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

(11) Publication number: **0 024 093**
A1

(12) # EUROPEAN PATENT APPLICATION

published in accordance with Art. 158(3) EPC

(21) Application number: **79900187.0**

(51) Int. Cl.³: **B 65 D 17/28**

(22) Date of filing: **29.01.79**

Data of the international application taken as a basis:

(86) International application number:
PCT/JP79/00021

(87) International publication number:
WO80 01558
International publication date:
07.08.80

(43) Date of publication of application:
25.02.81 Bulletin 81/8

(84) Designated Contracting States:
CH DE FR GB SE

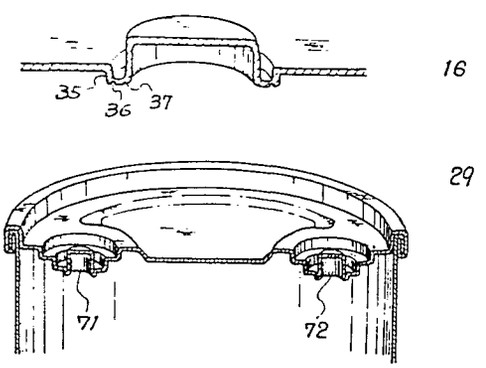
(71) Applicant: **TANIUCHI, Keiji**
6-7, Nishi-Koujiya 2-chome
Ota-ku Tokyo 144(JP)

(72) Inventor: **TANIUCHI, Keiji**
6-7, Nishi-Koujiya 2-chome
Ota-ku Tokyo 144(JP)

(74) Representative: **Bardehle, Heinz, Dipl.-Ing.**
Herrnstrasse 15 Postfach 260251
D-8000 München 26(DE)

(54) **EASY-TO-OPEN LID FOR CONTAINER.**

(57) Improvement in or relating to a container specially constructed to be easily opened only by push-tearing of its lid. A convex portion is formed in a thin sheet member by a deep drawing operation. There are further farmed lines of weakness to facilitate opening of the container to provide a pouring opening, the lines of weakness being partially or wholly arranged around and in proximity of the periphery of the convex portion.



EP 0 024 093 A1

DESCRIPTION

TECHNICAL FIELD

The present invention relates to an easy-opening container lid for containers such as cans of beverages, oils and the like.

BACKGROUND ART

Hitherto, tear-off opening type lids have been used for the containers of the kind described. In fact, most cans of beverages commercially available now incorporate this type of lid.

In the production of this type of container lid, a keen edge having a desired contour is pressed onto a lid blank placed on a lower die and is driven to a certain depth into the blank thereby to form a score having a V-shaped cross-section. In opening the lid, the area surrounded by the score is simply pulled and torn off. This type of container lid, however, requires a considerably large tearing-off force. Therefore, a finger-retaining tab is beforehand attached to the portion to be torn off. In use, the tab is pulled and made upright by a finger and the opening portion is torn off by the finger making use of a lever action.

Recently, the following disadvantages have been pointed out with this type of container lid.

Namely, a keen edge is left on the remaining portion of the container lid after the tear-off of the opening portion. Thus, a person who has happened to step on the container may be injured by the keen torn edge of the container. Also, an infant handling and playing with the opened can may be injured by the keen edge left on the container. Further, a domestic animal who has mistakenly eaten this container may be killed. These accidents have actually been reported.

Further, the keen edge left on the container may injure the lip or finger of the person who drinks from this container.

Another disadvantage is that it is necessary to separately form the finger-retaining tab and to attach the latter to the can as an accessory.

Under these circumstances, there is an increasing demand for an easy opening container lid in which, in contrast to the conventional containers, the opening is formed by pressing the area within the score into the container and the depressed portion of the container lid is not completely separated from the remaining portion of the container lid.

The following examples of container lid have been

proposed up to now to meet the above-described demands.

The first example is shown at Figs. 1 and 2. In this example, the fulcrum point 4 of a tab 3 is attached to the container lid 5 such that one end of the tab 3 is superposed on the opening portion 2 of the container lid defined by a score 1 similar to that of the conventional container lid. In use, the other end of the tab 3 is pulled upward, so that the opening portion 2 is severed along the score 1 and pushed into the container 6. This example, however, is not satisfactory in that it necessitates the tab, and in that the keen edge is left on the can lid, although it permits the opening portion 2 to be left united with the remainder portion of the can lid.

Figs. 3 and 4 show the second example, in which a score 7 similar to that of conventional container lid is formed around fully or partly the opening portion 9. Points 10, 11 are selected and designated on the score 7. In the opening operation, these points are depressed to partially open the container lid and, then, the opening portion 9 is further pressed toward the container 12 thereby to open the container lid.

This example can satisfy the demands for leaving the opened part not fully separated from the remainder portion of the container lid and for the elimination of

the tab. However, this example poses a new problem or danger that the finger may be injured during depression on the score. In addition, the aforementioned problem concerning the keen edge left on the remainder part of the container lid is left unsolved.

Figs. 5 and 6 show a third example in which the opening portion is beforehand punched from the container top 13. Also, depressable members 14 for opening the container lid, having a shape resembling a push-button, are formed separately and joined to the opening portion. The juncture between the depressable members 14 and the opening portion is sealed with an adhesive sealant 15 thereby to attach the depressable members 14 to the container lid. For opening the container lid, the depressable members 14 are depressed into the container 16, so that the sealant 15 is broken to allow the container lid to open.

This example can overcome the above-described problems of the prior art. However, additional problems are raised such as necessity of separate formation of the depressable members, joining of the depressable members to the container lid and so forth. Also, the sealant has to be carefully selected particularly when the container is for foodstuffs.

DISCLOSURE OF THE INVENTION

Under these circumstances, the present invention aims at providing a depression opening type easy-opening container lid supported by a distinguished press work technique and forming technique, thereby to overcome the aforementioned problems of the prior art.

Namely, an object of the invention is to provide an easy-opening container lid in which the opened portion does not have a keen edge thereon when it leaves the remaining part of the container lid and the tab or other attachment is eliminated, and in which the keen edge is not left on the remainder portion of the container lid thanks to the use of specific scores which have already been proposed by the present inventor.

The basic construction of the easy-opening container lid of the invention will be described with reference to Fig. 7 schematically showing an embodiment of the invention. A protrusion 18 is formed by a deep drawing on a single web 17. A score 19 is formed fully or partially around the protrusion to define the opening portion.

As the upper face of the protrusion 18 is depressed, the score is broken into a state shown in Fig. 8. Clearly, the opening portion including the protrusion 18 drops into the container if the score 19 is formed over the entire circumference of the protrusion, but is

left unseparated if the score 19 is formed only partially around the protrusion.

In Figs. 7 and 8, a winding line is used to represent the score 19. This mark, however, does not express the actual form of the score, but represents all types of score 19 symbolically.

In the container lid of the invention, the protrusion 18 is essential for effectively applying the depression force to the score 19 as a shearing force.

If the protrusion is not provided, i.e. if the score is formed merely in a flat plate, to define the opening portion, the depressing force applied to the opening portion is decomposed into a shearing force and a tensile force for tensioning the plate, so that the tearing effect is reduced considerably. However, if the protrusion 18 is formed, the depression force is transmitted through the vertical wall of the protrusion 18 directly to the score to act as shearing force. As will be understood from an explanation which will be given later, the score is formed by work hardening of the plate or by effecting buckling of the plate, so that it exhibits a considerable brittleness or fragility to shearing force.

It is possible to obtain various advantages by modifying the construction of the score, construction of the

container lid around the score and the shape of the protrusion of the described basic arrangement. These modifications are described hereinunder with reference to the accompanying drawings.

Referring first to Fig. 9 showing a first modification, a score line 21 is formed over the entire or part of the periphery of a protrusion 20 by a conventional technique in which a keen cutting edge is pressed against and driven into the flat plate blank to have a V or U-shaped cross-section.

This process may appear simple. However, it is possible to produce by this process an easy-opening container lid which can be opened at a force below 10 Kg which is considered to be the limit exertable by a finger, in case of an aluminum plate which is usually used as the material of beverage cans, if the protrusion is formed to stand up as vertically as possible and if the score is formed as close as possible to the portion from which the protrusion stands up.

The score used in the second to seventh examples is one that has been developed by the present inventor for the tear-off opening type container lid. This score can suitably be used in the present invention because it is torn off by a comparatively small shearing force.

The second modification is shown in Fig. 10. In the easy-opening container lid of this modification, a ridge 22 of a V or U-shaped cross-section is formed and a score is formed such that the tearing takes place at the lower end 23 of the ridge 22.

The container lid in the opened state is shown in Fig. 11. In this case, the opening portion 24 is left in the state bent toward the inside of the container lid, i.e. into the container 26. Therefore, it does not come out of the container lid 25, so that the accidental injury of fingers or the like is avoided.

The easy-opening container lid of the third modification is provided with a score which is formed by a process as shown in Figs. 12 and 13. According to this process, an upwardly directed thin-walled continuous projection or shoulder 27 is formed by effecting an extrusion of a portion corresponding to the score. Then, the continuous shoulder 27 is collapsed at its intermediate portion 29 such that the extruded portion 28 again occupies the same plane as the remainder portion of the container lid, thereby to form the score. This modification offers the same advantage as the second modification and, in addition, can be torn at a smaller force than that required in tearing the score of the second modification.

The easy-opening container lid of the fourth example has a score which is formed by a process as shown in Figs. 14 and 15. According to this process, the portion corresponding to the score is formed by an extrusion to form a thin-walled continuous portion 30 which diverges downwardly and, simultaneously, a V or U-cross-sectioned groove 31 in the upper side of the extruded portion near the inside of the continuous portion 30. Then, the extruded portion is pressed to assume the same plane as the remaining part of the container lid, thereby to bend the continuous portion 30 downwardly and form a V or U-cross-sectioned score groove 33 and also, on the reverse side, a notch 34 which cuts into the plate and toward the score groove 33. This modification offers the same advantage as the third modification.

The easy-opening container lid of the fifth modification is an easy-opening container lid formed by a process shown in Figs. 16 and 17.

According to this process, an annular side wall 35 is formed by an extrusion of the portion corresponding to the score. At the same time, a shallow groove 36 is formed on the reverse side of the container lid at a portion of the latter inside of and close to the side wall 35. Subsequently, the inner portion of the groove 36 is pressed toward the obverse side such that the

inner portion is inverted to the obverse side, thereby to form the score. The score of this modification is an improvement of the score of the second modification, and offers the same advantage as the third modification.

The easy-opening container lid of sixth modification has a score which is formed by a process shown in Fig. 18. According to this process, the protrusion 38 is formed by an extrusion performed by a combination of an upper and a lower dies 39, 40. The upper die 39 is provided with a sharp cutting edge 41 having a contour corresponding to the score, so that the score is formed simultaneously with the extrusion of the protrusion 38. The product of this process is substantially identical to that of the first modification. This sixth modification, however, offers advantages that the score and the protrusion are formed simultaneously in one step and that the container lid can be torn with a reduced force because the side wall of the protrusion 38 has been subjected to stretch drawing.

The seventh modification has a score which is formed by a process as illustrated in Figs. 19 to 20.

According to this process, a V or U-cross-sectioned groove 42 is formed by a sharp edge of a die, at a portion corresponding to the score to be formed. Then, the opening portion 43 at the inside of the groove 42 is

pressed downward by upper and lower dies while spreading the inner peripheral surface of the groove 42.

This modification also exhibits the same advantage as the third modification.

The techniques concerning the scores used in second to seventh modifications belong to the inventions of Patent or Utility Model Applications listed below.

Utility Model Application:

Japanese Utility Model Application 78209/74
(Laid-open No. 7367/76)

Patent Applications:

Japanese Patent Application No. 48721/74
(Laid-open No. 143682/75)

Japanese Patent Application No. 147588/74
(Laid-open No. 74779/76)

Japanese Patent Application No. 75868/74
(Laid-open No. 8082/76)

Japanese Patent Application No. 92297/74
(Laid-open No. 219282/76)

Japanese Patent Application No. 92298/74
(Laid-open No. 219283/76)

As to the techniques concerning the scores used in the second, third and fifth to seventh modifications, Patent applications have been filed abroad claiming

Convention Priorities on the basis of the foregoing applications, as listed hereinbelow.

nations	application No.	registration No.
U.S.A.	557391	3980201
	551591	3993010
	551657	3996867
Great Britain	6923/75	149368
	6872/75	1468121
	6873/75	1500152
Germany	P 2509164.9	under publication
	P 2509493.3	under publication
	P 2509494.4	under publication
Netherland	7507867	under publication
	7507868	under publication
	7505182	
Italy	22821A/75	
	22879A/75	
	22819A/75	
France	7517394	
	7511565	
	7512347	7512347
Belgium	157270	830163
	157269	830162
	155941	828579
Switzerland	8687/75	602426

		8686/75	595903
		5600/75	590157
	Sweden	7507556-4	
		7507555-6	
5		7505020-3	
	Spain		213.265
			438.678
			436.478
	Canada	224751	1031277
10		224097	under publication
		224096	under publication
	Mexico	159254	
		159255	
		157732	
15	Brazil	5247/75	
		5246/75	
		3061/75	
	Australia	79464/75	under publication
		79625/75	under publication
20		79624/75	under publication
	Korea	2148	
		845	
		1034	
	Formosa	6411032	9375

25 (January. 1979)

Another important advantage of the easy-opening container having scores of second to seventh modifications is that the expected function of the score can be achieved not only when aluminum is used as the material but also when the material is iron.

Conventionally, the easy-opening container lids have been made of aluminum, even when the container lid is of tear-off opening type, due to a reason concerning the formation of the score. This inconveniently raises the production cost of the can. If the aluminum can lid is used in combination with a can barrel made of iron, it is necessary to completely separate the a lid from the can barrel for the reuse of aluminum and iron. This separation is made only through troublesome work and, therefore, the reuse of aluminum and iron has been practically impossible. This problem, however, is overcome by the present invention which does not exclude the use of iron as the material of the container lid.

The invention can be carried out in various forms by adopting various constructions of the portion of container lid around the score, as described hereinunder.

The first form is shown in Fig. 21. In this form, the periphery 47 of the portion around the score 45 is extruded toward the protrusion 48, so that the portion in which the score 45 is formed constitutes the bottom of

a groove 46. In this case, the inside diameter of the outer side wall 49 of the groove 46 is so selected as to be smaller than the flank of the finger. By so doing, enhanced safety is ensured because the finger is retained on the periphery 47 and never contacts the torn edge, even when the finger is pressed against the protrusion 48 to tear the score 45.

The second form is a partial improvement of the first form, and is shown in Fig. 22.

In this second form, the whole or a part of the periphery of an extruded portion 51 around a groove 50 is extruded to have a height greater than the maximum height of the protrusion. By so doing, the protrusion is sheltered from an unintentional extraordinary force applied to the container lid.

The third form is shown in Fig. 23. In this form, a flange portion 55 is formed by folding thin-walled portion around the area of score 54 onto the latter. In this case, after the removal of opening portion 56 containing the protrusion, the torn edge of the remainder portion of the container lid is formed by the bent portion of the thin web, so as to ensure enhanced safety.

The invention can be carried out in various forms by adopting various shapes of the protrusion, as described hereinunder.

The first form is shown in Fig. 24. In this form, the protrusion 57 has an inclined frusto-conical shape and a flattened upper surface 58.

Generally speaking, the scores of the invention cannot be torn at once even when the protrusion is depressed. Rather, the tearing starts locally and is then propagated to other portions of the score. In the first form shown in Fig. 24, the depression force exerted on the flat surface 58 on the protrusion 57 is effectively applied to the portion of the score where the angle of side wall 60 of the protrusion 57 to the container lid 59 approximates a right angle, so that the tearing initially takes place at this portion of the score. Once the tearing has taken place locally, the tearing is propagated to adjacent portions successively even by a comparatively small depression force. In consequence, the maximum effort or finger force required for the opening operation is reduced. Also, it becomes possible to form a comparatively large opening.

Fig. 25 shows a second form. In this form, the protrusion has an oval shape. In the opening operation, the lid of the protrusion is successively depressed from one end 62 to the other end 63, so that the same advantage as the first form can be obtained. It is also possible to incline the upper face of the protrusion, so as to

facilitate depression by the finger for the convenience's sake.

Fig. 26 shows a third form. In this form, the protrusion 64 is recessed at its lid surface as at 65. This form can apply to all forms and modifications heretofore described, and offers an advantage that the finger is well retained by this recess during the depression.

The technique of the invention makes it possible to provide an easy-opening container lid having the following feature. This easy-opening container lid is shown in Figs. 27 and 28. In this easy-opening container lid, a first score 67 is formed to surround a protrusion 66 wholly or partially, and a second score 68 is formed around the first score 67. In opening the container lid, at first the protrusion 66 is depressed to tear the first score and, then, the opening portion 69 is caught and pulled outwardly to cause a tearing along the second score thereby to form a larger opening 70. This arrangement is quite advantageous in that, although the first opening is small, it is possible to form a much larger second opening.

BRIEF DESCRIPTION OF THE DRAWINGS

Figs. 1 to 6 show conventional depression tearing-off type easy-opening container lids in which Figs. 1, 3 and 5 are perspective views, while Figs. 2, 4 and 6 are

sectional views of essential parts;

Figs. 7 and 8 are a cross-sectional view and a perspective view of an essential part of basic arrangement of an embodiment of the invention;

Figs. 9 to 23 are sectional views of essential parts of different modifications of the invention;

Figs. 24 to 28 are sectional views and perspective views of various forms of carrying out the invention; and

Fig. 29 is a sectional view and a perspective view of the best mode for carrying out the invention.

In these Figures, the reference numerals denote the following parts or members.

1.. score, 2.. opening portion, 3.. tab, 4.. fulcrum, 5.. container lid, 6.. container, 7.. score, 8.. container top, 9.. opening portion, 10,11.. portions of score, 12.. can, 13.. container lid, 14.. depressable member, 15.. adhesive sealant, 16.. container, 17.. thin plate, 18.. protrusion, 19.. score, 20.. protrusion, 21.. score, 22.. ridge, 23.. lower end, 24.. torn-off portion, 25.. container lid, 26.. interior of container, 27.. continuous shoulder, 28.. extruded portion, 29.. intermediate portion, 30.. continuous portion, 31.. groove, 32.. extruded portion, 33.. score, 34.. notch, 35.. annular side wall, 36.. groove, 37.. inner part of groove, 38.. protrusion, 39.. upper

die, 40.. lower die, 41.. sharp cutting edge, 42.. groove, 43.. opening portion, 44.. inner peripheral surface of groove, 45.. score, 46.. groove, 47.. portion around score, 48.. protrusion, 49.. outer side wall, 50.. groove, 51.. extruded portion around groove, 52.. area around extruded portion around groove, 53.. top surface of extrusion, 54.. score, 55.. flange portion, 56.. opening portion, 57.. protrusion, 58.. upper surface of protrusion, 59.. container lid, 60.. side wall, 60.. portion of score, 62,63.. both ends of protrusion of oval shape, 64.. protrusion, 65.. lid surface of protrusion, 66.. protrusion, 67.. score, 68.. second score, 69.. opening, 70.. opening, 71,72.. opening portions.

BEST MODE FOR CARRYING OUT THE INVENTION

The present invention can be carried out optimumly and practically in the form as illustrated in Fig. 29. In this form, technical ideas as set forth in claims 6, 9, 10 and 15, not to mention claim 1 as described in the Disclosure of the Invention, are embodied. Namely, in this form, the container lid is provided with two openings 71 and 72. In use, both opening portions 71, 72 are torn and opened. One of the openings is used as the outlet of the content, while the other is used for air inlet port. This container lid can be

used most suitably for containers of beverages, oils and so forth.

INDUSTRIAL APPLICABILITY

The invention has a wide industrial applicability, because the container lid of the invention finds wide use such as container lids of containers intended for containing beverages, oils and powdered or granular materials which are now widely utilized.

WHAT IS CLAIMED IS:

1. An easy-opening container lid having an opening portion including a protrusion formed by a deep drawing in a single thin plate and a score formed in said plate wholly or partially around the periphery of said protrusion, whereby said container lid is opened as said score is broken by a depressing force exerted on said protrusion.

2. An easy-opening container lid as claimed in claim 1, wherein said score is formed to have a V or U-shaped cross-section by pressing and driving a sharp cutting edge into said thin plate from the upper side of the latter.

3. An easy-opening container lid as claimed in claim 1, wherein said thin plate is provided with a ridge of a V or U-shaped cross-section, the lower end of said ridge constituting said score.

4. An easy-opening container lid as claimed in claim 1, wherein said score is formed by the steps of: extruding the whole or a part of area around said protrusion so as to form a thin-walled upwardly directed continuous portion, and collapsing said thin-walled continuous portion at its mid portion by pressing the extruded portion such that the latter occupies the same plane as the remainder part of said container lid.

5. An easy-opening container lid as claimed in claim 1, wherein said score is formed by the steps of: forming a downwardly diverging thin-walled continuous portion and, at the same time, a V or U-cross-sectioned groove on the outer peripheral surface of said continuous portion or in the upper surface of an extruded portion inside said continuous portion, by an extrusion effected on the area wholly or partly surrounding said protrusion; and pressing the extruded portion so that it occupies the same plane again thereby to bend said continuous portion downwardly to form a V or U-cross-sectioned score groove and, at the reverse side, a notch which cuts into toward said score groove.

6. An easy-opening container lid as claimed in claim 1, wherein said score is formed by the steps of: effecting an extrusion on the area wholly or partly surrounding said protrusion to form an annular side wall and, at the same time, a shallow groove in the reverse side in the vicinity of the inner side of said side wall; and pressing the inner side portion of said groove toward the obverse side thereby to invert said inner portion of said side wall toward the obverse side.

7. An easy-opening container lid as claimed in claim 1, wherein said score is formed simultaneously with the formation of said protrusion by upper and lower dies,

by means of a sharp cutting edge attached to the portion of said upper die corresponding to said score.

8. An easy-opening container lid as claimed in claim 1, wherein said score is formed by the steps of: forming a V or U-cross-sectioned groove by driving a sharp cutting edge attached to an upper die into an area wholly or partly surrounding said protrusion; and effecting an extrusion on said groove by a cooperation of said upper die and a lower die while spreading the inner peripheral surface of said groove.

9. An easy-opening container lid as claimed in claim 1, wherein the portion in which said score is formed is extruded in the same direction as said protrusion such that said portion constitutes a bottom of a groove.

10. An easy-opening container lid as claimed in claim 9, wherein whole or a part of the area surrounding an extruded portion around said groove is projected to a height greater than the maximum height of said protrusion.

11. An easy-opening container lid as claimed in claim 1, wherein a flange portion is formed on the portion where said score is formed, said flange portion being formed by folding the portion of said thin plate into two layers.

12. An easy-opening container lid as claimed in claim

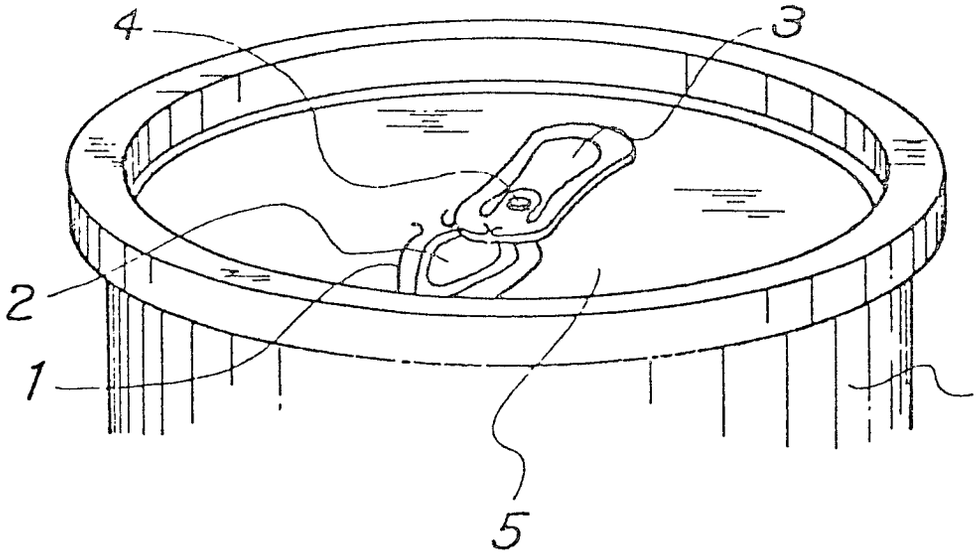
1, wherein said protrusion has an inclined frusto-conical shape with a flat lid surface.

13. An easy-opening container lid as claimed in claim 1, wherein said protrusion has an oval shape.

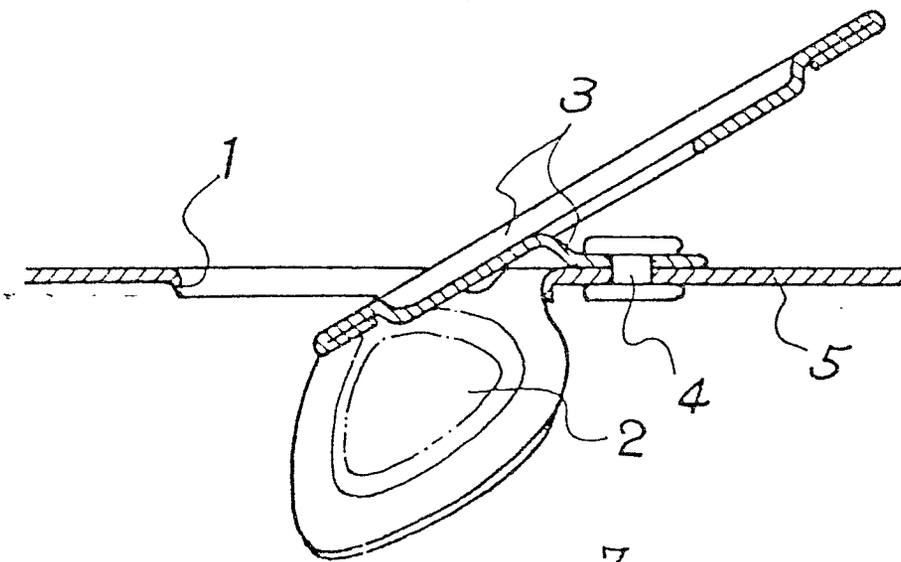
14. An easy-opening container lid as claimed in claim 13, wherein said protrusion has an inclined lid surface.

15. An easy-opening container lid as claimed in any one of claims 1 to 14, wherein a recess is formed in the lid surface of said protrusion.

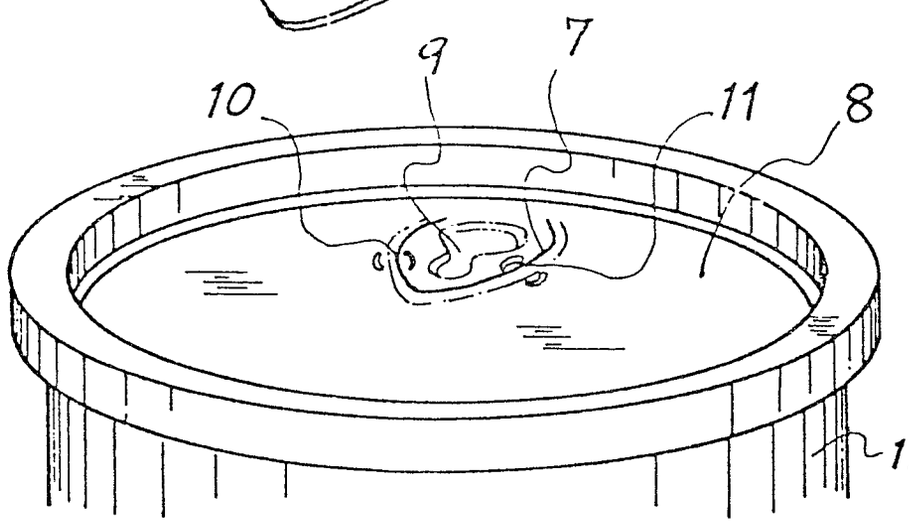
16. An easy-opening container lid as claimed in any one of claims 1 to 14, characterized by further comprising a second score of a desired diameter formed around said score, whereby, as said protrusion is depressed, said score is torn and broken to form an opening piece and, as said opening piece is pulled outwardly, the area within said second score is removed as said second score is torn and broken.



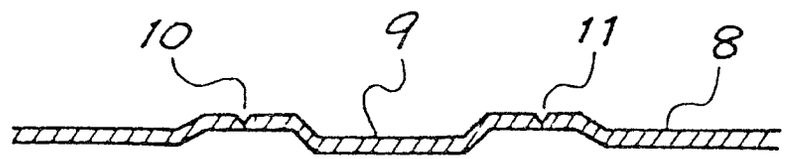
1



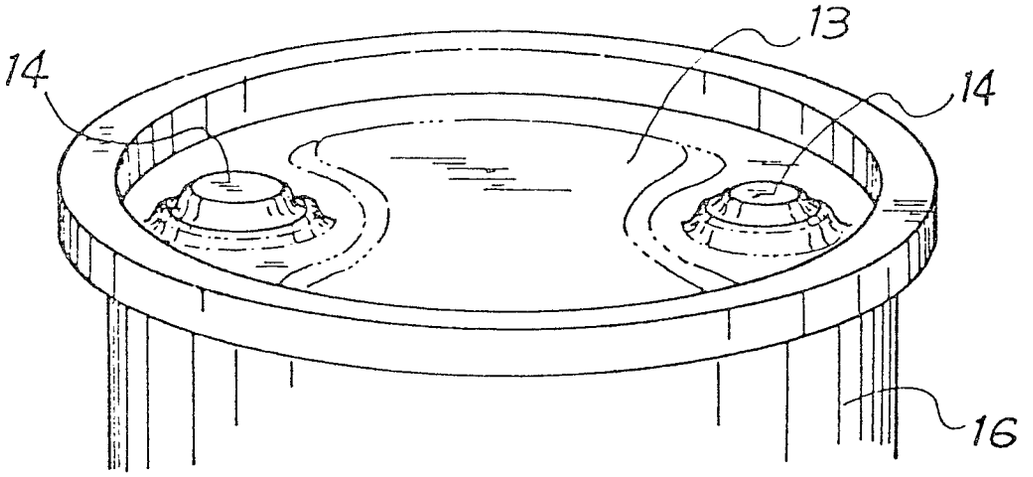
2



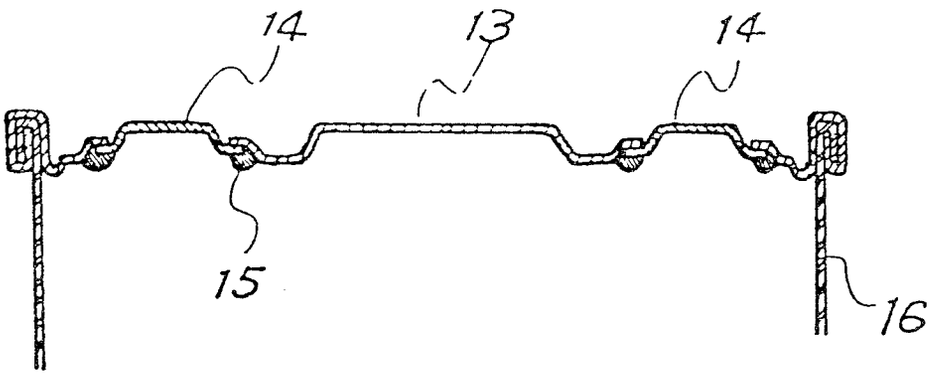
3



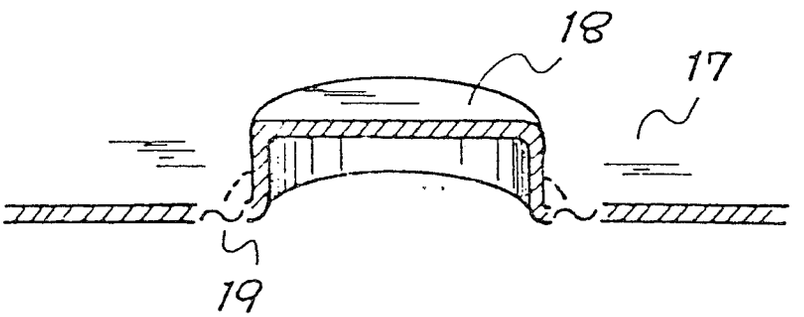
4



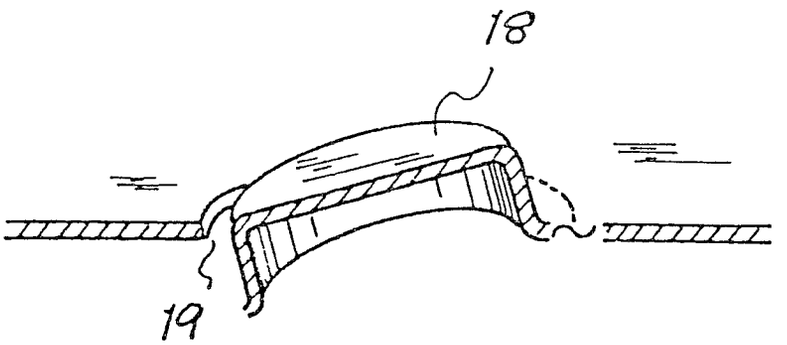
5



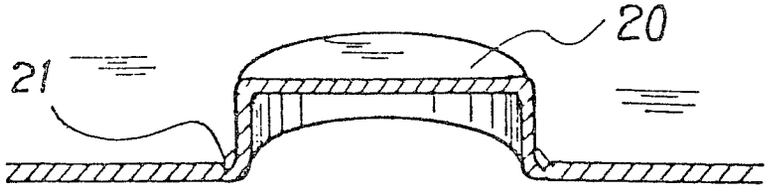
6



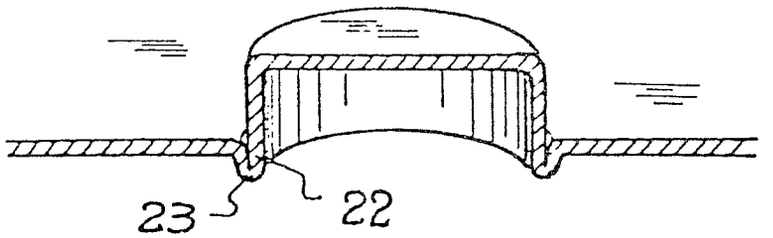
7



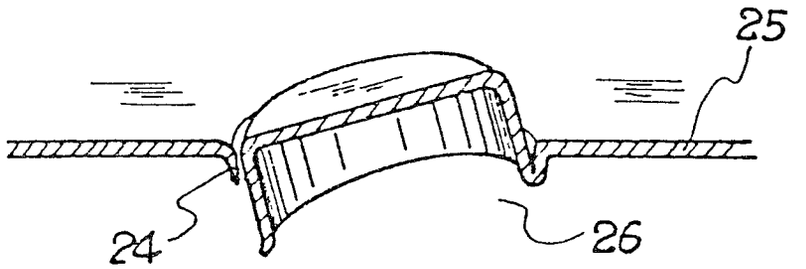
8



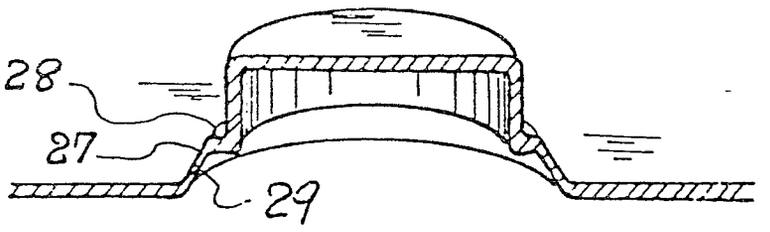
9



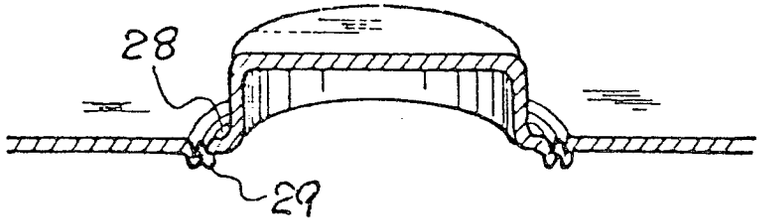
10



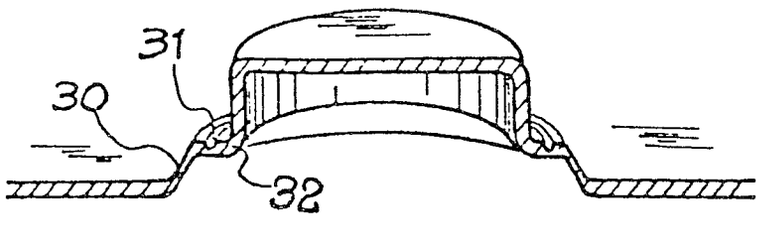
11



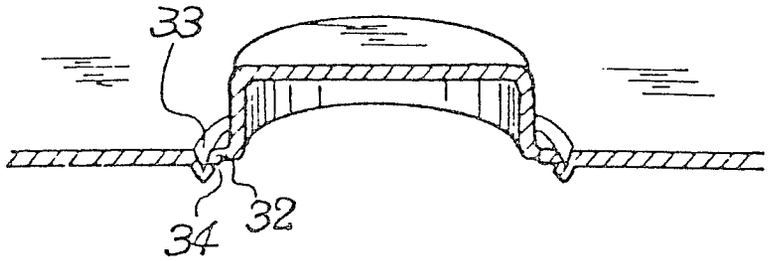
12



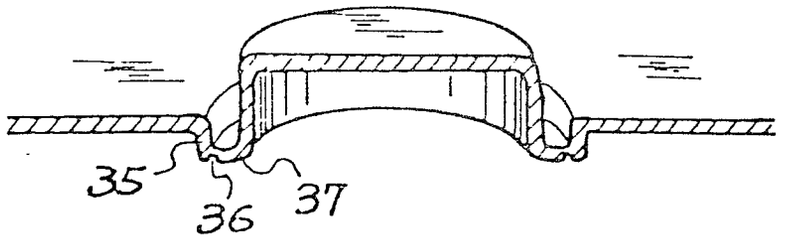
13



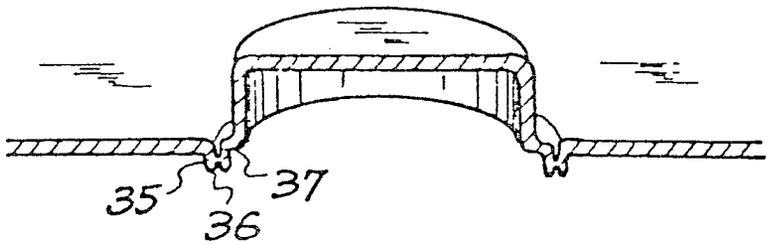
14



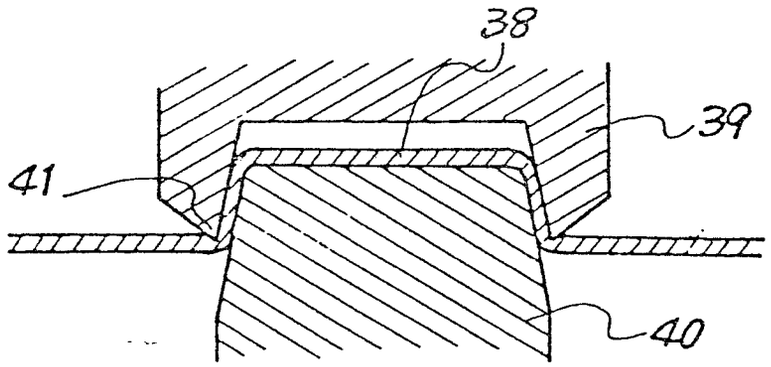
15



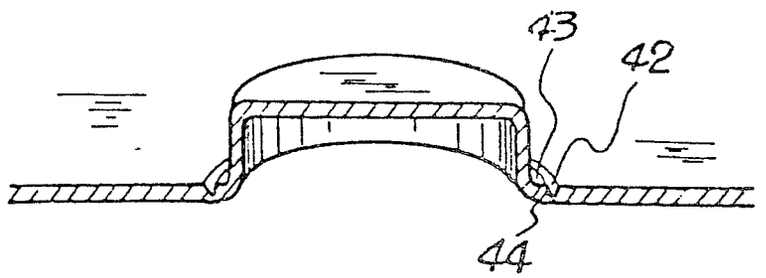
16



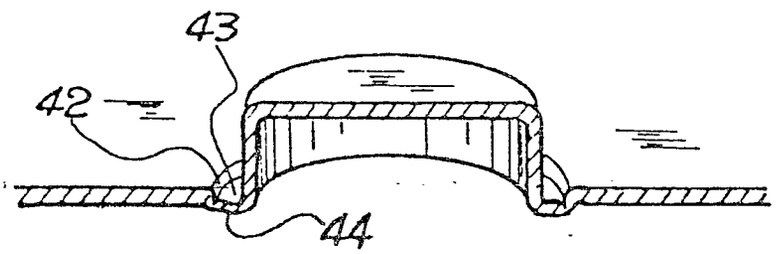
17



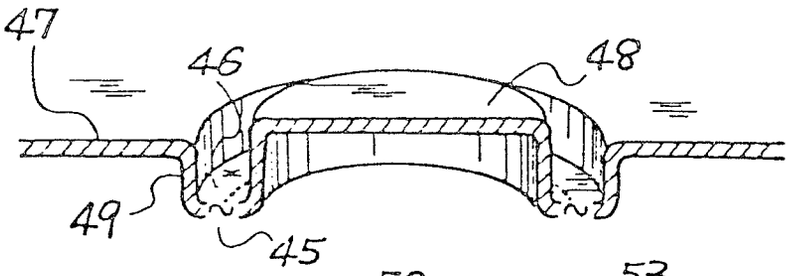
18



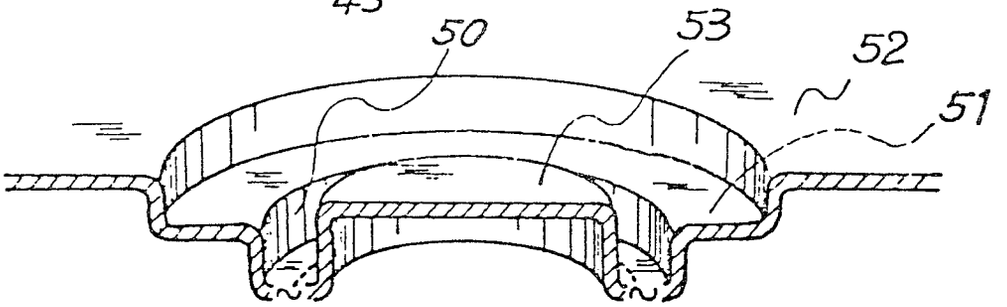
19



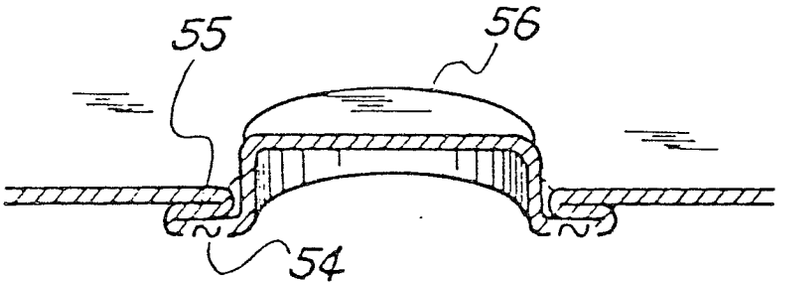
20



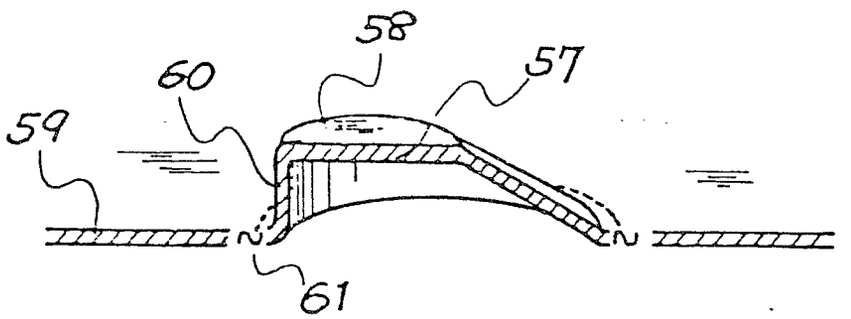
21



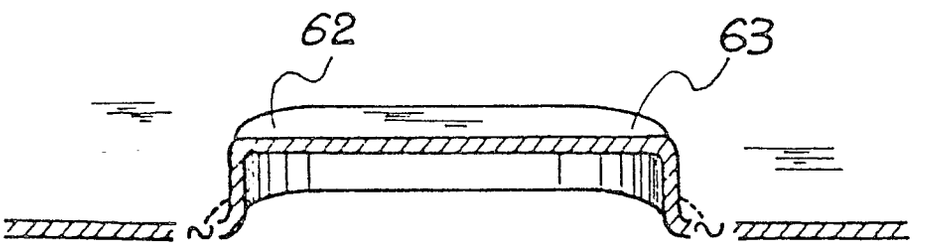
22



23

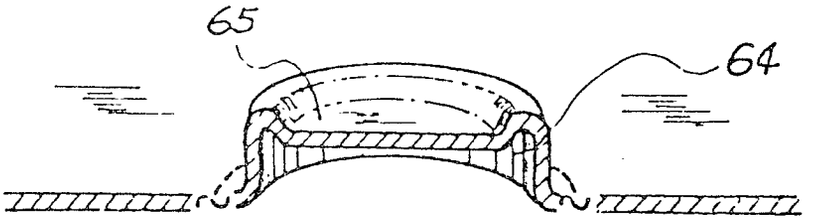


24

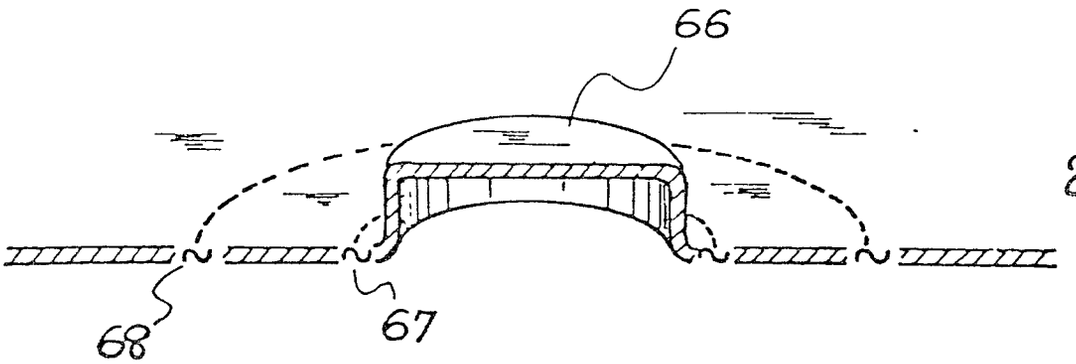


25

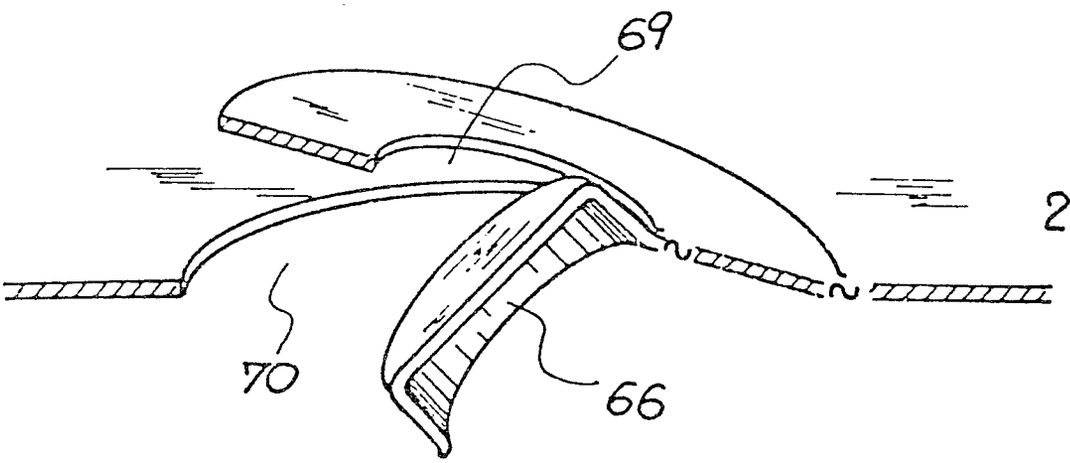
6 / 6



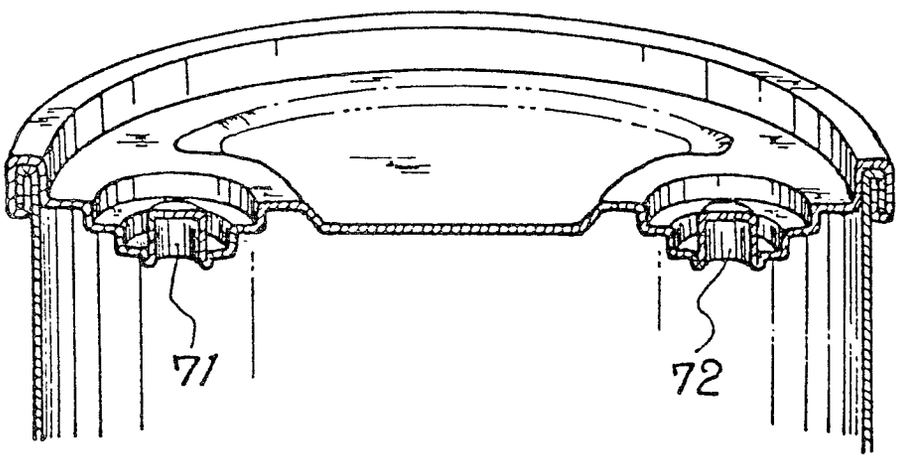
26



27



28



29

INTERNATIONAL SEARCH REPORT

International Application No PCT/JP79/00021

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) [3]

According to International Patent Classification (IPC) or to both National Classification and IPC

B 65 D 17/16

II. FIELDS SEARCHED

Minimum Documentation Searched [4]

Classification System	Classification Symbols
I P C	B 65 D 17/16

Documentation Searched other than Minimum Documentation to the Extent that such Documents are included in the Fields Searched [5]

III. DOCUMENTS CONSIDERED TO BE RELEVANT [14]

Category *	Citation of Document, [15] with indication, where appropriate, of the relevant passages [17]	Relevant to Claim No. [18]
X	JP, A, 49-52081, 1974- 5-21	1 - 3
X	JP, A, 50-26684, 1975- 3-19	1 - 3
X	JP, A, 53-65187, 1978- 6-10	1 - 3
X	US, A, 3993010, 1976-11-23	4
X	JP, A, 50-143682, 1975-11-19	4
X	US, A, 3996867, 1976-12-14	7
X	JP, A, 49-111784, 1974-10-24	9
X	JP, A, 50-125885, 1975-10- 3	9
X	JP, A, 51-8081, 1976- 1-22	9
X	JP, A, 51-100883, 1976- 9- 6	9
X	JP, A, 51-63786, 1976- 6- 2	11
X	JP, A, 51-90684, 1976- 8- 9	11
X	JP, A, 53-109789, 1978- 9-25	11

* Special categories of cited documents: [16]

"A" document defining the general state of the art

"E" earlier document but published on or after the international filing date

"L" document cited for special reason other than those referred to in the other categories

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but on or after the priority date claimed

"T" later document published on or after the international filing date or priority date and not in conflict with the application, but cited to understand the principle or theory underlying the invention

"X" document of particular relevance

IV. CERTIFICATION

Date of the Actual Completion of the International Search [2]	Date of Mailing of this International Search Report [2]
March 2, 1979 (02.03.79)	March 26, 1979 (26.03.79)
International Searching Authority [1]	**Signature of Authorized Officer [20]**
Japanese Patent Office	