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

(11) EP 1 657 172 A1

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 158(3) EPC

(43) Date of publication:
17.05.2006 Bulletin 2006/20

(21) Application number: **04771983.6**

(22) Date of filing: **20.08.2004**

(51) Int Cl.:
B65D 30/16 *(1980.01)*

(86) International application number:
PCT/JP2004/012022

(87) International publication number:
WO 2005/019051 (03.03.2005 Gazette 2005/09)

(84) Designated Contracting States:
FR

(30) Priority: **22.08.2003 JP 2003299316**

(71) Applicant: **Hosokawa Yoko Co., Ltd.**
Tokyo-to 102-0084 (JP)

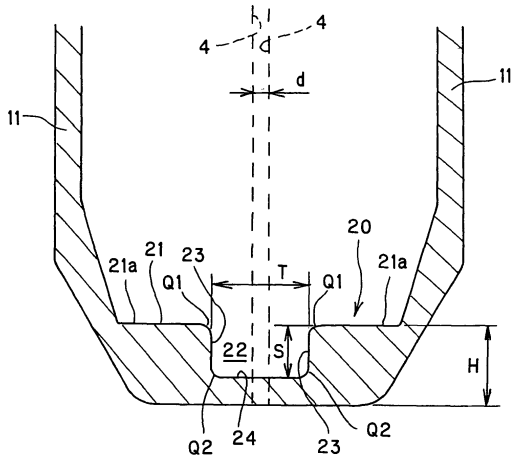
(72) Inventors:
- **SHIRAI, Kazuyoshi,**
  c/o Hosokawa Yoko Co., Ltd.
  Tokyo 1020084 (JP)
- **SHINOHARA, Tomonari,**
  c/o Hosokawa Yoko Co., Ltd.
  Tokyo 1020084 (JP)
- **IGOTA, Shoji,**
  c/o Ajinomoto Co., Inc.
  Kawasaki-shi, Kanagawa 2108681 (JP)

(74) Representative: **Grünecker, Kinkeldey,**
Stockmair & Schwanhäusser
Anwaltssozietät
Maximilianstrasse 58
80538 München (DE)

(54) SEAL STRUCTURE OF GUSSETTED BAG AND GUSSETED BAG

(57) There is provided a seal structure of a gusset bag having an improved impact-proof performance. In a gusset bag provided with a pair of flat surface portions and a pair of side surface portions, a seal portion 20 sealing an opening is formed by bonding inner surfaces of the flat surface portions 2 and inner surfaces of the side surface portions 3, respectively, with a predetermined depth along end edges thereof on the side of the opening of the gusset bag in a state in which the side surface portions are folded inward along folding lines 4, and an impact absorbing seal portion Q 1 is formed on an outer side of the folded lines 2 above intersection points between an inner edge of the seal portion 20 and the folded lines 4.

FIG. 4



EP 1 657 172 A1

Description

Technical Field

[0001] The present invention relates to a seal structure of a gusset bag for preventing a gusset bag from being broken by an impact load.

Background Technology

[0002] Conventionally, there is used a gusset bag, for accommodating food, condiment, detergent, shampoo or the like, having a pair of flat surface portions and a pair of side surface portions which are disposed between the flat surface portions so as to connect the side edges thereof and folded inside at their central portions with folding lines. Such gusset bag changes in its shape such that the side surface portions is changed to a folded state to an opened state, so that such gusset bag is superior in that the bag has a large dimension in the thickness direction when the bag is filled up with an inner content.

[0003] However, in such gusset bag, in which the flat surface portions and the side surface portions are sealed with each other and upper and lower (i.e., top and bottom) portions are sealed, a stress tends to be concentrated at portions at which the folded line portions of the side surface portions and the sealed inner edge portions intersect each other. Because of such reason, the gusset bag is dropped down in a state that the gusset bag is charged with the inner content and the side surface portions are widened, i.e., opened, the gusset bag is broken at portions at which the folded line portions of the side surface portions and the sealed inner edge portions intersect each other due to an impact load.

[0004] In order to obviate such defect, in a gusset bag disclosed in the following patent publication 1, so-called a detour seal portion is formed by recessing the sealed portions downward of the gusset bag at the portions at which the folded line portions of the side surface portions and the sealed inner edge portions intersect.

[0005] Patent Publication 1: Japanese Patent Laid-open Publication No. 2002-173149.

Disclosure of The Invention

Problems to be solved by The Invention

[0006] However, the invention disclosed in the Japanese Patent Laid-open Publication No. 2002-173149 aims to provide a gusset bag to be used at a time of temporarily accommodating an undesired substance when thrown away and does not assume a case that the impact load is applied to the gusset bag. Further, the gusset bag disclosed therein is of a type having a wide distance between the folded lines of the side surface portions when folded and does not refer to a gusset bag having a narrow distance therebetween, and accordingly, the technology disclosed in this publication cannot be simply applied as it is.

[0007] Then, the present invention aims to provide a seal structure of a gusset bag having a superior anti-impact (impact-proof) property, for which it is needed to accommodate an inner content for a long time, to which an impact load may be applied for the content accommodated period, and particularly, in which the folded line of the side surface portions has narrow distance therebetween.

Means for solving The Problem

[0008] In order to achieve the above object, the present invention provides a seal structure of a gusset bag comprising a pair of flat surface portions opposing to each other and a pair of side surface portions disposed between the flat surface portions so as to connect respective side deges of the flat surface portions, the side surface portions being folded inward along folding lines, and having an opening formed by the flat surface portions and the side surface portions,
wherein the opening side is closed by a seal portion which is formed by bonding inner surfaces of the flat surface portions and inner surfaces of the side surface portions, respectively, with a predetermined depth along end edges thereof on the side of the opening of the gusset bag in a state in which the side surface portions are folded inward along the folding lines, and an impact absorbing seal portion is formed by bonding the inner surfaces of the flat surface portions and the inner surfaces of the side surface portions, respectively, above intersection points between an inner edge of the seal portion and the folded lines.

[0009] In the gusset bag mentioned above, it may be desired that a non-seal portion is formed at portions of the folding lines by depressing the inner edge of the seal portion toward an outer edge side of the seal portion so as to straddle both the folded lines formed to the paired side surface portions, and the inner edge of the seal portion is formed such that an outer side portion of the gusset bag than the folded lines is positioned above the intersection point between the inner edge of the seal portion and the folded lines so as to form the outer side portion as the impact absorbing seal portion.

[0010] The non-seal portion may be formed to have a recessed shape so as to provide a rectangular shape and the inner edge of the seal portion is formed by connecting, in a circular-arc shape, portions on both sides of the non-seal portion and a portion corresponding to the inside edge of the non-seal portion.

[0011] In addition, it may be also desired that the non-seal portion has a depth of a length at least 1/3 with respect to a width thereof.

[0012] Further, the above problem can be also solved by applying the seal structure mentioned above to a gusset bag provided with a spout, and more specifically, the following structure may be adopted.

[0013] There is provided a seal structure of a gusset bag provided with a spout member comprising a bag body composed of a pair of flat surface portions opposing to each other and a pair of side surface portions disposed between the flat surface portions so as to connect respective side edges of the flat surface portions, the side surface portions being folded inward along folding lines, and a spout provided for an opening formed to a top portion of the bag body for taking out a content charged inside the bag body through the opening,
wherein a bottom side opening formed to a lower portion of the bag body is formed with a seal portion which is formed by bonding inner surfaces of the flat surface portions and inner surfaces of the side surface portions, respectively, with a predetermined depth along end edges thereof on the side of the bottom opening of the gusset bag in a state in which the side surface portions are folded inward along the folding lines, and an impact absorbing seal portion is formed by bonding the inner surfaces of the flat surface portions and the inner surfaces of the side surface portions, respectively, above intersection points between an inner edge of the seal portion and the folded lines.

[0014] In this gusset bug provided with the spout member, it may be desired that a non-seal portion is formed at portions of the folding lines by depressing the inner edge of the seal portion toward an outer edge side of the seal portion so as to straddle both the folded lines formed to the paired side surface portions, and the inner edge of the seal portion is formed such that an outer side portion of the gusset bag than the folded lines is positioned above the intersection point between the inner edge of the seal portion and the folded lines so as to form the outer side portion as the impact absorbing seal portion.

[0015] The non-seal portion may be recessed so as to provide a rectangular shape and the inner edge of the seal portion is formed by connecting, in a circular-arc shape, portions on both sides of the non-seal portion and a portion corresponding to the inside edge of the non-seal portion.

[0016] It may be also desired that the non-seal portion has a depth of a length at least 1/3 with respect to a width thereof.

Effects of The Invention

[0017] According to the present invention, in a gusset bag which is charged with an inner content and widened in its thickness direction, when an impact load is applied to such gusset bag, the impact load is received in a dispersed manner to the impact absorbing seal without transferring the impact load to the intersection point between the folded line and the inner edge of the seal portion. Since the force is dispersed to the impact absorbing portion, stress can be reduced and the breaking of the gusset bag can be prevented effectively.

[0018] In addition, since the non-seal portion is formed by recessing the inner edge of the seal portion toward the outer edge side of the seal portion so as to straddle both the folded lines formed to the paired side surface portions, the seal portion for sealing the opening and the impact absorbing seal portion can be both formed by using only a pair of seal bars.

[0019] Furthermore, with the seal structure of the gusset bag, by forming the non-seal portion so as to be depressed or recessed to provide a rectangular shape and by forming the inner edge of the seal portion by connecting, in a circular-arc shape, portions on both sides of the non-seal portion and a portion corresponding to the inside edge of the non-seal portion, the impact load applied can be effectively dispersed entirely to the circular-arc shaped portion to thereby reduce the stress. In addition, in the seal structure of the gusset bag, by forming the non-seal portion so as to have a depth of the length at least 1/3 of the width thereof, an excellent impact-proof performance can be achieved.

Brief Description of The Drawings

[0020]

[FIG. 1] FIG. 1 is a perspective view showing a using condition of a gusset bag having a seal structure according to one embodiment of the present invention.

[FIG. 2] FIG. 2 is a perspective view showing a condition before sealing a portion to be opened (opening portion) of the gusset bag shown in FIG. 1.

[FIG. 3] FIG. 3 is a view showing a heat sealed condition of the gusset bag of FIG. 1.

[FIG. 4] FIG. 4 is a view showing a seal structure for sealing an opening portion formed to a lower portion of the gusset bag.

[FIG. 5] FIG. 5 is an illustration of a lower portion of the bag at a time of the gusset bag being charged with an inner content and having the seal structure shown in FIG. 4.
[FIG. 6] FIG. 6 is an illustration of a lower portion of a conventional gusset bag charged with an inner content.
[FIG. 7] FIG. 7 is a view showing a seal structure of a gusset bag according to another embodiment of the present invention.
[FIG. 8] FIG. 8 is a view showing a seal structure of a gusset bag according to a further embodiment of the present invention.
[FIG. 9] FIG. 9 is an illustration showing one example of a seal structure applied to a test sample.
[FIG. 10] FIG. 10 is an illustration showing another example of a seal structure applied to a test sample.
[FIG. 11] FIG. 11 is an illustration showing a further example of a seal structure applied to a test sample.
[FIG. 12] FIG. 12 shows a state after the testing.
[FIG. 13] FIG. 13 is a perspective view showing a gusset bag provided with a spout.
[FIG. 14] FIG. 14 is a view showing a seal structure of the gusset bag provided with the spout shown in FIG. 13.

Explanation of Reference Numerals

1, 30, 50, 70	gusset bag
2, 31, 51, 72	flat surface portion
3, 32, 52, 73	side surface portion
4, 33, 53, 74	folding (folded) line
20, 40, 60, 80	seal (sealed) portion
21, 41, 60a, 81	inner edge
22, 42, 82	non-seal portion
61	impact absorbing seal portion
90	spout (member)

Best Mode for embodying The Invention

[0021] Hereunder, a best mode of the present invention will be described with reference to the accompanying drawings.
[0022] FIG. 1 represents a gusset bag 1 according to one embodiment of the present invention and shows the gusset bag 1 charged with the inner content, and FIG. 2 is a perspective view showing a state of the gusset bag 1 before being charged with the inner content. FIG. 3 shows heat seal portions 11 and 20 formed to the gusset bag 1.
[0023] This gusset bag 1 is composed of a pair of flat surface portions 2, 2 opposing to each other, and a pair of side surface portions 3, 3 disposed between the paired flat surface portions and connected to the side edges thereof.
[0024] The flat surface portions 2, 2 are composed of laminated films and have a shell portion 5 and a spout portion (discharge portion) 9 formed integrally with the shell portion 5 at an upper portion thereof. A portion between the upper (i.e. top) portion of the shell portion 5 and an intermediate portion of the shell portion extending downward form the upper portion is formed such that both side edge portions thereof are arranged in parallel with each other with a predetermined distance therebetween, and on the contrary, a lower (i.e. bottom) portion 6 of the shell portion 5 is formed obliquely so as to be tapered finely toward the lowermost portion of the shell 5. Lower end edges of the shell portion 5 are formed to be flat. The shell portion 5 has both shoulder portions 8 which provide gentle curve lines from both side edge portions toward a central spout portion 9.
[0025] On the other hand, the spout portion 9 is a portion serving as a discharge port at a time of discharging the content charged in the gusset bag 1 and projects upward from the upper portion of the shell portion 5 at the central portion in the width direction of the flat surface portions. The spout portion 9 is provided with a seal portion 10 formed by sealing the upper end of the spout portion 9 at a time of being heat sealed.
[0026] The side surface portions 3, 3 are formed form the laminated films substantially the same shape of the flat surface portions 2, 2 and include the shell portion 5 and the spout portion 9. The side surface portions 3, 3 is provided with folding (folded) lines 4, 4 at the central portions along the width direction (i.e., thickness direction of the gusset bag 1) thereof, and along the folding lines 4, 4, the side surface portions 3, 3 are folded inward toward the central portion of the gusset bag 1.
[0027] These flat surface portion 2, 2 and side surface portions 3, 3 are, as shown in FIG. 3, heat sealed at and along their side edge portions as heat seal portions 11, ---, 11. The heat seal portions 11, ---, 11 have constant width. The seal portion 10 formed to the upper end of the spout portion 9 is also formed by heat sealing both the side edges of the flat surface portions 2, 2 so as to tightly seal the upper end of the spout portion 9. FIG. 2 shows the state in which the side edges of the flat surface portions 2, 2 are thus heat sealed and the upper end seal portion 10 is also heat sealed. With

reference to FIG. 2, the content is charged into the gusset bag 1 through an opening A formed to the lower portion thereof, and after the charging of the content, the opening A formed to the lower portion of the gusset bag 1 is tightly sealed in a state as shown in FIG. 1.

[0028] FIG. 4 shows details of a seal portion 20 sealing the lower end portion of the gusset bag 1.

[0029] As shown in FIG. 4, when the gusset bag 1 is folded along the folding lines 4, 4 of the side surface portions 3, 3 in a state charged with no inner content, the folded lines 4, 4 face each other with a small distance d in a considerably close state. In such a gusset bag 1, the seal portion 20 shown in FIG. 4 has a seal structure capable of reducing a stress concentration to the lower portion of the gusset bag 1.

[0030] The seal portion 20 is formed with a predetermined depth H from the lower end edge of the gusset bag 1 at which the opening A is formed. The seal portion 20 has a recessed non-seal portion 22 formed by recessing or depressing an inner edge 21 at the central portion in the width direction of the gusset bag 1. This non-seal portion 22 is formed so as to straddle both the folded lines 4, 4 of the side surface portions 3, 3 so that the folded lines 4, 4 are disposed inside the non-seal portion.

[0031] The non-seal portion 22 is formed by depressing, substantially in a rectangular shape, the inner edge 21 of the seal portion 20 towards the outer edge side. The inner edge 21 of the seal portion 20 includes side portions 21a, 21a on both sides of the non-seal portion 22 and circular-arc portions Q1, Q1 connecting the side portions 21a, 21a and portions 23, 23 perpendicular to these portions 21a, 21a and positioned inside the non-seal portion 22. In addition, likely, a portion 24 corresponding to the bottom portion and the portions 23, 23 are also connected through circular-arc corner portions Q2, Q2 of the non-seal portion 22. However, with respect to these portions Q2, Q2, the inner edge 21 of the seal portion 20 may be formed so that the portions 24 corresponding to the bottom portion is perpendicular to the portions 23, 23 corresponding to the inside portions thereof.

[0032] In the gusset bag of this embodiment, the side surface portions 3, 3 are folded so that the distance between the folded lines 4, 4 is about 3 mm. As mentioned, in a gusset bag in which the side surface portions 3, 3 are folded so that the folded lines 4, 4 are close at the distance within about 5 mm, it will be better that the width T and the depth S of the non-seal portion 22 have a ration (S/T) of at least 1/3.

[0033] According to the formation of the seal portion 20, mentioned above, sealing the lower portion of the gusset bag 1, as shown in FIG. 5, an external force (a force externally applied) can be absorbed by the side portions 21a, 21a on both sides of the non-seal portion 22 and the connection portions Q1, Q1 perpendicular to the side portions 21a, 21a and connected to the portions 23, 23 corresponding to the inner portion of the non-seal portion 22 without transferring the external force to intersection points between the inner edge of the seal portion and the folded lines 4, 4. The connection portions Q1, Q1 thus serves as impact absorbing seal portion and the function thereof will be explained in comparison with a conventional one provided with no such non-seal portion with reference to FIG. 6.

[0034] In the conventional gusset bag illustrated in FIG. 6, since the non-seal portion is not provided, the inner edge 21 of the seal portion 20 are interested with the folded lines 4, 4 only at points P, P. Because of this reason, when the gusset bag 1 drops, the impact is concentrated on these points P, P.

[0035] On the other hand, when the gusset bag 1 is provided with the non-seal portion, the impact load applied to the gusset bag 1 can be absorbed by the connection portions Q,1, Q1 before the impact load is applied to, i.e. reaches, the intersection points to the folded lines 4, 4. These connection portions Q1, Q1 are, as shown in FIG. 5, formed to the respective flat portions with respect to two portions snapping the non-seal portion 22, and therefore, four connection portions Q1 are totally formed. For this reason, the impact load, which is received at two intersection portions P, P, extremely closing to each other, in the conventional gusset bag, can be dispersed into four portions. Furthermore, these connection portions Q1 are formed so as to provide a circular-arc shape having some length, not a point, so that the stress due to such impact load can be effectively dispersed, thus the gusset bag being prevented from being broken.

[0036] In the embodiment described above, the disclosure was made with reference to the gusset bag having a pair of folded lines of the side surface portions so as to be close to each, the present invention is not limited to such a structure.

[0037] FIG. 7 shows anther gusset bag to which a seal structure is applied according to another embodiment of the present invention. The gusset bag 30 of the embodiment shown in FIG. 7 has a wide distance d1 between folded lines 33, 33 when folding side surface portions 32, 32 are folded inside.

[0038] The gusset bag 30 has a seal portion 40 having a predetermined depth from a lower end edge of the gusset bag 30 at which an opening is formed, and the seal portion 40 is formed with a recessed non-seal portion 42 by depressing the inside edge toward the lower end edge. The non-seal portion 42 is formed such that the folded lines 33, 33 of the side surface portions 32, 32 are disposed inside the non-seal portion 42, that is, the non-seal portion 42 straddle both the folded lines 33, 33.

[0039] The non-seal portion 42 is formed by depressing, substantially in a rectangular shape, the inner edge 41 of the seal portion 42 toward the outer edge side. The inner edge 41 of the deal portion 40 includes side portions 41a, 41a on both sides of the non-seal portion 42 and circular connection portions Q3, Q3 connecting the side portions 41a, 41a and portions 43, 43 perpendicular to these portions 41a, 41a and positioned inside the non-seal portion 42. In addition, likely, a portion 44 corresponding to the bottom portion and the portions 43, 43 are also connected through corner portions

Q4, Q4 of the non-seal portion 42 as being intersecting points. Further, although the connecting points Q4, Q4 are thus not formed into a circular shaper, they may be formed so as to provide connecting circular-arc corner portions.

[0040] With the gusset bag 30 according to this embodiment, the seal portions positioned on both sides of the non-seal portion 42 serves as the impact absorbing seal portion. That is, the impact load applied to the gusset bag 30 charged with the content, when it drops, can be absorbed by the seal portions positioned on both sides of the non-seal portion 42, i.e., connection portions Q3, Q3 before the impact load is applied to, i.e. reaches, the intersection points between the folded lines 33, 33 and the seal portion 40.

[0041] These two connection portions Q3, Q3 are formed to the respective flat portions 31, 31, totally four connection portions. For this reason, the impact load can be dispersed into four portions and the stress can also be effectively reduced. Furthermore, these connection portions Q3, Q3 are formed so as to provide a linear circular-arc shape having a some length, not a point, so that the stress due to such impact load can be largely reduced in comparison with the point connection arrangement.

[0042] Further, the width and depth of the non-seal portion 42 of this embodiment may be preferably decided in accordance with the form or shape of the gusset bag.

[0043] FIG. 8 shows a seal structure of a gusset bag 50 according to a further embodiment of the present invention.

[0044] The gusset bag 50 shown in FIG. 8 includes another impact absorbing seal portions 61, 61 independently of a seal portion 60 for closing an opening formed by flat surface portions 51, 51 and side surface portions 52, 52. The gusset bag 50 has a structure substantially the same in itself as that of the gusset bag shown in FIG. 1 and is composed of a pair of opposing flat surface portions 51, 51 and a pair of side surface portions 52, 52 which are disposed between the flat surface portions 51, 51 so as to connect both side edge portions thereof. The gusset bag 50 also has a lower portion tapered gradually finely toward the lower end portion, and the lower end edges are formed to be flat.

[0045] The seal portion 60 closing the opening is formed along the peripheral edge of the gusset bag 50 with a predetermined width. The impact absorbing seal portions 61, 61 are formed by sealing inner surface portions of the flat surface portions 51, 51 and inner surface portions of the side surface portions together in an elliptical shape. These impact absorbing seal portions 61, 61 are formed respectively above the intersecting points of the folded lines 53, 53 and the inner edge 60a of the seal portion 60 and on the outer side of the gusset bag 50 than the folded lines 53, 53. Further, although, in this embodiment, the impact absorbing seal portions 61, 61 have the elliptical shape, the present invention is not limited to such elliptical shape and any other shape may be adopted, such as circular shape, as far as stress is not concentrated.

[0046] With the gusset bag 50 according to this embodiment, the impact load applied to the gusset bag 50 charged with the content, when it drops, can be absorbed by the seal portions 61, 61 and does not reach the intersection points between the folded lines 53, 53 and the inner edge 60a of the seal portion 60.

[0047] These two impact absorbing seal portions 61, 61 are formed to the respective flat portions 51, 51, totally four connection portions. For this reason, the impact load can be dispersed to these four portions and the stress can also be effectively reduced. Furthermore, since these impact absorbing portions 61, 61 are formed in the elliptical shape, the stress can be largely reduced in comparison with the case that the impact load is received on points, not lines, and accordingly, the gusset bag 50 can be effectively prevented from being broken at the impact absorbing seal portions.

[Experimental Example]

[0048] It was confirmed that an anti-impact (impact-proof) performance is improved in what extent through the following drop test.

[0049] This drop test was performed using four types of test samples, each of which was charged with 500ml water, and then left for more than 24 hours at a temperature of less than 5 degrees. FIG. 9 is a test sample having a seal shape of the type "a". This test sample of the type "a" has the seal portion 20 having a width of about 10mm from the lower end edge thereof and has the non-seal portion 22, at the lateral central portion of the gusset bag 1, having a width T of about 15mm and a depth S of about 5mm. FIG. 10 is a test sample having a seal shape of the type "b". This test sample of the type "b" has the seal portion 20 having a width H of about 15mm from the lower end edge thereof and has the non-seal portion 22, at the lateral central portion of the gusset bag 1, having a width T of about 15mm and a depth S of about 10mm. FIG. 11 is a test sample having a seal shape of the type "c". This test sample of the type "c" has the seal portion 20 having a width of about 10mm from the lower end edge thereof and has the non-seal portion 22, at the lateral central portion of the gusset bag 1, having a width T of about 8mm and a depth S of about 5mm.

[0050] Each of these test samples has a following layer structure:

PET (polyethylene terephthalate) #12 / Print Layer / DL (dry lamination) /AL (aluminum) 7 μm / DL /ONY (oriented nylon) # 15 / DL / LLDPE (linear low density polyethylene) #80

The tests were performed in the following manner. That is, five gusset bags were dropped respectively from positions of height levels of 80cm, 120cm, 100cm and 150cm respectively in the following three conditions of: a transverse

state in which the side surface portions 3, 3 are positioned vertically; a horizontal state in which the flat surface portions 2, 2 are positioned vertically; and a vertical state in which the gusset bag 1 is positioned vertically in its longitudinal direction. The drop test result was made based on the observation of broken ones, i.e., how many gusset bags in the respective five bags were broken. Further, with respect to the conventional test bags, the drop test was performed only in the transverse state in which the side surface portions of the test bags are vertically positioned.

[0051] Table 1 shows the test result of the drop tests.

Table 1

Test Sample	Content	Seal Shape	Dropping Condition	Dropping Height (cm)			
				80	100	120	150
A	Water (500ml)	Conventional	Transverse	0/5	0/5	0/5	3/5
B		Type a	Horizontal (Vertical)	0/5	0/5	0/5	0/5
C		Type a	Transverse	0/5	0/5	0/5	1/5
D		Type b	Horizontal (Vertical) (Vertical)	0/5	0/5	0/5	0/5
E		Type b	Transverse	0/5	0/5	0/5	0/5
F		Type b	*Transverse	0 / 5	0/5	0/5	3/5
G		Type c	Horizontal (Vertical)	0/5	0/5	0/5	0/5
H		Type c	Transverse	0/5	0/5	0/5	0/5
I		Type c	*Transverse	0/5	0/5	0/5	5/5
Mark *: in the test, the test samples were dropped in the state in which the upper side opening of the gusset bag was bent and closed with a tape.							

[0052] In the Table 1, the denominator represents the number of the test samples and the numerator represents the number of the broken test samples. As shown in the Table 1, in the case that the test samples were dropped down from the height level of 80cm and 100cm, any one of the test samples was not broken. However, in the case that the test samples were dropped down form the height level of 120cm, one of five test samples of the conventional gusset bags was broken, and on the contrary, the test samples having the improved seal structure were not broken at all.

[0053] Furthermore, in the case that the test samples were dropped down from the height level of 150cm, three of five samples of the conventional bags were broken. On the contrary, with the test samples having the improved seal structure, only one test sample to the type "a" was broken and other test samples were not broken at all. Further, with the test samples F and I (mark *), in which the upper side opening of the gusset bag 1 is bent and closed by using a tape, three and five test samples were broken. This is considered that adverse condition was created by closing the upper openings of the gusset bags in these samples in comparison with the other test samples.

[0054] In the observation of the test samples after the drop test, as shown in FIG. 12, the connection portions Q1, Q1 between the portions 23, 23 corresponding to the inside portions of the non-seal portion 22 and the inner edge portions 21a, 21a of the seal portion positioned on both the sides of the non-seal portion 22 are expanded in a circular-arc shape.

[0055] As is apparent from the above drop test result, by forming the non-seal portion 22 by depressing the inner edge of the seal portion 20 toward the outer edge side at the position corresponding to the folded lines 4, 4 formed to the side surface portions 3, 3, the impact load is dispersed to the connection portions Q1, Q1 and absorbed thereto, thereby achieving the excellent impact-proof performance.

[0056] The seal structures mentioned above can be applied to the gusset bags including an inner bag of a bag-in-box in which the bag is accommodated in a box, a gusset bag provided with a spout in which a spout (spout member) is mounted to an upper portion of the bag body, and a zippered gusset bag in which a zipper is attached to an inner surface of the flat surface portion for re-sealing the opening of the bag body. FIGs. 13 and 14 show a gusset bag 70 provided with a spout member having a seal structure according to an embodiment of the present invention.

[0057] The gusset bag 70 provided with the spout member is composed of a gusset bag body 71 and a spout member 90 mounted to an upper portion of the bag body 71. This bag body 71 is formed from a pair of opposing flat surface portions 72, 72 and a pair of side surface portions 73, 73 disposed between the paired flat surface portions and connected to the side edges thereof. The flat surface portions 72, 72 are composed of flat film members, and the side surface portions 73, 73 are formed with folding (folded) lines 74, 74 at their central portions, the side surface portions 73, 73 being folded inward toward the central portion of the bag body along the folding lines 74, 74.

[0058] The flat surface portions 72, 72 and side surface portions 73, 73 are heat sealed at their side edge portions so as to provide a heat portion 79 with a predetermined width. The bag body 71 is also formed, as like as the gusset bag 70 shown in FIG. 1, such that both the side edge portions are parallel with each other with a predetermined distance therebetween from the upper portion to the lower intermediate portion thereof. On the other hand, a lower portion 76 of the bag body 71 is formed from oblique sides tapered toward the lower end portion, and a lower end edge 77 is made flat. Furthermore, both shoulder portions 78, 78 of the bag body 71 provide gentle curves from both side edges toward the central portion thereof. At the shoulder portions 78, 78, the flat surface portions 72, 72 and the side surface portions 73, 73 are heat sealed together with the heat seal portion 79 at points, respectively, thereby the flat surface portions 72, 72 being bonded together.

[0059] The bag body 71 is further provided, at its lower portion, with a seal structure for reducing stress concentration as shown in FIG. 14.

[0060] A seal portion 80 constituting such seal structure is formed to a lower end edge of the bog body 71 having lower end opening with a depth H. This seal portion 80 is formed with a recessed non-seal portion 82 formed by depressing an inner edge 81 toward the lower end edge of the bag body 71 at the central portion in the width direction thereof. This non-seal portion 82 is formed so as to straddle two folded lines 74, 74 formed to the side surface portions 73, 73 so that the folded lines 74, 74 are disposed inside the non-seal portion 82. Since the gusset bag 70 provided with the spout member 90 employs the seal structure mentioned above, substantially the same impact-proof performance as improved functions and effects mentioned hereinbefore can be achieved.

[0061] The spout member 90 includes a straw 92 and an open/close cap 91 for opening or closing a mouth 93 of the straw 92. The straw 92 has a lower portion inserted inside the bag body 70 and attached, at an upper portion, to the upper end of the bag body 71. In the spout member 90, when the open/close cap 91 is rotated in a clockwise direction as viewed from an upper side thereof, the cap 91 is screw-engaged with the straw 92 and close the mouth 93, and on the contrary, when rotated in a counter-clockwise direction, the cap 91 is disengaged and removed from the straw 92.

[0062] Furthermore, it is to be noted that the seal structure for sealing the lower opening of the gusset bag 70 provided with the spout member 90 is not limited to one shown in FIG. 14, and the seal structure described with reference to FIG. 7 or 8 may be applied to this gusset bag 70 provided with the spout.

Claims

1. A seal structure of a gusset bag comprising a pair of flat surface portions opposing to each other and a pair of side surface portions disposed between the flat surface portions and connected to respective side edges of the flat surface portions, the side surface portions being folded inward along folding lines, and having an opening formed by the flat surface portions and the side surface portions,
   wherein the opening side is closed by a seal portion which is formed by bonding inner surfaces of the flat surface portions and inner surfaces of the side surface portions, respectively, with a predetermined depth along end edges thereof on the side of the opening of the gusset bag in a state in which the side surface portions are folded inward along the folding lines, and an impact absorbing seal portion is formed by bonding the inner surfaces of the flat surface portions and the inner surfaces of the side surface portions, respectively, above intersection points between an inner edge of the seal portion and the folded lines.

2. The seal structure of a gusset bag according to claim 1, wherein a non-seal portion is formed at portions of the folding lines by depressing the inner edge of the seal portion toward an outer edge side of the seal portion so as to straddle both the folded lines formed to the paired side surface portions, and the inner edge of the seal portion is formed such that an outer side portion of the gusset bag than the folded lines is positioned above the intersection point between the inner edge of the seal portion and the folded lines so as to form the outer side portion as the impact absorbing seal portion.

3. The seal structure of a gusset bag according to claim 2, wherein the non-seal portion is recessed so as to provide a rectangular shape and the inner edge of the seal portion is formed by connecting, in a circular-arc shape, portions on both sides of the non-seal portion and a portion corresponding to the inside edge of the non-seal portion.

4. The seal structure of a gusset bag according to claim 2 or 3, wherein the non-seal portion has a depth of a length at least 1 / 3 with respect to a width thereof.

5. A seal structure of a gusset bag provided with a spout comprising a bag body composed of a pair of flat surface portions opposing to each other and a pair of side surface portions disposed between the flat surface portions and connected to respective side edges of the flat surface portions, the side surface portions being folded inward along

folding lines, and a spout provided for an opening formed to a top portion of the bag body for taking out a content inside the bag body through the opening,
wherein a bottom side opening formed to a lower portion of the bag body is formed with a seal portion which is formed by bonding inner surfaces of the flat surface portions and inner surfaces of the side surface portions, respectively, with a predetermined depth along end edges thereof on the side of the bottom opening of the gusset bag in a state in which the side surface portions are folded inward along the folding lines, and an impact absorbing seal portion is formed by bonding the inner surfaces of the flat surface portions and the inner surfaces of the side surface portions, respectively, above intersection points between an inner edge of the seal portion and the folded lines.

6. The seal structure of a gusset bag provided with a spout according to claim 5, wherein a non-seal portion is formed at portions of the folding lines by depressing the inner edge of the seal portion toward an outer edge side of the seal portion so as to straddle both the folded lines formed to the paired side surface portions, and the inner edge of the seal portion is formed such that an outer side portion of the gusset bag than the folded lines is positioned above the intersection point between the inner edge of the seal portion and the folded lines so as to form the outer side portion as the impact absorbing seal portion.

7. The seal structure of a gusset bag provided with a spout according to claim 6, wherein the non-seal portion is recessed so as to provide a rectangular shape and the inner edge of the seal portion is formed by connecting, in a circular-arc shape, portions on both sides of the non-seal portion and a portion corresponding to the inside edge of the non-seal portion.

8. The seal structure of a gusset bag provided with a spout according to claim 6 or 7, wherein the non-seal portion has a depth of a length at least 1/3 with respect to a width thereof.

FIG. 1

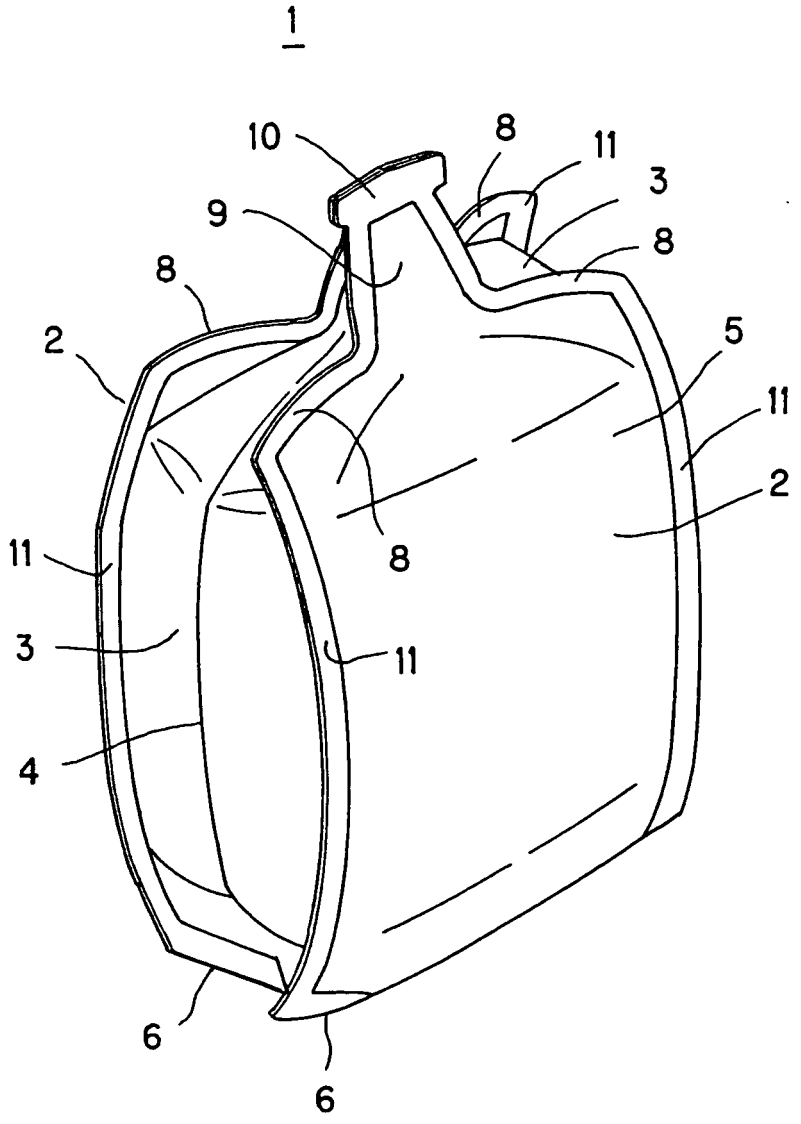


FIG. 2

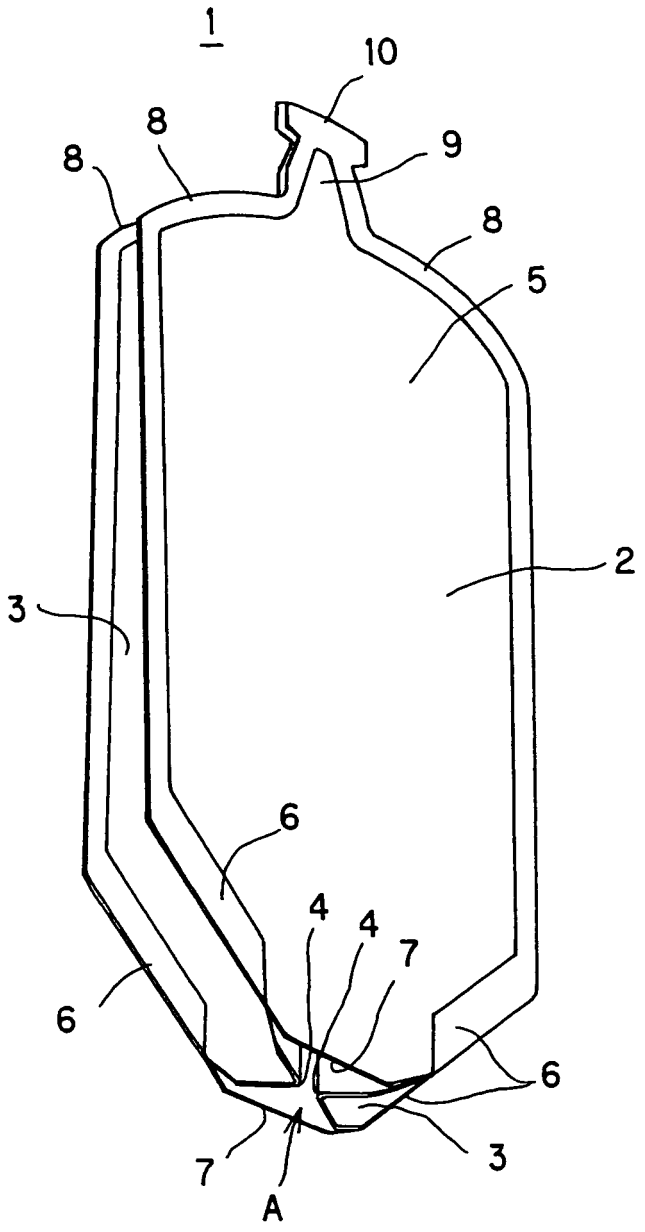


FIG. 3

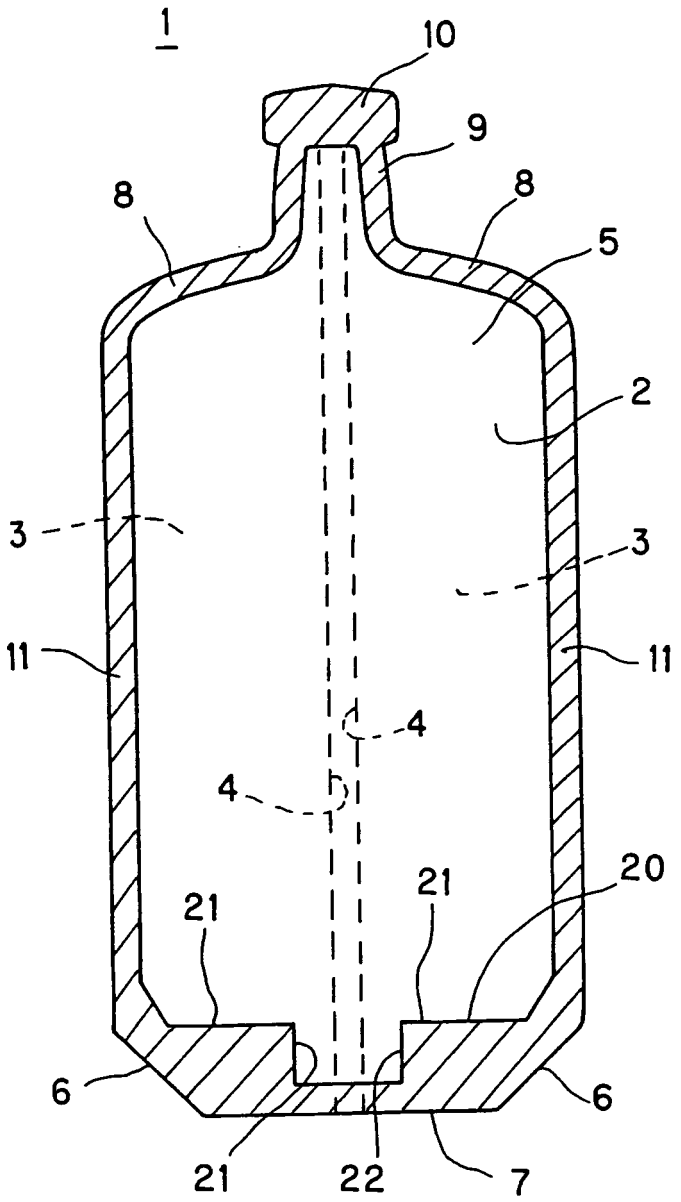


FIG. 4

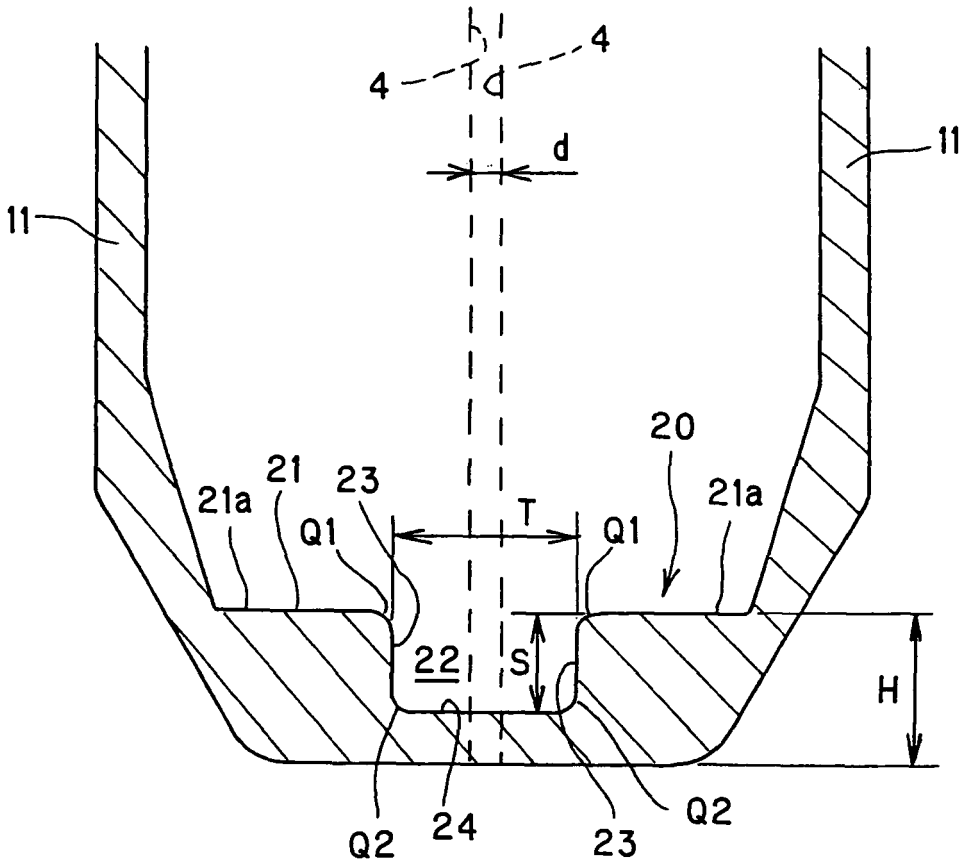


FIG. 5

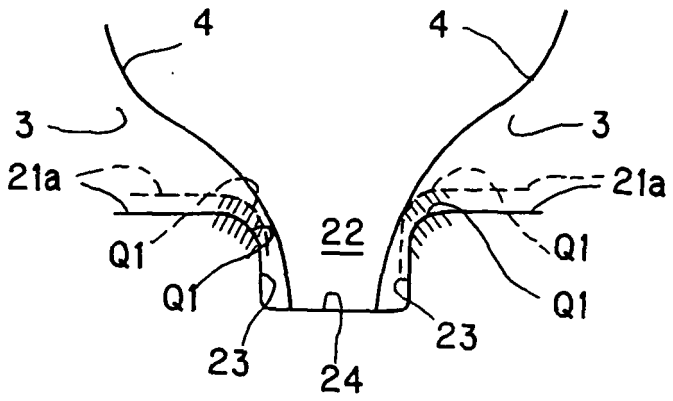


FIG. 6

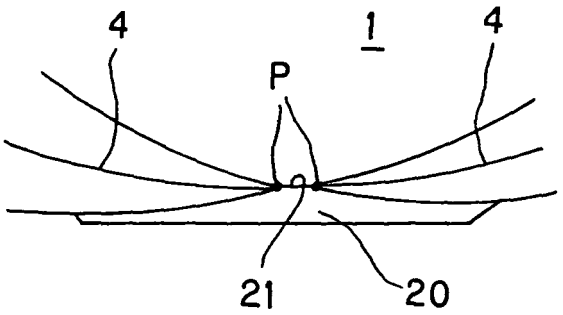


FIG. 7

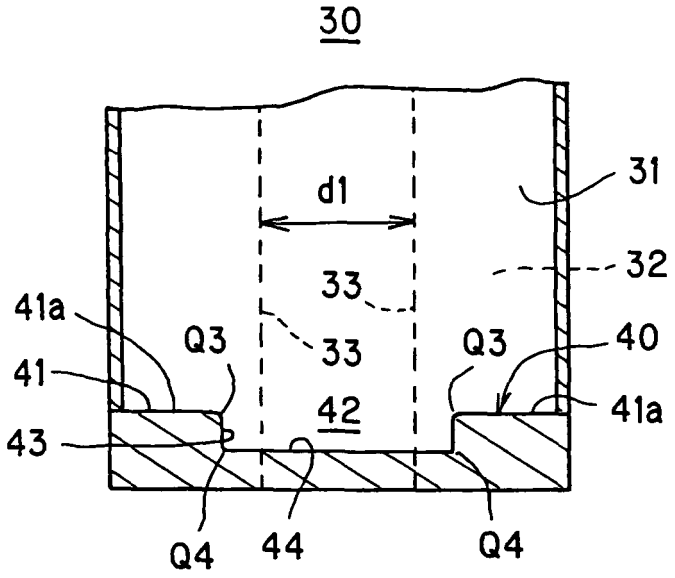

30
31
d1
32
33
41a
Q3
33
Q3
40
41
42
41a
43
Q4
44
Q4

FIG. 8

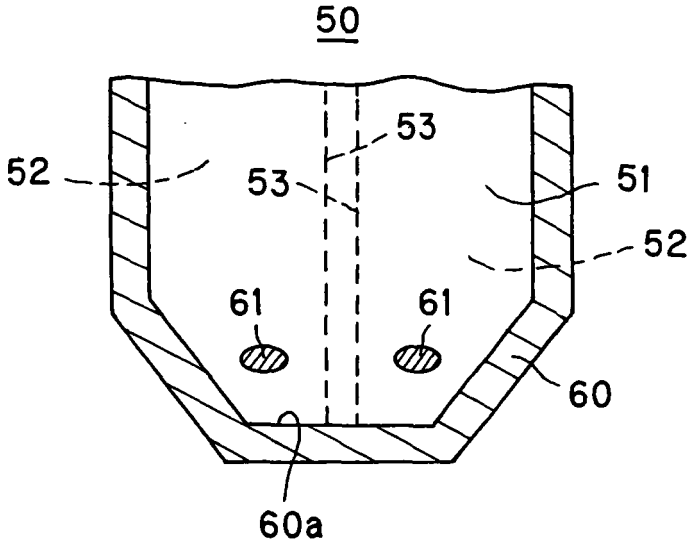

50
53
52
53
51
52
61
61
60
60a

FIG. 9

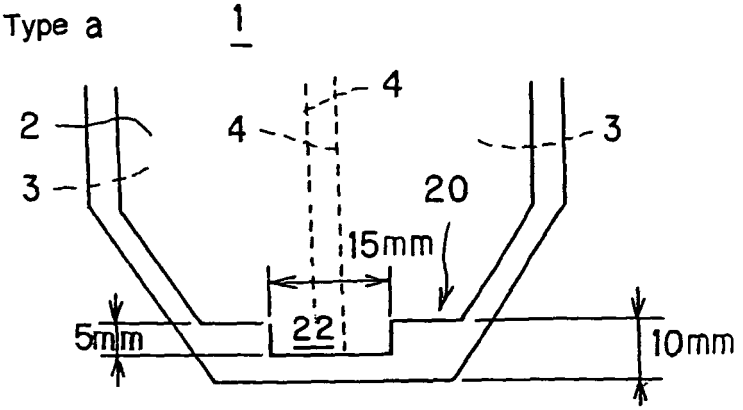


FIG. 10

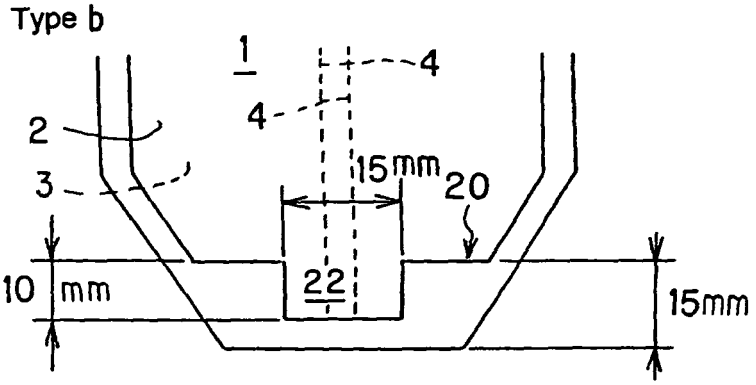


FIG. 11

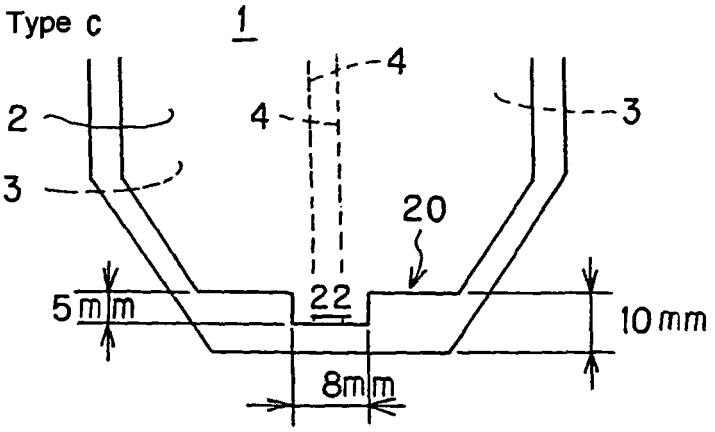


FIG. 12

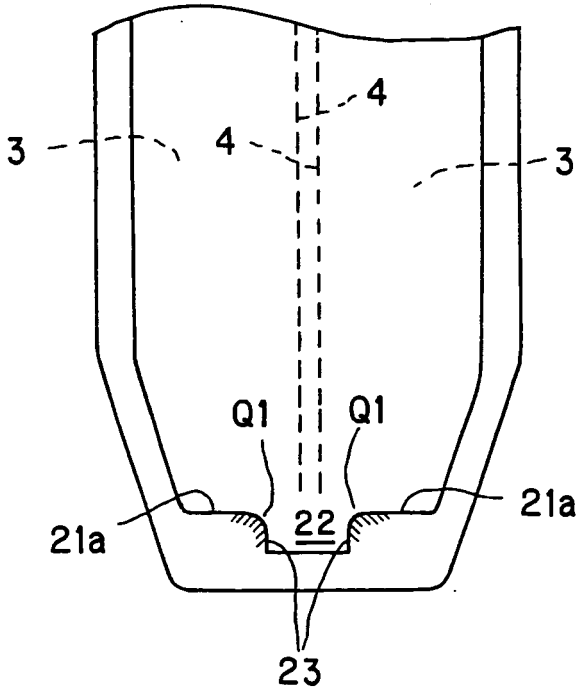


FIG. 13

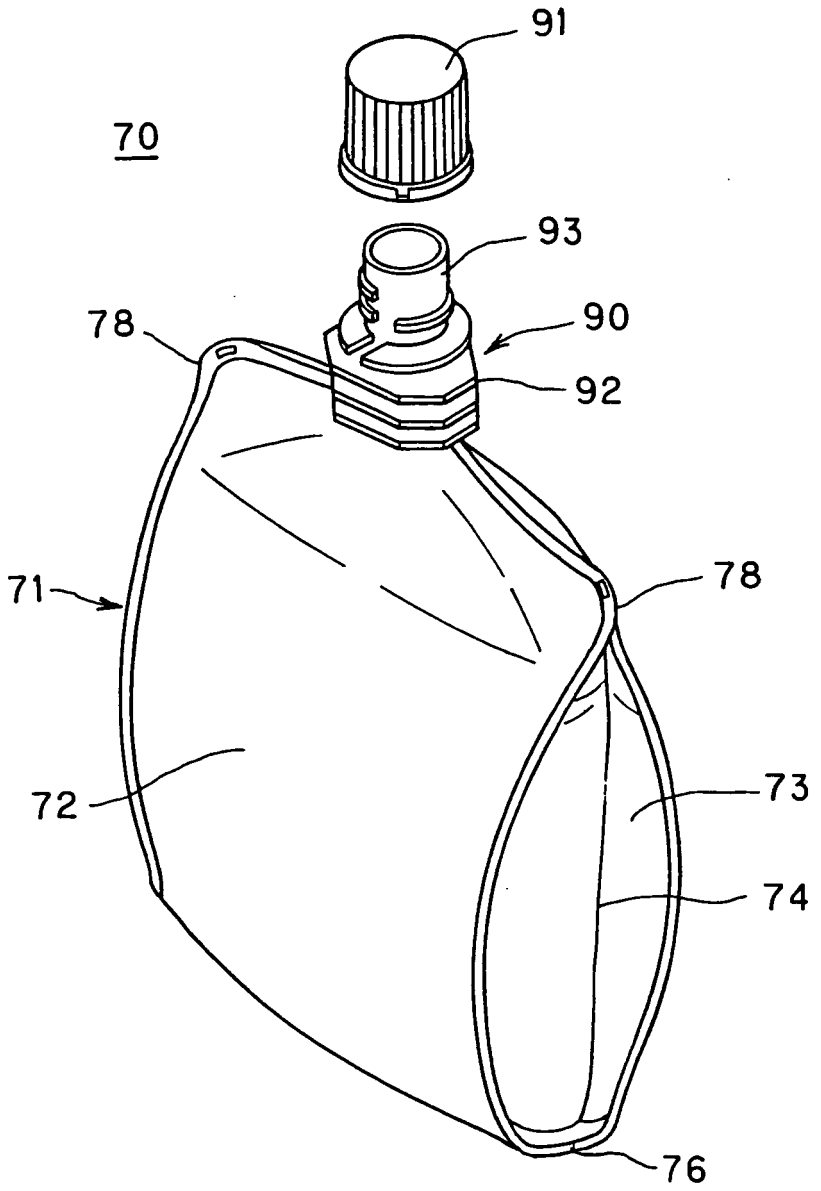
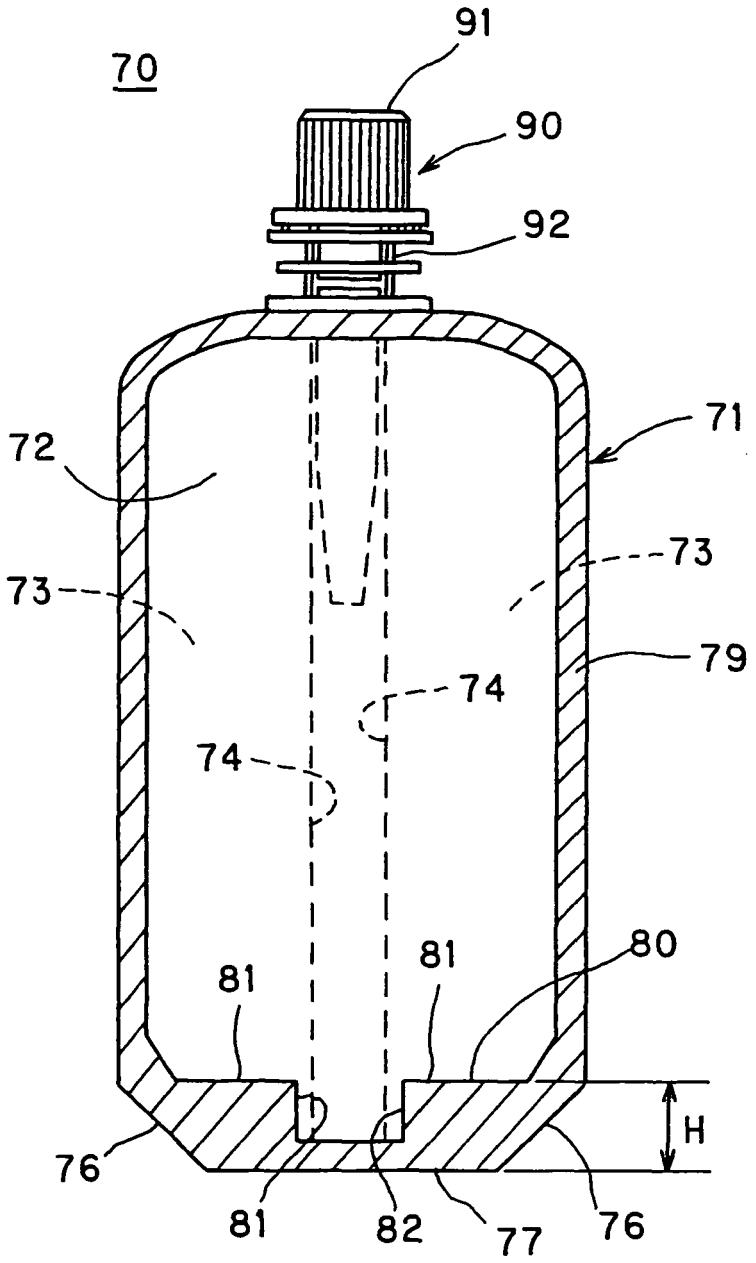


FIG. 14



INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2004/012022

A. CLASSIFICATION OF SUBJECT MATTER
Int.Cl[7] B65D30/16

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
Int.Cl[7] B65D30/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Jitsuyo Shinan Koho 1926-1996 Jitsuyo Shinan Toroku Koho 1996-2004
Kokai Jitsuyo Shinan Koho 1971-2004 Toroku Jitsuyo Shinan Koho 1994-2004

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	JP 2002-154553 A (Okura Industrial Co., Ltd.), 28 May, 2002 (28.05.02), Full text; all drawings (Family: none)	1
X	JP 10-287344 A (Shikoku Kako Kabushiki Kaisha), 27 October, 1998 (27.10.98), Full text; all drawings (Family: none)	1-4
X	JP 2002-179102 A (Toppan Printing Co., Ltd.), 26 June, 2002 (26.06.02), Full text; all drawings (Family: none)	5-8

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

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

Date of the actual completion of the international search	Date of mailing of the international search report
17 November, 2004 (17.11.04)	07 December, 2004 (07.12.04)
Name and mailing address of the ISA/ Japanese Patent Office	Authorized officer
Facsimile No.	Telephone No.

Form PCT/ISA/210 (second sheet) (January 2004)