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(11) **EP 1 652 791 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
03.05.2006 Bulletin 2006/18

(51) Int Cl.:
B65D 77/20 (2006.01)

(21) Application number: **04105308.3**

(22) Date of filing: **26.10.2004**

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IT LI LU MC NL PL PT RO SE SI SK TR**
Designated Extension States:
AL HR LT LV MK

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(54) **Reclosable food package**

(57) The invention relates to a reclosable package 10 which comprises a rigid base member 11, a product 50 placed over said rigid base member, a cover film 13 laid over product 50 and sealed to rigid base member 11 wherein removable reclosure means 14 (114) are embedded in rigid base member 11 and cover film 13 is also

sealed to removable reclosure means 14 (114).

Also disclosed are a rigid base member 11 having removable reclosure means 14 (114) embedded therein and a method of making the reclosable package 10.

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Description

Technical field

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

Background art

[0002] Hermetically sealed rigid 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 therefore forcing the consumer to time-consuming repackaging operations.

[0003] Several attempts have been made in the past to provide reclosable rigid packages. For instance US 5,651,462 discloses a packaging comprising a tray and a flexible cover which is permanently sealed to the tray flange except at one edge where a reclosable interlocking seal is placed. Said interlocking seal includes a male closure profile and a female closure profile. In one embodiment the female closure profile has been incorporated into the flange of the tray, while the male closure profile is a separate piece which has been attached to the cover. In this proposal, the need to assemble separate components, such as the male profile, adds complexity and cost to the final package. Therefore there is still the need to provide a reclosable rigid package that does not require a number of separate steps to be manufactured.

[0004] A first objective of the present invention is a simple and easy to use reclosable package. Another objective is a rigid base member suitable to obtain a reclosable package which is simple to make. Still another objective of the present invention is a method of making a reclosable package that does not require additional steps with respect to the method for making a non-reclosable package.

Disclosure of the invention

[0005] A first object of the present invention is therefore a reclosable package comprising a rigid base member, a product placed on the rigid base member and a cover film placed over the product and sealed to the rigid base member all around said product, characterized in that removable reclosure means are embedded in the rigid base member and the cover film is secured to the removable reclosure means.

[0006] A second object of the present invention is a

rigid base member having removable reclosure means embedded therein suitable to obtain a reclosable package of the first object.

[0007] A further object is a method of making a reclosable package according to the first object of the invention. 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 in the closed state;

[0009] Fig. 2A and 2B show two further embodiments of the reclosable package of the present invention in the closed state;

[0010] Fig. 3A and 3B respectively show a perspective and a sectional view of a reclosable package according to one embodiment of the present invention in the open state.

Mode(s) for carrying out the invention

[0011] Figures 1A and 1B represent a reclosable package 10 according to one embodiment of the present invention. Reclosable package 10 comprises a rigid base member 11 and a product 50 placed on rigid base member 11. As used herein, the term "rigid" refers to a material that does not deform, bend or lose its shape when deprived of support. Rigid base member 11 comprises removable reclosure means 14 which are embedded in the rigid base. Preferably they are located around the periphery of rigid base member 11. Cover film 13 is placed over product 50 and it is sealed to rigid base member 11 along its periphery and all around product 50 by means of seal 16. Cover film 13 is also secured to removable reclosure means 14 by means of bond 12. Rigid base member 11 is shown in Fig. 1A and 1B in the form of a tray with a bottom wall 21 and four upwardly projecting side-walls 22 terminating with a peripheral flange 23, horizontally extending from the side-walls 22. Alternatively, rigid base member 11 can be in the form of a flat, dish-like support, as shown in Fig. 2A and 2B. Rigid base member 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.

[0012] Rigid base member 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, rigid base member 11 is made of a multi-layer material. Suitable polymers are for instance ethylene homo- and co-polymers, propylene homo- and co-polymers, polyamides, polystyrene, polyes-

ters, poly(lactic acid), PVC and the like. Part of the multi-layer material can be solid and part can be foamed. Preferably rigid base member 11 comprises at least one layer of a foamed polymeric material chosen from the group consisting of polystyrene, polypropylene, polyesters and the like. 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 rigid base member 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 rigid base member 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 rigid base member 11 is obtained from a sheet of foamed polymeric material having a film comprising at least one oxygen barrier layer and at least one surface sealing layer laminated onto the side facing product 50, so that the surface sealing layer of the film is the food contact layer of rigid base member 11. A second film, either barrier or non-barrier, can be laminated on the outer surface of rigid base member 11. Rigid base member 11 typically has a thickness in the range from 1 to 15 mm, preferably from 2 to 10 mm, and even more preferably from 3 to 9 mm. Rigid base member 11 is manufactured through common techniques such as thermoforming or injection moulding.

[0013] When reclosable package 10 is in the closed state removable reclosure means 14 are embedded in rigid base member 11. The term "embedded" is used herein to indicate that removable reclosure means 14 fit tightly into the complementary housings 17 present in rigid base member 11 in such a way that reclosure means 14 do not exceed the height of rigid base member 11. Removable reclosure means 14 are generally located at the periphery of rigid base member 11. In the case of a tray-like base member 11, such as the one shown in Fig. 1A and 1B, removable reclosure means 14 are positioned in the flange area 23.

[0014] Removable reclosure means 14 can be either one or more than one discrete elements having different sizes and cross-sections. For instance, in the package of the invention shown in Fig. 1A and 1B, four removable reclosure means 14, having a circular cross-section, are positioned at the corners of flange 23 of rigid base member 11. Alternative embodiments of the reclosable package of the invention are shown in Fig. 2A and 2B. Figure 2A shows a reclosable package 10 having a flat rigid base member 11 and one single removable reclosure mean 14, having a rectangular cross-section, positioned parallel to one of the edges of rigid base member 11.

[0015] Fig. 2B shows a reclosable package 10 having a flat rigid base member 11 and one removable reclosure mean 14 forming a continuous frame surrounding the product.

[0016] Removable reclosure means 14 are rigid elements preferably made of thermoplastic materials. Alternatively they can be made of any other material which is compatible with the overall package, such as cardboard, rubber, metal and the like. According to one preferred embodiment when the removable reclosure means 14 are made of a thermoplastic material any plastic material can be suitably employed such as polyolefins, rubbers, polyamides, polyesters, PVC and the like. They can be made of a material different from the one used for the rigid base member or, preferably, of the same material as rigid base member 11. Even more preferably removable reclosure means 14 are made of the same material as rigid base member 11 and are created by cutting rigid base member 11 during its manufacturing cycle in the right size and shape to give removable reclosure means 14. Removable reclosure means 14 can be cut from rigid base member 11 by using a laser beam, by means of knives or by any other suitable method known in the art. The cutting can take place at any stage of the rigid base member manufacturing cycle. The cutting of removable reclosure means 14 from rigid base member 11 can be complete, that is removable reclosure means 14 are totally separated from rigid base member 11 so that they are held in place, embedded in base member 11, only by friction. Alternatively, the cut can be partial either around the perimeter of removable reclosure means 14, or along its height, therefore reducing to a minimum the risk of losing removable reclosure means 14 from rigid base member 11 during the distribution step.

[0017] With respect to other solutions reclosable package 10 offers several advantages: firstly it eliminates the need of separately producing rigid base member 11 and removable reclosure means 14, secondly it eliminates the need of joining the two elements therefore reducing the number of operations to be carried out either by the rigid base member supplier or before the packaging operations take place.

[0018] Cover film 13, generally in sheet or web form, may be a single layer or a multi-layer structure. 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 the rigid base member 11 (the heat-sealable layer) are as indicated above. Cover film 13 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 13 has a thickness comprised between 10 and 100 μm , preferably from 15 to 75 μm and even more preferably from 20 to 60 μm . In one embodiment of the present invention, when the base member 11 has a limited gas transmission rate, cover film 13 preferably comprises one heat-seal-

able 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.

[0019] Cover film 13 is sealed to rigid base member 11 by means of seal 16, which runs along the periphery of rigid base member 11 encircling product 50. Seal 16 can be positioned either inward or outward of the removable reclosure means 14 with respect to product 50. When seal 16 is positioned inward of removable reclosure means 14, as shown in Figure 1A, ingress of air into reclosable package 10 can be more efficiently prevented. Cover film 13 is secured to removable reclosure means 14 by means of bond 12. Alternatively, seal 16 and bond 12 can partially coincide, thus reducing the part of rigid base member 11 taken up by the seals.

[0020] Cover film 13 can be secured to rigid base member 11 either at the same time or at a different time, either before or after, it is secured to removable reclosure means 14. Typically, cover film 13 is heat-sealed to base member 11, preferably by means of a peelable seal, that is a seal that can be manually pulled open by the consumer without damaging either cover film 13 or rigid base member 11. Cover film 13 is secured to removable reclosure means 14 by sealing, welding, glueing, stitching or by any other suitable mean known in the art. Generally, cover film 13 is heat-sealed to reclosure means 14, 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.

[0021] A second object of the present invention is a rigid base member 11 having removable reclosure means 14 embedded therein suitable for making the reclosable package of the first object of the invention.

[0022] A third object of the present invention is a method of making a reclosable package 10, comprising the steps of:

- providing rigid base member 11 with removable reclosure means 14 embedded therein;
- placing product 50 over rigid base member 11;
- laying cover film 13 over product 50;
- optionally evacuating and/or gas flushing the space between rigid base member 11 and cover film 13 with a suitable gas or gas mixture; and
- securing cover film 13 to base member 11 around product 50 and to removable reclosure means 14.

[0023] 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 13 is heat-sealed to rigid base member 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 rigid base member 11 and cover film 13. The gas or the gas mixture are 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 13 is then secured to both rigid base member 11 and to removable reclosure means 14. Preferably cover film 13 will be heat-sealed to rigid base member 11 forming a peelable seal 16 encircling product 50 and it will be permanently secured to removable reclosure means 14 by means of bond 12. The two operations can be carried out either at the same time or at different times. The different strength with which cover film 13 is bonded to rigid base member 11 and to removable reclosure means 14 can be obtained in several ways. When rigid base member 11 and removable reclosure means 14 are made of the same material seals 16 and 12 could be made using different heat-sealing conditions, for instance a higher temperature and/or pressure to form permanent seal 12. Alternatively, the surface of removable reclosure means 14 could be coated with a heat-activated adhesive which will make seal 12 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 rigid base member 11 and removable reclosure means 14 are made of different materials by suitably selecting the sealing surface of removable reclosure means 14 to give a stronger bond with cover film 13 than rigid base member 11, even at the same sealing conditions, *i.e.* temperature and/or pressure. Other alternative methods of forming bonds 12 and 16 having different strength could be used without departing from the scope of the invention.

[0024] 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.

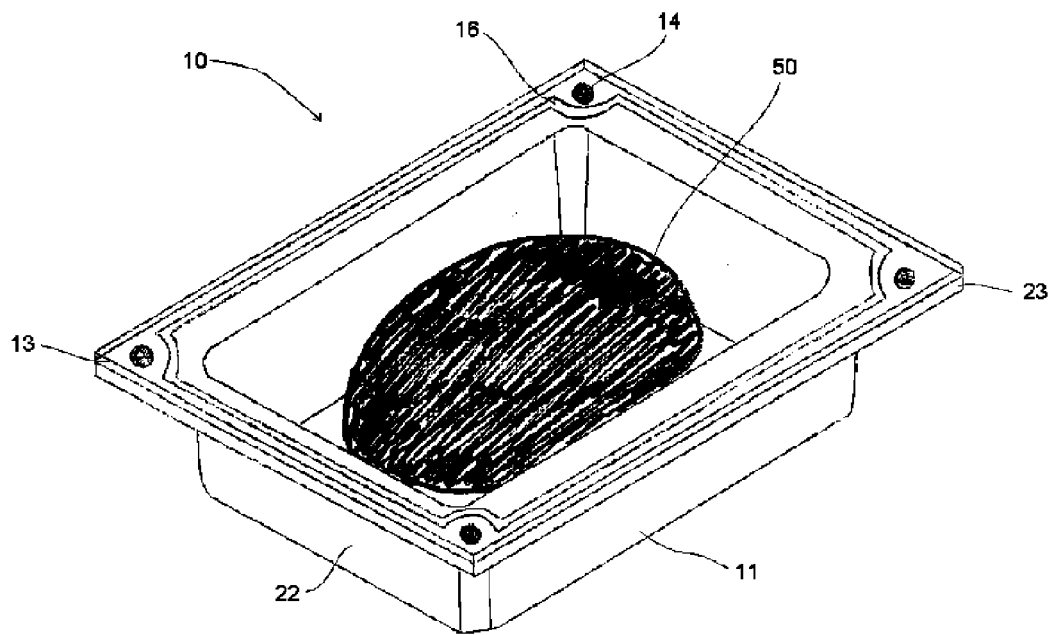
[0025] Reclosable package 10 can be opened by peeling cover film 13 open at seal 16. Fig. 3A and 3B show reclosable package 10 in its open state: removable reclosure means 14 have been pulled from their housings 17 in base member 11 and are integral with cover film 13. Alternatively, reclosure means can be firstly lifted from their housings 17 by pushing from below rigid base member and then used as a pull-tab to complete the opening of reclosable package 10. Once the consumer has removed the amount of product required, package 10 can be reclosed by inserting removable reclosure means 14 into the complementary housings 17. Such a reclosure mechanism can be used repeated times without deterioration.

[0026] 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.

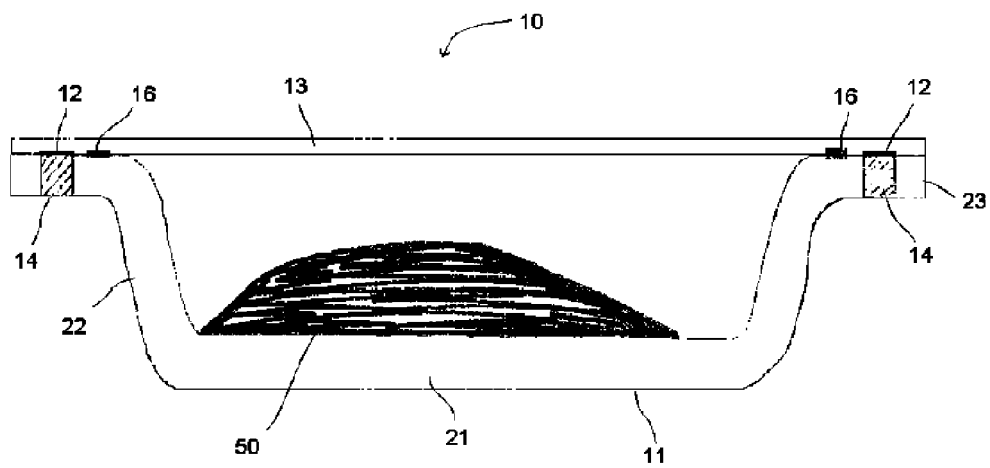
Claims

1. A reclosable package (10) comprising a rigid base member (11), a product (50) placed on said rigid base member (11) and a cover film (13) placed over the product (50) and sealed to the rigid base member (11) all around the product, **characterized in that** removable reclosure means (14, 114) are embedded in the rigid base member (11) and the cover film (13) is secured to said removable reclosure means (14). 5 10
2. The reclosable package (10) according to claim 1 wherein the cover film (13) forms a peelable seal (16) with the rigid base member (11) and is permanently secured to the removable reclosure means (14, 114). 15
3. The reclosable package (10) according to claims 1 or 2 wherein the removable reclosure means (14) are one or more discrete elements. 20
4. The reclosable package (10) according to claims 1 or 2 wherein the removable reclosure means (114) form one continuous frame around the product (50). 25
5. The reclosable package (10) according to any one of claims 1 to 4 wherein the rigid base member (11) comprises a foamed thermoplastic material chosen from the group consisting of polystyrene, polyesters and polypropylene. 30
6. The reclosable package (10) according to any one of claims 1 to 5 wherein the removable reclosure means (14, 114) are made of the same material as the rigid base member (11). 35
7. A rigid base member (11) of any one of the preceding claims having removable reclosure means (14, 114) embedded therein. 40
8. The rigid base member (11) according to claim 7 having partially attached removable reclosure means (14, 114).
9. A method for the manufacture of the reclosable package (10) of any one of claims 1 to 6 comprising the steps of providing a rigid base member (11) having removable reclosure means (14, 114) embedded therein; placing a product (50) over said rigid base member (11); laying a cover film (13) over the product (50); optionally evacuating and/or gas flushing the space between the rigid base member (11) and the cover film (13) with a suitable gas or gas mixture; and securing the cover film (13) to the base member (11) around the product (50) and to the removable reclosure means (14, 114). 45 50 55
10. The method according to claim 10 wherein the steps

of sealing the cover film (13) to the rigid base member (11) and securing the cover film to removable reclosure means (14, 114) take place simultaneously.

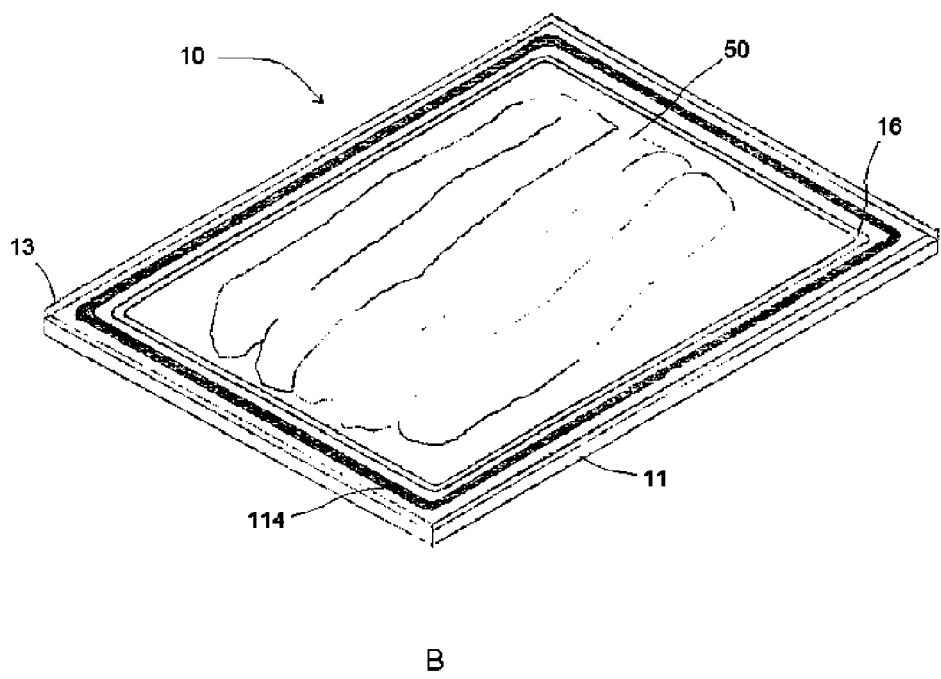
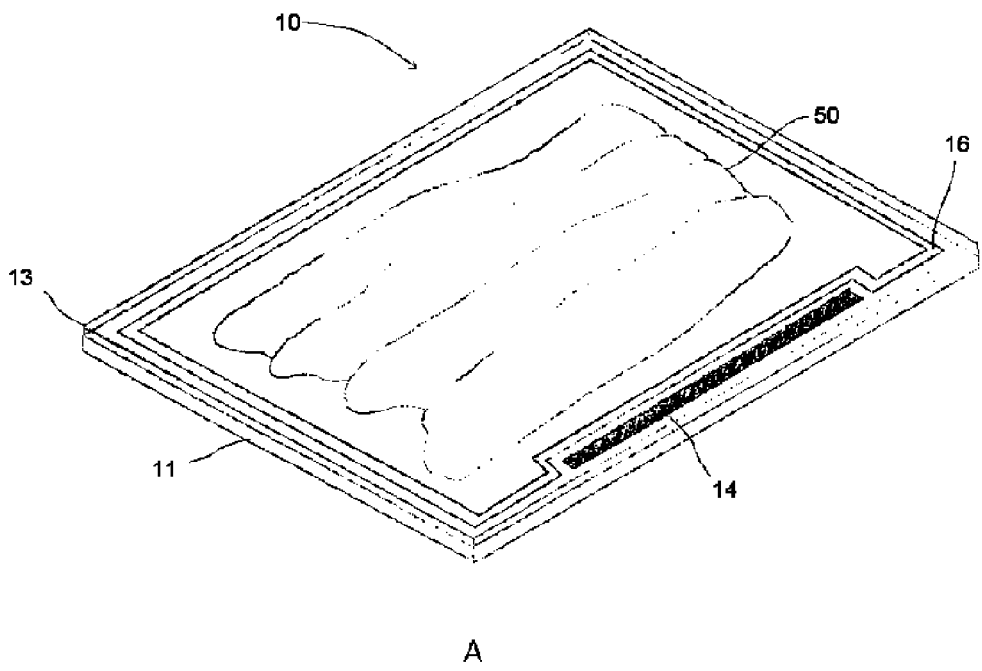


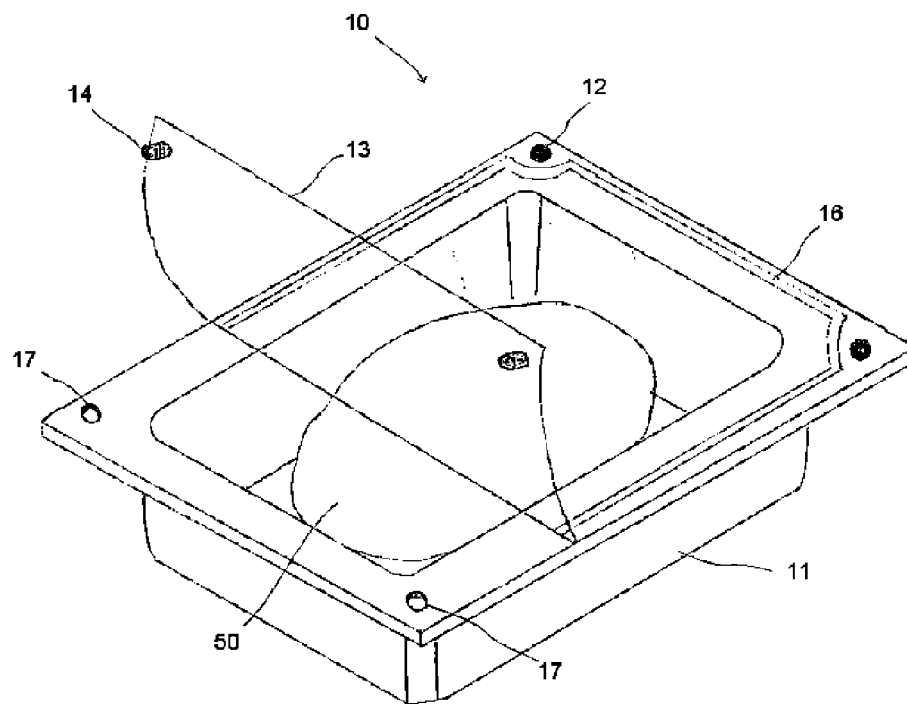
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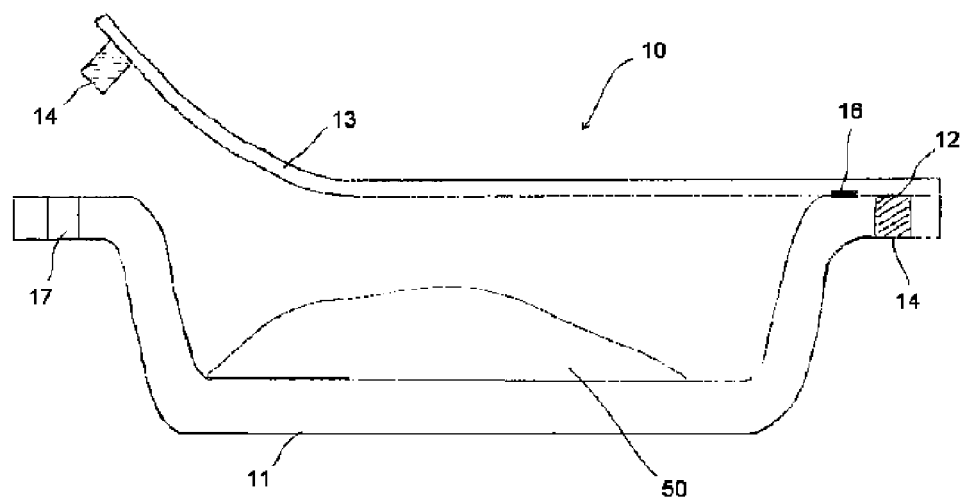
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Fig: 1





A



B

Fig: 3



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EUROPEAN SEARCH REPORT

Application Number
EP 04 10 5308

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X	US 6 691 886 B1 (BERNDT ET AL.) 17 February 2004 (2004-02-17) * column 3, line 56 - column 4, line 44 * * column 4, line 60 - line 64; figures 1,2,4 *	1-5,7-10	
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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 2 March 2005	Examiner Newell, P
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EPO FORM 1503 03/02 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 04 10 5308

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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