upper portion.

FIG. 1



OTSUKA PHARMATEUTICAL FACTORY, INC.
Applicant

ROMULO MABANTA BUENAVENTURA
SAYOC & DE LOS ANGELES

By:

Rogelio Nicandro
Patent Attorney

FIG. 2

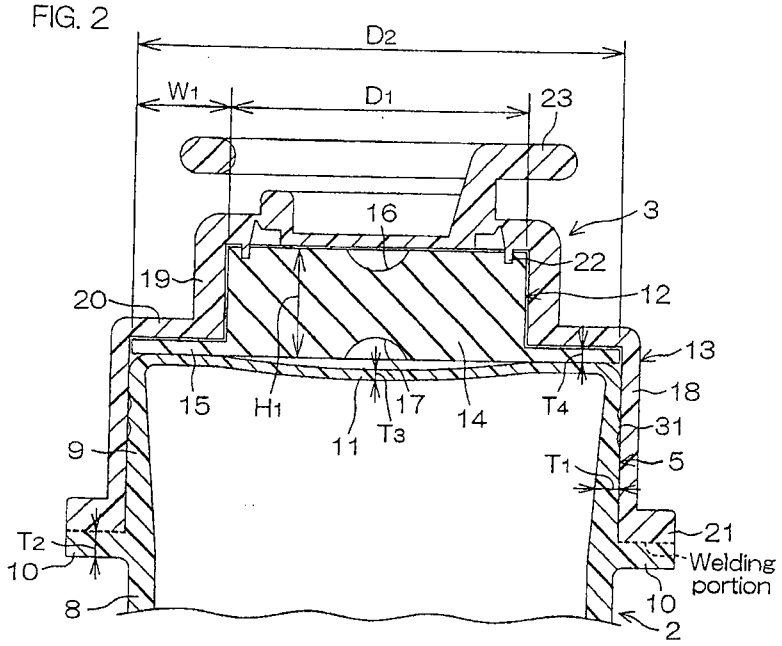
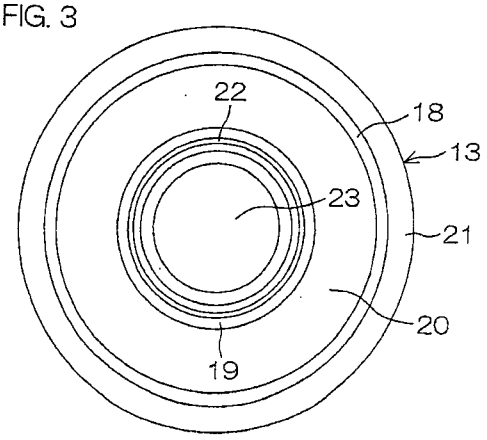


FIG. 3



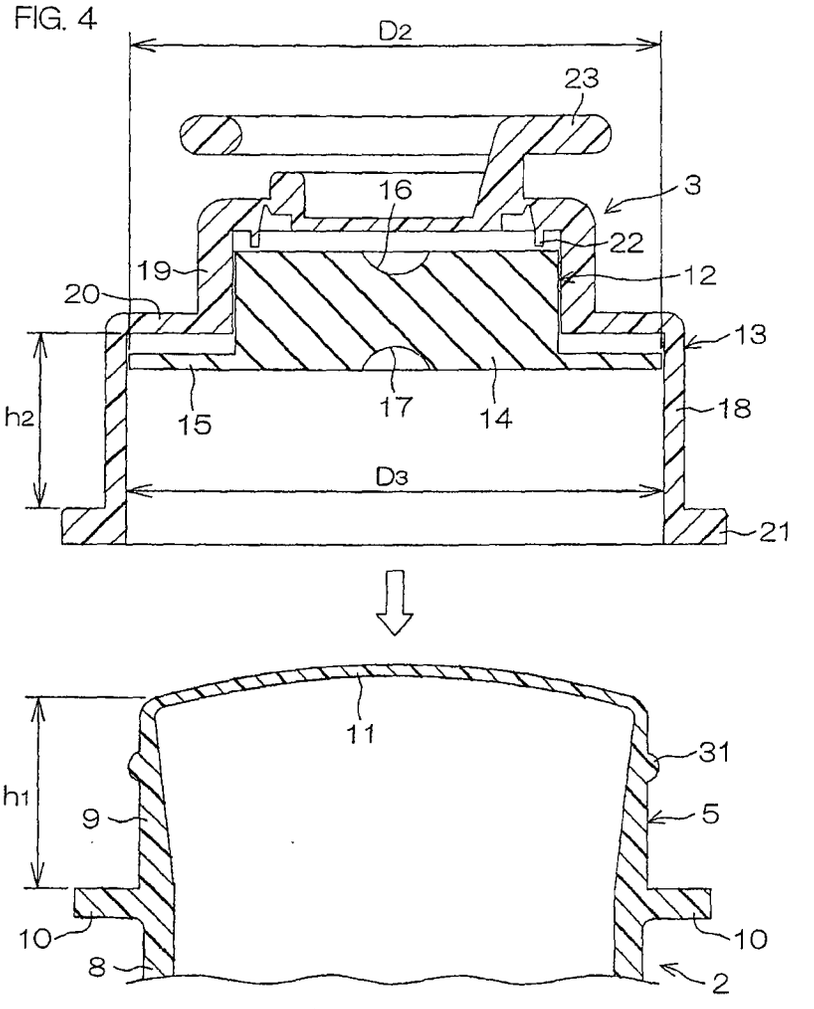
OTSUKA PHARMATEUTICAL FACTORY, INC.
Applicant

ROMULO MABANTA BUENAVENTURA
SAYOC & DE LOS ANGELES

By:

Rogelio Nicandro
Patent Attorney

FIG. 4



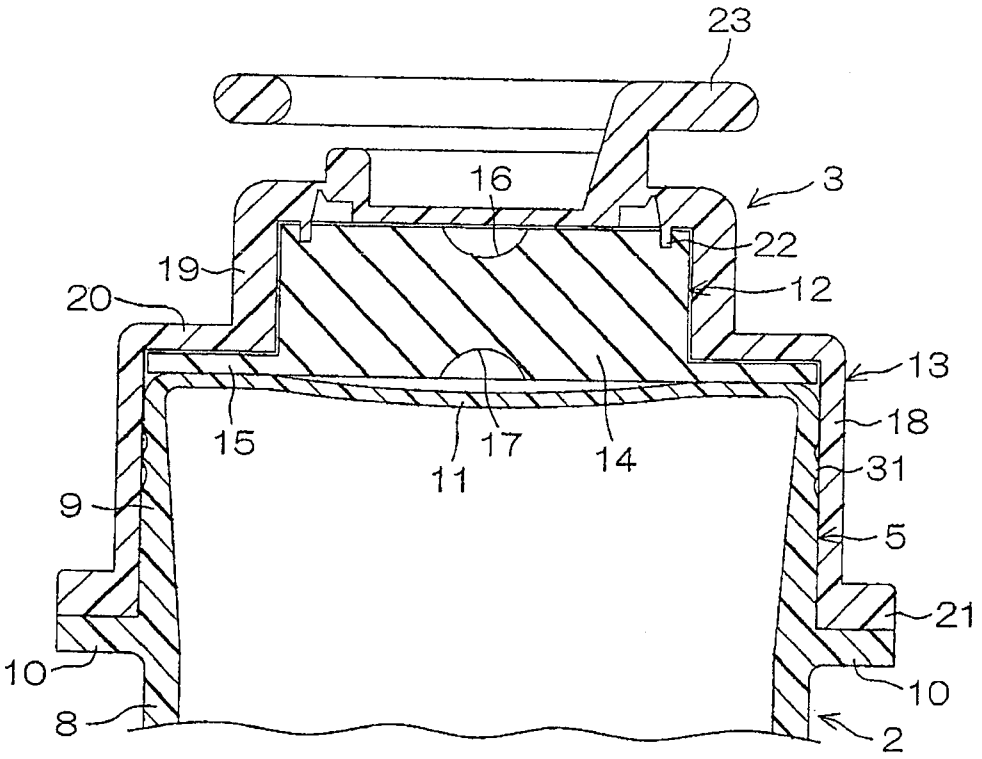
OTSUKA PHARMATEUTICAL FACTORY, INC.
Applicant

ROMULO MABANTA BUENAVENTURA
SAYOC & DE LOS ANGELES

By:

Rogelio Nicandro
Patent Attorney

FIG. 5



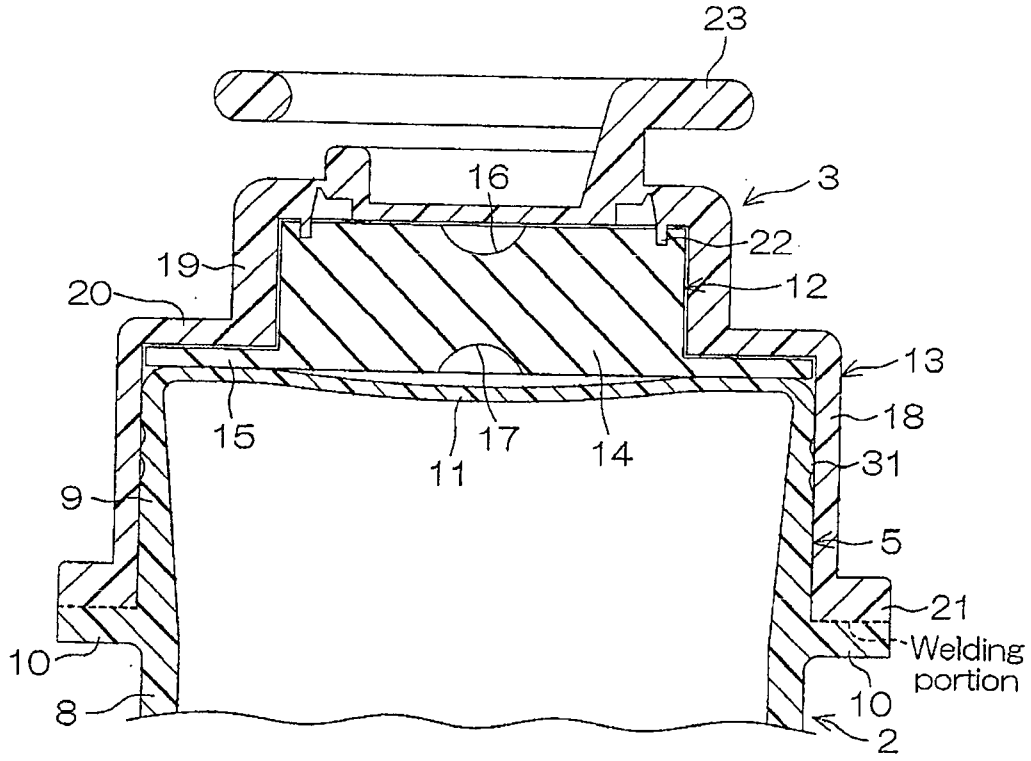
OTSUKA PHARMATEUTICAL FACTORY, INC.
Applicant

ROMULO MABANTA BUENAVENTURA
SAYOC & DE LOS ANGELES

By:

Rogelio Nicandro
Patent Attorney

FIG. 6



OTSUKA PHARMATEUTICAL FACTORY, INC.
Applicant

ROMULO MABANTA BUENAVENTURA
SAYOC & DE LOS ANGELES

By:

Rogelio Nicandro
Patent Attorney

FIG. 7A

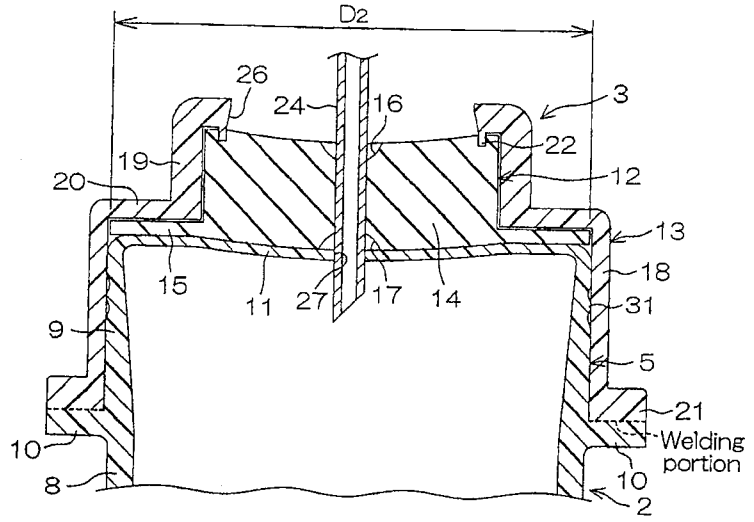
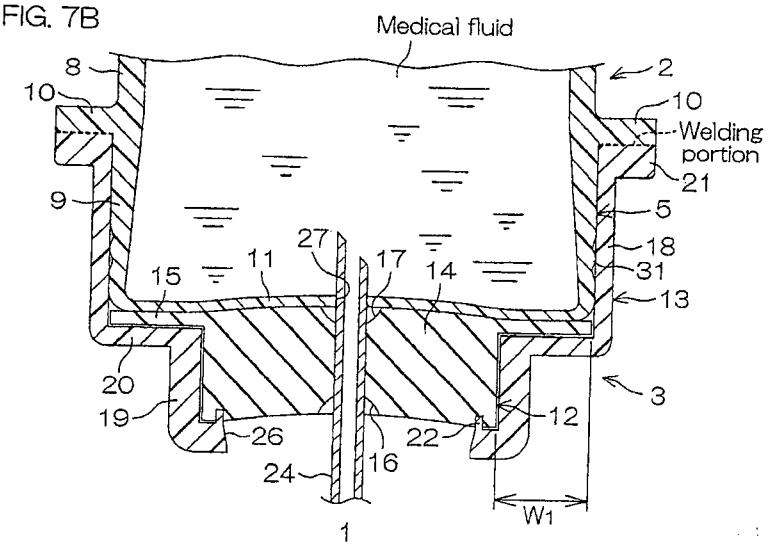


FIG. 7B



OTSUKA PHARMATEUTICAL FACTORY, INC.
Applicant

ROMULO MABANTA BUENAVENTURA
SAYOC & DE LOS ANGELES

By:

Rogelio Nicandro
Patent Attorney

FIG. 8A

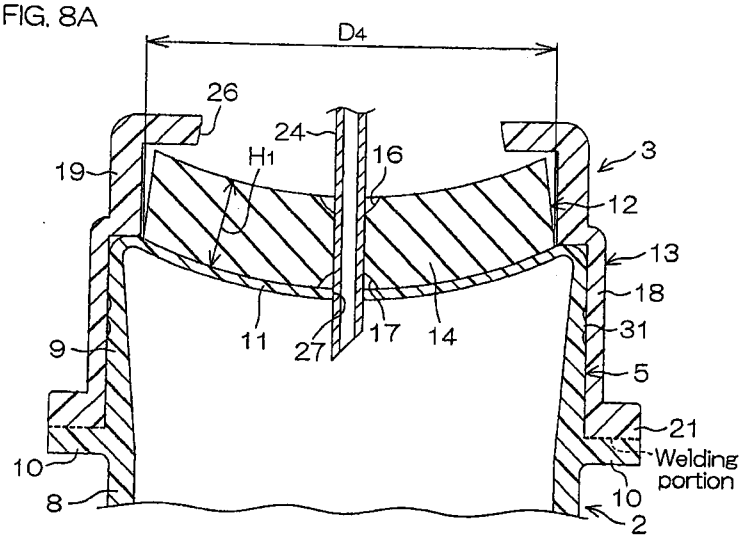
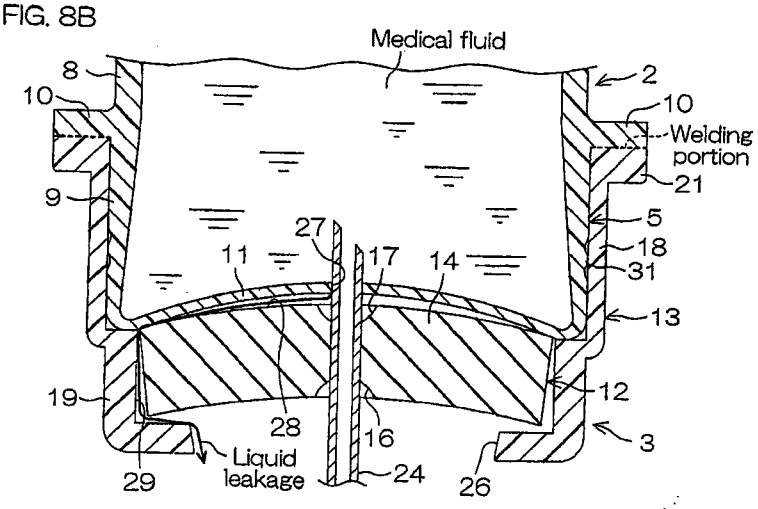


FIG. 8B



25

OTSUKA PHARMATEUTICAL FACTORY, INC.
Applicant

ROMULO MABANTA BUENAVENTURA SAYOC & DE LOS ANGELES

By:

Rogelio Nicandro
Patent Attorney

FIG. 9A

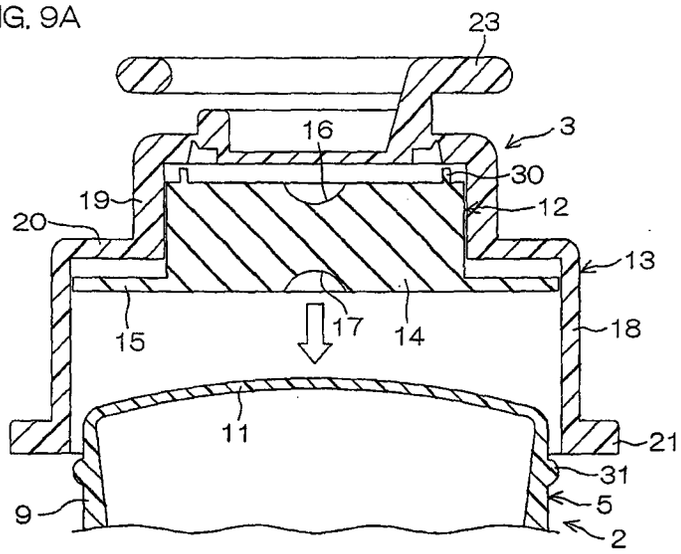
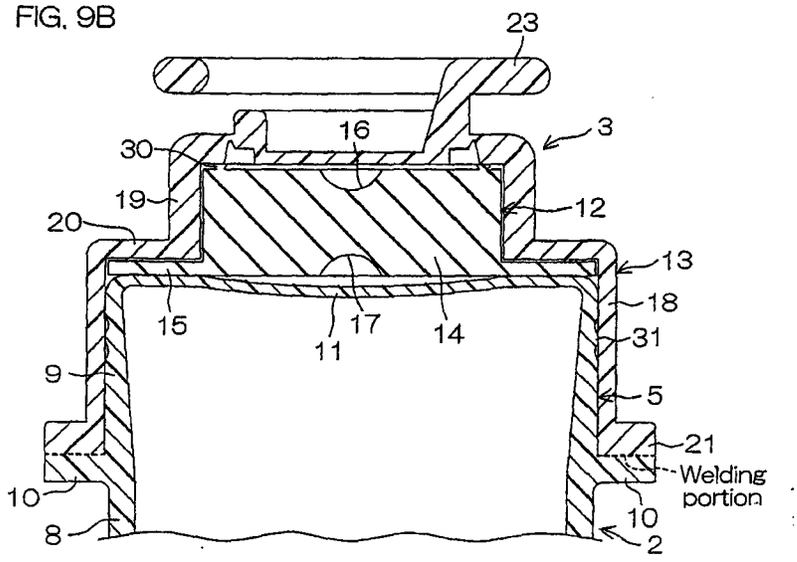


FIG. 9B



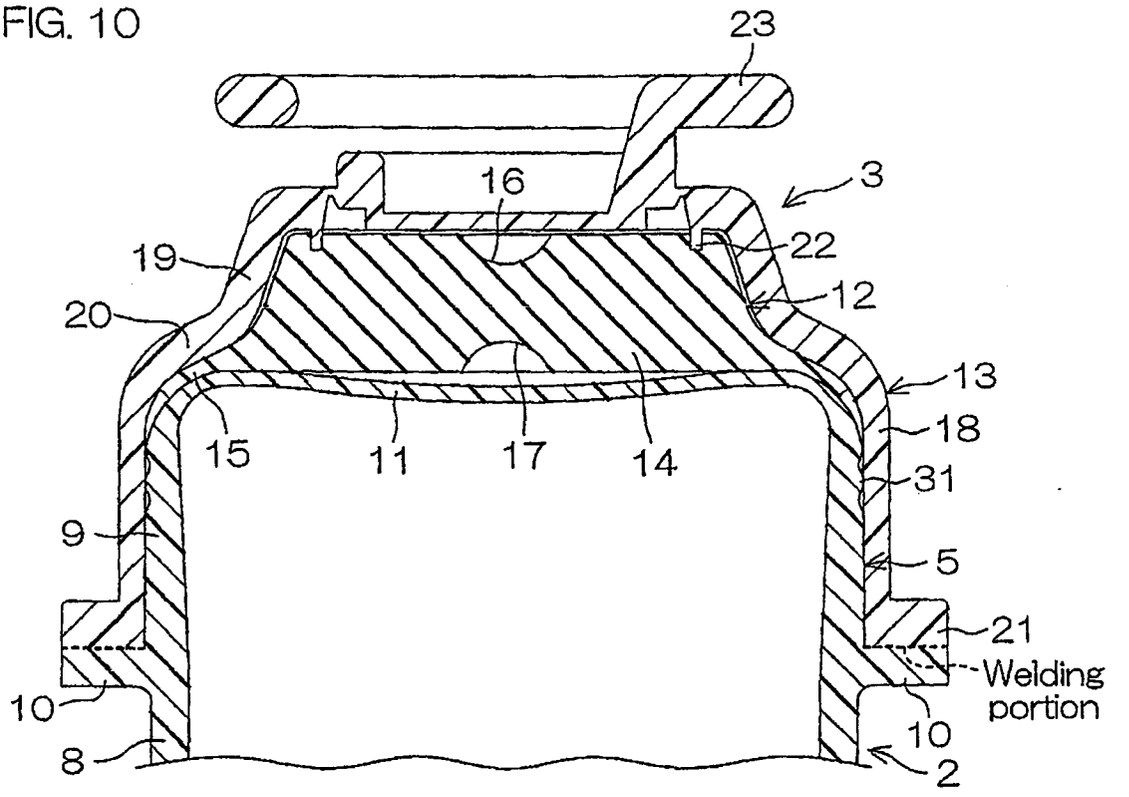
OTSUKA PHARMATEUTICAL FACTORY, INC.
Applicant

ROMULO MABANTA BUENAVENTURA SAYOC & DE LOS ANGELES

By:

Rogelio Nicandro
Patent Attorney

FIG. 10



OTSUKA PHARMATEUTICAL FACTORY, INC.
Applicant

ROMULO MABANTA BUENAVENTURA SAYOC & DE LOS ANGELES

By:

Rogelio Nicandro
Patent Attorney