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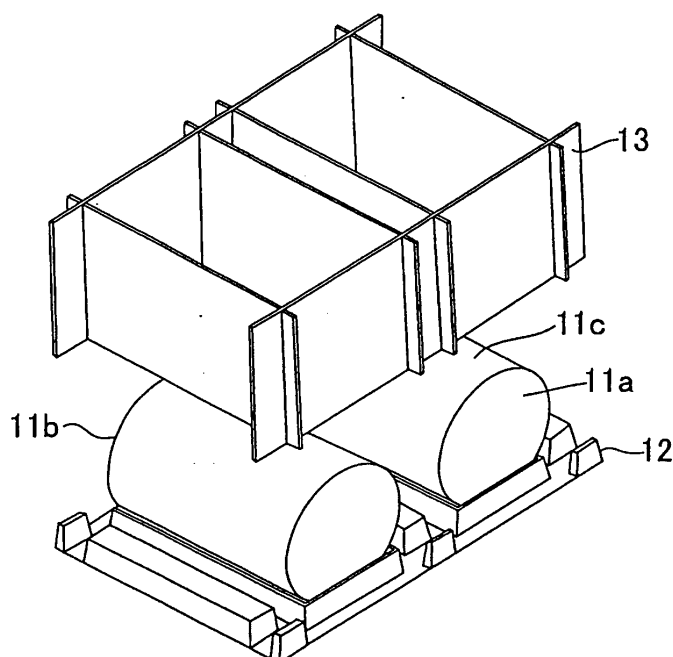
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(54) **Package**

(57) A package 10 can be piled up in a multistage condition. The package 10 includes a base 12 for supporting a side portion 11c of a honeycomb structure 11 so as to house a honeycomb structure by lying its long

axis in parallel with a horizontal direction; a protection member 13 for surrounding the honeycomb structure 11 and the base 12 from the side; and a box for housing the honeycomb structure 11, the base 12, and the protection member 13.

Fig. 1



Description

Background of the Invention and Related Art Statement

[0001] The present invention relates to a package. In more detail, the present invention relates to a package capable of storing and transporting honeycomb structures in good conditions without damaging the honeycomb structures.

[0002] At present, a package (package box) for storing and transporting honeycomb structures is made of a material such as plastic and corrugated paper, and a corrugated paper box is mainly used because it can easily be manufactured, has light weight, and requires a low cost.

[0003] The above package (package box) is piled up in a multistage condition as shown in, for example, Figs. 5 (a) and 5(b) upon storage and transportation. At this time, the above package box 18 has a form of housing honeycomb structures 20 in a vertical condition (the direction where the honeycomb structures are arranged so that the through-holes pass vertically) in through holes (the same size as the horizontal cross-sectional shape of the honeycomb structures 20 to be housed) of the positioning tray 16 disposed in the intermediate portion of the direction of height of the package box 18. The load of the package box 18 on the upper stage is supported by the honeycomb structures 20 (packaged objects) housed in the package box 18 on the lower stage.

[0004] However, honeycomb structures have been enlarged in recent years to have increased height (length) of products, and, when the height (length) is 30 cm or more, the products become too heavy to hold, and there arises a problem of difficulty in packing them in a package box.

[0005] In addition, since weight of the package box where products such as honeycomb structures are housed should be within the range where a person can easily treat the package box, the number of products which the package box can store is limited. As a result, there arises a problem of making transportation less efficiency.

[Patent Document] JP-A-2003-112771

Summary of the Invention

[0006] The present invention has been made in view of such problems of the prior art and aims to provide a package box whose height does not become so high, compared with the conventional one when products are housed, making packing products in the package box easy, capable of reducing a space in the package box, and improving transportation efficiency. The term in the present application "package" means a packing case for housing a honeycomb body itself, and sometimes a packing case to which honeycomb body is housed therein.

[0007] That is, according to the present invention, there is provided a package capable of being piled up in a multistage condition, which possesses such a construc-

tion that a longitudinal direction of a honeycomb structure is set in a horizontal direction.

[0008] It is preferable that a package of the present invention has a construction comprising a base for supporting a side portion of the honeycomb structure, a protection member for surrounding the honeycomb structure and the base from the side, and a box for housing the honeycomb structure, the base, and the protection member. It is also preferable that the base has a receiving portion having a shape complementary to a side portion of the honeycomb structure and evenly supports the side portion of the honeycomb structure from below.

[0009] It is preferable that the base supports the side portion of the honeycomb structure from below except for the end edge portion in the longitudinal direction (direction of through-holes) of the honeycomb structure in order to protect the end edge portion, which is the weakest portion and easily chipped. It is also preferable that a height of the protection member is the same as or more than a diameter of the honeycomb structure to protect the honeycomb structure from the impact from the outside.

[0010] Since the height of the package according to the present invention does not become so high, compared with the conventional one when products are housed, products can easily be packed in the package box, a space in the package box can be reduced; an effect in improving transportation efficiency is exhibited.

Brief Description of the Drawings

[0011] Fig. 1 is an exploded perspective view showing an embodiment of a package of the present invention.

[0012] Fig. 2 is a perspective view showing a state of housing honeycomb structures, a base, and a protection member in a package of the present invention.

[0013] Fig. 3 is a perspective view showing a state of piling up packages of the present invention in a multistage condition on a palette.

[0014] Fig. 4(a) and Fig. 4(b) show a state of mounting a honeycomb structure horizontally on a base.

Fig. 4 (a) is a view seen from an end face side, and Fig. 4(b) is a view seen from a side face side.

[0015] Figs. 5(a) and Fig. 5(b) are explanatory views showing a conventional package. Fig. 5(a) is a perspective view showing a packed state in a multistage condition, and Fig. 5 (b) is a local cross-sectional view taken along A-A line of Fig. 5(a).

Detailed Description of the Invention

[0016] An embodiment for carrying out the present invention will hereinbelow be described concretely. However, the present invention is by no means limited to the following embodiment, and it should be understood that modification, improvement, or the like, of the design can suitably be added on the basis of general knowledge of those skilled in the art within the range of not deviating

from the gist of the present invention.

[0017] Fig. 1 is an exploded perspective view for explaining an embodiment of a package of the present invention. The package 10 capable of being piled up in a multistage condition is constituted by a base 12 for supporting a (lower) side portion of the honeycomb structures 11 mounted horizontally to be packed, a protection member 13 for surrounding the honeycomb structures 11 and the base 12 from the side, and, as shown in Fig. 2, a box 14 for housing the honeycomb structures 11, the base 12, and the protection member 13.

Here, each of the honeycomb structures 11 has an outer form constituted by an inlet side end face 11a and an outlet side end face 11b of the through-holes and a side portion 11c connecting the inlet side end face 11a with the outlet side end face 11b.

[0018] In a package 10 of the present invention, honeycomb structures 11 to be packed are mounted on the base 12 in a state that the longitudinal direction is set horizontally (so that the direction of the through-holes of the honeycomb structures may be set horizontal).

As shown in Figs. 4 (a) and 4(b), the base 12 has a receiving portion 12a having a shape complementary to a side portion 11c of the honeycomb structure 11 to be packed and supports a side portion 11c of the honeycomb structure evenly from below.

[0019] As shown in Figs. 4(a) and 4(b), the base 12 supports the side portion 11c of the honeycomb structure 11 from below except for the end edge portion (inlet side end face 11a and outlet side end face 11b) in the longitudinal direction (direction of through-holes) of the honeycomb structure 11. By thus constituting the base 12, the end edge portions 11a and 11b, which are the weakest positions and easily chipped, can be protected.

[0020] In the present invention, as shown in Fig. 1, after two honeycomb structures 11 are mounted on the base 12, the honeycomb structures 11 and the base 12 are surrounded from the side by the protection member 13, and then, as shown in Fig. 2, the honeycomb structures 11, the base 12 and the protection member 13 are housed in the box 14. Here, since a height of the protection member 13 is the same as or more than a diameter of the honeycomb structures 11, the honeycomb structures 11 can be protected from an impact from outside (such as contact due to carelessness during operation).

[0021] After the honeycomb structures 11, the base 12, and the protection member 13 are housed in the box 14, the boxes 14 are piled up on a palette 15 in a multistage condition as shown in Fig. 3 to store them in a warehouse for a predetermined period or to transport them from the warehouse to a predetermined location.

[0022] It is preferable that the base 12 used in the present invention is made of material having shock absorbability, such as a polyolefin-based resin sheet or foaming sheet, and corrugated paper. Here, the polyolefin-based resin foaming sheet means a foaming sheet of polyethylene, polypropylene, or a copolymer mainly containing α -olefin or the like. Since corrugated paper and

a polyethylene resin foaming sheet are particularly excellent in elasticity, they can suitably be used for the base 12 used in the present invention.

Incidentally, for the box 14, a material having shock absorbability such as corrugated paper, which is generally used, can suitably be used.

[0023] It is preferable that the protection member 13 used in the present invention is made of plastic or corrugated paper.

Industrial Applicability

[0024] As described above, since a package of the present invention can store honeycomb structures, which are prone to be damaged, in a good condition and efficiently transport them, it has a great deal of potential in industry.

Claims

1. A package capable of being piled up in a multistage condition, which possesses such a construction that a longitudinal direction of a honeycomb structure is set in a horizontal direction.
2. A package according to Claim 1, wherein the construction comprises:
 - a base for supporting a side portion of the honeycomb structure,
 - a protection member for surrounding the honeycomb structure and the base from the side, and
 - a box for housing the honeycomb structure, the base, and the protection member.
3. A package according to Claim 2, wherein the base has a receiving portion having a shape complementary to a side portion of the honeycomb structure and evenly supports the side portion of the honeycomb structure from below.
4. A package according to Claim 3, wherein the base supports the side portion of the honeycomb structure from below except for the end edge portion in the longitudinal direction (direction of through-holes) of the honeycomb structure.
5. A package according to any one of Claims 2 to 4, wherein a height of the protection member is the same as or more than a diameter of the honeycomb structure.

Fig. 1

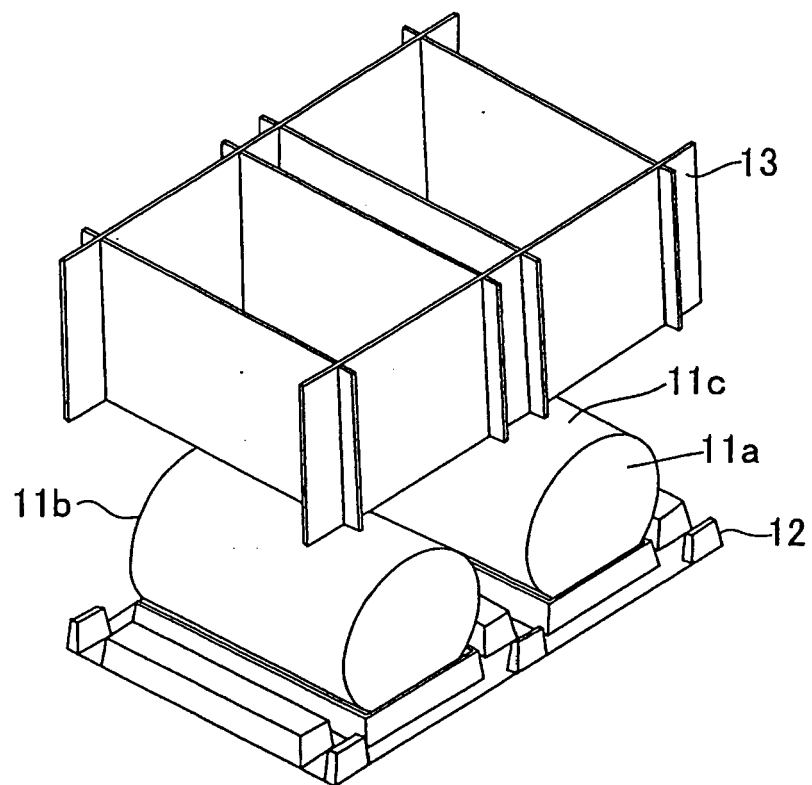


Fig. 2

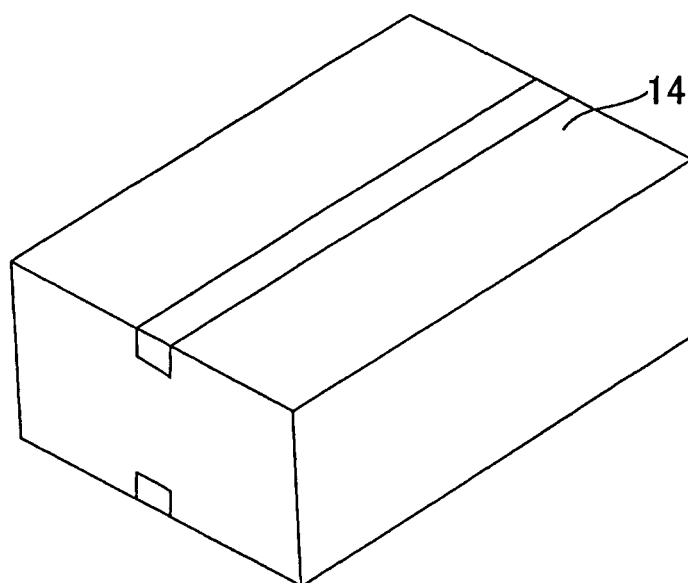


Fig. 3

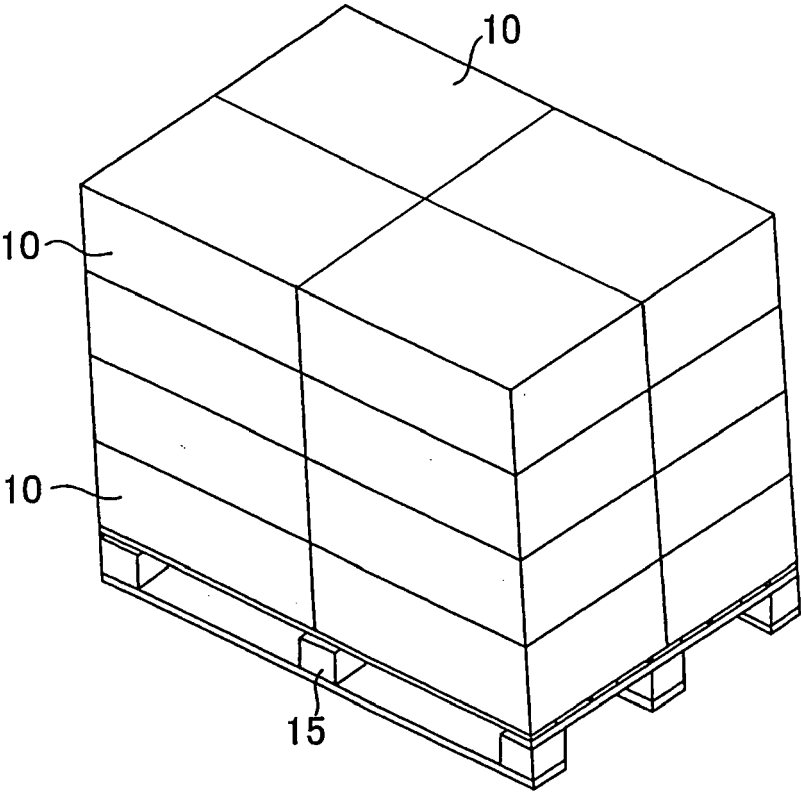


Fig. 4(a)

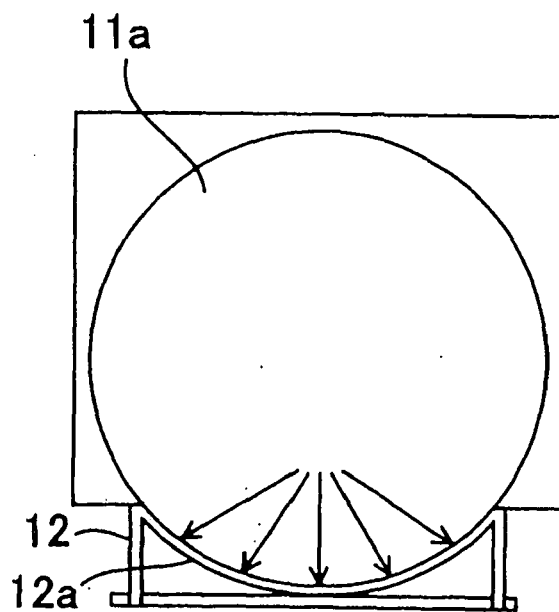


Fig. 4(b)

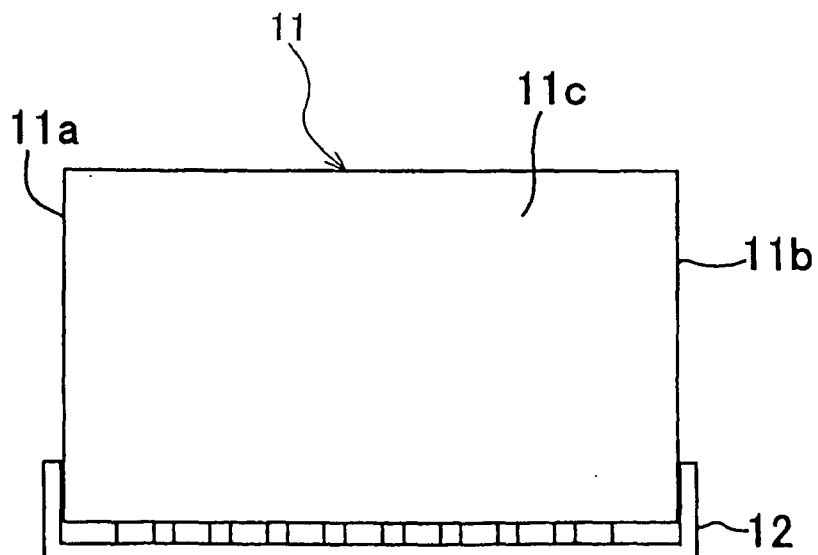


Fig. 5(a)

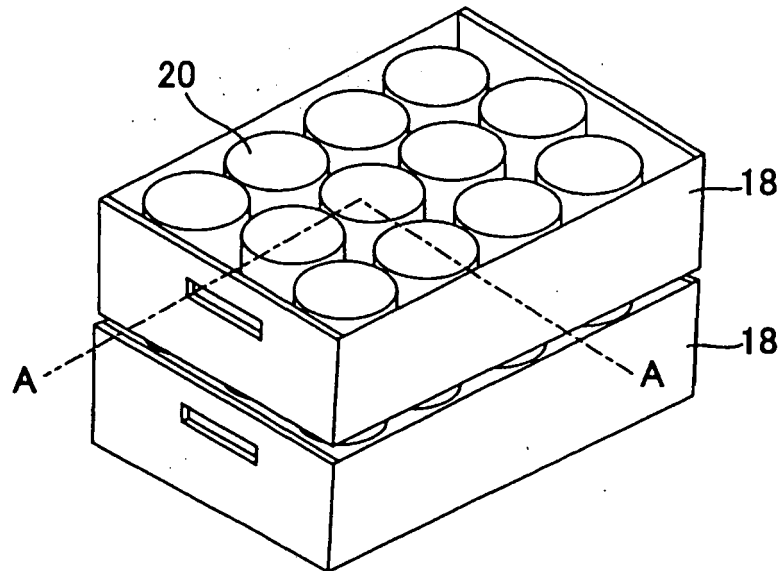
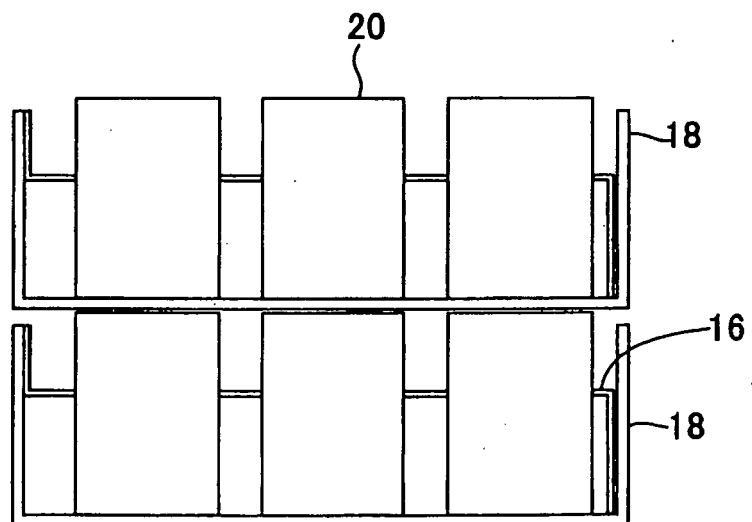


Fig. 5(b)





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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 24 May 2007	Examiner RODRIGUEZ GOMBAU, F
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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