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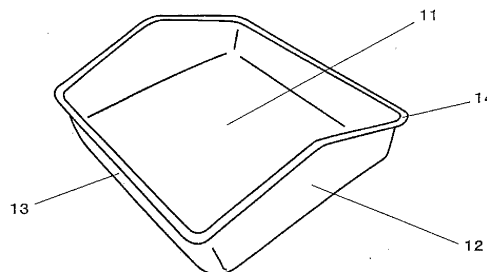
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(54) **PACKAGING CONTAINER AND PACKAGED PRODUCT CONTAINED IN SAID PACKAGING CONTAINER, AND MANUFACTURING METHOD AND MANUFACTURING APPARATUS FOR SAID PACKAGING CONTAINER**

(57) The purpose of the present invention is to provide: a packaging container that can be industrially mass-produced, that can be used as Modified Atmosphere Packaging (MAP) while ensuring sealing performance, and that allows contents to be displayed in a three-dimensional manner; a packaged product contained in the packaging container; and a manufacturing method and manufacturing apparatus for the packaging container. This packaging container has: a container main body having a bottom face part and sidewall parts, and having a flange at the upper end part periphery of the sidewall parts; and a lid material heat-sealed to the flange. The lid material is made of a film or sheet. A pair of opposing sidewall parts has the same shape, and upper end parts of the pair of side wall parts are at least positioned higher than the upper end parts of another pair of opposing sidewall parts.

FIG. 1



Description**TECHNICAL FIELD**

5 **[0001]** The present invention relates to packaging containers for containing various types of food products such as packaged lunches ("bento" in Japanese language), noodles and side dishes, the packaging container being formed of a main body and a base material.

BACKGROUND ART

10 **[0002]** A packaging container for containing food items such as packaged lunches, noodles and side dishes uses a lid material formed of a transparent sheet or film to enable visibility of the contents thereof.

[0003] For instance, a lid material formed of a sheet or the like is internally or externally fitted into an opening part of a container main body, and the container main body and the lid material are wrapped with a shrink film. For this type of packaging container, there is a case in which the container main body and the lid material are wrapped entirely by a shrink film or partially by a strip of a shrink film. There is also a case in which the container main body and the lid material are fixed to each other by an adhesive tape in place of the shrink film.

15 **[0004]** The shape of the opening part of the container main body of such a packaging container is not particularly limited; thus, a quadrangular shape, an elliptical shape, a round shape, and any other shape can be employed. The lid material matches the shape of the opening part of the container main body and is provided to the opening part by means of internal fitting or external fitting, and the container main body and the lid material are fixed to each other with the above-mentioned shrink film or adhesive tape.

20 **[0005]** Although the packaging container described above has its container main body and lid material fixed to each other with a shrink film or adhesive tape, when the contents thereof include a liquid content, the liquid content spills when the packaging container is tilted, because the lid material is fitted into the container main body. Especially when the entire packaging container is wrapped with the shrink film, the liquid matter leaks into the gap between the packaging container and the shrink film, significantly deteriorating the aesthetic appearance of the packaging container.

25 **[0006]** In addition, the ability to ensure sealing performance of the packaging container significantly affects food hygiene and the expiration date of the contained food product, and is therefore crucial for the packaging container. Unfortunately, sealing performance of the above-mentioned packaging container has not yet been ensured. Although the use of a shrink film to wrap entirely the container main body and the lid material appears to be able to achieve sealing performance, sealing performance is, in fact, not ensured due to the air holes which are formed in the shrink film in order to let air out when heat-shrinking the shrink film.

30 **[0007]** In order to enhance the sealing performance of a packaging container, there is proposed a technique of providing a flange part to the periphery of an opening part of a container main body and then heat-sealing a lid material formed of a film to the flange part (see Patent Document 1 and the like, for example).

PRIOR ART DOCUMENTS**Patent Document**

40 **[0008]** Patent Document 1: Japanese Patent Application Publication No. 2000-344224

SUMMARY OF INVENTION**Problems that the Invention is to Solve**

45 **[0009]** Incidentally, in view of improving the appearance of contents of a packaging container, a way to display the contents in a three-dimensional manner has been devised in recent years. However, only a flat-shaped packaging container is known as a packaging container capable of ensuring the sealing performance described above. In other words, although a quadrangular shape, an elliptical shape, a round shape, and any other shape can be employed as the shape of the opening part of the container main body of such a packaging container, this type of packaging container is in a flat tray-like shape with a constant distance between the bottom face of the container main body and the flange part. The reason of this configuration is because the flange part needs to be formed in the same plane in order to heat-seal a lid material formed of a film to the flange part.

55 **[0010]** Therefore, an object of the present invention is to provide a packaging container that can be industrially mass-produced and allows contents thereof to be displayed in a three-dimensional manner while ensuring sealing performance, a packaged product that is contained in the packaging container, and a manufacturing method and a manufacturing

apparatus for manufacturing the packaging container.

Means for Solving the Problems

[0011] As a result of a series of dedicated studies to solve the foregoing problems, the inventors of the present invention have discovered that, in a packaging container in which a lid material formed of a film or sheet is heat-sealed to a flange formed at an upper end part periphery on sidewall parts of a container main body, positioning at least a part of upper end parts of sidewall parts higher than upper end parts of the other sidewall parts can solve the problems described above.

[0012] As the shape of such a packaging container, for example, the shapes shown in Figs. 12(A), 13(A) and 14(A) are considered. A packaging container shown in Fig. 12(A) has a bottom face part (91) formed into a quadrangular shape, one of sidewall parts (92) into a triangular roof, and the rest of the sidewall parts into a rectangular shape. In a packaging container shown in Fig. 13(A), a bottom face part (101) is formed into a semi-elliptical shape, and a sidewall (102) standing upright from the linear portion of the bottom face part is formed into a triangular roof, and the remaining sidewall standing upright from the ellipse portion of the bottom face part is configured to have a constant height. A packaging container shown in Fig. 14 (A) has a bottom face part (111) formed into a circle, a part of which is cut into a fan shape. In this packaging container, sidewall parts (112) standing upright from the linear portion of the fan shape are sloped gradually from the center of the circle toward the circumference, with the portions of the sidewall parts at the center of the circle being the tallest, and the height of a sidewall standing upright from the circumferential portion of the remaining bottom face part is made constant.

[0013] Furthermore, modifications of the packaging containers shown in Figs. 12(A), 13(A) and 14(A) are considered, in each of which a top edge part of the sidewall having the high position and a bottom edge part at the bottom face side are formed into substantially an identical shape. These modified packaging containers are shown in Figs. 12(B), 13(B) and 14(B).

[0014] These packaging containers are capable of displaying contents thereof in a three-dimensional manner while ensuring sealing performance, but the problem is that these packaging containers cannot easily be mass-produced industrially. Specifically, in a manufacturing apparatus (120) for a conventional packaging container, as shown in Fig. 15, when a film configuring a lid material of the packaging container is heat-sealed to a flange of the container main body of the packaging container, the film forms wrinkles, deteriorating the appearance of the packaging container.

[0015] As a result of a series of further studies, the inventors of the present invention have discovered the effectiveness of the following inventions, completing the present invention. The present invention employs the following configurations for the purpose of solving the foregoing problems.

(1) A packaging container, characterized by comprising:

a container main body that has a bottom face part, sidewall parts, and a flange formed at an upper end part periphery of the sidewall parts; and
a lid material that is heat-sealed to the flange, wherein
the lid material is formed of a film or a sheet, and
a pair of opposing sidewall parts has an identical shape, and upper end parts of the pair of sidewall parts are at least partly positioned higher than upper end parts of another pair of opposing sidewall parts.

(2) The packaging container according to the foregoing aspect (1), wherein the lid material is in the form of a flat film or sheet when reeled out from a raw material roll or fed as a piece of a raw material sheet, is deformed so as to follow the shape of an upper end edge of the container main body prior to or during heat-sealing and then heat-sealed.

(3) The packaging container according to the foregoing aspect (1) or (2), wherein upper end contours of the sidewall parts whose upper end parts are at least partly positioned higher than the upper end parts of the other sidewall parts are in the shape of an upward arc, an upward triangle, or an upward trapezoid.

(4) The packaging container according to any one of the foregoing aspects (1) to (3), wherein the top edge parts of the sidewall parts having the higher upper end part and a bottom edge part at the bottom face side are formed in substantially the same shape.

(5) The packaging container according to any one of foregoing aspects (1) to (3), wherein the bottom face part is substantially flat and has projections projecting downward which are provided at positions enabling stacking of the packaging container on another packaging container.

(6) The packaging container according to the foregoing aspect (5), wherein a bottom edge part of the projection is in substantially the same shape as the top edge parts of the sidewall parts corresponding to the bottom edge part.

(7) The packaging container according to any one of the foregoing aspects (1) to (6), wherein the lid material has a function of automatically opening a steam hole formed therein by a pressure of steam generated when heating

contents of the packaging container in a microwave oven.

(8) The packaging container according to any one of the foregoing aspects (1) to (6), wherein at least a part of the flange of the container main body and at least a part of the lid material, which are heat-sealed to each other, have weaker sealing strength than the other parts and have a function of being separated and opened by a pressure of steam generated when the contents of the packaging container are heated in a microwave oven.

(9) A packaged product, characterized by comprising a food product placed in the packaging container described in any one of the foregoing aspects (1) to (8).

(10) A manufacturing method for a packaging container, characterized by comprising the steps of arranging and conveying a plurality of container main bodies, each of which has a bottom face part, sidewall parts, and a flange formed at an upper end part periphery of the sidewall parts, and serially heat-sealing a lid material to the flanges of the container main bodies, wherein

in each of the container main bodies, a pair of opposing sidewall parts has an identical shape, and upper end parts of the pair of sidewall parts are at least partly positioned higher than another pair of opposing sidewall parts;

the container main bodies are arranged and conveyed in such a manner that the pair of opposing sidewall parts of each of the container main bodies is positioned perpendicular to a conveyance direction of the container main bodies; the lid material formed of a flat film or sheet is reeled out from a reel roll and forwarded through a dancer roll; and a plate having substantially the same shape as an upper end contour shape of the pair of opposing sidewall parts is brought into abutment with the lid material and the lid material is heat-sealed to the flange of each of the container main bodies by using a heat-seal block.

(11) The manufacturing method for a packaging container according to the foregoing aspect (10), wherein: the flange of each of the container main bodies and the lid material are heat-sealed to each other in a vacuum chamber, the vacuum chamber having a chamber main body and a chamber lid abutting therewith, and the upper end contour shape of the pair of opposing sidewall parts of each of the container main bodies being similar to an upper end contour shape of sidewall parts of the chamber main body corresponding to the pair of opposing sidewall parts;

a support base for the container main bodies is provided at the chamber main body side;

the lid material has a width greater than the width of the container main body and narrower than the width of the vacuum chamber;

the container main bodies are mounted on the support base;

the vacuum chamber is tightly sealed by sandwiching the lid material between the chamber lid and the chamber main body, the lid material being brought into contact with the plate and deformed into the upper end contour shape of the pair of opposing sidewall parts;

after deaerating the vacuum chamber, the vacuum chamber is filled with filler gas, and the pressure in the vacuum chamber is adjusted;

the flange of each of the container main bodies and the lid material are heat sealed to each other by means of a heat-seal block provided at the chamber lid side; and

the lid material on the outside of the flange of each of the packaging containers is removed.

(12) A manufacturing method for a packaging container, characterized by comprising the steps of arranging and conveying a plurality of container main bodies, each of which has a bottom face part, sidewall parts, and a flange formed at an upper end part periphery of the sidewall parts, and serially heat-sealing a lid material to the flanges of the container main bodies, wherein

in each of the container main bodies, a pair of opposing sidewall parts has an identical shape, and upper end parts of the pair of sidewall parts are at least partly positioned higher than another pair of opposing sidewall parts:

the container main bodies are arranged and conveyed in such a manner that the pair of opposing sidewall parts of each of the container main bodies is positioned parallel to a conveyance direction of the container main bodies;

the lid material formed of a flat film or sheet is reeled out from a reel roll and forwarded through a dancer roll; and the lid material is heat-sealed to the flange of each of the container main bodies by using a heat-seal block while

correcting and adjusting a sag of the lid material that occurs between reeling out the lid material and heat-sealing the lid material to the flange of each of the container main bodies by using the dancer roll or another dancer roll different from that dancer roll, so that the lid material follows the contour shape of the upper end parts of the pair of opposing sidewall parts.

(13) The manufacturing method for a packaging container according to the foregoing aspect (12), wherein:

the flange of each of the container main bodies and the lid material are heat-sealed to each other in a vacuum chamber, the vacuum chamber having a chamber main body and a chamber lid abutting therewith, and an abutment face between the chamber lid and the chamber main body being a horizontal plane;

a support base for the container main bodies is provided at the chamber main body side;

the lid material has a width greater than the width of the container main body and narrower than the width of

the vacuum chamber;
 the container main bodies are mounted on the support base;
 the vacuum chamber is tightly sealed by sandwiching the lid material between the chamber lid and the chamber main body;
 5 after deaerating the vacuum chamber, the vacuum chamber is filled with filler gas, and the pressure in the vacuum chamber is adjusted;
 the flange of each of the container main bodies and the lid material are heat-sealed to each other by means of a heat-seal block provided at the chamber lid side; and
 10 the lid material on the outside of the flange of each of the packaging containers is removed.

(14) The manufacturing method for a packaging container according to any one of the foregoing aspects (10) to (13), wherein the heat-seal block is capable of being divided and joined.

(15) A manufacturing apparatus for a packaging container, characterized by comprising means for arranging and conveying a plurality of container main bodies, each of which has a bottom face part, sidewall parts, and a flange formed at an upper end part periphery of the sidewall parts, and serially heat-sealing a lid material to the flanges of the container main bodies, wherein

in each of the container main bodies, a pair of opposing sidewall parts has an identical shape, and upper end parts of the pair of sidewall parts are at least partly positioned higher than another pair of opposing sidewall parts;
 the container main bodies are arranged and conveyed in such a manner that the pair of opposing sidewall parts of each of the container main bodies is positioned perpendicular to a conveyance direction of the container main bodies;
 20 the lid material formed of a flat film or sheet is reeled out from a reel roll and forwarded through a dancer roll; and
 a plate having substantially the same shape as an upper end contour shape of the pair of the opposing sidewall parts is brought into abutment with the lid material and the lid material is heat-sealed to the flange of each of the container main bodies by using a heat-seal block.

(16) The manufacturing apparatus for a packaging container according to the foregoing aspect (15), wherein:

the flange of each of the container main bodies and the lid material are heat-sealed to each other in a vacuum chamber, the vacuum chamber having a chamber main body and a chamber lid abutting therewith, and the upper end contour shape of the pair of opposing sidewall parts of each of the container main bodies being similar to an upper end contour shape of sidewall parts of the chamber main body corresponding to the pair of opposing sidewall parts;

a support base for the container main bodies is provided at the chamber main body side;

the lid material has a width greater than the width of the container main bodies and narrower than the width of the vacuum chamber;

the container main bodies are mounted on the support base;

the vacuum chamber is tightly sealed by sandwiching the lid material between the chamber lid and the chamber main body, the lid material being brought into contact with the plate and deformed into the upper end contour shape of the pair of opposing sidewall parts;

after deaerating the vacuum chamber, the vacuum chamber is filled with filler gas, and the pressure in the vacuum chamber is adjusted;

the flange of each of the container main bodies and the lid material are heat-sealed to each other by means of a heat-seal block provided at the chamber lid side; and

the lid material on the outside of the flange of each of the packaging containers is removed.

(17) A manufacturing apparatus for a packaging container, characterized by comprising means for arranging and conveying a plurality of container main bodies, each of which has a bottom face part, sidewall parts, and a flange formed at an upper end part periphery of the sidewall parts, and serially heat-sealing a lid material to the flanges of the container main bodies, wherein

in each of the container main bodies, a pair of opposing sidewall parts has an identical shape, and upper end parts of the pair of sidewall parts are at least partly positioned higher than another pair of opposing sidewall parts,
 the container main bodies are arranged and conveyed in such a manner that the pair of opposing sidewall parts of each of the container main bodies is positioned parallel to a conveyance direction of the container main bodies;
 the lid material formed of a flat film or sheet is reeled out from a reel roll and forwarded through a dancer roll; and
 the lid material is heat-sealed to the flange of each of the container main bodies by using a heat-seal block while correcting and adjusting a sag of the lid material that occurs between reeling out the lid material and heat-sealing the lid material to the flange of each of the container main bodies by using the dancer roll or another dancer roll different from that dancer roll, so that the lid material follows the contour shape of the upper end parts of the pair of opposing sidewall parts.

(18) The manufacturing apparatus for a packaging container according to the foregoing aspect (17), wherein:

the flange of each of the container main bodies and the lid material are heat-sealed to each other in a vacuum chamber, the vacuum chamber having a chamber main body and a chamber lid abutting therewith, and an abutment face between the chamber lid and the chamber main body being a horizontal plane;
 a support base for the container main bodies is provided at the chamber main body side;
 the lid material has a width greater than the width of the container main bodies and narrower than the width of the vacuum chamber;
 the container main bodies are mounted on the support base;
 the vacuum chamber is tightly sealed by sandwiching the lid material between the chamber lid and the chamber main body;
 after deaerating the vacuum chamber, the vacuum chamber is filled with filler gas, and the pressure in the vacuum chamber is adjusted;
 the flange of each of the container main bodies and the lid material are heat-sealed to each other by means of a heat-seal block provided at the chamber lid side; and
 the lid material on the outside of the flanges of each of the packaging containers is removed.

(19) The manufacturing apparatus for a packaging container according to any one of the foregoing aspects (15) to (18), wherein the heat-seal block is capable of being divided and joined.

Advantageous Effects of Invention

[0016] The present invention can provide a packaging container that can be industrially mass-produced and allows contents thereof to be displayed in a three-dimensional manner while ensuring sealing performance, a packaged product that is contained in the packaging container, and a manufacturing method and manufacturing apparatus for manufacturing the packaging container.

BRIEF DESCRIPTION OF DRAWINGS

[0017]

Fig. 1 is a diagram showing an example of a container main body of a packaging container according to the present invention;

Fig. 2 is a diagram showing an example of the container main body of the packaging container according to the present invention;

Fig. 3 is a diagram showing an example of the container main body of the packaging container according to the present invention;

Fig. 4 is a diagram showing an example of the container main body of the packaging container according to the present invention;

Fig. 5 is a diagram showing an example of the container main body of the packaging container according to the present invention;

Fig. 6 is a diagram showing an example of the container main body of the packaging container according to the present invention;

Fig. 7 is a diagram showing an example of the container main body of the packaging container according to the present invention;

Fig. 8 is a diagram showing schematically an example of a manufacturing apparatus for manufacturing the packaging container according to the present invention;

Fig. 9 is a diagram showing an example of a configuration of a part of the manufacturing apparatus for manufacturing the packaging container according to the present invention;

Fig. 10 is a diagram showing schematically an example of the manufacturing apparatus for manufacturing the packaging container according to the present invention;

Fig. 11 is a diagram showing an example of a configuration of a part of the manufacturing apparatus for manufacturing the packaging container according to the present invention;

Fig. 12 is a diagram showing an example of a packaging container of a reference example of the present invention;

Fig. 13 is a diagram showing an example of a packaging container of a reference example of the present invention;

Fig. 14 is a diagram showing an example of a packaging container of a reference example of the present invention; and

Fig. 15 is a diagram showing schematically a conventional manufacturing apparatus for manufacturing a packaging container.

MODE FOR CARRYING OUT THE INVENTION

[0018] A packaging container according to the present invention is characterized by comprising a container main body that has a bottom face part, sidewall parts, and a flange formed at an upper end part periphery of the sidewall parts, and a lid material heat-sealed to the flange. The lid material is made of a film or a sheet. The container main body has a pair of opposing sidewall parts formed into an identical shape, and the upper end parts of the pair of sidewall parts are at least partly positioned higher than upper end parts of another pair of opposing sidewall parts.

[0019] As described above, the conventional packaging container has a flat structure in which the flange at the periphery of the opening part of the container main body is provided to be in the same plane. According to the structure of the packaging container of the present invention, on the other hand, a pair of opposing sidewall parts has an identical shape, and upper end parts of the pair of sidewall parts are at least partly positioned higher than the upper end parts of another pair of opposing sidewall parts. Therefore, the flange is not in the same plane and provides a three-dimensional effect while keeping sealing performance of the packaging container.

[0020] Note that, regarding the upper end parts of the pair of sidewall parts having the higher part than the upper end parts of the other pair of opposing sidewall parts, the height of the higher part from a mount surface on which the packaging container of the present invention is placed is preferably 1.2 to 2 times higher than the height of the upper end parts of the other pair of sidewall parts from the same mount surface.

[0021] Because the shape of the packaging container of the present invention is bilaterally symmetric, a sealed container having a three-dimensional effect can be realized while keeping the familiarity of the conventional, rectangular parallelepiped packaging containers. Moreover, as will be described hereinafter, the packaging container of the present invention can be industrially mass-produced without forming wrinkles in the lid material, with an added improvement in the conventional manufacturing apparatus for manufacturing a packaging container.

[0022] Fig. 1 shows an example of the shape of the container main body of the packaging container according to the present invention. The container main body shown in Fig. 1 has a quadrangular bottom face part (11), a pair of opposing sidewall parts (12) forming a triangular roof, and a remaining other pair of rectangular sidewall parts (13). The container main body of Fig. 1 shows that upper end parts of the pair of sidewall parts are at least partly positioned higher than upper end parts of the other pair of sidewall parts and the upper end contour shape of the higher sidewall parts forms an upward triangle. However, the shape of the upper end parts of the higher sidewall parts may be formed into an upward arc, an upward trapezoid or the like.

[0023] The packaging container and contents thereof can bring about a three-dimensional effect by forming the pair of opposing sidewall parts into an identical shape and positioning at least a part of the upper end parts of the pair of sidewall parts to be higher than the upper end parts of the other pair of opposing sidewall parts so that the upper end parts of the former pair of sidewall parts have the apex of the triangular roof, instead of making the levels of the sidewall parts of the container main body the same.

[0024] The material of the above-mentioned container main body is not particularly limited; thus, any material can be employed so long as a heat-sealable flange can be formed. The plastic resins used in the conventional packaging containers can favorably be used. Similarly, a heat-sealable film or sheet may be used as a material for the lid.

[0025] A flange (14) of the container main body may be inclined outward. Typically it is preferred that the flange be formed in such a manner that, after the flange and the lid material are heat-sealed together, the flange is substantially flat and the flange width is substantially constant as viewed from above.

[0026] As described above, in the packaging container of the present invention, the flange is provided at the upper end part periphery of the sidewall parts of the container main body, and the lid material made of a film or sheet is heat-sealed to the flange, thereby bringing about various effects.

[0027] One of the effects is the fact that the packaging container can be sealed completely. Therefore, when a content of the packaging container is, for example, a food product, a space with the environment of the kitchen can be sealed up by completely and tightly sealing the packaging container immediately after the food product is placed therein, preventing the future contamination. Controlling a space of the packaging container, i.e., MAP (Modified Atmosphere Packaging) can be realized, enabling controlling to a nitrogen atmosphere, nitrogen/carbon-dioxide atmosphere, nitrogen/carbon-dioxide/oxygen atmosphere, and the like. In addition, even when the food product contains sauce or other types of liquid, the configuration of the packaging container of the present invention can prevent liquid leakage.

[0028] Another effect is the fact that the lid material can be made highly glossy and highly transparent. Because the packaging container of the present invention employs a film or sheet for a lid material, the top face of the packaging container can be made highly glossy and highly transparent. Such a configuration can display contents clearly and gives the sense of freshness. Also, applying or introducing an antifogging agent to the lid material can provide antifogging properties into the packaging container.

[0029] Note that, although the lid material may be made of a single layer or a stack of multiple layers, it is preferred that the lid material be as thin as possible in order to create a highly glossy, highly transparent lid material. For instance, in a case where the lid material is made of a film, the thickness thereof can be approximately 30 μm or more but less

than 150 μm . In a case where the lid material is formed of a sheet, the thickness thereof can be approximately 150 μm or more but equal to or less than 250 μm .

[0030] The above-mentioned lid material of the container of the present invention is in the form of a flat film or sheet when reeled out from a raw material roll or fed as a piece of raw sheet, is deformed so as to follow the shape of the upper end edge the container main body prior to or during heat-sealing and then heat-sealed.

[0031] In the conventional packaging containers, normally a convex-type or concave-type lid obtained by molding a sheet is externally or internally fitted to the container main body. According to the packaging container of the present invention, on the other hand, the lid material formed of a flat film or sheet is deformed into the shape of the upper end edge of the container main body and heat-sealed thereto as described above, eliminating the need to mold the lid material into a lid in a separate processing line. In addition, the amount of waste can be reduced because there is no need to use unnecessary members such as a shrink film or adhesive tape, making the packaging container light and environmentally responsive.

[0032] Furthermore, adjusting the heat seal strength between the container main body and the lid material and providing a protruding tab to a part of the end part of the lid material can bring about easy openability.

[0033] Furthermore, in the packaging container of the present invention, it is preferred that the top edge parts of the pair of sidewall parts having the above-mentioned high position and a bottom edge part at the bottom face side be in substantially an identical shape. This makes the shape of the bottom face part of the container main body three-dimensional, bringing about a three-dimensional effect of the inside of the packaging container and a contained product thereof. Because the shape of the bottom face part of the container main body is substantially the same as the shape of the lid material on the top face of the packaging container, a plurality of the packaging containers can be stacked vertically. By raising the bottom face part of the packaging container, contents contained in the container are also raised. Therefore, unevenness heating in a food product can be prevented when heating the food product in a microwave oven. The uneven heating is because when heating a food product in a microwave oven, the upper part of the food product heats up more easily than the bottom of the same.

[0034] A container main body shown in Fig. 2 is an example obtained by making the shape of the bottom face part of the container main body shown in Fig. 1 substantially the same as the shape of the top face of the packaging container. More specifically, in the container main body shown in Fig. 2, a pair of opposing sidewall parts (22) has its top edge part and its bottom edge part at the bottom face side shaped into an upward convex triangle, and the remaining other pair of opposing sidewall parts (23) is shaped into a rectangle. A container main body shown in Fig. 3 is a modification of the container main body shown in Fig. 2, in which a pair of opposing sidewall parts (32) has its top edge part and its bottom edge part at the bottom face side in the shape of reversed "V" and the remaining other pair of opposing sidewall parts (33) is shaped into a rectangle.

[0035] In a container main body shown in Fig. 4, a pair of opposing sidewall parts (42) has its top edge part and its bottom edge part at the bottom face side shaped into an upward arc, and the remaining other pair of sidewall parts (43) is shaped into a rectangle. In a container main body shown in Fig. 5, a pair of opposing sidewall parts (52) has its top edge part and its bottom edge part at the bottom face side shaped into a trapezoid, and the remaining other pair of sidewall parts (53) is shaped into a rectangle. In case of each of the container main bodies shown in Figs. 2 to 5, a hand can easily be placed in the space formed below the bottom face part, allowing the packaging container to be carried easily and allowing one to eat the food contents thereof easily.

[0036] Also, the foregoing container main bodies of the present invention may have a configuration provided with a partition, as shown in Figs. 6(a) to 6(e). In this case, two container main bodies are connected to each other. The top face part of a sidewall part functioning as the partition may or may not be heat-sealed to the lid material.

[0037] It is preferred that the bottom face part of the packaging container of the present invention be substantially flat and have projections projecting downward at positions enabling stacking of the packaging container on another packaging container. Making the bottom face part substantially flat (horizontal) in this manner enables easy packing of contents and prevents the contents from shifting to one side of the packaging container. In addition, in a case of simply making the bottom face part substantially flat, a plurality of the packaging containers cannot be stacked vertically on top of each other. However, with the projections provided at predetermined positions on each bottom face part, a plurality of the packaging containers can be stacked on top of each other. In other words, the foregoing projections can be provided at, for example, each of the four corners of the bottom face part in such a manner as to project downward from the bottom face part by a distance approximately equivalent to the height difference between the highest position of the upper end part of each sidewall part and the lowest position of the same. Such a configuration allows the packaging container of the present invention to be stacked on another packaging container. Note that the position for placing the foregoing projection and the size of the projection are not limited to those described above; thus, the projection may be provided in such a manner as to allow the packaging containers of the present invention to be stacked on another packaging container.

[0038] Figs. 7(a) to 7(c) each show an example of a packaging container having a flat bottom face part and projections. As shown in Fig. 7, it is preferred that the bottom edge parts of the above-mentioned projections (65) have substantially

the same shape as the top edge parts of sidewall parts (62) (63) corresponding to the bottom edge parts. The top edge parts of the sidewall parts (62) (63) corresponding to the bottom edge parts are the top edge parts located in the upper portions of the sidewall parts (62) (63) provided with the projections (65).

[0039] In the example shown in Fig. 7, the projections (65) at the lower portions of the sidewall parts (62) with a trapezoidal top edge part are inclined so as to be parallel with the inclined portions of the top edge parts (Fig. 7(b)). The projections (65) at the lower portions of the sidewall parts (63) with a horizontal top edge part are horizontal so as to be parallel to the top edge parts (Fig. 7(c)).

[0040] In such a configuration where the bottom face part (61) is substantial flat (horizontal) and the projections (65) projecting downward are provided at the positions enabling stacking of the packaging container on another packaging container, a space is formed below the bottom face part (61). This space not only allows stacking of the packaging containers on top of each other, but also allows the packaging container to be picked up easily. As described above, such a configuration can prevent unevenness in temperature of the food product when heating the food product in a microwave oven.

[0041] It is also preferred that the packaging container of the present invention have a function of automatically opening a steam hole or holes of the foregoing lid material by pressure of steam generated when heating the contents of the foregoing packaging container in a microwave oven. This configuration is excellent in terms of convenience since the contents of the packaging container can be heated in a microwave without peeling in advance a part of the film or sheet functioning as the lid material of the packaging container.

[0042] For example, the film used in Seiro Pack (Microsteamer)® can be used as the lid material (see Japanese Patent No. 4817583).

[0043] To provide the ability of automatically opening an hole or holes to the packaging container, it is preferred that at least a part of the flange of the foregoing container main body and a part of the lid material, which are heat-sealed to each other, have a weaker sealing strength than the other parts and have a function of being peeled and opened by pressure of steam generated when the contents of the packaging container are heated in a microwave oven. In order to realize this function, a part of the flange provided at the periphery of the sidewall parts of the container main body may be made narrower than the other parts.

[0044] The packaged product having a food product contained in the foregoing packaging container of the present invention, such as a packaged lunch (or bento), enables easy visibility of the food contents and is excellent in exhibiting a three-dimensional appearance. In addition, because the packaging container is sealed, the packaging container is excellent in terms of hygiene and can extend the expiration date of the food product contained therein.

[0045] The manufacturing method for a packaging container according to the present invention is a manufacturing method for a packaging container, comprising steps of arranging and conveying a plurality of container main bodies and serially heat-sealing a lid material to flanges of the container main bodies.

[0046] According to an aspect of the manufacturing method for a packaging container according to the present invention, the container main bodies are each arranged and conveyed in such a manner that a pair of opposing sidewall parts of each of the container main bodies is positioned perpendicular to a conveyance direction of the container main bodies.

[0047] The lid material formed of a flat film or sheet is reeled out from a reel roll and fed above or on the container main bodies through a dancer roll. In order to heat-seal the lid material to the flanges of the container main bodies without generating wrinkles in the lid material, it is preferred that the lid material be deformed into substantially the same shape as the upper end contour shape of the pair of opposing sidewall parts of each container main bodies. In so doing, a plate having substantially the same shape as the upper end contour shape of the pair of opposing sidewall parts may be brought into abutment with the lid material.

[0048] Then, the flange of each of the container main bodies and the lid material are heat-sealed to each other using a heat-seal block. In this manner, the packaging containers according to the present invention can be manufactured serially.

[0049] The manufacturing apparatus for a packaging container that implements the foregoing manufacturing method for a packaging container is now described hereinafter.

[0050] The manufacturing apparatus for a packaging container has means for arranging and conveying a plurality of container main bodies, means for reeling out a lid material from a reel roll and supplying the lid material above/or on the container main bodies, and means for heat-sealing the lid material to the flanges of the container main bodies.

[0051] The means for conveying the container main bodies arranges and conveys the container main bodies in such a manner that a pair of opposing sidewall parts of each container main body is positioned perpendicular to a conveyance direction of the container main bodies. The lid material is supplied above or on of the container main bodies through a dancer roll. In addition, a plate is provided in order to deform the lid material into substantially the same shape as the upper end contour shape of the pair of opposing sidewall parts of each of the container main bodies.

[0052] The means for heat-sealing the lid material is provided with a heat-seal block for heat-sealing the lid material to the flange of each of the container main bodies.

[0053] It is preferred that, in the manufacturing method for a packaging apparatus according to the present invention,

heat-sealing the flange of each container main body and the lid material to each other be performed in a vacuum chamber. According to this configuration, the inside of the packaging container can be controlled to a nitrogen atmosphere, nitrogen/carbon-dioxide atmosphere, nitrogen/carbon-dioxide/oxygen atmosphere, or the like.

[0054] A vacuum chamber that has a chamber main body and a chamber lid abutting therewith, in which the upper end contour shape of the pair of opposing sidewall parts of each of the container main bodies is similar to the upper end contour shape of the corresponding sidewall parts of the chamber main body, can be used as the foregoing vacuum chamber. It is preferred that a support base for the container main bodies be provided at the chamber main body side. When using the vacuum chamber, it is preferred that the width of the lid material be greater than the width of the container main body and narrower than the width of the vacuum chamber.

[0055] When using the vacuum chamber in the foregoing manufacturing method for a packaging container according to the present invention, first, each of the conveyed container main bodies is mounted on the support base, and the lid material supplied above or on the container main bodies is sandwiched between the chamber lid and the chamber main body. Then, after tightly sealing the vacuum chamber, the vacuum chamber is deaerated, and the vacuum chamber becomes filled with filler gas, adjusting the pressure of the vacuum chamber. Thereafter, the flange of the container main body and the lid material are heat-sealed together by means of the heat-seal block provided at the chamber lid side. Finally, the lid material on the outside of the flange of the packaging container is removed by a means such as a cutter.

[0056] The manufacturing method for a packaging container that uses the foregoing vacuum chamber as described above can be implemented by the manufacturing apparatus for a packaging container that has the foregoing vacuum chamber.

[0057] The other aspect of the manufacturing method for a packaging container according to the present invention is described hereinafter.

[0058] First, as with the foregoing manufacturing method, a plurality of container main bodies are arranged and conveyed. In so doing, the container main bodies are each arranged and conveyed in such a manner that the pair of opposing sidewall parts is parallel to the conveyance direction of the container main bodies.

[0059] The lid material is reeled out from a reel roll and fed above or on the container main bodies through a dancer roll. At this moment, a sag of the lid material that occurs between reeling out the lid material and heat-sealing the lid material to the flange of each of the container main bodies is corrected and adjusted by using the dancer roll or another dancer roll different from that dancer roll. In this manner, the lid material can be formed into a shape that follows the contour shape of the upper end parts of the pair of opposing sidewall parts.

[0060] By heat-sealing the lid material to the flange of the container main body using the heat-seal block, the packaging containers according to the present invention can be manufactured serially.

[0061] The other aspect of the manufacturing apparatus for a packaging container according to the present invention that is capable of implementing the foregoing manufacturing method is described hereinafter.

[0062] The manufacturing apparatus according to this aspect of the present invention comprises, as a means for arranging and conveying a plurality of container main bodies, means for arranging and conveying the container main bodies in such a manner that the pair of opposing sidewall parts is parallel to the conveyance direction of the container main bodies.

[0063] The manufacturing apparatus also has means for reeling out a lid material from a reel roll and feeding the lid material above/on the container main bodies through a dancer roll, and means for correcting and adjusting a sag of the lid material that occurs between reeling out the lid material and heat-sealing the lid material to the flange of each of the container main bodies by using the dancer roll or another dancer roll different from that dancer roll. In this manner, the lid material can be formed into a shape that follows the contour shape of the upper end parts of the pair of opposing sidewall parts.

[0064] The manufacturing apparatus also has means for heat-sealing the lid material to the flanges of the container main bodies using a heat-seal block.

[0065] According to the manufacturing method for a packaging container of the foregoing aspect as well, the flange of each container main body and the lid material can be heat-sealed to each other within a vacuum chamber, realizing MAP (Modified Atmosphere Packaging).

[0066] A vacuum chamber that has a chamber main body and a chamber lid abutting therewith, in which the abutment face between the chamber lid and the chamber main body is a horizontal plane, can be used as the foregoing vacuum chamber. In the case of using this vacuum chamber as well, it is preferred that, as with the vacuum chamber described above, a support base for the container main bodies be provided at the chamber main body side, and that the width of the lid material be greater than the width of each container main body and narrower than the vacuum chamber.

[0067] A case in which the vacuum chamber having the horizontal abutment face between the chamber lid and the chamber main body is described hereinafter with respect to the above-mentioned other aspect of the manufacturing method for a packaging container according to the present invention.

[0068] First, container main bodies are arranged and conveyed in such a manner that a pair of opposing sidewall parts of each container main body is parallel to the conveyance direction of the container main bodies, and then each container

main body, conveyed to a predetermined position, is mounted on the support base. Furthermore, a sag on the lid material is adjusted by the dancer roll, and the resultant lid material is supplied and held between the chamber lid and the chamber main body. The rest of the steps such as deaerating the vacuum chamber and filling the vacuum chamber with filler gas to adjust the pressure of the vacuum chamber, are the same as those of the foregoing method. As a result, the flange of the container main body and the lid material are heat-sealed together.

[0069] Such a manufacturing method for a packaging container can be implemented by a manufacturing apparatus for a packaging container that employs the vacuum chamber having the horizontal abutment face between the chamber lid and the chamber main body in the foregoing manufacturing apparatus according to the other aspect of the present invention.

[0070] Since a heater is generally embedded in the heat-seal block, it is difficult to process the heat-seal block into a complicated shape. When processing the heat-seal block so as to conform it to the flange of the packaging container in which the upper end contour shape of the pair of opposing sidewall parts is in the shape of a triangular roof, trapezoid, reversed "V" shape (as shown in Fig. 3) or the like, it is sometimes difficult to adjust the angle corresponding to the vertex of each contour.

[0071] Therefore, it is preferred that the foregoing heat-seal block be capable of being divided or joined. For instance, when manufacturing a packaging container that is in the shape of a triangular roof or reversed "V" shape, a heat-seal block capable of being divided into right and left at the apex portion may be used. The angle of the joined portion can be adjusted easily by using such a heat-seal block, and a heat-seal block whose shape can easily be matched with the shape of the packaging container can be obtained. Similarly, when manufacturing a trapezoidal packaging container, a heat-seal block capable of being divided into three portions, i.e., the flat portion having inclined portions at both sides thereof, may be used and joined by adjusting the angles of the respective vertex portions.

[0072] The method and apparatus for reeling out a lid material from a reel roll to serially manufacture packaging containers have described above. When using pieces of raw sheet, a manufacturing method and a manufacturing apparatus for covering and heat-sealing the individual pieces of raw sheet onto the respective container main bodies can be employed.

(Embodiment 1)

[0073] Fig. 8 shows an example of the configuration of the manufacturing apparatus for the packaging container according to the present invention. The apparatus shown in Fig. 8 is an example of an apparatus for heat-sealing a lid material to a container main body that has a quadrangular bottom face part, a pair of opposing sidewall parts in the shape of a triangular roof, and another pair of rectangular sidewall parts. The container main body is placed and conveyed in such a manner that the pair of opposing sidewall parts in the shape of a triangular roof is perpendicular to the conveyance direction of the container main body. This apparatus heat-seals the lid material to a flange of the container main body by using a heat-seal block.

[0074] In the manufacturing apparatus shown in Fig. 8, as mentioned above, a plurality of container main bodies (701) are arranged on a conveyor (703) and conveyed in such a manner that a pair of opposing sidewall parts in the shape of a triangular roof is perpendicular to the conveyance direction of the container main bodies. From above, a lid material (702) formed of a film or sheet is reeled out from a reel roll (704) and fed through a dancer roll (705). A plate (not shown) that is substantially in the same shape as the shape of the triangular roof of the pair of opposing sidewall parts of each container main body is brought into abutment with the lid material to correct the shape of the lid material. Moreover, as shown in Fig. 8, it is preferred that the angle of the lid material be adjusted with a jig (706) prior to heat-sealing the lid material to a flange of each container main body, the jig being capable of adjusting the angle of the lid material. Shaping the lid material so as to conform to the shape of the top face of the container main body in this manner can prevent the occurrence of wrinkles in the lid material when heat-sealing the lid material to the flange of the container main body.

[0075] Subsequently, the flange of each of the container main bodies and the lid material are heat-sealed to each other. In so doing, the flange of each container main body and the lid material are held between a support base (707) provided under the container main body and a heat-seal block (708) provided above the support base, to thermally weld the flange and lid material to each other. The shape of the support base and the shape of the heat-seal block may be changed in accordance with the shape of the packaging containers to be manufactured.

[0076] Finally, the lid material is cut on the slightly outside of the flange of each container main body, completing the packaging container of the present invention. In so doing, the lid material may be cut by a cutter (709) that is arranged in accordance with the shape of the top face part of the packaging container. The shape of the cutter may be changed in accordance with the shape of the packaging container. Furthermore, there is another favorable example in which a portion that can be separated along the shape of the flange of each container main body is formed in the lid material in advance. In such a case, perforations or the like, for example, may be formed in the lid material.

[0077] The completed packaging container (710) is collected from a conveyor (711), and the resultant cut lid material (712) is forwarded directly through a roll, rolled up, and collected.

(Embodiment 2)

[0078] An example of a manufacturing apparatus that is configured to heat-seal a flange of a container main body and a lid material to each other in a vacuum chamber is described hereinafter with respect to the manufacturing apparatus for a packaging container described in Embodiment 1.

[0079] Fig. 9 is a diagram showing an example of a configuration of the vacuum chamber. As shown in Fig. 9, the vacuum chamber has a chamber main body (751) and a chamber lid (752) that can come into abutment with the chamber main body. The vacuum chamber is formed into a sealed vacuum chamber by bringing these chamber main body and chamber lid into abutment with each other. The chamber main body (751) is provided with a container support base (753) on which each container main body is mounted.

[0080] The flanges of the container main bodies and the lid material are heat-sealed to each other in the vacuum chamber, wherein, as in Embodiment 1, the lid material is abut with the plate and thereby deformed into the upper end contour shape of the pair of opposing sidewall parts of the container main body and conveyed. Therefore, it is preferred that the upper end contour shape of the pair of opposing sidewall parts be similar to the upper end contour shape of the corresponding sidewall parts of the chamber main body (751). Use of such a vacuum chamber having the chamber main body (751) and the chamber lid (752) capable of coming into abutment therewith can heat-seal the flange of the container main body and the lid material to each other in the vacuum chamber without generating wrinkles in the lid material.

[0081] The width of the lid material is greater than the width of the container main body in the short direction thereof and narrower than the width of the vacuum chamber in the short direction. Due to this width of the lid material, both end parts of the lid material in the width direction in the vacuum chamber do not come into contact with the vacuum chamber when the lid material is held between the chamber main body (751) and the chamber lid (752), and thereby a space is formed. As a result, the internal space in the chamber main body (751) becomes continuous with the internal space in the chamber lid (752), enabling deaeration and gas replacement.

[0082] As described above, the container main bodies are each mounted on the container support base (753) of the chamber main body (751), and the lid material, brought into contact with the plate and deformed into the upper end contour shape of the pair of opposing sidewall parts, is supplied between the chamber main body (751) and the chamber lid (752). The vacuum chamber is then tightly closed by sandwiching the lid material between the chamber main body (751) and the chamber lid (752). After the vacuum chamber is deaerated and evacuated in this state, filler gas is introduced to the vacuum chamber to adjust the pressure therein. The filler gas may be selected appropriately from among nitrogen gas, a mixed gas of nitrogen and carbon dioxide, a mixed gas of nitrogen, carbon dioxide and oxygen, and the like.

[0083] A heat-seal block (754) that is provided at the chamber lid (752) side is dropped to heat-seal the flange of the container main body and the lid material to each other. Subsequently, the vacuum chamber is opened, and the lid material outside the flange of the packaging container is removed, completing the packaging container according to the present invention.

[0084] Note that the steps subsequent to the step of opening the vacuum chamber are the same as those of Embodiment 1, wherein the lid material outside the flange can be cut using the cutter (709). In addition, as with Embodiment 1, a portion that can be separated along the shape of the flange of each container main body can be formed in the lid material in advance.

(Embodiment 3)

[0085] Another example of the configuration of the manufacturing apparatus for a packaging container according to the present invention is shown in Fig. 10. The apparatus shown in Fig. 10 is an example of an apparatus that arranges and conveys a container main body in such a manner that a pair of opposing sidewall parts thereof is parallel to the conveyance direction of the container main body, the container main body having a quadrangular bottom face part, the pair of opposing sidewall parts in the shape of a triangular roof, and the remaining other pair of rectangular sidewall parts.

[0086] In the manufacturing apparatus shown in Fig. 10, as described above, a plurality of container main bodies (801) are arranged on a conveyor (803) and conveyed in such a manner that a pair of opposing sidewall parts in the shape of a triangular roof of each container main body is parallel to the conveyance direction of the container main bodies. From above, a lid material (802) formed of a film or sheet is reeled out from a reel roll (804) and fed through a dancer roll (805). In order to form the lid material into the contour shape of the upper end parts of the sidewall parts that is in the shape of a triangular roof, a sag of the lid material that is generated between reeling out the lid material and heat-sealing the lid material to a flange of each container main body is corrected and adjusted using the dancer roll (806). By adjusting the feed length of the lid material in this manner, the lid material can be formed into the contour shape of the upper end parts of the pair of opposing sidewall parts, and wrinkles that are generated in the lid material when heat-sealing the lid material to the flange of each container main body can be prevented.

[0087] Subsequently, the flange of each container main body and the lid material are heat-sealed to each other. In so doing, the flange of each container main body and the lid material are held between a support base (807) provided under

the container main body and a heat-seal block (808) provided thereabove, and subjected to heat-welding. The shape of the support base and the shape of the heat-seal block may be changed in accordance with the shape of the packaging containers to be manufactured.

[0088] Finally, the lid material is cut on the slightly outside of the flange of each container main body, completing the packaging container of the present invention. In so doing, the lid material may be cut by a cutter (809) that is positioned in accordance with the shape of the top face part of the packaging container. The shape of the cutter may be changed in accordance with the shape of the packaging container. Furthermore, it is preferred that a portion that can be separated along the shape of the flange of each container main body be formed in the lid material in advance.

[0089] The completed packaging container (810) is collected from a conveyor (811), and the resultant cut lid material (812) is forwarded directly through a roll, rolled up, and collected.

(Embodiment 4)

[0090] An example of a manufacturing apparatus that is configured to heat-seal a flange of a container main body and a lid material to each other in a vacuum chamber is described with respect to the manufacturing apparatus for a packaging container described in Embodiment 3.

[0091] Fig. 11 is a diagram showing an example of a configuration of the vacuum chamber. As shown in Fig. 11, the vacuum chamber has a chamber main body (851) and a chamber lid (852) that can come into abutment with the chamber main body. The vacuum chamber is formed into a sealed vacuum chamber by bringing these chamber main body and chamber lid into abutment with each other. As shown in Fig. 11, the abutment face between the chamber main body (851) and the chamber lid (852) form a horizontal plane.

[0092] A lid material is supplied between the chamber main body (851) and the chamber lid (852), and the width of the lid material is greater than the width of the container main body in the longitudinal direction thereof and narrower than the width of the vacuum chamber in the longitudinal direction thereof. Therefore, both end parts of the lid material in the width direction in the vacuum chamber do not come into contact with the vacuum chamber when the lid material is held between the chamber main body (851) and the chamber lid (852), and a space is formed. As a result, the internal space in the chamber main body (851) becomes continuous with the internal space in the chamber lid (852), enabling deaeration and gas replacement.

[0093] The chamber main body (851) is provided with a container support base (853) on which each container main body is mounted, and a heat-seal block (854) is provided at the chamber lid (852) side.

[0094] In the manufacturing apparatus for a packaging container according to Embodiment 4, a container main body is mounted on the container support base (853) provided in the chamber main body (851), and a lid material is supplied between the chamber main body (851) and the chamber lid (852). The chamber main body (851) and the chamber lid (852) are closed having the lid material therebetween, and the vacuum chamber is tightly sealed. After the vacuum chamber is deaerated and evacuated in this state, filler gas is introduced to the vacuum chamber to adjust the pressure therein. The filler gas may be selected appropriately from among nitrogen gas, a mixed gas of nitrogen and carbon dioxide, a mixed gas of nitrogen, carbon dioxide and oxygen, and the like.

[0095] A heat-seal block (854) that is provided at the chamber lid (852) side is dropped to heat-seal the flange of the container main body and the lid material to each other. Subsequently, the vacuum chamber is opened, and the lid material outside the flange of the packaging container is removed, completing the packaging container according to the present invention.

[0096] Note that the steps subsequent to the step of opening the vacuum chamber are the same as those of Embodiment 3, wherein the lid material outside the flange can be cut using the cutter (809) or the like. It is preferred that a portion that can be separated along the shape of the flange of the container main body be formed in the lid material in advance.

[0097] Embodiments 1 to 4 each have described examples of an apparatus for manufacturing a packaging container having a pair of opposing sidewall parts in the shape of a triangular roof. However, even when the upper end contour shape of the pair of opposing sidewall parts is an upward arc shape, a trapezoid shape, a reversed "V" shape as shown in Fig. 3, or the like, the packaging container of the present invention can be manufactured by changing the shape of the plate, support base, heat-seal block, and cutter accordingly. Also, by configuring the heat-seal block so as to be able to be divided and joined, the heat-seal block that conforms to the shape of the packaging container can be created easily.

EXPLANATION OF REFERENCE NUMERALS

[0098]

11, 21, 31, 41, 51, 61: Bottom face part

12, 22, 32, 42, 52, 62: A pair of opposing sidewall parts

13, 23, 33, 43, 53, 63:	Another pair of opposing sidewall parts
14, 24, 34, 44, 54, 64:	Flange
65:	Projection
701, 801:	Container main body
5 702, 802:	Lid material
703, 803:	Conveyor
704, 804:	Reel roll
705, 805:	Dancer roll
706:	Jig for adjusting the angle of the lid material
10 806:	Dancer roll
707, 807:	Support base
708, 808:	Heat-seal block
709, 809:	Cutter
710, 810:	Packaging container
15 711, 811:	Conveyor
712, 812:	Cut lid material
751, 851:	Chamber main body
752, 852:	Chamber lid
753, 853:	Container support base
20 754, 854:	Heat-seal block
91, 101, 111:	Bottom face part
92, 102, 112:	One sidewall
94, 104, 11:	Flange
120:	Conventional manufacturing apparatus
25	

Claims

1. A packaging container, **characterized by** comprising:
 - a container main body that has a bottom face part, sidewall parts, and a flange formed at an upper end part periphery of the sidewall parts; and
 - a lid material that is heat-sealed to the flange, wherein
 - the lid material is formed of a film or a sheet, and
 - a pair of opposing sidewall parts has an identical shape, and upper end parts of the pair of sidewall parts are at least partly positioned higher than upper end parts of another pair of opposing sidewall parts.
2. The packaging container according to claim 1, wherein the lid material is in the form of a flat film or sheet when reeled out from a raw material roll or fed as a piece of a raw material sheet, is deformed so as to follow the shape of an upper end edge of the container main body prior to or during heat-sealing and then heat-sealed.
3. The packaging container according to claim 1 or 2, wherein upper end contours of the sidewall parts whose upper end parts are at least partly positioned higher than the upper end parts of the other sidewall parts are in the shape of an upward arc, an upward triangle, or an upward trapezoid.
4. The packaging container according to any one of claims 1 to 3, wherein the top edge parts of the sidewall parts having the higher upper end part and a bottom edge part at the bottom face side are formed in substantially the same shape.
5. The packaging container according to any one of claims 1 to 3, wherein the bottom face part is substantially flat and has projections projecting downward which are provided at positions enabling stacking of the packaging container on another packaging container.
6. The packaging container according to claim 5, wherein a bottom edge part of the projection is in substantially the same shape as the top edge part of the sidewall parts corresponding to the bottom edge part.
7. The packaging container according to any one of claims 1 to 6, wherein the lid material has a function of automatically opening a steam hole formed therein by a pressure of steam generated when heating contents of the packaging

container in a microwave oven.

8. The packaging container according to any one of claims 1 to 6, wherein at least a part of the flange of the container main body and at least a part of the lid material, which are heat-sealed to each other, have weaker sealing strength than the other parts and have a function of being separated and opened by a pressure of steam generated when the contents of the packaging container are heated in a microwave oven.

9. A packaged product, **characterized by** comprising a food product placed in the packaging container described in any one of claims 1 to 8.

10. A manufacturing method for a packaging container, **characterized by** comprising the steps of arranging and conveying a plurality of container main bodies, each of which has a bottom face part, sidewall parts, and a flange formed at an upper end part periphery of the sidewall parts, and serially heat-sealing a lid material to the flanges of the container main bodies, wherein

in each of the container main bodies, a pair of opposing sidewall parts has an identical shape, and upper end parts of the pair of sidewall parts are at least partly positioned higher than another pair of opposing sidewall parts; the container main bodies are arranged and conveyed in such a manner that the pair of opposing sidewall parts of each of the container main bodies is positioned perpendicular to a conveyance direction of the container main bodies; the lid material formed of a flat film or sheet is reeled out from a reel roll and forwarded through a dancer roll; and a plate having substantially the same shape as an upper end contour shape of the pair of opposing sidewall parts is brought into abutment with the lid material and the lid material is heat-sealed to the flange of each of the container main bodies by using a heat-seal block.

11. The manufacturing method for a packaging container according to claim 10, wherein:

the flange of each of the container main bodies and the lid material are heat-sealed to each other in a vacuum chamber, the vacuum chamber having a chamber main body and a chamber lid abutting therewith, and the upper end contour shape of the pair of opposing sidewall parts of each of the container main bodies being similar to an upper end contour shape of sidewall parts of the chamber main body corresponding to the pair of opposing sidewall parts;

a support base for the container main bodies is provided at the chamber main body side;

the lid material has a width greater than a width of the container main body and narrower than a width of the vacuum chamber;

the container main bodies are mounted on the support base;

the vacuum chamber is tightly sealed by sandwiching the lid material between the chamber lid and the chamber main body, the lid material being brought into contact with the plate and deformed into the upper end contour shape of the pair of opposing sidewall parts;

after deaerating the vacuum chamber, the vacuum chamber is filled with filler gas, and a pressure in the vacuum chamber is adjusted;

the flange of each of the container main bodies and the lid material are heat sealed to each other by means of a heat-seal block provided at the chamber lid side; and

the lid material on the outside of the flange of each of the packaging containers is removed.

12. A manufacturing method for a packaging container, **characterized by** comprising the steps of arranging and conveying a plurality of container main bodies, each of which has a bottom face part, sidewall parts, and a flange formed at an upper end part periphery of the sidewall parts, and serially heat-sealing a lid material to the flanges of the container main bodies, wherein

in each of the container main bodies, a pair of opposing sidewall parts has an identical shape, and upper end parts of the pair of sidewall parts are at least partly positioned higher than another pair of opposing sidewall parts:

the container main bodies are arranged and conveyed in such a manner that the pair of opposing sidewall parts of each of the container main bodies is positioned parallel to a conveyance direction of the container main bodies; the lid material formed of a flat film or sheet is reeled out from a reel roll and forwarded through a dancer roll; and the lid material is heat-sealed to the flange of each of the container main bodies by using a heat-seal block while correcting and adjusting a sag of the lid material that occurs between reeling out the lid material and heat-sealing the lid material to the flange of each of the container main bodies by using the dancer roll or another dancer roll different from that dancer roll, so that the lid material follows the contour shape of the upper end parts of the pair of opposing sidewall parts.

13. The manufacturing method for a packaging container according to claim 12, wherein:

the flange of each of the container main bodies and the lid material are heat-sealed to each other in a vacuum chamber, the vacuum chamber having a chamber main body and a chamber lid abutting therewith, and an abutment face between the chamber lid and the chamber main body being a horizontal plane;
 a support base for the container main bodies is provided at the chamber main body side;
 the lid material has a width greater than a width of the container main body and narrower than a width of the vacuum chamber;
 the container main bodies are mounted on the support base;
 the vacuum chamber is tightly sealed by sandwiching the lid material between the chamber lid and the chamber main body;
 after deaerating the vacuum chamber, the vacuum chamber is filled with filler gas, and a pressure in the vacuum chamber is adjusted;
 the flange of each of the container main bodies and the lid material are heat-sealed to each other by means of a heat-seal block provided at the chamber lid side; and
 the lid material on the outside of the flange of each of the packaging containers is removed.

14. The manufacturing method for a packaging container according to any one of claims 10 to 13, wherein the heat-seal block is capable of being divided and joined.

15. A manufacturing apparatus for a packaging container, **characterized by** comprising means for arranging and conveying a plurality of container main bodies, each of which has a bottom face part, sidewall parts, and a flange formed at an upper end part periphery of the sidewall parts, and serially heat-sealing a lid material to the flanges of the container main bodies, wherein

in each of the container main bodies, a pair of opposing sidewall parts has an identical shape, and upper end parts of the pair of sidewall parts are at least partly positioned higher than another pair of opposing sidewall parts;
 the container main bodies are arranged and conveyed in such a manner that the pair of opposing sidewall parts of each of the container main bodies is positioned perpendicular to a conveyance direction of the container main bodies;
 the lid material formed of a flat film or sheet is reeled out from a reel roll and forwarded through a dancer roll; and
 a plate having substantially the same shape as an upper end contour shape of the pair of the opposing sidewall parts is brought into abutment with the lid material and the lid material is heat-sealed to the flange of each of the container main bodies by using a heat-seal block.

16. The manufacturing apparatus for a packaging container according to claim 15, wherein:

the flange of each of the container main bodies and the lid material are heat-sealed to each other in a vacuum chamber, the vacuum chamber having a chamber main body and a chamber lid abutting therewith, and the upper end contour shape of the pair of opposing sidewall parts of each of the container main bodies being similar to an upper end contour shape of sidewall parts of the chamber main body corresponding to the pair of opposing sidewall parts;
 a support base for the container main bodies is provided at the chamber main body side;
 the lid material has a width greater than a width of the container main bodies and narrower than a width of the vacuum chamber;
 the container main bodies are mounted on the support base;
 the vacuum chamber is tightly sealed by sandwiching the lid material between the chamber lid and the chamber main body, the lid material being brought into contact with the plate and deformed into the upper end contour shape of the pair of opposing sidewall parts;
 after deaerating the vacuum chamber, the vacuum chamber is filled with filler gas, and a pressure in the vacuum chamber is adjusted;
 the flange of each of the container main bodies and the lid material are heat-sealed to each other by means of a heat-seal block provided at the chamber lid side; and
 the lid material on the outside of the flange of each of the packaging containers is removed.

17. A manufacturing apparatus for a packaging container, **characterized by** comprising means for arranging and conveying a plurality of container main bodies, each of which has a bottom face part, sidewall parts, and a flange formed at an upper end part periphery of the sidewall parts, and serially heat-sealing a lid material to the flanges of the container main bodies, wherein

in each of the container main bodies, a pair of opposing sidewall parts has an identical shape, and upper end parts

of the pair of sidewall parts are at least partly positioned higher than another pair of opposing sidewall parts, the container main bodies are arranged and conveyed in such a manner that the pair of opposing sidewall parts of each of the container main bodies is positioned parallel to a conveyance direction of the container main bodies; the lid material formed of a flat film or sheet is reeled out from a reel roll and forwarded through a dancer roll; and the lid material is heat-sealed to the flange of each of the container main bodies by using a heat-seal block while correcting and adjusting a sag of the lid material that occurs between reeling out the lid material and heat-sealing the lid material to the flange of each of the container main bodies by using the dancer roll or another dancer roll different from that dancer roll, so that the lid material follows the contour shape of the upper end parts of the pair of opposing sidewall parts.

18. The manufacturing apparatus for a packaging container according to claim 17, wherein:

the flange of each of the container main bodies and the lid material are heat-sealed to each other in a vacuum chamber, the vacuum chamber having a chamber main body and a chamber lid abutting therewith, and an abutment face between the chamber lid and the chamber main body being a horizontal plane;
a support base for the container main bodies is provided at the chamber main body side;
the lid material has a width greater than a width of the container main bodies and narrower than a width of the vacuum chamber;
the container main bodies are mounted on the support base;
the vacuum chamber is tightly sealed by sandwiching the lid material between the chamber lid and the chamber main body;
after deaerating the vacuum chamber, the vacuum chamber is filled with filler gas, and a pressure in the vacuum chamber is adjusted;
the flange of each of the container main bodies and the lid material are heat-sealed to each other by means of a heat-seal block provided at the chamber lid side; and
the lid material on the outside of the flanges of each of the packaging containers is removed.

19. The manufacturing apparatus for a packaging container according to any one of claims 15 to 18, wherein the heat-seal block is capable of being divided and joined.

FIG. 1

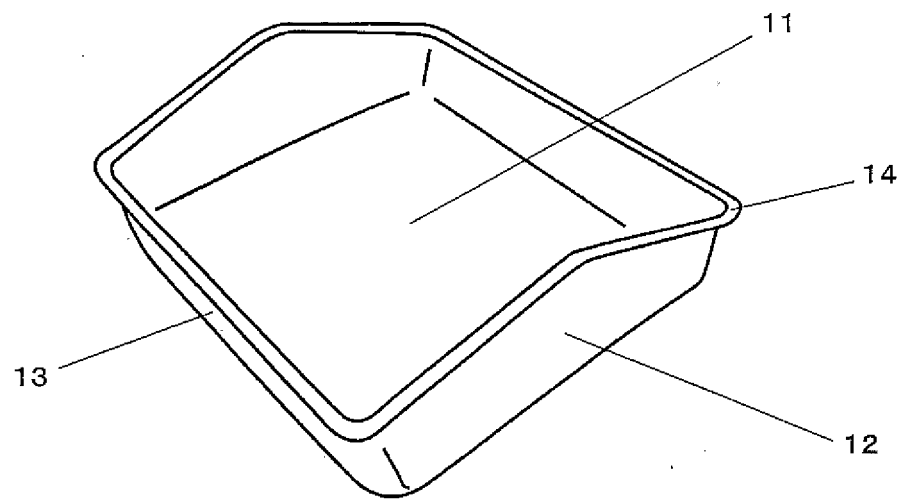


FIG. 2

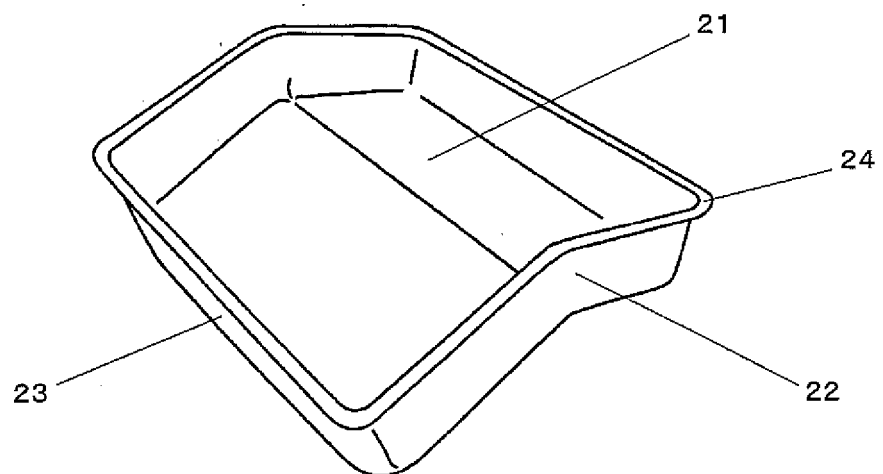


FIG. 3

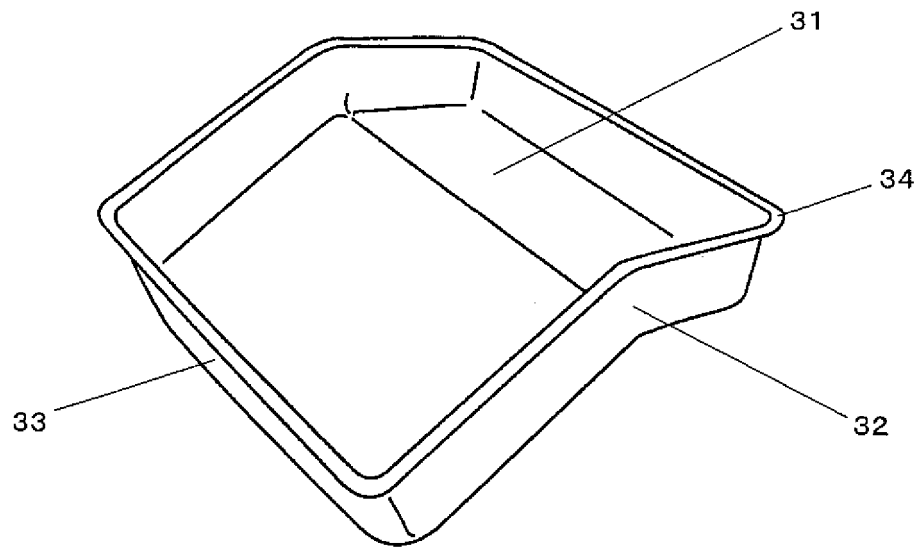


FIG. 4

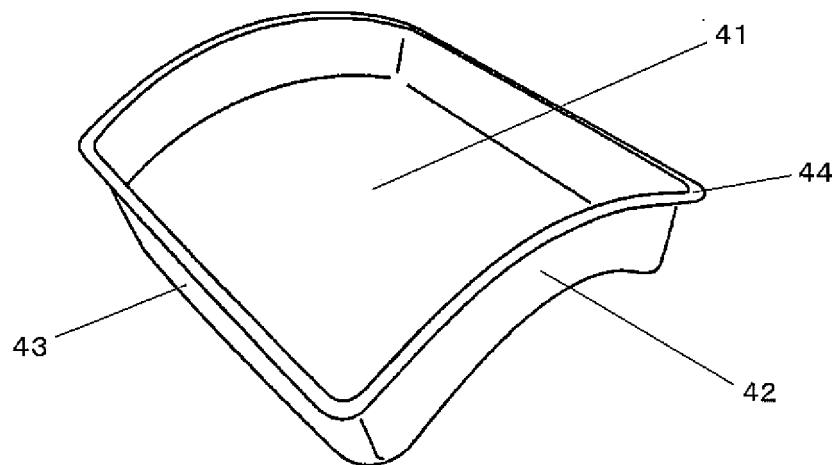


FIG. 5

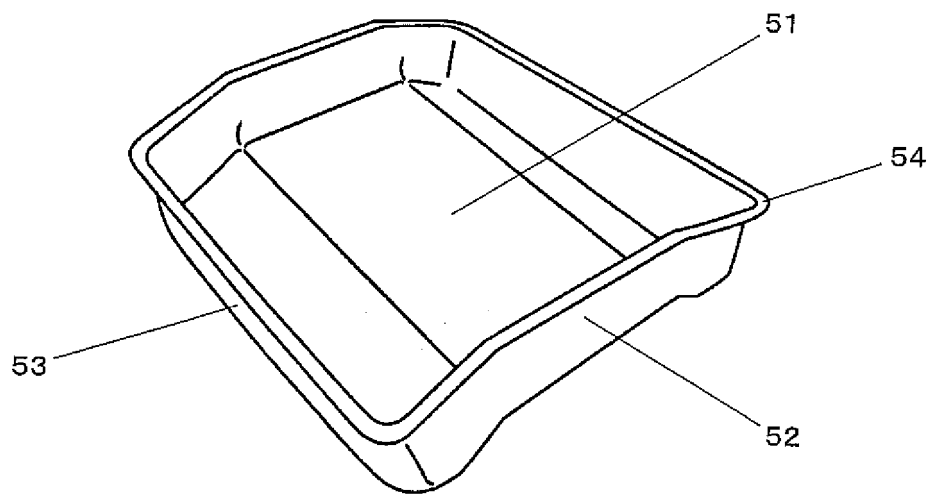
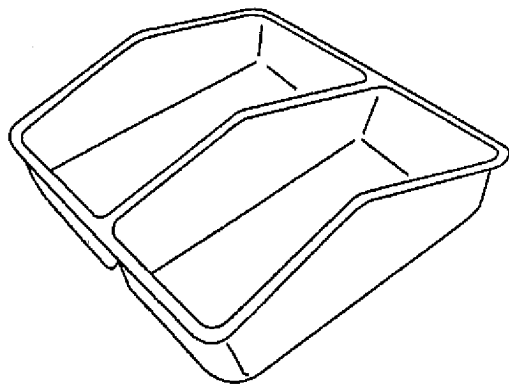
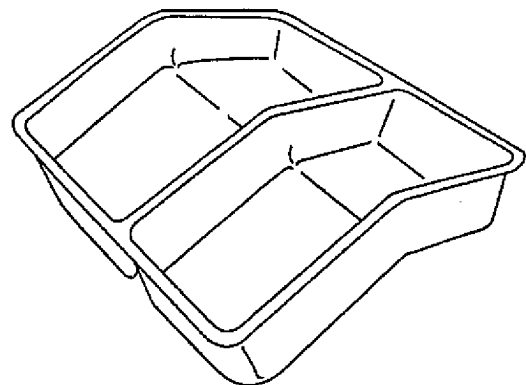


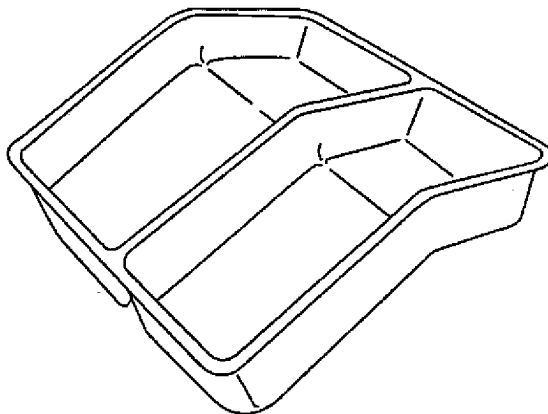
FIG. 6



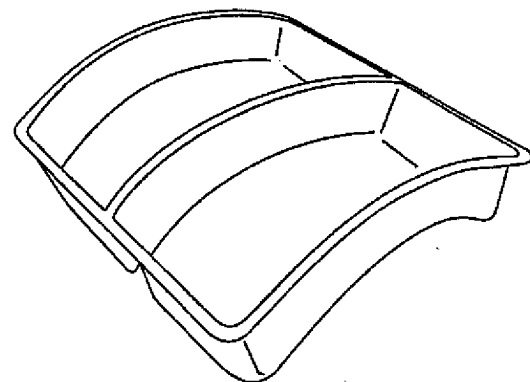
(a)



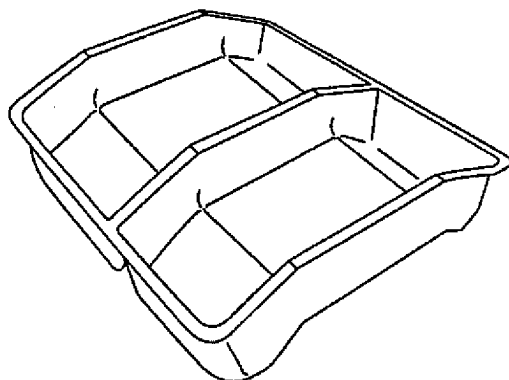
(b)



(c)



(d)



(e)

FIG. 7

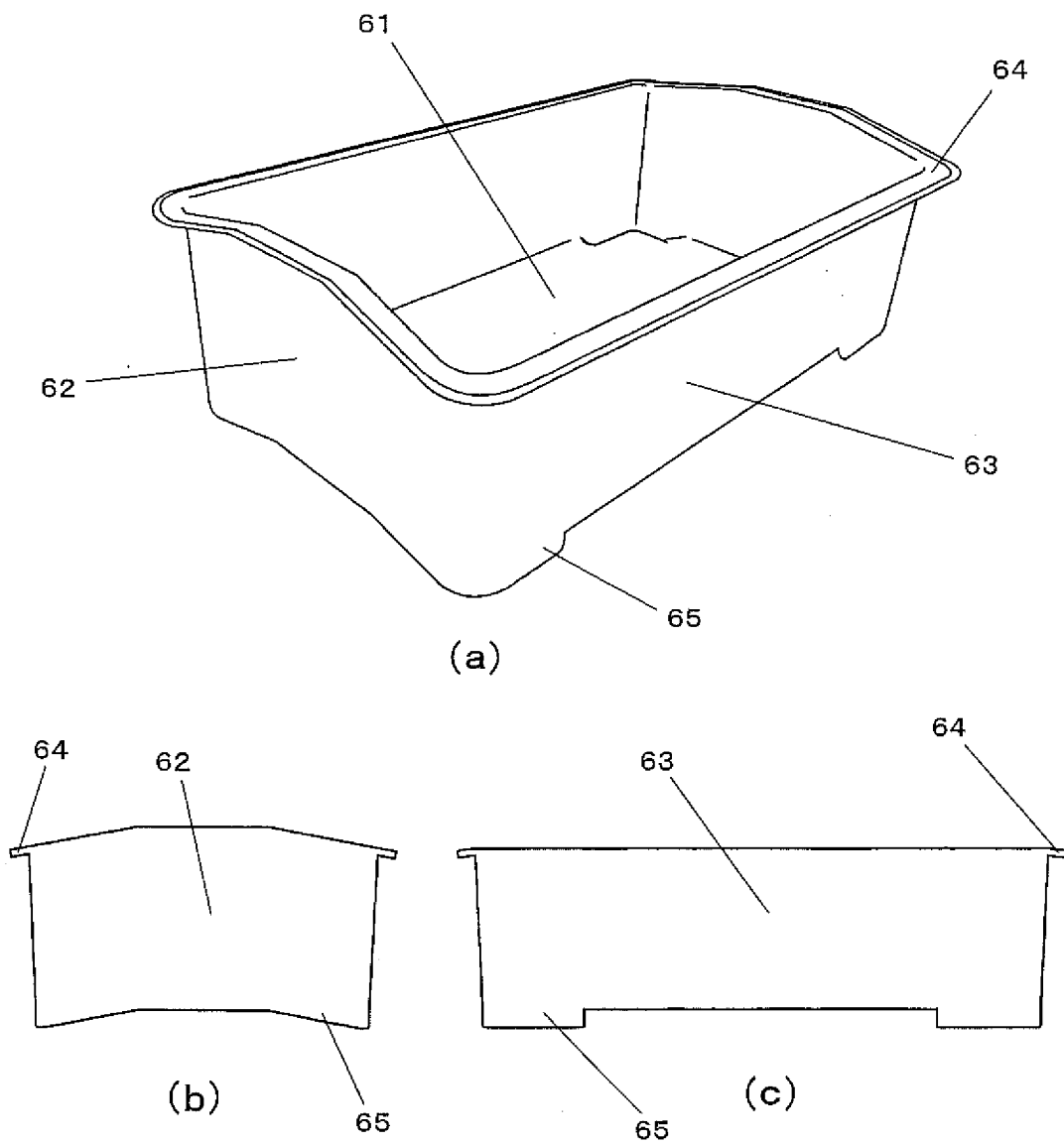


FIG. 8

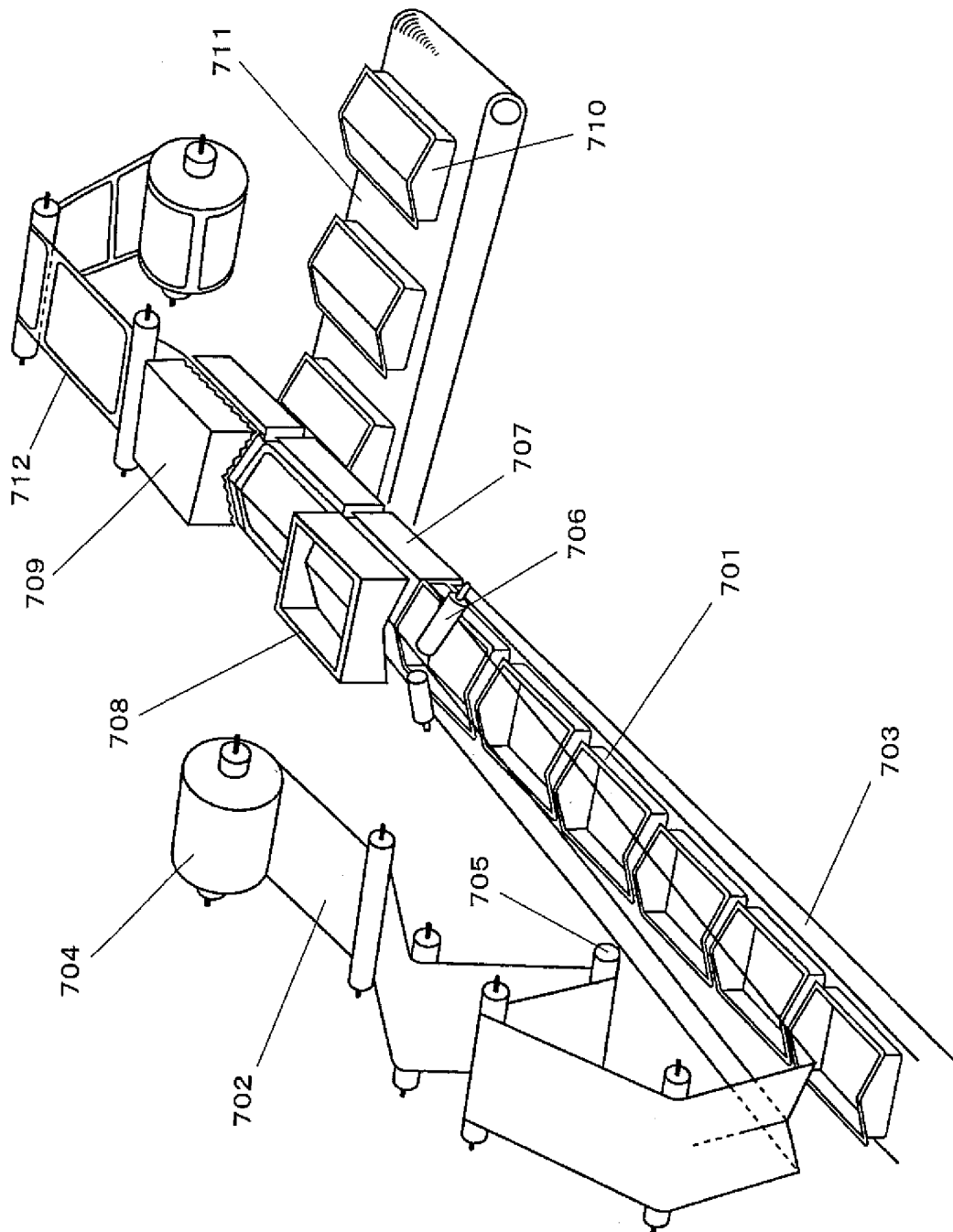


FIG. 9

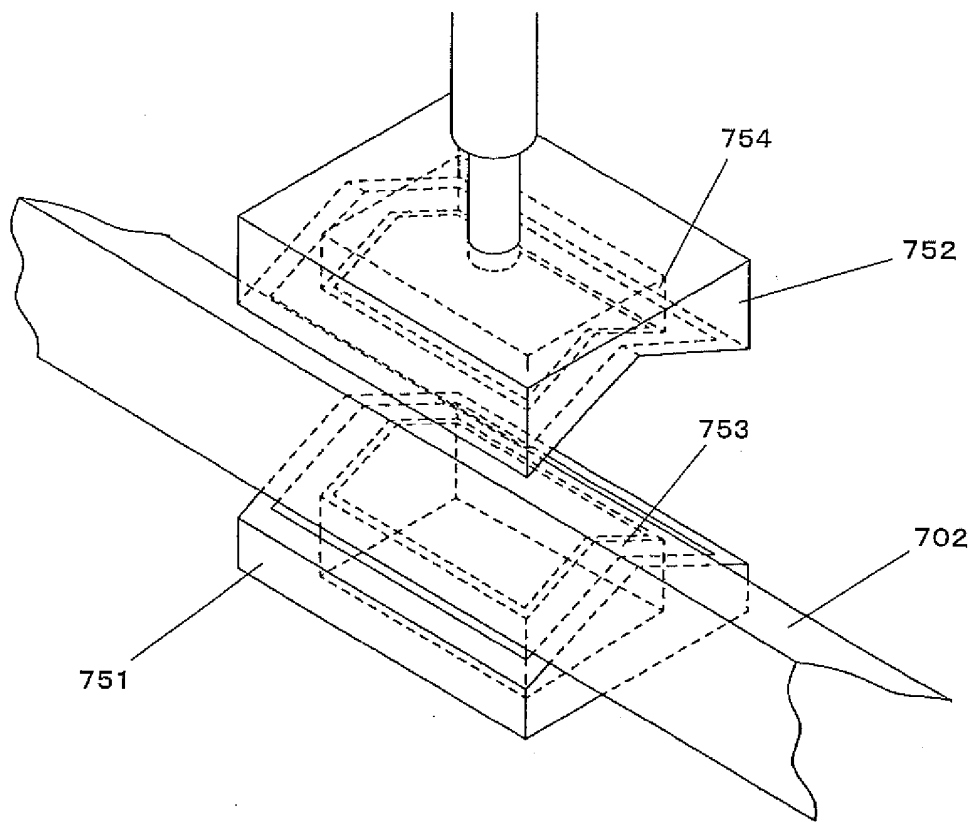


FIG. 10

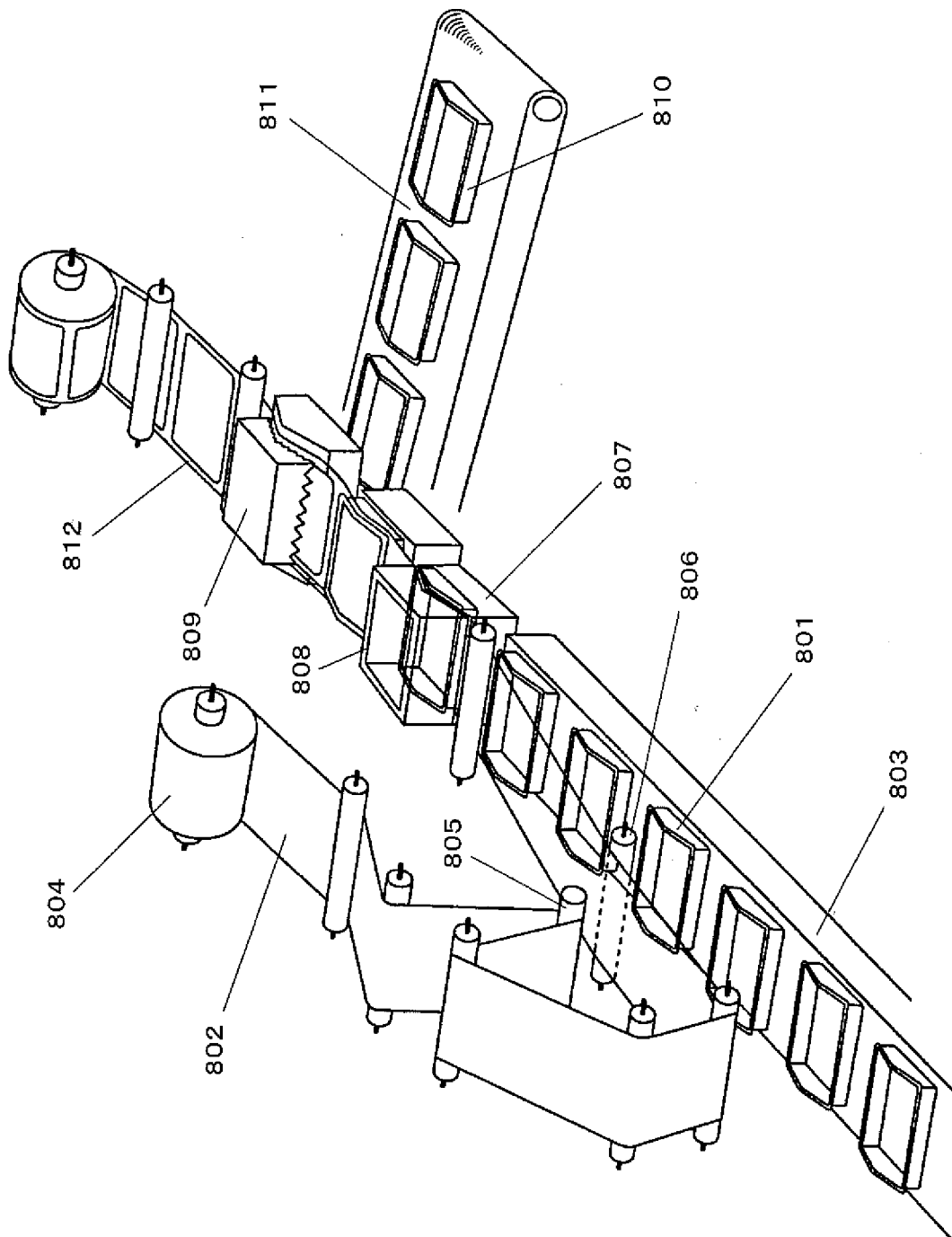


FIG. 11

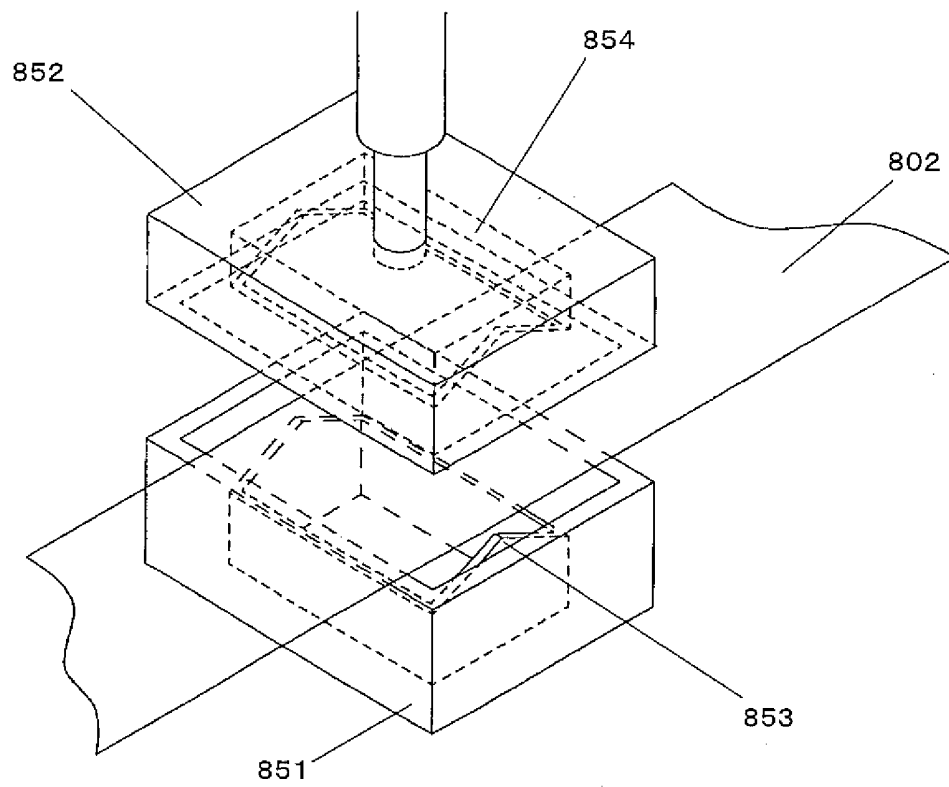


FIG. 12

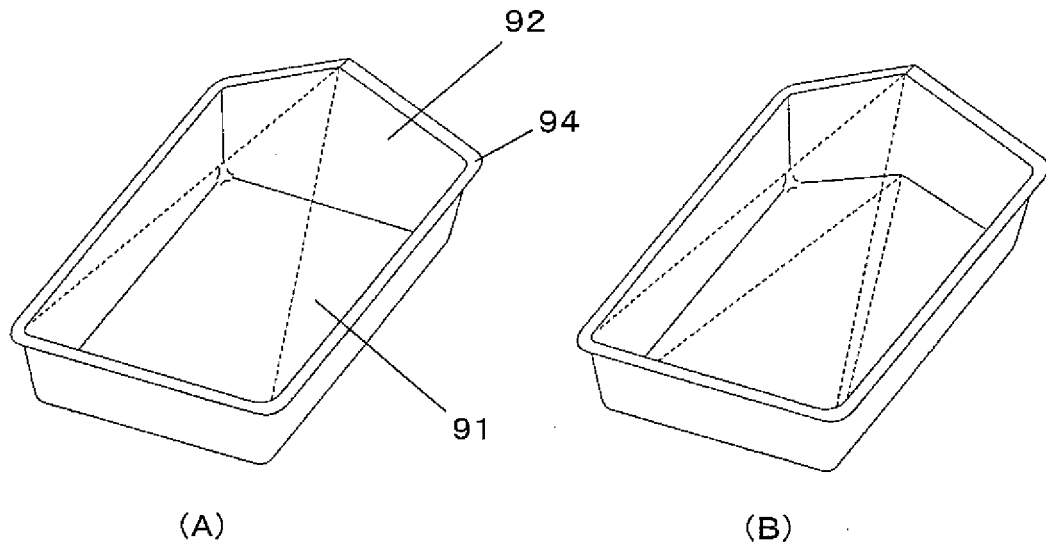


FIG. 13

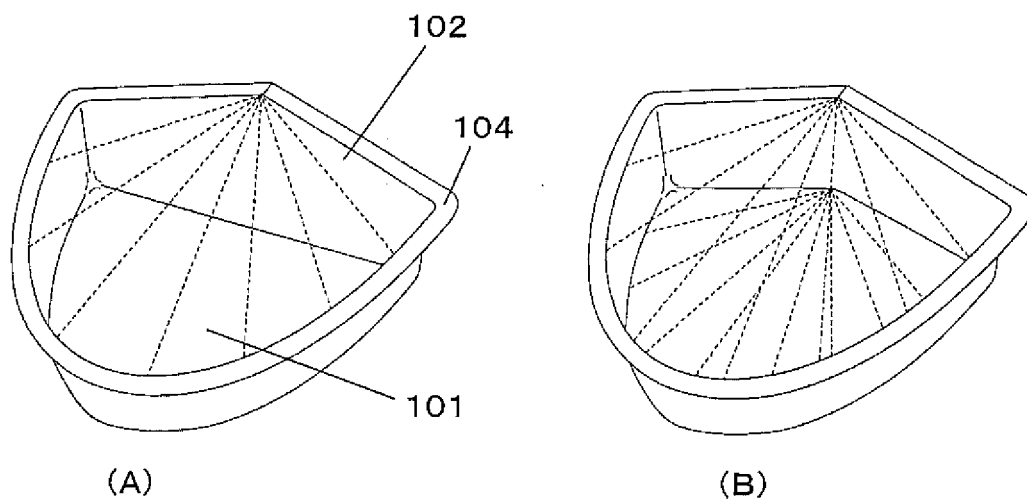


FIG. 14

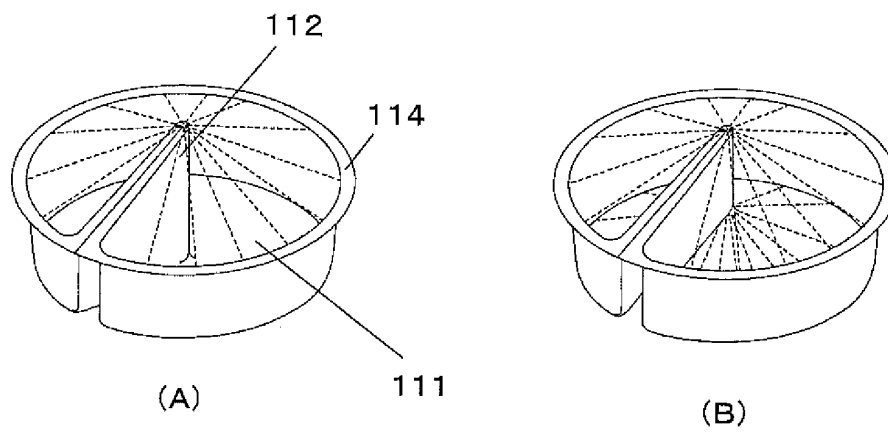
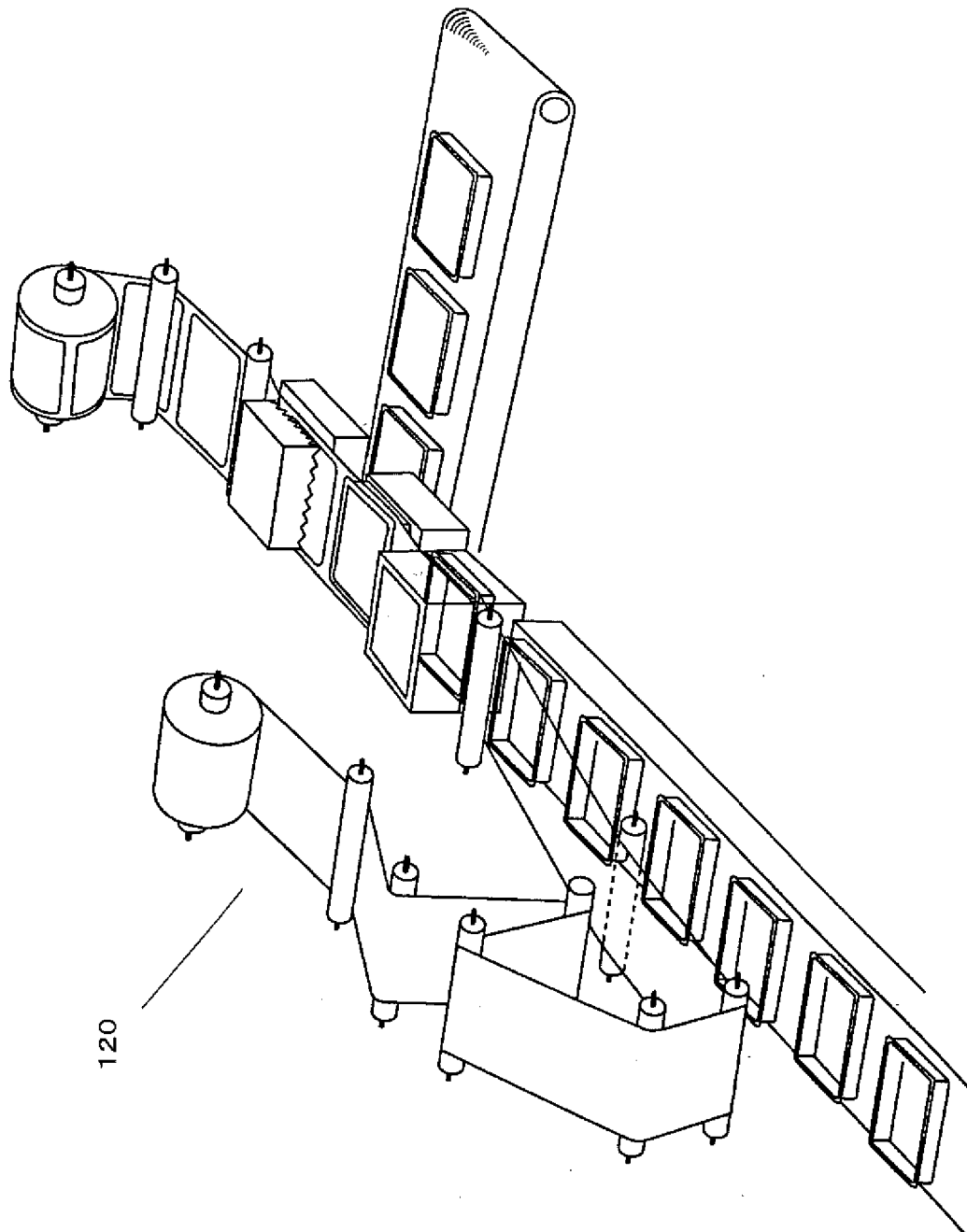


FIG. 15



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2013/073499

A. CLASSIFICATION OF SUBJECT MATTER

B65D77/20(2006.01)i, B65B7/28(2006.01)i, B65B31/02(2006.01)i, B65D81/20(2006.01)i, B65D81/34(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)

B65D77/20, B65B7/28, B65B31/02, B65D81/20, B65D81/34

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 1996-2013

Kokai Jitsuyo Shinan Koho 1971-2013 Toroku Jitsuyo Shinan Koho 1994-2013

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 A	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 60881/1976(Laid-open No. 152070/1977) (YAC Corp.), 17 November 1977 (17.11.1977), entire text; all drawings (Family: none)	1-3, 5-19 4
Y A	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 85171/1983(Laid-open No. 191350/1984) (Asahi Chemical Industry Co., Ltd. et al.), 19 December 1984 (19.12.1984), entire text; all drawings (Family: none)	1-3, 5-19 4

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

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"&" document member of the same patent family

Date of the actual completion of the international search
26 November, 2013 (26.11.13)

Date of mailing of the international search report
10 December, 2013 (10.12.13)

Name and mailing address of the ISA/
Japanese Patent Office

Authorized officer

Facsimile No.

Telephone No.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2013/073499

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y A	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 108131/1974 (Laid-open No. 36480/1976) (Kabushiki Kaisha Daiya Tokyo Project), 18 March 1976 (18.03.1976), entire text; all drawings (Family: none)	1-3, 5-19 4
Y A	JP 3144015 U (Shinwa Co., Ltd.), 14 August 2008 (14.08.2008), entire text; all drawings (Family: none)	1-3, 5-19 4
Y	JP 4-215982 A (Dowbrands Inc.), 06 August 1992 (06.08.1992), entire text; all drawings & EP 482281 A1 & CA 2039019 A & MX 9101323 A	5, 6
Y	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 138212/1986 (Laid-open No. 42577/1988) (Sumitomo Bakelite Co., Ltd. et al.), 22 March 1988 (22.03.1988), entire text; all drawings (Family: none)	5, 6
Y	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 70195/1987 (Laid-open No. 180530/1988) (Mitsubishi Monsanto Chemical Co.), 22 November 1988 (22.11.1988), entire text; all drawings (Family: none)	5, 6
Y	JP 3069530 U (Hakukei Matsunori Kabushiki Kaisha et al.), 23 June 2000 (23.06.2000), entire text; all drawings (Family: none)	7
Y	WO 01/081201 A1 (Hiromichi INAGAKI et al.), 01 November 2001 (01.11.2001), entire text; all drawings (particularly, fig. 20) & JP 4817583 B & US 2003/0031763 A1 & EP 1277672 A1 & DE 60137031 D & AU 5256601 A & CA 2419614 A & AU 780703 B & CN 1366506 A	7

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2013/073499

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP 2006-232280 A (Toppan Printing Co., Ltd.), 07 September 2006 (07.09.2006), entire text; all drawings (Family: none)	8
Y	CD-ROM of the specification and drawings annexed to the request of Japanese Utility Model Application No. 11439/1992 (Laid-open No. 72701/1993) (Shikoku Kakoki Co., Ltd.), 05 October 1993 (05.10.1993), entire text; all drawings & US 5371996 A & EP 559293 A1	10-19
Y	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 95763/1978 (Laid-open No. 12459/1980) (Furukawa Mfg. Co., Ltd.), 26 January 1980 (26.01.1980), entire text; all drawings (Family: none)	11, 13, 16, 18
Y	JP 36-14389 B1 (Tadahide MADENOKOJI), 25 August 1961 (25.08.1961), entire text; all drawings (Family: none)	11, 13, 16, 18
Y	JP 2009-126534 A (Daisey Machinery Co., Ltd.), 11 June 2009 (11.06.2009), entire text; all drawings (Family: none)	14, 19

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 2000344224 A [0008]
- JP 4817583 B [0042]