January 21, 2025

Certification

Welocalize Translations

TRANSLATOR'S DECLARATION:

I, Eric Vance, hereby declare:

That I possess advanced knowledge of the Japanese into English languages. The attached Japanese into English translation has been translated by me and to the best of my knowledge and belief, it is a true and accurate translation of: JP2004250040A

Eric Vance

Project Number: FBT_2501_P0002

15 W. 37th Street 4th Floor
New York, NY 10018
212.581.8870

(19) Japan Patent Office (JP) (12) JAPANESE UNEXAMINED PATENT APPLICATION PUBLICATION (A)

(11) Patent Application Publication No.
JP 2004-250040 A
(P2004-250040A)

(43) Publication Date: September 9, 2004 (Heisei 16)

(51) Int. Cl.[7]		FI			Theme Code (Reference)
B65D	23/08	B65D	23/08	BSFZ	3E033
B65D	1/09	B65D	81/24	D	3E062
B65D	81/24	B65D	81/30	BRLB	3E067
B65D	81/30	B65D	1/00	A	

Examination Request: Not yet No. of Claims: 5 OL (Total 15 pages)

(21) Application No. JP 2003-41999
(P2003-41999)

(22) Date of Filing February 20, 2003
(Heisei 15)

(71) Applicant 000002897
Dai Nippon Printing Co., Ltd.
1-1-1 Ichigayakaga-cho, Shinjuku-ku, Tokyo-to

(74) Agent 100111659
Satoru Kanayama, Patent Attorney

(72) Inventor Mie Ohta
c/o Dai Nippon Printing Co., Ltd.
1-1-1 Ichigayakaga-cho, Shinjuku-ku, Tokyo-to

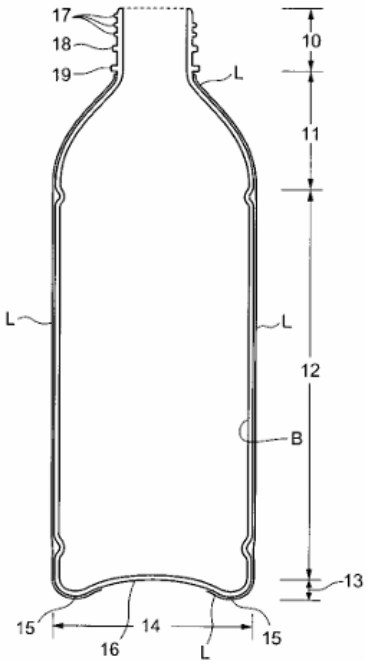
(72) Inventor Kazuhisa Nakai
c/o Dai Nippon Printing Co., Ltd.
1-1-1 Ichigayakaga-cho, Shinjuku-ku, Tokyo-to

F-Term (Reference) 3E033 AA02 BA15 BA16 BA17 BA18 BA24 BB01 CA16 DA03 DB01 DD05 EA20 FA03 GA02

Continued on final page

(54) [Title of Invention] SHRINK LABELLED BOTTLE

(57) [Abstract]
[Problem] To, in the field of shrink labelled bottles, provide a shrink labelled bottle in which a bottle body has a gas barrier properties, a shrink label applied to the bottle has a printed layer of a pattern or the like and a light shielding layer having excellent light shielding, the surface area of the bottle covered by the shrink label is large, and deterioration of contents due to light is more effectively suppressed.
[Resolution Means] A shrink labelled bottle is formed in a shape having a mouth neck portion 10 in which a bottle body B has gas barrier properties and to which a cap is attached, and a shoulder portion 11, a body portion 12, and a bottom portion 13 that follow the mouth neck portion 10, wherein a print layer of a pattern or the like and a light shielding layer having excellent light shielding properties are provided on the entire surface of the shrink label attached thereto, and a light shielding shrink label L thereof is attached so as to cover a region from the base portion of the mouth neck portion 10 of the bottle body B to the inside of a ground portion 15 of a bottom portion 13.
[Selected Drawing] FIG. 6



[Scope of Patent Claims]
[Claim 1]
A shrink labelled bottle in which a bottle body is formed from a mouth neck portion to which a cap is attached, a shoulder portion, a body portion, and a bottom portion that follow the mouth neck portion, and a shrink label is attached to the outer side, wherein the bottle body has gas barrier properties, the shrink label is formed in a configuration including at least a heat shrinkable film, a light shielding layer provided one entire surface of the heat shrinkable film, and a print layer of a pattern or the like, and the bottle body is attached so as to cover a region from the base portion of the mouth neck portion of the bottle body to the inner side of the ground portion of the bottom portion.
[Claim 2]
The shrink labelled bottle according to claim 1, wherein the light shielding layer is formed by a coating layer of a coating liquid containing at least one or both of titanium white (titanium oxide) powder and aluminum powder as a light shielding substance.
[Claim 3]
The shrink labelled bottle according to claim 1 or 2, wherein transmittance of ultraviolet rays and visible light rays in a wavelength range of 290 to 700 nm of the shrink label is 7% or less.
[Claim 4]
The shrink labelled bottle according to any one of claims 1 to 3, wherein the area of the bottom surface of the shrink labelled bottle that is not covered by the shrink label is 20 cm^2 or less.
[Claim 5]
The shrink labelled bottle according to any one of claims 1 to 4, wherein the bottle body of the shrink labelled bottle is formed of a resin whose main component is polyethylene terephthalate or another polyester resin, and the gas barrier properties of the bottle body are imparted by means that combine one or more from among multilayer molding, blend molding of two or more types of synthetic resins, vapor deposition, and coating means.
[Detailed Description of Invention]
[0001]
[Technical Field of Invention]
The present invention relates to a shrink labelled bottle, and more specifically relates to a shrink labelled bottle using a bottle having gas barrier properties in the bottle body, a shrink label having improved light shielding properties by providing a light shielding layer together with a printed layer of a pattern or the like in the shrink label, and further, to a shrink labelled bottle having improved light shielding properties of ultraviolet rays and visible light by increasing the covered surface area of the shrink labelled bottle, suppressing deterioration such as oxidation of contents loaded in the bottle, and improving perservability.
[0002]
[Conventional Art]
Conventionally, various plastic bottles, in addition to glass bottles and cans, are used as containers to fill, seal, and distribute liquid substances including alcoholic beverages such as beer, Japanese sake, foreign liquors, fruit juice, soft drinks such as cola, various types of tea, black tea, coffee, milk beverages, lactic acid beverages, or edible oil, soy sauce, noodle soup, sauce, dressing, and the like.
Of these, plastic bottles in particular are lightweight, have excellent processability in bottle molding, have excellent mass productivity, are relatively inexpensive to manufacture, have transparency, have a soft appearance, and are warm to the touch, and therefore, the amount used is rapidly increasing in recent years.
[0003]

However, with regard to the preservability of the contents of the plastic bottle, for example, in the case where the contents are beer, various types of milk beverages, and the like, in addition to the gas barrier properties of oxygen and the like, light shielding properties are required, but when a resin of the bottle is selected, there is nothing that combines the two, and there is a need to take some measure. Various studies have been made on the gas barrier properties described above heretofore, and examples include a method where a bottle has a multilayer configuration and gas barrier properties are imparted by providing a gas barrier resin layer such as an ethylene vinyl alcohol copolymer or the like in an intermediate layer or the like.

Furthermore, with regard to light shielding properties, as with the method for imparting gas barrier properties, for example, there is a blow molded bottle (for example, see Patent Document 1) in which the bottle has a multilayer configuration and light shielding properties is imparted by providing a resin layer containing a light reflective pigment and a light absorbing pigment as the light shielding resin layer in the intermediate layer.

Furthermore, as an improvement to a light shielding shrink label for covering a container surface such as a medicine, a label smaller than a synthetic resin colored film (for example, an opaque polyethylene film material colored orange) and having a fixed size (this label is configured of a first label piece and a second label piece that is adjacently separated from the first label piece, and the first label is adhered so as to be peelable) is arranged on the synthetic resin colored film, and this is wrapped around and adhered to the entire circumference of the body portion of a container such as a medicine and there is a label that imparts a description of display items and light shielding properties to the container (for example, see Patent Document 2).

[0004]

[Patent Document 1]

JP H5-338016 A (pages 2 to 4, FIG. 1)

[Patent Document 2]

JP H11-288221 A (pages 2 to 3, FIG. 1, FIG. 2)

[0005]

[Problem to Be Solved by Invention]

However, with the heat resistant light shielding blow molded bottle of the invention described in Patent Document 1, while favorable light shielding properties can be obtained, there is a problem where a method and the like is limited when recycling the bottle after use because a light reflecting pigment and a light absorbing pigment are contained in the resin of the bottle body. Furthermore, the "light shielding shrink label" of the invention described in Patent Document 2 (this label is adhered by a releasable adhesive and adhesive provided on the label, and it seems to be a light shielding label because there is no description for shrinking) uses a synthetic resin colored film (described as an opaque polyethylene film material colored orange for example) as a base material to provide light shielding properties, and on top of this, a first label piece printed and displayed with a general description necessary for selling and using the contents and a second label piece printed and displayed with a description that remains on the container surface even after the first label piece is removed by opening, and that includes the identification of the contents and the technical description necessary for medical offices and the like; furthermore, a separator is used on the back of the light shielding shrink label until it is used, and as a light shielding shrink label for use on bottles of beverages and the like, the structure is complicated and the manufacturing costs are high; furthermore, the position where this light shielding label is affixed is limited to the outer periphery of the body portion of the container as shown in FIG. 2, and the shoulder portion and bottom portion of the container cannot be covered at all, resulting in a problem that sufficient light shielding properties are not obtained overall.

[0006]
The present invention addresses the problem of providing a shrink labelled bottle, the bottle body having gas barrier properties, the shrink label to be applied to the bottle having excellent light shielding properties, the printed layer of a pattern or the like having good printing effect, the shrink label being applied so as to cover a region from the base portion of the mouth neck portion of the bottle body to the inside of the ground portion of the bottom portion, the shrink labelled bottle being suitably used for contents that require gas barrier properties and light shielding properties, the bottle body and the shrink label being easily separated after the bottle is used, and the bottle is not restricted from being recycled.
[0007]
[Means for Solving Problem]
The above problem can be solved by the present invention described below.
Namely, the invention according to claim 1 is a shrink labelled bottle in which a bottle body is formed of a mouth neck portion to which a cap is attached, a shoulder portion, a body portion, and a bottom portion that follow the mouth neck portion, and a shrink label is attached to the outside, wherein the bottle body has gas barrier properties, the shrink label is formed in a configuration that includes at least a light shielding layer provided on either the entire surface of a heat shrinkable film or the heat shrinkable film, and a print layer of a pattern or the like, and the bottle body is attached so as to cover a region from the base portion of the mouth neck portion of the bottle body to the inside of the ground portion of the bottom portion.
[0008]
In the present invention, as the bottle body having gas barrier properties, various plastic bottles provided with gas barrier properties by various means, glass bottles and the like can be used. The shape of the bottle is preferably a round bottle such as a round cross section, but the bottle may be a square bottle with a square cross section or a polygonal shape.
Furthermore, the heat shrinkable film used for the shrink label is not particularly limited and thus, for example, a polyester heat shrinkable film where a polyester copolymer resin or the like is stretched or a polystyrene heat shrinkable film, a polyvinyl chloride heat shrinkable film, a special polyethylene such as cross-linked polyethylene or an ethylene vinyl acetate copolymer, or a polyolefin heat shrinkable film using polypropylene or the like can all be used.
[0009]
In addition to being formed as a single layer, this type of heat shrinkable film can also use a heat shrinkable film of a laminated configuration formed by laminating a plurality of layers. In addition, uniaxially oriented heat shrinkable films are usually used, but biaxially oriented heat shrinkable films that balance vertical and horizontal shrinkage may also be used as necessary for applications.
The heat shrinkage rate of this type of heat shrinkable film, depending on the shape of the bottle body, and particularly the difference between the outer periphery of the mouth neck portion and the body portion, is preferably 55 to 80% in the direction corresponding to the circumferential direction of the bottle (normally, the width direction (TD direction) of the film).
Furthermore, the thickness of the heat shrinkable film varies depending on the material and the size of the bottle to which the shrink label is attached, but normally a range of 20 to 120 μm is appropriate.
[0010]
The light shielding layer is normally opaque to the light shielding layer provided on either the entire surface of the heat shrinkable film or to the printed layer of a pattern or the like, and thus when providing on the outer surface of the heat shrinkable film, the light shielding layer may be provided first, and the printed layer may be provided thereon, and as necessary, an overprint layer may be

further provided thereon to protect the printed layer. Furthermore, when providing on the inner surface of the heat shrinkable film, the printed layer may be provided first and a light shielding layer may be provided on top thereof. In this case as well, a slippery protective layer or the like for protecting the light shielding layer and improving slipperiness with the bottle surface may also be further provided thereon.

[0011]

The printed layer of the pattern or the like can be provided by commonly used printing means such as gravure printing or the like. Furthermore, providing the light shielding layer by a printing means similar to a printed layer of a pattern or the like is preferable because processing can be performed in line with the printed layer of the pattern or the like and because productivity is excellent; however, because this pattern is a simple pattern with a solid overall surface other than removing, for example, the bonded portion of the shrink label to a band shape, it can also be provided by various coating means such as a roll coat.

The light shielding layer can normally be formed by dispersing or dissolving various light shielding substances in a solution of a binder to prepare a coating solution, applying this coating solution using the printing or coating means, and drying.

This type of light shielding layer may be formed by one layer, but by forming a plurality of layers such as two layers, three layers, and the like by stacking, light shielding properties can be made even more superior.

[0012]

The light shielding material used in the light shielding layer can be any material that can block ultraviolet rays and/or visible light rays by reflection, diffusion, absorption, scattering, and the like.

Examples of substances that reflect, diffuse, or scatter ultraviolet and/or visible light include powders such as titanium dioxide, zinc oxide, iron titanate, iron oxide, zirconium oxide, cerium oxide, magnesium oxide, silica, alumina (particularly flat powder), zeolite, talc, kaolin, aluminum silicate, calcium silicate, magnesium silicate, calcium carbonate, magnesium carbonate, barium sulfate, magnesium sulfate, calcium sulfate, aluminum, copper, and other inorganic powders such as iron oxide - titanium oxide sinter, silica - cerium oxide coating pigments, and the like.

[0013]

Furthermore, examples of organic substances include powders or beads such as polyamide resins, polyethylene, polypropylene, polystyrene, polymethyl methacrylate, styrene-acrylic acid copolymers, fluororesins, and the like.

[0014]

An ultraviolet absorber for absorbing ultraviolet rays can be further added to the light shielding layer. Examples of available ultraviolet absorbers include benzophenone-based ultraviolet absorbers, benzotriazole-based ultraviolet absorbers, triazine-based ultraviolet absorbers, acid-modified anilide-based ultraviolet absorbers, cyanoacrylate-based ultraviolet absorbers, and the like; for example, 2-hydroxy-4-methoxybenzophenone, 2-hydroxy-4-methoxybenzophenone-5-sulfonic acid, 2-hydroxy-4-methoxybenzophenone-5-sulfonic acid sodium salt, 2,2'-dihydroxy-4,4'-dimethoxybenzophenone-5-sulfonic acid sodium salt, 2,4'-dihydroxybenzophenone, 2,2,4,4'-tetrahydroxybenzophenone, and the like are examples of benzophenones, and 2-(2-hydroxy-5-methylphenyl)benzotriazole and the like are examples of benzotriazoles.

[0015]

Furthermore, examples of substances that absorb, scatter, and diffuse ultraviolet and/or visible light include powders such as carbon black, titanium dioxide, zinc oxide, iron oxide, zirconium oxide, cerium oxide, magnesium oxide, chromium oxide, alumina, zeolite, talc, kaolin, aluminum silicate,

calcium silicate, magnesium silicate, barium silicate, strontium silicate, calcium carbonate, magnesium carbonate, barium sulfate, magnesium sulfate, calcium sulfate, calcium phosphate, iron titanate, tungstate metal salt, and the like, or powders such as silica - cerium oxide coating pigments, titanium oxide sinter, or plastic beads such as silica beads, nylon, acrylic resin, and the like.
The light shielding substance described above can be used in a mixture of two or more types in addition to using one type alone, and furthermore, as described above, the layer containing these light shielding substances may be made into a light shielding layer by one layer, but a light shielding layer with even more excellent light shielding properties can be made by stacking a plurality of layers such as two layers, three layers, and the like.

[0016]

By adopting such a configuration, the shrink labelled bottle according to claim 1 has a bottle body having gas barrier properties, and the shrink label applied has an excellent light shielding layer with light shielding properties on the entire surface thereof, and a printed layer of a pattern or the like can be provided on the outer side thereof; also, because the shrink label is applied so as to cover a region from the base portion of the mouth neck portion of the bottle to the inner side of the ground portion of the bottom portion, design properties and excellent light shielding properties are imparted to the bottle, and even when the shrink labelled bottle filled with content and sealed is displayed for a long period of time on a display shelf such as a supermarket or a CVS, ultraviolet rays and visible light rays such as illumination can be prevented from permeating directly or by reflection from the vicinity of the bottom portion of the bottle, and material change and color change from oxidation and the like of the content or scent and taste deteriorations and the like can be suppressed, thereby improving preservability of the content.

[0017]

The invention according to claim 2 is made of the shrink labelled bottle according to claim 1, wherein the light shielding layer is formed by a coating layer of a coating solution containing at least one or both of titanium white (titanium oxide) powder and aluminum powder as the light shielding substance.

[0018]

By adopting such a configuration, in addition to the operational effect of the invention described in claim 1, the light shielding layer can be a white or silver color; therefore, by providing the light shielding layer on the back surface of the printed layer of a pattern or the like, the printing effect of the printed layer can be enhanced for a wide range of designs, and the design properties of the shrink labelled bottle can be further improved.
Furthermore, the titanium white (titanium oxide) powder and the aluminum powder not only have excellent performance as a white or silver coloring agent but also have excellent performance as a light shielding substance. Moreover, the titanium white powder has a characteristic of having an excellent barrier properties against ultraviolet rays but a barrier properties against visible light rays being insufficient, and the aluminum powder has an excellent barrier properties against both ultraviolet rays and visible light rays; however, it is difficult to uniformly spread across the entire surface of the coating layer, and it has a characteristic of easily forming minute gaps between powder particles.
Accordingly, when using the coating film as a light shielding layer, it is preferable to use either of a method that mixes the two, a method that uses a plurality of the coating film layers stacked together, or a method that combines and stacks the coating film layers of the two, or a method that combines these.

[0019]

The invention according to claim 3 is made from the shrink labelled bottle according to claim 1 or 2,

wherein transmittance of ultraviolet rays and visible light rays in a wavelength range of 290 to 700 nm of the shrink label is 7% or less.

[0020]

In the present invention, the transmittance of the ultraviolet rays and visible light rays in the wavelength range of 290 to 700 nm is a value measured by a spectrophotometer (made by Shimadzu Corporation, UV-2400PC).

In order to effectively improve the preservability of the contents filled into the shrink labelled bottle, it is preferable to minimize the transmittance of the ultraviolet rays and visible light rays in the wavelength range of 290 to 700 nm of the shrink label, and more specifically, it is preferable to reduce the transmittance to 7% or less. When the transmittance exceeds 7%, it is not preferable because a significant improvement effect cannot be obtained with regard to the preservability of the contents.

Furthermore, in order to reduce the transmittance of the ultraviolet rays and visible light rays in the wavelength range of 290 to 700 nm of the shrink label to 7% or less, for example, the contents of the light shielding substance included in the coating liquid of the light shielding layer can be increased, and the film thickness of the light shielding layer can be formed to be thick in a range of 3 to 20 μm, more preferably in a range of 8 to 15 μm.

When the film thickness of the light shielding layer is less than 3 μm, it is not preferable because the transmittance of the ultraviolet rays and the visible light rays becomes difficult to be 7% or less. Furthermore, when the film thickness of the light shielding layer exceeds 20 μm, light shielding properties for reducing the transmittance of the ultraviolet rays and visible light rays to 7% or less is already sufficiently obtained, and this is not necessary, but is rather undesirable because this hinders thermal contraction of the shrink label.

Therefore, by adopting a configuration like that described above, in addition to the operational effect of the invention described in claim 1 or 2, the entry of ultraviolet rays and visible light rays in a wavelength range of 290 to 700 nm into the shrink labelled bottle can be suppressed to a low level; therefore, the effect of light on the contents filled in the bottle can be further reduced, and the storage stability of the contents can be further reliably and effectively improved.

[0021]

The invention according to claim 4 is made from the shrink labelled bottle according to any one of claims 1 to 3 wherein the area of the bottom surface of the shrink labelled bottle that is not covered by the shrink label is 20 cm^2 or less.

[0022]

In the present invention, in order to improve light shielding properties of the bottle and minimize the effect of light on the content, it is preferable to reduce the transmittance of the ultraviolet rays and visible light rays of the shrink label applied to the bottle to 7% or less, and more preferably to 1% or less, and to reduce the area of the portion not covered by the shrink label of the bottle to the utmost.

For example, if a method is used where the shrink label is applied in a divided manner such as the top portion, middle portion, and bottom portion of a bottle, the entire surface of the bottle can be covered, but this is not necessarily a good idea because manufacturing costs increase and external appearance problems arise.

Therefore, in order to improve the light shielding properties of the bottle and improve the preservability of the content while maintaining economic efficiency, it is effective to form a light shielding shrink label in one piece, apply the shrink label so as to cover the region from the base portion of the mouth neck portion of the bottle to the inside of the ground portion of the bottom portion, and make the area of the non-covered portion by the shrink label of the bottom surface of the bottle 20 cm^2 or less; therefore, for a bottle of a general shape, for example, a light shielding shrink

label can be sufficiently manufactured using a heat shrinkable film with a heat shrinkage rate of 60 to 80%.

By adopting such a configuration, in addition to the operational effect of the invention according to any one of claims 1 to 3, light transmitted by reflection or the like from the periphery of the bottom portion of the bottle can be further reduced, and the preservability of the contents can be further improved.

[0023]

The invention according to claim 5 is made from the shrink labelled bottle according to any one of claims 1 to 4, wherein the bottle body of the shrink labelled bottle is formed of a resin whose main component is polyethylene terephthalate or another polyester resin, and the gas barrier properties of the bottle body are imparted by one type or a combination of two or more types of means from among multilayer molding, blend molding of two or more types of synthetic resins, vapor deposition, or coating means.

[0024]

When the means for imparting gas barrier properties to the bottle body is a multilayer molding, a configuration can be adopted in which a gas barrier resin layer such as a saponified ethylene-vinyl acetate copolymer (hereinafter abbreviated as EVOH) or MXD6 (polymethaxylylene adipamide) or the like is laminated, for example, on an intermediate layer or the like.

When the means for imparting the gas barrier properties is a blend molding of two or more kinds of synthetic resins, the gas barrier properties can be improved by molding the bottle body by blending a gas barrier resin such as MXD6 or the like with polyethylene terephthalate (hereinafter abbreviated as PET). Furthermore, the oxygen barrier properties can also be improved by blending an oxygen absorbent into the PET besides the gas barrier resin.

[0025]

When the means for imparting gas barrier properties is a vapor deposition means, not only can the gas barrier properties be imparted by vapor deposition of a metal such as aluminum or the like to a thickness of approximately 200 to 1000 Å using vacuum vapor deposition or the like but also a transparent gas barrier layer can be provided by vapor deposition of an inorganic oxide such as silica, alumina, zinc oxide or the like or amorphous carbon to a thickness of approximately 200 to 1000 Å using a CVD method or a PVD method such as vacuum vapor deposition, ion plating, sputtering or the like.

[0026]

When a coating means is used, gas barrier properties can be improved by coating an aromatic polyvalent epoxy compound obtained by reacting meta-xylenediamine with epichlorohydrin with a thermosetting crosslinked coating film of polyvalent amine, polyvinylidene chloride, EVOH or the like. When EVOH is coated, gas barrier properties decrease due to moisture absorption, and therefore, it is preferable to coat the gas barrier properties further with a moisture-proof resin such as a polyolefin resin or the like.

Any one of the gas barrier properties improving means may be used, but the gas barrier properties can be further improved by using a combination of two or more kinds of means.

[0027]

By adopting a configuration as described above, in addition to the operational effect of the invention according to any one of claims 1 to 4, the bottle body is formed of a resin mainly containing PET or other polyester resin with excellent rigidity and other mechanical strength, and because gas barrier properties can be imparted with even greater gas barrier properties, the storage properties of the filled contents can be further improved.

Note that in the means for imparting the gas barrier properties described above, the resin of the bottle body is not limited to a resin whose main component is the polyester resin, and because the same can be applied to a resin whose main component is a polyolefin resin such as high density polyethylene or polypropylene, for example, the means can impart excellent gas barrier properties even to a bottle molded using these resins.

[0028]

[Embodiment of Invention]

Examples of the present invention will be described below with reference to drawings.

However, the present invention is not limited to the following drawings unless the gist thereof is not exceeded.

FIG. 1 to FIG. 4 are schematic partial cross-sectional diagrams illustrating an example configuration of a light shielding shrink label used in a shrink labelled bottle of the present invention, respectively. Further, FIG. 5 is a front view illustrating an example configuration of a bottle body used in a shrink labelled bottle of the present invention.

FIG. 6 is a vertical cross-sectional view illustrating a configuration of one example of a shrink labelled bottle of the present invention, and is a vertical cross-sectional view illustrating a configuration when a light shielding shrink label is applied to the bottle body of the configuration illustrated in FIG. 5.

[0029]

The light shielding shrink label 100 illustrated in FIG. 1 is configured by providing a print layer 2 of a pattern or the like by gravure printing or the like on an inner side surface (lower side surface in the figure) of a heat shrinkable film 1 and providing a light shielding layer 3 on the entire surface thereof. When applying the light shielding shrink label 100 of this type of configuration on a bottle, the end edges on both sides are normally bonded together using a solvent or the like in an envelope bonding form to form a cylindrical body, which is then arranged in a predetermined position on the bottle and is applied by being heat shrunk. Accordingly, it is preferable for the printed layer 2 and the light shielding layer 3 to form a pattern where one end edge portion that will be a joining portion when the light shielding shrink label 100 is pasted in a cylindrical shape is removed from the belt shape. This point is the same for the light shielding shrink labels 200 to 400 illustrated in FIG. 2 to FIG. 4 below.

[0030]

The light shielding shrink label 200 illustrated in FIG. 2 is configured by providing a print layer 2 of a pattern or the like by gravure printing or the like on an inner side surface (lower side surface in the figure) of a heat shrinkable film 1 and further dividing the light shielding layer into two layers, a light shielding layer 3a and a light shielding layer 3b, and laminating them on an entire surface.

[0031]

The light shielding shrink label 300 illustrated in FIG. 3 is configured by providing a print layer 2 of a pattern or the like by gravure printing or the like on an inner side surface (lower side surface in the figure) of a heat shrinkable film 1 and further dividing the light shielding layer into three layers of a light shielding layer 3a, a light shielding layer 3b, and a light shielding layer 3c and laminating them on an entire surface.

[0032]

Further, the light shielding shrink label 400 illustrated in FIG. 4 is configured by providing a light shielding layer on the outer side surface (top side surface in the figure) of the heat shrinkable film 1 with a two-layer configuration, a light shielding layer 3b and a light shielding layer 3a on the entire surface in this order, providing a printed layer 2 of a pattern or the like on top thereof in a surface printing format, and further providing an overprint layer 4 on top thereof for protecting the printed layer 2 of the pattern or the like.

[0033]
This type of configuration illustrates a configuration of one example of when the print layer 2 of a pattern or the like of the light shielding shrink label 200 of the configuration illustrated in FIG. 2 is changed to a surface printing format, and even for the light shielding shrink labels 100, 300 of the configuration illustrated in FIG. 1 and FIG. 3, the print layer 2 of the pattern or the like can be changed to a surface printing format by a similar method.
Furthermore, as another configuration example of when the print layer 2 of a pattern or the like is provided by changing to a surface printing format, for example, in the configuration of the light shielding shrink label 400 illustrated in FIG. 4, the print layer 2 of a pattern or the like and the overprint layer 4 above are only provided on the outer surface (top surface in the drawing) of the heat shrinkable film 1, and the light shielding layer 3a and the light shielding layer 3b can be configured by providing on the inner surface (bottom surface in the drawing) of the heat shrinkable film 1.
[0034]
In the configuration of the light shielding shrink label 100 to 400 illustrated in FIG. 1 to FIG. 4, the light shielding layers 3, 3a provided in contact with the back surface of the print layer 2 of a pattern or the like are, depending on the design of the print layer 2 of the pattern or the like, normally, a white or silver color is preferable in order to enhance the printing effect. Accordingly, it is preferable to use a white pigment such as titanium white and the like and a silver light shielding substance such as aluminum powder as the light shielding substance used in the light shielding layers 3, 3a, and it is preferable to use these single or mixed light shielding substances.
[0035]
Furthermore, not only when the light shielding layer 3 is provided as a single layer as in the light shielding shrink label 100 illustrated in FIG. 1, but also when the light shielding layer is formed by two or three layers as in the light shielding shrink label 200 to 400 illustrated in FIG. 2 to FIG. 4, in order to raise the light shielding properties of the overall light shielding layer, each light shielding layer preferably contains the light shielding substance in high concentration as much as possible in the formation of a coating film thereof.
For example, with the white ink used in normal gravure printing, titanium white is added in a range of 25 to 35 parts by mass relative to 10 parts by mass of the resin of the binder, but with the present invention, it is possible to increase the contents of titanium white in the light shielding layer to a range of 35 to 55 parts by mass relative to 10 parts by mass of the resin of the binder and add titanium white, and by this, the transmittance of ultraviolet rays and visible light rays in a range of a wavelength of 290 to 700 nm of the light shielding shrink label can be further reliably reduced to 7% or less.
Similarly, in the silver ink used in normal gravure printing, aluminum powder is added in a range of 5 to 10 parts by mass relative to 10 parts by mass of the resin of the binder, but in the present invention, it is possible to increase the aluminum powder contents of the light shielding layer to a range of 10 to 20 parts by mass relative to 10 parts by mass of the resin of the binder and add, by this, the transmittance of ultraviolet rays and visible light rays in a range of a wavelength of 290 to 700 nm of the light shielding shrink label can be further reliably reduced to 7% or less.
[0036]
Furthermore, when forming the light shielding layer from a plurality of two or three layers such as light shielding layers 3a and 3b or light shielding layers 3a, 3b, and 3c such as the light shielding shrinkable labels 200 to 400 illustrated in FIG. 2 to FIG. 4, it is preferable that the light shielding layer 3a provided in contact with the back surface of the printed layer 2 for the pattern or the like, as described above, is a white or silver color, but even though the other light shielding layers 3b and 3c are colored other than white or silver, there is not much risk of impairing the printing effect of the

printed layer 2 for the pattern or the like, and thus a colored light shielding substance can be used for the light shielding layers 3b and 3c. As a result, the transmittance of the ultraviolet rays and the visible light rays in the wavelength region can be easily lowered to 1% or less, and the light shielding properties of the light shielding shrink labels 200 to 400 can be remarkably improved.

[0037]

Next, FIG. 5 is a front view illustrating an example configuration of a bottle body used in a shrink labelled bottle of the present invention.

Further, FIG. 6 is a vertical cross-sectional view illustrating a configuration of one example of a shrink labelled bottle of the present invention, and is a vertical cross-sectional view illustrating a configuration of one example where a light shielding shrink label is applied to the bottle body illustrated in FIG. 5.

The bottle body B illustrated in FIG. 5 is normally a shape manufactured by stretch blow molding or the like of plastic and illustrates an example of a round bottle that is formed from the top with a mouth neck portion 10 followed by a shoulder portion 11, a body portion 12, and a bottom portion 13 with a cross-section in a circular shape. Further, a screw 17 is provided on an upper outer periphery of the mouth neck portion 10, a locking portion 18 and a support ring 19 are provided below it in order, a ring shaped ground portion 15 that is downwardly convex is provided on an outer peripheral edge of a bottom surface 14 on a lower side of the bottom portion 13, and a concave portion 16 such as a multi-stage type is provided on an inner side of the ground portion 15.

Note that, although not illustrated in the drawings, concave groove shaped ribs in the vertical and horizontal directions and wall plate portions for absorbing reduced pressure and the like can be provided on the wall surface of the body portion 12 in order to stabilize the shape of the bottle.

[0038]

Furthermore, the shrink labelled bottle illustrated in FIG. 6 is configured by applying a light shielding shrink label L on the outer peripheral surface of the bottle body B illustrated in FIG. 5 so as to cover the region from the base portion of the mouth neck portion 10, that is, in this situation, the bottom of the support ring 19 to the inner side of the ground portion 15 on the bottom portion 13.

For example, light shielding shrink labels 100 to 400 configured as illustrated in FIG 1 to FIG. 4 can be used for the light shielding shrink label L.

Furthermore, in order to apply the light shielding shrink label L so as to cover the region of the bottle body B, it is particularly necessary that the cylindrical light shielding shrink label L be disposed in a state protruding downward from the lower end of the bottle body B, and in order to do this, the heat shrinking device can use, for example, a device that can perform heat shrinking while holding and rotating the bottle in a state where it is lifted by the center portion of the bottom surface and the cap portion, or a device that can perform heat shrinking while rotating the bottle in the case of a round bottle and the like.

[0039]

[Examples]

Below, the present invention will be described in greater detail using examples and comparative examples.

(Example 1)

A shrink labelled bottle is manufactured in a configuration such as that illustrated in FIG. 6, the bottle body B uses a round bottle with a circular cross-section by multilayer stretch blow molding of a polyester system configured by using a EVOH layer as an intermediate layer with a capacity of 500 ml and by layering a polyester resin layer on both sides to provide gas barrier properties, the light shielding shrink label L was made by providing a print layer (five colors) of a pattern or the like by

gravure printing on the inner surface of a polyester shrink film having a thickness of 60 μm, providing a light shielding layer with a total thickness of 10 μm in a three-layer configuration formed by beta printing two high concentration white inks and one high concentration silver ink color as the light shielding layer, and laminating the light shielding layer in a cylindrical shape with light shielding properties, and, using the light shielding shrink label L made by pasting such in a tubular shape, the shrink labelled bottle of example 1 was made by applying the shrink label L to cover the region from the base portion of the mouth neck portion 10 of the bottle body B (in this case, directly below the support ring 19) to the inner side of the ground 15 of the bottom portion 13, and applying the shrink label L so that the bottom surface is considered to be a flat bottom surface and is substantially circular with a diameter of 25 mm and an area thereof is substantially 4.9 cm^2 as illustrated in FIG. 7 (a).

[0040]

Note that the transmittance of the ultraviolet rays and visible light rays in the wavelength range of 290 to 700 nm of the light shielding shrink label L was zero in the wavelength range of 290 to 400 nm and approximately 1% in the wavelength range of 400 to 700 nm, as a result of measuring a portion where there is no printed layer of a pattern or the like by a spectrophotometer (made by Shimadzu Corporation, UV-2400PC).

The light shielding shrink label L is applied to the bottle by refilling a bottle body B with canned beer on the market as the contents, and sealing the refilled bottle with a cap.

[0041]

(Example 2)

In the configuration of the shrink labelled bottle of example 1, the shrink labelled bottle of example 2 was manufactured similar to example 1 by making the applying range of the light shielding shrink label L applied to the bottle body B into a substantially circular diameter of 37 mm and the area changed to be substantially 10.7 cm^2 by regarding the bottom surface of the bottle as a flat bottom surface as illustrated in FIG. 7 (b) where the uncovered portion due to the shrink label L in the bottom surface of the bottle is in the region from the base portion of the mouth neck portion 10 of the bottle, that is, directly below the support ring 19 to the inside of the ground portion 15 of the bottom portion 13 of the bottle.

[0042]

(Example 3)

In the configuration of the shrink labelled bottle of example 1, the shrink labelled bottle of example 3 was manufactured similar to example 1 by making the applying range of the light shielding shrink label L applied to the bottle body B into a substantially circular diameter of 50 mm and the area thereof changed to be substantially 19.6 cm^2 by regarding the bottom surface of the bottle as a flat bottom surface as illustrated in FIG. 7 (C) where a uncovered portion by the shrink label L is formed on the bottom surface of the bottle in a region from the base portion of the mouth neck portion 10 of the bottle, that is, directly below the support ring 19, to the inside of the ground portion 15 of the bottom portion 13 of the bottle.

[0043]

(Comparative Example 1)

In the configuration of the shrink labelled bottle of example 1, the shrink labelled bottle of comparative example 1 was produced in the same manner as in example 1, except that the attachment range of the light shielding shrink label L attached to the bottle body B was changed to the base portion of the bottle neck portion 10, that is, the area from just below the support ring 19 to near the lower end of the side circumference of the bottom portion 13 of the bottle, and the portion of the bottle bottom surface that was not covered by the shrink label L was changed so that the bottom surface was

considered to be a flat bottom surface and was a circle with a diameter of approximately 62 mm and an area of approximately 30.2 cm^2 except that it is manufactured in a similar manner to example 1 to manufacture the shrink labelled bottle of the first comparative example. The applying range of the light shielding shrink label L is normally in the same range as what is called a full shrink label.

[0044]

For the shrink labelled bottles of examples 1 to 3 and comparative example 1 manufactured as described above, as an acceleration test to compare and evaluate the effect of improving the preservability of the contents due to the light shielding properties, a preservation test was performed for up to 28 days under the following preservation conditions, and the deterioration state of the contents (beer) was examined by performing color difference measurement of the contents every 7 days using a color computer (made by Suga Testing Machine, SM color computer, C light source, and 2° field), and changes in the ΔE* values thereof are collectively illustrated in the graph in FIG. 8. Furthermore, simultaneously with the measurement of the color difference described above, the change in smell and taste was also examined by sensory tests.

Note that canned beer was added to the test sample as a reference example to illustrate an example of a situation where light was completely blocked.

(Criteria for a Preservation Test)

Each sample was directly irradiated with light from the bottom portion of the bottle at an average illuminance of 1800 Lx using a fluorescent lamp at a storage temperature of 3°C, and stored for 28 days.

[0045]

[Evaluation Results]

As evident from the graph of the ΔE* value illustrated in FIG. 8, the beer filled in the shrink labelled bottle of comparative example 1 had a high ΔE* value of 2.7 after seven days and a high value of 3.8 after 28 days, while the beer filled in the bottles with the shrink label of examples 1 to 3 had a relatively low ΔE* value of 0.4 to 1.5 after seven days and 1.2 to 2.5 after 28 days, with little color deterioration and good storage stability.

Furthermore, with the sensory inspection of smell and taste, the beer filled in the shrink labelled bottle of comparative example 1 had a different smell after 14 days, but the beer filled in the bottles with the shrink label of examples 1 to 3 had a good smell with little change in smell and taste even after 28 days.

[0046]

[Effect of Invention]

As described in detail above, according to the present invention, a shrink labelled bottle has a bottle body having gas barrier properties, a shrink label applied to an outer side of the bottle has excellent light shielding properties, a printing effect of a printed layer of a pattern or the like printed on the shrink label is also good, the shrink label can be applied so as to cover a region from a base portion of a mouth neck portion of the bottle body to an inner side of a ground portion of a bottom portion, the shrink label can be suitably used for contents that requires gas barrier properties and light shielding properties, and furthermore, after the bottle is used, the bottle body and the shrink label can be easily separated, and a shrink labelled bottle that has few restrictions on recycling can be provided with high productivity.

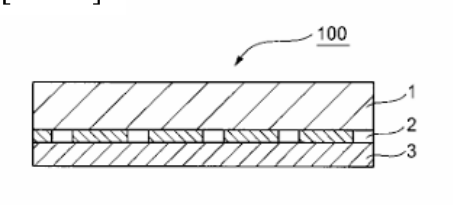
[Brief Description of Drawings]

[FIG. 1] A schematic partial cross-sectional view illustrating the configuration of example 1 of the light shielding shrink label used in the shrink labelled bottle of the present invention.

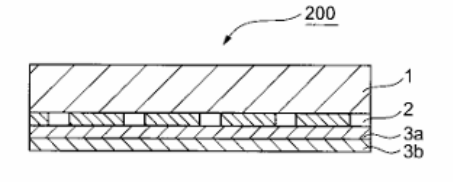
[FIG. 2] A schematic partial cross-sectional view illustrating the configuration of example 2 of the

light shielding shrink label used in the shrink labelled bottle of the present invention.
[FIG. 3] A schematic partial cross-sectional view illustrating the configuration of example 3 of the light shielding shrink label used in the shrink labelled bottle of the present invention.
[FIG. 4] A schematic partial cross-sectional view illustrating the configuration of example 4 of the light shielding shrink label used in the shrink labelled bottle of the present invention.
[FIG. 5] A front view illustrating an example configuration of a bottle body used in the shrink labelled bottle of the present invention.
[FIG. 6] A vertical cross-sectional view illustrating a configuration of one example of a shrink labelled bottle of the present invention.
[FIG. 7] A diagram describing, in the shrink labelled bottle of the present invention, a covering state of a bottle bottom surface by a light shielding shrink label, and (a) is a diagram illustrating an example where an area of a covering portion of a bottom surface by the light shielding shrink label is large and an area of a uncovered portion is small, (b) is a diagram illustrating an example where an area of a uncovered portion is approximately intermediate, and (c) is a diagram illustrating an example where an area of a uncovered portion is large.
Note that the dimensions (D_1, D_2) illustrated in the drawing are numerical values for a round bottle formed by stretch blow molding of plastic with a normal capacity of 500 ml, where (a) corresponds to example 1, (b) corresponds to example 2, and (c) corresponds to example 3.
[FIG. 8] A graph illustrating results of a preservation test of contents by light irradiation of a shrink labelled bottle filled with beer prepared in examples and comparative examples.
[Description of Reference Numerals]
1 Heat shrinkable film
2 Print layer of pattern or the like
3, 3a, 3b, 3c Light shielding layer
4 Overprint layer
10 Mouth neck portion
11 Shoulder portion
12 Body portion
13 Bottom portion
14 Bottom surface
15 Ground portion
16 Recessed portion
17 Screw
18 Locking ring
19 Support ring
21 Outer circumference of bottom surface
22 Inner line of ground portion
23 Part covered by light shielding shrink label
24 End portion of light shielding shrink label
25 Uncovered portion
D_1 Bottom outer diameter
D_2 Diameter of uncovered portion
B Bottle body
L Light shielding shrink label
100, 200, 300, 400 Light shielding shrink label

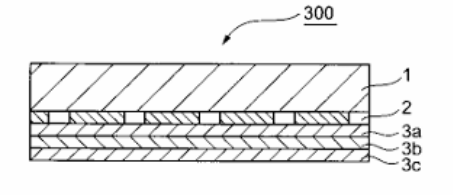
[FIG. 1]



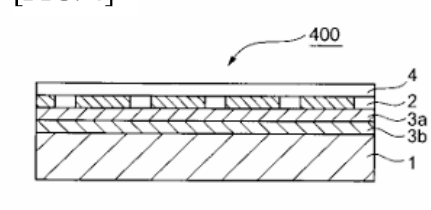
[FIG. 2]



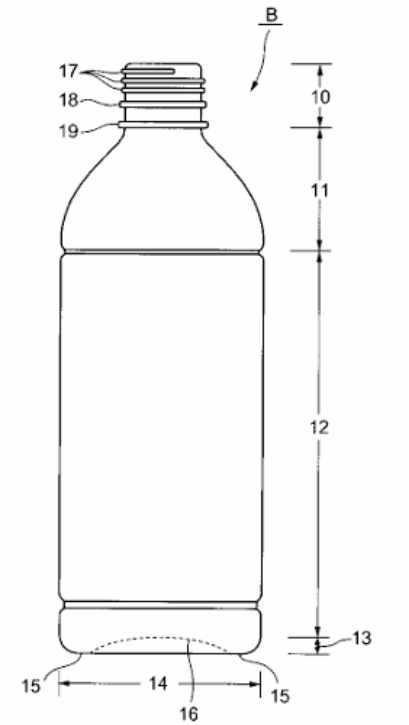
[FIG. 3]



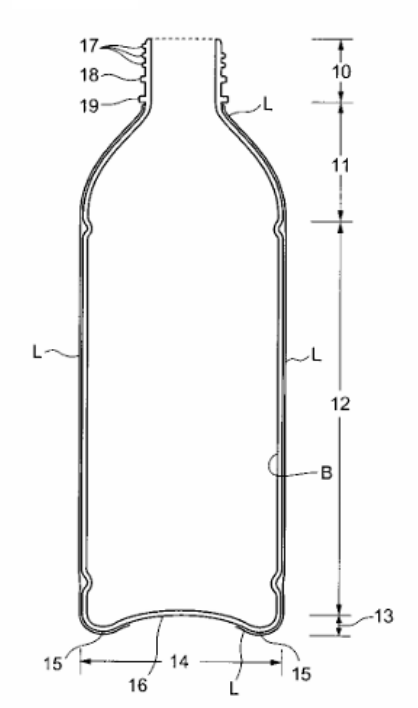
[FIG. 4]



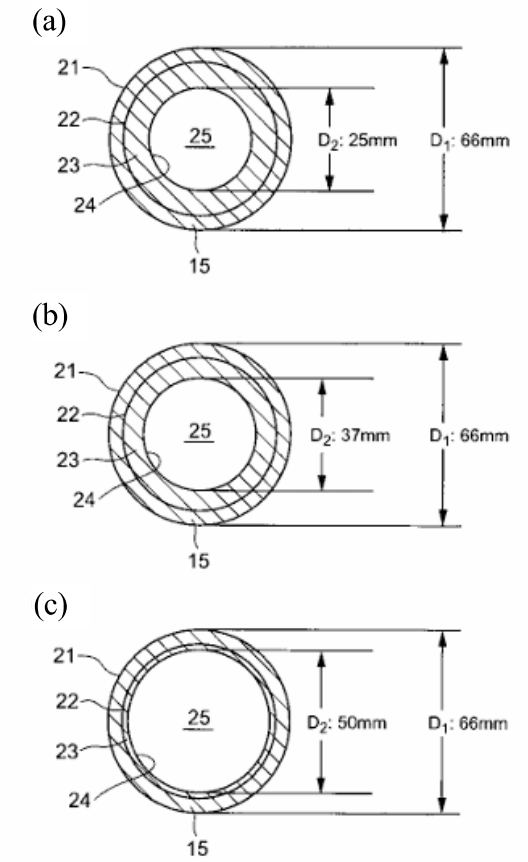
[FIG. 5]



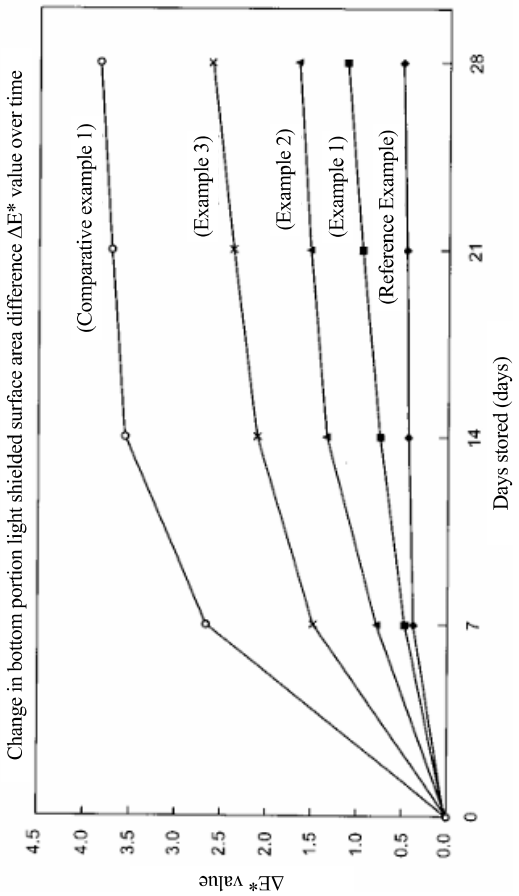
[FIG. 6]



[FIG. 7]



[FIG. 8]



Continued from front page

F-Term (Reference) 3E062 AA09 AB02 AC02 AC06 JA01 JA08 JB05 JC02 JD05 JD10
3E067 AA03 AB26 BA03A BB14A BB18A BB24A BB25A BB26A BC03A CA01
CA04 CA12 CA13 EA18 EE02 EE04 FB01 GD01