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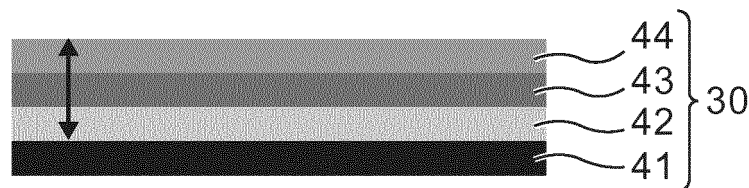
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(54) **PACKAGE**

(57) A package for internally containing cigarettes, the package including a lustrous part with excellent processability, the lustrous part having metallic luster and including: a sheet layer made of paper; an aluminum particle layer arranged above the sheet layer; an adhesive layer positioned between the sheet layer and the alumi-

num particle layer and configured to bond the aluminum particle layer to the sheet layer; and a protective layer arranged above the aluminum particle layer, wherein the aluminum particle layer is a transferred vapor-deposited aluminum particle layer.

Fig. 3



Description

TECHNICAL FIELD

5 **[0001]** The present invention relates to a package.

BACKGROUND ART

10 **[0002]** Various types of packages have conventionally been developed as packages for packaging articles to be packaged. When articles to be packaged are, for example, cigarettes such as paper rolled tobacco sticks or cigars, every predetermined number of cigarettes, for example, 10 or 20, are wrapped in a package. Such a package is composed of, for example, an inner paper such as a paper processed with an aluminum foil, and an outer paper covering the inner paper. Known examples of the outer paper are a package called a soft package made of a thin paper, and a package called a hard package formed by assembling paperboard into a box shape (see, for example, PTL 1 and PTL 2).

15 **[0003]** In such a package, for example, it has been known that silver or gold ink is printed on a surface of the package in order to give a luxurious look to the package. However, even if silver or gold ink is printed on a surface of a package made of paper, high brightness and a lustrous look cannot be obtained, and it is difficult to give a sufficient luxurious look to the package.

20 **[0004]** Therefore, in order to give high brightness and a lustrous look to the package, a surface of a sheet material which forms a part of the package is conventionally laminated with metallic aluminum (aluminum). As methods of laminating a surface of a sheet material with metallic aluminum, an aluminum lamination method and an aluminum vapor deposition method are conventionally known. In the aluminum lamination method, an aluminum layer is formed on a surface of a sheet material by bonding an aluminum foil to the surface of the sheet material through an adhesive agent. In the aluminum vapor deposition method, an aluminum particle layer and a PET layer are formed on a surface of a sheet material by bonding a PET (polyethylene terephthalate) film on which aluminum was deposited to the surface of the sheet material through an adhesive agent.

CITATION LIST

30 PATENT LITERATURES

[0005]

PTL 1: National Publication of International Patent Application No. 2004-517786

35 PTL 2: Japanese Patent Laid-Open No. 7-257671

SUMMARY OF INVENTION

TECHNICAL PROBLEM

40 **[0006]** In the aluminum lamination method, since an aluminum foil is bonded to a surface of a sheet material, the thickness of an aluminum layer formed on the surface of the sheet material corresponds to the thickness of the aluminum foil. In general, the thickness of the aluminum foil is thicker than the thickness of an aluminum particle layer which is formed by vapor deposition of aluminum. By performing a folding process and a punching process, the sheet material forms a package. As described above, in the aluminum lamination method, since the aluminum layer is thick, the aluminum layer may crack when the folding process is performed on the sheet material, or separation of the aluminum layer may occur when the punching process is performed on the sheet material. Moreover, since the stiffness of the sheet material itself is higher, it is difficult to process the sheet material.

45 **[0007]** On the other hand, in the aluminum vapor deposition method, since a sheet material has a PET layer made of a PET film, when the punching process is performed on the sheet material, the PET layer may elongate and may not be completely cut. Thus, there is the problem that processing is difficult.

[0008] The present invention has been made in view of the above problems, and one of the objects of the invention is to provide a package including a lustrous part with excellent processability.

55 SOLUTION TO PROBLEM

[0009] According to one aspect of the present invention, a package for internally containing cigarettes is provided. This package includes a lustrous part having metallic luster. The lustrous part includes: a sheet layer made of paper,

an aluminum particle layer arranged above the sheet layer; an adhesive layer positioned between the sheet layer and the aluminum particle layer and configured to bond the aluminum particle layer to the sheet layer; and a protective layer arranged above the aluminum particle layer, and the aluminum particle layer is a transferred vapor-deposited aluminum particle layer.

[0010] According to this aspect, the package has the transferred vapor-deposited aluminum particle layer above the sheet layer. Here, in the vapor deposited aluminum, the aluminum particles are sparser compared to an aluminum foil. Therefore, the aluminum layer to be deposited in this description is different from an aluminum layer formed by bonding an aluminum foil, and is called the "aluminum particle layer". The thickness of the transferred vapor-deposited aluminum particle layer is very thin compared to an aluminum layer formed by the aluminum lamination method. The density of the aluminum particles in the transferred vapor-deposited aluminum particle layer is also much lower compared to the density of the aluminum particles in the aluminum layer formed by the aluminum lamination method. More specifically, an aluminum foil to be used in the aluminum lamination method is formed by thinly stretching metallic aluminum, and thus the aluminum particles are densely arranged. On the other hand, the aluminum particle layer formed by transfer of vapor-deposited aluminum has a larger space between the aluminum particles compared to the aluminum foil. Therefore, the transferred vapor-deposited aluminum particle layer is less susceptible to surface cracking when the folding process is performed on the lustrous part, and separation from the sheet layer is less likely to occur when the punching process is performed. In addition, since the lustrous part has the transferred vapor-deposited aluminum particle layer with a thin thickness and does not have a PET film for vapor-deposited aluminum, the sheet stiffness is almost the same as that of an unprocessed sheet material, and the lustrous part can have high processability close to that of the unprocessed sheet material.

[0011] As described above, since the aluminum layer formed by the aluminum lamination method has a relatively high density between the aluminum particles, moisture permeability is lower compared to the transferred vapor-deposited aluminum particle layer. Accordingly, the difference between the amount of moisture entering the sheet material from a surface to which the aluminum foil is bonded and the amount of moisture entering the sheet material from a surface on the opposite side is relatively large. In this case, the difference in moisture content occurs in the thickness direction of the sheet material, and consequently warping of the sheet material may occur. When the warping of the sheet material occurs, it is difficult to supply a blank (material before being assembled into a package) to a packaging machine, or the assembly itself cannot be performed. On the other hand, as described above, in the transferred vapor-deposited aluminum particle layer, since the space between the aluminum particles is relatively large, the moisture permeability of the transferred vapor-deposited aluminum particle layer is higher compared to the aluminum foil. Therefore, since the difference between the amount of moisture entering the sheet layer from a surface on which the transferred vapor-deposited aluminum particle layer is formed and the amount of moisture entering the sheet layer from a surface on the opposite side is small, it is possible to reduce occurrence of warping of the sheet layer.

[0012] According to one aspect of the present invention, a package for internally containing cigarettes is provided. This package includes a lustrous part having metallic luster. The lustrous part includes: a sheet layer made of paper; an aluminum particle layer arranged above the sheet layer; an adhesive layer positioned between the sheet layer and the aluminum particle layer and configured to bond the aluminum particle layer to the sheet layer; and a protective layer arranged above the aluminum particle layer. The total thickness of the aluminum particle layer, the adhesive layer and the protective layer is 0.005 mm or less.

[0013] According to this aspect, the package has the adhesive layer, the aluminum particle layer and the protective layer above the sheet layer. The total thickness of the aluminum particle layer, the adhesive layer and the protective layer is 0.005 mm or less, which is thinner compared to an aluminum layer formed by the aluminum lamination method. Thus, the aluminum particle layer which enables the total thickness of the aluminum particle layer, the adhesive layer and the protective layer to be 0.005 mm or less can be formed by transfer of vapor-deposited aluminum. When the aluminum particle layer is formed by transfer of vapor-deposited aluminum, the density of the aluminum particles in the aluminum particle layer is also much lower compared to the density of the aluminum particles in an aluminum layer formed by the aluminum lamination method. More specifically, since an aluminum foil to be used by the aluminum lamination method is formed by thinly stretching metallic aluminum, the aluminum particles are densely arranged. On the other hand, the aluminum particle layer formed by transfer of vapor-deposited aluminum has a larger space between the aluminum particles compared to the aluminum foil. Therefore, the aluminum particle layer is less susceptible to surface cracking when the folding process is performed on the lustrous part, and separation from the sheet layer is less likely to occur when the punching process is performed. In addition, since the lustrous part has the thin aluminum particle layer and does not have a PET film for vapor-deposited aluminum, the sheet stiffness is almost the same as that of an unprocessed sheet material, and the lustrous part can have high processability close to that of the unprocessed sheet material. Further, as described above, since the difference between the amount of moisture entering the sheet layer from a surface on which the aluminum particle layer is formed and the amount of moisture entering the sheet layer from a surface on the opposite side is small, it is possible to reduce warping of the sheet layer.

[0014] In one aspect of the present invention, the protective layer contains a pigment.

[0015] Overcoat printing is performed on the aluminum layer formed on a surface of a sheet material formed by the aluminum lamination method in order to protect the surface during machining. Moreover, when adjusting the color tone of the surface, printing for color tone expression is performed. Therefore, when expressing a color tone on the surface of the aluminum layer, it is necessary to perform printing twice, namely printing for surface protection and printing for color tone expression, on the aluminum layer formed by the aluminum lamination method, and there is the problem that time and labor are required. According to this aspect, since the protective layer contains a pigment, the formation of the protective layer and the color tone expression process with the pigment can be performed simultaneously. In other words, since it is not necessary to perform overcoat printing and printing for color tone expression individually, it is possible to reduce man-hours and ink for printing.

[0016] In one aspect of the present invention, the protective layer has a pattern formed by the pigment.

[0017] According to this aspect, since the protective layer has a pattern formed by the pigment on its surface, it is possible to give more design to the package.

[0018] In one aspect of the present invention, the package includes: a package main body; a lid part for closing the package main body; and an inner frame provided inside the package main body. The inner frame is configured such that at least a portion of the inner frame is exposed when the lid part is opened, and the lustrous part is the inner frame.

[0019] According to this aspect, the inner frame has bright and lustrous looks because of the aluminum layer. Hence, when the lid part is opened, the bright and lustrous inner frame is exposed, and thus it is possible to give an excellent design and a luxurious look to the package. Note that if the protective layer contains a pigment, in general, the surface protection ability tends to decrease. However, even if the protective layer contains a pigment, it is possible to exhibit sufficient surface protection ability for a part which is relatively less susceptible to surface abrasion, such as the inner frame, during packaging by a packaging machine or during subsequent transportation. Accordingly, in the case where the inner frame is a lustrous part containing a pigment in the protective layer, a reduction in man-hours by simultaneously performing overcoat printing and printing for color tone expression and the surface protection ability can both be achieved.

[0020] In one aspect of the present invention, the inner frame has a punched portion.

[0021] According to one aspect of the present invention, the thickness of the aluminum particle layer is thin. When the aluminum particle layer is formed by transfer of vapor-deposited aluminum, the density of the aluminum particles in the transferred vapor-deposited aluminum particle layer is also much lower compared to the density of the aluminum particles in an aluminum layer formed by the aluminum lamination method. More specifically, since an aluminum foil to be used in the aluminum lamination method is formed by thinly stretching metallic aluminum, the aluminum particles are densely arranged. On the other hand, the aluminum particle layer formed by transfer of vapor-deposited aluminum has a larger space between the aluminum particles compared to the aluminum foil. Accordingly, the inner frame has high processability, and it is possible to reduce separation of the aluminum layer from the sheet layer when forming the punched portion. Moreover, as described above, since the difference between the amount of moisture entering the sheet layer from a surface on which the transferred vapor-deposited aluminum particle layer is formed and the amount of moisture entering the sheet layer from a surface on the opposite side is small, it is possible to reduce occurrence of warping of the inner frame.

[0022] In one aspect of the present invention, the inner frame has a folded ruled-line portion.

[0023] According to this aspect, since the thickness of the aluminum layer is thin, the inner frame has high processability, and it is possible to reduce occurrence of surface cracking of the aluminum layer when forming the folded ruled-line portion and when folding the inner frame along the folded ruled-line portion.

[0024] In one aspect of the present invention, smoothness of an outer surface of the lustrous part is not less than 500 seconds and not more than 2000 seconds.

[0025] According to this aspect, the lustrous part can smoothly pass through the inside of a machine when machine-processing the lustrous part, and has good processability. If the smoothness is less than 500 seconds, the smoothness is too low to smoothly pass through the inside of the machine, and a paper jam may occur. On the other hand, if the smoothness exceeds 2000 seconds, the smoothness is too high and makes it difficult for the machine to grip the lustrous part during assembly, and thus there is a possibility of assembly failure.

[0026] In one aspect of the present invention, the difference between stiffness in each of longitudinal and transverse directions of a surface of the lustrous part on the protective layer side and stiffness in each of longitudinal and transverse directions of the front side of an unprocessed paper is 1.0 mN or less, and the difference between stiffness in each of longitudinal and transverse directions of a surface of the lustrous part on the opposite side to the protective layer side and stiffness in each of longitudinal and transverse directions of the back side of the unprocessed paper is 1.5 mN or less.

[0027] According to this aspect, since the lustrous part has lower stiffness compared to an aluminum layer formed by the aluminum lamination method and a sheet material having an aluminum layer formed by the aluminum vapor deposition method, it is possible to easily perform the folding process and the punching process on the lustrous part.

ADVANTAGEOUS EFFECTS OF INVENTION

[0028] According to one aspect of the present invention, it is possible to provide a package having a lustrous part with excellent processability.

BRIEF DESCRIPTION OF DRAWINGS

[0029]

[Fig. 1] Fig. 1 is a perspective view illustrating a package according to an embodiment.

[Fig. 2] Fig. 2 is a perspective view of an inner frame.

[Fig. 3] Fig. 3 is an enlarged cross-sectional view illustrating a layer structure of the inner frame.

DESCRIPTION OF EMBODIMENT

[0030] An embodiment of the present invention will be described below with reference to the drawings. In the drawings described below, the same or corresponding constituent elements are denoted by the same reference numerals, and duplicate explanation is omitted. Note that X, Y, and Z axes are added to some of the drawings described below. In the drawings, the positive X-axis direction is the front direction, the negative X-axis direction is the rear direction, the positive Y-axis direction is the left direction, the negative Y-axis direction is the right direction, the positive Z-axis direction is the upper direction, and the negative Z-axis direction is the lower direction. In the description of the following embodiment, "width direction" and "side direction" mean the Y-axis direction, and "thickness direction" means the X-axis direction.

[0031] Fig. 1 is a perspective view illustrating a package according to an embodiment. In the illustrated example, the package is opened. The package according to this embodiment is configured to contain cigarettes such as rolled tobacco sticks. As illustrated in Fig. 1, a package 20 has a substantially rectangular parallelepiped shape as a whole. The package 20 includes a main body part 21 (corresponding to an example of a package main body) having a space for containing cigarettes, and a lid part 22 for closing the space. The main body part 21 and the lid part 22 are connected by a hinge part on the rear side of the package 20. In short, the package 20 is a hinge-lid type package.

[0032] The package 20 has an inner frame 30 (corresponding to an example of a lustrous part) provided inside the main body part 21. As will be described later, the inner frame 30 has an aluminum particle layer on its outer surface, and thereby has metallic luster. In this description, the "outer surface" means a surface located on the outer side of the package 20. Further, the inner frame 30 is configured such that when the lid part 22 is opened at least a portion of the inner frame 30 is exposed. More specifically, the outer surface of a lower portion of the inner frame 30 is bonded to the inner surface of the main body part 21 with an adhesive agent or the like, and an upper portion of the inner frame 30 is positioned to protrude from the opening of the main body part 21. The inner frame 30 is configured to reinforce the main body part 21 and also to come into contact with the inner surface of the lid part 22 when opening and closing the lid part 22 and keep the lid part 22 in a closed condition.

[0033] Fig. 2 is a perspective view of the inner frame 30 illustrated in Fig. 1. The inner frame 30 has a front face portion 31 positioned on the front side of the main body part 21, a left side face portion 32 positioned on the left side surface side of the main body part 21, and a right side face portion 33 positioned on the right side surface side of the main body part 21. The front face portion 31 includes a locking portion 31a (corresponding to an example of a punched portion) formed by a punching process. The locking portion 31a is folded outward and can keep the lid part 22 in a closed condition by engagement with a slit (not shown) formed in the inner surface of the lid part 22.

[0034] A curved portion 34 is formed between the front face portion 31 and the right side face portion 33 to join the front face portion 31 and the right side face portion 33 so that the front face portion 31 and the right side face portion 33 meet at a substantially right angle. A plurality of folded ruled-line portions 34a are formed in the curved portion 34 along a longitudinal direction of the inner frame 30. The folded ruled-line portion 34a is a ridge formed to protrude toward the outer surface by surface-processing the inner frame 30. The inner frame 30 is formed such that the inner frame 30 matches the shape of the main body part 21 by folding the curved portion 34 along the folded ruled-line portions 34a as illustrated in Fig. 2.

[0035] Further, the curved portion 34 includes a projecting portion 34b (corresponding to an example of a punched portion) formed by a punching process. When opening and closing the lid part 22, the projecting portion 34b comes into contact with the inner surface of the lid part 22 and gives resistance to the opening and closing operation of the lid part 22.

[0036] Formed between the front face portion 31 and the left side face portion 32 is a curved portion 35 that joins the front face portion 31 and the left side face portion 32 so that the front face portion 31 and the left side face portion 32 meet at a substantially right angle. In the curved portion 35, a plurality of folded ruled-line portions 35a are formed along the longitudinal direction of the inner frame 30. Like the folded ruled-line portion 34a, the folded ruled-line portion 35a is a ridge formed by surface-processing the inner frame 30 to protrude toward the outer surface. The inner frame 30 is

formed to conform to the shape of the main body part 21 by curving the curved portion 35 along the folded ruled-line portions 35a as illustrated in Fig. 2.

[0037] Further, the curved portion 35 includes a projecting portion 35b (see Fig. 1) formed by a punching process. Like the projecting portion 34b, when opening and closing the lid part 22, the projecting portion 35b (corresponding to an example of a punched portion) comes into contact with the inner surface of the lid part 22 and gives resistance to the opening and closing operation of the lid part 22.

[0038] Next, a layer structure of the inner frame 30 illustrated in Figs. 1 and 2 will be described. Fig. 3 is an enlarged sectional view illustrating the layer structure of the inner frame 30. As illustrated in Fig. 3, the inner frame 30 includes a sheet layer 41 made of paper or the like, an aluminum particle layer 43 arranged above the sheet layer 41, an adhesive layer 42 positioned between the sheet layer 41 and the aluminum particle layer 43 and configured to bond the aluminum particle layer 43 to the sheet layer 41, and a protective layer 44 arranged above the aluminum particle layer 43.

[0039] The sheet layer 41 is made of paper having a basis weight ranging, for example, from not less than 200 g/m² to not more than 250 g/m². The adhesive layer 42 has a thickness that is negligible compared to the thicknesses of the sheet layer 41 and the aluminum particle layer 43. The aluminum particle layer 43 is a transferred vapor-deposited aluminum particle layer formed by transfer of vapor-deposited aluminum. The total thickness of the adhesive layer 42, the aluminum particle layer 43 and the protective layer 44 illustrated in Fig. 3 is about 0.005 mm or less. Such a thickness is realized by forming the aluminum particle layer 43 by transfer of vapor-deposited aluminum. Thus, since the inner frame 30 illustrated in Fig. 3 has a thickness substantially equal to the thickness of an unprocessed sheet material, it has processability equivalent to that of the unprocessed sheet material.

[0040] In order to form the aluminum particle layer 43, first, a PET film on which aluminum is vapor-deposited is produced. Subsequently, the surface of the PET film on which aluminum is deposited is adhered to the adhesive layer 42. Thereafter, the aluminum particle layer 43 is transferred onto the adhesive layer 42 by removing the PET film from the adhesive layer 42. The thickness of the aluminum particles deposited on the PET film is about 0.002 mm or less. Accordingly, the aluminum particle layer 43 formed by transfer of vapor-deposited aluminum has a thickness of about 0.002 mm or less which is much thinner than an aluminum layer formed by the aluminum lamination method. The density of the aluminum particles in the aluminum particle layer 43 is also very low compared to the density of the aluminum particles in the aluminum layer formed by the aluminum lamination method. More specifically, an aluminum foil to be used in the aluminum lamination method is formed by thinly stretching metallic aluminum, and thus aluminum particles are densely arranged. On the other hand, the aluminum particle layer formed by transfer of vapor-deposited aluminum has a larger space between the aluminum particles compared to the aluminum foil. Therefore, the aluminum particle layer 43 is less susceptible to surface cracking when a folding process is performed on the inner frame 30 and less susceptible to separation from the sheet layer 41 when a punching process is performed. Moreover, the inner frame 30 has the aluminum particle layer 43 with a thin thickness and does not have a PET film layer as in aluminum formed by the aluminum vapor deposition method. Accordingly, the inner frame 30 has almost the same sheet stiffness as that of the unprocessed sheet material and can have high processability close to that of the unprocessed sheet material.

[0041] Further, as described above, since the aluminum layer formed by the aluminum lamination method has a relatively high density between the aluminum particles, the moisture permeability is lower compared to the aluminum particle layer 43. Therefore, the difference between the amount of moisture entering the sheet material from a surface to which the aluminum foil is bonded and the amount of moisture entering the sheet material from a surface on the opposite side is relatively large. In this case, the difference in moisture content occurs in the thickness direction of the sheet material, and consequently there is a possibility of occurrence of warping of the sheet material. If the warping of the sheet material occurs, it is difficult to supply a blank (material before being assembled into a package) to a packaging machine, or the assembly itself cannot be performed. On the other hand, as described above, since the aluminum particle layer 43 has a relatively large space between the aluminum particles, the aluminum particle layer 43 has higher moisture permeability compared to the aluminum foil. Thus, since the difference between the amount of moisture entering the sheet layer 41 from a surface on which the aluminum particle layer 43 is formed and the amount of moisture entering the sheet layer 41 from a surface on the opposite side is small, it is possible to reduce occurrence of warping of the sheet layer 41.

[0042] The protective layer 44 is formed on the upper surface of the aluminum particle layer 43. The protective layer 44 can be formed by applying a surface protective material (for example, a varnish or the like) including a resin to the aluminum particle layer 43. In addition, by mixing a pigment of an arbitrary color with the surface protective material, it is possible to form the protective layer 44 having an arbitrary color. Thus, since the protective layer 44 has a pigment, a color tone expression process with a pigment can be performed simultaneously with the formation of the protective layer 44. In other words, since it is not necessary to perform each of overcoat printing and printing for color tone expression individually, it is possible to reduce man-hours and ink for printing. Alternatively, the protective layer 44 can be formed by sticking a known protective film to the aluminum particle layer 43. As the protective film, it is also possible to use a film having a pattern formed in an arbitrary color.

[0043] Moreover, for example, by applying a surface protective material mixed with a silver pigment and a surface

protective material mixed with a gold pigment to the aluminum particle layer 43, patterns of the respective pigments are formed on the protective layer 44. As the pigments, it is possible to use a white pigment, a red pigment, a yellow pigment, a blue pigment, a black pigment, and other pigments of existing colors, and it is possible to use pigments of desired colors, such as gold and silver, by mixing pigments. Thus, since the protective layer 44 has a pattern formed by a pigment on the surface, it is possible to give more design to the package.

[0044] The smoothness of the outer surface of the inner frame 30 illustrated in Fig. 3 is preferably within a range from not less than 500 seconds to not more than 2000 seconds. When the smoothness is within this range, the inner frame 30 can smoothly pass through the inside of the machine when machining the inner frame 30, and has good processability. If the smoothness is less than 500 seconds, the smoothness is too low to smoothly pass through the machine, and a paper jam may occur. On the other hand, if the smoothness exceeds 2000 seconds, the smoothness is too high, and it is difficult for the machine to grip the inner frame 30 during assembly and there is a possibility of assembly failure. Note that the smoothness is a value measured according to "JIS P8119".

[0045] The difference between the stiffness in each of longitudinal and transverse directions of the outer surface (the surface on the protective layer 44 side) of the inner frame 30 illustrated in Fig. 3 and the stiffness in each of longitudinal and transverse directions of the front side of the unprocessed paper is preferably 1.0 mN or less. Further, the stiffness in each of longitudinal and transverse directions of the inner surface of the inner frame 30 (the surface on the opposite side to the surface on the protective layer 44 side, that is, the surface on the sheet layer 41 side) illustrated in Fig. 4 and the stiffness in each of longitudinal and transverse directions of the back side of the unprocessed paper is preferably 1.5 mN or less. Here, the "longitudinal/transverse direction" means the grain direction of the base paper. The stiffness of paper is a value measured according to "JIS P8125".

[0046] If the stiffness of the inner frame 30 is within this range, the inner frame 30 has lower stiffness compared to a sheet material having an aluminum particle layer formed by the aluminum lamination method or the aluminum vapor deposition method, and it is possible to easily perform the folding process and the punching process on the inner frame 30. If the stiffness of the inner frame 30 exceeds either of the above-mentioned upper limit values, the stiffness of the inner frame 30 is too high, making it difficult to fold the inner frame 30. If the stiffness of the inner frame 30 falls below either of the above-mentioned lower limit values, the stiffness of the inner frame 30 is too low and the inner frame 30 cannot properly reinforce the main body part 21 illustrated in Fig. 1. In addition, when the inner frame 30 comes into contact with the inner surface of the lid part 22 by opening or closing the lid part 22 illustrated in Fig. 1, the inner frame 30 cannot give appropriate resistance to the opening or closing operation of the lid part 22 and consequently it is impossible to properly keep the lid part 22 in a closed condition.

[0047] While it is described that the adhesive layer 42, the aluminum particle layer 43 and the protective layer 44 are formed on the sheet layer 41 constituting the inner frame 30 in Figs. 1 to 3, the present invention is not limited to this. In other words, the adhesive layer 42, the aluminum particle layer 43 and the protective layer 44 may be formed on a sheet layer constituting the main body part 21 or the lid part 22 illustrated in Fig. 1. Thus, the main body part 21 or the lid part 22 can be configured as a lustrous part having metallic luster.

[0048] In this embodiment, the aluminum particle layer 43 formed by transfer of vapor-deposited aluminum has such advantages that the aluminum particle layer 43 is less likely to separate from the sheet layer 41 in the punching process and less susceptible to surface cracking in the folding process. Therefore, in a part like the inner frame 30 including the curved portions 34, 35 which are formed by folding, the locking portion 31a and the projecting portions 34b, 35b which are formed by punching process, and the folded ruled-line portions 34a, 35a which are formed by surface-processing, it is particularly effective to form the aluminum particle layer 43 by transfer of vapor-deposited aluminum as in the present embodiment because separation and cracking of the aluminum particle layer 43 are less likely to occur. Further, at least a portion of the inner frame 30 is exposed when the lid part 22 is opened. Therefore, if the inner frame 30 has bright and lustrous looks because of the aluminum particle layer 43, the bright and lustrous inner frame 30 is exposed only when the lid part 22 is opened, thereby giving an excellent design and a luxurious look to the package 20. If the protective layer 44 contains a pigment, in general, the surface protection ability tends to decrease. However, even if the protective layer 44 contains a pigment, the protective layer 44 can exhibit sufficient surface protection ability for a part like the inner frame 30, which is less susceptible to surface abrasion during packaging by the packaging machine or during subsequent transportation. Accordingly, in the case where the adhesive layer 42, the aluminum particle layer 43 and the protective layer 44 containing a pigment are formed on the sheet layer 41 to be the inner frame 30 as in the present embodiment, a reduction in man-hours by simultaneously performing overcoat printing and printing for color tone expression and the surface protection ability can both be achieved.

[0049] Next, several measurement results with respect to portions of a package 20 including an adhesive layer, an aluminum particle layer and a protective layer according to the present embodiment will be described.

<Experimental Example 1>

[0050] In Experimental Example 1, as illustrated in Fig. 3, five sheets of an inner frame 30 (transfer-vapor-deposition

inner frame) formed by arranging an adhesive layer 42, an aluminum particle layer 43 formed by transfer of vapor-deposited aluminum, and a protective layer 44 on a sheet layer 41 were produced, and the thicknesses of these sheets were measured. As a comparative example, five sheets of an inner frame which was not processed (unprocessed inner frame), five sheets of an inner frame having an aluminum layer formed by the aluminum vapor deposition method (vapor-deposition inner frame), one sheet of an inner frame having an aluminum layer formed by the aluminum lamination method (aluminum laminated inner frame) were produced, and the thicknesses of these sheets were respectively measured. The measurement results are shown in Table 1. The unit of the numerical values in Table 1 is mm.

[Table 1]

Unit :mm							
	1	2	3	4	5	Average	Difference
Unprocessed inner frame	0.236	0.233	0.233	0.235	0.235	0.2344	-
Transfer-vapor-deposition inner frame	0.238	0.235	0.235	0.236	0.236	0.236	0.002
Vapor-deposition inner frame	0.245	0.245	0.247	0.246	0.247	0.246	0.012
Aluminum laminated inner frame	0.254	-	-	-	-	0.254	0.020

[0051] As shown in Table 1, the average value of the thickness of the transfer-vapor-deposition inner frame is 0.002 mm greater than the average value of the thickness of the unprocessed inner frame. This indicates an increase in thickness by the adhesive layer 42, the aluminum particle layer 43 and the protective layer 44. As described above, since the aluminum particle layer 43 formed by transfer of vapor-deposited aluminum, the adhesive layer 42 and the protective layer 44 are about 0.005 mm or less and can be formed very thin, the transfer-vapor-deposition inner frame has a thickness almost equal to the thickness of the unprocessed inner frame.

[0052] On the other hand, the average value of the thickness of the vapor-deposition inner frame is 0.012 mm greater than the average value of the thickness of the unprocessed inner frame. This means that, in the vapor-deposition inner frame, since a PET film is adhered to the inner frame in order to form the aluminum particle layer, the vapor-deposition inner frame is thicker than the transfer-vapor-deposition inner frame by the thickness of the PET film. In other words, it can be understood that it is difficult to reduce the increase in the thickness of the vapor-deposition inner frame with respect to the unprocessed inner frame to 0.005 mm or less.

[0053] The average value of the thickness of the aluminum laminated inner frame is 0.020 mm greater than the average value of the thickness of the unprocessed inner frame. This means that, in the aluminum lamination method, an aluminum foil bonded to the inner frame is thick.

[0054] As described above, it was found that the inner frame 30 having the aluminum particle layer 43 formed by transfer of vapor-deposited aluminum can be made thinner than the inner frame having the aluminum particle layer formed by other method. Therefore, the inner frame 30 has excellent processability, and cracking of the aluminum particle layer 43 in the folding process and separation of the aluminum particle layer 43 in the punching process are less likely to occur.

<Experimental Example 2>

[0055] In Experimental Example 2, ten sheets of a test paper (transfer-vapor-deposition paper) formed by arranging an adhesive layer, an aluminum particle layer formed by transfer of vapor-deposited aluminum and a protective layer on a sheet material were produced. The stiffness in each of longitudinal and transverse directions was measured on the processed side (a surface on the side where the aluminum particle layer was formed) and the unprocessed side of the respective sheets. As a comparative example, ten sheets of a test paper which was not processed (unprocessed paper) were produced, and the stiffness in each of longitudinal and transverse directions was measured on the front surface and the rear surface of these sheets. Here, the "longitudinal/transverse direction" means the grain direction of the base paper. Note that the stiffness of paper is a value measured according to "JIS P8125". The measurement results are shown in Table 2. The unit of the numerical values in Table 2 is mN.

[Table 2]

Unit :mN

Paper stiffness when vapor-deposited aluminum was transferred to sheet of 230g/m² base paper

		1	2	3	4	5	6	7	8	9	10	Average	Difference	
Unprocessed paper	Longitudinal direction	Front	4.78	4.59	4.78	4.85	5.16	4.78	4.59	4.66	4.72	4.66	4.76	-
		Rear	4.02	4.27	4.15	4.15	3.96	3.70	4.02	4.02	4.34	4.08	4.07	-
	Transverse direction	Front	2.11	2.62	2.49	2.68	2.55	2.36	2.11	2.36	2.55	2.49	2.43	-
		Rear	2.55	2.55	2.17	2.49	2.23	2.43	2.36	2.43	2.36	2.74	2.43	-
Transfer-vapor-deposition paper	Longitudinal direction	Processed surface (aluminum)	4.59	4.78	4.78	4.72	4.66	5.23	4.78	5.04	4.59	4.59	4.78	0.02
		Unprocessed (paper)	5.73	5.54	5.54	5.61	5.35	5.29	5.42	5.10	5.54	5.54	5.47	1.40
	Transverse direction	Processed surface (aluminum)	3.19	3.06	2.62	2.55	2.68	2.74	2.74	2.74	2.87	2.87	2.81	0.37
		Unprocessed (paper)	3.00	3.32	3.57	3.51	3.57	3.70	3.38	3.19	3.64	3.64	3.45	1.02

[0056] As shown in Table 2, the average value of the stiffness of the processed surface of the transfer-vapor-deposition paper is 0.02 mN greater in the longitudinal direction and 0.37 mN greater in the transverse direction. The average value of the stiffness of the unprocessed surface is 1.40 mN greater in the longitudinal direction and 1.02 mN greater in the transverse direction compared to the average values of the stiffness of the unprocessed paper. This indicates that the

stiffness is increased by the process of transfer of vapor-deposited aluminum.

[0057] On the other hand, the aluminum layer formed by the aluminum lamination method is thicker than the aluminum particle layer formed by transfer of vapor-deposited aluminum. Therefore, paper having an aluminum layer formed by the aluminum lamination method (aluminum laminated paper) is presumed to have stiffness greater than the stiffness of the transfer-vapor-deposition paper. Paper having an aluminum particle layer formed by the aluminum vapor deposition method (aluminum-vapor-deposition paper) has a PET film, and accordingly the aluminum-vapor-deposition paper is presumed to have stiffness greater than the stiffness of the transfer-vapor-deposition paper. In short, the transfer-vapor-deposition paper has greater stiffness than the stiffness of the unprocessed paper, but has smaller stiffness than the stiffness of the aluminum laminated paper and the aluminum-vapor-deposition paper. Therefore, it is possible to easily perform the folding process and the punching process on the transfer-vapor-deposition paper compared to the aluminum laminated paper and the aluminum-vapor-deposition paper.

<Experimental Example 3>

[0058] In Experimental Example 3, one sheet of a test paper (transfer-vapor-deposition paper) formed by arranging an adhesive layer, an aluminum particle layer formed by transfer of vapor-deposited aluminum and a protective layer on a sheet material was produced, and smoothness was measured. As a comparative example, one sheet of a test paper which was not processed (unprocessed paper) and one sheet of a test paper (vapor-deposition paper) having an aluminum particle layer formed by the aluminum vapor deposition method were produced, and the smoothness of each paper was measured. The smoothness of paper is a value measured according to "JIS P 8119". The measurement results are shown in Table 3. The unit of the numerical values in Table 3 is seconds. Smoothness indicates that the greater the value, the higher the smoothness.

[Table 3]

	Measurement values
Vapor-deposition paper	2,204 Seconds
Transfer-vapor-deposition paper	1,637 Seconds
Unprocessed paper	675 Seconds

[0059] As shown in Table 3, the smoothness of the surface of the transfer-vapor-deposition paper is greater than the smoothness of the unprocessed paper and is smaller than the smoothness of the vapor-deposition paper. This means that the transfer-vapor-deposition paper has improved smoothness compared to the unprocessed paper by having the adhesive layer, the aluminum particle layer and the protective layer. It is also indicated that there is a difference in smoothness between the vapor-deposition paper and the transfer-vapor-deposition paper because the vapor-deposition paper has a PET film layer between the aluminum particle layer and the protective layer in addition to the adhesive layer, the aluminum particle layer and the protective layer.

[0060] Thus, since the smoothness of the surface of the transfer-vapor-deposition paper is higher than that of the unprocessed paper, the transfer-vapor-deposition paper can smoothly pass through inside the machine and has good processability. On the other hand, since the smoothness and the stiffness of the vapor-deposition paper are increased by having the film, it is difficult to grip the vapor-deposition paper by the machine during assembly, and assembly failure may occur.

[0061] The embodiment of the present invention has been described above, but the present invention is not limited to the above-described embodiment and can be modified in various ways within the scope of the claims and the technical idea described in the description and the drawings. If any shape and material which are not described directly in the description and the drawings exhibit the functions and effects of the present invention, they are within the scope of the technical idea of the present invention.

REFERENCE SIGNS LIST

[0062]

- 20 Package
- 21 Main body part
- 22 Lid part
- 30 Inner frame

- 31a Locking portion
- 34a Folded ruled-line portion
- 34b Projecting portion
- 35a Folded ruled-line portion
- 5 35b Projecting portion
- 41 Sheet layer
- 42 Adhesive layer
- 43 Aluminum particle layer
- 44 Protective layer
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Claims

- 15 1. A package for internally containing cigarettes, comprising a lustrous part having metallic luster, the lustrous part including:
 - a sheet layer made of paper,
 - an aluminum particle layer arranged above the sheet layer,
 - an adhesive layer positioned between the sheet layer and the aluminum particle layer and configured to bond
 - 20 the aluminum particle layer to the sheet layer; and
 - a protective layer arranged above the aluminum particle layer, wherein the aluminum particle layer is a transferred vapor-deposited aluminum particle layer.
- 25 2. A package for internally containing cigarettes, comprising a lustrous part having metallic luster, the lustrous part including:
 - a sheet layer made of paper;
 - an aluminum particle layer arranged above the sheet layer;
 - an adhesive layer positioned between the sheet layer and the aluminum particle layer and configured to bond
 - 30 the aluminum particle layer to the sheet layer; and
 - a protective layer arranged above the aluminum particle layer, wherein

a total thickness of the aluminum particle layer, the adhesive layer and the protective layer is 0.005 mm or less.
- 35 3. The package according to claim 1 or 2, wherein the protective layer contains a pigment.
- 40 4. The package according to claim 3, wherein the protective layer has a pattern formed by the pigment.
5. The package according to any one of claims 1 to 4, comprising:
 - a package main body;
 - a lid part for closing the package main body; and
 - 45 an inner frame provided inside the package main body, wherein the inner frame is configured such that at least a portion of the inner frame is exposed when the lid part is opened, and
 - the lustrous part is the inner frame.
- 50 6. The package according to claim 5, wherein the inner frame has a punched portion.
7. The package according to claim 5 or 6, wherein the inner frame has a folded ruled-line portion.
- 55 8. The package according to any one of claims 1 to 7, wherein smoothness of an outer surface of the lustrous part is not less than 500 seconds and not more than 2000 seconds.

9. A package according to any one of claims 1 to 8, wherein
a difference between stiffness in each of longitudinal and transverse directions of a surface on the protective layer
side of the lustrous part and stiffness in each of longitudinal and transverse directions of a front side of an unprocessed
paper is 1.0 mN or less, and
a difference between stiffness in each of longitudinal and transverse directions of a surface on an opposite side to
the protective layer side of the lustrous part and stiffness in each of longitudinal and transverse directions of a back
side of the unprocessed paper is 1.5 mN or less.

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Fig. 1

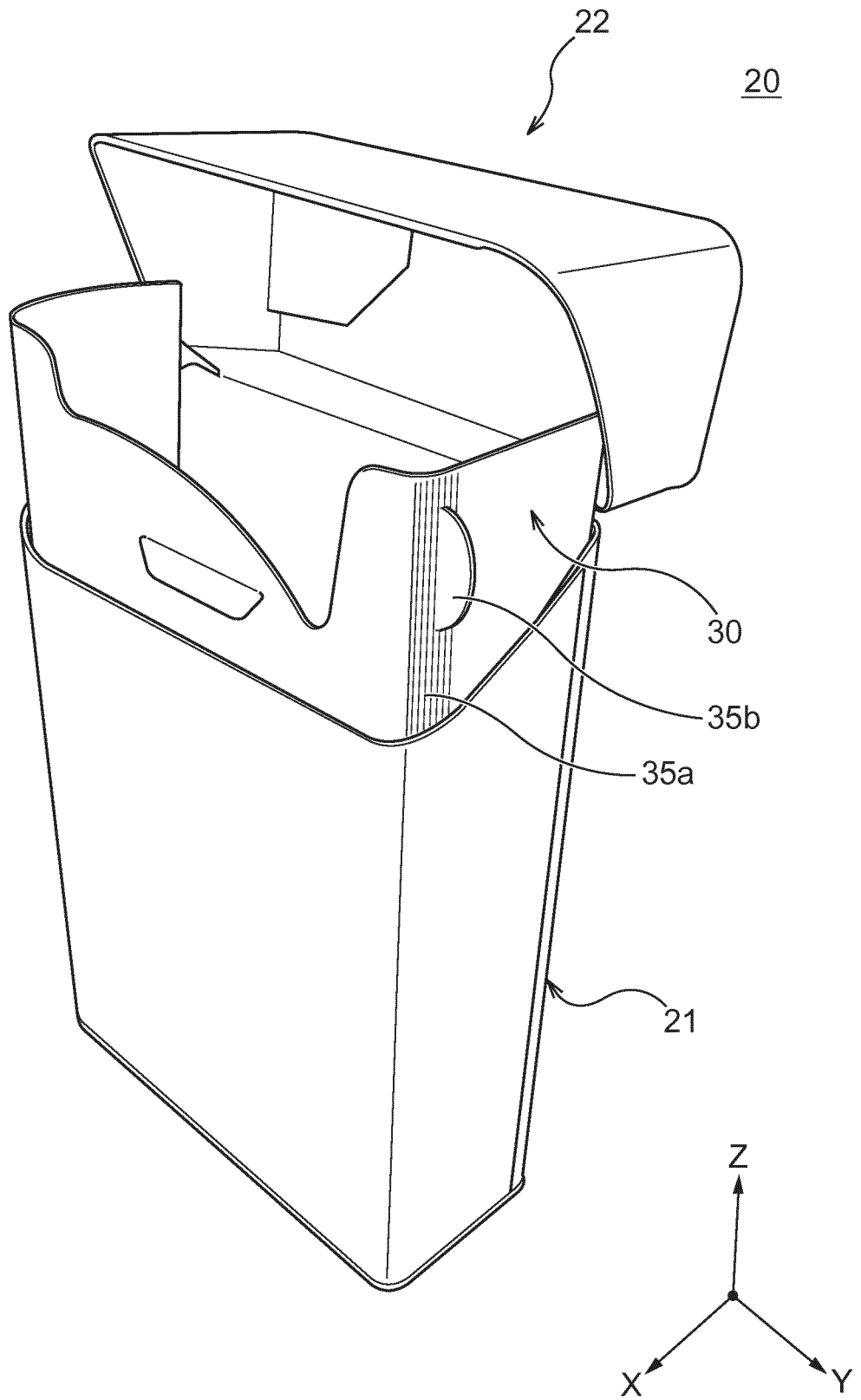


Fig. 2

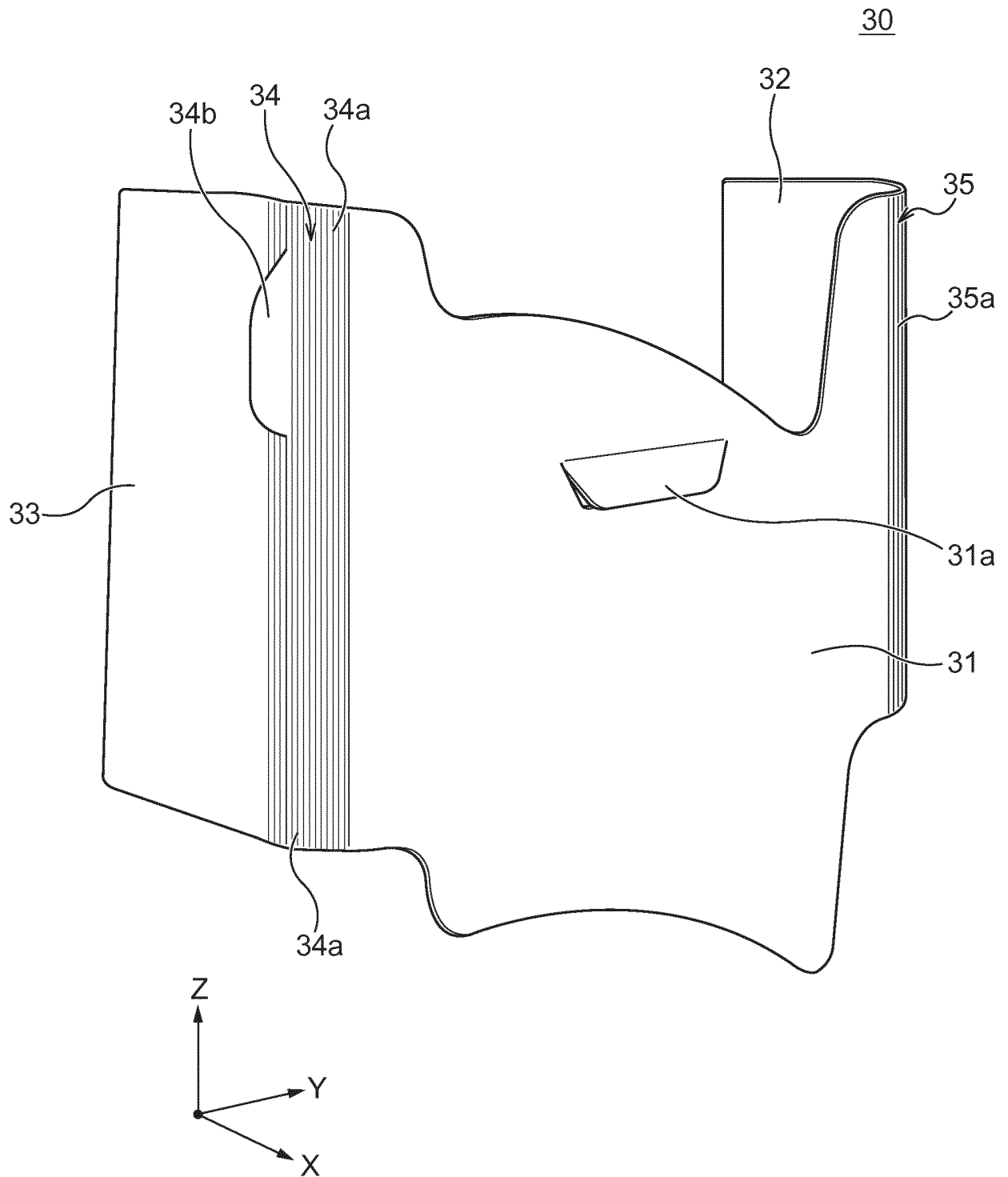
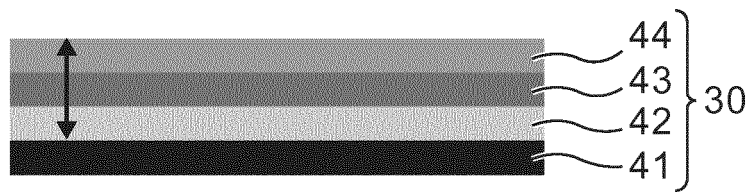


Fig. 3



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2015/083856

A. CLASSIFICATION OF SUBJECT MATTER

B65D85/10 (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)

B65D85/10

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

Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2016

Kokai Jitsuyo Shinan Koho 1971-2016 Toroku Jitsuyo Shinan Koho 1994-2016

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 2004-352364 A (Dainippon Printing Co., Ltd.), 16 December 2004 (16.12.2004), paragraphs [0001], [0016] to [0020]; fig. 1, 4 to 6 (Family: none)	1-9
Y	WO 2013/042187 A1 (Japan Tobacco Inc.), 28 March 2013 (28.03.2013), paragraphs [0021] to [0023]; fig. 1 to 4 & EP 2759491 A1 paragraphs [0021] to [0023]; fig. 1 to 4	1-9

☒ Further documents are listed in the continuation of Box C.
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Date of the actual completion of the international search

23 February 2016 (23.02.16)

Date of mailing of the international search report

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Tokyo 100-8915, Japan

Authorized officer

Telephone No.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2015/083856

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Y	JP 8-276519 A (Rengo Co., Ltd.), 22 October 1996 (22.10.1996), paragraph [0004] (Family: none)	2-9
Y	JP 3-190800 A (Oike & Co., Ltd.), 20 August 1991 (20.08.1991), page 2, lower right column, line 1 to page 3, upper left column, line 18; fig. 1 to 2 (Family: none)	3-9
Y	JP 3-13080 B2 (Oike & Co., Ltd.), 21 February 1991 (21.02.1991), page 1, column 2, line 9 to page 3, column 5, line 41 (Family: none)	3-9
Y	WO 2014/002166 A1 (Japan Tobacco Inc.), 03 January 2014 (03.01.2014), paragraphs [0034], [0035], [0039]; fig. 1, 4 (Family: none)	5-9
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REFERENCES CITED IN THE DESCRIPTION

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