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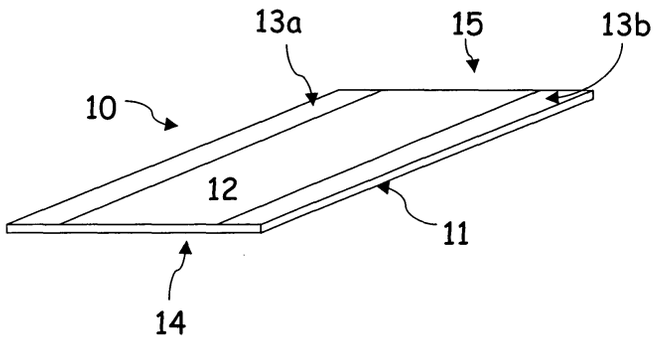
(54) Absorbent pad and package containing it

(57) There is described a rigid or semi-rigid absorbent pad (10) suitable for the packaging of food products. The pad (10) includes a support (11) made of a liquid impermeable material having two flat opposing surfaces, and a mat of liquid absorbent material (12) laminated over one of the surfaces of the rigid or semi-rigid support (11). The mat of liquid absorbent material (12) has a surface smaller in size than that of the rigid or semi-rigid support (11). The portion (13) of the surface of the support (11) not covered by the mat of absorbent material (12) is provided of means (30) for binding the pad to a container, which means (30) do not encircle the mat of liquid absorbing material (12) in a continuous manner. Also described is a process for the manufacture of the pad and a package comprising the pad (10) and a container (20).

Figure 1



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Description

[0001] The invention relates to a new absorbent pad for use in the packaging of food products, to the process for the manufacture thereof, to its use in the manufacture of food packages and to the packages thus obtainable.

BACKGROUND OF THE INVENTION

[0002] It is common practice in retail stores to display certain types of foods, such as meat, poultry and some vegetables, in individually wrapped containers. Examples of such containers are trays overwrapped by a transparent plastic film and transparent bags. The use of these types of packages offers the advantage to the consumer of seeing and inspecting the packaged product. However, in the case of liquid containing products, such as meat or poultry, the liquids exuded from the food can create a negative visual impression on the consumer. Furthermore, the presence of these liquids in direct contact with the food product may promote the growth of bacteria inside the package. These problems have been generally overcome by the use of absorbent pads, which are introduced in the package between the product and the bottom of the container.

[0003] Several absorbent pads have been proposed which comprise a mat of an absorbent material enclosed between two sheets of plastic material, which are sealed along their edges. For instance, US Patent 5,055,332 and US Patent 6,270,873 both disclose absorbent pads for food products including an upper and lower plastic film, at least one of which is perforated, and an intermediate absorbent layer. However, these types of absorbent pads have some disadvantages. The absorbed liquid is visible through the plastic sheet of the pad partly due to the perforations and, unless it is glued to the bottom of the container, the pad tends to stick to the packaged product creating a negative impression on the consumer who has to manually remove it. A possible way to eliminate the latter problem is described in FR-A-2,687,381, which discloses a mat of absorbent material held in place at the bottom of a packaging container by means of a film of plastic material glued to the bottom of the container, the film being preferably perforated. All these types of pad are sometimes difficult to handle in automatic padding operations, their excessive flexibility making it difficult to correctly position the pad in a container, such as a tray or a bag.

[0004] A way to solve some of the problems outlined above is described in DE 90 13 898.8U, which discloses an absorbent pad, covering only part of the bottom of the tray, comprising two plies, one of an absorbent material and the other of a water-impermeable support, made of a material chosen from the group of PE, PP or PS which is preferably foamed and with a thickness comprised from 120 to 300 μm. The water-impermeable support covers completely the absorbent material hiding the absorbed liquid from the sight of the consumer. Furthermore the support and the absorbent layer are sealed or glued to each other and to the bottom of the tray to avoid any displacement. However this solution has two main drawbacks. First of all, with such an arrangement when the tray is in a vertical or inclined position the absorption of the liquids exuded by the product is limited, depending on how smaller is the pad with respect to the tray bottom, and therefore the liquid tends to pool in the comer of the tray with obvious disadvantages. Secondly, since the pad is bound to the bottom of the tray through the absorbent material, once this has absorbed the liquids exuded from the product, it swells causing the detachment of the pad. An improved technical solution with respect to DE 90 13 898.8U is proposed by EP-A-609,184, which discloses an absorbent pad comprising two plies, i.e, a layer of an absorbent material laid on the bottom of a tray separated from the product by a support, said pad forming with the sides of the tray a drain encircling the pad. Said pad can be either glued to the bottom of the tray or it can be secured by a series of clips protruding from the sides of the tray. Similarly, FR-A-2,749,567 discloses a tray having an internal ledge which is profiled to present an overhang projecting over the base of the tray to form a structure which grips and centres a pad of absorbent material on the base of the tray. The above-mentioned solutions involve the use of special moulds for producing a tray with suitable clips requiring additional expenses in the manufacturing of the tray.

[0005] The need therefore still exists for a pad, which suitably absorbs and hides the drip and that can be easily manufactured and handled in automatic padding operations.

[0006] A first objective of the present invention is therefore to provide an absorbent pad that may efficiently absorb and hide from the sight of the consumer any type of liquid present in a food package.

[0007] Another objective is to provide a pad that can be conveniently handled and positioned during packaging operations.

[0008] Still another objective of the invention is to provide a pad that can be reliably secured to a container without requiring special moulding tools for the preparation of the container, thus avoiding the risk of removing the pad together with the product.

SUMMARY OF THE INVENTION

[0009] A first object of the present invention is a rigid or semi-rigid absorbent pad comprising a rigid or semi-rigid support made of a liquid impermeable material having two flat opposing surfaces, and a mat of liquid absorbent material laminated over only one of the surfaces of the rigid or semi-rigid support, characterized in that,

- the mat of liquid absorbent material has a surface smaller in size than that of the rigid or semi-rigid

support thus leaving exposed a portion of the surface of the support onto which it is laminated, and

- means are present in said exposed portion of the surface of the support to bind the pad to the container,

provided said means do not encircle the mat of liquid absorbing material in a continuous manner.

[0010] A second object of the present invention is a process for the manufacture of a pad according to a preferred embodiment of the present invention.

[0011] A third object of the present invention is a composite web for the production of an absorbent pad according to the present invention, said composite web being wound into a roll.

[0012] A further object of the present invention is a food package comprising an absorbent pad according to the present invention and a container.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013]

Fig. 1 is a perspective view of a pad of the present invention;

Fig. 2 is a representative schematic of a process line for making a pad according to one embodiment of the present invention;

Fig. 3 is a representative schematic of a process line for making a pad according to a further embodiment of the present invention;

Fig. 4 is a top view of a package of the present invention;

Fig. 5 is a section along the line I-I in Figure 4.

DETAILED DESCRIPTION OF THE INVENTION

[0014] According to a first aspect of the invention there is provided an absorbent pad comprising a rigid or semi-rigid support made of a liquid impermeable material having two flat opposing surfaces, and a mat of liquid absorbent material laminated over only one of the surfaces of the rigid or semi-rigid support, characterized in that,

- the mat of liquid absorbent material has a surface smaller in size than that of the rigid or semi-rigid support thus leaving exposed a portion of the surface of the support onto which it is laminated, and
- means are present in said exposed portion of the surface of the support to bind the pad to a container,

provided said means do not encircle the mat of liquid absorbing material in a continuous manner.

[0015] As used herein, the phrase "rigid or semi-rigid" refers to a material that does not deform, bend or loose its shape when deprived of support.

[0016] Preferably the rigid or semi-rigid support of liquid impermeable material employed for the pad of the present invention is made of one or more layers of a thermoplastic material chosen from the group comprising polyolefins, polyesters, polystyrenes, PVC, poly(lactic acid) and the like materials.

[0017] Suitable polyolefins include ethylene homo- and co-polymers and propylene homo- and co-polymers. As used herein, the term "copolymer" refers to a polymer derived from two or more types of monomers, and includes terpolymers. Ethylene homopolymers include high density polyethylene (HDPE) and low density polyethylene (LDPE). Ethylene copolymers include ethylene/alpha-olefin copolymers and ethylene/unsaturated ester copolymers. Ethylene/alpha-olefin copolymers generally include copolymers of ethylene and one or more comonomers selected from C_3 to C_{20} alpha-olefins, such as 1-butene, 1-pentene, 1-hexene, 1-octene, 4-methyl-1-pentene and the like.

[0018] Ethylene/alpha-olefin copolymers generally have a density in the range of from about 0.86 to about 0.94 g/cc. The term linear low density polyethylene (LLDPE) is generally understood to include that group of ethylene/alpha-olefin copolymers which fall into the density range of about 0.915 to about 0.94 g/cc and particularly about 0.915 to about 0.925 g/cc. Sometimes linear polyethylene in the density range from about 0.926 to about 0.94 is referred to as linear medium density polyethylene (LMDPE). Lower density ethylene/alpha-olefin copolymers may be referred to as very low density polyethylene (VLDPE) and ultra-low density polyethylene (ULDPE). Ethylene/alfa-olefin copolymers may be obtained by either heterogeneous or homogeneous polymerization processes. Heterogeneous processes afford products with relatively wide molecular weight distribution (M_w/M_n greater than 3.0) and composition distribution. Heterogeneous copolymers typically contain a relatively wide variety of main chain lengths and comonomer percentages. On the other hand, homogeneous processes afford products with relatively narrow molecular weight distribution (M_w/M_n less than 3.0) and composition distribution. Homogeneous polymers are structurally different from heterogeneous polymers, in that homogeneous polymers exhibit a relatively even sequencing of comonomers within a chain, a mirroring of sequence distribution in all chains, and a similarity of length of all chains. Heterogeneous polymers may be prepared, for instance, with Ziegler-Natta catalysts. On the other hand, homogeneous polymers are typically prepared using metallocene or other single-site catalysts.

[0019] Another useful ethylene copolymer is ethylene/unsaturated ester copolymer, which is the copolymer of ethylene and one or more unsaturated ester monomers. Useful unsaturated esters include vinyl esters of aliphatic carboxylic acids, where the esters have from 4 to 12 carbon atoms, such as vinyl acetate, and alkyl esters of acrylic or methacrylic acid, where the esters have from 4 to 12 carbon atoms.

[0020] Useful propylene copolymers include propylene/ethylene copolymers (EPC), which are copolymers of propylene and ethylene having a majority weight percent content of propylene, and propylene/ethylene/butene terpolymers (EPB), which are copolymers of propylene, ethylene and 1-butene.

[0021] As used herein the term "polyesters" refers to polymers obtained by the polycondensation reaction of dicarboxylic acids with dihydroxy alcohols. Suitable dicarboxylic acids are, for instance, terephtalic acid, isophtalic acid, 2,6-naphthalene dicarboxylic acid and the like. Suitable dihydroxy alcohols are for instance ethylene glycol, diethylene glycol, 1,4-butanediol, 1,4-cyclohexanedimethanol and the like. Examples of useful polyesters include poly(ethylene 2,6-naphtalate), poly (ethylene terephtalate), and copolyesters obtained by reacting one or more dicarboxylic acids with one or more dihydroxy alcohols.

[0022] As used herein the term "polystyrenes" refers to homo- and co-polymers of styrene. Useful styrene copolymers include styrene/butadiene rubbers (SBR), styrene/butadiene block copolymers (SBS), styrene/ethylene/butadiene copolymers (SEBS), styrene/isoprene block copolymers (SIS) and the like.

[0023] Typically, the rigid or semi-rigid support of the liquid impermeable material has a thickness comprised between 100 microns to 5 mm, preferably from 200 microns to 4 mm, and even more preferably from more than 250 microns to 3 mm. Thicknesses lower than 100 microns, e.g. down to 50, 60, 70, 80, 90 microns, may also be employed, depending on the modulus of the particular resins used, but in most cases they would not offer a sufficient rigidity for a reliable handling and positioning of the pad in automatic padding operations. Thicknesses higher than 5 mm would make the cost of the pad excessive without providing beneficial effects.

[0024] In one embodiment of the present invention the rigid or semi-rigid support of the pad is an extruded monolayer material. Preferably the support is foamed or contains inorganic fillers, such as talc, TiO_2, calcium carbonate and the like, so to be rendered opaque, therefore hiding the absorbed liquid from the sight of the consumer.

[0025] In a preferred embodiment of the present invention the rigid or semi-rigid support of the pad consists of at least two layers: an upper layer, which is in contact with the product in the final package, that confers rigidity to the support and a lower layer, which is bound to the mat of liquid absorbent material. Typically the upper layer is thicker than the lower layer, the ratio of the two thicknesses depending on the modulus of the plastic materials employed. Preferably the upper layer of the support is foamed or contains inorganic fillers, such as talc, TiO_2 and the like. Even more preferably, the upper layer of the support is made of the same material as the container with which it forms the final package, therefore not only hiding the absorbed liquid but also being indistinguishable from the container at first sight.

[0026] Preferably the lower layer is made of a material chosen from the group of polyolefins, suitable for binding with the mat of liquid absorbent material. Preferred materials are copolymers of ethylene and unsaturated esters, such esters of aliphatic carboxylic acids and alkyl esters of acrylic or methacrylic acid, more preferably vinyl acetate. Other layers can be present between said upper and lower layers. For instance a tie layer might be employed to improve the adhesion between the upper and the lower layer or additional layers might be employed to modulate the mechanical properties of the whole support. The support can be produced either by extrusion, co-extrusion or by heat- or glue-lamination.

[0027] Non-limiting examples of suitable supports for the pad of the present invention, particularly in conjunction with foamed polystyrene trays, are laminates of a foamed polystyrene sheet (having a thickness between 0.5 to 2 mm) with a multilayer film comprising an ethylene/vinyl acetate copolymer outer layer, that is the layer that will be bonded to the absorbent mat, and another outer layer comprising a polymeric material that could be easily heat-laminated to the foamed polystyrene sheet, such as a linear low or very low density polyethylene, an anhydride modified linear low or very low density polyethylene, a styrene-butadiene block copolymer, a styrene-butadiene rubber or mixtures thereof. The thickness of said film heat-laminated to the foamed polystyrene sheet may typically range between 20 microns to 100 microns.

[0028] Suitable absorbent mats for the pad of the present invention comprise fibers or fiber assemblies made, for instance, of cellulose pulp, rayon, naturally occurring materials, synthetic fibers with hydrophilic surface treatments and the like. Such fibers are typically arranged in the form of fluff wadding, tissue, paper or non-woven sheet material. Preferably the absorbent mat is composed of an airlaid or dry-formed web of fibers, which can be bonded either by addition of a latex spray or by softening or partially melting thermoplastic fibers present in the web. Preferably super-absorbent polymers are added to the fiber core. As used herein the term "super-absorbent polymer" refers to one or more hydrocolloid materials capable of absorbing many times their dry weight of water. In a preferred embodiment, the absorbent mat of the present invention is made of a material chosen from the group of super-absorbent non-woven materials. Examples of preferred non-woven super-absorbent materials are the ones produced and sold by Buckeye Technologies Inc. having a water absorption capacity from about 500 to 7000 g/sqm, preferably from about 700 to 4500 g/sqm, and even more preferably from about 800 to 3000 g/sqm.

[0029] Said absorbent mat may cover from about 50 % to about 95 %, preferably from about 60 % to about 90 %, and even more preferably from about 70 to about 85 % of the total surface of the support.

[0030] In the preferred embodiment of the invention, illustrated in Figure 1, the absorbent mat is laminated to

the support 11 as a strip 12 having the same size of the support, along one of the axes of the support itself, and a size which is from about 50 % to about 95 %, preferably from about 60 % to about 90 %, and even more preferably from about 70 to about 85 % of that of the support along the other axis, preferably leaving two areas of the support uncovered by the absorbent material, said areas forming two parallel stripes 13a and 13b along the edges of the support, one on each side of the absorbent mat.

[0031] On the surface of the support that is not covered by the absorbent material (13a and 13b), there are provided means to bind the pad to the tray.

[0032] In one embodiment this may be achieved by one or more spots of glue that can be applied just before the tray-padding step. Examples of suitable glues are hot melt adhesives, i.e. solvent-free thermoplastics-based adhesives that, when heated and in liquid form (typically above 80°C), are capable of effectively wetting substrate surfaces and that, after cooling and solidifying adhere firmly to those surfaces. Suitable hot-melt adhesives are the ones sold by Sealock Ltd, UK under the trade name Sealock H1125.

[0033] In another embodiment the spots can be of a material that can be applied at an early stage, in the pad manufacturing process, and be activated, by heat, pressure, or any other suitable way, at the tray padding stage. Examples of suitable materials are e.g. pressure sensitive adhesives, energy-curable adhesives, heat-activated adhesives and the like. The term "pressure sensitive adhesives" refers to adhesives that adhere to the surfaces of most materials under only light pressure. Typically, pressure-sensitive adhesives are based on natural and synthetic rubbers in conjunction with modified rosins or hydrocarbon resins. In addition to rubber, polyacrylates, polymethacrylates, poly(vinyl ethers) and polyisobutylenes are also used frequently. The term "energy-curable adhesives" refers to solvent-free adhesive compositions, containing only reactive low molecular weight, unsaturated resins which can be cured through the use of radiant energy (electron beam or ultraviolet). The term "heat-activated adhesive" refers to adhesive materials, which are made sticky by the use of heat and pressure. Suitable heat-activated adhesives are polyvinylacetate, ethylene-vinyl acetate copolymers, PVC, polyacrylates, polymethacrylates and many rubber-resin compositions.

[0034] Preferably, instead of spots of adhesive material, the stripes of support surface void of any absorbent material (13a and 13b) comprise a continuous layer of an adhesive. Suitable adhesives are for example pressure sensitive adhesives, hot melt adhesives or heat-activated adhesives.

[0035] The pad of the present invention offers several advantages over the pads of the prior art: the adhesive spots or stripes are not affected by the absorption of liquid by the mat of absorbent material and therefore the pad is tightly and reliably secured to the bottom of the container for the whole life of the end package. At the same time, the contact between the mat of liquid absorbing material and the liquid is possible along the sides of the pad, indicated as 14 and 15 in Figure 1, which are not glued to the bottom of the container.

[0036] The pad of the present invention can be easily obtained by laminating a preformed support of a size suitable for the desired use to a preformed mat of absorbing material smaller in size. Alternatively it can be obtained by laminating discrete mats of absorbing material to a web of support and then suitably cutting the obtained laminate to get pads of the desired size. Still alternatively the pad of the present invention can also be obtained by laminating one or more continuous strips of absorbing material to a web of support material and then cutting the obtained laminate so as to obtain a pad, such as that illustrated in Fig. 1, where the mat of absorbing material has the same size of the support in one direction, e.g. the longitudinal direction, while it is smaller in the other direction, e.g. the transversal direction.

[0037] Said alternative process is particularly advantageous industrially as it is a continuous process that allows controlling the amount of scrap generated and possibly to generate scrap that can completely be recycled.

[0038] A second object of the present invention is therefore a process for the preparation of an absorbent pad according to the present invention, comprising the steps of:

- providing a rigid or semi-rigid web of a liquid impermeable mono or multi-layer material having a width in the transversal direction equal to that of the final pad or to a multiple thereof,
- longitudinally laminating at least one stripe of liquid absorbent material onto the rigid or semi-rigid web, said stripe of liquid absorbent material having a width in the transversal direction inferior than the width of the final pad, in such a way that each final pad will have at least one edge which only comprises the rigid or semi-rigid support and is void of any absorbent material and where means for binding the pad to the container can be applied, and
- cutting the composite web into single pads.

[0039] In a first embodiment of the above process the composite web is converted into the single pads at the end of the laminating step by a series of transverse and, as the case maybe, longitudinal cuts.

[0040] Cutting can be done simultaneously in both the longitudinal and transversal direction or first in one direction and then in the other, by using any known means in the art, for instance a blade, a heated knife or a laser beam.

[0041] In a second embodiment the composite web is wound into a roll and the conversion into the single pads is performed at a later stage at the pad manufacturing facility or right before the packaging operations take

place at the food packaging facility.

[0042] If the composite web contains more than one stripe of liquid absorbent material laminated onto the rigid or semi-rigid web, so that longitudinal cuts are anyway required to obtain single pads, in a third embodiment said composite web will be cut only longitudinally at the pad manufacturing facility and each of the thus obtained "single" webs will be wound into a roll and converted into the single pads by transversal cuts at a later stage, for instance at the food packaging facility. Alternatively the longitudinal cuts to convert the composite "multiple" web into the corresponding number of "single" webs may be carried out by suitably slitting a roll of the "multiple" composite web.

[0043] A further specific object of the present invention is therefore a composite web of a rigid or semi-rigid web of a liquid impermeable mono or multi-layer material with longitudinally laminated thereto at least one stripe of liquid absorbent material, wherein the size and respective positioning of the rigid or semi-rigid web and of the stripes is such that said composite web can be converted into the final pads of the invention, each one of them having at least one edge which only comprises the rigid or semi-rigid support and is void of any absorbent material, by a series of transverse and possibly longitudinal cuts, said composite web being wound into a roll.

[0044] The liquid absorbent material can be either heat- or glue-laminated onto the rigid or semi-rigid sheet of liquid impermeable material.

[0045] When the stripe or stripes of absorbent material are glue-laminated to the support web, preferably a layer of a suitable adhesive is coated either on the stripe of absorbing material or onto the support web, before or at the time of lamination. When the adhesive is coated onto the support web, it is preferably distributed at least on the surface thereof that will be covered by the stripe (s). More preferably however a surface larger than that covered by the stripe will be coated so that no separate additional step will then be required to apply to the exposed portion of the surface of the support means for binding the pad to the container, as the adhesive layer on the surface of the support web that is not involved in the glue lamination of the stripe(s) will represent a suitable mean for binding the pad to the container. Preferably the glue is selected from the group of hot-melt or pressure sensitive adhesives.

[0046] When the stripe or stripes of absorbent material are heat-laminated to the support web, the liquid impermeable sheet preferably comprises as an outer layer a heat-activated adhesive, so that the portion of the surface of the support not covered by the liquid absorbent material will represent a suitable mean for binding the pad to the container. Preferably, the heat- activated adhesive is made of a material chosen from the group of ethylene-vinyl acetate copolymers, copolymers of ethylene and alkyl esters of acrylic or methacrylic acid, styrene/isoprene block copolymers, styrene/butadiene block copolymers and blends thereof.

[0047] The process for obtaining the pad according to the first embodiment of the present invention is schematically described in Figure 2. Foamed polystyrene sheet web 31 is unwound from foamed polystyrene roll 32 and fed to a glue applying station 33 that applies a layer of suitable adhesive onto the surface of foamed polystyrene web 31. Foamed polystyrene web 31 is then fed to lamination station 34. The stripe or stripes of absorbing material 40 are unwound from absorbent material roll or rolls 41 and also fed to laminating station 34 where they are laminated to foamed polystyrene web 31. The composite web 50 is then fed to a diamond-shaped punch press 35 that forms the rounded edges 26 in the pad showed in Figure 4, needed to conform the pad to the bottom of the tray. Composite web 50 is then fed to a cutting station 36 that cuts the web in single pads 10. The diamond-shaped fragments that are cut out from composite web 50 consist of foamed polystyrene material coated with a thin layer of adhesive that can be recycled in the foamed polystyrene sheet manufacturing cycle without any further treatment. Thus the pad manufacturing process of the present invention provides a simple and continuous process that allows generating scrap that can be completely recycled and eliminates the problem of producing scrap of expensive and non-recyclable liquid absorbent material.

[0048] The process for obtaining the pad according to the third embodiment of the present invention is schematically described in Figure 3. Foamed polystyrene sheet web 31 is unwound from foamed polystyrene roll 32 and fed to a glue applying station 33 that applies a layer of suitable adhesive onto the surface of foamed polystyrene web 31. Foamed polystyrene web 31 is then fed to lamination station 34. The stripe or stripes of absorbing material 40 are unwound from absorbent material roll or rolls 41 and also fed to laminating station 34 where they are laminated to foamed polystyrene web 31. The composite web 50 is then fed to a cutting station 135 that longitudinally cuts the web in single webs 51, which are then individually wound into separate rolls 52. Rolls 52 are then cut transversely into single pads 10 by means of a cutting device 136.

[0049] Further advantages of the pad of the present invention can be easily appreciated when said pad is used in conjunction with certain types of food packaging containers, such as rigid trays. Foamed polystyrene trays, for instance, are widely used in the packaging of meats and poultry and generally require the addition of an absorbent pad to remove the juices exuded from the products. The use of the pad of the preferred embodiment of the invention, described in Fig. 1, would result in a particularly appealing and convenient final package. The rigid foamed polystyrene support of the pad would allow the pad to blend in with the bottom of the tray and be almost invisible to the eye of the consumer. Furthermore, the foamed polystyrene support would effectively hide the colour imparted to the absorbent material by

the absorbed juices. The pad would also be tightly secured to the bottom of the tray thanks to the means provided on the stripes adjacent to the absorbent mat. Therefore, a fourth object of the present invention is a package comprising the absorbent pad of the present invention and a container.

[0050] Suitable containers can be pouches, bags or trays made of mono- or multi-layer thermoplastic materials. In a preferred embodiment of the present invention the container is a tray made of plastic material. Suitable plastic materials for the container are PVC, polypropylene, polyesters, poly(lactic acid) and foamed polystyrene. In another embodiment of the present invention the inner surface of the container is provided with a gas barrier composite film made of plastic material. In an even preferred embodiment of the present invention, when the container is a tray the rigid or semi-rigid liquid impermeable support of the absorbent pad, is made of the same material as the tray and has the same shape and size of the bottom of the tray, so that it snugly fits the bottom of the tray, completely covering the liquid absorbed by the pad.

[0051] The package 60 of the preferred embodiment is represented by way of example in Figures 4 and 5. A rectangular tray-shaped container 20 made of foamed polystyrene comprises a base wall 21 completely covered by absorbent pad 10, a continuous, tapered side wall 22 upstanding therefrom and an outwardly extending peripheral rim 23. The inner surface of the tray is provided with a gas barrier composite film 24.

[0052] The absorbent pad 10 comprises a rigid or semi-rigid support 11 and a mat of liquid absorbent material 12. The support 11 is made of the same foamed polystyrene sheet as the tray and has the same size and shape as the tray base wall 21, including the rounded edges 26 at the comers of the tray. The mat of liquid absorbent material 12 is smaller than support 11 along the transversal direction leaving two areas of the support 11 adjacent to the side walls of the tray 23 uncovered by the absorbent material and provided with two means 30 for binding pad 10 to the base wall 21 of container 20.

Claims

1. A rigid or semi-rigid absorbent pad (10) suitable for the packaging of food products, said pad comprising:

   - a rigid or semi-rigid support (11) made of a liquid impermeable material having two flat opposing surfaces, and
   - a mat of liquid absorbent material (12) laminated over one of the surfaces of the rigid or semi-rigid support,

   characterized in that,

   - the mat of liquid absorbent material (12) has a surface smaller in size than that of the rigid or semi-rigid support (11) thus leaving exposed a portion (13) of the surface of the support onto which it is laminated; and
   - means (30) are present in said exposed portion (13) of the surface of the support (11) to bind the pad to a container;

   provided said means (30) do not encircle the mat of liquid absorbing material (12) in a continuous manner.

2. The pad (10) according to Claim 1 wherein the rigid or semi-rigid support (11) consists of one or more layers of a thermoplastic material chosen from the group comprising polyolefins, polyesters, polystyrenes, PVC, poly(lactic acid) and the like materials.

3. The pad (10) according to Claim 1 wherein the mat of liquid absorbent material (12) covers from about 50 % to about 95 %, preferably from about 60 % to about 90 %, and even more preferably from about 70 to about 85 % of the total surface of the support (11).

4. The pad (10) according to Claim 1 wherein the liquid absorbent material (12) has a water absorption capacity from about 500 to 7000 g/sqm, preferably from about 700 to 4500 g/sqm, and even more preferably from about 800 to 3000 g/sqm.

5. The pad (10) according to Claim 1 wherein the liquid absorbent material (12) is chosen from the group comprising super-absorbent non-woven materials.

6. A process for the preparation of a pad (10), comprising the steps of:

   - providing a rigid or semi-rigid web of a liquid impermeable mono or multi-layer material (11) having a width in the transversal direction equal to that of the final pad (10) or to a multiple thereof;
   - longitudinally laminating at least one stripe of liquid absorbent material (12) onto the rigid or semi-rigid web (11), said stripe of liquid absorbent material having a width in the transversal direction inferior than the width of the final pad;
   - optionally winding the obtained composite web (50) into a roll; and
   - cutting the obtained composite web (50) transversely and, if more than one stripe of absorbing material is laminated onto the support web, longitudinally, to generate the single pads, in such a way that each pad has at least one edge which only comprises the rigid or semi-rigid support (11) and is void of any absorbent ma-

terial (12) and where means (30) for binding the pad to the container can be applied.

7. The process according to claim 6 wherein, if more than one stripe of absorbing material (12) is laminated onto the support web (11), the composite web (50) is firstly cut longitudinally into "single" webs (51), in such a way that each single web (51) of composite material has at least one edge which only comprises the rigid or semi-rigid support (11) and is void of any absorbent material (12), then optionally wound into individual rolls (52) and then cut transversely to generate the single pads (10).

8. The process according to claim 6 where the stripe (s) of liquid absorbing material (12) are glue-laminated to the support web (11), the adhesive is coated onto the support web over a surface larger than that covered by the stripe(s) so that the adhesive layer on the surface of the support web that is not involved in the glue lamination of the stripe(s) will provide means (30) for binding the pad (10) to a container.

9. The process according to claim 8 where the glue is selected from the group of hot-melt or pressure sensitive adhesives.

10. The process according to claim 6 where the stripe (s) of liquid absorbent material (12) are heat-laminated to the support web and the liquid impermeable sheet (11) comprises an outer layer of a heat-activated adhesive, so that the portion (13) of the surface of the support not covered by the liquid absorbent material (12) will represent a suitable mean (30) for binding the pad (10) to a container.

11. The process according to claim 10 where the heat-activated adhesive is made of a material chosen from the group of ethylene-vinyl acetate copolymers, copolymers of ethylene and alkyl esters of acrylic or methacrylic acid, styrene/isoprene block copolymers, styrene/butadiene block copolymers.

12. A roll of absorbent composite material (52) for the production of pads (10) according to claim 1 obtained by providing a rigid or semi-rigid web of a liquid impermeable mono or multi-layer material (11) having a width in the transversal direction equal to that of the final pad (10) or to a multiple thereof; longitudinally laminating at least one stripe of liquid absorbent material (12) onto the rigid or semi-rigid web (11), said stripe of liquid absorbent material having a width in the transversal direction inferior than the width of the final pad; if more than one stripe of absorbing material (12) is laminated onto the support web (11), cutting the web longitudinally into "single" webs (51), in such a way that each single web (51) of composite material has at least one edge which only comprises the rigid or semi-rigid support (11) and is void of any absorbent material (12); winding each single web (51) into an individual roll (52).

13. A package (60) comprising an absorbent pad (10) according to claim 1 and a container (20).

14. The package (60) according to claim 13 wherein the container (20) is a tray made of a thermoplastic material.

15. The package (60) according to claim 14 wherein the liquid impermeable support (11) of the pad (10) according to claim 1 and the tray (20) are made of the same thermoplastic material.

16. The package (60) according to claim 14 wherein the plastic material is chosen from the group of PVC, polypropylene, polyesters, poly(lactic acid) and foamed polystyrene.

17. The package (60) according to claim 14 wherein the absorbent pad (10) has the same size and shape of the bottom of the tray (20).

Figure 1

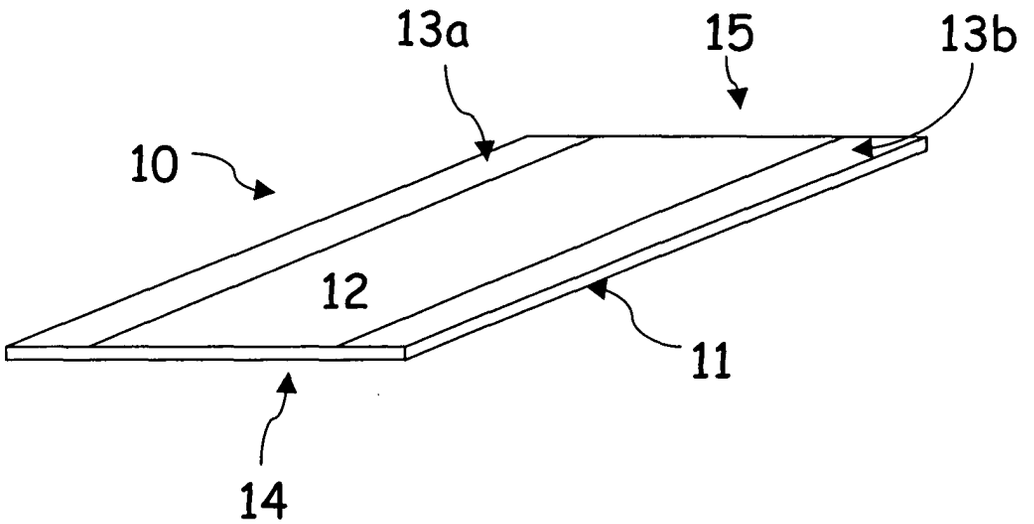


Figure 2

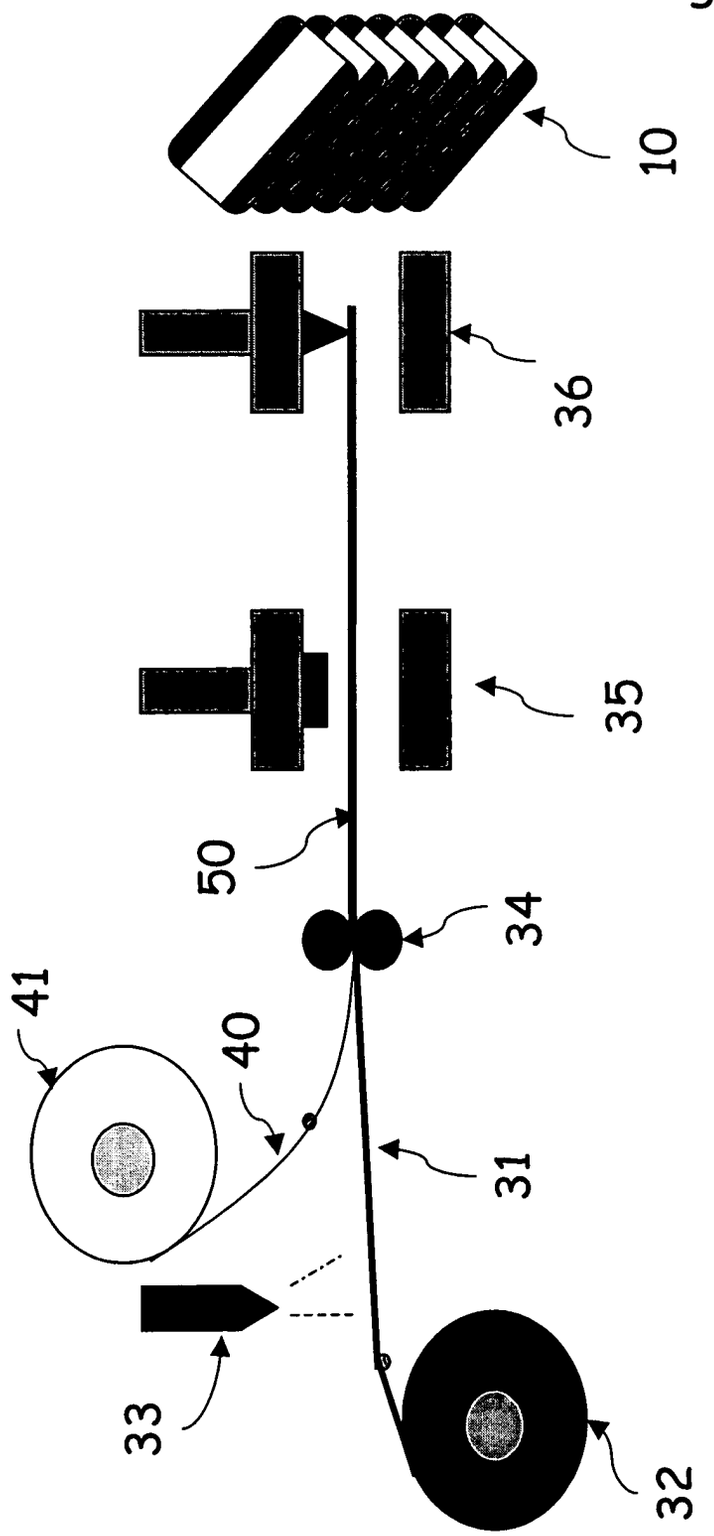


Figure 3

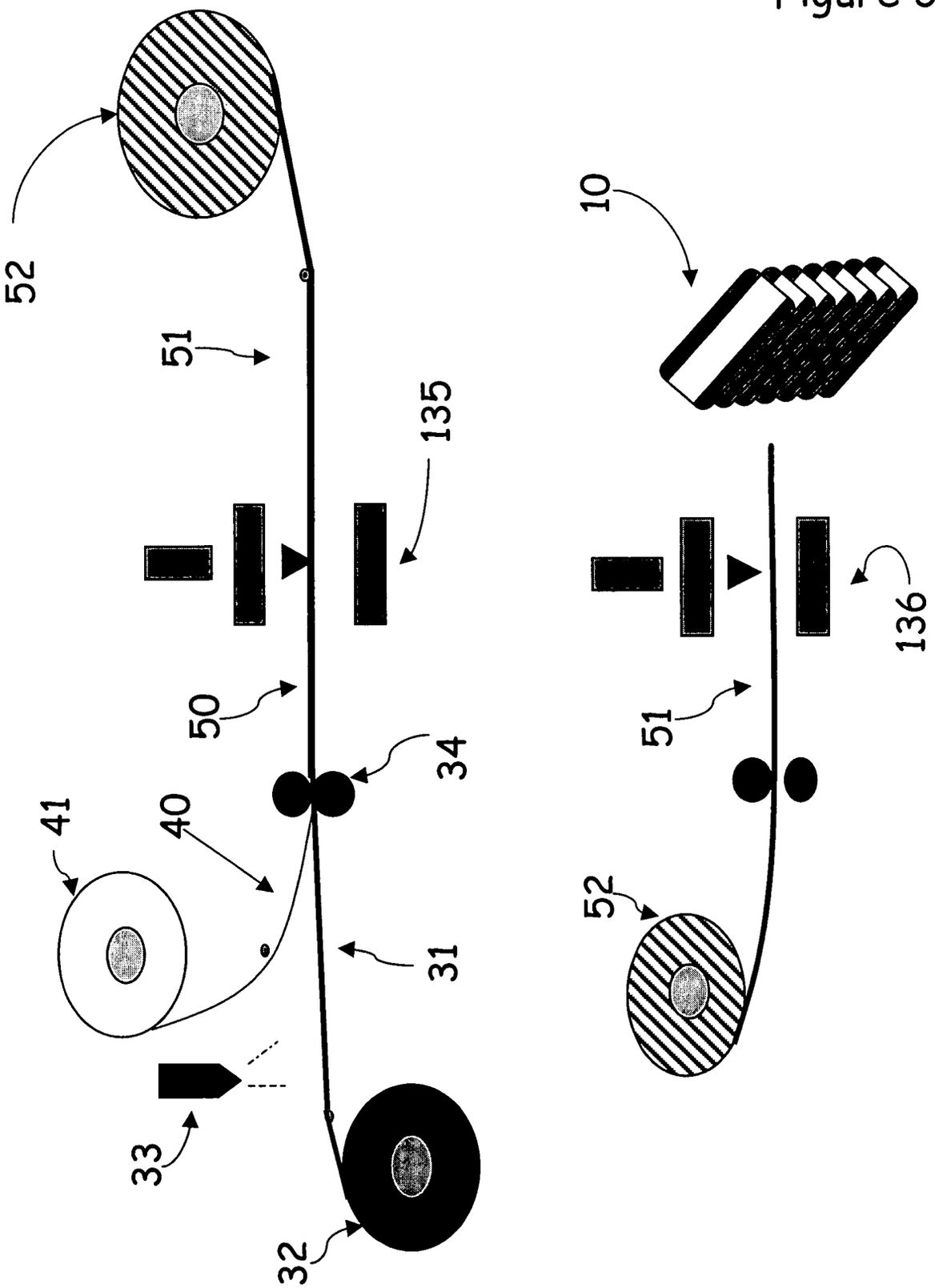


Figure 4

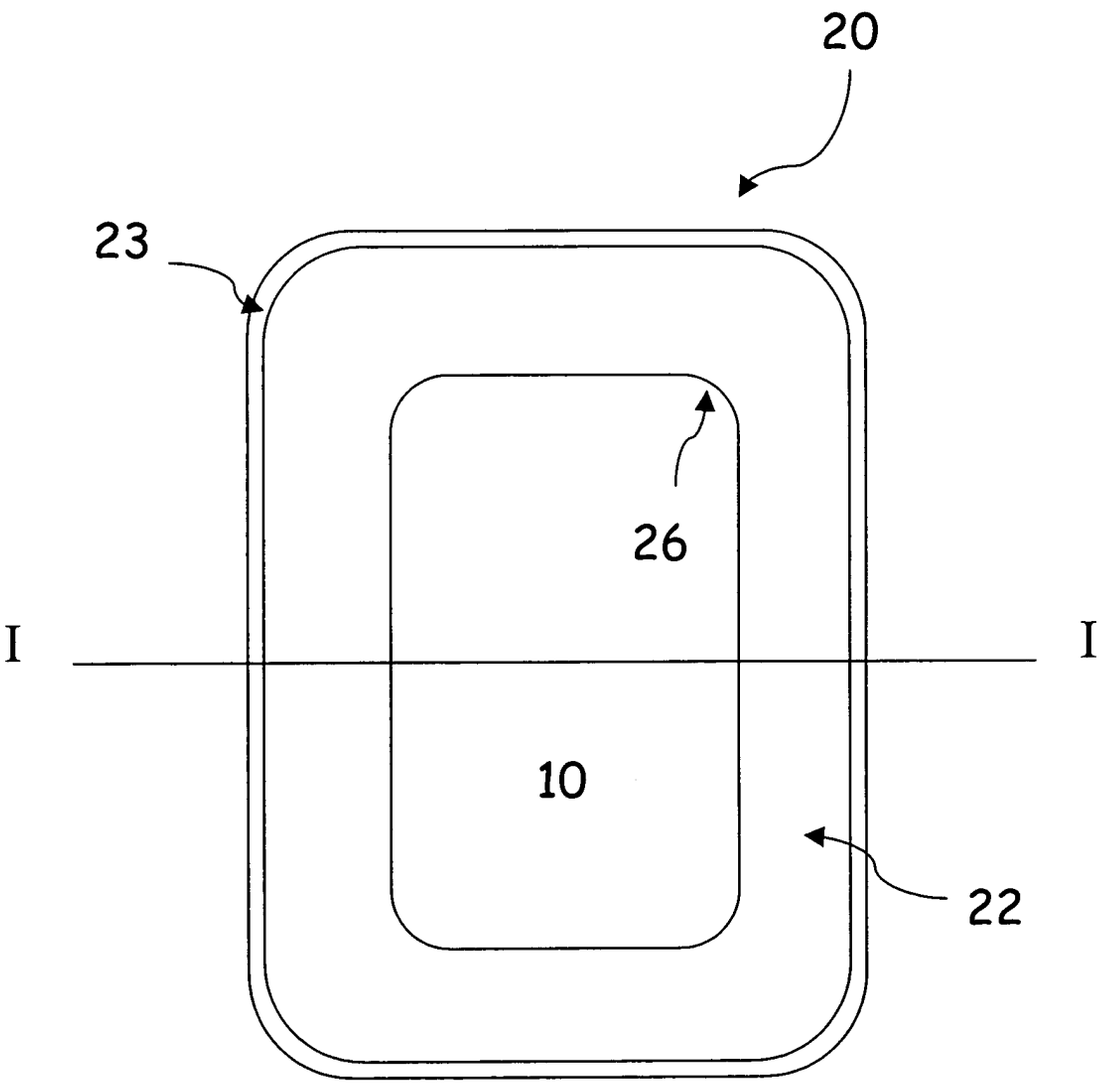
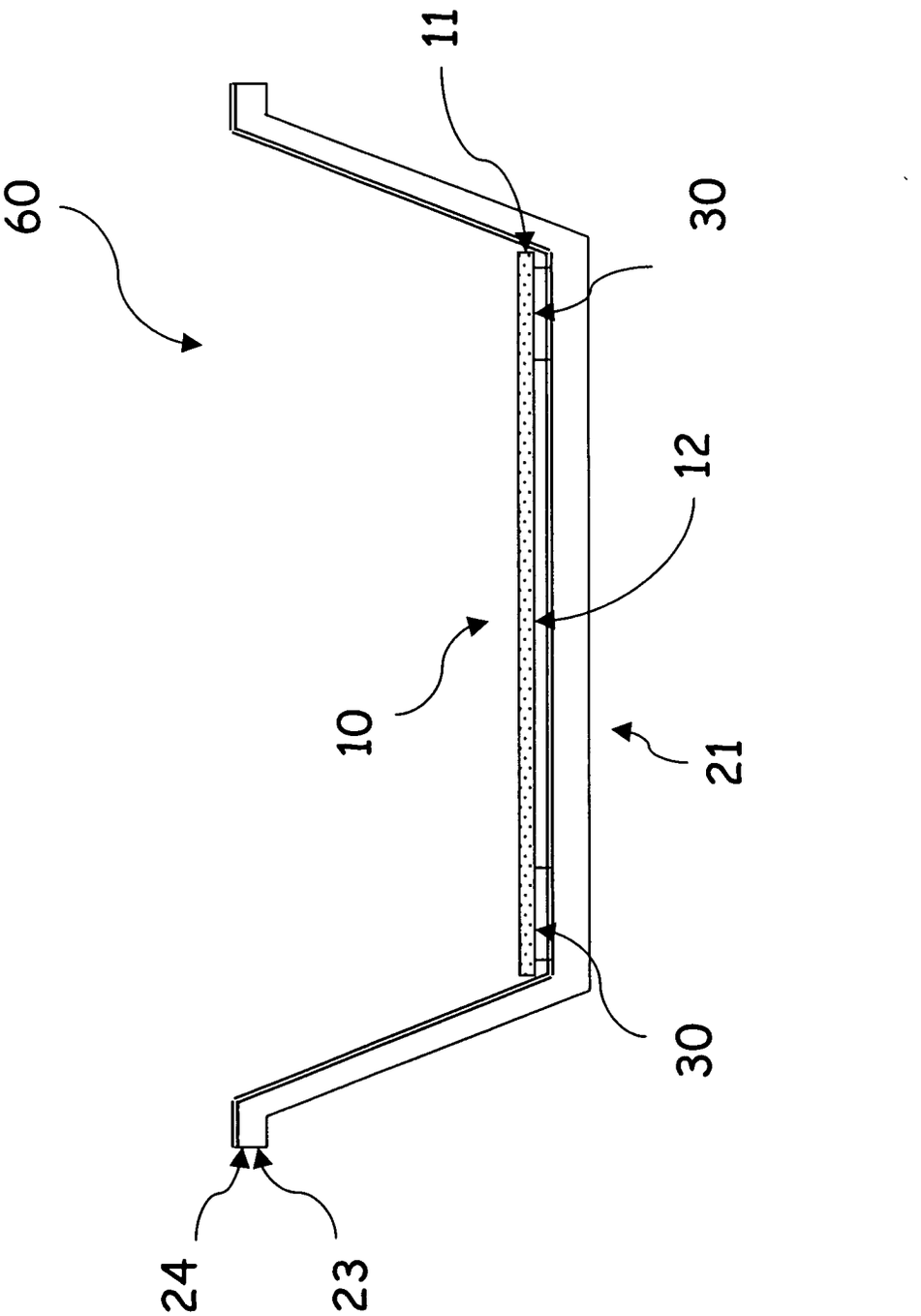


Figure 5



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Application Number
EP 04 00 2536

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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
BERLIN	18 May 2004	Nistor, L

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