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(54) **PACKAGING CONTAINER**

(57) The purpose of the invention is to provide a packaging container such that the ease of pinching a wrap film therefrom is not liable to change over time. The present invention provides a packaging container (100) provided with a container body (11) that houses a wrap roll (1) therein and has an open upper side, and a lid body (21) connected to a rear panel (14) of the container body (11). In the packaging container (100), a varnish coating layer (31) is disposed on a front panel (13) of the container body (11), and the varnish coating layer (31) satisfies

Requirement 1.
(Requirement 1)
For T-peel strengths measured by using a 25 mm-wide varnish coating layer sample piece and a wrap film in accordance with JIS Z 0237:2009 "Testing methods of pressure-sensitive adhesive tapes and sheets", T-peel strength T_i measured immediately after adhesion of the wrap film and T-peel strength T_{3d} measured three days after the adhesion of the wrap film satisfy $\{(T_{3d} - T_i)/T_i\} \times 100 \leq 50$.

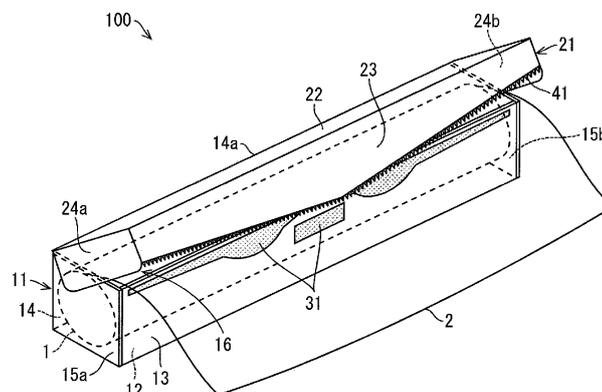


FIG. 1

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Description

Technical Field

5 **[0001]** The present invention relates to a packaging container. More particularly, the present invention relates to a packaging container that houses a wrap film.

Background Art

10 **[0002]** Conventionally, a packaging container in which varnish is applied to a front panel of a packaging container body is known as a packaging container that is configured to house a wrap roll. The application of varnish to the front panel of the packaging container body makes it possible for the pulled-out wrap film to sufficiently adhere and lock to the front panel, making it easier to cut the wrap film. Furthermore, after cutting, it is possible to prevent the wrap film from rolling back to the wrap roll side, and the wrap film is easily pulled out when used for next time.

15 **[0003]** For example, Patent Document 1 discloses a packaging container containing a varnish coating layer that temporarily adheres to a wrap film, wherein, a strength upon sliding and a T-peel strength of the varnish coating layer with respect to the wrap film are defined.

Citation List

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Patent Literature

[0004] Patent Document 1: JP 2014-005079 A

25 Summary of Invention

Technical Problem

30 **[0005]** However, if the strength of adhesion of the wrap film to the varnish coating layer is too strong, when the wrap film is pulled out again, the wrap film becomes difficult to be pinched therefrom, and problems such as breakage and tearing in the longitudinal direction tend to occur due to the high strength. Additionally, the strength of adhesion of the wrap film to the varnish coating layer becomes stronger over time. As a result, when the time elapsed until the wrap film is pulled out again is extended, the problems described above are more likely to occur.

35 **[0006]** Therefore, an object of the present invention is to provide a packaging container in which the ease of pinching a wrap film therefrom is not liable to change over time and which can maintain the ease of pinching the wrap film.

Solution to Problem

40 **[0007]** In order to solve the problems described above, the packaging container according to the present invention is a packaging container provided with a container body that houses a wrap film roll therein and that has an open upper side and provided with a lid body connected to a rear panel of the container body, a varnish coating layer being disposed on a front panel of the container body, and the varnish coating layer satisfying Requirement 1 below.

Requirement 1

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[0008] For T-peel strengths measured by using a 25 mm-wide varnish coating layer sample piece and a wrap film in accordance with JIS Z-0237:2009 "Testing methods of pressure-sensitive adhesive tapes and sheets", T-peel strength T_i measured immediately after adhesion of the wrap film and T-peel strength T_{3d} measured three days after the adhesion of the wrap film satisfy $\{(T_{3d} - T_i)/T_i\} \times 100 \leq 50$.

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Advantageous Effects of Invention

[0009] The present invention can provide a packaging container in which the ease of pinching a wrap film therefrom is not liable to change over time and which can maintain the ease of pinching the wrap film.

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Brief Description of the Drawings

[0010]

FIG. 1 is a perspective view illustrating an example of a packaging container according to the present embodiment.
 FIG. 2 is a back view illustrating a cutting blade and a lid front panel of the packaging container according to an embodiment of the present invention.
 FIG. 3 is a front view of a front panel indicating varnish coating layers of the packaging container according to an embodiment of the present invention.

Description of Embodiments

[0011] An embodiment of the packaging container of the present invention will be specifically described below.

[0012] FIG. 1 is a perspective view illustrating a packaging container according to the present embodiment. A packaging container 100 is a box container configured to store a wrap roll (wrap film roll) 1 in which a wrap film 2 is wound in a roll shape in a manner that the axial direction of the wrap roll 1 is in parallel with the longitudinal direction of the packaging container 100. The packaging container 100 is provided with a container body 11 and a lid body 21. Furthermore, although the details are described below, the container body 11 is provided with a flap 51 and varnish coating layers 31, and the lid body 21 is provided with a cutting blade 41. Note that the packaging container 100 of the present embodiment is a carton formed from paperboard, but the material and the shape are not limited thereto. For example, plastic besides paper may be used. The shape may also be a cylindrical shape besides a box shape.

Container body

[0013] The container body 11 is a box-shaped container having an open upper side, and its shape is cuboid in which a bottom face is rectangular. The container body 11 is formed from a bottom panel 12, a front panel 13, a rear panel 14, a side panel 15a, and a side panel 15b. The front panel 13 and the rear panel 14 are provided standing on the long sides of the bottom panel 12. The side panels 15a, 15b are provided standing on the short sides of the bottom panel 12. The front panel 13 is connected to each of the side panels 15a, 15b, and the rear panel 14 is also connected to each of the side panels 15a, 15b. By this configuration, the front panel 13, the side panel 15a, the rear panel 14, and the side panel 15b are continuous. The container body 11 has an open upper side, forming an opening part 16.

Lid body

[0014] The lid body 21 is a lid that covers the opening part 16 on the upper face of the container body 11 in a manner that the lid body 21 can be opened and closed, and the lid body 21 is connected to the rear panel 14 of the container body 11. The lid body 21 is formed from a lid top panel 22, a lid front panel 23, and lid side panels 24a, 24b. One of the long sides of the lid top panel 22 is connected to an upper side 14a of the rear panel 14 of the container body 11. When the lid body 21 is closed, the lid top panel 22 covers the opening part 16 on the upper face of the container body 11. The lid front panel 23 is connected to the other long side of the lid top panel 22. Furthermore, the lid side panels 24a, 24b are each connected to each of the short sides of the lid top panel 22. In the present embodiment, the lid front panel 23 covers a part of the front panel 13 of the container body 11 when the lid body 21 is closed. Therefore, when the wrap film 2 is pulled out and the lid body 21 is closed, the wrap film 2 is sandwiched between the lid front panel 23 and the front panel 13 of the container body 11 at the portion where the lid front panel 23 covers the front panel 13 of the container body 11. In addition, in the present embodiment, when the lid body 21 is closed, the lid side panels 24a and 24b respectively cover some parts of the side panels 15a and 15b.

Varnish coating layer

[0015] The varnish coating layer 31 is provided on the front panel 13 of the container body 11. The varnish coating layer 31 is provided for the pulled-out wrap film 2 to adhere and lock to the front panel 13. When the lid body 21 is closed, the wrap film 2 adheres to the varnish coating layer 31. Therefore, when the lid body 21 is closed and the wrap film 2 is cut, the wrap film 2 can be surely locked and can be easily cut. Furthermore, after the wrap film 2 is cut, it is possible to prevent the pulled-out wrap film 2 from rolling back to the wrap roll 1. The varnish coating layer 31 is provided so as to be in contact with the wrap film 2 by allowing the wrap film 2 to be sandwiched between the lid front panel 23 and the front panel 13 when the lid body 21 is closed.

[0016] FIG. 3 illustrates an embodiment of a pattern of the varnish coating layer 31. As illustrated in FIG. 3, the varnish coating layer 31 is formed from a central varnish coating layer 31a provided in the center of the upper side of the front panel 13 (on the opening part side of the container body), end varnish coating layers 31b provided at the ends in the longitudinal direction on the upper side of the front panel 13, and flap varnish coating layers 31c provided on the flaps 51 described below.

[0017] The varnish coating layer 31 has a T-peel strength that satisfies Requirement 1 below for the wrap film 2.

Requirement 1

[0018] For T-peel strengths measured by using a 25 mm-wide varnish coating layer sample piece and a wrap film in accordance with JIS Z-0237:2009 "Testing methods of pressure-sensitive adhesive tapes and sheets", T-peel strength T_i measured immediately after adhesion of the wrap film and T-peel strength T_{3d} measured three days after the adhesion of the wrap film satisfy $\{(T_{3d} - T_i)/T_i\} \times 100 \leq 50$.

[0019] The above formula represents that the increased percentage in the T-peel strength measured three days after the adhesion of the wrap film relative to the T-peel strength measured immediately after the adhesion of the wrap film is 50% or less.

[0020] In the present embodiment, the T-peel strength of the sample piece and the wrap film means a peel strength when the wrap film 2 adhering to the varnish coating layer 31 is pulled vertically relative to the varnish coating layer 31. Specifically, it corresponds to the 90° peel adhesion in JIS Z-0237:2009 described above. Note that the detailed test conditions are as described in Examples below.

[0021] Satisfying Requirement 1 described above for the T-peel strength in the varnish coating layer 31 makes the increase in adhesive strength small even when the wrap film is pulled out again after a long period of time has passed since the wrap film was first pulled out and cut. Because of this, the ease of pinching a wrap film 2 becomes less likely to change over time, and the ease of pinching can be maintained, and as a result, problems such as breakage and tearing in the longitudinal direction are less likely to occur.

[0022] Furthermore, the varnish coating layer 31 of the present embodiment has a T-peel strength that satisfies Requirement 2 below for the wrap film 2.

Requirement 2

[0023] The T-peel strength T_i immediately after adhesion of the wrap film is 4.0×10^{-2} N/25 mm or less.

[0024] Satisfying Requirement 2 described above for the T-peel strength T_i can prevent the adhesion of the pulled-out wrap film 2 to the varnish coating layer 31 from being too strong even immediately after the wrap film 2 adhered to the varnish coating layer 31 or three days after the adhesion.

[0025] Therefore, even when the wrap film 2 is pulled out immediately after cutting the wrap film 2 or three days after the adhesion, the wrap film 2 becomes easier to pinch. As a result, problems such as breakage and tearing in the longitudinal direction are less likely to occur.

[0026] The T-peel strength T_i immediately after adhesion of the wrap film is 4.0×10^{-2} N/25 mm or less, preferably 3.5×10^{-2} N/25 mm or less, and more preferably 2.5×10^{-2} N/25 mm or less. When the T-peel strength T_i is 3.5×10^{-2} N/25 mm or less, easy pinching is achieved because the T-peel strength is low even when the varnish is applied to a wide range of the front panel, thus problems such as tearing can be suppressed, and a packaging container that is easy to use can be provided. When the T-peel strength T_i is 2.5×10^{-2} N/25 mm or less, because the T-peel strength immediately after the adhesion of the wrap film is low, low T-peel strength can be maintained even for the T-peel strength three days after the adhesion.

[0027] Therefore, even when the wrap film 2 is pulled out immediately after cutting the wrap film 2 or three days after the adhesion, the wrap film 2 becomes easier to pinch. As a result, problems such as breakage and tearing in the longitudinal direction are less likely to occur.

[0028] The T-peel strength of the varnish coating layer 31 relative to the wrap film 2 can be adjusted by adjusting the amount of UV irradiation onto the varnish coating layer 31; film formation condition such as drying rate; depth of printing of the varnish coating layer 31; pattern of the varnish coating layer 31; and varnish component.

[0029] Note that the varnish coating layer 31 is not limited to the pattern illustrated in FIG. 3 and may be another pattern. For example, the pattern may be a pattern described in Patent Document 1.

[0030] Note that, in Examples described below, a portion of the central varnish coating layer 31a is used as the varnish coating layer 31 in the T-peel strength test, but another varnish coating layer may be used as long as the varnish coating layer is a varnish coating layer 31. For example, instead of the varnish coating layer 31a, a region in which the varnish coating layer 31c is continuously present across the entire measurement width may be selected and used. In the case where a region in which a varnish coating layer continuously present across the entire measurement width is not present, such as a case where a part having varnish coating and a part having no varnish coating are alternately present, the contour of the entire varnish coating pattern formed by the plurality of parts having varnish coating may be assumed, and the portion surrounded by the contour line may be regarded as the part having varnish coating. Also, in the case where the part having no varnish coating is surrounded by the part having varnish coating, the portion surrounded by the part having varnish coating may be regarded as the part having varnish coating. Note that, in the case where a predetermined width of the measurement region (25 mm in Examples described below) is not obtained, the conversion into the prescribed width may be performed based on the measured value.

[0031] Furthermore, in Examples described below, various evaluations are performed for the varnish coating layer 31

by using a pattern illustrated in FIG. 3; however, of course, the evaluation may be performed using other coating patterns.

Varnish

5 **[0032]** The varnish used in the varnish coating layer is an active energy ray curable resin composition that undergoes radical polymerization and curing by active energy rays, such as ultraviolet light and electron beams, and contains an active energy beam curable resin. The active energy beam curable resin contains a compound having an ethylenically unsaturated double bond. The ultraviolet light curable resin composition that undergoes radical polymerization and curing by ultraviolet light irradiation and the ultraviolet light curable resin will be described below.

10 **[0033]** The ultraviolet light curable resin is formed from an oligomer or a monomer, or an oligomer and a monomer.

[0034] The oligomer imparts durability and flexibility to the varnish coating layer, and examples thereof include urethane acrylates, polyester acrylates, acrylic acrylates, epoxy acrylates having a (meth)acrylate group, and the like.

[0035] The monomer is added for the purpose of improving the physical properties of the varnish coating layer and adjusting the viscosity of the ultraviolet light curable resin composition, and examples thereof include monofunctional, difunctional, and polyfunctional monomers having a (meth)acrylate group, and the like.

15 **[0036]** Examples of the monofunctional monomer include 2-(2-ethoxyethoxy)ethyl acrylate, stearyl acrylate, tetrahydrofurfuryl acrylate, lauryl acrylate, 2-phenoxyethyl acrylate, indecyl acrylate, isocetyl acrylate, tridecyl acrylate, caprolactone acrylate, 4-hydroxybutyl acrylate, ethoxylated nonylphenol acrylate, propoxylated nonylphenol acrylate, phenoxyethyl acrylate, phenoxydiethylene acrylate, ethylene oxide-modified nonylphenyl acrylate, methoxytriethylene glycol acrylate, ethylene oxide 2-ethylhexyl acrylate, isobornyl acrylate and dipropylene glycol acrylate, and the like; and methacrylate monomers of these.

20 **[0037]** Examples of the difunctional monomer include 1,3-butanediol diacrylate, 1,4-butanediol diacrylate, polyethylene glycol diacrylate, polypropylene glycol diacrylate, neopentyl glycol diacrylate, propoxylated neopentyl glycol diacrylate, ethoxylated neopentyl glycol diacrylate, hydroxypivalic acid neopentyl glycol diacrylate, (hydrogenated) bisphenol A diacrylate, (hydrogenated) ethylene oxide-modified bisphenol A diacrylate, (hydrogenated) propylene glycol-modified bisphenol A diacrylate, 1,6-hexanediol diacrylate, 2-ethyl,2-butyl-propanediol diacrylate and 1,9-nonanediol diacrylate, and the like; and methacrylate monomers of these.

25 **[0038]** Examples of the polyfunctional monomer include tris(2-hydroxyethyl)isocyanurate triacrylate, ethylene oxide-modified trimethylolpropane triacrylate, propylene oxide-modified trimethylolpropane triacrylate, propylene oxide-modified glyceryl triacrylate, pentaerythritol triacrylate, trimethylolpropane acrylate, ethylene oxide-modified trimethylolpropane acrylate, propylene oxide-modified trimethylolpropane acrylate, tris(acryloxyethyl) isocyanurate, pentaerythritol tetraacrylate, ditrimethylolpropane tetraacrylate, dipentaerythritol hydroxy pentaacrylate, ethoxylated pentaerythritol tetraacrylate, pentaacrylate esters and dipentaerythritol hexaacrylate, and the like; and methacrylate monomers of these.

30 **[0039]** The ultraviolet light curable resin preferably contains from 0 to 80 wt.% of oligomer and from 20 to 100 wt.% of monomer in the ultraviolet light curable resin from the perspective of physical properties of the film.

35 **[0040]** When the radical polymerizable crosslinking component is crosslinked by ultraviolet light, acetophenones, benzophenones, thioxanones, aromatic diazonium salts, metallocene, and the like may be used as photopolymerization initiators. Furthermore, a polymerization accelerator can be used in combination, and examples of the polymerization accelerator include amines and phosphines.

40 **[0041]** The ultraviolet light curable resin composition can further contain organic/inorganic fillers as necessary, and it is possible to impart luster adjustment and wear properties. Examples of the organic filler include organic fillers that are polymerized and micronized so that a resin, such as an epoxy resin, melamine resin, urea resin, acrylic resin, polyimide resin, Teflon (trade name) resin, polyethylene resin, polyester resin, or polyester resin and polyamide resin, becomes insoluble to solvents. Examples of the inorganic filler include alumina, talc, magnesium carbonate, calcium carbonate, natural mica, synthetic mica, aluminum hydroxide, precipitated barium sulfate, precipitated barium carbonate, barium titanate, barium sulfate, and the like.

45 **[0042]** The ultraviolet light curable resin composition can be compounded with a colorant, as well as various additives such as leveling agents and antifoaming agents as necessary. The additives are not particularly limited, and examples thereof include silicone-based and polymeric additives.

50 **[0043]** In the varnish used in the varnish coating layer, 8% or less of modified vegetable oil, such as epoxidized soybean oil, is preferably added to impart appropriate adhesion and releasability of the wrap film and the varnish.

Ultraviolet light curing method

55 **[0044]** As a method of curing the ultraviolet light curable resin composition by ultraviolet irradiation, from 30 to 5000 mJ/cm², preferably from 100 to 1000 mJ/cm², of irradiation is performed by using a high pressure mercury lamp, an ultrahigh pressure mercury lamp, a carbon arc lamp, a metal halide lamp, a xenon lamp, a chemical lamp, a non-electrode discharge lamp, an LED that emits light in a wavelength range of from 150 to 450 nm, or the like. After the UV irradiation,

complete curing can be attempted by heating the ultraviolet light curable resin composition as necessary. The film thickness during coating of ultraviolet light curable resin composition (film thickness after the curing) is typically preferably from 1 to 80 μm , more preferably from 3 to 60 μm , and particularly preferably from 5 to 50 μm . When the film thickness is in the range of from 1 to 80 μm , curing is not inhibited, irradiation time of the ultraviolet light can be shortened, and productivity is excellent. Furthermore, from the perspective of increasing smoothness and gloss of the coating film surface, it is preferable to adjust the coating conditions so that the film thickness at the time of application of the ultraviolet light curable resin composition is 10 μm or greater.

Cutting blade

[0045] On the lid front panel 23 of the lid body 21, the plate-like cutting blade 41 is provided to cut the pulled-out wrap film 2. As illustrated in FIG. 1, the cutting blade 41 is provided across the entire width of the side of the lid front panel 23 opposite the side connected to the lid top panel 22. Furthermore, the cutting blade 41 is attached to the inside of the lid front panel 23 such that the blade portion is exposed outside the lid front panel 23. By allowing the wrap film 2 to be sandwiched between the front panel 13 of the container body 11 and the lid front panel 23 when the wrap film 2 is pulled out and the lid body 21 is closed, it is possible to fix the wrap film 2 to the front panel 13 when the wrap film 2 is cut. At this time, the cutting blade 41 contacts the wrap film 2.

[0046] FIG. 2 is a view of the lid front panel 23 viewed from the back side. The cutting blade 41 is attached to the inner face of the lid front panel 23 of the lid body 21 as illustrated in FIG. 2, with the face of the cutting blade 41 opposite the side attached to the lid front panel 23 exposed. Hereinafter, the face of this side is referred to as the exposed face of the cutting blade 41. The exposed face of the cutting blade 41 is the face facing the outer face of the front panel 13 of the container body 11 when the upper opening of the container body 11 is closed by the lid body 21. That is, the exposed face of the cutting blade 41 is the face that comes into contact with the wrap film 2 when the wrap film 2 is pulled out and the lid body 21 is closed.

[0047] The face of the cutting blade 41 that is in contact with the wrap film 2 when the wrap film 2 is cut has a strength upon sliding that satisfies the following Requirement 3 for the wrap film.

Requirement 3

[0048] The strength upon sliding measured immediately after the wrap film adhered to a 25 mm-width cutting blade sample piece determined in accordance with JIS Z-0237:2009 "Testing methods of pressure-sensitive adhesive tapes and sheets" is 0.1 N/25 mm or less.

[0049] In the present embodiment, the strength upon sliding between the cutting blade 41 and the wrap film 2 refers to the strength when the wrap film 2 adhering to the cutting blade 41 is shifted parallel to the cutting blade 41 (the shearing direction). Specifically, it corresponds to the 180° peel adhesion in JIS Z-0237:2009 described above. Note that the detailed test conditions are as described in Examples below. In the case where the strength upon sliding of the exposed face of the cutting blade 41 is high relative to the wrap film 2, when the lid body 21 is opened to pinch the wrap film 2, the wrap film 2 may be pulled toward the cutting blade 41, and the wrap film 2 may be peeled off from the varnish coating layer 31. When the wrap film 2 is in close contact with the exposed face of the cutting blade 41, the wrap film 2 is less likely to be pinched compared to the case where the wrap film 2 is in close contact with the varnish coating layer 31. Alternatively, peeling of the wrap film 2 from the varnish coating layer 31 may cause the wrap film 2 to roll back to the wrap roll 1.

[0050] By satisfying Requirement 3, the adhesive strength of the wrap film 2 on the cutting blade 41 is not too strong, so when next time the lid body 21 is opened to pull out the wrap film 2 after the wrap film 2 is cut, it is possible to prevent the wrap film 2 from being peeled off from the varnish coating layer 31 due to being pulled by the cutting blade 41 side. As a result, the ease of pinching the wrap film 2 can be maintained. The exposed face of the cutting blade 41 is roughened to a degree that preferably the entirety or at least the central region satisfies the strength upon sliding of Requirement 3 so that the cutting blade 41 has a strength upon sliding that satisfies Requirement 3 with respect to the wrap film 2. The central region extends evenly from the center in the length direction of the cutting blade 41 to both sides thereof, and preferably has a length of 5% or more and 50% or less of the entire length of the cutting blade 41 in the length direction of the cutting blade 41. By roughening the exposed face of the cutting blade 41, the strength upon sliding of the wrap film 2 relative to the cutting blade 41 is reduced, and the wrap film 2 is less likely to adhere to the cutting blade 41. As a result, when the lid is opened again and the wrap film 2 is pulled out, it is possible to prevent the wrap film 2 from being peeled off from the varnish coating layer 31 and adhering to the cutting blade 41 side, and thus the ease of pinching the wrap film 2 is achieved.

[0051] With respect to the surface roughness of the cutting blade 41, the arithmetic mean roughness Ra is preferably 0.1 μm or greater, but less than 0.4 μm , and more preferably 0.15 μm or more and 0.3 μm or less. Furthermore, the maximum height Rz of the cutting blade 41 is preferably 1.0 μm or more and 2.5 μm or less. The arithmetic mean

roughness Ra and the maximum height Rz are values calculated by a method in accordance with JIS B 0601:2001.

[0052] In order to achieve an appropriate rough surface state, a method of roughening by adding an additive component to a blade raw material, a method of subjecting the exposed surface to roughening treatment, and the like can be used. Furthermore, other processing methods may be used as long as the roughening treatment is possible. By applying a roughening treatment to the entire surface or at least the central region of the exposed face to satisfy the strength upon sliding of Requirement 3, in the case where the wrap film 2 is cut by gripping the center part of the packaging container 100, it is possible to prevent the wrap film 2 from being peeled off from the varnish coating layer 31 and being rolled back to the wrap roll 1 because the wrap film 2 adheres to the blade material.

[0053] When the strength upon sliding immediately after adhesion of the wrap film 2 to the cutting blade 41 is 0.1 N/25 mm or less, it is possible to prevent the wrap film 2 from adhering to the exposed face of the cutting blade 41 and being rolled back to the wrap roll 1. Typically, when the strength upon sliding immediately after adhesion of the wrap film to the cutting blade is high, the wrap film closely adheres to the cutting blade, and when the lid is opened, the wrap film tends to be rolled back to the wrap roll. Meanwhile, in the varnish coating layer, in the case where the increased percentage between the T-peel strength measured immediately after adhesion and the T-peel strength measured three days after adhesion of the wrap film the varnish coating layer is 50% or greater, or in the case where the T-peel strength measured immediately after the adhesion is 4.0×10^{-2} N/25 mm or greater, even when the strength upon sliding immediately after the wrap film 2 adhered to the cutting blade 41 is high, the wrap film closely adheres to the varnish coating layer, and adhesion to the cutting blade side is suppressed because the T-peel strength of the varnish coating layer is high. However, when the increased percentage of the T-peel strengths is 50% or greater or the T-peel strength measured immediately after the wrap film adhered to the varnish coating layer is 4.0×10^{-2} N/25 mm or greater in the varnish coating layer, problems such as difficulty in pinching, breakage, and tearing in the longitudinal direction tend to occur as described above. Therefore, by setting the strength upon sliding measured immediately after the wrap film adhered to the exposed face of the cutting blade to 0.1 N/25 mm or less by using a varnish coating layer having the increased percentage in the T-peel strength measured three days after adhesion of the wrap film relative to the T-peel strength measured immediately after adhesion of the wrap film of 50% or less, it is possible to suppress adhesion of the wrap film to the exposed face of the cutting blade when the lid is opened and to suppress rolling back of the wrap film to the wrap roll. The varnish coating layer having the increased percentage in the T-peel strength measured three days after adhesion of the wrap film relative to the T-peel strength measured immediately after adhesion of the wrap film of 50% or less can suppress the occurrence of problems, such as difficulty in pinching, breakage, and tearing in the longitudinal direction. Furthermore, because the wrap film appropriately and closely adheres to the varnish coating layer when the wrap film is cut, excellent cutting is possible even if the strength upon sliding between the exposed face of the cutting blade and the wrap film is low.

Flap

[0054] The flap 51 is provided on a part of the upper side (opening part side) of the front panel 13 of the container body 11. As illustrated in FIG. 3, the flap 51 is formed from a cutting line 52 and an upper side of the front panel 13 by arranging the cutting line 52 on the front panel 13, and the flap 51 is a portion that lift outward from the front panel 13. The varnish coating layer 31c is provided on the flap 51. Due to the flap 51 having the varnish coating layer 31c, the wrap film 2 is sandwiched and fixed by the lid front panel 23 and the flap 51 having the varnish coating layer 31c when the wrap film 2 is cut. As a result, the pulled-out wrap film 2 is reliably locked by the varnish coating layer 31c, making it easier to cut the wrap film 2. After the cutting, the wrap film 2 is brought into close contact with the varnish coating layer 31c. When the lid body 21 is opened again, the flap 51 is lifted outward from the front panel 13, making the wrap film 2 easier to be pinched when the wrap film 2 is pulled out next time.

Wrap film

[0055] The wrap film may be a polyvinylidene chloride film, a polyvinyl chloride film, a polyethylene film, a polypropylene film, a polymethylpentene film, a polyester film, an ethylene-vinyl acetate copolymer film, or the like. In particular, the effect of the present invention becomes significant in the case where the present invention is applied to a wrap film of a vinylidene chloride-based resin having a high adhesion strength.

Summary

[0056] The packaging container 100 according to an embodiment of the present invention is the packaging container 100 provided with the container body 11 that is configured to house a wrap film roll therein and has an open upper side, and the lid body 21 connected to the rear panel 14 of the container body. In the packaging container 100, the varnish coating layers 31, 31a, 31b, 31c are disposed on the front panel 13 of the container body 11, and the varnish coating layers 31, 31a, 31b, 31c satisfy Requirement 1 below.

Requirement 1

[0057] For T-peel strengths measured by using a 25 mm-wide varnish coating layer sample piece and a wrap film in accordance with JIS Z-0237:2009 "Testing methods of pressure-sensitive adhesive tapes and sheets", T-peel strength T_i measured immediately after adhesion of the wrap film and T-peel strength T_{3d} measured three days after the adhesion of the wrap film satisfy $\{(T_{3d} - T_i)/T_i\} \times 100 \leq 50$.

[0058] Furthermore, in the packaging container 100 according to an embodiment of the present invention, the varnish coating layers 31, 31a, 31b, 31c preferably further satisfy Requirement 2 below.

Requirement 2

[0059] The T-peel strength T_i is 4.0×10^{-2} N/25 mm or less.

[0060] Furthermore, in the packaging container 100 according to an embodiment of the present invention, the lid body 21 has the cutting blade 41 configured to cut the wrap film 2 pulled out from the wrap film roll. In the cutting blade 41, a face that is brought into contact with the pulled-out wrap film 2 during cutting preferably satisfies Requirement 3 below.

Requirement 3

[0061] The strength upon sliding measured immediately after the wrap film adhered to a 25 mm-width cutting blade sample piece determined in accordance with JIS Z-0237:2009 "Testing methods of pressure-sensitive adhesive tapes and sheets" is 0.1 N/25 mm or less.

[0062] Furthermore, in the packaging container 100 according to an embodiment of the present invention, the front panel 13 has the flap 51 having a cutting line 52 formed on the front panel 13, and the varnish coating layer 31c is preferably provided at least on a front face of the flap 51.

[0063] Furthermore, in the packaging container 100 according to an embodiment of the present invention, the wrap film 2 is preferably a polyvinylidene chloride film.

[0064] Embodiments of the present invention will be described in further detail hereinafter using examples. The present invention is not limited to the examples below, and it goes without saying that various aspects are possible with regard to the details thereof. Furthermore, the present invention is not limited to the embodiments described above, and various modifications are possible within the scope indicated in the claims. Embodiments obtained by appropriately combining the technical means disclosed by the embodiments are also included in the technical scope of the present invention. In addition, all of the documents disclosed in the present specification are herein incorporated by reference.

Examples

T-peel strength test

[0065] The T-peel strength is a strength measured by using a 25 mm-wide varnish coating layer sample piece and a wrap film in accordance with JIS Z 0237:2009 "Testing methods of pressure-sensitive adhesive tapes and sheets".

Production of sample piece of varnish coating layer

[0066] As a coating solution, the SP varnish (available from Toyo Ink Co., Ltd.) formed from an ultraviolet light curable resin and a diluting solvent (available from Toyo Ink Co., Ltd.) were mixed in a volume proportion of 10:3. The SP varnish used here was an ultraviolet light curable gloss varnish for flexographic printing machines. The coating solution was applied to a packaging container in the printing pattern illustrated in FIG. 3 with a depth of printing of 40 μm , 50 μm , or 60 μm . A coating film was subjected to high pressure mercury lamp irradiation to cure the coating film, thereby producing a packaging container having a varnish coating layer. This was used as each of Examples 1 to 5. The central varnish coating layer portion was cut out and used as each of sample pieces A to E of the varnish coating layers of Examples 1 to 5. The cut central varnish coating layer portion was a portion of the central varnish coating layer 31a provided in the center of the upper side (opening part side) of the front panel 13. The width of the cut was 25 mm, and the height in the direction perpendicular to the axial direction was a height that the varnish coating portion was sufficiently ensured and, in this example, was 20 mm. The varnish coating pattern of the cut portion was a solid coating.

[0067] The width 25 mm of the cut-out portion was selected from the region where the varnish coating layer was present when the cut-out portion was cut out. Specifically, the cut-out portion was selected from the region where the varnish coating layer 31a was present continuously across the entire measurement width. Finally, double-sided tape was attached to the back face of the sample piece (the back face of the surface on which the SP varnish was applied). In the present example, a plurality of sample pieces with a width of 25 mm were obtained along an axial direction of one

packaging container, but evaluation was performed on a sample piece obtained from the center part of the carton (a range including a point of 1/2 the entire carton length), which is a more important region for the ease of use.

[0068] Note that, in Examples 4 and 5, the portion of the cutting blade of the packaging container was changed from Example 2. Therefore, for the varnish coating layer portion, Examples 2, 4, and 5 were the same.

[0069] A packaging container was produced in the same manner as in Examples 1 to 3 except for using FDPCA (available from Toyo Ink Co., Ltd.) as the SP varnish and increasing the degree of UV irradiation during the curing of the coating film. This was used as Comparative Example 1. Note that the depth of printing was 50 μm. The central varnish coating layer portion was cut out and used as a sample piece F of the varnish coating layer of Comparative Example 1.

[0070] Packaging containers were produced in the same manner as in Examples 1 to 3 except for using FDPCA (available from Toyo Ink Co., Ltd.) as the SP varnish. These were used as Comparative Examples 2 to 4. The depths of printing were 40 μm, 50 μm, and 60 μm, respectively. The central varnish coating layer portion was cut out and used as each of sample pieces G to I of the varnish coating layers of Comparative Examples 2 to 4.

Production of film piece

[0071] A wrap film (trade name: NEW Krewrap, available from Kureha Corporation) was cut to a size of 25 mm width and 100 mm length. At this time, the length direction was aligned with the direction of pulling out the film. Paper tape (width 25 mm, length 15 mm) was applied at one end side in the length direction as a gripping base. At this time, adhesion was performed by matching the width direction of the paper tape and the width direction of the wrap film piece. Note that the indoor environment was 23 ± 5°C and 40 ± 20%RH.

Pressure adhesion of varnish coating layer and film piece

[0072] The sample piece was placed on the steel plate with the varnish coating layer facing upward and secured to the steel plate with double-sided tape. The varnish coating layer was covered with the end portion of the length direction of the film piece, the end portion being on the opposite side to the end to which the paper tape adhered, in a direction where the 25 mm width of the film piece and the 25 mm width of the sample piece matched. As a result, the entire face of the sample piece was covered with a film piece. Note that the face of the film piece that adhered to the varnish coating layer was the bottom side of the wrap (the face facing the winding core direction). Using a 2 kg roller apparatus for pressure-sensitive adhesion described in JIS Z-0237:2009, the roller was rolled in the width direction of the film piece, and the film piece and the varnish coating layer were subjected to pressure-sensitive adhesion to produce a pressure adhered product for measurement.

Measurement of T-peel strength

[0073] The steel sheet was fixed to a support so that the normal line of the face, to which the sample piece adhered, faced vertically upward, and the T-peel strength test was performed by pinching the paper tape side of the film piece of the pressure adhered product for measurement with the Tensilon (model: RTA-100, available from Orientec Co., Ltd.) above the steel plate, at the tensile speed of 300 mm/min. A plurality of tests were performed, and the maximum value was used as the measured value. The test was performed immediately after the film piece adhered and three days after the film piece adhered.

Increased percentage in T-peel strength

[0074] Taking the T-peel strength measured immediately after adhesion of the wrap film as T_i and the T-peel strength measured three days after adhesion of the wrap film as T_{3d} , increased percentage of the T-peel strength was calculated by the following Formula 1. The results are shown in Table 1.

$$\{(T_{3d} - T_i)/T_i\} \times 100 \dots \text{Formula 1}$$

[Table 1]

	Sample piece	Depth of printing (μm)	T-peel strength immediately after adhesion ($\times 10^{-2}$) (N/25 mm)	T-peel strength after 3 days ($\times 10^{-2}$) (N/25 mm)	Increased percentage in T-peel strength (%)
5	Example 1	40	2.2	3.0	36
	Example 2	50	2.3	2.8	21
	Example 3	60	2.1	3.1	48
10	Example 4	50	2.3	2.8	21
	Example 5	50	2.3	2.8	21
	Comparative Example 1	50	4.8	16.0	233
15	Comparative Example 2	40	16.1	38.5	139
	Comparative Example 3	50	11.9	40.2	238
20	Comparative Example 4	60	13.9	38.5	177

Test for strength upon sliding of cutting blade exposed face

[0075] Strength upon sliding of the wrap film 2 and the face, which was in contact with the wrap film 2 when the wrap film 2 was cut, of the cutting blade 41 (exposed face) was measured.

Preparation of sample

[0076] A resin sheet containing polylactic acid-based resin as a main component and containing a polystyrene-based resin as an additive at a concentration in the range of from 0.5 to 50 mass% was punched into a V-shape to form a cutting blade of a sample 1 (Examples 1 to 3 and Comparative Examples 1 and 2) having a thickness of approximately 250 μm .

[0077] For sample 2 (Example 4 and Comparative Examples 3 and 4), a cutting blade was formed in the same manner as the sample 1 except for using a resin sheet containing a reduced amount of the polystyrene-based resin as the additive.

[0078] For sample 3 (Example 5), a cutting blade was formed in the same manner as the sample 1 except for using a resin sheet containing no polystyrene-based resin as the additive.

Production of sample piece

[0079] Sample pieces of Examples 1 to 5 and Comparative Examples 1 to 4 were produced by subjecting each of the samples 1 to 3 to the following treatments (1) to (3).

(1) A sample cut to width 7.5 mm \times length 25 mm or greater adhered to a steel plate with double-sided tape so as to be parallel with the measurement direction.

(2) The steel plate portion to which no sample adhered was covered with paper whose surface was not subjected to gloss treatment so that the wrap film did not attach thereto, and a film piece which was cut to 25 mm width was placed on the sample. The film pieces at this time were produced in the same manner as in the T-peel strength test. Note that the portion that touched the cutting blade when an actual film for packaging was cut was a portion that was outside the roll of the wrap film, so the wrap film was disposed so that the portion contacted the sample.

(3) Using a nonwoven fabric (KimWipes (registered trademark) in this example), the sample and the wrap film were rubbed and subjected to pressure-sensitive adhesion.

Measurement of strength upon sliding

[0080] A steel plate was pinched by the Tensilon (bottom side) on a support so that a normal line of a face to which a sample piece adhered faced vertically upward, and the paper tape side of the film piece was pinched by the Tensilon

(upper side). Thus, the sample was set to the Tensilon Universal Material Testing Instrument (RTG-1210), available from A&D Co., Ltd., and the strengths upon sliding were measured in the testing environment at 23°C, 50%RH, and the testing speed of 300 mm/min. The average value thereof was determined. The measurement results are shown in Table 2.

[0081] The cutting blade of the packaging container used in the evaluation was a cutting blade that used a layer containing a polylactic acid-based resin as a main material and containing at least from 0.5 to 50 mass% of a polystyrene-based resin as an additive component for roughening the surface, in at least the exposed surface layer at the time of attaching the blade material. In the packaging containers of Examples 1 to 3 and Comparative Examples 1 and 2, the cutting blade having the surface condition in which the strength upon sliding of the wrap film and the cutting blade exposed face was 0.03 N was used. Furthermore, in the packaging containers of Example 4 and Comparative Examples 3 and 4, the cutting blade containing a reduced amount of the polystyrene-based resin as the additive component and having the surface condition in which the strength upon sliding of the wrap film and the cutting blade exposed face was 0.21 N was used. Furthermore, in the packaging container of Example 5, the cutting blade in which the polystyrene-based resin as the additive component for roughening the surface was not contained and in which the strength upon sliding was 1.02 N was used.

Rolling back evaluation

[0082] The rolling back evaluation of a wrap film was performed by using each of the packaging containers having the varnish coating layers of Examples and Comparative Examples and the cutting blades having strengths upon sliding of Examples and Comparative Examples. As the wrap film, 30 cm × 20 cm of NEW Krewrap (trade name) available from Kureha Corporation was used. The wrap film was pulled out from the packaging container and cut from the center of the wrap film. After the cutting, when the lid body was opened, it was checked if the wrap film was peeled off from the varnish coating layer and rolled back inside the container body. The cutting of the film and opening of the lid body was repeated for 100 times to determine the number of times of rolling back of the film. The results are shown in Table 2.

[Table 2]

	Strength upon sliding of cutting blade (N/25 mm)	Number of rolling back (time/100 times)
Example 1	0.03	0
Example 2	0.03	0
Example 3	0.03	0
Example 4	0.21	3
Example 5	1.02	26
Comparative Example 1	0.03	0
Comparative Example 2	0.03	0
Comparative Example 3	0.21	0
Comparative Example 4	0.21	0

As a result of the evaluation, rolling back occurred 26 times with Example 5 in which the strength upon sliding of the wrap film and the cutting blade exposed face was high, 1.02 N. Rolling back occurred 3 times with Example 4 in which the strength upon sliding was 0.21 N.

[0083] On the other hand, no rolling back occurred with Examples 1 to 3 and Comparative Examples 1 and 2, which had a low strength upon sliding of 0.03 N. Furthermore, no rolling back occurred with Comparative Examples 3 and 4, which had a strength upon sliding of 0.21 N, which were the same as that of Example 4. It is conceived that this occurred because the wrap film adhered to the varnish coating layer, thereby preventing the rolling back, since Comparative Examples 3 and 4 exhibited higher T-peel strengths immediately after the wrap film adhered to the varnish coating layer than the T-peel strength of Example 4.

Sensory evaluation

Evaluation of ease of pinching

[0084] For each of Examples and Comparative Examples, sensory evaluation was performed on ease of pinching when the wrap film was pinched using the same packaging container used in the rolling back evaluation described

above. A series of operations of "pinching a wrap film, pulling out the wrap film, and cutting the wrap film" was performed continuously, and the ease of pinching was evaluated. In addition, the case where, after cutting the wrap film, the wrap film was stored for three days and then "pinching the wrap film" of the next series of operations was performed, was evaluated as the "evaluation after 3 days". The evaluation criteria were as follows: "the film was pinched with almost no resistance" was scored as 3, "a little resistance was observed when the film was pinched" was scored as 2, and "resistance was clearly observed when the film was pinched" was scored as 1. The number of testers was 5, and the average value of the scores from the 5 testers was determined. The results are shown in Table 3. In Examples 1 to 5, in which the increased percentage of the T-peel strength three days after the adhesion relative to the T-peel strength immediately after the adhesion of the varnish coating layer and the wrap film was 50% or less, the wrap film was easily pinched immediately after the adhesion and three days after the adhesion. On the other hand, for Comparative Examples 1 to 4, in which the increased percentage of the T-peel strength was 50% or greater, problems were observed because, in particular, the evaluation results for the ease of pinching after three days was lower than score 2.

[Table 3]

	Ease of pinching immediately after adhesion	Ease of pinching after 3 days
Example 1	3	3
Example 2	3	2.8
Example 3	3	3
Example 4	3	2.8
Example 5	3	2.8
Comparative Example 1	2.8	1.6
Comparative Example 2	2.2	1
Comparative Example 3	2.4	1.2
Comparative Example 4	2	1.2

Evaluation of the occurrence of film longitudinal tearing

[0085] The same packaging container as that for the evaluation of the ease of pinching was used to evaluate whether a phenomenon occurs in which the longitudinal tearing of the wrap film occurred or the pinched portion of the film was broken into small pieces when the wrap film was pinched. The evaluation was performed by using 60 rolls in each of Examples and Comparative Examples. The wrap film was pulled out and cut. The central part of the wrap film was then pinched immediately after the wrap film attached to the varnish coating layer was cut or after three days of storage and was pulled at an angle of 45 degrees diagonally below. The number of times that tearing, breakage, and the like of the wrap film occurred when the wrap film was pulled out was measured. The results are shown in Table 4. With Examples 1 to 5, because the increased percentage of the T-peel strength three days after the adhesion relative to the T-peel strength immediately after the adhesion of the varnish coating layer and the wrap film was 50% or less, no tearing and breakage occurred even when the wrap film was pulled out after the three days of storage as well as immediately after the adhesion.

[Table 4]

	Occurrence of longitudinal tear immediately after adhesion	Occurrence of longitudinal tear after 3 days
Example 1	0	0
Example 2	0	0
Example 3	0	0
Example 4	0	0
Example 5	0	0
Comparative Example 1	0	2
Comparative Example 2	0	10

(continued)

	Occurrence of longitudinal tear immediately after adhesion	Occurrence of longitudinal tear after 3 days
5 Comparative Example 3	2	8
Comparative Example 4	3	6

Industrial Applicability

10 **[0086]** The present invention can be suitably used as a packaging container.

Reference Signs List

15 **[0087]**

- 1 Wrap roll
- 2 Wrap film
- 11 Container body
- 20 12 Bottom panel
- 13 Front panel
- 14 Rear panel
- 15a, 15b Side panel
- 16 Opening part
- 25 21 Lid body
- 22 Lid top panel
- 23 Lid front panel
- 24a, 24b Lid side panel
- 31 Varnish coating layer
- 30 31a Central varnish coating layer
- 31b End varnish coating layer
- 31c Flap varnish coating layer
- 41 Cutting blade
- 51 Flap
- 35 52 Cutting line
- 100 Packaging container

40 **Claims**

1. A packaging container comprising: a container body configured to house a wrap film roll and having an open upper side and a lid body connected to a rear panel of the container body; a varnish coating layer being disposed on a front panel of the container body; and the varnish coating layer satisfying Requirement 1 below:

45 Requirement 1
for T-peel strengths measured by using a 25 mm-wide varnish coating layer sample piece and a wrap film in accordance with JIS Z-0237:2009 "Testing methods of pressure-sensitive adhesive tapes and sheets", T-peel strength T_i measured immediately after adhesion of the wrap film and T-peel strength T_{3d} measured three days after the adhesion of the wrap film satisfying $\{(T_{3d} - T_i)/T_i\} \times 100 \leq 50$.
2. The packaging container according to claim 1, wherein the varnish coating layer further satisfying Requirement 2 below:

50 Requirement 2
the T-peel strength T_i being 4.0×10^{-2} N/25 mm or less.
3. The packaging container according to claim 1 or 2, wherein the lid body comprises a cutting blade configured to cut a wrap film pulled out from the wrap film roll; and

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a face of the cutting blade that is brought into contact with the pulled-out wrap film during cutting satisfies Requirement 3 below:

Requirement 3

5 strength upon sliding measured immediately after the wrap film adhered to a 25 mm-width cutting blade sample piece determined in accordance with JIS Z-0237:2009 "Testing methods of pressure-sensitive adhesive tapes and sheets" being 0.1 N/25 mm or less.

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4. The packaging container according to any one of claims 1 to 3, wherein the front panel comprises a flap having a cutting line formed on the front panel, and the varnish coating layer is provided at least on a front face of the flap.
 5. The packaging container according to any one of claims 1 to 4, wherein the wrap film is a polyvinylidene chloride film.

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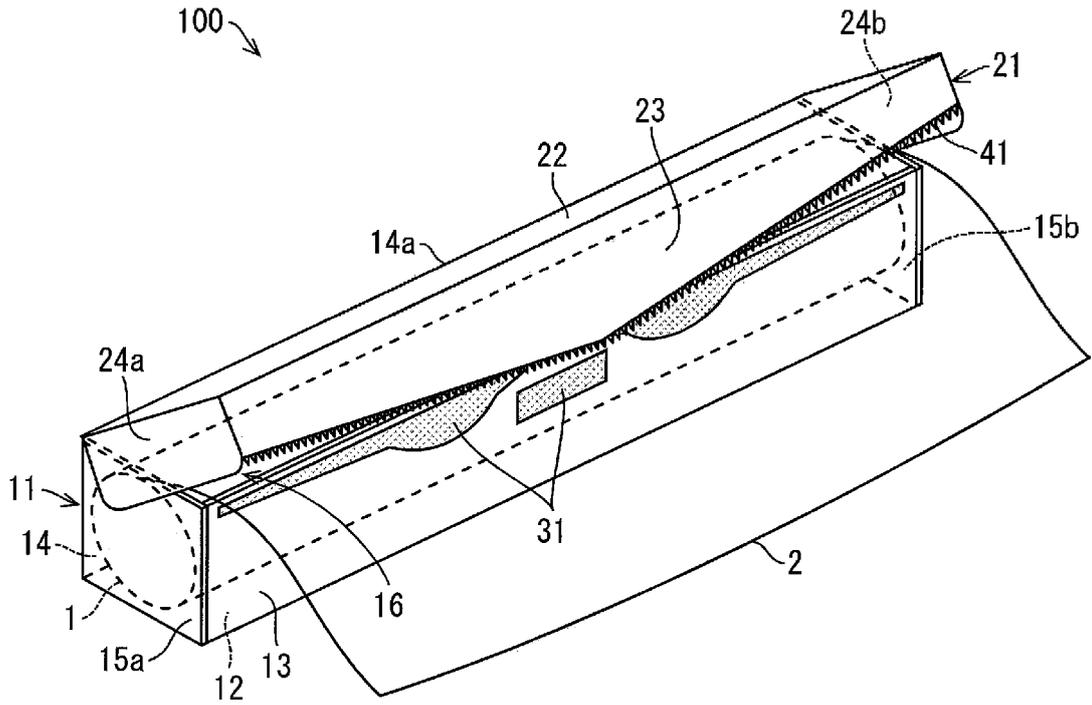


FIG. 1

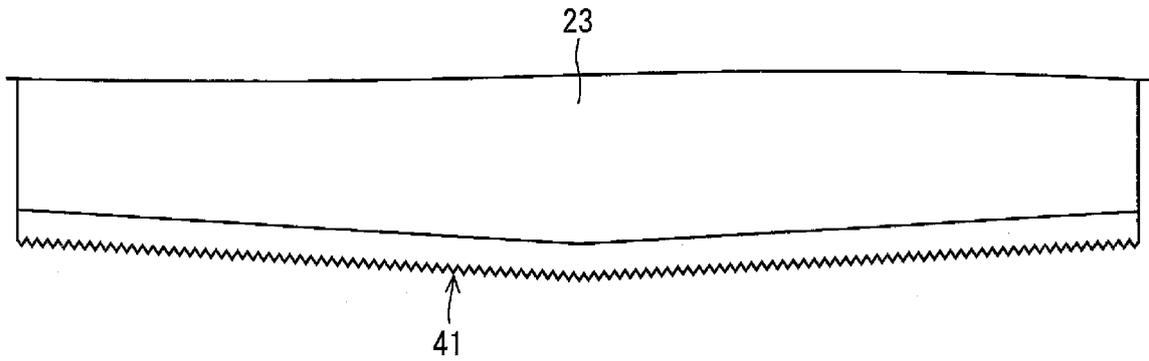


FIG. 2

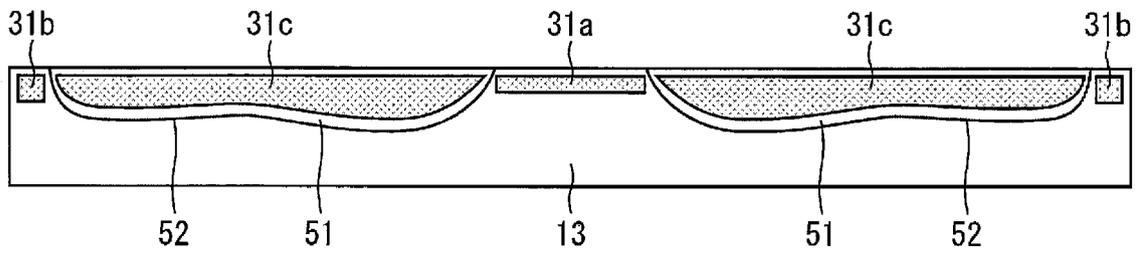


FIG. 3

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2018/000343

A. CLASSIFICATION OF SUBJECT MATTER

Int.Cl. B65D25/52(2006.01)i, B65D5/72(2006.01)i

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. B65D25/52, B65D5/72

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

Published examined utility model applications of Japan 1922-1996

Published unexamined utility model applications of Japan 1971-2018

Registered utility model specifications of Japan 1996-2018

Published registered utility model applications of Japan 1994-2018

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.
Y	JP 2014-5079 A (KUREHA CORPORATION) 16 January 2014, paragraphs [0015]-[0046], fig. 1-6 & JP 2017-145063 A & CN 103449233 A	1-5
Y	JP 10-35657 A (KUREHA CHEMICAL INDUSTRY CO., LTD.) 10 February 1998, paragraphs [0037]-[0053], fig. 1-6 & US 5884763 A, page 9, right column, line 40 to page 11, left column, line 51, fig. 1-6 & CN 1176215 A	1-5
Y	JP 2016-120538 A (KUREHA CORPORATION) 07 July 2016, paragraphs [0016]-[0041], fig. 1-3 (Family: none)	3-5

 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

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"P" document published prior to the international filing date but later than the priority date claimed

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"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
25 January 2018 (25.01.2018)Date of mailing of the international search report
06 February 2018 (06.02.2018)Name and mailing address of the ISA/
Japan Patent Office
3-4-3, Kasumigaseki, Chiyoda-ku,
Tokyo 100-8915, Japan

Authorized officer

Telephone No.

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 2014005079 A [0004]