



Europäisches Patentamt  
European Patent Office  
Office européen des brevets



(11)

**EP 1 693 313 A1**

(12)

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

(43) Date of publication:

**23.08.2006 Bulletin 2006/34**

(51) Int Cl.:

**B65D 81/34 (2006.01)**

(21) Application number: **04819333.8**

(86) International application number:

**PCT/JP2004/017278**

(22) Date of filing: **19.11.2004**

(87) International publication number:

**WO 2005/051800 (09.06.2005 Gazette 2005/23)**

(84) Designated Contracting States:

**DE FR GB IT**

(30) Priority: **28.11.2003 JP 2003399237**

**01.10.2004 JP 2004290168**

(71) Applicant: **TOYO SEIKAN KAISYA, LTD.**

**Tokyo 100-8522 (JP)**

(72) Inventor: **KANZAKI, Keizo**

**c/o Toyo Seikan Kaisha, Ltd.**

**Yokohama-shi,**

**Kanagawa 2300047 (JP)**

(74) Representative: **TBK-Patent**

**Bavariaring 4-6**

**80336 München (DE)**

(54) **PACKAGING CONTAINER FOR MICROWAVE OVEN**

(57) A packaging container for a microwave oven, by which the fact that heating of the container content has been completed and the container has been automatically opened can be easily recognized. This can be achieved without requiring a special member and complex steps, but by processing wrapping materials constructing the packaging container such as a packaging bag, cup, tray, etc. Also provided is a packaging container for a microwave oven, where danger, including spilling of the content of the container and burning by touching an opening section occurring in heating by a microwave oven, can be avoided. Further provided is a packaging container for a microwave oven, sealed by heat-sealing plastic films and having a steam vent seal section having a weakened section. The steam vent seal section has mark emerging means, where, when the steam vent seal section is separated and opened, the means shows different surface- and back face-wrapping materials constituting the steam vent seal section, enabling the recognition of the opening.

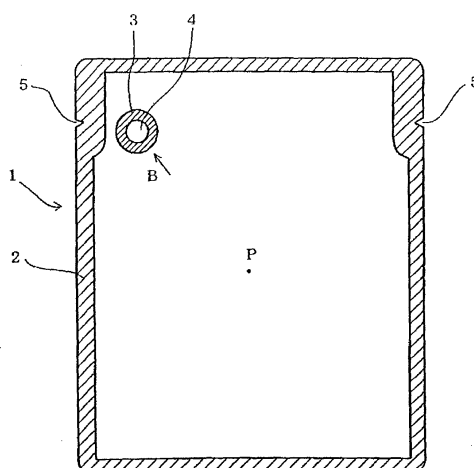


Fig.1

EP 1 693 313 A1

**Description**

## TECHNICAL FIELD

**[0001]** The present invention relates to a packaging container for a microwave oven such as a packaging pouch, a cup, or a tray filled with contents such as a retort food containing a liquid substance, a solid substance, or a mixture of them. The packaging container of the present invention is capable of automatically releasing water vapor or the like to be generated inside the packaging container, preventing the rupture and deformation of the packaging container, scattering of the content, and allowing one to easily recognize the fact that the packaging container is opened under heating in a microwave oven.

## BACKGROUND ART

**[0002]** Heating of a packing container such as a packaging pouch, a cup, or a tray hermetically filled with a retort food, a frozen food, or the like in a microwave oven increases the pressure inside the pouch and a container due to water vapor or the like to be generated from contents under heating. The packaging container may tear, and the content may scatter, to thereby make the inside of the microwave oven dirty or harm a human body by burning or the like.

**[0003]** Thus, before heat-cooking such a packaging container in a microwave oven, methods of preventing tearing of the packaging container are employed. That is, the packaging container is partly opened in advance or the packaging container itself is pierced, to thereby discharge out water vapor or the like to be generated inside the packaging container. However, such methods involve much time and effort for a general consumer. Further, when these methods are applied, the methods have disadvantages in that a flavor of the contents cooked by heating is lost because the water vapor generated by microwave heating is immediately discharged out of the packaging container and a heat steaming effect of the water vapor on the content is reduced.

**[0004]** To overcome such disadvantages, there have been proposed various packaging containers each provided with an automatic opening mechanism with which an increase in the inner pressure of the packaging container under heating in a microwave oven is automatically relieved (see, for example, Patent Documents 1 to 4).

In each of those packaging containers, the opening of the packaging container by heating in a microwave oven can be judged on the basis of the sound of water vapor to be released on and after opening and clouding of the inside of the microwave oven due to the water vapor. However, this method of judging the opening is hard to recognize and may cause one to ignore the opening of a packaging container.

**[0005]** To overcome such disadvantages, there has been proposed a container, a food pouch, and the like, each of which is specifically designed to be heated in a microwave oven and is coupled with a separate alarm seedling (see Patent Document 5). However, each of those containers requires a step of using a high-cost, separate alarm whistle and coupling the alarm whistle. Accordingly, there arises, for example, a problem in that the production process of each of the containers becomes complicated, which results in an increase in cost.

**[0006]** Meanwhile, there has been also proposed an ordinary packaging pouch not heated in a microwave oven, a heat seal part of which is provided with a hidden printing layer so that a letter or symbol appears upon opening of the pouch to prevent, for example, mixing of a toxic substance or the like (see, for example, Patent Document 6). However, in such a packaging pouch, it becomes difficult to recognize a letter or symbol appearing upon opening unless an area of a portion to be provided with the hidden printing layer is equal to or larger than a certain value. Therefore, it has not been possible to apply this technique to a vapor release seal part opening automatically upon heating of a packaging container for a microwave oven such as a packaging pouch, a cup, or a tray.

**[0007]** Patent Document 1: JP 10-59433 A

Patent Document 2: JP 10-95471 A

Patent Document 3: JP 10-101154 A

Patent Document 4: JP 2002-249176 A

Patent Document 5: JP 06-245861 A

Patent Document 6: Japanese Utility Model Application Laid-open No. 62-90334 A

## DISCLOSURE OF THE INVENTION

## PROBLEMS TO BE SOLVED BY THE INVENTION

**[0008]** Therefore, an object of the present invention is to provide a packaging container for a microwave oven such as a packaging pouch, a cup, or a tray constituted by a packaging material which itself is processed with no need for a special member or a complicated step so that one can easily recognize that heat-cooking of contents in the packaging container has been completed and the packaging container has automatically opened. Another object of the present

invention is to provide a packaging container for a microwave oven capable of avoiding a risk of spilling contents in the packaging container or a risk of contact with an opening to cause a heat injury upon heating in a microwave oven.

#### MEANS FOR SOLVING THE PROBLEMS

**[0009]** The inventors of the present invention have made extensive studies. As a result, they have found that the above-mentioned problems can be solved by providing, by means of printing processing or the like, a vapor release seal part having a weakened part of each of surface and back packaging materials constituting a packaging container for a microwave oven such as a packaging pouch, a cup, or a tray with a mark developing means with which exfoliation opening of the vapor release seal part can be recognized by a difference between the surface and back packaging materials. Thus, the inventors have completed the present invention.

**[0010]** That is, the present invention employs the following constitutions 1 to 15.

1. A packaging container for a microwave oven hermetically sealed by heat-sealing with a plastic film, the packaging container including a vapor release seal part having a weakened part, characterized in that the vapor release seal part is provided with a mark developing means with which exfoliation opening of the vapor release seal part can be recognized by a difference between surface and back packaging materials constituting the vapor release seal part.

2. A packaging container for a microwave oven according to the above item 1, characterized in that the mark developing means is constituted by providing a vapor release seal part of one plastic film constituting the packaging container with a printing layer having a pattern having a void part and by providing a vapor release seal part of the other plastic film constituting the packaging container with a printing layer having a pattern corresponding to the void part.

3. A packaging container for a microwave oven according to the above item 1, characterized in that the mark developing means is constituted by coloring a vapor release seal part of one plastic film constituting the packaging container a first color and by coloring a vapor release seal part of the other plastic film constituting the packaging container a second color different from the first color.

4. A packaging container for a microwave oven according to the above item 1, characterized by the mark developing means comprising a peeling surface of which opacifies or whitens in association with peeling due to cohesion failure of the vapor release seal parts of the plastic films constituting the packaging container.

5. A packaging container for a microwave oven according to the above item 4, characterized in that the mark developing means is constituted by providing a color printing layer for an upper layer of the vapor release seal part of at least one plastic film constituting the packaging container on a side of an external surface of the container.

6. A packaging container for a microwave oven according to any one of the above items 1 to 5, characterized in that the vapor release seal part is formed continuously along the peripheral edge seal part of the packing container.

7. A packaging container for a microwave oven according to any one of the above items 1 to 5, characterized in that the vapor release seal part is formed separately from the peripheral edge seal part of the packing container.

8. A packaging container for a microwave oven according to any one of the above items 1 to 7, characterized in that the vapor release seal part is provided with a through-hole, a semi through-hole, or a slit to thereby form a weakened part.

9. A packaging container for a microwave oven according to any one of the above items 1 to 5, characterized in that a notch is formed inwardly into the container and a periphery edge of the notch is heat sealed to thereby form the vapor release seal part having the weakened part.

10. A packaging container for a microwave oven according to any one of the above items 1 to 9, characterized in that a pouring port forming means is arranged near the vapor release seal part.

11. A packaging container for a microwave oven according to any one of the above items 1 to 10, characterized in that the packaging container includes a packaging pouch hermetically heat-sealed with a plastic film.

12. A packaging container for a microwave oven according to the above item 11, characterized in that the packaging pouch includes a standing pouch.

13. A packaging container for a microwave oven according to the above item 11 or 12, characterized in that the packaging pouch includes a packaging pouch having a branched section.

14. A packaging container for a microwave oven according to any one of the above items 1 to 5, characterized in that the packaging container is hermetically sealed by heat-sealing of a container main body having a flange part with a lid composed of a plastic film.

15. A packaging container for a microwave oven according to the above item 14, characterized in that the vapor release seal part is formed by causing a heat seal part between the flange part of the packaging container and the lid to project toward an inside of the container.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[0011]**

- 5 [Fig. 1] A view showing an example of the application of the present invention to a packaging pouch for a microwave oven.
- [Figs. 2] Views each explaining a mark developing means to be provided for a vapor release seal part of the packaging pouch of Fig. 1.
- 10 [Figs. 3] Views each explaining a mark developing upon exfoliation opening of the vapor release seal part of the packaging pouch of Fig. 1.
- [Fig. 4] A view showing another example of the application of the present invention to a packaging pouch for a microwave oven.
- [Fig. 5] A view showing another example of the application of the present invention to a packaging pouch for a microwave oven.
- 15 [Fig. 6] A view showing another example of the application of the present invention to a packaging pouch for a microwave oven.
- [Fig. 7] A view showing another example of the application of the present invention to a packaging pouch for a microwave oven.
- [Fig. 8] A view showing another example of the application of the present invention to a packaging pouch for a microwave oven.
- 20 [Fig. 9] A view showing an example of the application of the present invention to a tray-shaped container for a microwave oven.
- [Fig. 10] A plan view of the container of Fig. 9.
- [Figs. 11] Schematic views each showing the section of the vapor release seal part of the container of Fig. 9.

## DESCRIPTION OF SYMBOLS

**[0012]**

- |    |                       |  |
|----|-----------------------|--|
| 30 | 1, 21, 31, 41, 51, 61 | packaging pouch for a microwave oven     |
|    | 2, 112                | peripheral edge seal part                |
|    | 3, 43, 53, 113        | vapor release seal part                  |
|    | 4, 44, 54             | weakened part                            |
|    | 5                     | notch                                    |
| 35 | 6                     | perforation                              |
|    | 7                     | bottom folding part                      |
|    | 11                    | void part                                |
|    | 12, 14                | solid pattern part                       |
|    | 13                    | pattern                                  |
| 40 | 52                    | branched section                         |
|    | 56                    | part (opposing part)                     |
|    | 57                    | opening preventive mean                  |
|    | 58                    | branched section base part               |
|    | 100                   | packaging container for a microwave oven |
| 45 | 101                   | container main body                      |
|    | 102                   | flange part                              |
|    | 103                   | lid                                      |
|    | 115                   | opening part                             |

## BEST MODE FOR CARRYING OUT THE INVENTION

**[0013]** Plastic films forming a packaging container such as a packaging pouch, a cup, and a tray for a microwave oven in the present invention employ a plastic material having heat sealing property and generally used for production of a packaging container. Examples of such a plastic material include: monolayer films or sheets each formed of a thermo-

plastic resin having a heat sealing property; and multilayer films, sheets, or the like each prepared by laminating a thermoplastic resin having heat sealing property and other thermoplastic resin(s) or the like.

Examples of such a plastic material having a heat sealing property include: a known olefin resin such as a low density polyethylene, a linear low density polyethylene, a medium density polyethylene, a high density polyethylene, a polypro-

polyene, a propylene-ethylene copolymer, an ethylene-vinyl acetate copolymer, an olefin-based resin subjected to graft modification with an ethylene-based unsaturated carboxylic acid or an anhydride thereof; a polyamide resin or copolyamide resin having a relatively low melting point or relatively low softening point; a polyester resin or copolyester resin; and a polycarbonate resin.

**[0014]** Examples of other plastic material(s) to be laminated with the plastic materials having heat sealing property include a thermoplastic resin or various barrier films each having heat sealing property or having no heat sealing property. Examples of such thermoplastic resin can include: polyolefins such as crystalline polypropylene, a crystalline propylene-ethylene copolymer, crystalline polybutene-1, crystalline poly4-methylpentene-1, low-density polyethylene, medium-density polyethylene, high-density polyethylene, an ethylene-vinyl acetate copolymer (EVA), a saponified product of an EVA, an ethylene-ethyl acrylate copolymer (EEA), and an ion-crosslinked olefin copolymer (ionomer); aromatic vinyl copolymers such as polystyrene and a styrene-butadiene copolymer; vinyl halide polymers such as polyvinyl chloride and a vinylidene chloride resin; a polyacrylic resin; nitrile polymers such as an acrylonitrile-styrene copolymer and an acrylonitrile-styrene-butadiene copolymer; polyesters such as polyethylene terephthalate and polytetramethylene terephthalate; various polycarbonates; a fluorine-based resin; and polyacetals such as polyoxymethylene. Those thermoplastic resins can be used independently, or with being blended with two or more kinds of them. Furthermore, those thermoplastic resins may be used to be blended with various additives.

**[0015]** In addition, examples of various barrier films can include: a silica-deposited polyester film; an alumina-deposited polyester film, a silica-deposited nylon film, an alumina-deposited nylon film, an alumina-deposited polypropylene film, a carbon film-deposited polyester film, and a carbon film-deposited nylon film; a co-deposited film obtained by simultaneously vapor-depositing alumina and silica onto a base film such as a polyester film or a nylon film; a film obtained by co-extruding nylon 6/metha-xylylene diamine nylon 6 and a film obtained by co-extruding a polypropylene/ethylene-vinyl alcohol copolymer; an organic resin-coated film such as a polyvinyl alcohol-coated polypropylene film, a polyvinyl alcohol-coated polyester film, a polyvinyl alcohol-coated nylon film, a polyacrylic acid-based resin-coated polyester film, a polyacrylic acid-based resin-coated nylon film, a polyacrylic acid-based resin-coated polypropylene film, a polyglycolic acid resin-coated polyester film, a polyglycolic acid resin-coated nylon film, and a polyglycolic acid resin-coated polypropylene film; and a film obtained by coating a hybrid coating material consisting of an organic resin material and an inorganic material on a base film such as a polyester film, a nylon film, a polypropylene film, and the like. Those barrier films can be used independently, or with being combined with two or more kinds of barrier films.

**[0016]** In the present invention, a packaging container for a microwave oven such as a packaging pouch, a cup, or a tray is produced by forming or molding an unoriented, uniaxially oriented, or biaxially oriented film or sheet constituted by any one of the above plastic materials into a pouch and the like according to an ordinary method. When a packaging pouch is produced by means of a laminated film composed of a thermoplastic resin having heat-sealing property and a thermoplastic resin having no heat-sealing property, heat-sealing is performed in a state where thermoplastic resin layers each having a heat-sealing property are arranged so that each of them serves as an inner surface. An adhesive resin layer can be interposed between adjacent layers constituting the laminated film as required.

**[0017]** Next, the packaging container for a microwave oven of the present invention will be described in detail on the basis of the drawings in conjunction with an example of the application of the present invention to a packaging pouch. However, the following specific examples do not limit the present invention.

Figs. 1 to 3 are views of the present invention, each showing an example of a packaging pouch for a microwave oven provided with a vapor release seal part having a weakened part. Fig. 1 is a front view of the packaging pouch, and Figs. 2 are enlarged schematic views each explaining the mark developing means to be provided for the vapor release seal part of the packaging pouch. In addition, Figs. 3 are enlarged schematic views each explaining a mark developing owing to the exfoliation opening of the vapor release seal part upon heating of the packaging pouch in a microwave oven.

**[0018]** The packaging pouch 1 for a microwave oven was produced by subjecting a peripheral edge seal part 2 of a packaging material (plastic film) constituting the surface and back of the pouch to heat-sealing and by providing a corner part of the pouch with a vapor release seal part 3 having a weakened part 4. Notches 5 are formed in the upper part of the pouch to facilitate an opening of the pouch after the completion of cooking by means of a microwave oven.

In the packaging pouch, the weakened part 4 is formed by providing the vapor release seal part 3 with a single through-hole. The weakened part can also be formed by providing a semi through-hole or a slit instead of the through-hole. The vapor release seal part 3 may be provided with multiple through-holes, semi through-holes, or slits.

**[0019]** As shown in Fig. 2(A), a pattern 12 having a void part 11 is solid-printed on the vapor release seal part 3 of the packaging material of one of the surface and the back constituting the packaging pouch 1. Meanwhile, as shown in Fig. 2(B), a pattern 13 corresponding to the void part 11 of Fig. 2(A) is printed on the vapor release seal part 3 of the other packaging material. The pattern 13 is preferably formed to be larger than the void part 11 so that alignment upon heat-sealing of the packaging pouch may be easily performed.

**[0020]** The vapor release seal part 3 is formed by superimposing the void part 11 of each of the surface and back packaging materials constituting the packaging pouch 1 and the pattern 13 corresponding to the part on each other, and by subjecting the resultant to heat-sealing. As a result, as shown in Fig. 2(C), the vapor release seal part 3 is provided

with a pattern 14, the entire surface of which is uniformly solid-printed. The weakened part 4 is formed in the vapor release seal part 3 by providing a through-hole simultaneously with or after the heat-sealing.

**[0021]** When contents such as curry or stew is added and hermetically sealed in the packaging pouch 1 and the packaging pouch 1 is heated in a microwave oven, an inner pressure of the packaging pouch 1 increases owing to water vapor or the like generated from the content, and then the packaging pouch 1 expands from its center point P toward its peripheral edge part. As a result, stress concentrates on a part B of the vapor release seal part 3 closest to the center point P, whereby the breakage and opening of the vapor release seal part 3 starts.

The vapor release seal part 3 peels and regresses owing to the stress concentration. When the peeling reaches the weakened part 4, the packaging pouch 1 partially opens so that water vapor or the like is discharged to the outside. Accordingly, the rupture of the packaging pouch 1 can be prevented.

**[0022]** As shown in Figs. 3(A) and 3(B), the solid-printed pattern 12 having the void part 11 printed on the vapor release seal part of each packaging material constituting the packaging pouch 1 and the pattern 13 corresponding to the void part 11 develop in the vapor release seal part 3 that has peeled and opened. As a result, one can easily recognize automatic opening of the packaging pouch 1 and completion of the heat-cooking of the contents. The pattern to be formed in the vapor release seal part can be arbitrarily selected. In addition, the pattern can be provided for not only the vapor release seal part but also a part adjacent to the vapor release seal part.

**[0023]** In the above example, the mark developing means was constituted by printing a pattern on the vapor release seal part of each packaging material constituting the packaging pouch. The mark developing means can also be constituted by coloring the vapor release seal part of one packaging material constituting the packaging pouch a first color and by coloring the vapor release seal part of the other packaging material a second color different from the first color. For example, when printing is performed so that the surface of the vapor release seal part of the packaging pouch has a red color and the back of the part has a blue color, the vapor release seal part is colored to be purple after heat-sealing. When the packaging pouch is heated in a microwave oven so that the vapor release seal part peels and opens, the color of the surface changes to red and the color of the back changes to blue. Therefore, one can easily recognize that the heat-cooking of the content has been completed and the pouch has automatically opened.

**[0024]** In the above example, the corner part of the packaging pouch 1 was provided with the vapor release seal part 3 of a circular shape in such a manner that the vapor release seal part 3 would be separated from the peripheral edge seal part 2. The position where the vapor release seal part 3 is placed, the number of the vapor release seal parts 3, the shape and dimensions of each of the vapor release seal parts 3, and the like can be arbitrarily selected. The shape, dimensions, and the like of the weakened part 4 to be formed in the vapor release seal part 3 can also be appropriately selected. In addition, any one of the methods such as machine work (for example, punching) and laser processing can be arbitrarily selected as a method of forming the weakened part 4.

**[0025]** Figs. 4 to 6 are views each showing another example of the application of the present invention to a packaging pouch for a microwave oven.

A packaging pouch 21 of Fig. 4 shows an example of the application of the present invention to a standing pouch. In this example, the shape of the vapor release seal part 3 to be formed in a corner part of the packaging pouch 21 is substantially a triangle, and the bottom of the packaging pouch 21 is provided with a bottom folding part 7. The other constitutions of the packaging pouch are the same as those of the packaging pouch 1 of Fig. 1.

Of course, the shape of the vapor release seal part 3 can be appropriately changed to an oblong, a quadrangle, a trapezoid, or the like instead of the triangle.

**[0026]** Fig. 5 is a view showing another example of the application of the present invention to a standing pouch.

In this packaging pouch 31, the shape of the vapor release seal part 3 is substantially a quadrangle, and the vapor release part 3 is connected to the peripheral edge seal part of a corner part. In addition, a perforation 6 is formed to facilitate the opening of the pouch. The other constitutions of the packaging pouch are the same as those of the packaging pouch 21 of Fig. 4.

**[0027]** Fig. 6 is a view showing another example of the packaging pouch for a microwave oven of the present invention. In a packaging pouch 41, a cutout 44 serving as a weakened part and directed toward the inside of the pouch is arranged near a corner part of the packaging pouch 41. A vapor release seal part 43 having a weakened part is formed by subjecting the peripheral edge part of the cutout 44 to heat-sealing. A part distinguished from the pouch main body of the packaging pouch 41 by the cutout 44 is provided with an opening facilitating means 6 such as a perforation or laser processing. The peripheral edge seal part 2 is provided with the notches 5. A pouring port (not shown) can be formed in the packaging pouch 41 by opening the pouch 41 along the opening facilitating means 6 from the notch 5 after the completion of heating in a microwave oven.

**[0028]** Fig. 7 is a perspective view showing another example of the application of the present invention to a packaging pouch for a microwave oven.

A foldable branched section 52 that can be lodged to one surface of a packaging pouch main body is formed in this packaging pouch 51. In addition, an upper edge part of the branched section 52 is provided with a cutout 54 directed toward the inside of the pouch. The peripheral edge part of the cutout 54 is subjected to heat-sealing so as to have a

width equal to or narrower than that of the peripheral edge seal part 2, whereby a vapor release seal part 53 having a weakened part is formed. In addition, each of the water vapor release seal part 53 of the packaging pouch 51 and a part 55 adjacent to the part 53 is provided with the mark developing means based on printed patterns as in the case of the packaging pouch 1 shown in each of Figs. 1 to 3.

In addition, in the packaging pouch 51 provided with the branched section 52, opening preventive means 57 based on heat-sealing are arranged at four sites in the branched section 52 of the packaging pouch main body and a part (opposing part) 56 opposed to the branched section 52 in order to prevent the break of the packaging pouch and the leakage of a content due to the peeling of the heat-seal of the pouch at a base part 58 of the branched section 52.

**[0029]** Fig. 8 is a perspective view showing another example of the application of the present invention to a packaging pouch for a microwave oven.

This packaging pouch 61 is produced by removing the outside of the opening preventive means 57 provided for the branched section 52 in the packaging pouch 51 of Fig. 7 along the outer periphery of the means 57. The other constitutions of the packaging pouch 61 are the same as those of the packaging pouch 51 of Fig. 7.

**[0030]** In the examples of Figs. 1 to 8, description has been given of an example of the application of the present invention to a packaging pouch for a microwave oven. Of course, the present invention is applicable to any packaging container for a microwave oven except a packaging pouch such as a cup, a tray, or a box.

Any one of such containers is provided with a flange part. A vapor release seal part having a weakened part is formed in the flange part. The mark developing means of the present invention can be provided for the vapor release seal part or the vicinity of the part.

**[0031]** Figs. 9 to 11 are views showing an example of the application of the present invention to a tray-shaped container for a microwave oven. Fig. 9 is a perspective view of the container, and Fig. 10 is a plan view of the container. In addition, Figs. 11 are schematic views each showing the section of a vapor release seal part of the container. Fig. 11 (A) is a view showing a state before the peeling of the vapor release seal part, and Fig. 11(B) is a view showing a state after the peeling of the vapor release seal part.

The packaging container 100 for a microwave oven is hermetically sealed by subjecting a flange part 102 of a container main body 101 made of polypropylene to heat-sealing with a lid 103. A vapor release seal part 113 is formed in one corner portion of the container by causing a peripheral edge heat seal part 112 to project in a U-shape fashion toward the inside of the container. In addition, an opening part 115 for opening the lid 103 after the container has been subjected to heat-cooking in a microwave oven is formed in a corner portion opposed to the vapor release seal part 113 by causing the peripheral edge seal part 112 to project in a V-shape fashion toward the outside of the container.

**[0032]** As shown in Figs. 11, the lid 103 of the packaging container 100 is constituted by polyethylene terephthalate (PET) 121 having a thickness of 12  $\mu\text{m}$ , a printing layer 122, an adhesive layer 123, nylon 124 having a thickness of 15  $\mu\text{m}$ , the adhesive layer 123, and an easy-peel layer 125 having a thickness of 50  $\mu\text{m}$  and composed of an unoriented polypropylene-based resin (CPP) in the stated order from the outside. In addition, the lid 103 is subjected to heat-sealing with the flange part 102 of the container main body at the easy-peel layer 125.

When the container is heated in a microwave oven, the inner pressure of the container increases owing to water vapor or the like generated from contents in the container. The cohesion failure of CPP constituting the easy-peel layer 125 of a heat seal part starts from the tip part of the vapor release seal part 113 projecting in a U-shape fashion, so the vapor release seal part 113 starts to peel. When the inner pressure of the container additionally increases so that the peeling at the tip part of the vapor release seal part 113 reaches the outer edge of the heat seal part, the heat seal part opens as shown in Fig. 11(B).

**[0033]** In association with the peeling of the heat seal part in the vapor release seal part 113, irregularities are formed on a CPP peeling surface that has undergone cohesion failure to roughen the surface. In addition, the CPP peeling surface that has been transparent becomes white and opaque owing to a phenomenon such as stress whitening, so a white opacified layer 126 is formed on the surface of the easy-peel layer 125. As a result, such a state that the lower layer of the printing layer 122 of the lid 103 is white-coated is established. Accordingly, the peeled part can be easily recognized because the color of the printing of the peeled part appears to be different from the color of a peripheral part. The white opacified layer 126 formed by the peeling of the heat seal part can be recognized even when the printing layer 122 of the lid 103 is omitted; provided that the printing layer 122 is preferably arranged to enable the white opacified layer 126 to be recognized with improved definition.

**[0034]** The layer constitution of the lid 103 is not limited to that described above, and can be appropriately changed. For example, another layer constitution of the lid 103 is composed of the nylon 121 having a thickness of 15  $\mu\text{m}$ , the printing layer 122, the adhesive layer 123, an ethylene-vinyl alcohol copolymer 124 having a thickness of 12  $\mu\text{m}$ , the adhesive layer 123, and the easy-peel layer 125 having a thickness of 50  $\mu\text{m}$  and composed of a polyolefin-based resin in the stated order from the outside. Of course, the number of layers constituting the lid 103 may be increased or decreased. The printing layer can be provided for not only the vapor release seal part 113 but also a part adjacent to the vapor release part 113 or the entire surface of the lid 103. An adhesive to be interposed between adjacent layers constituting the lid 103 is not particularly limited, and an ordinary adhesive such as a polyurethane-based adhesive or

an acid-modified polyolefin-based adhesive can be used.

The flange part 102 of the container main body can be subjected to printing or coloring as desired. The shape and dimensions of the container main body are arbitrary, and the container may be, for example, a cylindrical cup, a rectangular parallelepiped tray, or a box.

**[0035]** The seal strength of each of the peripheral edge seal part and vapor release seal part of the packaging container for a microwave oven of the present invention can be 2.3 kg/15 mm width or more.

A conventional packaging container automatically opening upon heating in a microwave oven involved a significant reduction in seal strength of an opening part upon heating, and could not achieve a seal strength of 2.3 kg/15 mm width or more needed for a packaging container for a retort food. A material, the seal strength of which reduces upon heating, is used in neither the peripheral edge seal part of the packaging container for a microwave oven of the present invention, nor the vapor release seal part of the container. In addition, the above seal strength can be maintained because no seal part is subjected to a processing treatment that results in a reduction in seal strength upon heating.

**[0036]** As a result, the packaging container does not burst from its vapor release seal part or its peripheral edge seal part when the packaging container is subjected to a retort treatment after the packaging container has been filled with contents. In addition, the breakage of the packaging container at the time of the transport or storage of the packaging container can be prevented.

In addition, even in the case of heating in a microwave oven, the vapor release seal part of the packaging container maintains its seal strength for a certain time period, and the inner pressure of the packaging container is kept high by water vapor. Therefore, a heat steaming effect on the content in the packaging container is obtained. As a result, significant effects, that is, an improvement in taste of the contents and a reduction in time required for the cooking of the contents, are exerted.

## Claims

1. A packaging container for a microwave oven hermetically sealed by heat-sealing with a plastic film, the packaging container comprising a vapor release seal part having a weakened part,  
**characterized in that** the vapor release seal part is provided with a mark developing means with which exfoliation opening of the vapor release seal part can be recognized by a difference between surface and back packaging materials constituting the vapor release seal part.
2. A packaging container for a microwave oven according to claim 1, **characterized in that** the mark developing means is constituted by providing a vapor release seal part of one plastic film constituting the packaging container with a printing layer having a pattern having void parts and by providing a vapor release seal part of the other plastic film constituting the packaging container with a printing layer having patterns corresponding to the void parts.
3. A packaging container for a microwave oven according to claim 1, **characterized in that** the mark developing means is constituted by coloring a vapor release seal part of one plastic film constituting the packaging container a first color and by coloring a vapor release seal part of the other plastic film constituting the packaging container a second color different from the first color.
4. A packaging container for a microwave oven according to claim 1, **characterized by** the mark developing means comprising a peeling surface of which opacifies or whitens in association with peeling due to cohesion failure of the vapor release seal parts of the plastic films constituting the packaging container.
5. A packaging container for a microwave oven according to claim 4, **characterized in that** the mark developing means is constituted by providing a color printing layer for an upper layer of the vapor release seal part of at least one plastic film constituting the packaging container on a side of an external surface of the container.
6. A packaging container for a microwave oven according to any one of claims 1 to 5, **characterized in that** the vapor release seal part is formed continuously along a peripheral edge seal part of the packing container.
7. A packaging container for a microwave oven according to any one of claims 1 to 5, **characterized in that** the vapor release seal part is formed separately from the peripheral edge seal part of the packing container.
8. A packaging container for a microwave oven according to any one of claims 1 to 7, **characterized in that** the vapor release seal part is provided with a through-hole, a semi through-hole, or a slit to thereby form a weakened part.



## EP 1 693 313 A1

9. A packaging container for a microwave oven according to any one of claims 1 to 5, **characterized in that** a cutout is formed in the packing container inwardly into the container and a periphery edge of the cutout is heat-sealed to thereby form the vapor release seal part having a weakened part.
- 5 10. A packaging container for a microwave oven according to any one of claims 1 to 9, **characterized in that** a pouring port forming means is arranged near the vapor release seal part.
11. A packaging container for a microwave oven according to any one of claims 1 to 10, **characterized in that** the packaging container comprises a packaging pouch hermetically sealed by heat-sealing with a plastic film.
- 10 12. A packaging container for a microwave oven according to claim 11, **characterized in that** the packaging pouch comprises a standing pouch.
13. A packaging container for a microwave oven according to claim 11 or 12, **characterized in that** the packaging pouch comprises a packaging pouch having a branched section.
- 15 14. A packaging container for a microwave oven according to any one of claims 1 to 5, **characterized in that** the packaging container is hermetically sealed by heat-sealing of a container main body having a flange part with a lid composed of a plastic film.
- 20 15. A packaging container for a microwave oven according to claim 14, **characterized in that** the vapor release seal part is formed by causing a heat-seal part of the flange part of the packaging container and the lid to project toward an inside of the container.

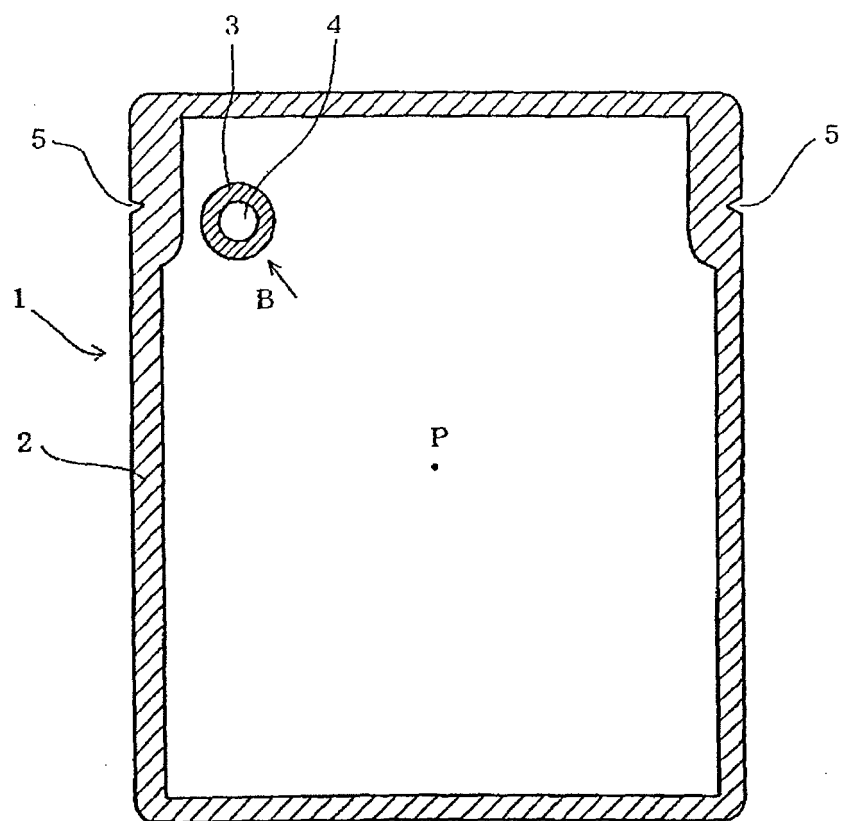


Fig.1

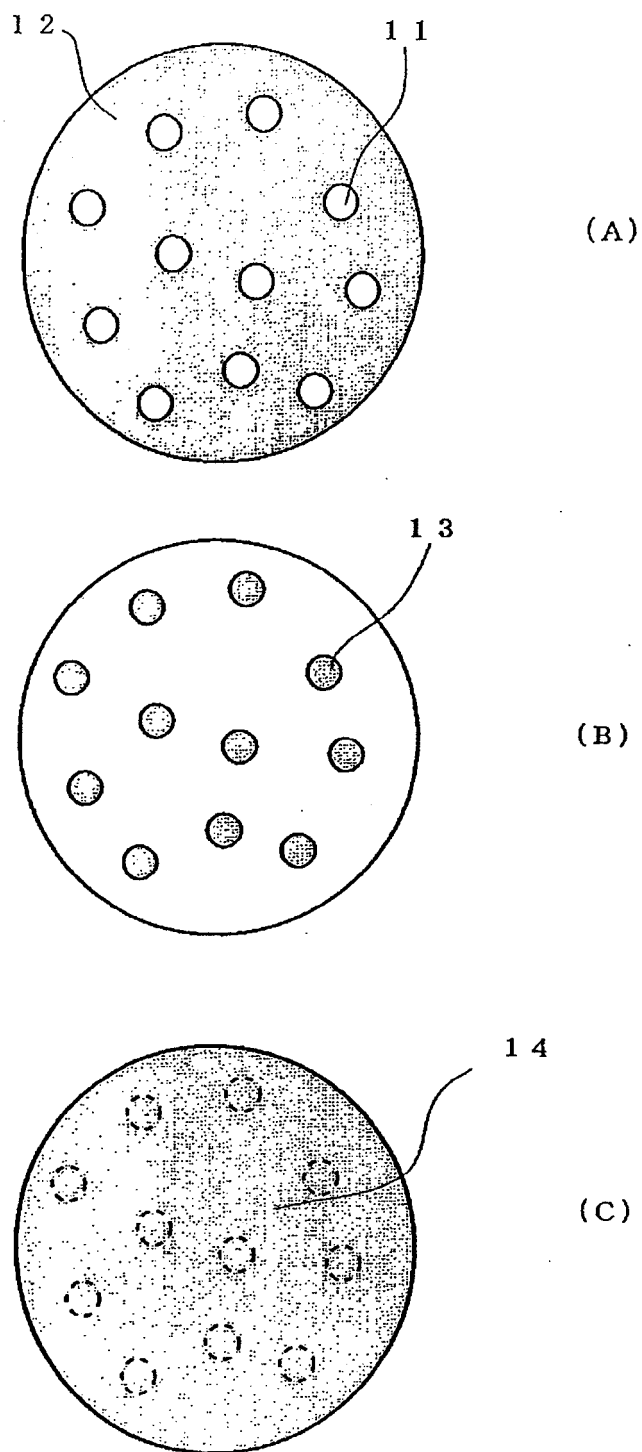


Fig.2

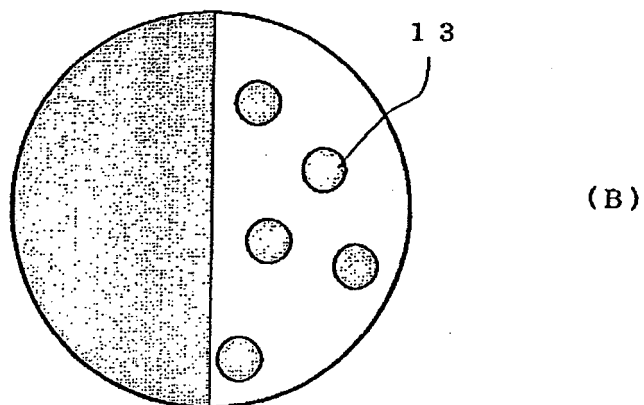
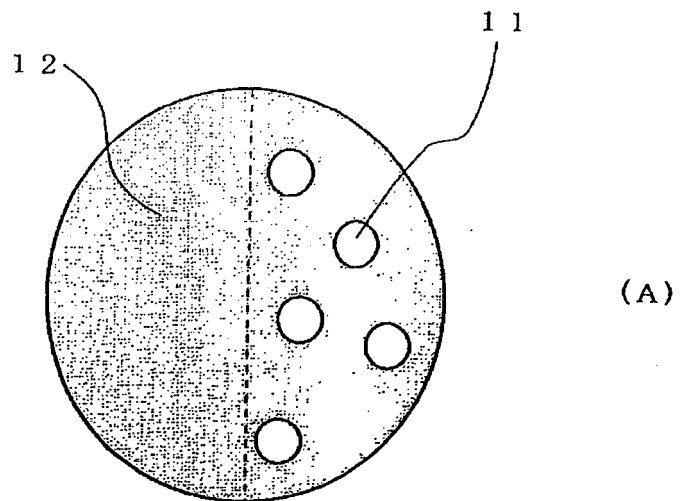


Fig.3

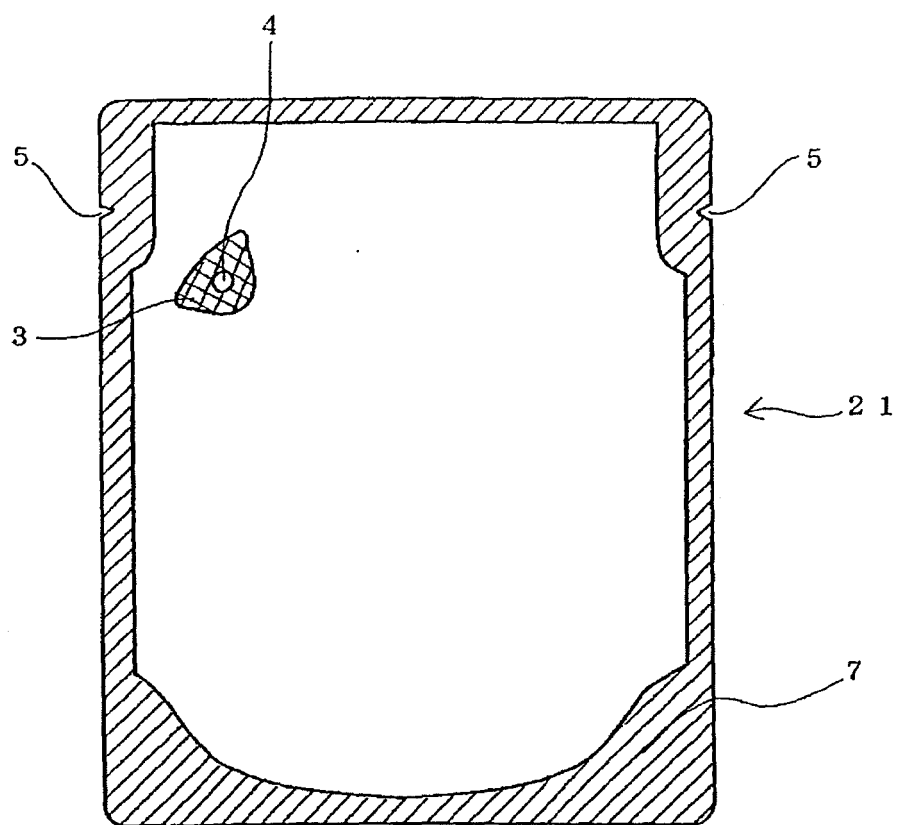


Fig.4

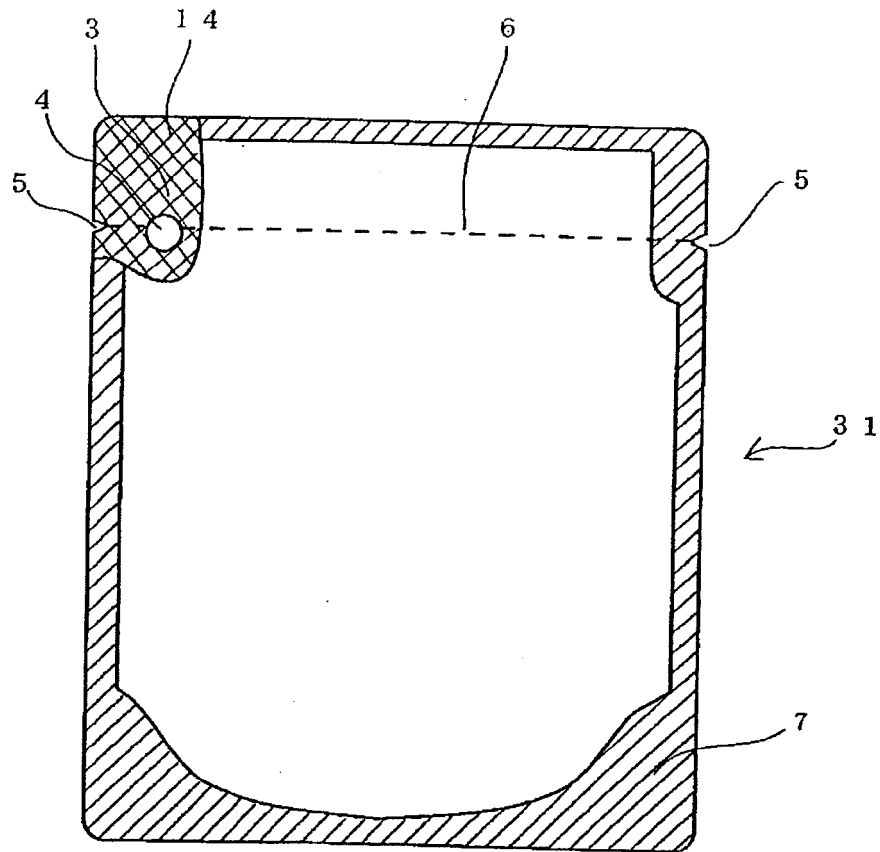


Fig.5

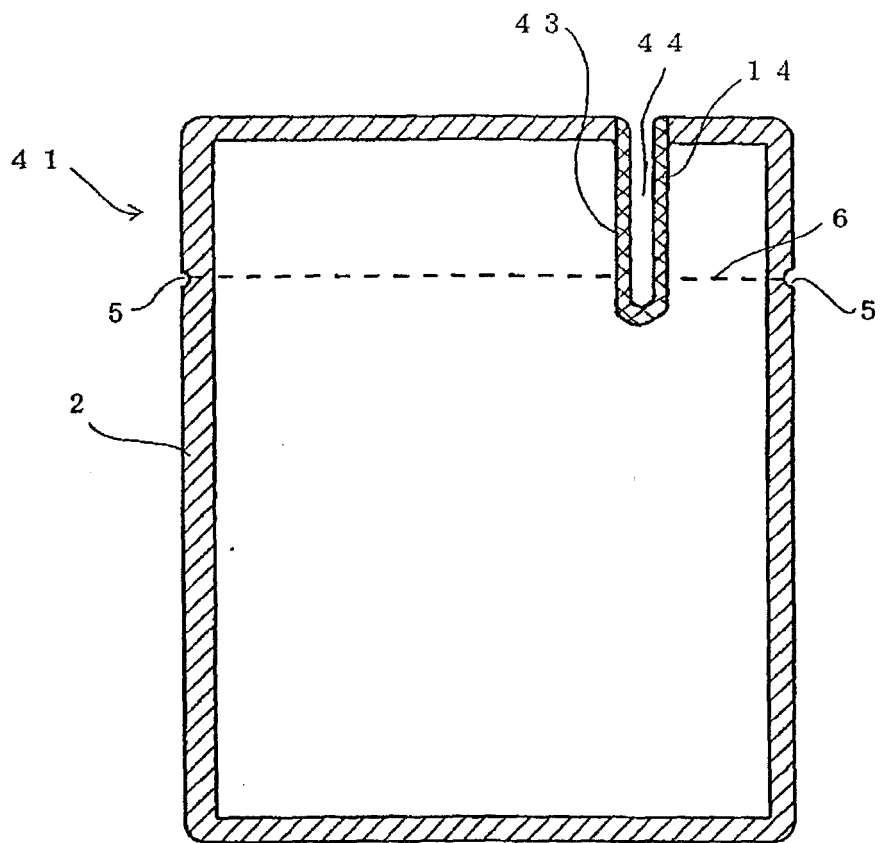


Fig.6

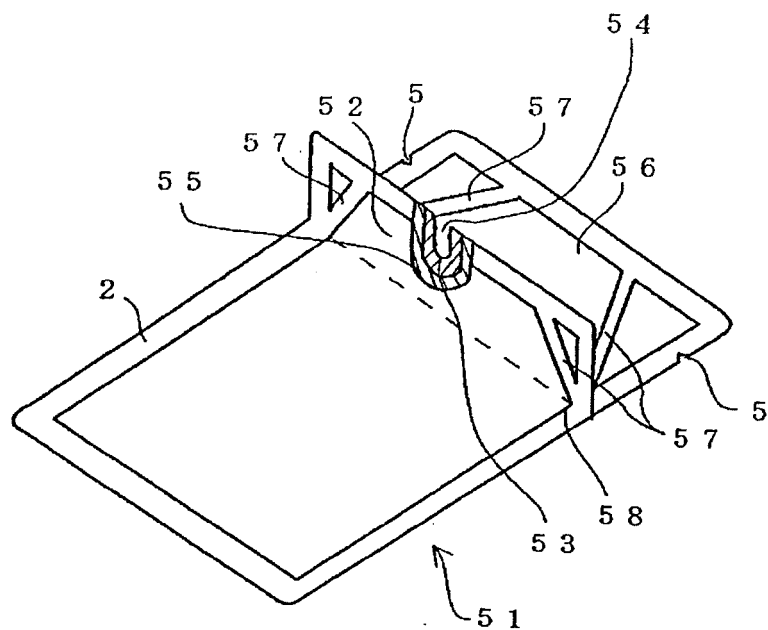


Fig.7



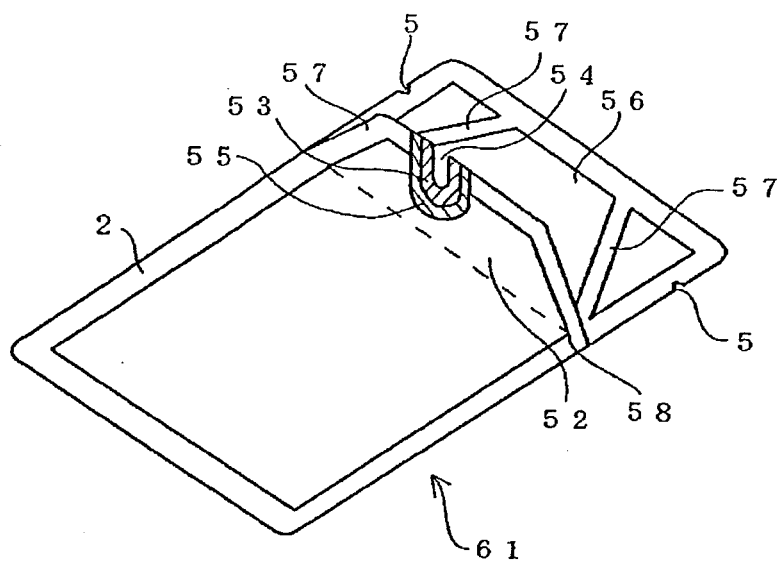


Fig.8

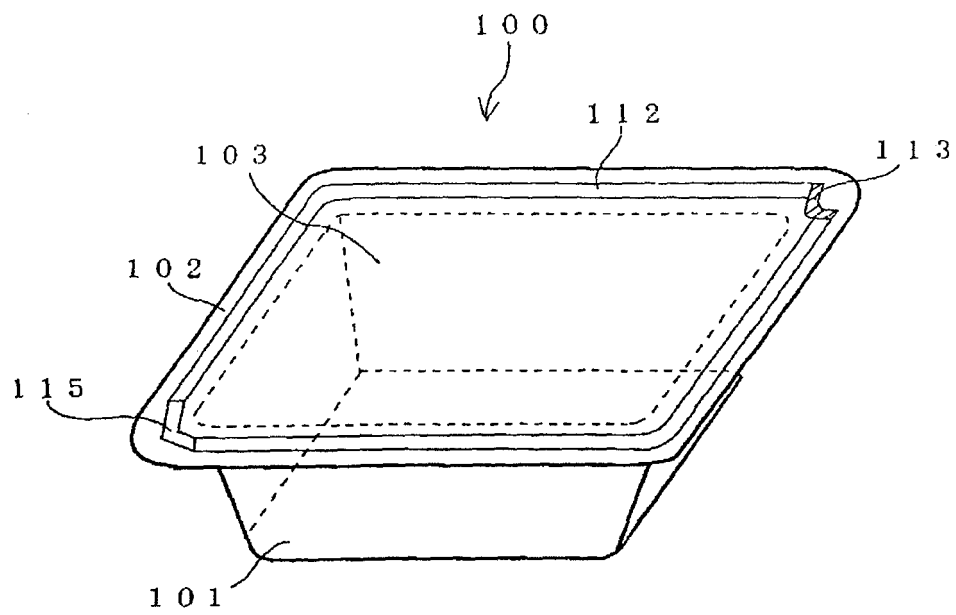


Fig.9

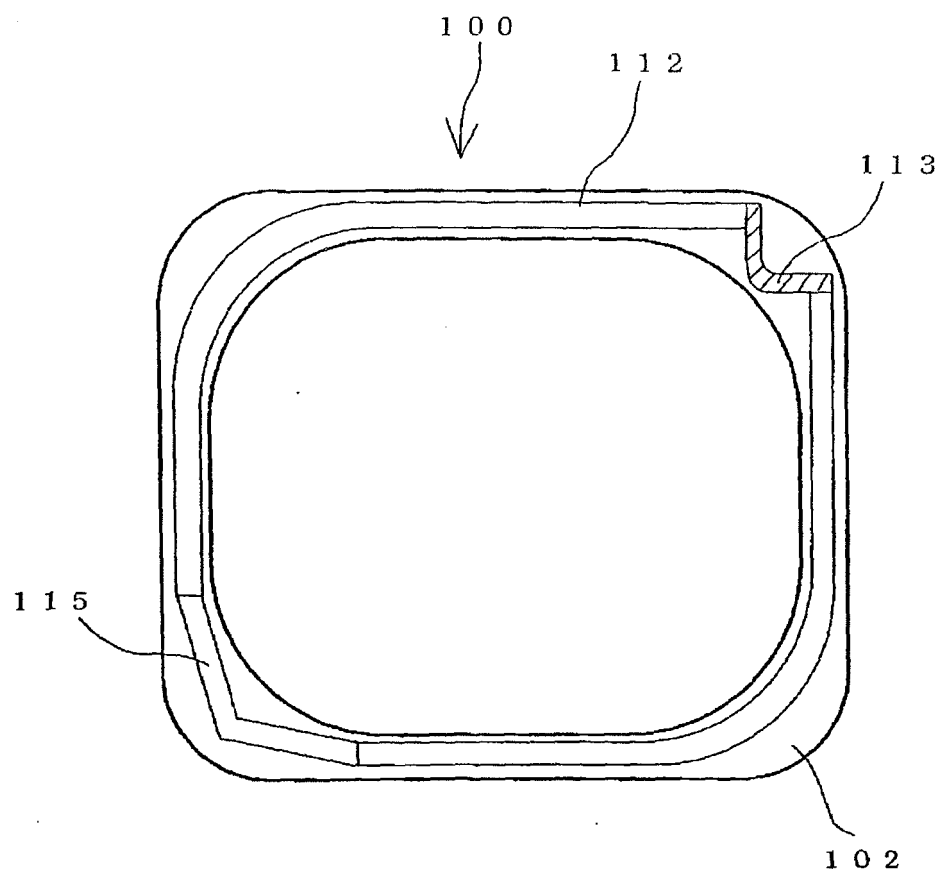


Fig.10

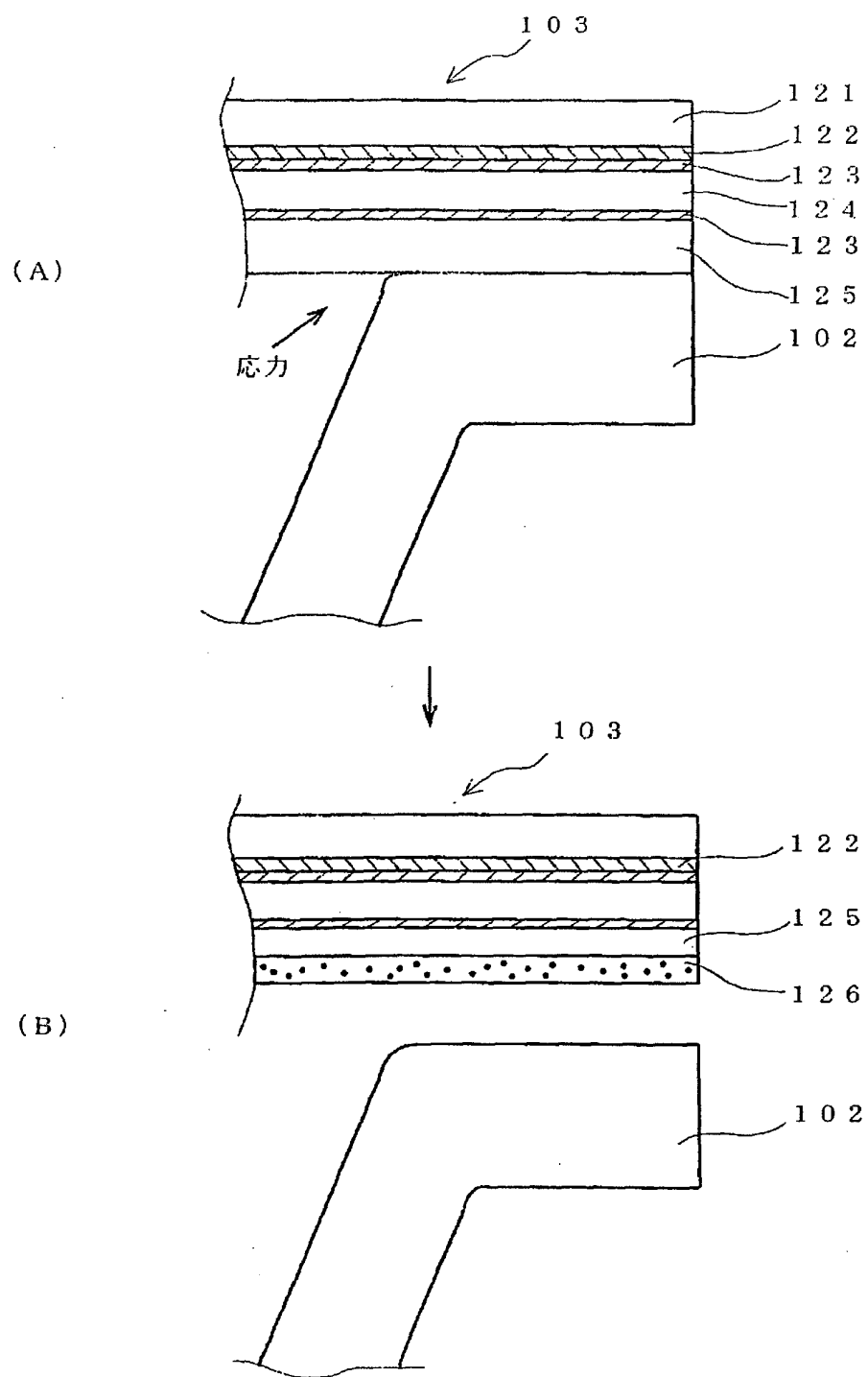


Fig.11

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2004/017278

A. CLASSIFICATION OF SUBJECT MATTER  
Int.Cl<sup>7</sup> B65D81/34

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<sup>7</sup> B65D81/34

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

Jitsuyo Shinan Koho	1922-1996	Toroku Jitsuyo Shinan Koho	1994-2004
Kokai Jitsuyo Shinan Koho	1971-2004	Jitsuyo Shinan Toroku Koho	1996-2004

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.
A	JP 3000625 U (Kabushiki Kaisha Morii), 01 June, 1994 (01.06.94), (Family: none)	1-15
A	JP 6-32359 A (Toyo Aluminium Kabushiki Kaisha), 08 February, 1994 (08.02.94), (Family: none)	1-15
A	JP 4-7073 Y2 (Fuji Shiru Kabushiki Kaisha), 26 February, 1992 (26.02.92), (Family: none)	1-15

☐ 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  
12 January, 2005 (12.01.05)

Date of mailing of the international search report  
25 January, 2005 (25.01.05)

Name and mailing address of the ISA/  
Japanese Patent Office

Authorized officer

Facsimile No.

Telephone No.