(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 639 178 A2**

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
18.09.2013 Bulletin 2013/38

(21) Application number: **11840141.3**

(22) Date of filing: **10.11.2011**

(51) Int Cl.:
B65D 41/14 *(2006.01)* ***B65D 41/20*** *(2006.01)*
B65D 53/04 *(2006.01)* ***B65D 47/36*** *(2006.01)*

(86) International application number:
PCT/KR2011/008577

(87) International publication number:
WO 2012/064132 (18.05.2012 Gazette 2012/20)

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

(30) Priority: **10.11.2010 KR 20100112357**

(71) Applicant: **Rho, Hee Kwon**
449-855 Gyeonggi-do (KR)

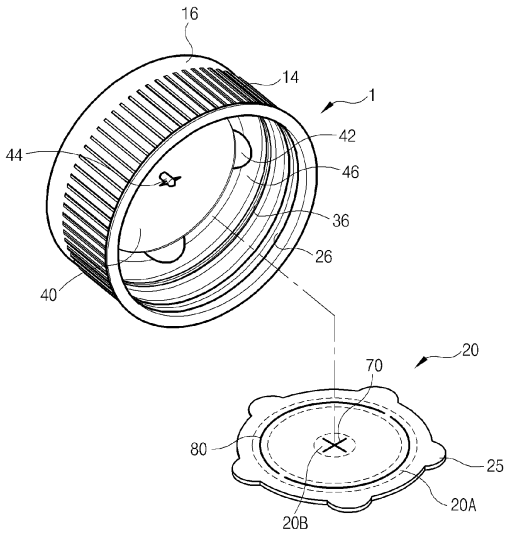
(72) Inventor: **Rho, Hee Kwon**
449-855 Gyeonggi-do (KR)

(74) Representative: **ABG Patentes, S.L.**
Avenida de Burgos, 16D
Edificio Euromor
28036 Madrid (ES)

(54) SEALING MEMBER FOR CONTAINER

(57) A vessel closure, and more particularly, a sealing member for sealing a vessel by being coupled to an inlet of the vessel, the sealing member being coupled to a vessel inlet of a vessel and sealing the vessel sealing member, wherein a vessel closure coupled to the vessel inlet, comprises a body mounted to the vessel inlet; a pressing plate disposed in the body so as to be movable up and down; one or more cutters formed on a lower surface of the pressing plate in a circumferential direction of the vessel inlet, and configured to punch the sealing member when the pressing plate is pressed, and to cut the sealing member when the body is rotated; a locking portion downwardly protruding from the lower surface of the pressing plate, and configured to accommodate the sealing member cut by the cutter in the body; and a connection portion connected between an outer circumferential surface of the pressing plate and an inner circumferential surface of the body, and elastically-transformed such that the pressing plate is movable up and down, wherein the sealing member has a disc shape in correspondence to the vessel inlet, a first cutting portion is formed at a position corresponding to the locking portion such that the sealing member is easily punched by the locking portion, and a second cutting portion is formed in a circumferential direction at a position corresponding to the cutter such that the sealing member is easily cut by the cutter, is disclosed.

【Figure 2】



EP 2 639 178 A2

Description

[Technical Field]

[0001] The present invention relates to a vessel closure, and more particularly, a sealing member for sealing a vessel by being coupled to an inlet of the vessel.

[Background Art]

[0002] FIG. 1 is a sectional view of a vessel closure in accordance with the prior art.

[0003] Generally, a sealing member 152 is attached to a vessel 150 such as a drink vessel and a drug vessel, so as to protect content stored in the vessel 150. Such sealing member 152 is attached to a vessel inlet 160 in adhesion manner, etc., and a vessel closure 154 is mounted to the vessel inlet 160 so as to prevent the sealing member 152 from being damaged by an external impact or contact with an object.

[0004] A female screw portion 162 is formed on an inner circumferential surface of the vessel closure 154, a male screw portion 164 is formed at the vessel inlet 160, and under such configuration, once a user rotates the vessel closure 154, the vessel closure 154 is separated from the vessel inlet 160 or is mounted to the vessel inlet 160.

[0005] If a user grips and rotates the vessel closure 154, the vessel closure 154 is separated from the vessel inlet 160. Then the sealing member 152 is removed from the vessel inlet 160, and content inside the vessel 150 is discharged outside through the vessel inlet 160.

[0006] However, such vessel closure of the prior art has a problem in that after the vessel closure is separated from the vessel, a user should tear up the sealing member being attached to and sealing the vessel inlet using his or her hand, or an additional tool such as a knife, which result in the user's inconvenience.

[0007] Especially, in case that the sealing member is not easily separated from the edge of the vessel inlet due to a great bonding force between the sealing member and the edge of the vessel inlet, when the user removes the sealing member using his or her hand, the user should tear up again the sealing member using his or her hand. In this case, the user's hand comes in contact with the vessel inlet to cause a sanitary problem.

[0008] In order to solve such problems occurring when the sealing member is removed, International Publication No. W02006062357 proposed a method for automatically removing a sealing member when a vessel closure is separated from a vessel inlet.

[0009] However, the sealing member disclosed in the International Publication No. W02006062357 may have its material, intensity, etc. changed according to a type of content stored in the vessel. Therefore, a material and a structure of a vessel closure, especially a material of a locking portion and a cutter which are formed on a lower surface of a pressing plate, should be changed according to a material, a structure, etc. of the sealing member coupled to the vessel inlet.

[0010] Especially, in the vessel closure disclosed in International Publication No. W02006062357, it is inconvenient to perform a punching and cutting operation according to a material, a structure, etc. of the sealing member coupled to the vessel inlet.

[Disclosure]

[Technical Problem]

[0011] Therefore, an object of the present invention is to provide a sealing member for a vessel, the sealing member capable of being easily punched and cut by a vessel closure having a pressing plate, a locking portion and a cutter which are formed on a lower surface of the pressing plate.

[Technical Solution]

[0012] To achieve these and other advantages and in accordance with the purpose of the present invention, as embodied and broadly described herein, there is provided a sealing member for a vessel, the sealing member being coupled to a vessel inlet of a vessel and sealing the vessel sealing member, wherein a vessel closure coupled to the vessel inlet, comprises a body mounted to the vessel inlet; a pressing plate disposed in the body so as to be movable up and down; one or more cutters formed on a lower surface of the pressing plate in a circumferential direction of the vessel inlet, and configured to punch the sealing member when the pressing plate is pressed, and to cut the sealing member when the body is rotated; a locking portion downwardly protruding from the lower surface of the pressing plate, and configured to accommodate the sealing member cut by the cutter in the body; and a connection portion connected between an outer circumferential surface of the pressing plate and an inner circumferential surface of the body, and elastically-transformed such that the pressing plate is movable up and down, wherein the sealing member has a disc shape in correspondence to the vessel inlet, a first cutting portion is formed at a position corresponding to the locking portion such that the sealing member is easily punched by the locking portion, and a second cutting portion is formed in a circumferential direction at a position corresponding to the cutter such that the sealing member is easily cut by the cutter.

[0013] The locking portion may be formed at a central part of the vessel inlet.

[0014] The locking portion may comprise a supporting rod downwardly protruding from a central part of the pressing plate; and one or more locking rods outwardly protruding from an end of the supporting rod.

[0015] The sealing member may comprise: a metallic layer formed of metallic material, and having an adhesive layer on a lower surface thereof such that the sealing

member is adhered onto the vessel inlet; and a cover layer adhered onto the metallic layer, wherein the first cutting portion and the second cutting portion are formed only at the cover layer.

[0016] The cover layer may not be adhered onto the metallic layer at parts including the first cutting portion and the second cutting portion.

[0017] The metallic layer may comprise aluminum, and the cover layer is formed of any one of paper and synthetic resin.

[0018] The first cutting portion may have a shape of one or more lines formed to pass through the center of the vessel inlet.

[0019] The first cutting portion may have any one shape of a polygonal shape and a circular shape each comprising the center of the vessel inlet.

[0020] The second cutting portion may be implemented as a cutting circle of a circular shape concentric with the vessel inlet.

[0021] The second cutting portion may be implemented as one or more arcs concentric with the vessel inlet.

[0022] The second cutting portion may be formed between an inner circumferential surface of the vessel inlet and the center of the vessel inlet.

[0023] The first cutting portion and the second cutting portion may be substantially formed in lines, or have widths spaced from each other.

[0024] One or more protrusion portions may protrude more than an outer diameter of the vessel inlet.

[Advantageous Effects]

[0025] The sealing member for a vessel according to the present invention has an advantage in that, in the sealing member punched and cut by the vessel closure, the vessel closure having the pressing plate, and the locking portion and the cutter which are formed on a lower surface of the pressing plate, cutting portions are previously formed at positions corresponding to the locking portion and the cutter, which facilitates a punching operation and a cutting operation with respect to the sealing member.

[0026] In addition, the sealing member for a vessel according to the present invention has an advantage in that, in a case where the sealing member comprises a metallic layer and a cover layer adhered onto the metallic layer, the cutting portions are formed only at the cover layer, and the metallic layer and the cover layer are not adhered to each other at the positions of the cutting portions, and under such configuration, the positions of the cutting portions may have a low strength, which results in facilitation of a punching operation and a cutting operation.

[Description of Drawings]

[0027]

FIG. 1 is a sectional view of a vessel closure in accordance with the prior art;

FIG. 2 is a perspective view of a sealing member for a vessel according to the present invention;

FIG. 3 is a sectional view illustrating a mounted state of the sealing member of FIG. 2 to a vessel inlet;

FIG. 4 is an enlarged sectional view of part 'A' in FIG. 4;

FIG. 5 is a plane view illustrating another example of the sealing member of FIG. 2;

FIG. 6 is a cut-out perspective view illustrating one example of a cutter of a vessel closure of FIG. 2;

FIG. 7 is a perspective view illustrating one example of a locking portion of a vessel closure of FIG. 2;

FIG. 8 is a sectional view illustrating a state that a sealing member of FIG. 3 punched and cut by the locking portion and the cutter; and

FIG. 9 is a sectional view illustrating a state that a vessel closure and a sealing member of FIG. 8 have been removed.

[Best Mode]

[0028] Hereinafter, a sealing member for a vessel according to the present invention will be explained in more detail with reference to the attached drawings. The drawings of the present invention may be illustrated in an enlarged manner or in a contracted manner for convenience.

[0029] As shown in FIGS. 2 to 9, a sealing member 20 for a vessel according to the present invention is configured to be coupled to an inlet 12 of a vessel 10. The sealing member 20 is removed from the vessel inlet 12 by punching and cutting operation by a vessel closure 1.

[0030] As shown in FIGS. 2, 3, 8 and 9, the vessel closure 1, includes a body 16 configured to remove the sealing member 20 from the vessel inlet 12, is mounted to the vessel inlet 12 from which content stored in the vessel 10 is discharged to outside, the body having an inner space; and a sealing member removing portion formed on an inner circumferential surface of the body 16, and configured to remove the sealing member 20 from the vessel inlet 12 in punching and cutting manner, when the body 16 is open.

[0031] The vessel 10 is implemented as a drink vessel, a drug vessel or an oil vessel each for storing liquid content or solid content therein. The sealing member 20, which protects the content stored in the vessel 10 by sealing the vessel inlet 12, is attached to the vessel inlet 12 from which the content is discharged outside.

[0032] A male screw portion 28 is formed on an outer circumferential surface of the vessel inlet 12, and a female screw portion 26 is formed on an inner circumferential surface of the body 16. Under such configuration, once the body 16 is rotated, the vessel closure 1 is separated from the vessel inlet 12 or is mounted to the vessel inlet 12.

[0033] As skirt portions (not shown), connected to the body 16 by a plurality of bridges which are easily broken,

are formed at a lower end of the body 16, a mounted state of the body 16 to the vessel inlet 12 can be maintained. Here, the skirt portions are mounted to the vessel inlet 12 in a locked state by protrusion portions (not shown) formed at the vessel inlet 12.

[0034] The skirt portions are torn up when the body 16 is rotated, thereby separating the body 16 and the vessel inlet 12 from each other. Concavo-convex type protrusions 36 are formed on an outer circumferential surface of the body 16 in a circumferential direction, so that the body 16 can be easily gripped and open by a user's hand.

[0035] The body 16 may be coupled to the vessel inlet 12 in a snap manner which is open and closed by pressing, rather than in a screw-coupling manner. That is, protrusion (not shown) protrudes from the end of the vessel inlet 12 from an outer circumferential surface, and the protrusion may be coupled to the body 16. In a case where the body 16 and the vessel inlet 12 are coupled to each other in a snap manner, when the body 16 is separated from the vessel inlet 12, the sealing member 20 is separated from the vessel inlet 12 in a mounted state in the body 16.

[0036] In a case where the body 16 and the vessel inlet 12 are coupled to each other in a snap manner, the sealing member 20 may be firstly separated from the vessel inlet 12 as the body 16 is rotated with respect to the vessel inlet 12.

[0037] The sealing member removing portion comprises a pressing plate 40 disposed in the body 16 so as to be movable up and down, and pressed by a user; one or more cutters 42 formed on a lower surface of the pressing plate 40 in a circumferential direction of the vessel inlet 12, and configured to punch the sealing member 20 when the pressing plate 40 is pressed, and to cut the sealing member 20 when the body 16 is rotated; a locking portion 44 downwardly protruding from the lower surface of the pressing plate 40, and configured to lock the sealing member such that the sealing member 20 cut by the cutter 42 is accommodated in the body 16; and a connection portion 46 connected between an outer circumferential surface of the pressing plate 40 and an inner circumferential surface of the body 16, and configured to guide the pressing plate 40 to move up and down, and configured to support a moved position of the pressing plate 40 by its elastic force.

[0038] Preferably, the pressing plate 40 is formed in a disc shape having an inner diameter smaller than an inner diameter of the body 16, and is disposed at a position lower than an upper surface of the body 16. A cover (not shown) may be mounted to an upper surface of the body 16, to thus protect the pressing plate. The pressing plate 40 may be concentric with the vessel inlet 12, or may be eccentric from the center of the vessel inlet 12 as shown in International Publication No. W02006062357.

[0039] The cutter 42 may include a plurality of supporting portions 50 formed on a lower surface of the pressing plate 40 in a circumferential direction of the vessel inlet 12, e.g., in the same intervals as shown in FIGS. 2, 3 and 6; a first cutter 52 sharply formed at a lower end of the supporting portions 50, and configured to punch the sealing member 20 while downwardly moving when the pressing plate 40 is pressed; and a second cutter 54 formed on at least one of two side surfaces of the supporting portions 50, and configured to cut the sealing member 20 in a circular shape while being rotated in a contacted state to an inner circumferential surface of the vessel inlet 12 when the body 16 is rotated.

[0040] The connection portion 46 may be implemented as a dome-shaped thin film which connects between an inner circumferential surface of the body 16 and an outer circumferential surface of the pressing plate 40. When the pressing plate 40 is pressed with a force more than a prescribed value, the connection portion 46 is elastically-transformed to guide the pressing plate 40 to downwardly move.

[0041] The connection portion 46 elastically supports a current position of the pressing plate 40. That is, when the pressing plate 40 is in an upward protruding state without being pressed, the connection portion 46 maintains its convex dome shape, thereby maintaining the current position of the pressing plate 40. On the other hand, when the pressing plate 40 is pressed by a force more than a prescribed value, the connection portion 46 is elastically-transformed into a concaved shape, thereby maintaining the pressed position of the pressing plate 40.

[0042] As shown in FIGS. 2, 3 and 7, the locking portion 44 may include a supporting rod 56 downwardly extending from a central part of the vessel inlet 12 toward the pressing plate 40, and configured to punch the sealing member 20 when the pressing plate 40 is pressed; and one or more locking rods 58 formed on an outer circumferential surface of the end of the supporting rod 56, and configured to lock the sealing member 20 such that the sealing member 20 cut by the cutter 42 is stored in the body 16.

[0043] The supporting rod 56 is formed in circular bar shape, and downwardly extends from the center of the vessel inlet 12, at a lower surface of the pressing plate 40. A punch portion 60, which has a sharp shape to punch the sealing member 20, may be formed at the end of the supporting rod 56.

[0044] The locking rod 58 may have various shapes and structures. The locking rod 58 may be elastically-transformed so as to be upward bent. When punching the sealing member 20, the locking rod 58 is upward bent to be positioned in the sealing member 20 via a hole formed by the punch portion 60. After being positioned in the sealing member 20, the locking rod 58 may extend to the original state to thus be locked to an inner side surface of the sealing member 20.

[0045] An operation to separate the sealing member from the vessel inlet by the vessel closure will be explained with reference to FIGS. 3, 8 and 9.

[0046] In order to discharge content stored in the vessel 10 outside, the pressing plate 40 is pressed downward, so that the connection portion 46 is elastically-

transformed and the pressing plate 40 is downwardly moved. Then, as shown in FIG. 8, the cutter 42 formed at a lower edge of the pressing plate 40 punches the edge of the sealing member 20. At the same time, the locking portion 44 formed on a lower surface of the pressing plate 40 punches the center of the sealing member 20.

[0047] The locking rod 58 of the locking portion 44 is introduced into a hole formed by the punch portion 60 of the supporting rod 56.

[0048] Upon completion of such processes, if a user rotates the body 16 in an open direction using his or her hand, the second cutter 54 of the cutter 42 cuts the sealing member 20 in a circular shape.

[0049] As shown in FIG. 9, once the body 16 is separated from the vessel inlet 12, the sealing member 20 removed from the vessel inlet 12 is in a locked state to the locking rod 58 of the locking portion 44. Accordingly, the sealing member 20 is separated from the vessel inlet 12 together with the body 16, thereby being accommodated in the body 16.

[0050] Hereinafter, the sealing member for a vessel according to the present invention will be explained in more detail.

[0051] The sealing member 20 has a disc shape in correspondence to the vessel inlet, a first cutting portion 70 is formed at a position corresponding to the locking portion 44 such that the sealing member 20 is easily punched by the locking portion 44, and a second cutting portion 80 is formed in a circumferential direction at a position corresponding to the cutter 42 such that the sealing member 20 is easily cut by the cutter 42.

[0052] The first cutting portion 70 and the second cutting portion 80 are configured to facilitate punching and cutting operation by the cutter 42 and the locking portion 44, which are preferably formed so that sealing function of the sealing member 20 with respect to the vessel closure 1 can be maintained.

[0053] The sealing member 20 may have any configuration to seal the vessel inlet 12. For instance, the sealing member 20 may include a metallic layer 21 formed of metallic material, and having an adhesive layer 23 on a lower surface thereof such that the sealing member 20 is adhered onto the vessel inlet 12; and a cover layer 22 adhered onto the metallic layer 21.

[0054] Preferably, the first cutting portion 70 and the second cutting portion 80 are formed only at the cover layer 22.

[0055] The metallic layer 21 may constitute part of the sealing member 20, and may be formed of metallic material such as aluminum foil. The metallic layer 21 may comprise aluminum such as an aluminum alloy.

[0056] The cover layer 22, which is formed or adhered on/onto the metallic layer 21, may be formed of non-woven fabric such as paper, synthetic resin, etc. The cover layer 22 may be adhered onto the metallic layer 21 by an adhesive 24.

[0057] The cover layer 22 may not be adhered onto the metallic layer 21 at parts 20A and 20B including the first cutting portion 70 and the second cutting portion 80.

[0058] As shown in FIGS. 2 and 5, the parts 20A and 20B, which include the first cutting portion 70 and the second cutting portion 80, may have various shapes such as a circular shape 20B positioned near the first cutting portion 70 and the second cutting portion 80 and concentric with the sealing member 20, or a ring shape concentric with the second cutting portion 80.

[0059] If the cover layer 22 is not adhered onto the metallic layer 21 at the parts 20A and 20B including the first cutting portion 70 and the second cutting portion 80, strength near the first cutting portion 70 and the second cutting portion 80 is lowered. This can facilitate a punching and cutting operation by the cutter 42 and the locking portion 44.

[0060] The first cutting portion 70 is formed at a position corresponding to the locking portion 44, thereby facilitating a punching operation by the locking portion 44. The first cutting portion 70 may have various shapes, and may be formed in a shape having one or more lines such as 'X' which pass through the center of the vessel inlet 12.

[0061] The first cutting portion 70 may have a shape in a polygonal shape and a circular shape each including the center of the vessel inlet 12.

[0062] The second cutting portion 80 may be implemented as a cutting circle of a circular shape concentric with the vessel inlet 12.

[0063] As shown in FIG. 5, the second cutting portion 80 may be implemented as a complete circle. Alternatively, as shown in FIG. 2, the second cutting portion 80 may be implemented as one or more arcs concentric with the vessel inlet 12. Alternatively, the second cutting portion 80 may be implemented as a plurality of cutting circles concentric with each other.

[0064] If the second cutting portion 80 is implemented as one or more arcs, a circle concentric with the vessel inlet 12 has regions rather than the arcs. The regions serve as a bridge to connect inside and outside to each other based on the arcs. Under such configuration, the cover layer 22 can be easily adhered onto the metallic layer 21 after the first cutting portion 70 and the second cutting portion 80 are formed.

[0065] When the sealing member 20 having been coupled to the vessel inlet 12 is removed by the vessel closure, the regions of the circle concentric with the vessel inlet 12, rather than the arcs, may be cut by the cutter 42.

[0066] The second cutting portion 80 may be formed at a position corresponding to the cutter 42, and may be formed between an inner circumferential surface of the vessel inlet 12 and the center of the vessel inlet 12.

[0067] The first cutting portion 70 and the second cutting portion 80 may be formed in lines, or may have widths spaced from each other.

[0068] The first cutting portion 70 and the second cutting portion 80 may be formed at the sealing member 20, especially, the cover layer 22, in various shapes such as a cut shape or a partially-cut groove shape.

[0069] One or more protrusion portions 25 may be

formed so as to protrude more than an outer diameter of the vessel inlet 12.

[0070] The protrusion portions 25 are positioned in the vessel closure 1, and are used when the sealing member 20 is attached to the vessel inlet 12 by an induction method after the vessel closure 1 is coupled to the vessel inlet 12. The protrusion portions 25 may have various shapes.

[0071] When the vessel closure 1 coupled to the vessel inlet 12, the protrusion portions 25 are bent toward an outer circumferential surface of the vessel inlet 12, along the hidden line 25a of FIG. 5, by an inner surface of the vessel closure 1.

[0072] In a state where the body 16 is mounted to the vessel inlet 12, if the metallic layer 26 is heated by a magnetic field of a prescribed strength(in an induction heating manner), or by conduction (in a conduction manner), the adhesive layer 23 melts to cause the sealing member 20 to be attached to the vessel inlet 12.

[0073] It will also be apparent to those skilled in the art that various modifications and variations can be made in the present invention without departing from the spirit or scope of the invention. Thus, it is intended that the present invention cover modifications and variations of this invention provided they come within the scope of the appended claims and their equivalents.

Claims

1. A sealing member for a vessel, the sealing member being coupled to a vessel inlet of a vessel and sealing the vessel sealing member, wherein a vessel closure coupled to the vessel inlet, comprises a body mounted to the vessel inlet; a pressing plate disposed in the body so as to be movable up and down; one or more cutters formed on a lower surface of the pressing plate in a circumferential direction of the vessel inlet, and configured to punch the sealing member when the pressing plate is pressed, and to cut the sealing member when the body is rotated; a locking portion downwardly protruding from the lower surface of the pressing plate, and configured to accommodate the sealing member cut by the cutter in the body; and a connection portion connected between an outer circumferential surface of the pressing plate and an inner circumferential surface of the body, and elastically-transformed such that the pressing plate is movable up and down,
   wherein the sealing member has a disc shape in correspondence to the vessel inlet,
   a first cutting portion is formed at a position corresponding to the locking portion such that the sealing member is easily punched by the locking portion, and a second cutting portion is formed in a circumferential direction at a position corresponding to the cutter such that the sealing member is easily cut by the cutter.

2. The sealing member for a vessel of claim 1, wherein the locking portion is formed at a central part of the vessel inlet.

3. The sealing member for a vessel of claim 2, wherein the locking portion comprises:

   a supporting rod downwardly protruding from a central part of the pressing plate; and one or more locking rods outwardly protruding from an end of the supporting rod.

4. The sealing member for a vessel of any one of claims 1 to 3, wherein the sealing member comprises:

   a metallic layer formed of metallic material, and having an adhesive layer on a lower surface thereof such that the sealing member is adhered onto the vessel inlet; and a cover layer adhered onto the metallic layer,
   wherein the first cutting portion and the second cutting portion are formed only at the cover layer.

5. The sealing member for a vessel of claim 4, wherein the cover layer is not adhered onto the metallic layer at parts including the first cutting portion and the second cutting portion.

6. The sealing member for a vessel of claim 4, wherein the metallic layer comprises aluminum, and the cover layer is formed of any one of paper and synthetic resin.

7. The sealing member for a vessel of claim 4, wherein the first cutting portion has a shape of one or more lines formed to pass through the center of the vessel inlet.

8. The sealing member for a vessel of claim 4, wherein the first cutting portion has any one shape of a polygonal shape and a circular shape each comprising the center of the vessel inlet.

9. The sealing member for a vessel of claim 4, wherein the second cutting portion is implemented as a cutting circle of a circular shape concentric with the vessel inlet.

10. The sealing member for a vessel of claim 4, wherein the second cutting portion is implemented as one or more arcs concentric with the vessel inlet.

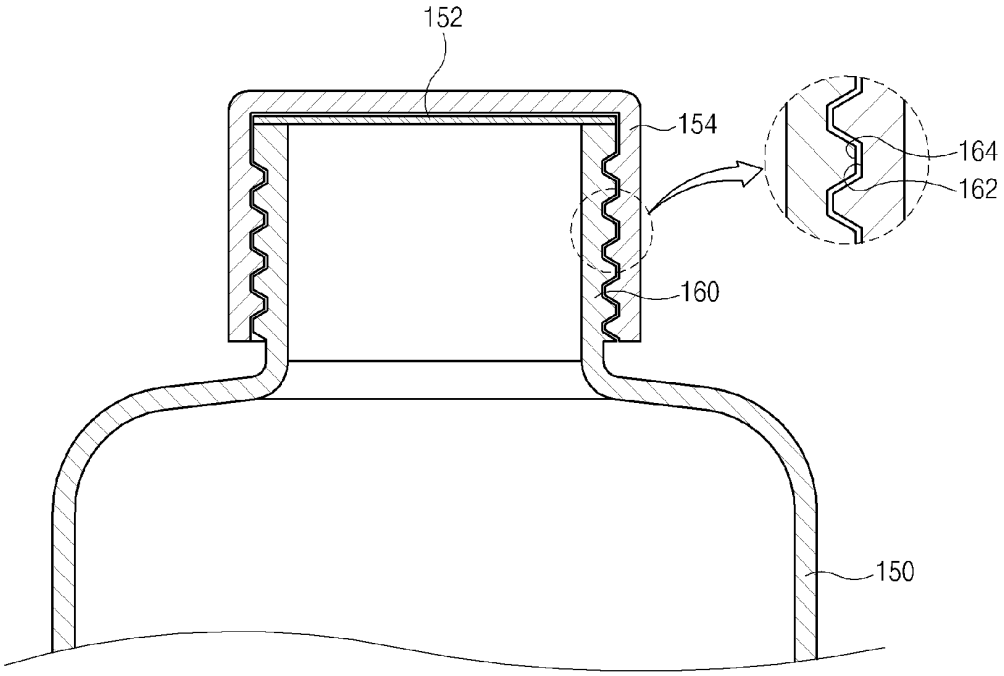
11. The sealing member for a vessel of claim 4, wherein the second cutting portion is formed between an inner circumferential surface of the vessel inlet and the center of the vessel inlet.

12. The sealing member for a vessel of claim 4, wherein

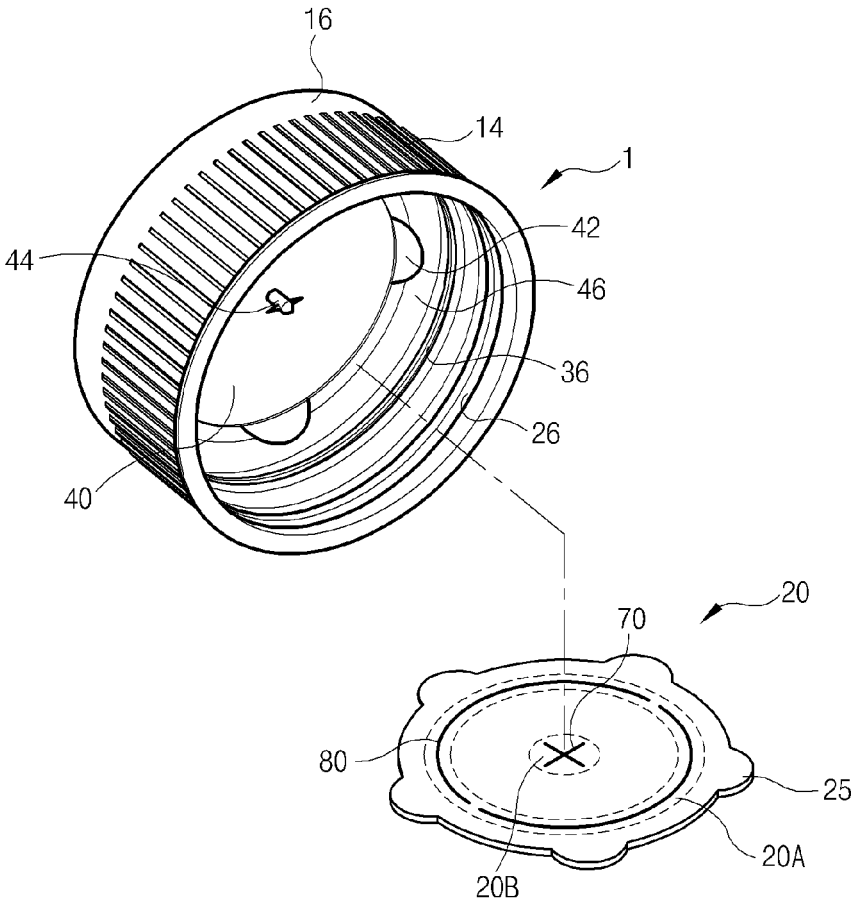
the first cutting portion and the second cutting portion are substantially formed in lines, or have widths spaced from each other.

13. The sealing member for a vessel of claim 4, wherein one or more protrusion portions protrude more than an outer diameter of the vessel inlet.

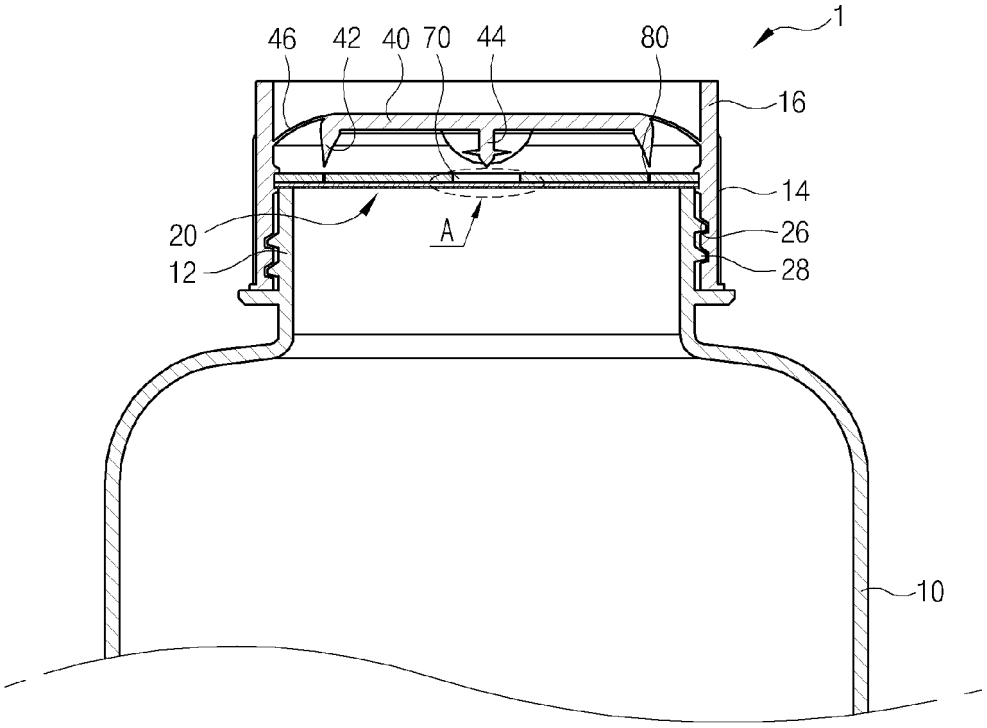
【Figure 1】



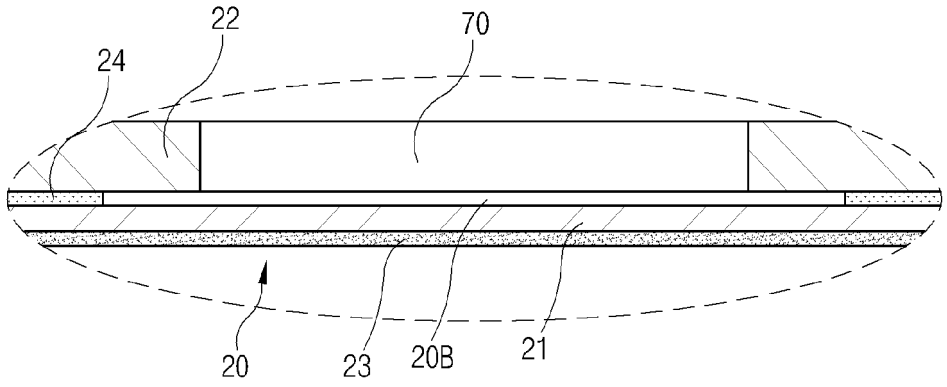
【Figure 2】



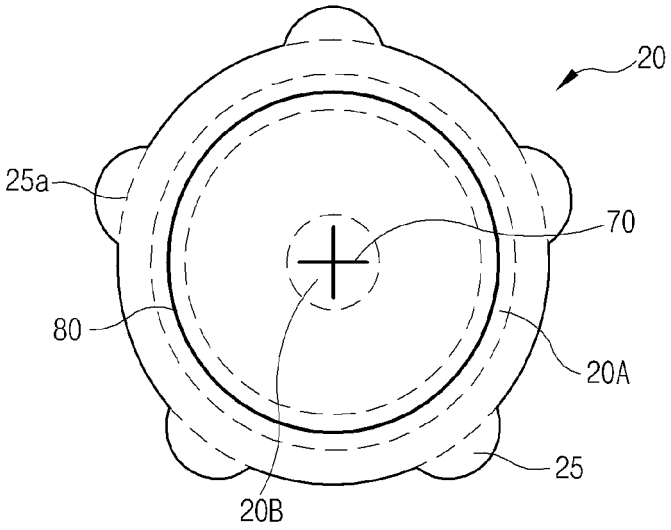
【Figure 3】



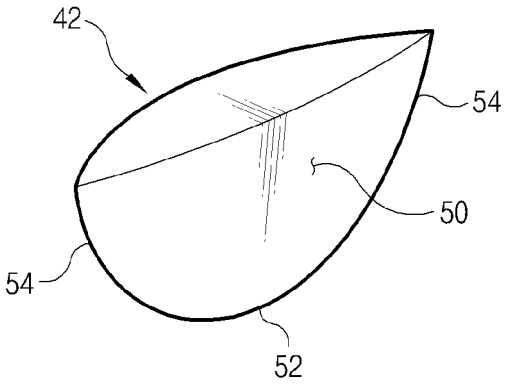
【Figure 4】



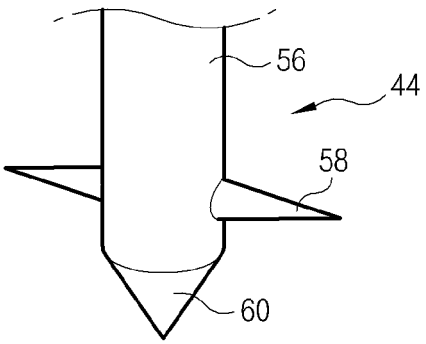
【Figure 5】



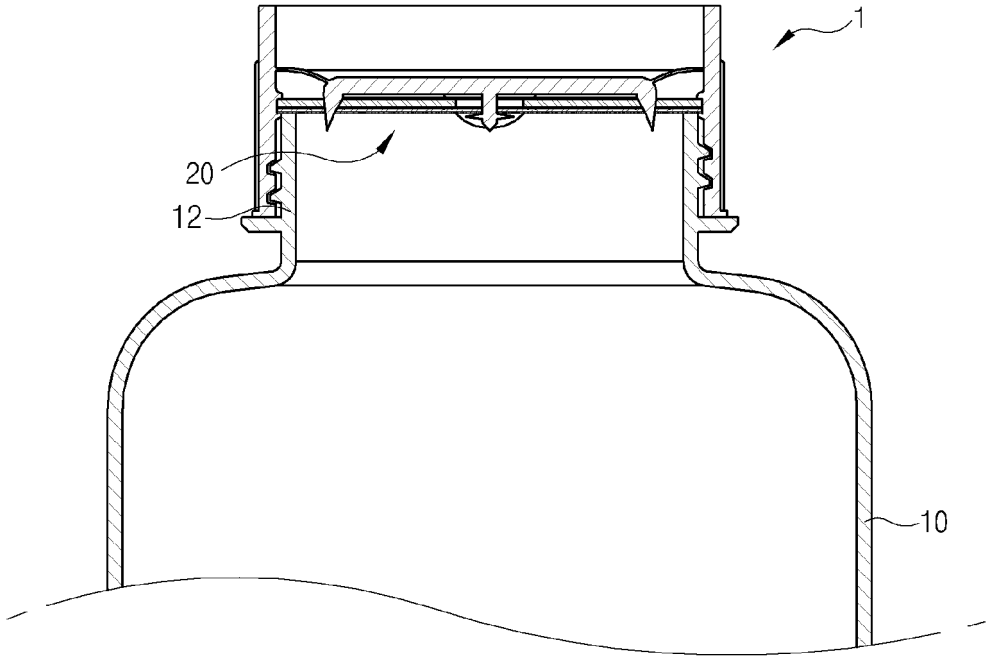
【Figure 6】



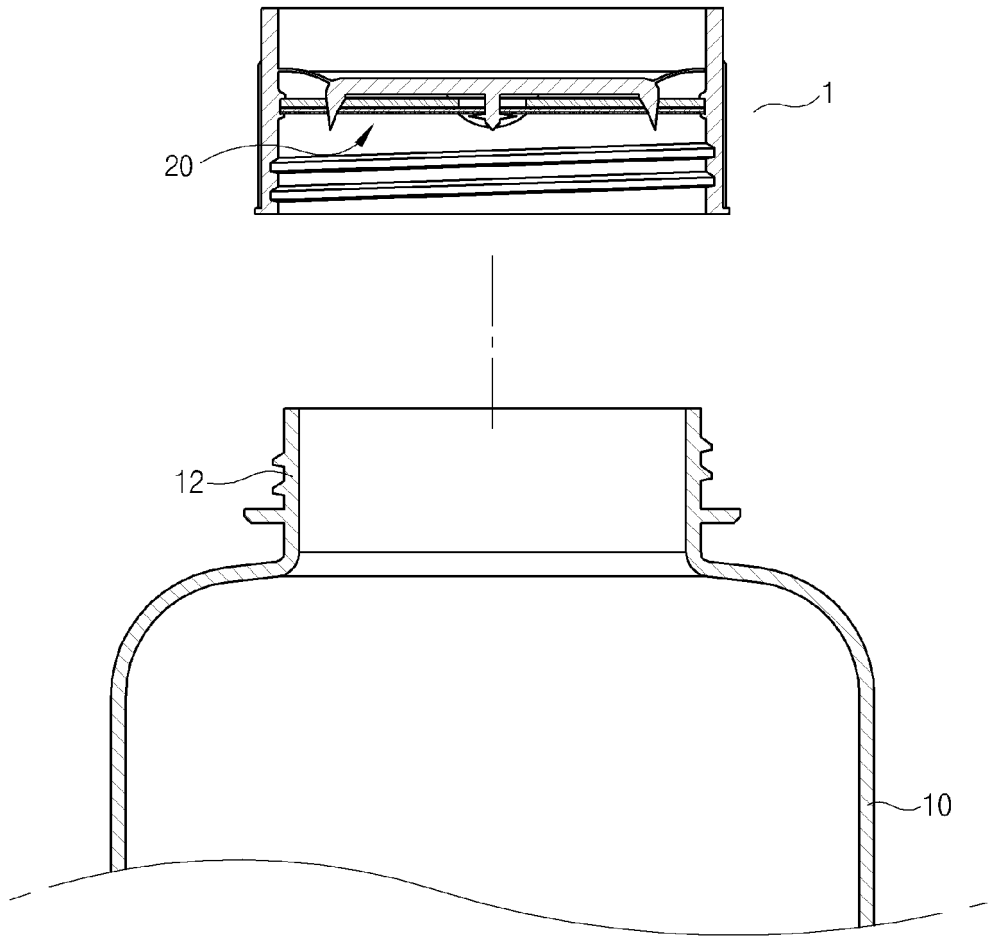
【Figure 7】



【Figure 8】



【Figure 9】



REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- WO 2006062357 A **[0008] [0009] [0010] [0038]**