



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
**13.02.2008 Bulletin 2008/07**

(51) Int Cl.:  
**B65D 71/00** (2006.01) **B65D 81/02** (2006.01)  
**B65D 81/05** (2006.01)

(21) Application number: **07253083.5**

(22) Date of filing: **06.08.2007**

(84) Designated Contracting States:  
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC MT NL PL PT RO SE SI SK TR**  
Designated Extension States:  
**AL BA HR MK YU**

(72) Inventors:  
• **Shiraki, Koji**  
**Nagoya City,**  
**Aichi-ken 467-8530 (JP)**  
• **Hosoi, Toru**  
**Nagoya City,**  
**Aichi-ken 467-8530 (JP)**

(30) Priority: **08.08.2006 JP 2006216013**

(71) Applicant: **NGK INSULATORS, LTD.**  
**Nagoya-City, Aichi Pref. 467-8530 (JP)**

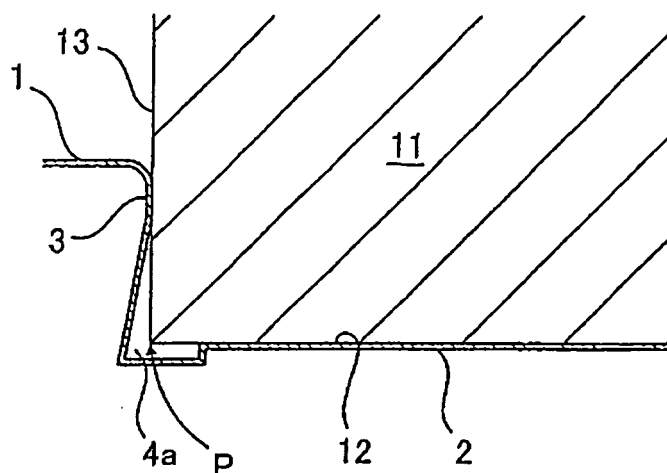
(74) Representative: **Paget, Hugh Charles Edward et al**  
**Mewburn Ellis LLP**  
**York House**  
**23 Kingsway**  
**London WC2B 6HP (GB)**

(54) **Tray for brittle columnar body**

(57) There is disclosed means for satisfactorily storing or transporting a columnar product formed of a brittle material which is easily damaged. The means is a plate-like tray 1 including two pockets. In this tray 1, a bottom

surface forming the pockets 4 has bottom surface raised portions, and side surfaces forming the pockets 4 have side surface raised portions. When a brittle columnar body is held or transported using this tray 1, damage can be prevented.

**FIG.4**



## Description

### BACKGROUND OF THE INVENTION

#### 1. Field of the Invention

**[0001]** The present invention relates to a tray capable of satisfactorily transporting or storing a brittle columnar body without damaging the body.

#### 2. Description of the Related Art

**[0002]** As a catalyst or a filter for a car which purifies an exhaust gas from the car, a honeycomb structure having a columnar shape including a circular or elliptic section which is vertical in an axial direction is used. To ship such a honeycomb structure as a product, the structure is subjected to operations such as packing, transporting and storing. However, the honeycomb structure is mainly made of a ceramic which is a brittle material. Therefore, this involves a problem that the structure is easily damaged under impact due to vibrations generated during the operations.

**[0003]** A similar problem applies to general ceramic products. Furthermore, the problem applies to all columnar products such as a narrow-sense glass product and a plastic product, excluding the ceramic product, which are formed of the brittle material. It is to be noted that examples of a prior document concerning prevention of the damage on the ceramic product include Japanese Patent Application Laid-Open No. 9-226837.

### SUMMARY OF THE INVENTION

**[0004]** The present invention has been developed in view of the above-mentioned situations, and an object thereof is to provide means for satisfactorily storing or transporting a columnar product formed of a brittle material which is easily damaged without damaging the product. As a result of repeated investigations, it has been found that, when the product is packaged using the following tray, the above object can be achieved.

**[0005]** That is, first, according to the present invention, there is provided a tray for a brittle columnar body (hereinafter referred to simply as the tray) which is used to transport or hold the brittle columnar body, the tray having a plate-like shape and at least one pocket for holding the brittle columnar body at the end side of the columnar body and having raised portions respectively on a bottom surface and side surfaces of the tray defining a part of a pocket except a corner portion of the pocket where the bottom surface and the side surface of the tray come in contact, relations of  $DS > TB$  and  $DB > TS$  being satisfied, in which TB is a height of the raised portion disposed on the bottom surface of the tray, DS is a distance between the side surface facing to the corner of the tray of the raised portion disposed on the bottom surface of the tray and the bottom surface of the tray, TS is a height of the

raised portion disposed on the side surface of the tray, and DB is a distance between the side surface facing to the corner of the tray of the raised portion disposed on the bottom surface of the tray and the side surface of the tray.

**[0006]** In the present specification, the tray is expressed as the plate-like tray including the pocket. The tray is used to transport or hold an object, and can also be expressed as a server, a shallow box or a plate including a peripheral wall. The brittle columnar body is a formed brittle body which is easily damaged and which has a columnar shape. The pocket is not only a bag-like storage member but also a depression or a shallow hole.

**[0007]** In a preferable configuration, the raised portion has a constant height. However, when the height is not constant, the height TB of the raised portion disposed on the bottom surface and the height TS of the raised portion disposed on the side surface are heights of the highest portions from the bottom surface and the side surface. The distance DB between the side surface facing to the corner of the tray of the raised portion disposed on the bottom surface of the tray and the side surface of the tray and the distance DS between the side surface facing to the corner of the tray of the raised portion disposed on the side surface of the tray and the bottom surface are respectively the distances between the side surface or the bottom surface of the tray and each closest end side of raised portions.

**[0008]** In the tray for the brittle columnar body according to the present invention, it is preferable that the raised portion disposed on the side surface as a part of defining a pocket is constituted of a member which is different from that of the side surface (of a tray main body). In this case, the only raised portion may be attached as the separate member. Examples of an especially preferable configuration include a configuration where on one tray member which does not have the only raised portion disposed on the side surface forming the pocket, there is superimposed another tray member having the only raised portion disposed on the side surface of the tray defining a part of a pocket. That is, the examples include a tray having a double structure.

**[0009]** It is preferable that the tray for the brittle columnar body according to the present invention is formed of a main material including one of polypropylene, polyethylene, polyethylene terephthalate, vinyl chloride, iron, aluminum and paper. When the tray is formed of a plastic material such as polypropylene, polyethylene or polyethylene terephthalate, the tray has a preferable thickness of about 0.3 to 2.0 mm.

**[0010]** It is preferable that the tray for the brittle columnar body according to the present invention is formed of a foam material. Examples of a preferable foam material include a material obtained by foam-forming a polyolefin-based resin. The polyolefin-based resin is a copolymer or the like mainly made of polyethylene, polypropylene and olefin.

**[0011]** Next, according to the present invention, there

is provided a packaging body comprising: two trays for the brittle columnar body described above; and a box in which the two trays for the brittle columnar body and the brittle columnar body supported by two trays for the brittle columnar body are held. As the box in which the brittle columnar body is held, a cardboard box is preferably used.

**[0012]** The tray for the brittle columnar body according to the present invention, has raised portions respectively on a bottom surface and side surfaces of the tray defining a part of a pocket at portions except a corner portion of the pocket where the bottom surface and the side surface of the tray come in contact, wherein a height of the raised portion TB disposed on the bottom surface of the tray, a distance DS is a distance between the side surface facing to the corner of the tray of the raised portion disposed on the side surface of the tray and the bottom surface of the tray, a height of the raised portion TS disposed on the side surface of the tray, and a distance DB is a distance between the side surface facing to the corner of the tray of the raised portion disposed on the bottom surface of the tray and the side surface of the tray, meet relations of  $DS > TB$  and  $DB > TS$ , therefore the bottom surface and the side surface forming the pocket are provided with the raised portions disposed at portions except the corners of the pocket where the bottom surface comes in contact with the side surface, respectively. Therefore, when an end surface of the brittle columnar body is held in the pocket at the end side of the columnar body, the end surface of the brittle columnar body abuts on the raised portion of the pocket forming bottom surface of the tray. Moreover, a peripheral surface of the brittle columnar body abuts on the raised portion of the pocket forming side surface of the tray, and the brittle columnar body is firmly fixed. Furthermore, as a result, an edge portion (a portion where the end surface comes in contact with the peripheral surface) of the brittle columnar body which is supposed to be most easily damaged does not abut on the tray. Therefore, in a case where this tray is used during packaging, even if vibrations are caused by a transporting or storing operation after the packaging, the brittle columnar body does not unintentionally move in the packaging body. Moreover, any useless stress is not applied to the edge portion of the brittle columnar body. Therefore, when the brittle columnar body is held or transported, the problem does not occur that the edge portion of the brittle columnar body touches the tray and the packaging body and is impacted and damaged.

**[0013]** In the tray for the brittle columnar body according to the present invention, in the preferable configuration, the raised portion disposed on the side surface forming the pocket is constituted of the member which is different from that of the side surface. In a further preferable configuration, the tray has a double structure where the one tray member which does not have the only raised portion disposed on the bottom surface forming the pocket is superimposed on the other tray member having the only raised portion disposed on the bottom surface form-

ing the pocket. Therefore, the tray is easily prepared. That is, it is sometimes difficult to especially form the raised portion disposed on the pocket forming side surface, depending on the material for use in the tray and a method of forming the tray. However, when this portion is constituted of the (attachable) separate member, difficulty in forming the tray can be overcome.

## BRIEF DESCRIPTION OF THE DRAWINGS

### **[0014]**

FIG. 1 is a plan view (a top plan view) showing one embodiment of a tray for a brittle columnar body according to the present invention;

FIG. 2 is a sectional view cut along the AA line of FIG. 1;

FIG. 3 is a sectional view cut along the BB line of FIG. 1;

FIG. 4 is a sectional view cut along the II line of FIG. 1, showing a section of a part of the tray in a case where a honeycomb structure as one example of the brittle columnar body is held in the tray for the brittle columnar body according to the present invention;

FIG. 5 is a sectional view cut along the JJ line of FIG. 1, showing a section of a part of the tray in a case where the honeycomb structure as one example of the brittle columnar body is held in the tray for the brittle columnar body according to the present invention;

FIG. 6 is a sectional view showing a configuration different from that of FIG. 4, in which a stepped portion is generated at a side surface forming a pocket in one embodiment of the tray for the brittle columnar body according to the present invention;

FIG. 7 is a perspective view of one embodiment of a packaging body according to the present invention, showing a state in which the brittle columnar body is held in the tray for the brittle columnar body according to the present invention, before the tray is held in a box;

FIG. 8 is a perspective view showing one embodiment of a packaging body according to the present invention;

FIG. 9 is a plan view (a top plan view) showing one example of a tray member constituting a tray for a brittle columnar body according to the present invention shown in FIG. 15;

FIG. 10 is a sectional view cut along the CC line of FIG. 9;

FIG. 11 is a sectional view cut along the DD line of FIG. 9;

FIG. 12 is a plan view (a top plan view) showing one example of the tray member constituting the tray for the brittle columnar body according to the present invention shown in FIG. 15;

FIG. 13 is a sectional view cut along the EE line of FIG. 12;

FIG. 14 is a sectional view cut along the FF line of FIG. 12;

FIG. 15 is a plan view (a top plan view) showing another embodiment of the tray for the brittle columnar body according to the present invention;

FIG. 16 is a sectional view cut along the GG line of FIG. 15;

FIG. 17 is a diagram showing a section (corresponding to FIG. 16) in a case where one set of two trays for a brittle columnar body shown in FIGS. 15 and 16 is used and the sides of opposite end surfaces of a honeycomb structure are held;

FIG. 18 is a diagram showing a section of a part of the tray for the brittle columnar body according to the present invention in a case where a honeycomb structure as one example of the brittle columnar body is held in the tray for the brittle columnar body according to the present invention;

FIG. 19 is a diagram showing a section of a part of a conventional tray in a case where a honeycomb structure as one example of a brittle columnar body is held in the conventional tray;

FIG. 20 is a diagram showing a section of a part of the conventional tray in a case where the honeycomb structure as one example of the brittle columnar body is held in the conventional tray; and

FIG. 21 is a sectional view showing a still another embodiment of the tray for the brittle columnar body according to the present invention.

#### DESCRIPTION OF THE PREFERRED EMBODIMENT

**[0015]** A mode for carrying out the present invention will hereinafter be described with reference to the drawings as desired, but the present invention should not be limited to these examples when interpreted. The present invention can variously be changed, modified, improved and replaced based on knowledge of any person skilled in the art. For example, the drawings show preferable modes for carrying out the present invention, but the present invention is not limited by the modes shown in the drawings and information shown in the drawings. To carry out or verify the present invention, means similar or equivalent to means described in the present specification can be applied, but preferable means are means described below.

**[0016]** FIGS. 1 to 3 are diagrams showing one embodiment of a tray for a brittle columnar body according to the present invention. FIG. 1 is a plan view (a top plan view, FIG. 2 is a sectional view cut along the AA line of FIG. 1, and FIG. 3 is a sectional view cut along the BB line of FIG. 1. Moreover, FIGS. 4 and 5 are diagrams showing a section of a part of the tray in a case where a honeycomb structure as one example of the brittle columnar body is held in the tray for the brittle columnar body shown in FIGS. 1 to 3. FIG. 4 is a sectional view cut along the II line of FIG. 1, and FIG. 5 is a sectional view cut along the JJ line of FIG. 1.

**[0017]** A tray 1 shown in FIGS. 1 to 5 is a tray which is used to transport or hold two columnar honeycomb structures. The tray 1 has a plate-like shape as a whole, and include two pockets 4 which are spaces where the sides of end surfaces 12 of two honeycomb structures 11 are held. This tray 1 has raised portions at portions except corners 4a of the pockets 4 where the bottom surface and the side surface of the tray come in contact at the bottom surface and the side surfaces which form the pockets 4, respectively.

**[0018]** The raised portion includes a bottom surface raised portion 2 corresponding the raised portion of the bottom surface, and side surface raised portions 3 corresponding to the raised portions of the side surfaces. As apparent from FIGS. 2 to 5, at the bottom surface, a stepped portion is generated between the bottom surface raised portion 2 and a portion other than the bottom surface raised portion. On the other hand, at the side surface, the side surface raised portion 3 is smoothly connected to a portion other than the side surface raised portion, and any stepped portion is not formed. As a result, the side surface raised portions 3 are formed in a reversed tapered shape so as to enlarge toward the bottom surface.

**[0019]** FIG. 6 is a sectional view corresponding to FIG. 4, showing a tray having a configuration in which the stepped portion is generated. In a tray 101 shown in FIG. 6, a side surface includes a side surface raised portion, but the side surface raised portion 103 is not smoothly connected to a portion other than the side surface raised portion 103, and a stepped portion is generated. The side surface may have a configuration of the tray 101 shown in FIG. 6. In any case, an edge portion (a portion denoted with P in FIG. 4) of the honeycomb structure 11 does not abut on the tray.

**[0020]** In the tray 1, as shown in FIG. 5, every side surface of the tray does not necessarily come in contact with a peripheral surface 13 of the honeycomb structure 11. This is because the reversed tapered surface 5 is formed in a tapered shape toward the bottom surface. Therefore, the side surface 5 does not abut on the peripheral surface 13 of the honeycomb structure 11, and the side surface raised portion 3 abuts on the peripheral surface 13 of the honeycomb structure 11 (see FIG. 4) to fix the honeycomb structure 11.

**[0021]** In the tray 1, a height of the bottom surface raised portion 2 disposed on the bottom surface is smaller than a distance from the side surface raised portion 3 disposed on the side surface to the bottom surface, and a height of the side surface raised portion 3 disposed on the side surface is smaller than a distance from the bottom surface raised portion 2 disposed on the bottom surface to the side surface. This respect as a characteristic of the tray (for the brittle columnar body) according to the present invention will be described with reference to FIGS. 18 to 20 showing the tray having the raised portions so as to form the difference in the height or the width. In the following description with reference to FIGS. 18 to

20, it is assumed that the height TB of the raised portion 2 disposed on the bottom surface, the distance between the side surface of the raised portion 2 disposed on the bottom surface of the tray facing to the corner of the tray and the side surface of the tray is DB, the height TS of the raised portion 3 disposed on the side surfaces, and the distance DS between the side surface of the raised portion 3 disposed on the side surface of the tray facing to the corner of the tray and the bottom surface of the tray.

**[0022]** FIG. 18 is a diagram showing a section of a part of the tray for the brittle columnar body according to the present invention in a case where a honeycomb structure as one example of the brittle columnar body is held in the tray for the brittle columnar body according to the present invention. FIGS. 19 and 20 are diagrams showing a section of a part of a conventional tray which is not the tray for the brittle columnar body according to the present invention, in a case where a honeycomb structure as one example of the brittle columnar body is held in the conventional tray which is not the tray for the brittle columnar body according to the present invention. In FIGS. 18 to 20, to facilitate understanding, the honeycomb structure 11 is depicted apart from the bottom surface raised portion 2 and the side surface raised portion 3.

**[0023]** In FIG. 18, relations of  $DS > TB$  and  $DB > TS$  are satisfied. As a result, the edge portion (the portion denoted with P in FIG. 18) of the honeycomb structure 11 does not abut on the tray including the bottom surface raised portion 2 and the side surface raised portion 3. On the other hand, in FIG. 19,  $DB > TS$  is satisfied, but  $DS < TB$  results. As a result, the edge portion (the portion denoted with P in FIG. 19) of the honeycomb structure 11 abuts on the side surface raised portion 3 as a part of the tray, and is easily damaged. In FIG. 20,  $DS > TB$  is satisfied, but  $DB < TS$  results. As a result, the edge portion (the portion denoted with P in FIG. 20) of the honeycomb structure 11 abuts on the bottom surface raised portion 2 as a part of the tray, and possibility of the damage rises.

**[0024]** The tray (for the brittle columnar body) according to the present invention can be used alone in transporting, storing and holding the brittle columnar body. Especially, A set of trays is used to hold a honeycomb structure at the respective ends of the structure, and are preferably used as a packaging body together with a box (the packaging body according to the present invention). FIGS. 7 and 8 are perspective views showing a behavior in which the honeycomb structures are packaged in such a packaging body including one set of two trays and the box. FIG. 7 shows a behavior in which two trays 71 hold the sides of opposite (upper and lower in the drawing) end surfaces of the honeycomb structures 11 to support the honeycomb structures in order to transport or hold 15 honeycomb structures 11. FIG. 8 further shows a behavior in which a set of two trays 71 where the sides of the opposite end surfaces of the honeycomb structures 11 are held are held in a box 8. The tray 71 shown in FIGS. 7 and 8 include 15 pockets which are spaces for

holding the end surfaces of 15 honeycomb structures 11 at the end sides.

**[0025]** Next, FIGS. 9 to 17 are diagrams showing another embodiment of the tray for the brittle columnar body according to the present invention. This embodiment is a tray having a double structure in which on one tray member, there is superimposed another tray member to form one tray. FIGS. 9 to 11 are diagrams showing the upper tray member (i.e., a superimposing side) at a time when the members are superimposed. FIG. 9 is a plan view (a top plan view), FIG. 10 is a sectional view cut along the CC line of FIG. 9, and FIG. 11 is a sectional view cut along the DD line of FIG. 9. Moreover, FIGS. 12 to 14 are diagrams showing the lower tray member (i.e., a superimposed side) at a time when the members are superimposed. FIG. 12 is a plan view (a top plan view), FIG. 13 is a sectional view cut along the EE line of FIG. 12, and FIG. 14 is a sectional view cut along the FF line of FIG. 12. Furthermore, FIGS. 15 and 16 are diagrams showing a configuration in which two tray members are superimposed and showing a tray obtained by superimposing the tray members. FIG. 15 is a plan view (a top plan view), and FIG. 16 is a sectional view cut along the GG line of FIG. 15. When FIG. 9 is superimposed on FIG. 12, FIG. 15 is obtained. When FIG. 10 is superimposed on FIG. 13, FIG. 16 is obtained. In addition, FIG. 17 is a diagram showing a section (corresponding to FIG. 16) in a case where one set of two trays for a brittle columnar body shown in FIGS. 15 and 16 is used and the sides of opposite end surfaces of a cylindrical honeycomb structure as one example of the brittle columnar body are held.

**[0026]** A tray member 31 shown in FIGS. 12 to 14 is different only in the point that it does not have the raised portions disposed on the side surfaces forming the pocket 4. In other words, the tray member 31 is equal to the tray for the brittle columnar body according to the present invention, except that the side surfaces are not provided with any raised portion. The tray member 31 has a plate-like shape as a whole, and includes two pockets 4 which are spaces where the end surfaces 12 of two honeycomb structures 11 are held at the end sides. The bottom surface forming the two pockets 4 is provided with the bottom surface raised portions 2 corresponding to the raised portions of the bottom surface at portions except the corners 4a of the pockets 4 where bottom surface comes in contact with the side surfaces.

**[0027]** The side surfaces of the tray member 31 are not provided with any raised portion. Therefore, when the tray members are superimposed to form a tray 41, this is realized by a tray member 21 shown in FIGS. 9 to 11. The tray member 21 has only side surface raised portions 33 which are raised portions disposed on the side surface forming the pocket 4.

**[0028]** The tray 41 constituted by superimposing the tray member 21 on the tray member 31 as shown in FIGS. 15 and 16 is used to transport or hold two cylindrical honeycomb structures in the same manner as in the above-mentioned tray 1. The tray 41 has a plate-like

shape as a whole, and includes two pockets 4 which are spaces for holding the end surfaces 12 of two honeycomb structures 11 at the end side (see FIG. 17). In this tray 41, the bottom surface and the side surfaces forming the pockets 4 are provided with the bottom surface raised portions 2 based on the tray member 31 and the side surface raised portions 33 based on the tray member 21 at portions except the corners 4a of the pockets 4 where the bottom surface comes in contact with the side surfaces. That is, in the tray 41, the side surfaces themselves which form the pockets 4 are given by the tray member 31, and the side surface raised portions 33 are given by the tray member 21. Therefore, it can be said that, in the tray 41, the tray member 21 and the tray member 31 are separate members and that the side surface raised portions 33 disposed on the side surfaces forming the pockets 4 can be separated from the side surfaces.

**[0029]** In the tray 41, as shown in FIGS. 15 to 17 and FIGS. 12 to 14, the bottom surface forming the pocket 4 is constituted of the same tray member 31, and a stepped portion is generated between the bottom surface raised portion 2 and a portion other than the bottom surface raised portion in the same manner as in the tray 1. On the other hand, as shown in FIGS. 15 to 17 and FIGS. 9 to 11, at the side surface, the side surface raised portions 33 are disposed on the tray member 21 superimposed on the tray member 31 and being apart from the side of the tray 31 disposed at the lower side. Therefore, the side surface raised portions are disposed above the side surface of the lower tray member 31. Moreover, in two pockets disposed on the tray 41, the side surface raised portions 33 of the side surface abuts on the peripheral surface 13 of the honeycomb structure 11 to fix the honeycomb structure 11.

**[0030]** Next, FIG. 21 is a diagram showing a still another embodiment of the tray for the brittle columnar body according to the present invention. FIG. 21 is a sectional view corresponding to FIG. 2 showing the tray 1 as described above and corresponding to FIG. 16 showing the tray 41. A tray 51 shown in FIG. 21 has a thickness larger than that of the tray 1 or 41 described above. The trays 1, 41 have a shape which is suitable to be prepared by a vacuum forming process or the like using a plastic material, whereas the tray 51 has a shape suitable to be prepared by a foam forming process or the like using a plastic material.

**[0031]** The tray 51 is used to transport or hold two cylindrical honeycomb structures. The tray 51 has a plate-like shape as a whole, and includes two pockets 4 which are spaces to hold the surfaces of two honeycomb structures in the end sides. In this tray 51, a bottom surface and side surfaces forming the pockets 4 are provided with raised portions at portions except corners 4a of the pockets 4 where the bottom surface comes in contact with the side surfaces.

**[0032]** The raised portions include bottom surface raised portions 52 corresponding to the raised portions of the bottom surface, and side surface raised portions

53 corresponding to the raised portions of the side surfaces. As apparent from FIG. 21, at the bottom surface, stepped portions are generated between the bottom surface raised portions 52 and the portions other than the bottom surface raised portions. Moreover, at the side surfaces, stepped portions are similarly generated between the side surface raised portions 53 and portions other than the side surface raised portions. In two pockets of the tray 51, at the bottom surface, the bottom surface raised portions 52 abut on the end surfaces of the honeycomb structures, and at the side surface, the side surface raised portions 53 abut on the peripheral surfaces of the honeycomb structures to fix the honeycomb structures.

**[0033]** Next, a method of manufacturing the tray for the brittle columnar body according to the present invention will be described. The tray for the brittle columnar body according to the present invention can be prepared by a vacuum forming process or the like by use of a plastic material including a main component such as polypropylene, polyethylene, polyethylene terephthalate or vinyl chloride. Alternatively, the tray may be prepared by a foam forming operation, an attaching operation and the like by use of polypropylene, polyethylene, polyethylene terephthalate or the like as a main material. There is not any special restriction on specific means, and the tray may be prepared by a known method. Furthermore, the tray may be prepared by a punch forming operation, a member attaching operation and the like by use of paper, especially cardboard paper or hard paper. Especially, the tray prepared by a foam-formed foam material has a further improved damage preventing performance owing to a buffer property and elasticity of the material.

**[0034]** The tray for the brittle columnar body according to the present invention is usable as means for satisfactorily storing or transporting brittle columnar products such as a ceramic product, a narrow-sense glass product and a plastic product. Especially, the tray is preferably used as means for storing or transporting the honeycomb structure for use as a catalyst or a filter to purify an exhaust gas from a car.

## Claims

1. A tray for a brittle columnar body which is used to transport or holding the brittle columnar body, each tray having a plate-like shape and at least one pocket for holding the brittle columnar body at the end side of the columnar body; and having raised portions respectively on a bottom surface and side surfaces of the tray defining a part of a pocket at portions except a corner portion of the pocket where the bottom surface and the side surface of the tray come in contact, wherein a height of the raised portion disposed on the bottom surface of the tray: TB, a distance between the side surface facing to the corner of the

tray of the raised portion disposed on the side surface of the tray and the bottom surface of the tray: DS, a height of the raised portion disposed on the side surface of the tray: TS, and a distance between the side surface facing to the corner of the tray of the raised portion disposed on the bottom surface of the tray and the side surface of the tray: DB, meet relations of  $DS > TB$  and  $DB > TS$ .

2. The tray for the brittle columnar body according to claim 1, wherein the raised portion disposed on the side surface as a part for defining a pocket and said raised portion is constituted of a member which is different from that of the side surface. 5  
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3. The tray for the brittle columnar body according to claim 2, wherein on one tray member which does not have the only raised portion disposed on the side surface forming the pocket, there is superimposed another tray member having the only raised portion disposed on the side surface forming the pocket. 20
4. The tray for the brittle columnar body according to any one of claims 1 to 3, which is formed of a main material including one of polypropylene, polyethylene, polyethylene terephthalate, vinyl chloride, iron, aluminum and paper. 25
5. The tray for the brittle columnar body according to any one of claims 1 to 3, which is formed of a foam material. 30
6. A packaging body comprising:
 

A set of two trays for the brittle columnar body according to any one of claims 1 to 5; and 35

a box for housing the set of two trays for the brittle columnar body and the brittle columnar body supported by the two trays for the brittle columnar body. 40

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FIG. 1

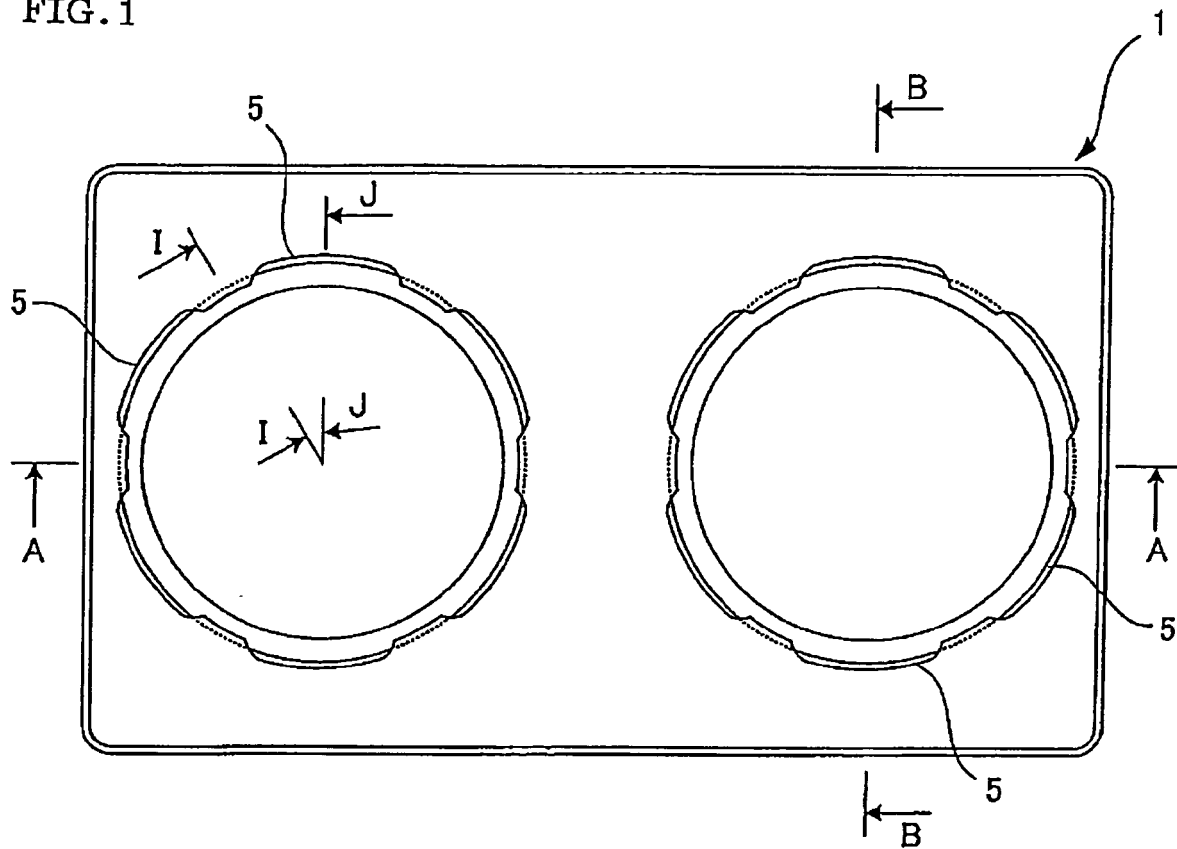


FIG. 2

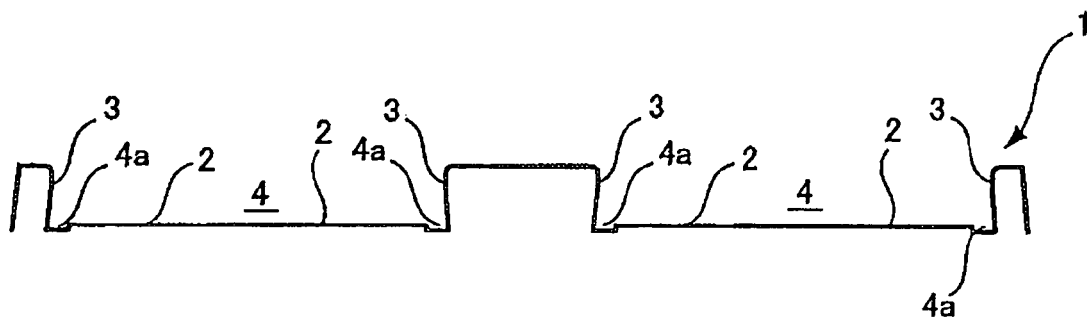


FIG. 3

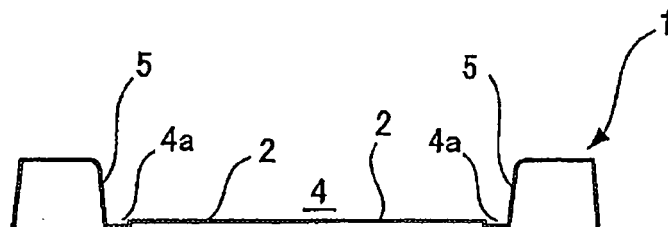




FIG. 4

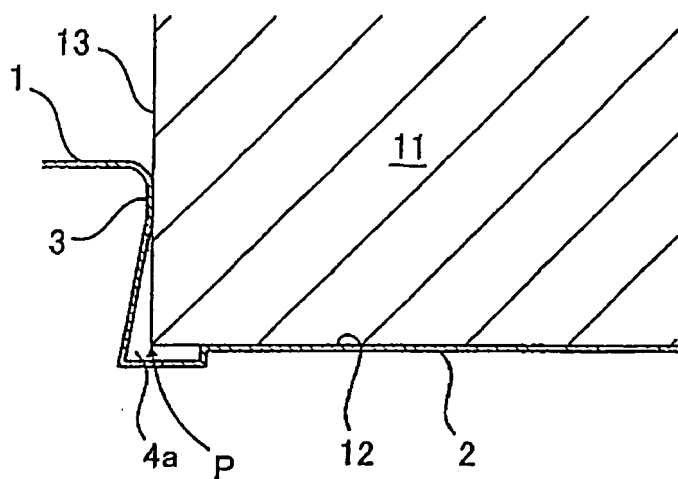


FIG. 5

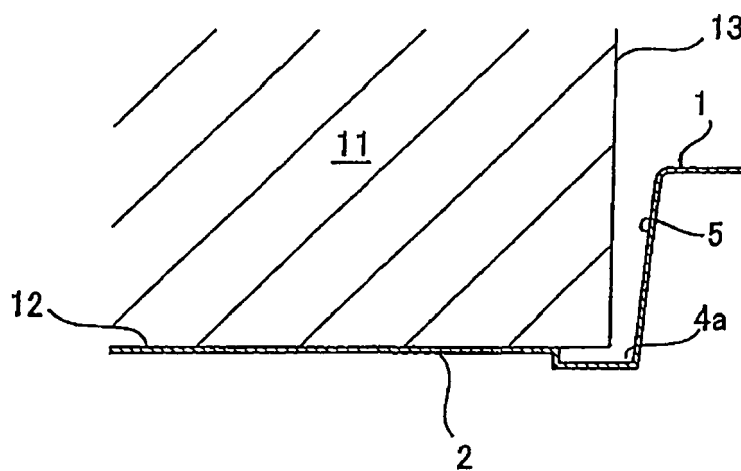


FIG. 6

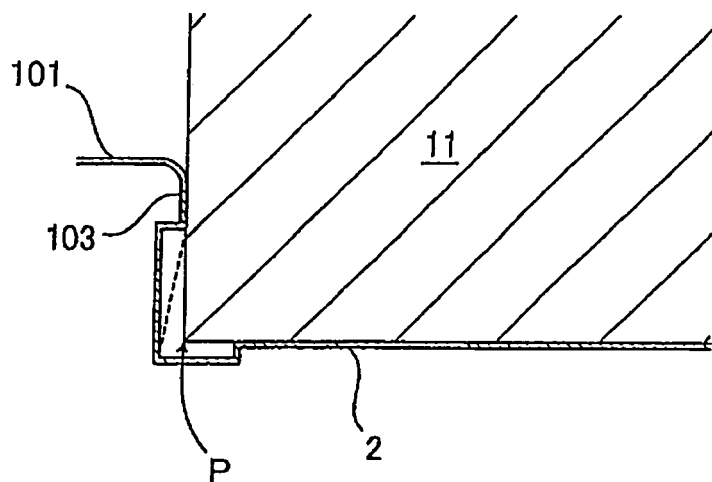


FIG. 7

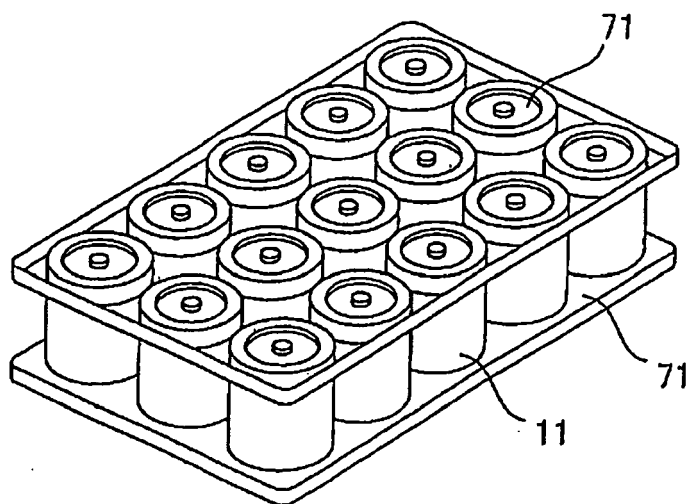


FIG. 8

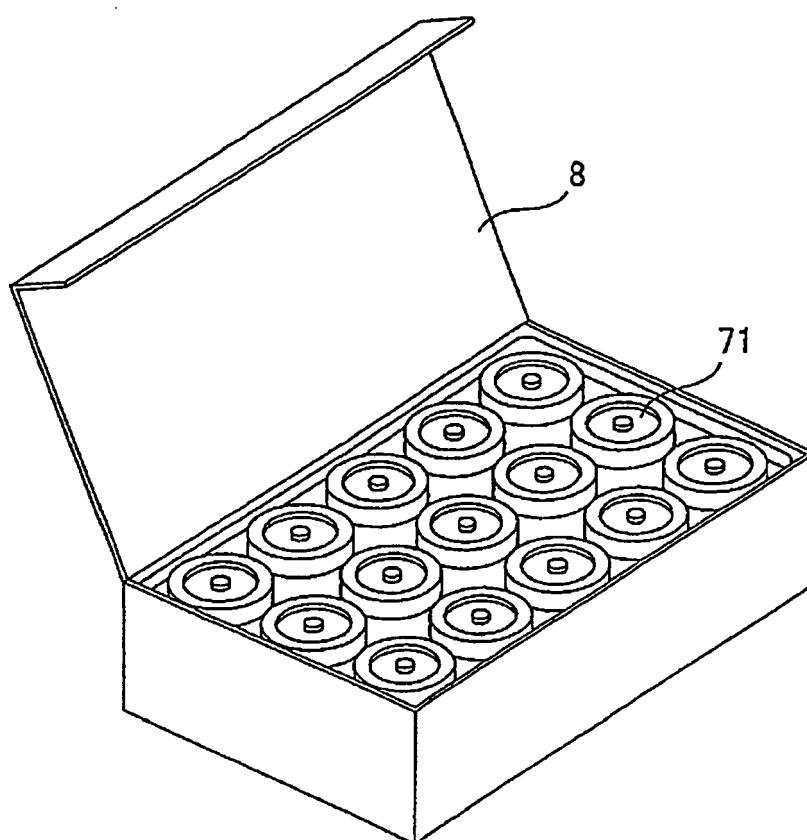


FIG. 9

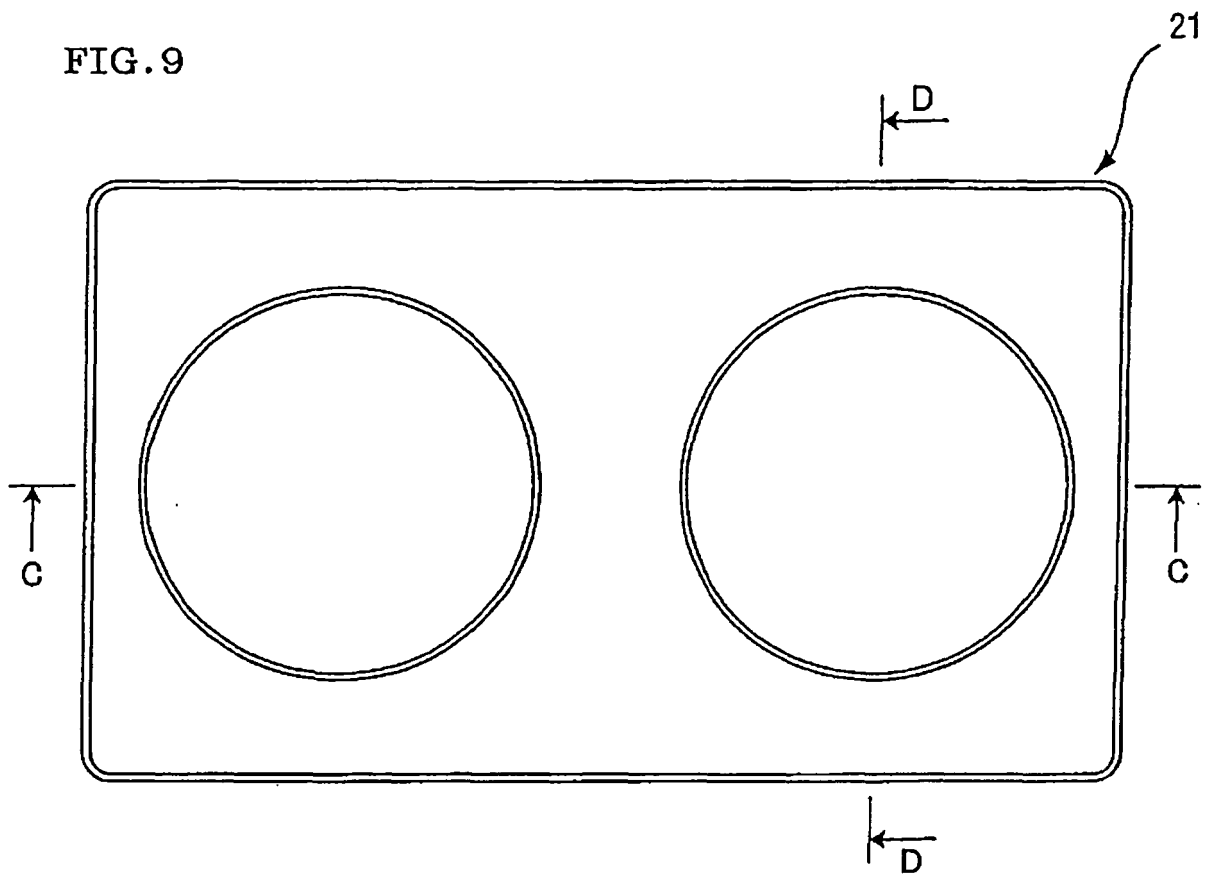


FIG. 10

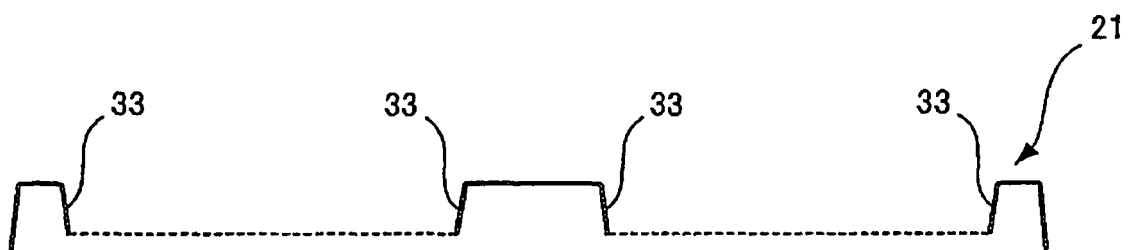


FIG. 11



FIG.12

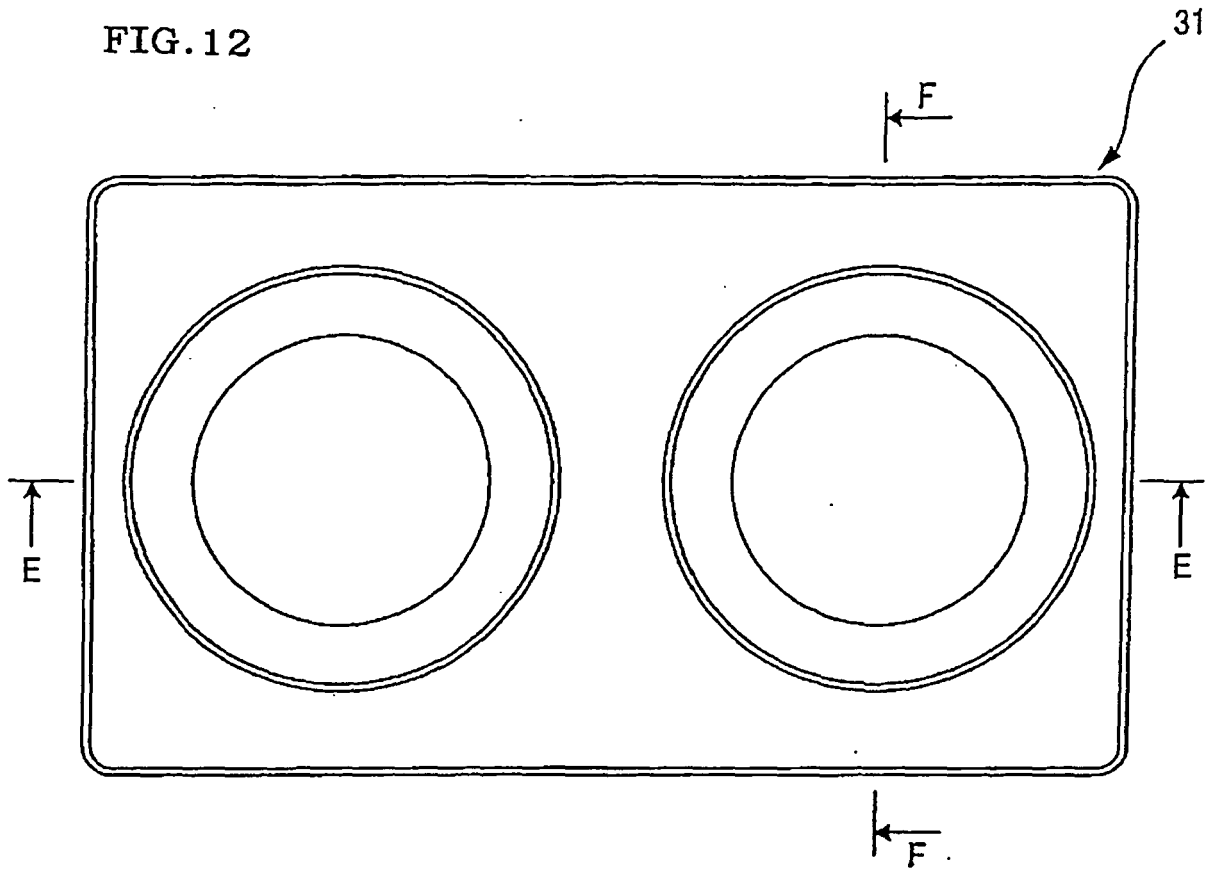


FIG.13

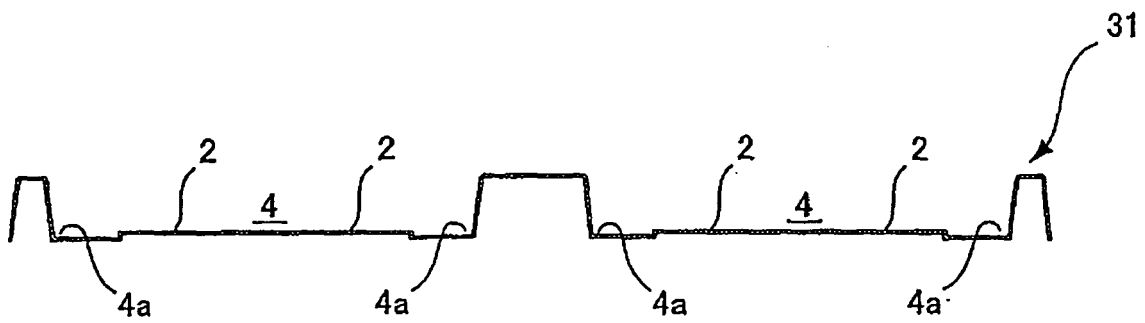


FIG.14

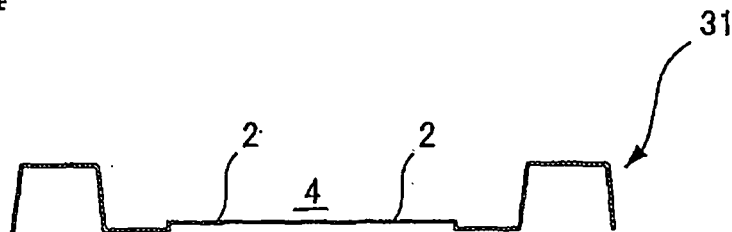


FIG. 15

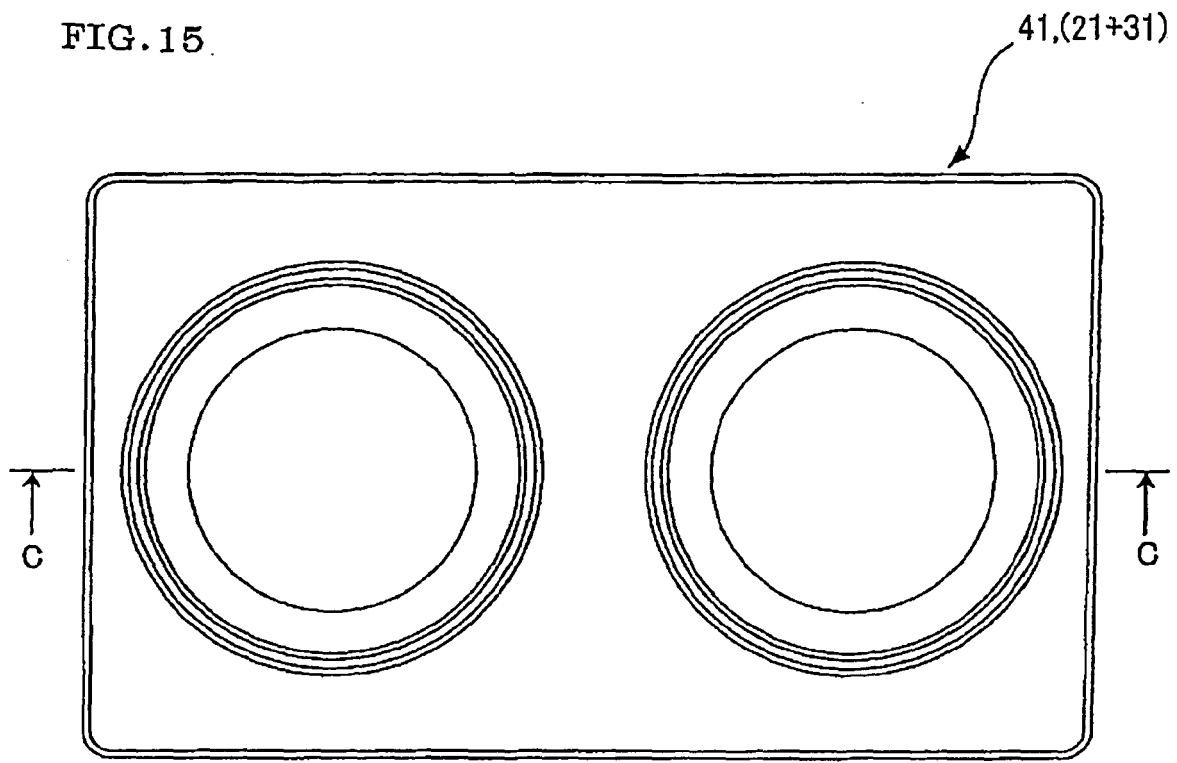


FIG. 16

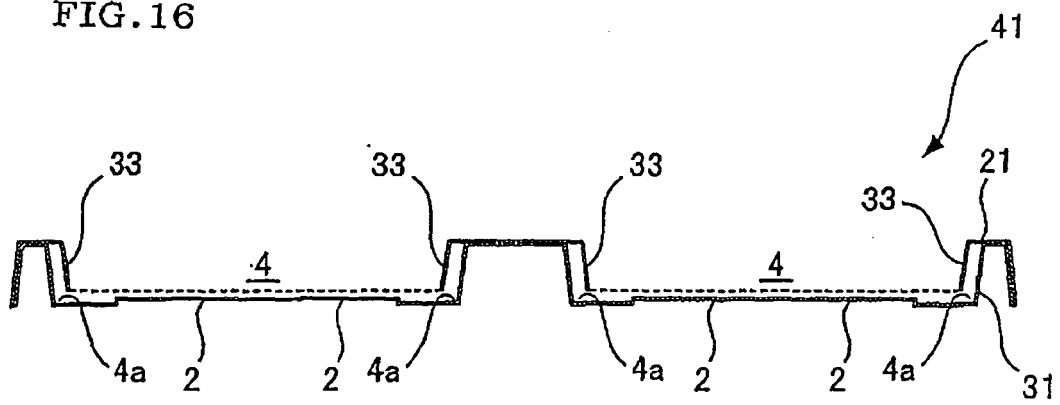


FIG. 17

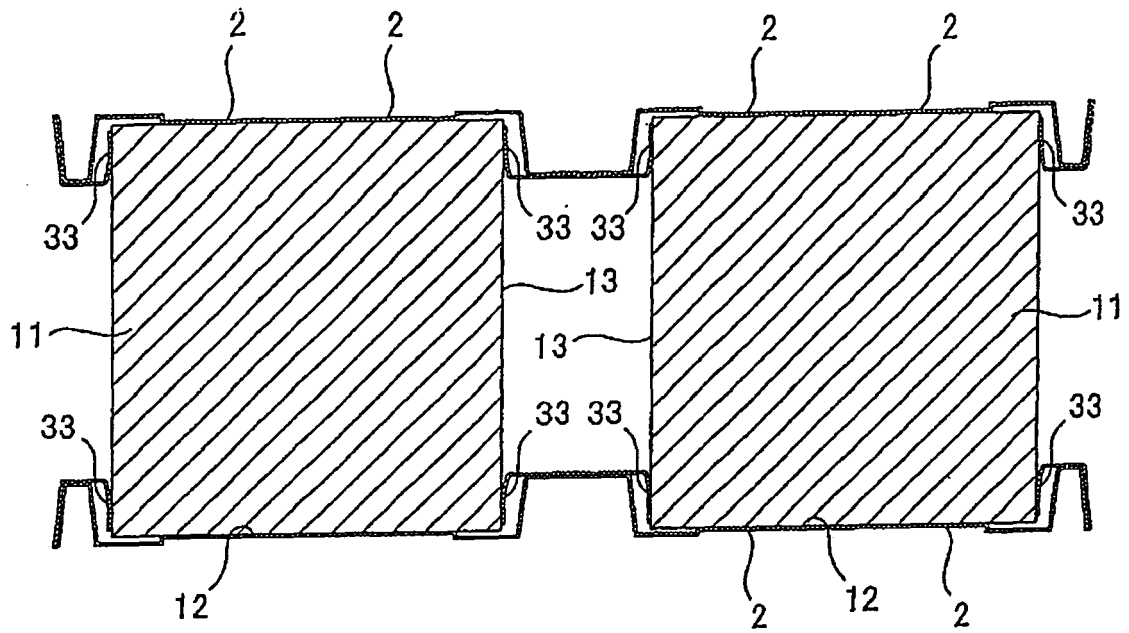


FIG. 18

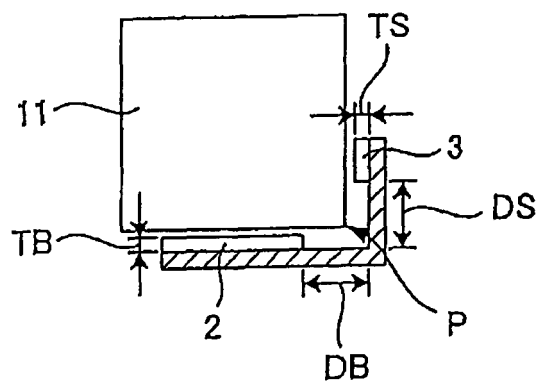


FIG. 19

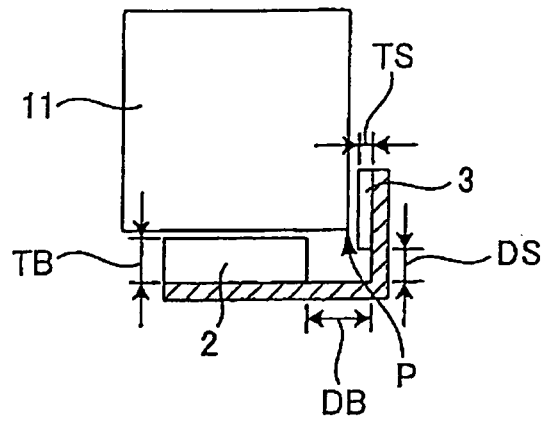


FIG. 20

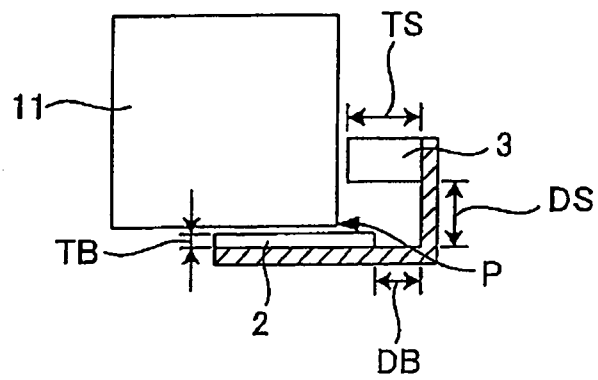
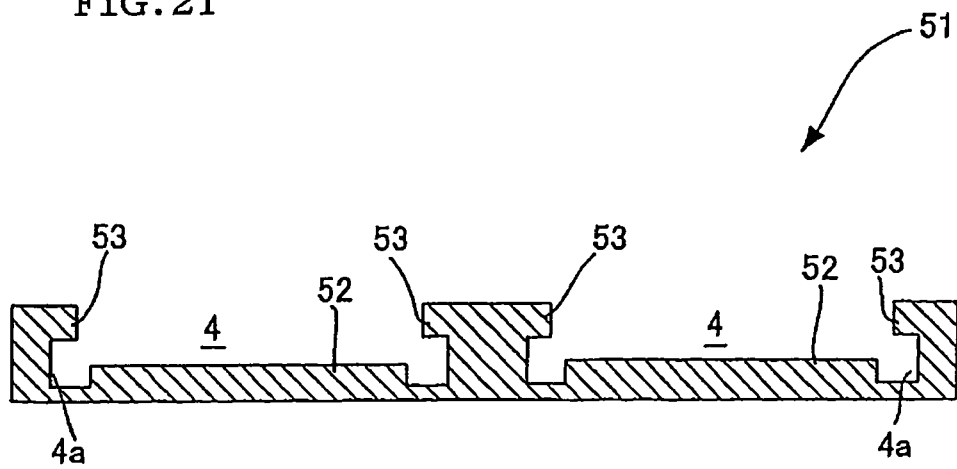


FIG. 21







European Patent  
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# EUROPEAN SEARCH REPORT

Application Number  
EP 07 25 3083

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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			TECHNICAL FIELDS SEARCHED (IPC)
			B65D
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
Munich		26 November 2007	Bevilacqua, Vincenzo
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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EPO FORM 1503 03.82 (P04C01)

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EP 07 25 3083

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The members are as contained in the European Patent Office EDP file on  
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26-11-2007

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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