

DESCRIPTION

Title of the Invention

THERMAL FORMED TRAY AND FOOD-CONTAINING TRAY

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Technical Field

[0001]

The present invention relates to a thermal formed tray which accommodates a food and is used when the food
10 accommodated therein is subjected to thermal cooking and pasteurization, and also relates to a food-containing tray.

Background Art

[0002]

15 In recent years, a practice has been made in which a tray-shaped container is packed with a foodstuff, a lid member is sealed to the container to seal the container, and thereafter the foodstuff is thermally cooked and pasteurized by use of microwaves. In this case, the lid member is equipped with a
20 check valve, which, for preventing rupture of the container, is structured in such a manner as to release air and vapors out of the container when the pressure inside the container is raised. When heating of the foodstuff in the container is finished, the check valve is closed, and the pressure inside the container is
25 reduced.

Prior Art Literatures

Patent Literatures

[0003]

30 Patent Literature 1: Japanese Utility Model Laid-open No. Hei 1-179881

Patent Literature 2: Japanese Utility Model Publication No. Hei 4-42116

Patent Literature 3: JP-A-Hei 8-133345

35 Patent Literature 4: JP-A-2011-42385

[0004]

Meanwhile, in the case where the pressure inside the container is thus reduced, the container is deformed inwards. In the case where a conventionally known container (see, for example, Patent Literatures 1 to 4) is used as a container of this type, however, the reduction in the pressure inside the container may be accompanied by large deformation of a side part of the container, which would worsen the external appearance of the container.

[0005]

Especially in the case where the above-mentioned container is reduced in thickness for the purpose of reducing the amount of material needed for the container, there arises a problem that the deformation of the side part becomes more conspicuous.

[0006]

The present invention has been made in consideration of the above-mentioned points. Accordingly, it is an object of the present invention to provide a thermal formed tray and a food-containing tray such that even when the pressure inside the tray is reduced, a side part of the tray is not deformed, a favorable external appearance of the tray can be maintained, and local deformation at a margin of a bottom part of the tray can be prevented from occurring.

Disclosure of Invention

[0007]

The present invention provides a thermal formed tray which accommodates a food and is used when the food accommodated therein is subjected to thermal cooking and pasteurization. The thermal formed tray includes: a side part; a bottom part connected to the side part; and a flange part provided around the side part, wherein the bottom part has bottom part deformation accelerating means for accelerating deformation of the bottom part when pressure inside the thermal formed tray is reduced, and the side part has side part deformation preventing means for preventing deformation of the

side part when the pressure inside the thermal formed tray is reduced.

[0008]

5 The present invention provides the thermal formed tray, wherein the side part deformation preventing means includes a reinforcing rib.

[0009]

10 The present invention provides the thermal formed tray, wherein the reinforcing rib is provided in parallel to a flat surface on which to place the thermal formed tray.

[0010]

The present invention provides the thermal formed tray, wherein the reinforcing rib is provided over a whole circumference of the side part.

15 [0011]

The present invention provides the thermal formed tray, wherein the side part has a thickness of 0.35 to 0.40 mm.

[0012]

20 The present invention provides the thermal formed tray, wherein the bottom part deformation accelerating means of the bottom part includes a central bottom portion, and a marginal bottom portion located at a margin of the central bottom portion, the central portion is comprised of a polygonal panel, tetragonal panels are provided between the polygonal panel and the marginal bottom portion in such a manner as to each correspond to each of sides of the polygonal panel, and an inclined wall is provided along an outer periphery of the marginal bottom portion.

[0013]

30 The present invention provides a food-containing tray characterized by including: the above-mentioned thermal formed tray; a food accommodated in the thermal formed tray; and a lid member fusion-bonded to the flange part of the thermal formed tray.

35 [0014]

In accordance with the present invention, the bottom

part has the bottom part deformation accelerating means for accelerating deformation of the bottom part, and the side part has the side part deformation preventing means for preventing deformation of the side part. This ensures that the bottom part is more easily deformable than the side part. Accordingly, even in the case where the thermal formed tray has a reduced thickness, the side part is not deformed and a good external appearance can be maintained when the pressure inside the thermal formed tray is reduced.

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Brief Description of the Drawings [0015]

FIG. 1 is a perspective view showing a thermal formed tray and a lid member according to one embodiment of the present invention.

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FIG. 2 is a plan view of the thermal formed tray according to the one embodiment of the present invention.

FIG. 3 is a partial side partial sectional view (a sectional view taken along section line III-III of FIG. 2) of the thermal formed tray according to the one embodiment of the present invention.

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FIG. 4 is a partial side partial sectional view taken along section line IV-IV of FIG. 2) of the thermal formed tray according to the one embodiment of the present invention.

FIG. 5 is a bottom view of the thermal formed tray according to the one embodiment of the present invention.

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FIG. 6 is a schematic view showing steps for producing a food-containing tray by use of the thermal formed tray.

FIG. 7 is a perspective view, as viewed from the bottom side, of the thermal formed tray according to the one embodiment of the present invention, in the case where the internal pressure is reduced.

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FIGS. 8(a) to 8(d) are schematic views showing steps for putting the food-containing tray to cooking.

FIG. 9 is a plan view of a thermal formed tray according to a modification.

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FIG. 10 is a plan view of a thermal formed tray according to a modification.

FIG. 11 is a plan view of a thermal formed tray according to a modification.

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Mode for Carrying Out the Invention

[0016]

One embodiment of the present invention will be described below, referring to the drawings. FIGS. 1 to 8
10 illustrate one embodiment of the present invention.

[0017]

First, referring to FIGS. 1 to 5, an outline of a thermal formed tray according to the embodiment will be described.

[0018]

15 A thermal formed tray 10 shown in FIGS. 1 to 5 is one that accommodates a food 16 as will be described later and that is used when the food 16 accommodated therein is subjected to thermal cooking and pasteurization. Such a thermal formed tray 10 as this includes a side part 11, a bottom part 20
20 connected to a lower side of the side part 11, and a flange part 30 provided around an upper portion of the side part 11.

[0019]

Of these parts, the side part 11 is substantially elliptically shaped in horizontal section, and the area of the horizontal
25 section gradually decreases along a direction from the flange part 30 side (the upper side) toward the bottom part 20 side (the lower side).

[0020]

The side part 11 has side part deformation preventing means 12 for preventing deformation of the side part 11 when
30 pressure inside the thermal formed tray 10 is reduced. In this case, the side part deformation preventing means 12 includes a plurality of (five) projected reinforcing ribs 13 projected sideways from the inside of the thermal formed tray 10. Valley
35 portions 14 are each formed respectively between each pair of adjacent reinforcing ribs 13.

[0021]

The side part 11 is formed in a shape in which the reinforcing ribs 13 and the valley portions 14 are alternately disposed throughout the whole region thereof in the vertical direction. This configuration ensures that the side part 11 is enhanced in strength throughout the whole region thereof in the vertical direction, such that deformation of the side part 11 is easily prevented.

[0022]

As depicted in FIGS. 3 and 4, each of the reinforcing ribs 13 has a curved line shape such as a circular arc shape or an elliptic arc shape in vertical section. The radius of curvature of each reinforcing rib 13 may be 10 to 15 mm, for example. In this case, while the five reinforcing ribs 13 are substantially the same in sectional shape, this configuration is not restrictive, and the five reinforcing ribs 13 may have different sectional shapes.

[0023]

In this embodiment, while the five reinforcing ribs 13 are substantially the same in height "h" (see FIG. 3), this configuration is not limitative, and the reinforcing ribs 13 may have different heights "h." In addition, the reinforcing ribs 13 are each provided in parallel to a flat surface (a central bottom part 21 described later) on which to place the thermal formed tray 10. However, this configuration is not restrictive, and the reinforcing ribs 13 may extend in the vertical direction, or may extend obliquely in relation to the flat surface.

[0024]

Further, in this embodiment, the reinforcing ribs 13 are each provided over the whole circumference of the side part 11. This configuration ensures that concentration of forces on a specified part of the side part 11 is obviated, and that the side part 11 can be enhanced in strength, and its deformation can be easily prevented, over the whole region in the circumferential direction thereof. However, this configuration is not limitative, and a region in which the reinforcing ribs 13 are not formed may be present in a part in the circumferential direction.

[0025]

In addition, the side part 11 preferably has a thickness t_1 (a thickness at the reinforcing rib 13) (see FIG. 3) of 0.35 to 0.40 mm. With the side part 11 set to have such a small
5 thickness t_1 , it is possible to reduce the amount of material needed for the thermal formed tray 10 and to reduce the manufacturing cost of the thermal formed tray 10. In this case, also, the formation of the side part 11 with the reinforcing ribs 13 makes it possible to prevent deformation of the side part 11
10 when the pressure inside the thermal formed tray 10 is reduced.

[0026]

In FIGS. 1 to 5, the flange part 30 includes a flange marginal portion 31 located at a margin of the side part 11, and grip portions 32 at two locations which extend horizontally from
15 the side part 11 toward an outer side of the container and which are gripped by the user at the time of eating. Of these portions, the grip portions 32 are formed respectively with recesses 33 which are substantially circular arc shaped in plan view. The recesses 33 are provided for ensuring that heat is not easily
20 transferred to the user's fingers when the user carries the thermal formed tray 10 having been used for thermal cooking.

[0027]

In addition, the bottom part 20 has a substantially elliptic shape (elongated elliptic shape) in plan view. The bottom part
25 20 has bottom part deformation accelerating means 25 for accelerating deformation of the bottom part 20 when the pressure inside the thermal formed tray 10 is reduced. This ensures that the bottom part 20 can be deformed more easily than the side part 11 having the side part deformation
30 preventing means 12. The bottom part deformation accelerating means 25 of the bottom part 20 includes a central bottom portion 21 located in the center, and a marginal bottom portion 22 located at a margin of the central bottom portion 21.

[0028]

35 Of these portions, the central bottom portion 21 is composed of a polygonal panel 21a including a substantially flat

surface.

Besides, the marginal bottom portion 22 includes a substantially flat surface and is disposed substantially in parallel to the central bottom portion 21. Further, between the polygonal panel 21a and the marginal bottom portion 22, there are provided a plurality of tetragonal panels 23 each of which is provided so as to correspond to each of sides 21b of the polygonal panel 21a. With each of the tetragonal panels 23 thus provided correspondingly to each of the sides 21b of the polygonal panel 21a, it can be ensured that the bottom part 20 is easily deformed and that deformation of the bottom part 20 is not be conspicuous.

[0029]

The polygonal panel 21a is composed of an octagonal panel which has a horizontally elongated octagonal shape and which is line symmetrical about lengthwise and crosswise center axes. On the other hand, each of the tetragonal panels 23 has a substantially trapezoidal shape, and is disposed with its base 23a joined respectively to each side 21b of the octagonal panel. Eight such tetragonal panels 23 are provided respectively correspondingly to the sides 21b of the polygonal panel 21a.

[0030]

Note that at least in a state before deformation of the thermal formed tray 10, the tetragonal panels 23 are each provided being inclined relative to the central bottom portion 21 (the polygonal panel 21a), and the marginal bottom portion 22 is provided being inclined relative to the tetragonal panels 23. As shown in FIG. 3, in a vertical section along a longitudinal direction of the thermal formed tray 10, an angle α_1 formed between the central bottom portion 21 (the polygonal panel 21a) and one of the tetragonal panels 23 may be 20° to 30° .

[0031]

Note that while the polygonal panel 21a is not limited to an octagonal panel, it is most preferable that the polygonal panel 21a is an octagonal panel. Where the polygonal panel 21a is an octagonal panel, an effect of preventing local

deformation from being generated at the margin of the bottom part 20 can be obtained most reliably. In addition, while each of vertexes of the polygonal panel 21a and the tetragonal panels 23 may be pointed, a configuration in which each of the vertexes is slightly rounded increases the strength of the thermal formed tray 10 during transportation and on falling.

[0032]

In addition, an inclined wall 24 is provided along an outer periphery of the marginal bottom portion 22. The inclined wall 24 is jointed to a lower end portion 11a of the side part 11, and extends along the outer periphery of the marginal bottom portion 22 over the entire range in the circumferential direction. The inclined wall 24 has a substantially elliptic annular shape, and has a width substantially constant over the entire circumference.

[0033]

Note that at least in a state before deformation of the thermal formed tray 10, the inclined wall 24 is inclined in relation to both the side part 11 and the marginal bottom portion 22 in its vertical section (see FIGS. 3 and 4). Specifically, an angle α_2 (see FIG. 3) formed between the inclined wall 24 and the horizontal plane (between the central bottom portion 21 and the marginal bottom portion 22) may be 30° to 60° .

[0034]

The thermal formed tray 10 as above is produced by molding (sheet molding) of a monolayer sheet of a thermoplastic resin such as PE (polyethylene), PP (polypropylene), PET (polyethylene terephthalate), and PEN (polyethylene naphthalate) or a multilayer sheet including a barrier layer of EVOH or Nylon (registered trademark) or the like. For instance, at the time of producing the thermal formed tray 10, molding may be conducted by a method in which a heated plate-shaped multilayer sheet is placed on a female die, and the multilayer sheet is pressed into the female die to a certain extent by use of a plug, followed by drawing a vacuum.

[0035]

In addition, the central bottom portion 21 has a thickness t_2 of, for example, 0.35 to 0.50 mm, whereas the flange part 30 has a thickness t_3 of, for example, 0.5 to 1.0 mm (see FIG. 3).

5 [0036]

Meanwhile, a food 16 (see FIG. 6) is accommodated in the thermal formed tray 10, after which a lid member (lid film) 40 (see FIG. 1) is fusion-bonded to the flange part 30, to seal the thermal formed tray 10. Such a lid member 40 is formed,
10 for example, of PE (polyethylene) or PP (polypropylene), and is provided with check valve means 41 at its central portion, for example. The check valve means 41 has such a structure that when the inside of the thermal formed tray 10 is pressurized, air and water vapor in the inside can escape, but the external
15 air cannot flow into the thermal formed tray 10. Note that as the check valve means 41, a known one can be used and, accordingly, a detailed description thereof is omitted here.

[0037]

Now, operation of the embodiment residing in the
20 aforementioned configuration will be described referring to FIGS. 6 to 8.

[0038]

FIG. 6 illustrates steps for producing a food-containing tray 15 by use of the thermal formed tray 10. In FIG. 6,
25 numeral 50 denotes a food-containing tray production system for producing the food-containing tray 15. The food-containing tray production system 50 includes a tray supplying device 51, a filling device 53, a check valve supplying device 54, a heating device 55 and a cooling device 56, in this order from the
30 upstream side. In addition, the food-containing tray production system 50 has a conveying device 52 composed of a conveyor or the like, and the thermal formed tray 10 is conveyed by the conveying device 52.

[0039]

35 In FIG. 6, first, a thermal formed tray 10 in an empty state is supplied from the tray supplying device 51 to the

conveying device 52.

[0040]

Subsequently, the thermal formed tray 10 is filled with a food 16 by the filling device 53 provided on the downstream side of the tray supplying device 51. In this instance, the food 16 with which the thermal formed tray 10 is to be filled is in the state of a raw material, a semi-cooked material, or a compounded material. Note that a plurality of kinds of materials may be sequentially placed to fill the thermal formed tray 10 at the filling device 53.

[0041]

On the other hand, the check valve supplying device 54 is provided in the vicinity of the conveying device 52, and the check valve means 41 is attached to the lid member 40 at the check valve supplying device 54.

[0042]

Thereafter, the lid member 40 fitted with the check valve means 41 is fusion-bonded, for example by heat sealing, to the thermal formed tray 10 conveyed on the conveying device 52, whereby the thermal formed tray 10 filled with the food 16 is sealed.

[0043]

Subsequently, the thermal formed tray 10 sealed with the lid member 40 is conveyed into the heating device 55 provided on the downstream side of the filling device 53. The heating device 55 is composed of a microwave oven, for example, and functions to thermally cook the food 16 in the thermal formed tray 10 and to pasteurize the food 16.

[0044]

In the heating device 55, the food 16 in the thermal formed tray 10 is subjected to thermal cooking and pasteurization. In this instance, the pressure inside the thermal formed tray 10 is raised, and the lid member 40 is bulged upwards. Then, when the pressure inside the thermal formed tray 10 reaches a predetermined pressure, water vapor generated from the food 16 and air are discharged to the

exterior through the check valve means 41. After the water vapor and air are discharged, the pressure inside the thermal formed tray 10 is lowered, the check valve means 41 is closed and the lid member 40 is returned downwards.

5 [0045]

After the food 16 is thus heated and pasteurized, the thermal formed tray 10 is conveyed out of the heating device 55 into the cooling device 56. During the conveyance, the pressure inside the thermal formed tray 10 is reduced. In the
10 cooling device 56, the thermal formed tray 10 filled with the food 16 is cooled to a temperature of 0 to 10°C.

[0046]

After cooled in the cooling device 56, the thermal formed tray 10 is carried out of the cooling device 56. In this manner,
15 the food-containing tray 15 provided with the thermal formed tray 10, the food 16 accommodated in the thermal formed tray 10, and the lid member 40 fusion-bonded to the flange part 30 of the thermal formed tray 10 is obtained.

[0047]

Meanwhile, in this embodiment, the side part 11 of the thermal formed tray 10 has the side part deformation preventing means 12, and the side part deformation preventing means 12 includes the plurality of reinforcing ribs 13, as
20 aforementioned. This configuration ensures that the strength of the side part 11 is sufficiently maintained, and, therefore, the side part 11 is not recessed toward the inside of the thermal formed tray 10 when the pressure inside the thermal formed tray 10 is reduced.
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[0048]

In addition, in this embodiment, the bottom part 20 of the thermal formed tray 10 has the bottom part deformation accelerating means 25, and the bottom part deformation accelerating means 25 includes the central bottom portion 21 and the marginal bottom portion 22 located at the margin of the
30 central bottom portion 21, as aforementioned. Besides, the central bottom portion 21 is composed of the polygonal panel
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21a, and, between the polygonal panel 21a and the marginal bottom portion 22, the tetragonal panels 23 are provided in the manner of each corresponding to each of the sides 21b of the polygonal panel 21a. Further, the substantially elliptical inclined wall 24 is provided along the outer periphery of the marginal bottom portion 22.

[0049]

This configuration ensures that when the pressure inside the thermal formed tray 10 is reduced, the bottom part 20 is recessed toward the inside of the thermal formed tray 10, and the central bottom portion 21 is inverted to the inside of the thermal formed tray 10 (see the imaginary line in FIG. 3 and FIG. 7). On the other hand, the side part 11 is not deformed, as aforementioned, and, accordingly, deformation of the bottom part 20 is not conspicuously visible when viewed from outside. In addition, although the inclined wall 24 is deformed in this instance into such a direction as to be substantially parallel to the grounding surface, this deformation occurs uniformly throughout the circumferential direction, so that local deformation does not occur at the margin of the bottom part 20. Further, since the inclined wall 24 becomes a grounding part when the central bottom portion 21 is inverted to the inside of the thermal formed tray 10, the thermal formed tray 10 can be grounded stably, without becoming unstable.

[0050]

Besides, since the marginal bottom portion 22 of the thermal formed tray 10 is thinner than the side part 11, the bottom part 20 can be reliably recessed toward the inside of the thermal formed tray 10, while preventing deformation of the side part 11.

[0051]

Now, operation at the time when the food-containing tray 15 produced as above is put to cooking for eating by the user will be described below. FIGS. 8(a) to 8(d) illustrate steps for putting the food-containing tray 15 to cooking.

[0052]

As shown in FIG. 8(a), the food-containing tray 15 is placed in a cooker 60 such as a microwave oven and heated. In this instance, the pressure inside the thermal formed tray 10 is raised, whereby the lid member 40 is bulged upward, and
5 water vapor and air are discharged through the check valve means 41 (FIG. 8(b)). The check valve means 41 may be configured in such a manner that a sound is generated therefrom in this instance.

[0053]

10 After the heating is completed, the food-containing tray 15 is taken out of the cooker 60. Subsequently, the food-containing tray 15 is let cool naturally, whereby the pressure inside the thermal formed tray 10 is again reduced, and the lid member 40 is recessed downward (FIG. 8(c)).
15 Thereafter, the lid member 40 is peeled off the flange part 30, whereby the food 16 in the thermal formed tray 10 becomes ready to be eaten (FIG. 8(d)).

[0054]

Thus, according to this embodiment, the bottom part 20
20 has the bottom part deformation accelerating means 25 for accelerating deformation of the bottom part 20 when the pressure inside the thermal formed tray 10 is reduced, whereas the side part 11 has the side part deformation preventing means 12 for preventing deformation of the side part 11 when
25 the pressure inside the thermal formed tray 10 is reduced. Since the bottom part 20 is thus set to be deformed more easily than the side part 11, it is ensured that when the pressure inside the thermal formed tray 10 is reduced, the bottom part 20 is recessed toward the inside of the thermal formed tray 10
30 but, on the other hand, the side part 11 is not deformed. For this reason, a favorable appearance of the food-containing tray 15 can be maintained.

[0055]

In addition, the side part deformation preventing means
35 12 of the side part 11 includes the plurality of reinforcing ribs 13, whereby the strength of the side part 11 is enhanced. For

this reason, the problem of deformation of the side part 11 can be prevented, especially even where the thickness of the side part 11 is reduced to a level of about 0.35 to 0.40 mm, for example.

5 [0056]

Besides, since the inclined wall 24 is provided along the outer periphery of the marginal bottom portion 22, it is ensured that when the pressure inside the thermal formed tray 10 is reduced, no force is locally exerted on the margin of the bottom
10 part 20, so that local deformation at the margin of the bottom part 20 can be prevented from occurring. Especially, in this embodiment, since the bottom part 20 has an elliptic shape, stress is not evenly exerted on the margin of the bottom part 20. Even in this case, since the inclined wall 24 is provided, local
15 deformation at the margin of the bottom part 20 is not generated.

[0057]

Note that examples of the food 16 accommodated in the thermal formed tray 10 include, but are not limited to, lasagna,
20 penne, paella, and pasta. Especially where a food containing a multiplicity of grains (cooked rice or the like) such as jambalaya is used as the food 16, the presence of voids between the grains ensures that the pressure inside the thermal formed tray 10 is largely reduced. Even in this case, the above-mentioned
25 configuration ensures that local deformation at the margin of the bottom part 20 can be securely prevented from occurring.

[0058]

Modifications

Now, modifications of this embodiment will be described
30 below. FIGS. 9 to 11 are each a plan view showing a thermal formed tray according to a modification of the aforementioned embodiment. Each of the modifications depicted in FIGS. 9 to 11 differs from the aforementioned embodiment in the configuration of the bottom part deformation accelerating
35 means 25 of the bottom part 20, and is substantially the same as the aforementioned embodiment in other points of

configuration. In FIGS. 9 to 11, the same parts as those in the embodiment illustrated in FIGS. 1 to 8 are denoted by the same numerals as used above, and detailed descriptions of the parts will be omitted.

5 [0059]

In a thermal formed tray 10A shown in FIG. 9, bottom part deformation accelerating means 25 of a bottom part 20 includes a central bottom portion 21, and a marginal bottom portion 22 located at a margin of the central bottom portion 21. Of these portions, the central bottom portion 21 is composed of a polygonal panel 21a, and, between the polygonal panel 21a and the marginal bottom portion 22, triangular panels 72 are provided in the state of each corresponding to each of sides 21b of the polygonal panel 21a. In this case, the polygonal panel 15 21a is composed of a hexagonal panel which is substantially a regular hexagon in shape. On the other hand, each of the triangular panels 72 is composed of an isosceles triangle, a long side 72a (base) of which is joined to each of the sides 21b of the polygonal panel 21a. Six triangular panels 72 are each provided so as to correspond to each of the sides 21b of the 20 polygonal panel 21a, and these six triangular panels 72 are identical to one another in shape. In a state before deformation of the thermal formed tray 10A, the triangular panels 72 are each provided being inclined relative to the 25 central bottom portion 21 (the polygonal panel 21a), and the marginal bottom portion 22 is provided being inclined relative to the triangular panels 72. Note that in a vertical section, an angle formed between the central bottom portion 21 (the polygonal panel 21a) and one of the triangular panels 72 may be 15° to 20°.

30 [0060]

In a thermal formed tray 10B depicted in FIG. 10, bottom part deformation accelerating means 25 of a bottom part 20 includes a central bottom portion 81 located in the center, and a 35 marginal bottom portion 82 located at a margin of the central bottom portion 81. Of these portions, the central bottom

portion 81 includes a substantially flat surface, and has an elliptic shape. In addition, the marginal bottom portion 82 has an elliptic shape. Further, between the central bottom portion 81 and the marginal bottom portion 82, there is provided a circumferential stepped portion 83 which has an elliptic shape. In a state before deformation of the thermal formed tray 10B, the circumferential stepped portion 83 is provided being inclined relative to the central bottom portion 81, and the marginal bottom portion 82 is provided being inclined relative to the circumferential stepped portion 83. Note that in a vertical section, the angle formed between the central bottom portion 81 and the circumferential stepped portion 83 may be 20° to 25° , and the angle formed between the central bottom portion 81 and the marginal bottom portion 82 may be 40° to 50° .

[0061]

In a thermal formed tray 10C shown in FIG. 11, bottom part deformation accelerating means 25 of a bottom part 20 includes a central bottom portion 91 located in the center, and a marginal bottom portion 92 located at a margin of the central bottom portion 91. Of these portions, the central bottom portion 91 includes a substantially flat surface, and an outer periphery of the central bottom portion 91 has a first elliptical shape 91a. On the other hand, an outer periphery of the marginal bottom portion 92 has a second elliptic shape 92a. The second elliptic shape 92a constituting the marginal bottom portion 92 is greater than the first elliptic shape 91a constituting the central bottom portion 91, and the first elliptic shape 91a is entirely disposed inside the second elliptic shape 92a. In this case, a long axis of the second elliptic shape 92a is shifted by 90° from a long axis of the first elliptic shape 91a. In a state before deformation of the thermal formed tray 10C, the marginal bottom portion 92 is provided being inclined relative to the central bottom portion 91; in a vertical section along the long axis of the second elliptic shape 92a, the angle formed between the marginal bottom portion 92 and the central bottom portion 91 may be 15° to 20° , and, in a vertical section

along the short axis of the second elliptic shape 92a, the angle formed between the marginal bottom portion 92 and the central bottom portion 91 may be 35° to 40° .

CLAIMS

1. A thermal formed tray that accommodates a food and is used when the food accommodated therein is subjected to thermal cooking and pasteurization, the thermal formed tray comprising:

a side part;

a bottom part connected to the side part; and

a flange part provided around the side part, wherein:

the bottom part has bottom part deformation accelerating means for accelerating deformation of the bottom part when pressure inside the thermal formed tray is reduced;

the side part has side part deformation preventing means for preventing deformation of the side part when the pressure inside the thermal formed tray is reduced;

5 the bottom part deformation accelerating means of the bottom part includes a central bottom portion, and a marginal bottom portion located at a margin of the central bottom portion;

the central bottom portion is composed of a polygonal panel, tetragonal panels are provided between the polygonal panel and the marginal bottom portion in such a manner that each of the tetragonal
10 panels corresponds to each of sides of the polygonal panel; and

an inclined wall is jointed to a lower end portion of the side part and is provided along an outer periphery of the marginal bottom portion.

2. The thermal formed tray according to claim 1, wherein the side part deformation preventing means includes a reinforcing rib.

3. The thermal formed tray according to claim 2, wherein the reinforcing rib is provided in parallel to a flat surface on which to place the thermal formed tray.

4. The thermal formed tray according to claim 2, wherein the reinforcing rib is provided over a whole circumference of the side part.
5. The thermal formed tray according to claim 1, wherein the side part has a thickness of 0.35 to 0.40 mm.
6. A food-containing tray comprising:
 - the thermal formed tray according to claim 1;
 - a food accommodated in the thermal formed tray; and
 - a lid member fusion-bonded to the flange part of the thermal formed tray.