



(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
27.12.2017 Bulletin 2017/52

(51) Int Cl.:
B65D 71/06 ^(2006.01) **B65D 19/38** ^(2006.01)
B65D 85/672 ^(2006.01)

(21) Application number: **16768260.8**

(86) International application number:
PCT/JP2016/055066

(22) Date of filing: **22.02.2016**

(87) International publication number:
WO 2016/152357 (29.09.2016 Gazette 2016/39)

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
MA MD

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(30) Priority: **23.03.2015 JP 2015058925**

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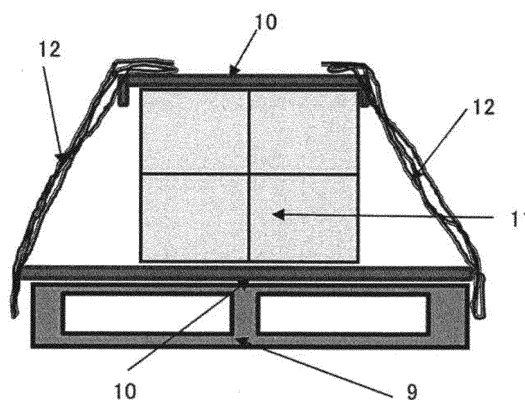
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(54) **FILM ROLL PACKAGING BODY FOR TRANSPORTATION**

(57) In accordance with the present invention, there is provided a film roll package that hardly suffers from deformation of a paper box owing to moisture condensation in a container, or hardly suffers from deformation of a paper core for the film roll owing to impact, etc., upon transportation thereof which tends to be caused by deterioration in strength of the paper core for the film roll owing to absorption of moisture. The present invention relates to a film roll package for transportation comprising a film roll comprising a paper core and a plastic film wound around the paper core, a paper box accommodating the

film roll therein which is rested on a pallet, plastic films or sheets respectively disposed on upper and lower side surfaces of the paper box, each of the plastic films or sheets having a longitudinal dimension and a lateral dimension which are longer than a longitudinal dimension and a lateral dimension of the upper or lower side surface of the paper box, respectively, and a thickness of 5 to 500 μm , and a stretched film wound over side surfaces of the paper box and the pallet so as to cover 20 to 90% of a height of a side surface of the pallet to fix the paper box onto the pallet.

FIG. 2



DescriptionTECHNICAL FIELD

5 **[0001]** The present invention relates to a film roll package that hardly suffers from deformation of a paper box owing to moisture condensation in a container when the film roll is shipped abroad, or hardly suffers from deformation of a paper core for the film roll owing to impact, etc., upon transportation thereof which tends to be caused by deterioration in strength of the paper core for the film roll owing to absorption of moisture.

BACKGROUND ART

10 **[0002]** In film roll products shipped for exportation, a packaging material thereof has been left unrecovered in many cases, and therefore not a high-strength plastic core but a paper core or a paper box which is formed mainly of a paper as a raw material has been frequently used therefor. In addition, as a pallet, not a plastic pallet but a heat-treated wooden pallet has been generally used.

15 **[0003]** In general, upon transportation of cargoes in shipping, the cargoes are accommodated in a container. In the case where the cargoes accommodated in a container in high-temperature and high-humidity seasons or regions are transported through a relatively low-temperature region, moisture condensation tends to be caused in the container. The film roll products packaged in a paper box tend to be sometimes contacted with the paper box by deformation of the box owing to water absorption or moisture absorption of the box, so that adverse influence on appearance of the film roll tends to occur. In addition, the paper core tends to suffer from deterioration in strength owing to moisture absorption thereof and therefore tends to be deformed owing to impact by up-and-down motion upon unloading or transportation, so that the roll products retained and supported in a state suspended in midair in a corrugated box tend to be fallen off therefrom.

20 **[0004]** With respect to the technologies for preventing moisture absorption of the film roll products, for example, in Patent Literature 1, there has been proposed the method of covering and packaging a film roll product by a plastic film laminated with a metal film or an inorganic oxide film, and sealing a drying agent in the resulting package. However, this method fails to solve the problem concerning moisture absorption of a paper box accommodating a film roll.

25 **[0005]** In addition, according to Patent Literature 2, there is described a package in which a laminate of a wound yarn body is fixed on a pallet using a stretched film. However, this package also fails to solve the problem concerning water absorption or moisture absorption of the laminate.

CITATION LIST:PATENT LITERATURE**[0006]**

35 Patent Literature 1: Japanese Patent Application Laid-open (KOKAI) No. 2004-175440

40 Patent Literature 2: Japanese Patent Application Laid-open (KOKAI) No. 06-080154

SUMMARY OF INVENTIONTECHNICAL PROBLEM

45 **[0007]** The present invention has been accomplished to solve the above conventional problems. An object of the present invention is to provide a film roll package that hardly suffers from deformation of a paper box owing to moisture condensation in a container, or hardly suffers from deformation of a paper core for the film roll owing to impact, etc., upon transportation thereof which tends to be caused by deterioration in strength of the paper core for the film roll owing to absorption of moisture.

SOLUTION TO PROBLEM

50 **[0008]** As a result of the present inventors' earnest study in view of the above conventional problems, it has been found that the aforementioned conventional problems can be solved by a film roll package having a specific structure. The present invention has been attained on the basis of this finding.

[0009] That is, in an aspect of the present invention, there is provided a film roll package for transportation comprising:

a film roll comprising a paper core and a plastic film wound around the paper core;
 a paper box accommodating the film roll therein which is rested on a pallet;
 plastic films or sheets respectively disposed on upper and lower side surfaces of the paper box, in which each of
 the plastic films or sheets have a longitudinal dimension and a lateral dimension which are longer than a longitudinal
 dimension and a lateral dimension of the upper or lower side surface of the paper box, respectively, and a thickness
 of 5 to 500 μm ; and
 a stretched film wound over side surfaces of the paper box and the pallet so as to cover 20 to 90% of a height of a
 side surface of the pallet to fix the paper box onto the pallet.

TECHNICAL EFFECTS OF INVENTION

[0010] According to the present invention, it is possible to provide a film roll package that hardly suffers from deformation of a paper box owing to moisture condensation, or deterioration in strength of a paper core for the film roll owing to absorption of moisture, and therefore can be prevented from suffering from poor appearance of the film roll and falling-off of the film roll owing to deformation of a paper core by impact, etc., upon transportation. Thus, the present invention provides high industrial values.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011]

FIG. 1 is a schematic sectional view of a paper box package for a film roll.
 FIG. 2 is a schematic sectional view of the package.

DETAILED DESCRIPTION OF INVENTION

[0012] The package of the present invention is constructed of (A) a film roll, (B) a paper box, (C) plastic films or sheets and (D) a stretched film.

[0013] The film roll is constructed by winding a plastic film having a predetermined width around a paper core. The paper core is a tube formed of a paper as a main raw material, and has an inner diameter of 3 to 10 inches. Examples of the plastic film include a polyester film, a polyethylene film, a nylon film, a polypropylene film, a polyimide film and the like. As the paper box, there may be generally used a corrugated box of a rectangular parallelepiped shape having a laminated structure which is formed by processing a paper board into a corrugated shape. The film roll has a weight of 50 to 1000 kg, and is accommodated in a state suspended in midair in the paper box by supporting opposite ends of the paper core with collar flanges. The paper box is rested on a pallet.

[0014] The plastic films or sheets disposed on upper and lower side surfaces of the paper box each have a thickness of 5 to 500 μm . When the thickness of each of the plastic films or sheets is less than 5 μm , the plastic films or sheets tend to suffer from formation of holes owing to irregularities on the surface of the wooden pallet. On the other hand, when the thickness of each of the plastic films or sheets is more than 500 μm , the rigidity of the plastic films or sheets becomes excessively high, so that it may be difficult to cover the rectangular parallelepiped box.

[0015] The kinds of plastic films or sheets are not particularly limited. Examples of the material of the plastic films or sheets include a polyester film, a polyethylene film and a polypropylene film. More preferably, the material of the plastic films or sheets is a moisture-permeable waterproof film capable of controlling a water content in the paper box.

[0016] Examples of the moisture-permeable waterproof film include a moisture-permeable waterproof film A and a moisture-permeable waterproof film B as prescribed in JIS A 6111.

[0017] The plastic films or sheets are disposed on upper and lower side surfaces of the paper box, respectively. If no plastic films or sheets are present on upper and lower side surfaces of the paper box, a condensed water generated in the container is adhered onto the paper box, so that the paper box tends to be undesirably deformed or the paper core tends to be deteriorated in its strength.

[0018] In addition, it is necessary that the size of each of the plastic films or sheets is controlled such that longitudinal and lateral dimensions thereof are longer than longitudinal and lateral dimensions of an upper or lower surface of the paper box, respectively. If the size of each of the plastic films or sheets is shorter than any of the longitudinal and lateral dimensions of an upper or lower surface of the paper box, a condensed water generated in the container is adhered onto the paper box, or water droplets puddled on a floor of the container are adsorbed in the the paper box through a wooden pallet, so that it is not possible to prevent the problems such as undesirable deformation of the paper box or deterioration in strength of the paper core. Furthermore, the size of the plastic film or sheet positioned on a lower portion of the paper box is preferably slightly longer than longitudinal and lateral dimensions of the pallet.

[0019] The stretched film used herein is preferably formed of a linear low-density polyethylene (LLDPE) film having a

width of about 300 to about 2000 mm and a thickness of about 10 to about 30 μm .

[0020] The stretched film is wound over side surfaces of the paper box and the pallet so as to fix the paper box on the pallet. At this time, the stretched film is wound to cover 20 to 90%, preferably 30 to 80%, of a height of the pallet. If the percentage of the height of the pallet which is covered by the stretched film is less than 20%, the paper box and the pallet tend to be fixed incompletely, so that when the package undergoes rolling motion in a lateral direction thereof, collapse of the package tends to be caused. On the other hand, if the percentage of the height of the pallet which is covered by the stretched film is more than 90%, it may be difficult to insert a fork of a fork lift truck into the pallet, so that the handling of the package tends to be disturbed.

[0021] As the pallet, there may be used a wooden pallet or a plastic pallet. The material of the pallet is not particularly limited as long as the pallet has a strength enough to support the weight of the cargoes. For the purpose of exportation of the cargoes, the wooden pallet may be frequently used.

[0022] Next, the film roll package for transportation according to the present invention is described in more detail. However, the film roll package of the present invention is not particularly limited to the below-mentioned embodiment as long as the constructional requirements of the present invention can be satisfied.

[0023] The roll accommodated in the paper box among the components of the film roll package for transportation according to the present invention is prepared by slitting a film into a predetermined film width and length and winding the slit film around the paper core. After the winding, a tape is attached to the rolled film to fix the film, and then a label indicating a product name and a lot is adhered onto the resulting film roll, if required. Thereafter, the roll is covered with a dust-proofing plastic film. If required, before covering the roll with the dust-proofing plastic film, the roll may also be covered with a film having a metal-deposited surface or a metal foil-attached surface for preventing moisture absorption of the film roll.

[0024] In addition, in the case where the weight of the roll exceeds 100 kg, it is preferred that in order to compensate the strength of the paper core, a plastic cylindrical cap having the same inner and outer diameters as those of the paper core is fitted into each of opposite ends of the paper core. The length of a cylinder portion of the plastic cylindrical cap is usually 50 to 200 mm, and the thickness of the cylinder portion of the plastic cylindrical cap is usually 5 to 20 mm.

[0025] The film roll is accommodated in a state suspended in midair in the paper box by supporting the opposite ends of the paper core with collar flanges. In addition, a clearance between the paper box and the respective collar flanges is filled with a corrugated board pad. If required, a moisture absorber may be placed in the paper box.

[0026] FIG. 1 is a schematic view showing such a condition that the film roll is accommodated in the paper box.

[0027] The pallet is placed on a turning table, and then a plastic film or sheet having longitudinal and lateral dimensions longer than those of the paper box is disposed on the pallet. The portion of the plastic film or sheet which is projected from the edge of the pallet may be fixed to the pallet with a tape. Next, the paper box accommodating the film roll is placed on the plastic film or sheet. A single paper box or a plurality of paper boxes may be placed on the plastic film or sheet, and the plurality of paper boxes may be stacked in two stages. Then, another plastic film or sheet having longitudinal and lateral dimensions longer than longitudinal and lateral dimensions of the paper box or the plurality of paper boxes is disposed thereon so as to cover an upper side portion of the paper box or the plurality of paper boxes. The portion of the plastic film or sheet which is projected from the paper box or the plurality of paper boxes may be fixed to the paper box or the plurality of paper boxes with a tape. Meanwhile, in the case where the plurality of paper boxes are disposed, the plastic film or sheet used therefor has longitudinal and lateral dimensions that are longer than respective total longitudinal and lateral dimensions of the plurality of paper boxes thus disposed. Also, if required, a moisture absorber may be placed on the pallet.

[0028] Finally, the stretched film is fixed at its edge to the pallet, and successively wound over the pallet and the paper box while rotating the turning table. At this time, the stretched film is wound in a slightly stretched state by applying an adequate tension force thereto while moving it up and down to fix the paper box and the pallet together.

[0029] The sectional schematic view of the thus produced package is shown in FIG. 2.

EXAMPLES

[0030] The present invention is described in more detail below by referring to the following Examples. However, these Examples are only illustrative and not intended to limit the present invention thereto, and other changes or modifications are also possible unless they depart from the subject matter of the present invention.

[0031] Meanwhile, the percentage of a height of the pallet which is covered with the stretched film is defined as follows. That is, the maximum height and minimum height of the pallet as measured on four side surfaces of the pallet which are covered with the stretched film are determined to calculate an average value thereof. The ratio of the average value to the height of the pallet is defined as a percentage (%) of the height of the pallet which is covered with the stretched film.

Example 1:

[0032] A 12 μm -thick biaxially oriented polyester film produced by a sequential biaxial drawing method having a width of 1000 mm and a length of 4000 m was slit and wound around a paper core having an inner diameter of 3 inches and a length of 1005 mm using a slitter, thereby preparing a film roll. The weight of the film of the film roll was 68 kg. Next, the film roll was covered with a polyethylene tube, and a plastic cylindrical cap was inserted into each of opposite ends of the paper core. Furthermore, the opposite ends of the paper core were supported by collar flanges, and the thus assembled film roll was accommodated in a corrugated box having a length of 500 mm, a height of 500 mm and a width of 1200 m.

[0033] A wooden pallet having having a length of 1300 mm, a width of 1400 mm and a height of 180 mm was rested on a turning table. Then, a 12 μm -thick polyester film having a width of 1500 mm and a length of 1.5 m was disposed on the pallet, and the corrugated boxes each having a length of 500 mm, a height of 500 mm and a width of 1200 m and accommodating the film roll therein were placed in two rows and two stages on the polyester film. An upper side portion of the paper boxes thus arranged was covered with the 12 μm -thick polyester film having a width of 1500 mm and a length of 1.5 m, and the polyester film was fixed at several positions thereof to the paper boxes using a tape.

[0034] Next, a stretched film having a thickness of 20 μm and a width of 500 mm was fixed at its edge to the pallet, and wound over the pallet and the paper boxes while rotating the turning table. At this time, the stretched film was wound in a slightly stretched state by applying an adequate tension force thereto while moving it up and down to fix the paper boxes and the pallet together. As a result, it was confirmed that 70% of a side surface of the pallet was covered with the stretched film.

Example 2:

[0035] A 25 μm -thick biaxially oriented polyester film produced by a sequential biaxial drawing method having a width of 1575 mm and a length of 6000 m was slit and wound around a paper core having an inner diameter of 6 inches and a length of 1635 mm using a slitter, thereby preparing a film roll. The weight of the film of the film roll was 334 kg. Next, the film roll was covered with an aluminum-laminated moisture-proof sheet and further covered with a polyethylene tube. Moreover, in order to increase the strength of the paper core, a plastic cylindrical cap was inserted into each of opposite ends of the paper core, and further the opposite ends of the paper core were supported by collar flanges. The thus assembled film roll was accommodated in a corrugated box having a length of 560 mm, a height of 560 mm and a width of 1670 m.

[0036] A wooden pallet having having a length of 600 mm, a width of 1740 mm and a height of 190 mm was rested on a turning table. Then, a moisture-permeable waterproof sheet having a thickness of 0.2 mm, a width of 1000 mm and a length of 2 m as prescribed in JIS A 6111 was disposed on the pallet, and the corrugated box having a length of 560 mm, a height of 560 mm and a width of 1670 m in which the film roll was accommodated was placed on the moisture-permeable waterproof sheet. An upper side portion of the paper box was covered with a moisture-permeable waterproof sheet B having a thickness of 0.2 mm, a width of 1000 mm and a length of 2 m as prescribed in JIS A 6111, and the moisture-permeable waterproof sheet B was fixed at several positions thereof to the paper box using a tape.

[0037] Next, a stretched film having a thickness of 20 μm and a width of 500 mm was fixed at its edge to the pallet, and wound over the pallet and the paper box while rotating the turning table. At this time, the stretched film was wound in a slightly stretched state by applying an adequate tension force thereto while moving it up and down to fix the paper box and the pallet together. As a result, it was confirmed that 50% of a side surface of the pallet was covered with the stretched film.

Comparative Example 1:

[0038] The same packaging procedure as described in Example 1 was conducted except that no plastic film was placed on upper and lower side surfaces of the paper boxes, thereby producing a film roll package.

Comparative Example 2:

[0039] The same packaging procedure as described in Example 2 was conducted except that no moisture-permeable waterproof sheet was placed on upper and lower side surfaces of the paper boxes, thereby producing a film roll package.

Comparative Example 3:

[0040] The same packaging procedure as described in Example 1 was conducted except that 10% of a side surface of the pallet was covered with the stretched film, thereby producing a film roll package.

Comparative Example 4:

[0041] The same packaging procedure as described in Example 1 was conducted except that 95% of a side surface of the pallet was covered with the stretched film, thereby producing a film roll package.

[0042] The thus obtained film roll package was accommodated in a container, and then transported by sea at a distance of not less than 1000 km. The evaluation results of the film roll package after the marine transportation are collectively shown in the following Table 1.

Table 1

	Example 1	Example 2	Comp. Example 1
Deformation of upper side portion of box (undulation)	None	None	Occurred
Moisture condensation inside stretched film	None	None	Occurred
Falling-off of film roll owing to breakage (collapse) of paper core	None	None	None
Occurrence of defects upon handing by fork lift truck	None	None	None

Table 1 (Continued)

	Comp. Example 2	Comp. Example 3	Comp. Example 4
Deformation of upper side portion of box (undulation)	Occurred	None	None
Moisture condensation inside stretched film	Occurred	None	None
Falling-off of film roll owing to breakage (collapse) of paper core	Occurred	None	None
Occurrence of defects upon handing by fork lift truck	None	Occurred	Occurred

[0043] In Examples 1 and 2, the film roll packages stored in a warehouse after the marine transportation were free from deterioration in appearance of the respective packages as well as defects in the film roll within the paper box. In particular, in Example 2, notwithstanding that the weight of the film roll exceeded 300 kg, the film roll packages were free from deformation of the paper box and deformation of the paper core. On the other hand, in Comparative Examples

1 and 2, neither plastic films nor moisture-permeable waterproof sheets were placed on upper and lower side portions of the paper boxes, so that the packages suffered from poor appearance. In Comparative Example 3, since the percentage of the height of the side surface of the pallet which was covered with the stretched film was less than 20%, the package was moved when pushed by hands in a horizontal direction thereof, so that there occurred such a risk that collapse of the package was caused. In Comparative Example 4, the fork of the fork lift truck was unable to be inserted into the pallet, so that there occurred disadvantages upon handling the package.

INDUSTRIAL APPLICABILITY

[0044] The film roll package for transportation according to the present invention can be suitably utilized as a film roll package to be loaded in a container and subjected to marine transportation.

EXPLANATION OF REFERENCE NUMERALS

[0045]

- 1: Cylindrical paper core
- 2: Film roll
- 3: Moisture proofing film
- 4: Plastic film tube
- 5: Plastic cylindrical cap
- 6: Collar flange (side plate)
- 7: Pad
- 8: Corrugated box
- 9: Pallet
- 10: Plastic film or moisture-permeable waterproof sheet
- 11: Paper box
- 12: Stretched film

Claims

1. A film roll package for transportation comprising:

a film roll comprising a paper core and a plastic film wound around the paper core;
a paper box accommodating the film roll therein which is rested on a pallet;
plastic films or sheets respectively disposed on upper and lower side surfaces of the paper box, in which each of the plastic films or sheets have a longitudinal dimension and a lateral dimension which are longer than a longitudinal dimension and a lateral dimension of the upper or lower side surface of the paper box, respectively,
and a thickness of 5 to 500 μm ; and
a stretched film wound over side surfaces of the paper box and the pallet so as to cover 20 to 90% of a height of a side surface of the pallet to fix the paper box onto the pallet.

FIG. 1

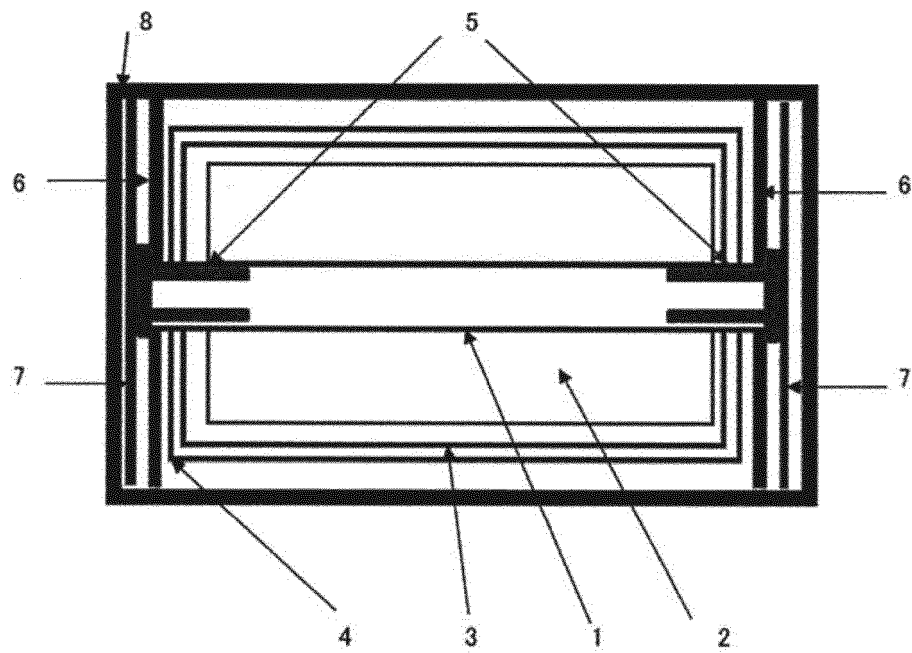
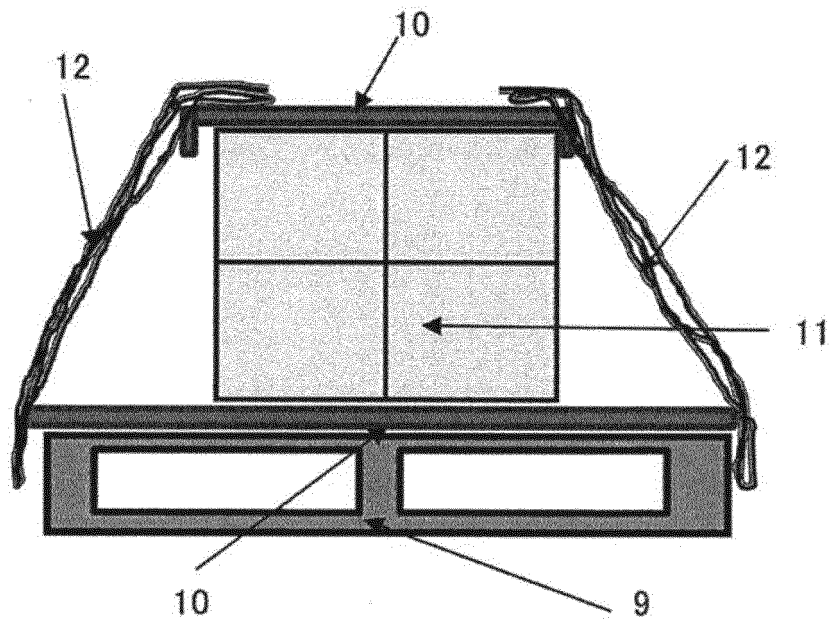


FIG. 2



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2016/055066

A. CLASSIFICATION OF SUBJECT MATTER

B65D71/06(2006.01)i, B65D19/38(2006.01)i, B65D85/672(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)

B65D71/06, B65D19/38, B65D85/672

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 2012-140185 A (Sumitomo Chemical Co., Ltd.), 26 July 2012 (26.07.2012), paragraphs [0007] to [0031]; fig. 1A to H (Family: none)	1
Y	JP 2005-132414 A (Du Pont-Toray Co., Ltd.), 26 May 2005 (26.05.2005), paragraphs [0002] to [0003] (Family: none)	1

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

* Special categories of cited documents:

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Date of the actual completion of the international search

31 March 2016 (31.03.16)

Date of mailing of the international search report

12 April 2016 (12.04.16)

Name and mailing address of the ISA/

Japan Patent Office

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Form PCT/ISA/210 (second sheet) (January 2015)

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 2004175440 A [0006]
- JP 6080154 A [0006]