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(54) **LIDDED VESSEL**

(57) A container having a lid coupled to the container via a hinge, with improved reliability and ease of opening/closing of the lid relative to the cylindrical container body. The opening portion of the container body has an outer peripheral surface, at least a part of which has a container body rib. The lid member is formed with a sidewall at a position externally contacting the opening por-

tion when the lid member is closed. The sidewall has an inner side surface provided with a lid rib which the container body rib contacts and slides over in opening/closing the lid member. In closing the lid member, before the container body rib contacts and slides over the lid rib, no other part of the opening portion than the container body rib comes into contact with the lid member.

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Description

[Technical Field]

[0001] The present invention relates to a container that includes a container body and a lid member that seals an opening portion of the container body.

[Background Art]

[0002] There is known a container that includes a lid member coupled to a container body by a hinge so as to be openable/closable relative to an opening portion of the container body.

[Citation List]

[Patent Literature]

[0003] [PTL 1]
JP-A-2008-297010

[Summary of the Invention]

[Technical Problem]

[0004] In such a container, the lid member is closed in such a way that a sidewall and an inner ring provided to the lid member sandwich the opening portion of the container body. At this time, in order to enhance sealing properties, the inner ring is fitted to an inner wall of the opening portion. Accordingly, in opening/closing the lid member, the sidewall, the inner ring, and other parts come into contact with the opening portion almost simultaneously, resulting in that the lid member receives a resistance force. Consequently, a large force may be involved in opening/closing the lid member, making it difficult to open/close the lid member, or ending up with insufficient sealing due to lack of pushing force in closing the lid member.

[0005] An object of the present invention is to provide a container that has a lid member coupled to a container body by a hinge, the container being improved in ease of opening/closing of the lid member and reliability of sealing by the lid member.

[Solution to Problem]

[0006] An aspect of the present invention is a container that includes a cylindrical container body, and a lid member coupled to the container body by a hinge so as to be openable/closable relative to an opening portion of the container body, wherein: the opening portion of the container body has an outer peripheral surface, with at least a part of which being formed with a container body rib; the lid member is formed with a sidewall at a position externally contacting the opening portion, in a state where the lid member is closed; the sidewall has an inner

side surface provided with a lid rib which the container body rib contacts and slides over in opening/closing the lid member; and in closing the lid member, before the container body rib contacts and slides over the lid rib, no other part of the opening portion than the container body rib comes into contact with the lid member.

[0007] The lid member may be further formed with an inner ring at a position of internally contacting the opening portion in a state where the lid member is closed, and in closing the lid member, after the container body rib contacts and slides over the lid rib, the inner ring may come into contact with an inner peripheral surface of the opening portion.

[0008] The opening portion of the container body may have an inner diameter at least in a portion extending from a position where the container body rib is formed to an edge of the opening portion, the inner diameter being larger than that in the rest of the opening portion.

[0009] The inner side surface of the sidewall may have a part that is closer to the lid member with reference to the lid rib, the part having an inner diameter larger than an outer diameter of the container body rib to provide a gap between itself and the container body rib in closing the lid member.

[0010] The container body rib may be formed at least at a position in the opening portion, the position being on the other side of the hinge.

[0011] A force involved in opening/closing the lid member does not have to necessarily have two or more local maximum values in a process of opening/closing the lid member.

[0012] A force involved in opening/closing the lid member may be constant for a predetermined period.

[0013] The container may further include a flange at a position in the lid member, the position being on the other side of the hinge, the flange being connected to an outer side surface of the sidewall; and the flange may have an upper surface corresponding to a top surface of the lid member, the upper surface being slanted such that a tip portion of the flange has a thickness smaller than that of the portion connected to the sidewall.

[0014] The flange may have a lower surface formed with a recess, the lower surface being opposed to the upper surface.

[Advantageous Effects of Invention]

[0015] In a container that has a lid member coupled to a container body by a hinge, the present invention can provide an improvement in the easiness of opening/closing the lid member and the reliability of sealing the container with the lid member.

[Brief Description of the Drawings]

[0016]

[Fig. 1]

Fig. 1 is a cross section of a container according to an embodiment of the present invention.

[Fig. 2]

Fig. 2 is a top view of the container according to the embodiment of the present invention.

[Fig. 3]

Fig. 3 is a cross section of the container according to the embodiment of the present invention.

[Fig. 4]

Fig. 4 shows cross sections of the container according to the embodiment of the present invention.

[Fig. 5]

Fig. 5 shows graphs each indicating a magnitude of a force involved in an opening/closing motion of the container according to the embodiment of the present invention.

[Fig. 6]

Fig. 6 shows graphs for comparison, for explaining an effect of the present invention.

[Fig. 7]

Fig. 7 is a cross section of a container according to a modification of the embodiment of the present invention.

[Fig. 8]

Fig. 8 is a cross section of a container according to a modification of the embodiment of the present invention.

[Description of Embodiments]

[0017] A container 100 according to an embodiment of the present invention will be described. The container 100 has a cylindrical container body 101 and a lid member 111. The container body 101 and the lid member 111 are coupled to each other by a hinge 121. Fig. 1 is a longitudinal cross section of the container 100 in a state where the lid member 111 is closed, taken by a plane that passes through a central axis of the container body 101 and the hinge 121. Fig. 2 is a top view of the container body 101 and the lid member 111 in a state where the lid member 111 is open at an angle of 180°. Fig. 3 is a partial enlarged view of the longitudinal cross section shown in Fig. 1.

[0018] The container body 101 has an opening portion whose outer peripheral surface is formed with a container body rib 102. The container body rib 102 may be formed, for example, throughout the perimeter of the opening portion, or may be partially formed at least in a portion on the other side of the portion to which the hinge 121 is connected. The container body rib 102 has an outer diameter that is larger than an outer diameter of the opening portion. In a part of the container body 101 extending at least from the position where the container body rib 102 is formed to an edge of the container body 101, an inner diameter of the opening portion is larger than an inner diameter thereof in a portion lower than the rib position.

[0019] The lid member 111 is formed with an inner ring

112 and a sidewall 113. The inner ring 112 and the sidewall 113 are formed at positions where they sandwich the opening portion of the container body from inside and from outside in closing the lid member 111.

[0020] The sidewall 113 has an inner side surface in which a lid rib 114 is formed. The lid rib 114 has an inner diameter smaller than that of the rest of the inner side surface of the sidewall 113. The lid rib 114 is formed at a position where the container body rib 102 comes into contact with the lid rib 114 and slides it over in opening/closing the lid member 111.

[0021] The inner ring 112 has an outer diameter smaller than the inner diameter of the opening portion of the container body 101. Therefore, as shown in Fig. 3, in a state where the lid member 111 is closed, a gap 151 is formed between the inner ring 112 and the opening portion of the container body 101.

[0022] The inner side surface of the sidewall 113 has a portion located on a top surface side of the lid member 111 relative to the lid rib 114, the portion having an inner diameter larger than an outer diameter of the container body rib 102. Therefore, as shown in Fig. 3, in a state where the lid member 111 is closed, a gap 152 is formed between this portion of the sidewall 113 and the container body rib 102.

[0023] The lid member 111 is formed with a flange 115 in a portion on the other side of the portion to which the hinge 121 is connected. The flange 115 is formed being connected to the sidewall 113, with its upper surface being connected, as an example, to an outer top surface of the lid member 111. The flange 115 has a slanted upper surface, with its thickness in a tip portion being smaller than that of a portion connected to the sidewall 113. The flange 115 is formed with a recess 116 in a lower surface opposed to the upper surface. The lid member 111 can be closed by pushing down the upper surface of the flange 115 with a finger, and can be opened by pushing up the lower surface.

[0024] How the lid member 111 is opened/closed will hereinafter be described. Fig. 4 shows cross sections each indicating a vicinity of the flange 115 of the container 100, in a process of opening/closing the lid member 111.

[0025] In closing the lid member 111 from its opened state, with the hinge 121 serving as an axis, the container body rib 102 firstly comes into contact with the lid rib 114 as shown in Fig. 4 by (a).

[0026] Afterwards, as shown in Fig. 4 by (b), the container body rib 102 receives a pressing force from the lid rib 114 and is elastically deformed. Further, as shown in Fig. 4 by (c), the container body rib 102, which is in contact with the lid rib 114, slides and slides over the lid rib 114. The expression "slides over" refers to the fact that the container body rib 102 passes over the peak portion of the lid rib 114 and starts recovering from the deformed state.

[0027] As shown in Fig. 4 by (c), after the container body rib 102 slides over the lid rib 114, the inner ring 112 comes into contact with the opening portion of the con-

tainer body 101. Afterwards, as shown in Fig. 4 by (d), the inner ring 112 comes into contact with the inner side surface of the opening portion, receives a pressing force from the opening portion, and is elastically deformed. Then, the inner ring 112 is fitted to the opening portion by sliding, while the container body rib 102 recovers from the elastic deformation, thereby closing the lid member.

[0028] In opening the lid member 111 from its closed state, with the hinge 121 serving as an axis, a process reverse to the above-described process is performed. Specifically, from the state shown in Fig. 4 by (d), the inner ring 112 is permitted to slide over the inner side surface of the opening portion of the container body 101 and separate from the opening ((c) of Fig. 4). Afterwards, the container body rib 102 slides over the lid rib 114 by being elastically deformed ((b) of Fig. 4). Further, the container body rib 102 is detached from the lid rib 114, thereby opening the lid member.

[0029] Since there is the gap 151 between the inner ring 112 and the opening portion of the container body 101, a tip of the opening portion of the container body 101 does not come into contact with the inner ring 112 in either of the opening and closing motions described above. Thus, the occurrence of unnecessary interference can be minimized.

[0030] In addition, the gap 152 that is present between the sidewall 113 and the container body rib 102 thrusts the container body rib 102 into movement to recover from the deformed state at the time of completing the closing motion. As a result, the container body rib 102 is displaced, in the gap 152, closer to the sidewall 113 than when in its original shape, followed by recovering to the original shape. Therefore, when the closing motion is completed, the user can feel that the lid member 111 has been thrust to close with a click, and hence can easily confirm that the container has been sealed.

[0031] The force involved in the opening/closing motion of the lid member 111 will hereinafter be described. Fig. 5 shows by (a) and (b) graphs indicating changes of force with time which should be applied to the flange 115 in the closing and opening motions, respectively. In the graphs, the horizontal axis represents time, while the vertical axis represents a magnitude of force. This force is a resultant force expressed by $X+Y$, where X is a resistance force of the container body rib 102 caused by friction due to the contact between the container body rib 102 and the lid rib 114 or elastic deformation of the container body rib 102 when it slides over the lid rib 114, and Y is a resistance force of the inner ring 112 caused by friction due to the contact between the inner ring 112 and the opening portion of the container body 101 or elastic deformation of the inner ring 112. In Fig. 5, for clarity, the origin of the vertical axis is shifted in each of the graphs of the resultant force.

[0032] As shown in Fig. 5 by (a) and (b), both in the closing and opening motions, the resultant force $X+Y$ is maintained at an approximately constant value for some period of time. This is because there is a time lag between

the period when the container body rib 102 is in contact with the lid rib 114 and the period when the inner ring 112 is in contact with the opening portion of the container body 101, and thus because the periods of generating resistance forces and the peaks of the forces are decentralized.

[0033] In a manner similar to Fig. 5, Fig. 6 shows, for comparison, graphs in the case where the time points of generating the resistance forces are varied. Fig. 6 shows by (a) resistance forces in the closing motion of the lid member 111 in the case where an overlap period is longer than that of the present embodiment. The overlap period in this case is between the period when the container body rib 102 is in contact with the lid rib 114 and the period when the inner ring 112 is in contact with the opening portion of the container body 101. In contrast, Fig. 6 shows by (b) resistance forces in the closing motion in the case where the overlap period is shorter than that of the present embodiment. As shown in Fig. 6 by (a), if the overlap period is longer, the resultant force of each of the resistance forces has a larger peak, and a force involved in the closing motion becomes larger. As shown in Fig. 6 by (b), if the overlap period is shorter, two peaks are generated in the resultant force. Thus, at a time point when the first peak has been overcome, in other words, at a time point when the container body rib 102 has slid over the lid rib 114, the closing motion may be erroneously taken as having been completed, causing insufficient sealing.

[0034] Fig. 6 shows by (c) resistance forces in the opening motion of the lid member 111 in the case where an overlap period is longer than that of the present embodiment. The overlap period in this case is between the period when the container body rib 102 is in contact with the lid rib 114 and the period when the inner ring 112 is in contact with the opening portion of the container body 101. In contrast, Fig. 6 shows by (d) resistance forces in the opening motion in the case where the overlap period is shorter than that of the present embodiment. As shown in Fig. 6 by (c), if the overlap period is longer, the resultant force of the resistance forces has a larger peak, and a force involved in the opening motion becomes larger, as in the closing motion. As shown in Fig. 6 by (d), if the overlap period is shorter, two peaks are generated in the resultant force as in the closing motion. In this case, the first peak may be easily passed through by a short-time impact such as of a fall of the lid member, or in other words, the inner ring 112 may be easily detached from the opening portion of the container body 101. In addition, the undesired opening motion may further proceed until a time point corresponding to a local minimum value between the peaks, ending up with insufficient sealing.

[0035] It is possible to adjust the period when the container body rib 102 is in contact with the lid rib 114 and the period when the inner ring 112 is in contact with the opening portion of the container body 101. The adjustment may be made by appropriately designing the size, the shape, and the like of the container body rib 102, the

lid rib 114, the opening portion of the container body 101, the gaps 151, 152, and the like. In particular, provision of the gaps 151, 152 can contribute to achieving preferable adjustment. In the present embodiment, the inner ring 112 is ensured to come into contact with the opening portion of the container body 101 after the container body rib 102 has contacted and slid over the lid rib 114 in the closing motion. Then, in an opening motion, the container body rib 102 is ensured to slide over the lid rib 114 after the inner ring 112 has separated from the opening portion. With this configuration, the above periods are adjusted. Thus, it is ensured that there is a time lag between the peaks of the resistance forces, and that the resultant force is constant for some period of time. It is thereby possible to open/close the lid member 111 with a force smaller than the sum of the peak values of the resistance forces, and to provide usability to the aged, women, and children. Moreover, with the fact that the resultant force does not have a plurality of peaks (local maximum values), or being coupled with the above-described fact that a good sense of sealing is felt at the time of completing a closing motion, it is possible to suppress the closing motion is erroneously stopped halfway, reduce an undesired opening motion such as when the lid member falls, and minimize insufficient sealing.

[0036] Moreover, since the upper surface of the flange 115 is slanted, the user can be guided to a correct pushing direction that enables a closing motion with a small force. It is therefore possible to prevent the user from applying a large force in an incorrect direction. Further, the recess 116 provided in the lower surface of the flange 115 causes the flange 115 to be warped when the flange 115 is pushed. Thus, the user can have a softer feeling of touch, and if the pushing direction is deviated from the correct direction, deviation components in the pushing force is absorbed to thereby prevent the lid rib 114 or the like from being applied with a force more than necessary.

[0037] The container body rib 102 and the lid rib 114 may be provided such that they engage with each other in the entire perimeter of the opening portion of the container body 101 and in the entire perimeter of the inner side surface of the sidewall 113 of the lid member 111, respectively. Alternatively, the container body rib 102 and the lid rib 114 may be provided such that they engage with each other in a part of the entire perimeter. For example, the lid rib 114 may be provided in the vicinity of the flange 115, and the outer diameter of the container body rib 102 may be made larger only in a part facing the lid rib 114, than the outer diameter of the opening portion of the container body 101.

[0038] In a closed state, the container body 101 may be sealed by allowing the entire perimeter of a tip portion of the inner ring 112 to come into contact with and fit to the inner side surface in the vicinity of the opening portion of the container body 101 with a sufficient contact pressure. Alternatively, in this case, the degrees of contact and fitting may be made lower, with the sealing properties not being sufficient. The gaps 151 and 152 serve as by-

passes of air in the closing motion. Thus, if the container 100 is of a sealing-type, the gaps 151 and 152 can suppress the internal pressure of the container 100 from increasing at the time of completing the closing motion, thereby reducing a repulsive force in sealing.

[0039] For example, although the container 100 can be integrally molded with a material having some rigidity, such as a resin or the like, the material quality, the size, the shape and the like of the container in the present invention are not particularly limited. For example, the contents of the container may be, but are not particularly limited to, chemical agents, test pieces, foods or the like.

(Modification 1)

[0040] A modification is described below. Fig. 7 shows a longitudinal cross section of a container 200 according to the present modification. As for the components similar to or corresponding to those of the above-described embodiment, the same reference signs are assigned. The container 200 is different from the container 100 in that the lid member 111 does not include an inner ring.

[0041] In the container 200, the inner diameter of the opening portion is uniform throughout the container body 101. However, similar to the container 100, the inner diameter in a tip portion of the opening portion may be made larger than that of the portion lower than the tip portion. In the container 200, there is no gap between the sidewall 113 of the lid member 111 and the container body rib 102 in a closed state. However, similar to the container 100, a gap may be provided therebetween. In the container 200, the flange 115 has a uniform thickness. However, similar to the container 100, the thickness may be varied and a slant may be provided to the upper surface of the flange 115.

[0042] In the present modification, before the container body rib 102 comes in contact with and slides over the lid rib 114 in closing the lid member 111, no other part of the opening portion of the container 200 than the lid rib 114 comes into contact with the lid member 111 at least in the vicinity of the flange 115 or in the entire perimeter. In the container 200, the main factor of the force to be applied to the flange 115 in the opening/closing motion is the resistance force X of the container body rib 102, which is caused by friction due to the contact between the container body rib 102 and the lid rib 114 or elastic deformation of the container body rib 102 when it slides over the lid rib 114. The shapes of the container body rib 102 and the lid rib 114 may be appropriately designed to thereby allow the resistance force X to be constant for a predetermined time, or it may be ensured that two or more peaks are not generated. In this way, an opening/closing motion as good as the one in the above-described embodiment can be achieved without taking account of other factors as the resistance force.

(Modification 2)

[0043] Another modification is described. Fig. 8 shows a longitudinal cross section of a container 300 according to the present modification. As for the components similar to or corresponding to those of the above-described embodiment, the same reference signs are assigned. The container 300 is different from the container 100 in that the amount by which the inner ring 112 protrudes from the top surface of the lid member 111 is made smaller than in the container 100.

[0044] In the container 300, the inner diameter of the opening portion of the container body 101 is uniform throughout the container body. However, similar to the container 100, the inner diameter of the tip portion of the opening portion may be made larger than that of the portion lower than the tip portion. In the container 300, the flange 115 has a uniform thickness. However, similar to the container 100, the thickness may be varied and a slant may be provided to the upper surface of the flange 115.

[0045] In the present modification, immediately before completing a closing motion, the inner ring 112 and the opening portion of the container body 101 come into contact with each other. Therefore, the resistance force Y of the inner ring 112 caused by the contact-induced friction or the elastic deformation of the inner ring 112 is not generated, or generated by only a small amount for a brief period, and thus does not influence the opening/closing motion. Accordingly, similar to the modification 1, the shapes of the container body rib 102 and the lid rib 114 may be appropriately designed. Thus, the resistance force X of the container body rib 102 may be ensured to be constant for a predetermined time, the resistance force X being caused by the contact between the container body rib 102 and the lid rib 114 or the elastic deformation of the container body rib 102 when it slides over the lid rib 114. In addition, it may be ensured that two or more peaks are not generated. Thus, a good opening/closing motion similar to the above-described embodiment can be achieved without taking account of other factors as the resistance force.

[0046] The present invention should not be construed as being limited to the foregoing embodiment and modifications, but may be appropriately implemented by variously modifying or replacing the characteristics of the components.

[Industrial Applicability]

[0047] The present invention is useful for the containers that include a container body and a lid member that seals an opening portion of the container body.

[Reference Signs List]

[0048]

100: container
101: container body
102: container body rib
111: lid member
112: inner ring
113: sidewall
114: lid rib
115: flange
116: recess
121: hinge
151, 152: gap

Claims

1. A container that comprises a cylindrical container body, and a lid member coupled to the container body by a hinge so as to be openable/closable relative to an opening portion of the container body, wherein:

the opening portion of the container body has an outer peripheral surface, with at least a part of which being formed with a container body rib; the lid member is formed with a sidewall at a position of externally contacting the opening portion, in a state where the lid member is closed;

the sidewall has an inner side surface provided with a lid rib which the container body rib contacts and slides over in opening/closing the lid member; and

in closing the lid member, before the container body rib contacts and slides over the lid rib, no other part of the opening portion than the container body rib comes into contact with the lid member.

2. The container according to claim 1, wherein:

the lid member is further formed with an inner ring at a position of internally contacting the opening portion, in a state where the lid member is closed; and

in closing the lid member, after the container body rib contacts and slides over the lid rib, the inner ring comes into contact with an inner peripheral surface of the opening portion.

3. The container according to claim 1 or 2, wherein the opening portion of the container body has an inner diameter at least in a portion extending from a position where the container body rib is formed to an edge of the opening portion, the inner diameter being larger than that in the rest of the opening portion.

4. The container according to any one of claims 1 to 3, wherein the inner side surface of the sidewall has a

part that is closer to the lid member with reference to the lid rib, the part having an inner diameter larger than an outer diameter of the container body rib to provide a gap between itself and the container body rib in closing the lid member.

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5. The container according to any one of claims 1 to 4, wherein the container body rib is formed at least at a position in the opening portion, the position being on the other side of the hinge.

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6. The container according to any one of claims 1 to 5, wherein a force involved in opening/closing the lid member does not have two or more local maximum values in a process of opening/closing the lid member.

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7. The container according to claim 6, wherein a force involved in opening/closing the lid member is constant for a predetermined period.

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8. The container according to any one of claims 1 to 7, wherein:

the container further comprises a flange at a position in the lid member, the position being on the other side of the hinge, the flange being connected to an outer side surface of the sidewall; and

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the flange has an upper surface corresponding to a top surface of the lid member, the upper surface being slanted such that a tip portion of the flange has a thickness smaller than that of the portion connected to the sidewall.

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9. The container according to claim 8, wherein the flange has a lower surface formed with a recess, the lower surface being opposed to the upper surface.

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FIG. 1

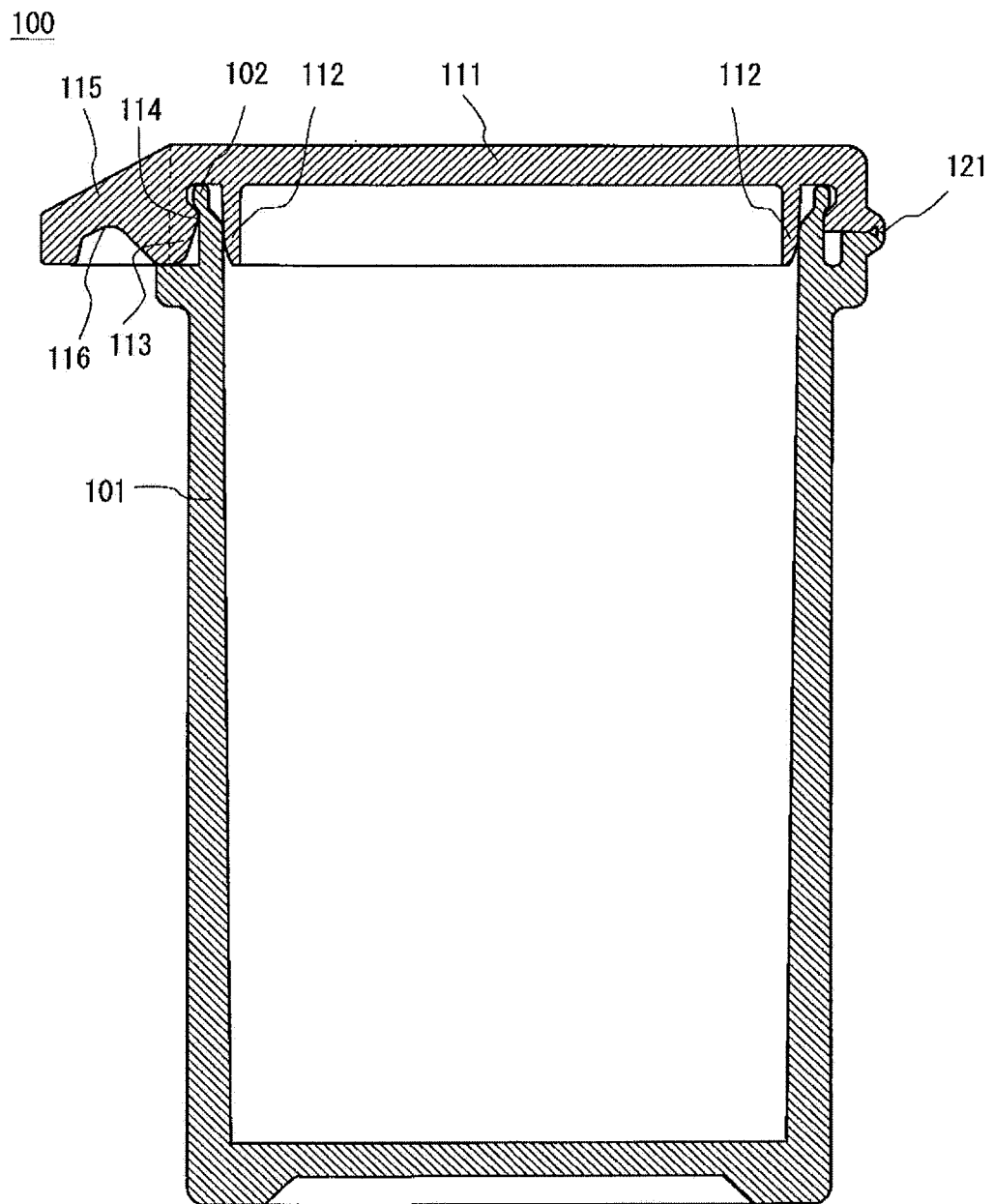


FIG. 2

100

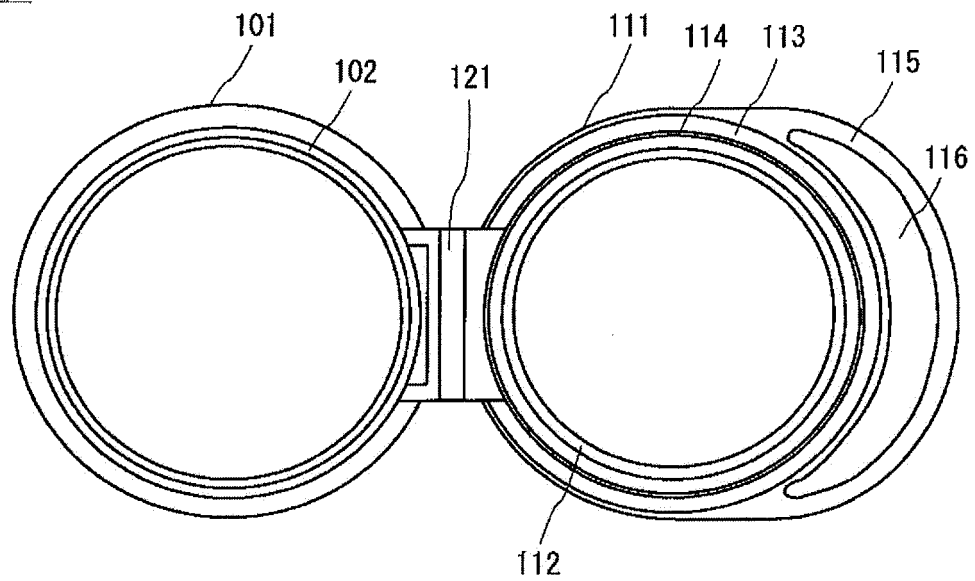


FIG. 3

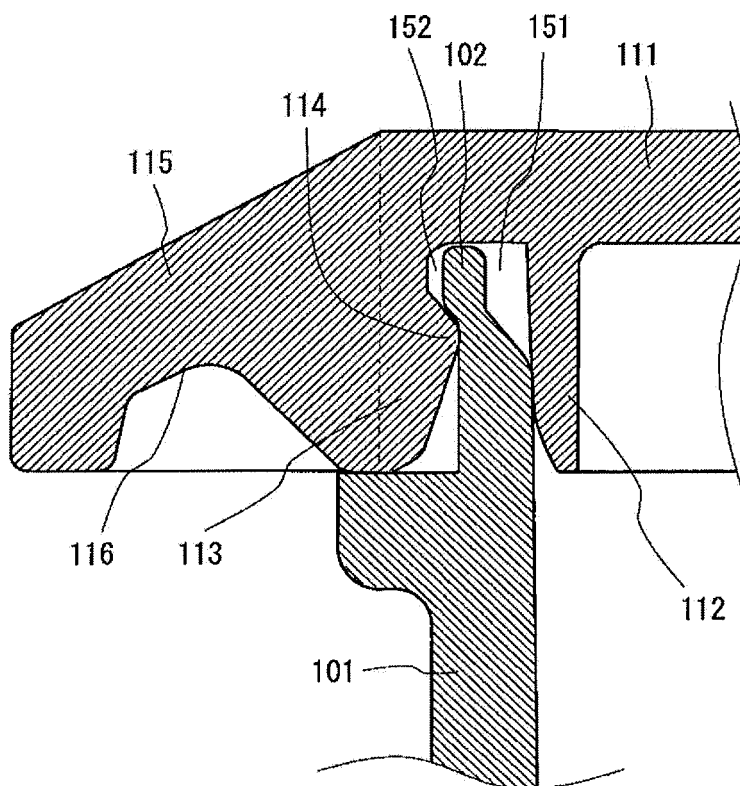


FIG. 4

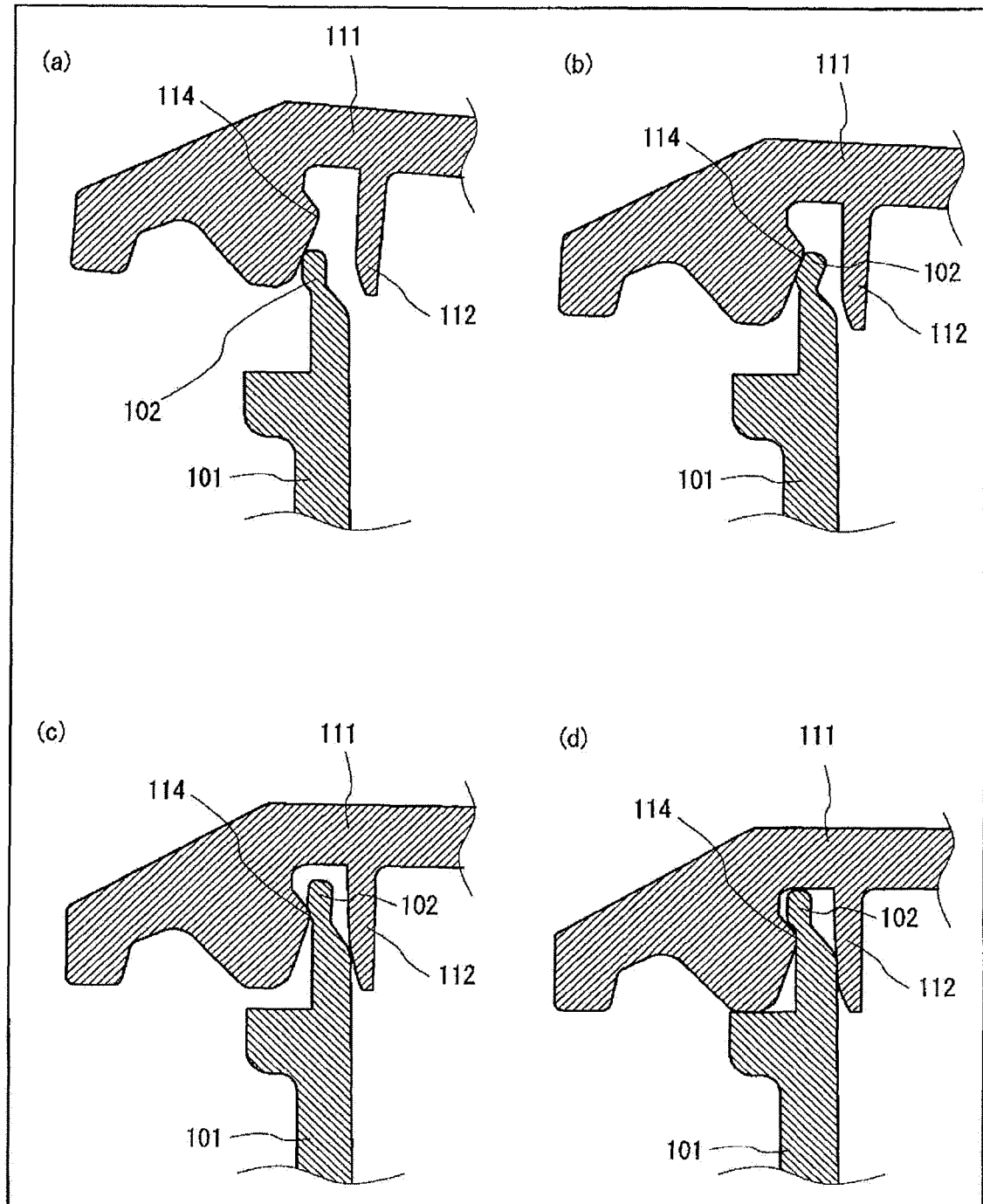


FIG. 5

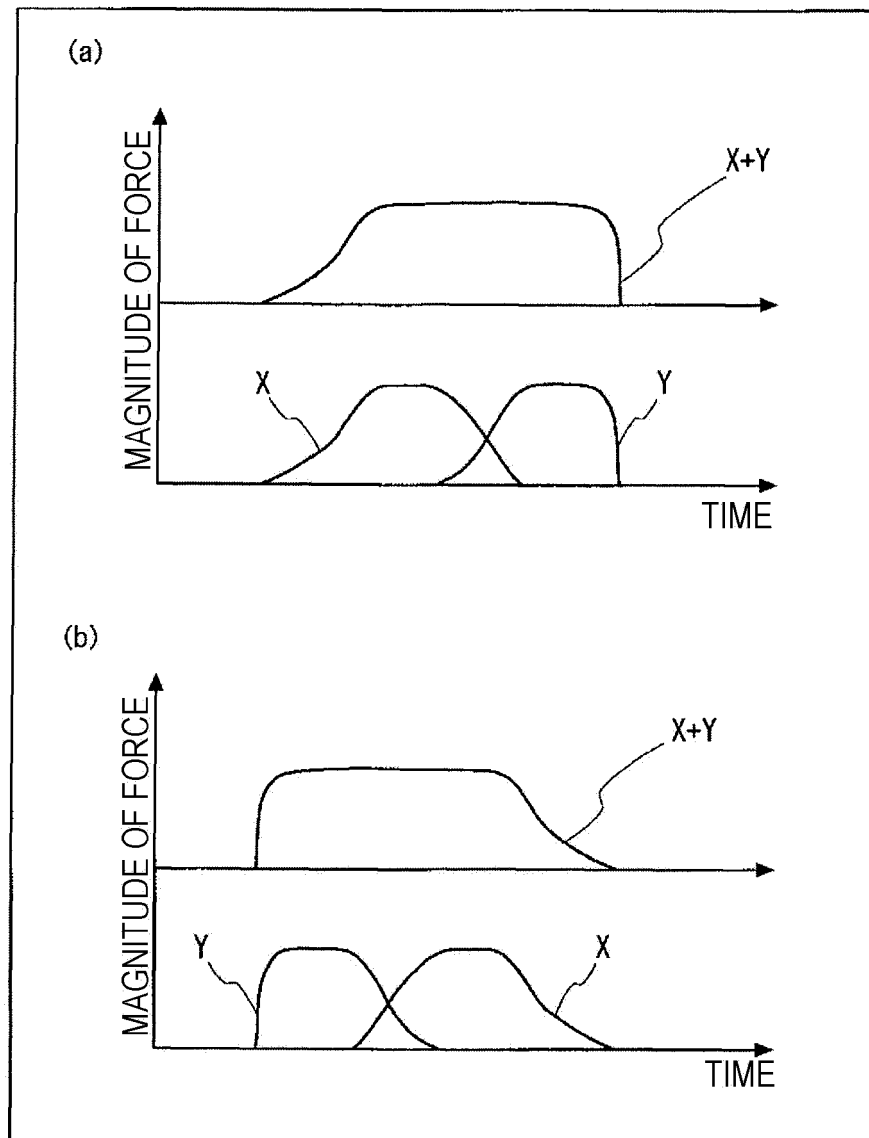


FIG. 6

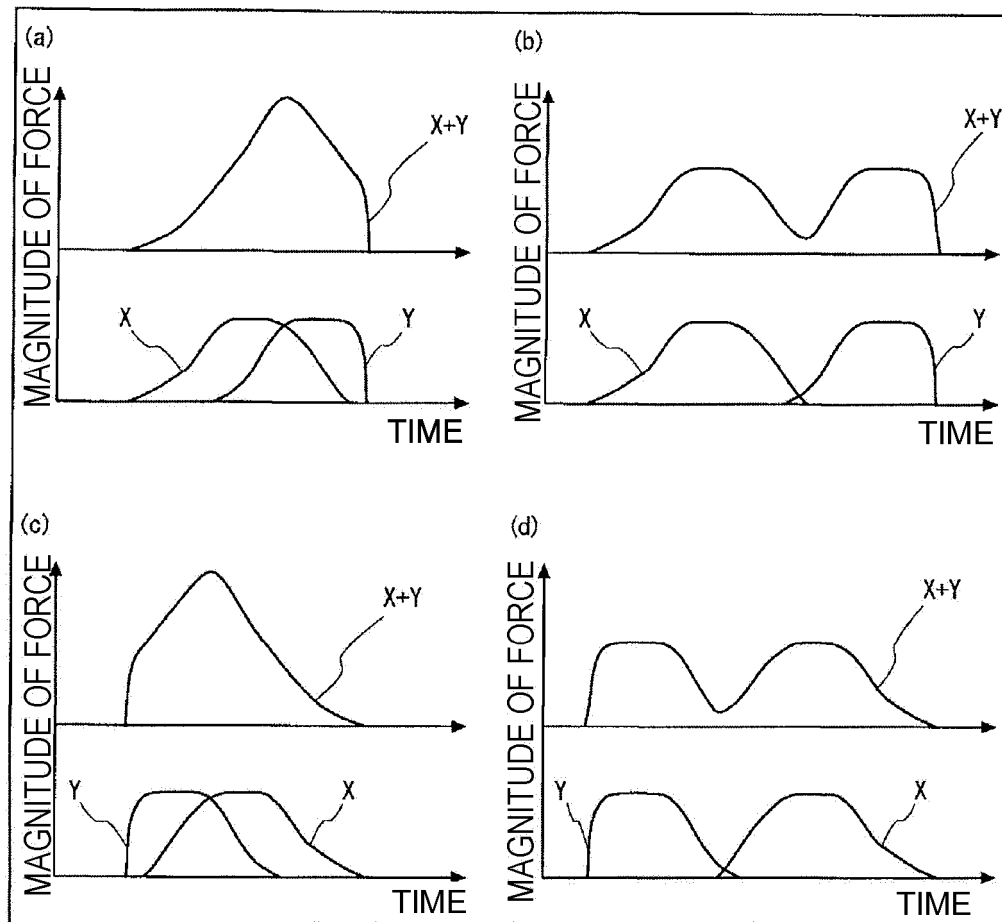


FIG. 7

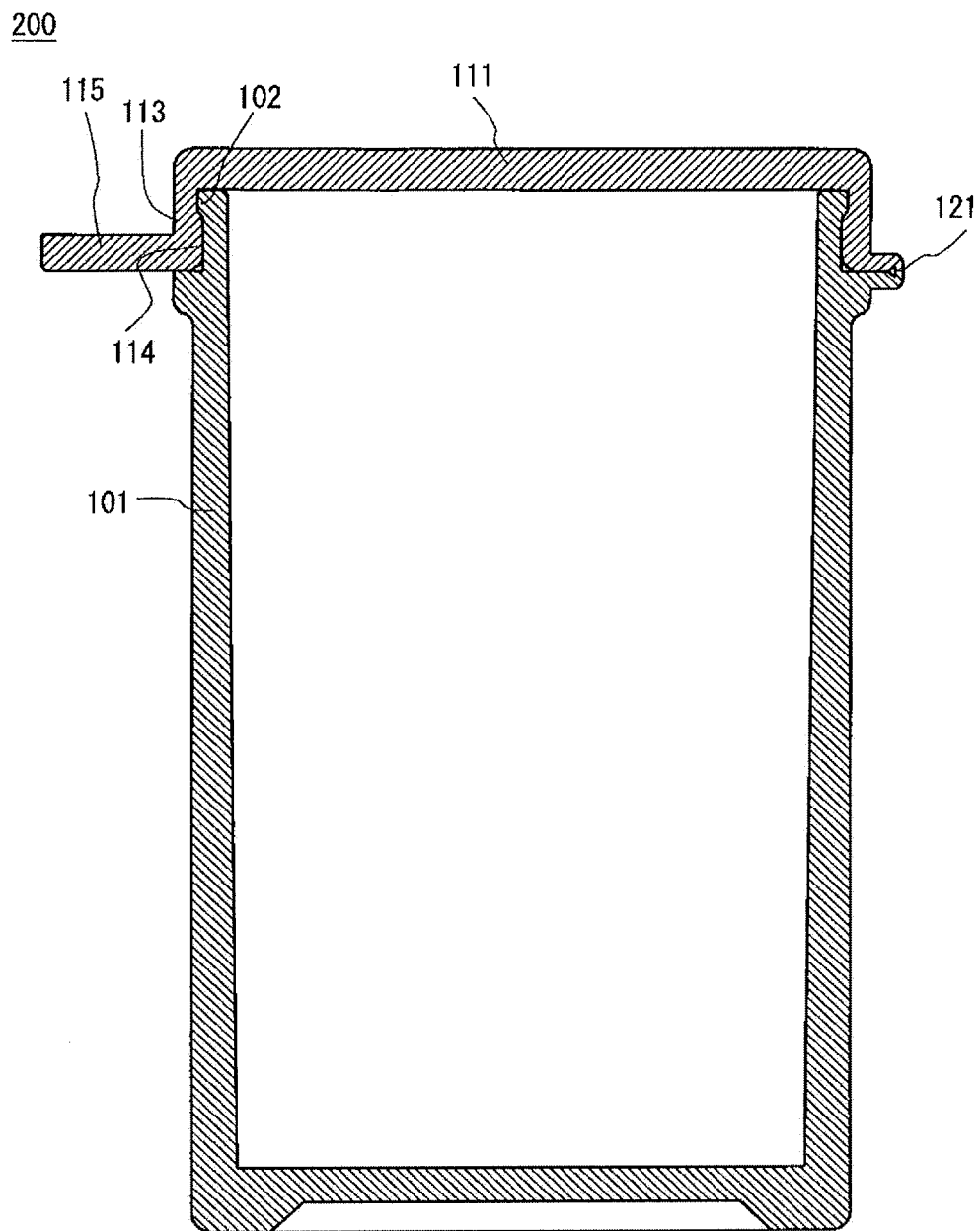
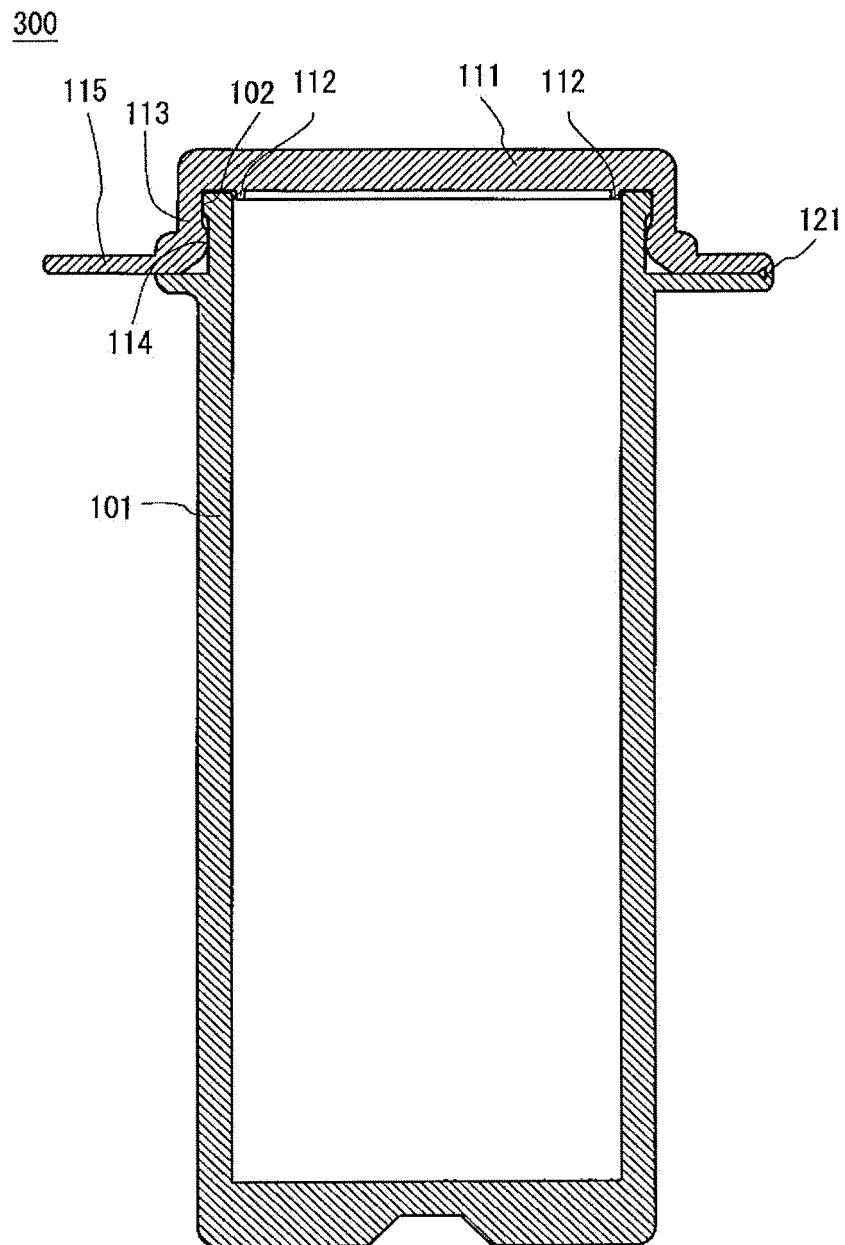


FIG. 8



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2014/005563

A. CLASSIFICATION OF SUBJECT MATTER

B65D43/22(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)

B65D43/22

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

Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2015

Kokai Jitsuyo Shinan Koho 1971-2015 Toroku Jitsuyo Shinan Koho 1994-2015

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 2004-161323 A (Toppan Printing Co., Ltd.), 10 June 2004 (10.06.2004), paragraphs [0012] to [0017]; fig. 3, 4 (Family: none)	1-5 6-9
X Y	JP 2010-173674 A (Japan Crown Cork Co., Ltd.), 12 August 2010 (12.08.2010), paragraphs [0012] to [0016]; fig. 1 to 4 (Family: none)	1, 3-5, 8 6, 7, 9
Y	JP 2003-63550 A (Toppan Printing Co., Ltd.), 05 March 2003 (05.03.2003), paragraphs [0013], [0017], [0018] (Family: none)	6-9

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

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"&" document member of the same patent family

Date of the actual completion of the international search
20 January 2015 (20.01.15)Date of mailing of the international search report
03 February 2015 (03.02.15)Name and mailing address of the ISA/
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INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2014/005563

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 2007-269367 A (Toppan Printing Co., Ltd.), 18 October 2007 (18.10.2007), entire text; all drawings (Family: none)	1-9
A	JP 2006-273343 A (Toppan Printing Co., Ltd.), 12 October 2006 (12.10.2006), entire text; all drawings (Family: none)	1-9

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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