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(54) Reclosable food package

(57) The invention relates to a reclosable package 10, which comprises a support 11 comprising a base for loading of the product to be packaged and a peripheral flange 12 outwardly extending from said base, a product 50 placed over said base, a cover film 30 laid over product 50 and sealed to said peripheral flange 12, wherein a plurality of discrete removable reclosure elements 40 are engaged with the flange 12 of the support and overlay a fraction of said flange 12, the cover film 30 is bonded also to said removable reclosure elements 40 and said removable reclosure elements 40 are indivisible upon opening of the package, that is they do not separate into multiple complementary parts.

Also disclosed are a support 11 having removable reclosure elements 40 engaged with the flange 12 of said support and which overlay a fraction of said flange and a method of making the reclosable package 10.

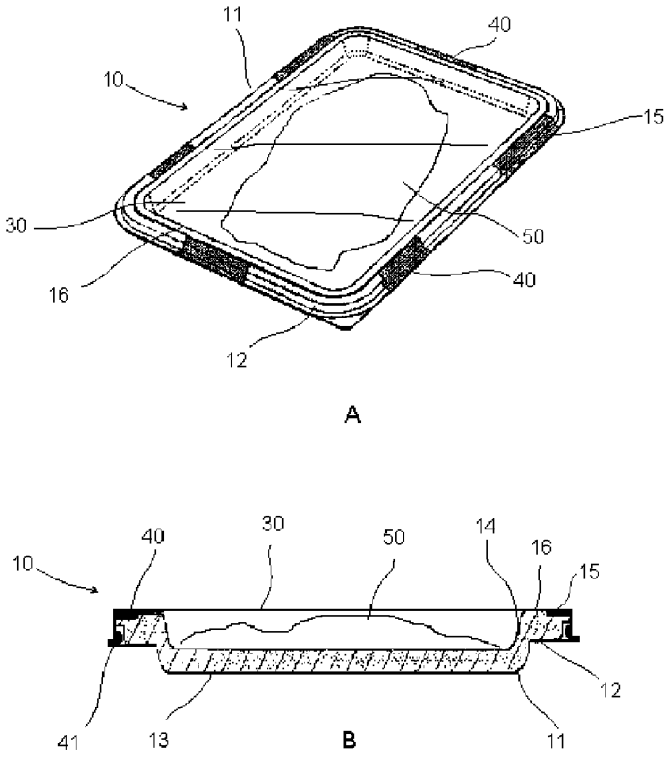


Fig. 1

EP 1 714 907 A1

Description

Technical field

[0001] The present invention relates to the field of reclosable food packages, particularly packages having a rigid or semi-rigid base and a flexible cover sealed onto the base.

Background art

[0002] Hermetically sealed containers, such as trays with a flexible lid sealed around their edges, are widely used in the packaging of food products. This type of packaging offers several advantages: the rigidity of the container provides protection to the contents of the package during transportation, storage and handling, and the hermeticity of the seals contributes to the increase in the shelf-life of the product. Reclosable packages are convenient for a variety of reasons. For example when the packaged product is not immediately consumed after opening of the package, it could undergo contamination and spoilage. To avoid this inconvenience consumers are often forced to time-consuming repackaging operations.

[0003] Several attempts have been made in the past to provide reclosable rigid packages. For instance US 6,691,886 discloses a resealable packaging container consisting of a tray and a lid film which is sealed to the tray so that it can be at least partly peeled back. The container further comprises at least one hook and loop closure, whose two complementary parts are arranged opposite to each other on the tray and on the lid film, that allows the packaging container to be reclosed after the peel seal has been opened. A similar type of closure may have the disadvantage that when the food is removed from the package contaminants, such as fat, grease or liquids, may soil the surface of the loop and hook closure, thereby reducing its closing ability. EP-A-1,140,653 discloses a package consisting of a tray and a cover lid at least partly sealed to the tray in a peelable manner, wherein either the cover lid or the tray comprises at least one peg and in a complementary way the tray or the cover lid comprises a hole through which the peg is pressed to reclose the package after opening. The pegs are obtained by thermoforming either the cover lid or the tray. This solution to be operable clearly requires fairly thick cover lids to produce pegs which are not so deformable that they cannot be easily pushed through the complementary holes or to produce holes that do not easily break.

[0004] A first objective of the present invention is to provide a reclosable package that does not have the disadvantages of the prior art. Another objective is a method of making a reclosable package from a suitable support and a cover film.

Disclosure of the invention

[0005] A first object of the present invention is therefore a reclosable package comprising a support, said support comprising a base for loading of the product to be packaged and a peripheral flange outwardly extending from said base, a product placed on said base and a cover film placed over the product and sealed to said peripheral flange, wherein a plurality of discrete removable reclosure elements are engaged with said peripheral flange and overlay a fraction thereof, the cover film is secured also to said removable reclosure elements and said removable reclosure elements are indivisible upon opening of the package.

[0006] A second object of the present invention is a support comprising a base and a peripheral flange outwardly extending from said base wherein a plurality of discrete and indivisible removable reclosure elements are engaged with said peripheral flange and overlay a fraction thereof.

[0007] A further object is a method of making a reclosable package according to the first object of the invention comprising the steps of loading a product on the base of the support of the second object, placing a cover film over said product, securing said film to the flange of the support and to the removable reclosure elements engaged thereon. These and other objects, advantages, and features of the invention will be more readily understood and appreciated by reference to the detailed description of the invention and the drawings.

Brief description of the drawings

[0008] Fig. 1A and 1B respectively show a perspective and a sectional view of a reclosable package according to one embodiment of the present invention;

[0009] Fig. 2A and 2B respectively show a perspective and a sectional view of a reclosable package according to a second embodiment of the present invention.

Mode(s) for carrying out the invention

[0010] With reference to Fig. 1A and 1B, which represent one embodiment of the reclosable package of the present invention in the closed state, package 10 comprises a support 11, a product 50 and a cover film 30. Support 11 comprises a base on which product 50 is loaded comprising a bottom wall 13 and upwardly extending side-walls 14. Support 11 further comprises a flange 12 that extends outwardly of side-walls 14 forming the periphery of support 11. Removable reclosure elements 40 are engaged with flange 12 by means of a snap-type feature 41 shown in Fig. 1B. Removable reclosure elements 40 overlay only a fraction of flange 12, leaving a portion of the flange uncovered to allow the continuous sealing of cover film 30 around flange 12. Cover film 30 is placed over product 50 and it is sealed to flange 12 by means of seal 16. Cover film 30 is also secured to re-

movable reclosure elements 40 by means of bond 15.

[0011] Fig. 2A and 2B show an alternative embodiment of the reclosable package of the present invention comprising a tray-like support 11, a product 50, cover film 30 and removable reclosure elements 40. Support 11 comprises a base comprising a bottom wall 13 and upwardly extending side-walls 14 terminating in a horizontal outwardly extending flange 12, which forms the periphery of support 11. In the embodiment shown in Fig. 2A and 2B removable reclosure elements 40 cover only the central portion of flange 12, leaving both the inner and the outer edges (12a and 12b) of flange 12 uncovered. Removable reclosure elements 40 engage with flange 12 by means of an interlocking mechanism whereby projection 43 on removable reclosure elements 40 fits into hole 19 on flange 12. Cover film 30 is draped over product 50 and forms a tight skin around it. Cover film 30 is secured to removable reclosure elements by means of bond 15 and it is sealed to support 11 and portions 12a and 12b of flange 12 with seal 16.

[0012] The person skilled in the art recognizes that other alternative engagement mechanisms between removable reclosure elements 40 and support 11 can be provided without departing from the scope of the invention. For instance, hole 19 could be replaced by a groove or a slit in flange 12.

[0013] Support 11 is made of a single layer or, preferably, of a multi-layer polymeric material. In case of a single layer material suitable polymers are for instance polystyrene, polypropylene, polyesters, high density polyethylene, poly(lactic acid), PVC and the like, either foamed or solid. Generally, support 11 is made of a multilayer material. Suitable polymers are for instance ethylene homo- and co-polymers, propylene homo- and copolymers, polyamides, polystyrene, polyesters, poly(lactic acid), PVC and the like. Part of the multi-layer material can be solid and part can be foamed. The multi-layer material can be produced either by coextrusion of all the layers using well-known coextrusion techniques or by glue- or heat-lamination of, for instance, a rigid foamed or solid substrate with a thin film. The thin film can be laminated either on the side of support 11 in contact with the product or on the side facing away from the product or on both sides. In the latter case the films laminated on the two sides of support 11 can be the same or different. A layer of an oxygen barrier material, for instance (ethylene-co-vinyl alcohol) copolymer, is optionally present to increase the shelf-life of product 50. In a preferred embodiment support 11 is obtained from a sheet of polymeric material having a film comprising at least one oxygen barrier layer and at least one surface sealing layer facing product 50. Support 11 typically has a thickness in the range from 0.1 to 15 mm, preferably from 0.2 to 6 mm, and even more preferably from 0.2 to 2 mm. Support 11 is manufactured through common techniques such as thermoforming or injection moulding.

[0014] Support 11 can have a rectangular shape, as shown in the figures, or it can have any other suitable shape, such as round, square, elliptical etc.

[0015] Support 11 can also be in the form of a flat, dish-like support; in this case the term "flange" is used to refer to the outermost peripheral portion of the support itself and the term "base" is used to refer to the central portion of the flat support.

[0016] Typically the width of flange 12 ranges from 4 to 20 mm, preferably from 4 to 18 mm, and even more preferably from 5 to 16 mm.

[0017] Removable reclosure elements 40 are rigid or semi-rigid elements preferably made of thermoplastic materials. Alternatively they can be made of any other material compatible with the overall package, such as cardboard, rubber, metal and the like. According to one preferred embodiment when the removable reclosure elements 40 are made of a thermoplastic material any plastic material can be suitably employed such as polyolefins, rubbers, polyamides, polyesters, PVC and the like. Low melting point materials, such as ethylene/alpha-olefin copolymers, (ethylene-co-vinyl acetate) copolymers and the like, are especially preferred. Generally removable reclosure elements are made of a material different from the one used for support 11 but in some cases they could be made of the same material as support 11.

[0018] Removable reclosure elements 40 can have different sizes and shapes as long as they provide a suitable engagement with support 11.

[0019] There can be any number of removable reclosure elements 40 depending on the size and shape of support 11 and also on the tightness that one wants to obtain for the reclosed package. For instance, in the package of the invention shown in Fig. 1A and 1B, six elongated removable reclosure elements 40 are positioned along the sides of support 11. In the alternative embodiment of the reclosable package 10 shown in Fig. 2A and 2B fourteen removable reclosure elements 40 having a T-shaped section are arranged around flange 12.

[0020] When reclosable package 10 is in the closed state removable reclosure elements 40 are engaged with flange 12 of support 11. Removable reclosure elements 40 are preferably arranged all around the product, so that package 10 can be easily reclosed regardless of the way it was opened. Alternatively, they could be arranged only on one side of package 10 with indications for the consumer regarding the correct side for opening the package.

[0021] Upon opening of the package removable reclosure elements 40 are indivisible, that is they do not separate into multiple complementary parts and retain their integrity.

[0022] Cover film 30 may be a single layer or a multilayer structure. Optionally cover film 30 can be coupled to layers of materials other than plastic materials, such as aluminum foil, paper or cardboard. In the latter case the various layers may be bonded together by any conventional and suitable method, e.g. coextrusion, extrusion coating, lamination etc. In case of a single layer

structure suitable polymeric materials are for instance polyolefins, such as ethylene homo- and co-polymers and propylene homo- and co-polymers, ionomers, polyamides, polyesters, polystyrene, poly(lactic acid) and the like. In case of a multi-layer structure suitable materials for the layer that will be sealed to support 11 (the heat-sealable layer) are as indicated above. Cover film 30 can be either oriented or non-oriented and in the former case it can be either heat-shrinkable or non heat-shrinkable. Generally, cover film 30 has a thickness comprised between 10 and 300 μm, preferably from 15 to 250 μm and even more preferably from 20 to 200 μm. In one embodiment of the present invention, when support 11 has a limited gas transmission rate, cover film 30 preferably comprises one heat-sealable surface layer facing product 50, one oxygen barrier layer and optionally one outer heat-resistant layer, wherein the outer heat-resistant layer is made, for instance, from materials chosen from the group of polyolefins, polyesters and polyamides.

[0023] In the embodiment of the reclosable package of the invention shown in Fig. 1A cover film 30 is sealed to support 11 by means of seal 16, which runs along flange 12 of support 11. Seal 16 can be positioned either inward or outward of the removable reclosure elements 40 with respect to product 50. When seal 16 is positioned inward of removable reclosure elements 40, as shown in Figure 1A, ingress of air into reclosable package 10 can be more efficiently prevented. Cover film 30 is secured to removable reclosure elements 40 by means of bond 15. Alternatively, seal 16 and bond 15 can partially coincide.

[0024] In the embodiment of the reclosable package of the invention shown in Fig. 2 cover film 30 forms a tight skin around product 50 and it is sealed to the whole surface of support 11 not covered by product 50 and removable reclosure elements 40 by means of seal 16. Cover film 30 is secured to removable reclosure elements 40 by means of bond 15.

[0025] Typically, cover film 30 is heat-sealed to support 11, preferably by means of a peelable seal. As used herein the term "peelable seal" refers to a seal which is strong enough to guarantee the hermeticity of the package during its life-cycle but which can be easily opened by tearing apart by hand the two materials that were joined by the seal. Peelable seals can be obtained, for instance, by sealing together layers of poorly compatible materials or by forming at least one of the layers of the materials joined by the seal with a blend of immiscible or partly immiscible materials.

[0026] Cover film 30 is secured to removable reclosure elements 40 by sealing, welding, glueing, stitching or by any other suitable mean known in the art. Typically, cover film 30 is heat-sealed to removable reclosure elements 40, preferably by means of a permanent heat-seal, that is a seal that cannot be opened without causing the destruction of at least one of the materials joined by the seal.

[0027] The different strength with which cover film 30 is bonded to support 11 and to removable reclosure elements 40 can be obtained in several ways. When support 11 and removable reclosure elements 40 are made of the same material seals 16 and 15 could be made using different heat-sealing conditions, for instance a higher temperature and/or pressure to form permanent seal 15. Alternatively, the surface of removable reclosure elements 40 could be coated with a heat-activated adhesive which will make seal 15 stronger than seal 16 even if the same sealing conditions are used. On the other hand, the different bond strength can be easily attained when support 11 and removable reclosure elements 40 are made of different materials by suitably selecting the sealing surface of removable reclosure elements 40 to give a stronger bond with cover film 30 than with support 11, even at the same sealing conditions, *i.e.* temperature and/or pressure. Other alternative methods of forming seals 15 and 16 having different strength could be used without departing from the scope of the invention

[0028] A second object of the present invention is a support 11 comprising a base for loading of the product to be packaged and a peripheral flange 12 outwardly extending from said base. A plurality of discrete and indivisible removable reclosure elements 40 is engaged with flange 12 and covers a fraction of the flange. Removable reclosure elements 40 can be engaged to support 11 after or, more preferably, before the product to be packaged is loaded onto the support. In the latter case this can be done right before the packaging operations take place or, alternatively, by the supplier of support 11 at his own production facility.

[0029] A third object of the present invention is a method of making a reclosable package 10, comprising the steps of:

- providing support 11 with removable reclosure elements 40 engaged thereon;
- placing product 50 over the base of support 11;
- laying cover film 30 over product 50;
- optionally evacuating and/or gas flushing the space between support 11 and cover film 30 with a suitable gas or gas mixture; and
- sealing cover film 30 to support 11 around product 50 and to removable reclosure elements 40.

[0030] Depending on the nature of the product to be packaged it may be desirable to modify the atmosphere inside reclosable package 10 before cover film 30 is heat-sealed to support 11. The atmosphere can be modified either by simply flushing with a suitable gas or gas mixture or by firstly evacuating and then back-filling with a suitable gas or gas mixture the space between support 11 and cover film 30. The gas or the gas mixture is selected to maximize the shelf-life of product 50. Preferred gases to replace evacuated air include oxygen, carbon dioxide, nitrogen, argon and mixtures thereof. Once this step has been completed, cover film 30 is then secured to both flange 12 of support 11 and removable reclosure elements 40. Preferably cover film 30 is heat-sealed to

flange 12 forming a peelable seal 16 encircling product 50 and is permanently secured to removable reclosure elements 40 by means of bond 15. The two operations can be carried out at different times or, preferably, at the same time.

[0031] In a first embodiment of the packaging method of the present invention cover film 30 is an oriented and heat-shrinkable film and the method further comprises subjecting cover film 30 to a sufficiently high temperature to shrink it either after cover film 30 is sealed to the container or during said sealing step.

[0032] The packaging method of the invention can be performed on currently available tray lidding machines, either automatic or manual, commercially supplied by, e.g., Ross Industries, Inc., Multivac, Inc. or Mondini S.p.A. with only minor modifications.

[0033] In a second embodiment of the packaging method of the present invention cover film 30 is placed over support 11 and product 50, is heated and stretched upwardly away from the product; the area between cover film 30 and support 11 is evacuated; cover film 30 is allowed to drape over product 50 and it is sealed on removable reclosure elements 40, on part of the flange 12 not covered by removable reclosure elements and on the part of support 11 not covered by product 50. Preferably, in said second embodiment of the packaging method, cover film 30, softened by heating, is stretched against the dome of a vacuum skin packaging chamber by means of vacuum applied to the area between cover film 30 and said dome. Draping of said film over and around product 50 is accomplished by releasing the vacuum pulling on cover film 30.

[0034] As shown in Fig. 2B, at the end of the packaging process cover film 30 forms a tight skin around product 50, touching almost the whole surface of product 50 not in contact with support 11. Cover film 30 forms a peelable seal 16 with the area of support 11 not covered either by product 50 or by removable reclosure elements 40 and it forms a permanent seal 15 with removable reclosure elements 40. Several methods can be employed to form peelable seal 16. For instance support 11could be made from a multi-layer structure comprising a thin heat-sealable food-contact layer adjacent to a layer consisting of a blend of resins having a low cohesive strength. Blends with low cohesive strength that can be used are for instance those described in WO99/54398. An alternative method could be to select the heat-sealable layers of both cover film 30 and support 11 to obtain a peelable seal. Suitable combinations of heat-sealable layers are for instance those described in WO 02/62575.

[0035] Generally both support 11 and cover film 30 comprise at least one layer of an oxygen impermeable material. Preferably support 11 is made of a rigid or semi-rigid multi-layer film which can be easily thermoformed. Cover film 30 is generally a non-oriented material with good formability.

[0036] The packaging method of the invention could be performed on currently available Vacuum Skin Packaging (VSP) machines, like the Multivac® CD6000 machine, by introducing minor modifications. In this type of machines a first web of material is thermoformed into the support part of the package, then the product is loaded and the supported product is advanced to a vacuum chamber where the top film is heated, stretched and then sealed to the support under vacuum. According to one possible modification of such process, after thermoforming of support 11 and before loading of product 50, separately produced removable reclosure elements could be engaged onto support 11. According to another possible modification, support 11 with removable reclosure elements 40 engaged thereon could be fed directly to the product loading section of a VSP machine, by replacing the thermoforming section of the machine with a conventional tray loading apparatus.

[0037] Reclosable package 10 can be opened by peeling cover film 30 open at seal 16. Removable reclosure elements 40 are disengaged from flange 12 and form an integral lid with cover film 30. Once the consumer has removed the amount of product required, package 10 can be reclosed by re-engaging removable reclosure elements 40 with support 11. Such a reclosure mechanism can be used repeated times without deterioration.

[0038] The reclosable package of the invention is therefore very convenient and simple to use. At the same time reclosable package 10 can be manufactured with no additional separate operations with respect to a conventional non-reclosable package.

Claims

1. A reclosable package (10) comprising a support (11), said support comprising a base for loading of the product to be packaged and a peripheral flange (12) outwardly extending from said base, a product (50) placed on said base and a cover film (30) placed over the product and sealed to said peripheral flange (12), wherein a plurality of discrete removable reclosure elements (40) are engaged with said peripheral flange (12) and overlay a fraction thereof, the cover film (30) is bonded also to said removable reclosure elements (40) and said removable reclosure elements (40) are indivisible upon opening of the package.

2. The reclosable package (10) according to claim 1 wherein the cover film (30) forms a peelable seal (16) with the flange (12) of the support and is permanently sealed to the removable reclosure elements (40).

3. The reclosable package (10) according to claim 1 wherein the cover film (30) forms a peelable seal (16) with the flange (12) of the support and with the part of the support (11) not covered by the product (50) and by the removable reclosure elements (40)

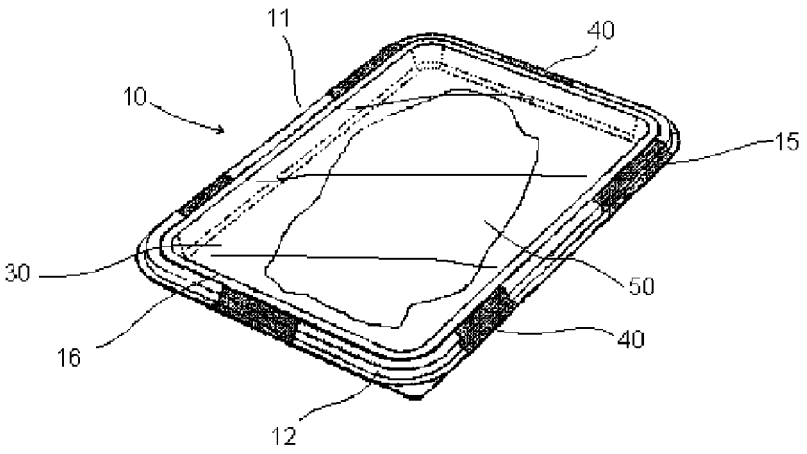
and is permanently sealed to the removable reclosure elements (40).

4. The reclosable package (10) according to claim 1 wherein the removable reclosure elements (40) are made of a material different than the material of support (11).

5. A support (11) comprising a base for loading of a product to be packaged and a peripheral flange (12) outwardly extending from said base, wherein a plurality of discrete and indivisible removable reclosure elements (40) are engaged with said peripheral flange (12) and overlay a fraction thereof.

6. A method for the manufacture of the reclosable package (10) of claim 1 comprising the steps of providing a support (11) comprising a base for loading of a product to be packaged and a peripheral flange (12) outwardly extending from said base and having removable reclosure elements (40) engaged thereon; placing a product (50) over said base; laying a cover film (30) over the product (50); optionally evacuating and/or gas flushing the space between the support (11) and the cover film (30) with a suitable gas or gas mixture; and securing the cover film (30) to said flange (12) and to the removable reclosure elements (40).

7. The method according to claim 6 further **characterized in that**, before evacuating the area between the cover film (30) and the support (11), the cover film (30) is heated and stretched upwardly away from the product (50); the area between the cover film (30) and the support (11) is evacuated; the cover film (30) is allowed to drape over and around the product (50) and is additionally sealed on the whole area of the support (11) not covered by the product (50).



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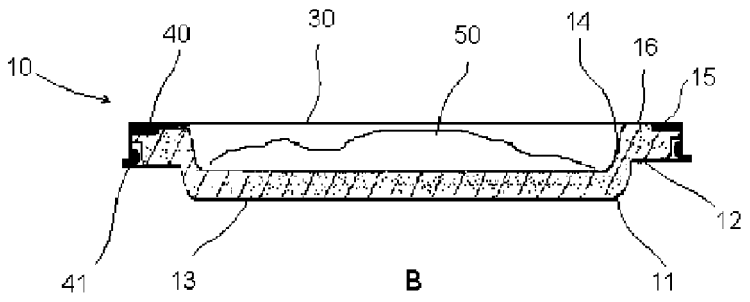

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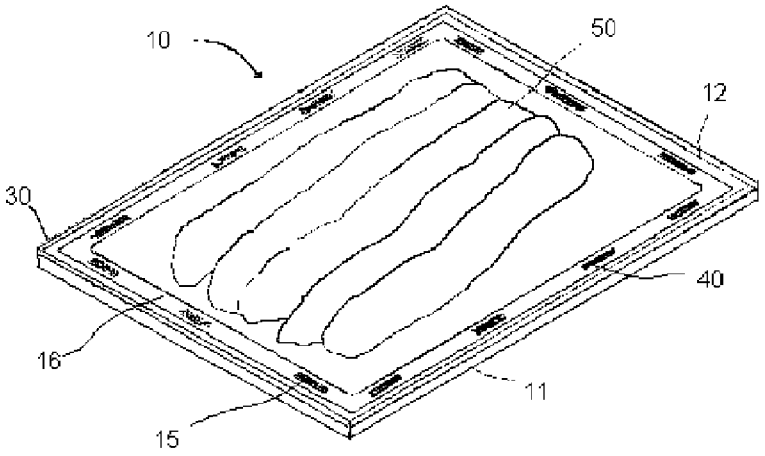
Fig. 1



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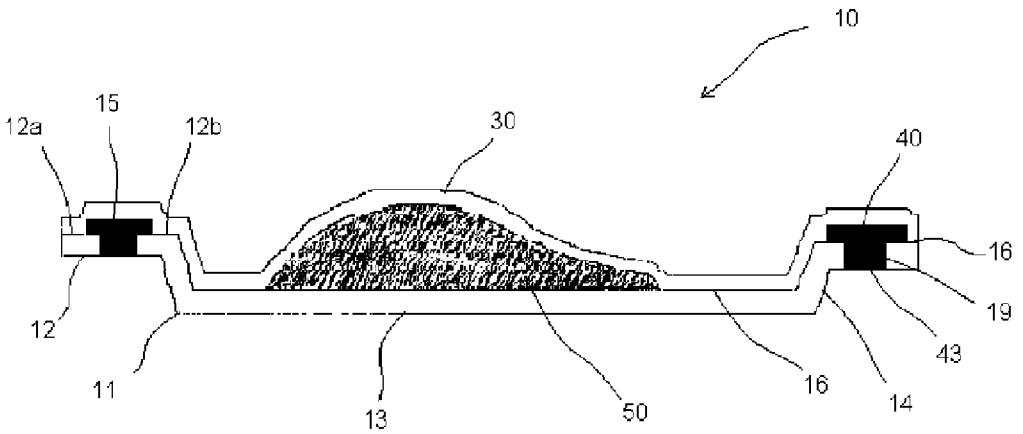

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Fig. 2

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 05 10 3183

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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	26 September 2005	Pernice, C

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 05 10 3183

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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