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(54) Microwaveable container

(57) A container suitable for steam cooking of a food product in a microwave oven, comprises a tray (1), preferably of a solid unfoamed thermoplastic material, and a suitably moisturized pad, wherein the pad comprises a sheet of absorbing material (11) and a sheet (10) of a rigid or semi-rigid, imperforated, thermoplastic material, and rests on the bottom (2) of the tray (1) with the sheet of absorbing material (11) facing the inner surface thereof. In the packaging process using the container of the present invention, the food product is positioned on the imperforated surface of the rigid or semi-rigid thermoplastic material (10) of the moisturized pad (11) and the tray (1) is closed by a wrapping film or a lidding closure.

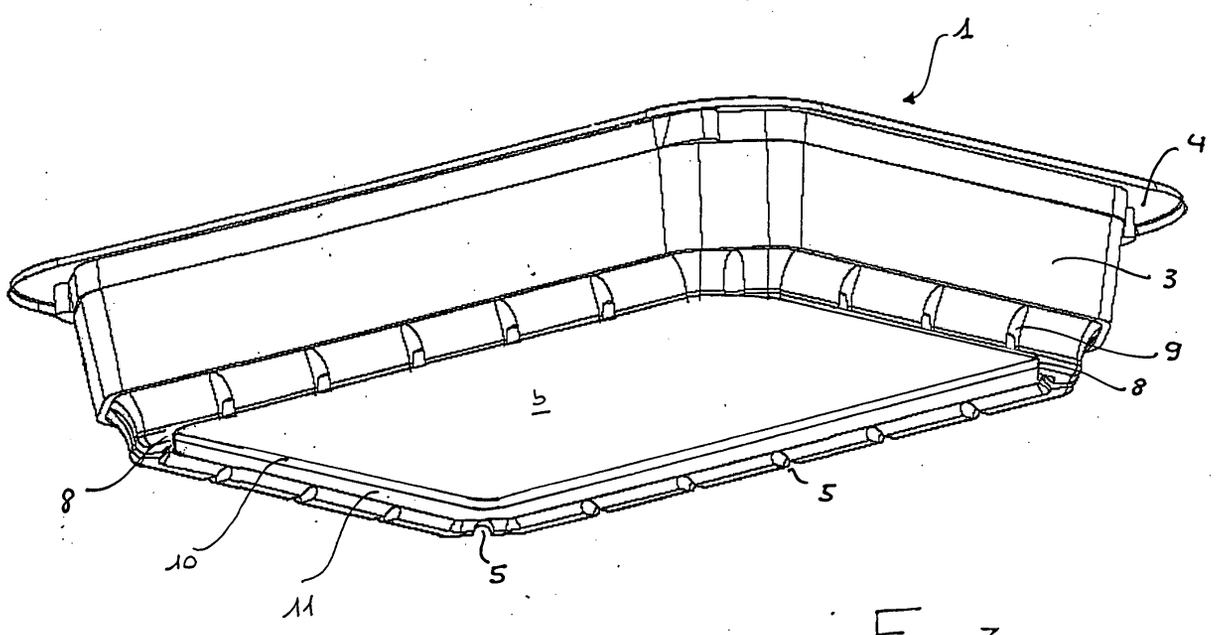

Fig. 3

EP 1 445 213 A1

Description

[0001] The present invention relates to an improved storage and cook-in container for use in the packaging of food products to be steam cooked in their package.

[0002] The invention also relates to a method of packaging a food product using said container and to the food package unit obtained thereby.

BACKGROUND OF THE INVENTION

[0003] It is widely known that for many fresh food products the ideal storage conditions require a humid environment, with a suitable amount of moisture uniformly distributed in the environment where the product is stored, to avoid on the one hand the accelerated dehydration of the food product that occurs in dry conditions and on the other hand the growth of mould that may occur in case of wetting or over humidification of the product. It is also known that steam cooking of fresh food products is a very good cooking method as it preserves the organoleptic qualities (aroma and taste) of the products and maintains most of the vitamins and nutritional factors contained therein.

[0004] The advantage of using steam is also recognized in connection with the thawing, re-heating or cooking of frozen foods where the use of a steam environment greatly enhances the taste and aroma of the de-frosted products. This particularly when a single step thawing/cooking or thawing/reheating is carried out.

[0005] EP-A-1,053,944 describes a package for the storage and cook-in or re-heat of a food product, comprising a tray with a perforated false bottom upon which it is placed the food product, a moisturized pad positioned in the space thus created between the bottom and the false bottom of the tray and a thermoplastic film covering the product and closing the package. The product is thus stored under moisturized but not wet conditions and is then cooked, directly into the package, by placing the package into a microwave oven. The advantages of this packaging system are remarkable as the products, packaged under the suitable moisturized conditions, are maintained fresh for a long period of time and when they are passed into the microwave oven within the package, they are steam-cooked without being boiled.

[0006] An improvement to this package has been described in EP-A-1,231,160. More particularly the invention claimed in this latter document relates to the positioning and shape of the perforations in the false bottom, aimed at making the distribution of steam within the package more uniform.

[0007] The general system described in these two documents however has some disadvantages : the use of a double bottom tray requires a huge amount of space in the packaging facility merely for storing the packaging materials; the cost of such a package is high, mainly because of the cost of the double bottom tray that is required; moisturization of the pad which is positioned between the bottom and the false bottom of the tray is not always easy and often this operation slows down the overall packaging process; the transfer of heat through the false bottom to the product is disuniform due to the presence of the perforations; and finally also the distribution of steam in the package is disuniform as part of the perforations in the false bottom are "closed" by the product laying on top of them, while others allow passage of steam from below the false bottom to above it.

[0008] The need therefore exists of a package that would solve the above problems, maintaining however the advantages offered by the particular packaging system.

SUMMARY OF THE INVENTION

[0009] It has now been found that it is possible to overcome the above problems by a container suitable for microwave applications, comprising a tray and a suitably moisturized pad, wherein the pad comprises a sheet of absorbing material and a sheet of a rigid or semi-rigid, imperforated, thermoplastic material, and rests on the bottom of the tray with the sheet of absorbing material facing the inner surface thereof.

[0010] In the packaging process using the container of the present invention, the food product will be positioned on the imperforated surface of the rigid or semi-rigid thermoplastic material of the moisturized pad and the tray will be closed by a wrapping film or a lidding closure suitable for microwave applications. When the packaged product needs to be cooked (or heated or thawed), the package, with or without prior formation of a vent in the closure, is simply introduced into a microwave oven and steam cooked (or heated or thawed).

[0011] With the new packaging system

- there is no longer any need to have a specially designed double bottom tray and the pad may be inserted into any pre-formed conventional tray at the time of packaging;
- the pad can be very easily moisturized with the steam-generating liquid just before or after its insertion into the tray as in the absence of the false bottom the introduction of the moisturizing liquid in the pad does no longer represent a problem;

- the absence of holes in the food-supporting sheet favours a uniform heat distribution within the food product and a uniform cooking thereof;
- the absence of holes in the food supporting sheet gives a faster cooking.
- the direct contact of the absorbent material, soaked with the steam generating liquid, to the rigid supporting sheet allows a faster and more uniform cooking.

[0012] In a first aspect, the present invention is therefore directed to a microwaveable container suitable for food packaging comprising

a) a tray comprising a bottom or base portion, side walls extending upwardly from the edges of the base portion to define a storage compartment for the food and a rim structure extending around the upper edges of the side walls, and
b) a pad comprising a layer of absorbent material bound to a rigid or semi-rigid, imperforated, thermoplastic sheet,

wherein said pad is positioned with the absorbent material in contact with the inner surface of the tray bottom and is moisturized with a steam generating liquid.

[0013] In a second aspect the invention is directed to a food package unit comprising a microwaveable container of the invention, a food product resting on the surface of the rigid or semi-rigid, imperforated, thermoplastic sheet of the pad, and a microwaveable wrap or other closure sealing the package unit.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014]

Figure 1 is a perspective view of a preferred embodiment of a tray suitable for the manufacture of the container according to the present invention;
Figure 2 is a perspective view of another preferred embodiment of a tray suitable for the manufacture of the container according to the present invention;
Figure 3 is a perspective view of the tray of Figure 2 with a rigid imperforated pad inserted therein;
Figure 4 is a perspective view of another tray suitable for the manufacture of the container according to the present invention..

DETAILED DESCRIPTION OF THE INVENTION

[0015] As used herein the term "microwaveable", when referred to the package unit according to the present invention, means that under the specific conditions that might be required for thawing, cooking, or re-heating the packaged product into a microwave oven, the packaging material is substantially not deformed (by melting or softening and re-shaping upon cooling) and does not release more than 60 ppm of global contaminants to the packaged food in contact therewith.

[0016] As used herein the term "microwaveable", when referred to the packaging materials *per se,* refers to packaging materials that may withstand a temperature of 121 °C without melting.

[0017] As used herein the term "rigid", when referred to the thermoplastic sheet of the pad bound to the absorbent material, refers to a sheet of thermoplastic material that, when held horizontally by one only of its corners, is able to support itself in substantially a horizontal position, and that can tolerate a certain amount of physical forces, such as pressure or vacuum, without being deformed; the term "semi-rigid" on the other hand refers to a sheet of thermoplastic material that, when held horizontally by one only of its corners, is able to support itself in substantially a horizontal position, but whose shape may change if pressure, vacuum, or some other force is applied thereto.

[0018] The tray of the container according to the present invention is preferably made of thermoplastic material. Examples of thermoplastic materials suitable for the manufacture of a microwaveable tray are typically polypropylene and propylene co-polymers, nylons, polystyrene, ethylene-styrene copolymers, polyesters, co-polyesters, polyethylene, particularly irradiated polyethylene, and blends thereof.

[0019] When in the food packaging unit of the invention the closure of the container is obtained by simply wrapping up the container loaded with the desired food in a thermoplastic film, then there is no need to have a layer of a heat-sealable plastic material on the tray rim because the wrapping film will typically be bunch-sealed on the bottom of the tray or it will be heat-sealed to itself to create a film pouch containing the loaded tray, if hermetic closure of the package is desired. In such a case mono-layer trays, such as polypropylene trays, trays of a blend of polypropylene and a co- or terpolymer of propylene, polystyrene trays, polyester or co-polyester trays or trays made of a blend of polyester and co-polyester, are preferably employed. Any gas barrier properties that may be required for the food packaging unit may

in fact be provided by using a gas-barrier wrapping film.

[0020] When, on the other hand, the closure is provided by means of a lid sealed to the tray rim, then the material used for the tray will preferably be a multilayer material. In addition to the bulk layer of a polymer or polymer blend as indicated above, said multi-layer material, will contain as the innermost layer (i.e. the skin or external layer of the tray structure which is closer to the food product) a heat-sealable layer, comprising a heat-sealable resin, such as a polyethylene resin. Other layers may then be present, such as, a gas-barrier layer, typically comprising ethylene-vinyl alcohol copolymers, nylons, or blends thereof, if gas-barrier properties are desired, and suitable tie or adhesive layers, to bind these different layers one to the other.

[0021] In this case the multilayer material is preferably obtained by co-extrusion or by lamination of a thicker sheet of the bulk polymer to a thinner film (a liner) containing the other layers. Alternatively the multilayer material may be obtained by lamination of any other combination of preformed layers or group of layers.

[0022] The thermoplastic material used for the tray of the present invention may be transparent, either clear or colored, translucent, either clear or colored, or opaque.

[0023] In a preferred embodiment tray a) will be formed of a non-foam, solid, plastic material. Solid (non-foam) plastic trays can be thermoformed or injection moulded, with steeper walls than foam trays where a small draft angle may cause a tray failure. This may be an advantage particularly for modified atmosphere packaging as a solid container with steeper sides can hold more product and more gas, in case of a modified or controlled atmosphere package, than a foam container with the same given face area. Furthermore this will allow an easier stackability of the end packaging units and an increased number of packages that can be contained in a conventional display case.

[0024] Alternatively foamed, and preferably lightly foamed, trays may also be employed and, when a liner is employed, e.g. to provide the tray with heat-sealability and/or gas-barrier properties, partially foamed trays, wherein the bulk substrate is foamed and lined with a solid film.

[0025] Still alternatively the tray may also be of cardboard or of plasticized paper or cardboard.

[0026] The thickness of the tray generally ranges from about 400 to about 1,500 μm, preferably from about 500 to about 1,250 μm, and even more preferably from about 600 to about 1,000 μm, if the tray is a solid, non-foam tray, and from about 500 to about 2,500 μm, typically from about 700 to about 1,500 μm, if the tray is a foamed plastic tray or a cardboard or plasticized cardboard tray.

[0027] When according to a preferred embodiment the tray is a solid non-foam tray, ribs, vertical, horizontal or a network of crossing ribs or other reinforcing features as known in the art can be introduced to impart acceptable structural rigidity and three dimensional stability sufficient for the specific use.

[0028] When the food packaging unit has to be closed by wrapping, the tray will preferably have a rim structure that prevents splitting or tearing of the wrapping film on the edges of the tray itself. As an example, the edges of the tray rim may be rounded or the edges of the tray rim may be curved downwards and slightly inwardly so that the wrapping film that will be stretched or shrunk over and around the tray and its side walls will not be hit by sharp free edges of the rim structure.

[0029] For the manufacture of a container of the present invention few small channels are preferably present in the tray bottom and/or around the tray base. They will favour water dosing and improve the distribution of the steam generating liquid and its absorption by the pad, particularly when the moisturization of the pad is carried out after its insertion into the tray. Their presence will also improve steam circulation during the microwave heating or cooking step and give a more uniform heat distribution. Finally, the presence of small channels will also increase the stiffness of the tray structure. The size of these channels is not particularly critical, typically they would be 1.5 to 5 mm, preferably 2 to 4 mm, wide, and 0.5 to 4 mm, preferably 1 to 3 mm, deep.

[0030] The tray may also have, internally, along the side walls and close to the bottom surface, one or preferably a series of clips that are used to block pad b) on the bottom of the tray.

[0031] Also, the tray can be provided with separation (de-nesting) features, such as one or more lugs, of the same or different shape, positioned, e.g on one or more of the corners of the tray side wall. Said separation features are useful to avoid that the trays telescope into each other or otherwise lock together, when they are stacked.

[0032] With reference to the Figures, Figure 1 represents a perspective view of a tray 1 suitable for the manufacture of a container of the present invention wherein the tray comprises a bottom or base portion 2, side walls 3 extending upwardly from the edges of the base portion and a rim structure 4 extending around the upper edges of the side walls. In said Figure 1 the structural rigidity is provided to the tray by ribs 5 along the walls of the tray and in the portion joining the walls to the tray bottom. The tray contains suitable channels 6 in the bottom surface and denesting lugs 7 in the corners.

[0033] In Figure 2, a tray 1 comprising a bottom or base portion 2, side walls 3 extending upwardly from the edges of the base portion and a rim structure 4 extending around the upper edges of the side walls is described, that has a continuous annulus (annular channel) 8 all around the base of the tray and clips 9 on the lower ribs. Ribs 5 on the outer surface of the tray bottom 2 increase the rigidity of the structure.

[0034] Figure 3 represents the same tray of Figure 2 with a rigid imperforated pad inserted therein. The pad comprises

a rigid or semi-rigid imperforated upper sheet 10 and the lower absorbing sheet 11.

[0035] Figure 4 represents a further preferred embodiment of a tray suitable for the manufacture of a container according to the present invention. In said Figure 4 tray 1 is shown comprising a bottom or base portion 2, side walls 3 extending upwardly from the edges of the base portion and a rim structure 4 extending around the upper edges of the side walls. The tray has suitable channels 6 on the bottom surface and a continuous annulus (annular channel) 8 all around its base, denesting lugs 7 in the corners, and clips 9 on the lower ribs.

[0036] The pad b) to be inserted into tray a) has a size (in terms of surface) which is preferably only slightly smaller than that of the tray bottom, so as to allow its easy insertion into the tray and, if an annular channel is present, also an easy moisturization of the absorbing sheet by injecting the steam-generating liquid into said annular channel and let the overlying pad to absorb it. Furthermore a pad with almost the same size of the tray bottom will be a preferred support for the food product, giving a better appearance to the end food package unit and a better cooking behaviour. Also, a pad of almost the same size as the tray bottom can be easily fastened to the tray by means of clips positioned on the lower side ribs.

[0037] Any type of liquid absorbing material can be employed provided it is suitable for microwave applications. Thus the sheet of absorbing material can comprise cellulose/pulp fibers, superabsorbent fibers, a non-woven hydrophilic material, and the like absorbing materials. Said absorbing sheet may be comprised of one single layer or of two or more layers. In this latter case, in a preferred embodiment the absorbing sheet comprises a layer of non-woven porous material, that in the end pad would be the outer layer facing the tray bottom, and a layer of cellulose or pulp fibers, typically arranged in the form of fluff wadding, tissue, paper or non-woven sheet material, optionally admixed with other fibers, e.g. superabsorbent fibers, as the truly absorbing sheet. Compatibilizers, can also be added to give a homogeneous blend of these fibers. Optionally, a film of thermoplastic material, such as a polyethylene, polypropylene, or polyester film, can be positioned on the side of the absorbing layer that is not adhered to the porous non-woven layer.

[0038] In another embodiment the absorbing sheet may comprise superabsorbent polymer (SAP) particles, preferably embedded in a polymeric matrix or bonded with a polymeric binder to allow either the extrusion thereof in a layer or the distribution thereof on a thermoplastic substrate by a continuous or discontinuous coating process or by spraying. The term "SAP" as used herein and in the relevant art refers to any water-swellable homo- or co-polymer that may absorb and hold many times its weight of aqueous fluids. Typically these water-swellable polymers possess a structure in which a water-soluble polymer has been made insoluble by some process, typically by means of well-known multifunctional cross-linking agents employed during or after polymerization, or by radiation cross-linking or by thermal treatments. Examples of water-swellable polymers that may suitably be employed in the absorbing sheet of the pad include : poly(acrylic acid) salts, poly(acrylate) salts, poly(vinyl alcohol-acrylic acid) salts, poly(isobutylene-maleic acid) salts, poly(ether)-based non ionic polymers, sodium carboxymethylcellulose, poly(vinylpyrrolidone), acrylonitrile-grafted starch, acrylic acid grafted-starch, and the like polymers. Super absorbent polymers suitable for use in food packaging pertaining to the class of poly(acrylic acids) and poly(acrylates) are commercially available from e.g. Dow and Chemdal. Another class of SAP particularly suitable for food packaging applications is that of cross-linked poly(vinylpyrrolidones), such as those commercially available from BASF (Kollidon®).

[0039] The thickness of the absorbing layer, or the amount of absorbing material, will depend on the amount of steam-generating liquid required by the particular food that will be packaged. However the maximum absorbency that may be required is about 5,000 ml/m^2, typically about 4,000 ml/m^2, wherein an absorbency of about 2,500 ml/m^2, will satisfy almost all the conventional applications.

[0040] The imperforated rigid or semi-rigid thermoplastic sheet that has to be bonded to the absorbing sheet can be a mono- or multi-layer thermoplastic laminate. Preferably however it will be a mono-layer laminate and typically it will be formed of the same material of the tray to hide the absorbing sheet and give the impression to the customer of the tray bottom. When it is desired to better hide the absorbing sheet, the imperforated thermoplastic sheet is preferably opaque. The thickness of said thermoplastic sheet will be sufficient to yield a rigid- or semi-rigid sheet as defined above. Depending on the flexural modulus of the thermoplastic material employed it may range from about 200 to about 2,000 μm, and typically it will be comprised between about 300 and about 1,800 μm, preferably between about 400 and about 1,700 μm, and even more preferably between about 500 and about 1,500 μm.

[0041] The absorbing sheet and the imperforated rigid- or semi-rigid thermoplastic sheet can be heat or glue laminated together, either directly or with the use of an intermediate material. Preferably they are heat-laminated together directly using heat and pressure.

[0042] The thus obtained pad may be positioned into the tray by just laying it on the innermost surface of the bottom of the tray. If the tray is designed with means to block the pad, such as clips at the bottom of the walls of the tray along the inner profile, correct positioning of the pad can be obtained by slightly pressing on the pad at the time of inserting it.

[0043] As indicated above, in the container according to the present invention the pad is soaked with a steam generating liquid. Water and water containing media such as wine, aromatized water, vinegar, water/oil emulsions, and the like can be employed. Additives, such as flavorings, preservatives, particularly plant-based preservatives such as those described in US-A-6,482,452, thickeners, emulsifiers, and the like can be admixed to the liquid.

[0044] The pad can be soaked with the steam-generating liquid either before of after being positioned into the tray. Preferably the liquid is added just before loading the product to be packaged into the tray, it is however possible also to add the liquid at the same time or once the product to be packaged is loaded. The amount of liquid to be added, will depend on several factors, including the type of product to be packaged, its weight, the volume of the packaging tray, the type of packaging (whether the tray is closed by a lid or by wrapping up in a film), the time required for cooking, the cooking conditions, the presence of a venting system, etc. Generally, however, amount of steam-generating liquids corresponding to or containing from about 3 to about 100 ml, typically from about 5 to about 60 ml, and preferably from about 10 to about 40 ml , of water are suitably employed. If the steam-generating liquid is added after the pad has been inserted into the tray, a liquid injection tool can be devised that would inject the desired quantity of liquid in a precise point of the tray (i.e., any free space between the side walls of the tray and the rigid pad, and, if the annular channel is present, preferably in said annular channel) to reach the pad.

[0045] Once the pad soaked with the suitably selected steam-generating liquid has been positioned into the tray and the product to be packaged has been placed on the imperforated sheet of the pad, the container is closed. The closure may be thin film conventional wrap of any suitable composition, or it may be a lidding film or sheet which may be bonded to the tray rim via adhesive, heat bonding or any other way. The thickness of said closing thermoplastic films will generally be comprised between about 10 and about 50 μm, preferably between about 12 and about 40 μm and even more preferably between about 15 and about 35 μm, in case of a wrapping thermoplastic film, while, in case of a lid, the closing thermoplastic film may be as thin as the wrapping film but it might also be thicker, e.g. 60, 70, 80, 100 μm, or much thicker, e.g. 150, 200, 220, 250 μm. The closure may also be a lid of any other suitable material, such as paper or cardboard, connected to the tray rim in any way desired.

[0046] Thermoplastic materials suitable for the manufacture of the wrapping or lidding closure include mono- and multi-layer films, oriented or non oriented, and, if oriented, heat-shrinkable or heat-set. Mono-layer structures will typically comprise polyolefins (such as propylene-based polymers or, preferably cross-linked, polyethylene-based polymers) or polyesters. Multi-layer structures will comprise at least an outer sealing layer, generally an outer heat-sealing layer, and an outer abuse layer.

[0047] While the outer sealing layer will generally comprise a polyethylene-based polymer or a resin that would seal to the outer layer of the tray rim, the outer abuse layer may include any type of resin, such as polyolefins, nylons, polyesters, etc.

[0048] The multi-layer structure may include additional inner layers, such as gas-barrier layers, if a gas-barrier package is desired, bulk layers, and tie layers, as known in the art. Non-limitative examples of gas-barrier polymers that can suitably be employed for the gas-barrier layer are EVOH, PVDC, polyamides, and blends of EVOH with polyamides. Preferably however the barrier layer in the closing film or lid will comprise a barrier layer of PVDC, EVOH, and/or polyamides and even more preferably said barrier layer would comprise EVOH and/or polyamides.

[0049] Barrier properties may be required e.g. to maintain a suitably modified or controlled atmosphere within the package that would prolong the shelf life of the packaged food product. In such a case the thickness of the gas-barrier layer in the gas-barrier tray and film will be set in order to provide the materials with an Oxygen Transmission Rate (OTR) (evaluated by following the method described in ASTM D-3985 and using an OX-TRAN instrument by Mocon) lower than 120, preferably lower than 100 cm^3/m^2.d.atm, when measured at 23 °C and 0 % of relative humidity.

[0050] For certain products, such as, typically, vegetables and any other "breathing" product, a highly permeable closing film is generally required and in such a case films with an OTR higher than 9,000 cm^3/m^2.d.atm, preferably higher than 12,000 cm^3/m^2.d.atm, and more preferably higher than 15,000 cm^3/m^2.d.atm, are preferably employed.

[0051] When the tray is closed by a lidding film or sheet, the sealable layers of the film and/or of the tray may also comprise peelable blends in order to provide the packaging unit with a self-venting feature, allowing the package to smoothly vent, and thus avoid a sudden bursting of the package in the oven, should the overpressure generated by the steam during the microwave treatment be too high. Self-venting of the end packaging unit may be obtained in any known manner, e.g. by perforating the closing film before introducing the package unit into the microwave oven; by providing the package with a hole covered by a label to be removed just before microwave treatment; or covered by a label that would be lifted up by the overpressure during the heat treatment; by providing the package with a hole closed by a material that would melt or dissolve when in contact with the steam generated in the microwave oven; by inserting a valve, preferably a one-way valve; or by providing in any other way a zone of weakness in the seal that would open up if needed. The use of a peelable blend for the outer sealing layers of the tray and/or lid, even if not necessary to give self-venting, will anyway provide an easy openable end package.

[0052] The following Examples further illustrate the invention in some representative embodiments thereof.

Examples 1 to 3

[0053] A solid tray of a blend of polypropylene and propylene co-polymer, 15 cm long, 10 cm wide, and 3 cm deep, with a thickness of 800 μm, is obtained by thermoforming. The tray has the design indicated in Figure 4. A pad com-

prising a sheet of absorbing material, about 100 μm thick, comprising an inner layer of mixed absorbent fibers (comprising super-absorbent fibers and cellulose fibers), an external layer of a blend of polyethylene and polypropylene, and the other external layer of a non-woven porous material, is heat laminated via the polyethylene/polypropylene blend to a sheet, 400 μm thick, of the same blend of polypropylene and propylene co-polymer used for the manufacture of the tray. The size of the pad is just slightly smaller than the bottom surface of the tray. The pad is inserted into the tray and water (50 ml) is injected into the annular channel and absorbed by the pad.

[0054] Cooking tests were carried out by positioning on the pad in the trays slices of chicken breast, approximately 1.2 cm thick (maximum thickness). The packages were then closed with a lid of a 39 μm thick bi-axially oriented polypropylene film with a polyethylene heat-sealing layer sealed to the tray rim. The packages were then introduced in microwave ovens. Venting was allowed by piercing the top lid in the center with a calibrated hole (about 3 mm in diameter) before the microwave treatment.

[0055] As a comparison, cooking tests were carried out, under identical cooking conditions, but - comparative examples 4 to 6 - using only the tray with no pad and no steam-generating liquid, and - comparative examples 7 to 9 - using a double bottom tray according to EP-1,053,944, i.e with a moisturised pad on the tray bottom and a false bottom, i.e. the support on which the chicken breast slices are positioned, which is perforated and not laminated to the pad. The polypropylene used for the manufacture of the trays used in the examples according to the present invention and those used in the comparative examples are identical as well the BOPP lids, The weight of the food products and - for comparative examples 7 to 9 - the composition of the absorbing sheets and the amount of water added, are identical. Cooking times and conditions are reported in the following Table I

Table I

Cooking time/power	Example no.	Results
5.5 min / 600W	1	OK
5 min / 700 W	2	OK
4.5 min / 800W	3	OK
5.5 min / 600W	4	not acceptable
5 min / 700 W	5	not acceptable
4.5 min / 800W	6	not acceptable
5.5 min / 600W	7	OK
5 min / 700 W	8	OK
4.5 min / 800W	9	OK

[0056] The cooking tests performed show that the packages of examples 1 to 3, according to the present invention, give much better results than those of comparative examples 4 to 6 (having no pad and no steam releasing liquid) because the steam, produced by the pad, contributes to the heating of the food surface while preserving its original water content and meat texture and also because the direct contact of the food with the rigid support, hot because impregnated with water which soon becomes hot, allows heating, through conduction, of the food part laying in contact with the rigid support in the tray, this part being usually less irradiated by the microwaves than the surface. On the contrary, the products cooked according to comparative examples 4 to 6, were ranked as "not acceptable" because the chicken breasts were not cooked in a uniform manner (part of it was raw while part was overcooked) and the meat lost its texture and appeared ragged.

[0057] The cooking tests also showed that the packages of examples 1 to 3, according to the present invention, allowed a faster and more uniform steam cooking of the food products with respect to what is obtained with the packages of examples 7 to 9, because of a quicker heat transfer from the moisturised pad to the product due to the absence of a double bottom system and of a more uniform heat distribution in the supporting sheet due to the absence of perforations therein.

[0058] The above descriptions are those of preferred embodiments of the invention. Various alterations and changes can be made without departing from the spirit and broader aspects of the invention as defined in the claims.

Claims

1. A microwaveable container suitable for food packaging comprising

a) a tray comprising a bottom or base portion, side walls extending upwardly from the edges of the base portion to define a storage compartment for the food and a rim structure extending around the upper edges of the

side walls, and
b) a pad comprising a layer of liquid absorbent material bound to a rigid or semi-rigid, imperforated, thermoplastic sheet,

wherein said pad b) is positioned with the absorbent material in contact with the tray base inner surface and is moisturised with a steam-generating liquid.

2. A food package unit comprising a microwaveable container of claim 1, a food product resting on the surface of the rigid or semi-rigid, imperforated, thermoplastic sheet of the pad, and a microwaveable wrap or other closure sealing the package unit.

3. The microwaveable container of claim 1 or the food package unit of claim 2 wherein a few small channels are present in the tray bottom and/or around the tray base.

4. The microwaveable container or the food package unit of claim 3 wherein said small channels are 1.5 to 5 mm, preferably 2 to 4 mm, wide, and 0.5 to 4 mm, preferably 1 to 3 mm, deep.

5. The microwaveable container of claim 1 or the food package unit of claim 2 wherein the tray is formed of a non-foam, solid, plastic material.

6. The microwaveable container of claim 1 or the food package unit of claim 2 wherein the tray is of a gas-barrier multi-layer material.

7. The microwaveable container of claim 1 or the food package unit of claim 2 wherein the liquid absorbent sheet of the pad comprises absorbing fibers.

8. The microwaveable container or the food package unit of claim 7 wherein the absorbing fibers are a blend comprising cellulose and pulp fibers.

9. The microwaveable container of claim 1 or the food package unit of claim 2 wherein pad b) is fastened to the bottom of tray a) by means of one or more clips positioned on the lower side ribs.

10. The microwaveable food package unit of claim 2 wherein the container is closed by film wrapping or lidding.

11. The microwaveable food package unit of claim 10 wherein the closing film is gas-barrier.

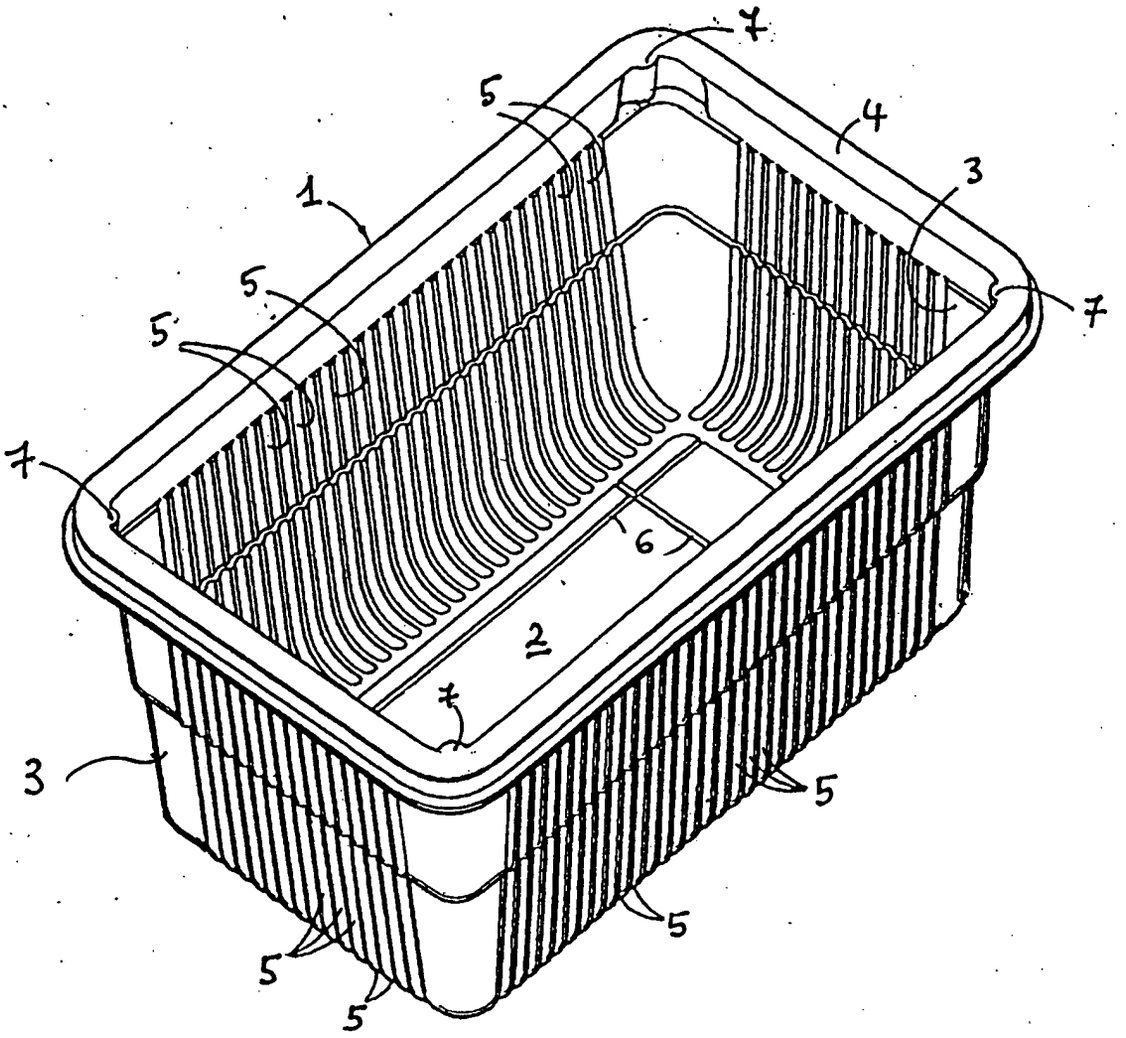

Fig. 1

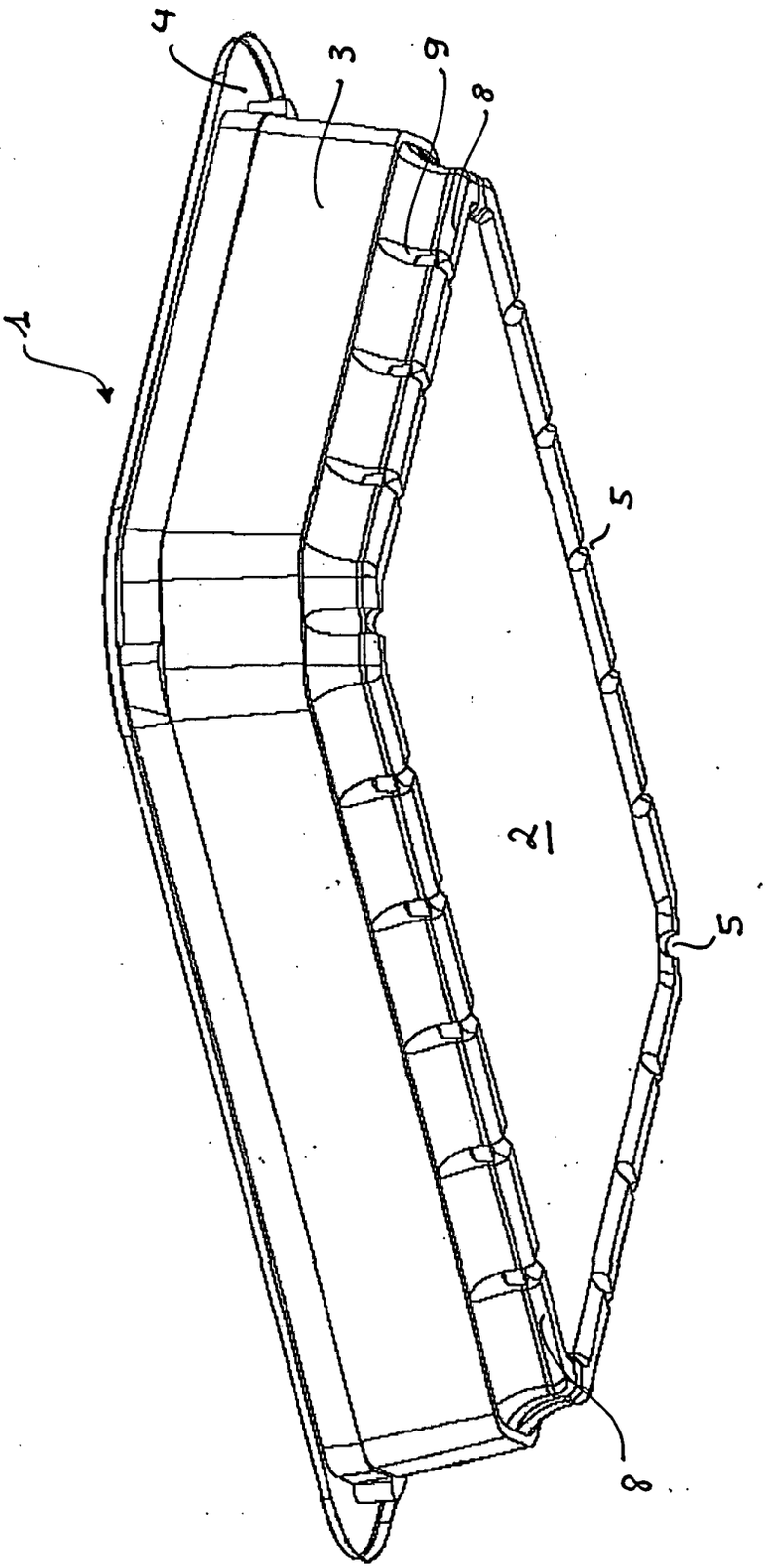

Fig. 2

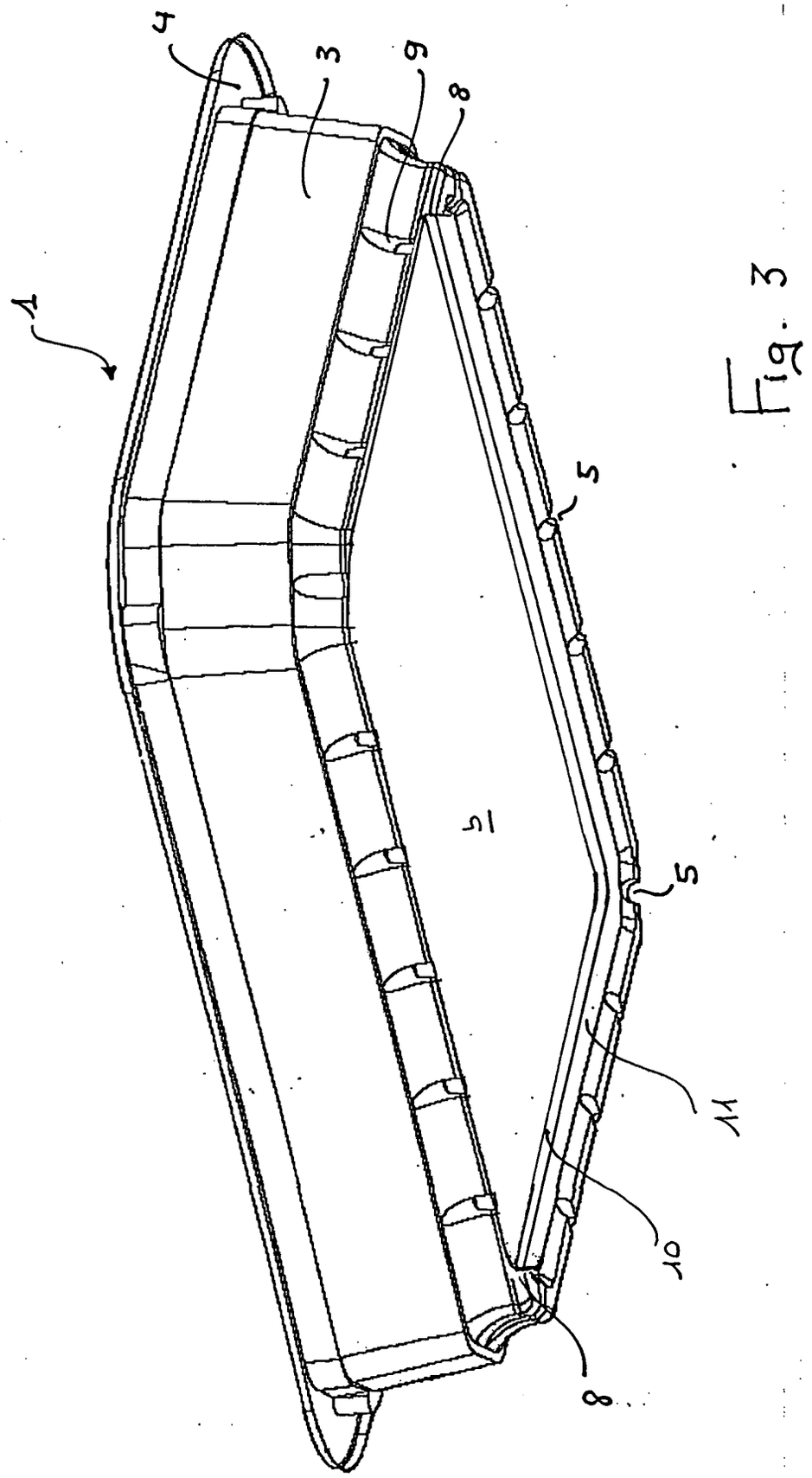

Fig. 3

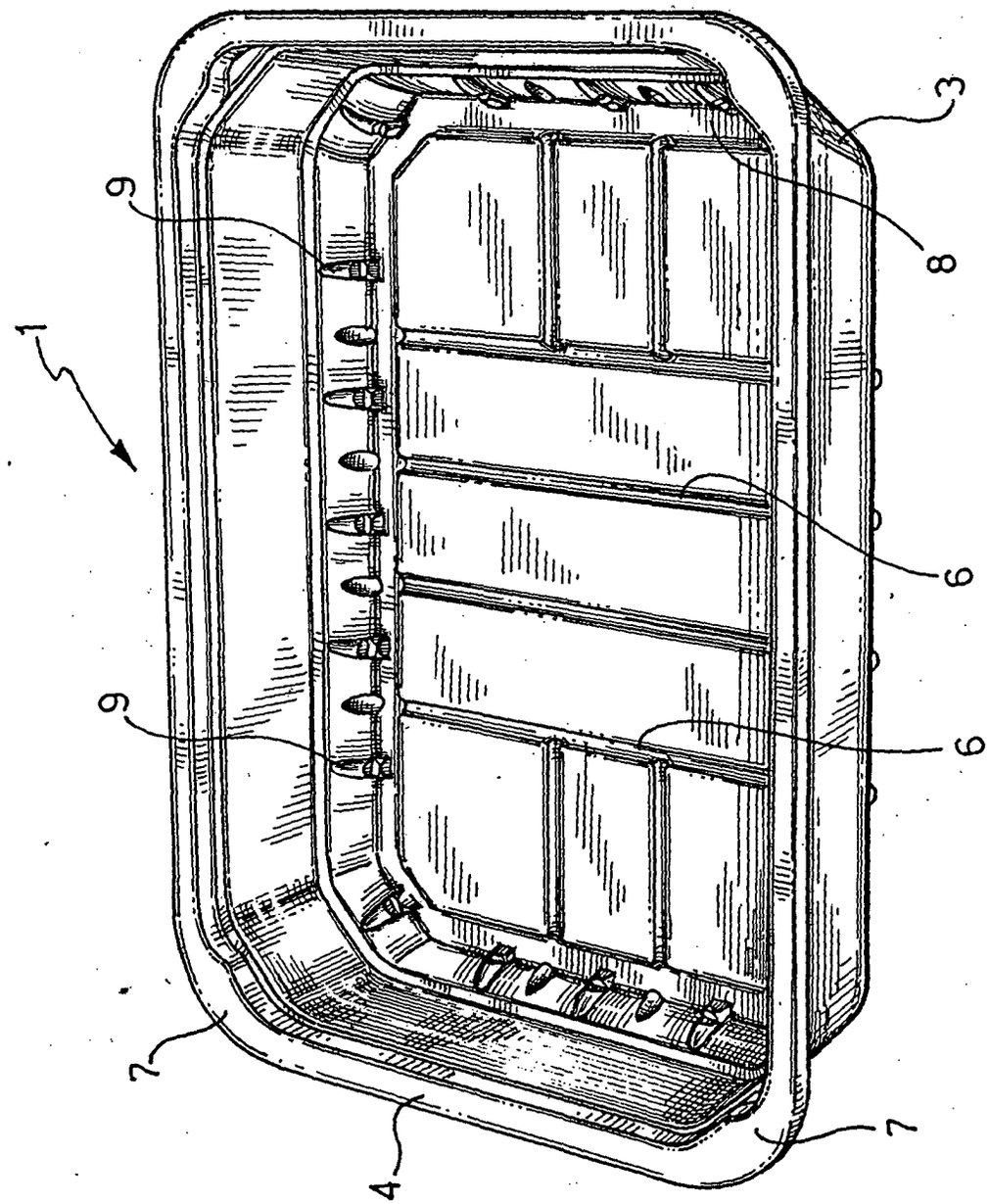

FIG. 4

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EUROPEAN SEARCH REPORT

Application Number
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	25 May 2004	Fournier, J

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