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(54) Chilled packaged dough product

(57) The invention relates to a chilled packaged dough product (1) suitable for vertical displaying comprising a package member (2) having a tray (20) with a bottom portion (21), the tray being closed by a sealing member (4) defining an interior cavity (23), a pre-garnished dough positioned within the interior cavity and holding means arranged to maintain the dough substantially adjacent to the the bottom when the package is exposed in a standing position in which the bottom portion is substantially vertically oriented. Preferably, the holding means comprise a bottom foil (50) onto which the dough is adhered by tackiness.

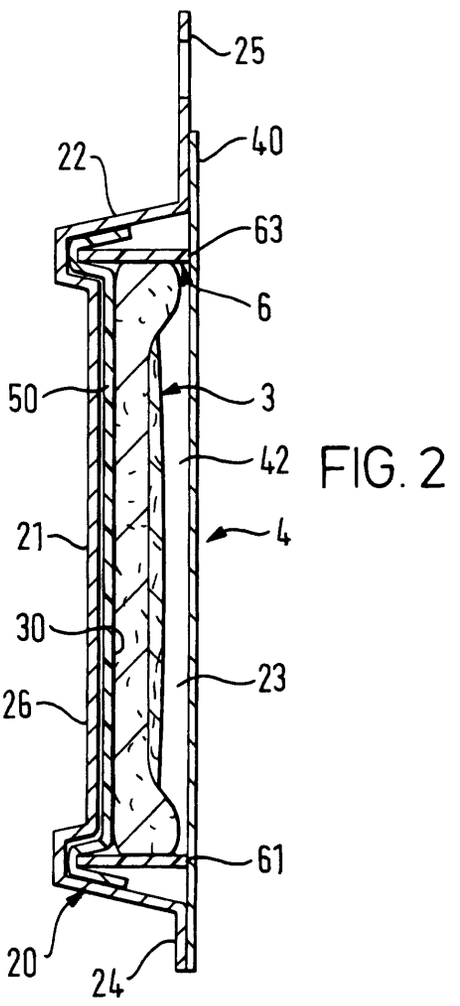

FIG. 2

EP 1 043 247 A1

Description

[0001] The invention relates to a packaging of chilled dough and the like. More particularly, the invention is well suited for a package assembly of a refrigerated raw dough presented in a flat configuration and pre-garnished with toppings and sauce such as a pizza and the like.

[0002] A wide variety of refrigerated raw doughs packaged in sealed containers are sold commercially. These raw doughs are generally not garnished but are simply rolled with a baking paper and are packaged in elongated trays. These doughs most commonly utilise chemical leavening agents or living yeast that produces carbon dioxide to proof the dough. The proofing process generates a quantity of gas within the container. The doughs have to be kept in packages having a room sufficient to keep the quantity of released gas under control during the proofing process.

[0003] EP 0 672 349 B1 discloses a package with a valve means particularly well suited for conserving raw dough under chilled conditions without risk of ballooning or bursting the package.

[0004] Contrary to frozen ready-to-bake dough product or pre-baked dough product such as pizza, "quiche Lorraine" or similar, the chilled dough is loosely held within the package so as to leave sufficient room to permit rising within the package during the manufacturing process and after. In frozen ready-to-bake or pre-baked dough products, the package is usually a shrinkable thin transparent foil which tightly wraps the toppings and dough together so that the dough can be manipulated without particular care. In addition, frozen pre-garnished dough has less tendency to loose its toppings as all the ingredients readily stick to the dough. Therefore, the shrinkwrapped dough products can be exposed both vertically and horizontally. These products may also be packaged in large cardboard box. However, cardboard box are not suited for chilled dough products as they are permeable to oxygen.

[0005] Until now, chilled dough product has always been packaged in sufficiently large sized packages that have required careful manipulation and storage conditions.

[0006] Commercially produced pre-baked dough products are displayed during sale in substantially horizontal position. For that, the packages are designed to resist vertical stacking in the refrigerated shelves. Horizontal displays of appealing products such as pre-garnished pizzas or similar with toppings is inconvenient since the product is not visible by the consumer. The consumer can be attracted by products which looks less savoury but which can be better shown off to its advantage.

[0007] One of the main objects of the invention is to propose a chilled pre-garnished dough product that has the capability to be displayed in a more commercially attractive manner in the shelves. Another object of the invention is to propose a chilled pre-garnished dough product that can be manipulated with less care during transport and storage until the dough is finally consumed. Another object of the invention is further to secure a pre-garnished dough product in a suitable package that can be stored under various spacial configurations as more desired by the distributor and/or the consumer. Another object of the invention is to propose a dough packaged in a way that adapts to the consumer's needs so as to promote increase of the sales of these types of food products.

[0008] For that, the invention relates to a chilled packaged dough product comprising a package member having a tray with a bottom portion and a peripheral wall portion. The bottom and peripheral portions define an interior cavity. A sealing member is attached to the tray and covers the interior cavity. A dough is positioned within the interior cavity. According to the invention, holding means are further provided and arranged so as to maintain the dough substantially adjacent to the bottom portion when the package is exposed in a standing position in which the bottom portion is substantially vertically oriented. Consequently, the packaged dough product of the invention can be more easily manipulated, stored and presented as desired including vertical presentation in commercial shelves. The package dough product when presented vertically in shelves becomes more visible and appealing for consumers. The substantially vertical presentation also gives the advantage that on-floor room can be saved compared to traditional ways of presenting chilled dough packages. As "substantially vertical" it is intended to cover positions between about 65 to 90 degrees, preferably 85 to 90 degrees, with respect to a horizontal plane. Within these defined ranges, the packaged dough product has a visibility which is very satisfactory. In the context of the present invention, the term "adjacent" has a relatively broad meaning that encompasses situations in which the dough is physically separated from the bottom portion by additional layers. However, the dough remains substantially adjacent in the sense that it is indirectly joined or contacted to the bottom portion.

[0009] In a preferred embodiment, the holding means comprises a bottom foil onto which the dough is adhered by tackiness. More particularly, the bottom foil has a contact layer with the dough having a humidity content at a level sufficient to have the dough durably attached onto it when the bottom portion of the tray is substantially vertically oriented at display. It is an important advantage to use the tackiness of the raw dough to serve the purpose for holding the dough within the package. Indeed, the dough is not at all affected in its shape or its general texture. The dough also conserves its freshness and appealing aspect under the usual required chilling conditions until the day of consumption. It has also been found that the dough keeps all its characteristics of crispiness and smoothness after baking.

[0010] In another preferred aspect of the invention,

the bottom foil comprises at least one layer of baking paper. Therefore, the paper advantageously serves the function of support of the dough in the package as well as it serves the function of cooking surface for the dough during the baking operation.

[0011] In another embodiment, the bottom foil is removably attached to the bottom portion of the tray by either mechanical attaching means or adhesive means that both are arranged in such a way that preserves integrity of the tray of the package member.

[0012] The doughs of the invention are preferably, although non exclusively, those which comprises living yeast or a chemical leavening agent such as a baking powder which so generates gas over time. Therefore, the package member is made of an impervious material to oxygen and comprises valve means operatively associated with the housing for allowing exit of gas from the interior cavity when the gas pressure exceeds a certain minimum value to prevent entry of oxygen into the housing. One of the features of the package resides in its capability to keep a substantially constant humidity level within the package which, in the context of the present invention, represents an important benefit as the dough is preferably hold by tackiness onto the package member.

[0013] The advantages and specific features of this invention will become apparent from the following detailed description, which, taken in conjunction with the drawings, discloses preferred embodiments of the present invention.

FIG. 1 is a top plan view of the packaged dough product when the product is displayed in a standing position according to the invention,

FIG. 2 is a cross sectional view of the packaged dough product taken along line A-A of FIG. 1,

FIG. 3 is an enlarged detailed cross sectional view taken along line B-B of FIG. 1,

FIG. 4 is a diagrammatic top plan view according to an embodiment of the invention,

FIG. 5 is an enlarged cross sectional view of a detail taken along line C-C of FIG. 4,

FIG. 6 and 7 illustrate a process step according to the invention,

FIG. 8 shows a diagrammatic view of the operative device for manufacturing the package dough product of the invention,

FIG. 9 shows the heat sealing step of the manufacturing process of FIG. 8,

FIG. 10 is a diagrammatic cross sectional view of the packaged dough product according to another variant of the invention.

[0014] In reference to FIG. 1, the packaged dough product of the invention is identified by reference numeral 1. The product has a package member 2 and a piece of dough 3 positioned within the package member. The invention is directed to raw dough, i.e., a fresh piece of dough that has not been pre-baked before packaging. The piece of dough is proposed in an unrolled configuration and it is garnished with toppings and a sauce layer with controlled thickness and viscosity at the chilled temperature. Compositions of dough of the invention comprises: wheat flour or other types of flour, water, fat, salt, yeast or/and chemical leavening agents. Chemical leavening agents such as baking powder typically comprise a leavening acid and a leavening base, the reaction of which results in the generation of carbon dioxide. The quantity of leavening agents or yeast is selected to provide the desired degree of leavening in the dough. Yeast could be used either alone or in combination with leavening agent. Yeast are living yeast such as those generally used in the bakery field. It is preferably selected from the general species S. Cerevisiae. Low Temperature Inactive type (LTI) of yeast are more preferred as they have a very low gassing activity at refrigerated temperature. EP 0 487 878 gives more details on the types of yeast that can be used for making dough, the entire content of which is incorporated herein by reference.

[0015] As best shown by FIG. 2, the package member 2 comprises a tray 20 which forms a recipient for the reception of the piece of pre-garnished dough. The tray 20 comprises a bottom portion 21 and a peripheral portion 22 that extends from the bottom portion to form the contoured side of the tray. Of course, the bottom portion could have other shapes such as rectangular or squared shapes without departing from the scope of the invention. The bottom and peripheral portions defines an interior cavity 23 of sufficient room allowing the dough piece to be positioned in an unrolled position and further to permit proofing of the piece of dough before opening of the package. The tray also presents lateral flanges 24 which form a continuation of the peripheral portion. The lateral flanges preferably extend on the periphery of the interior cavity in a substantially continuous manner. A hanging portion 25 is furthermore provided adjacent at least one side of the lateral flanges so as to serve to hang the packaged dough product in a substantially vertical position in the shelves. Thus, the disposal of a vertical series of several packaged dough products is made possible in a relatively reduced space. In general, the tray is made of polymeric material having properties of gas barrier. The tray can be made of a monolayer or a laminate. The tray may preferably be thermoformed. As an example, polypropylene film may be used alone or in conjunction with other types of layers such as aluminium layers.

[0016] A transparent or translucent sealing member

4 is attached to the lateral flanges of the tray so as to close the interior cavity. The sealing member or top web 4 has side edges 40 preferably sealed on the flanges. The top web preferably also comprises a one-way valve means 41 authorising carbon dioxide generated by the dough during storage to escape for avoiding any swelling of the assembly and for reducing the risks of burst. Generally, the valves operate as soon as the inside pressure reaches a certain predetermined level. For example, the valve can activate between 3 to 7 mbar above the atmospheric pressure. The interior cavity of the tray is sized so as to leave a headspace 42 between the dough upper surface and the sealing member 4. The headspace is advantageously at least partly filled by an inert gas such as nitrogen. It can be noted that the interior cavity is maintained at atmospheric pressure but that the volume of the package member can slightly vary from under-volume where the top web presents a concave configuration to an over-volume where the top web presents a convex configuration.

[0017] More details regarding the package member including the valve means can be found in EP 0 672 349 B1, the content of which is enclosed herein by reference.

[0018] In a first embodiment, the holding means comprises a bottom foil 50 located between the bottom portion 21 of the tray and the lower face 30 of the dough. The bottom foil holds the dough by tackiness. Tackiness is inherent of the raw dough at a certain level of humidity. However, in the context of the present invention, tackiness at the interface is preferably increased at a level sufficient to have the dough stuck to the bottom foil when the package is standing in the configuration of FIG. 1 and 2; i.e., the bottom portion 21 being in a substantially vertical or highly inclined position. Tackiness mainly depends on the constitution of the foil, the composition of the dough especially the water content plays an important role in controlling the tackiness. The bond created between the dough and the bottom foil must be durable. By durable, we intend a bond that can resist during all the period of chilled conservation; i.e., at least 4 weeks at about 8°C or at least 3 weeks at about 12°C when the packaged dough product is presented in vertical position. Suitable tackiness can be achieved by controlling the moisture content of the bottom foil and/or the dough, at least at the bonding interface between these two components. The bottom foil has preferably at least one baking layer. More preferably, the bottom foil is a two-sided siliconised baking paper. The baking phase will generally have the effect of suppressing the tackiness so that the dough can be easily removed from the baking paper. The baking paper has preferably a layer thickness from 0.05 to 0.5 mm so as to resist to the tearing effort of the dough as well as to provide a sufficient capacity of water absorption.

[0019] In the context of the invention, the dough is preferably maintained sufficiently spaced from the sealing member 4 while durably attached to the bottom foil so as to avoid degradation or accidental adhesion of the toppings against the surface of the sealing member and to also prevent the raw dough from deforming within the package member.

[0020] The bottom foil 50 is preferably removably attached to the bottom portion of the tray so it can follow the dough when the dough is baked in an oven. There is no need to separate the foil from the dough as the tackiness prevents from easily separating the created assembly. However, the attachment of the bottom foil to the tray must also be sufficiently secured to support the dough in the standing position. For that, a preferred embodiment consists in providing a ring-shaped support member 6 that mechanically applies onto the bottom foil a pinching action that keeps the foil attached to the bottom portion. Preferably, the support member 6 is positioned as a spacing element in pressure contact between the sealing member or top web 4 and the bottom foil. The support member 6 circumferentially delimits the outer contour of the dough. The support member may also participate in holding the peripheral edge of the dough depending how close the dough fits within its contour. The support member is oriented transversally inside the interior cavity so as to confer rigidity sufficient in direction toward the bottom foil. For that, the thickness and the elastic modulus of the support member are parameters which are precisely chosen for ensuring a proper rigidity. The relative elasticity of the tensed web 4, particularly in the vicinity of the side edges, participates to a proper control of the pinching action on the bottom foil. Preferably, the ring shaped support member is attached to the sealing member 4 to better secure it to the package assembly. For economical and practical processing reasons, it is advantageous that the support member be secured by heat sealing to the interior surface of the web 4. Discrete heat sealing joins 61, 62, 63, 64 can be provided at regular intervals along the periphery of the ring-shaped member. In an alternative, a continuous peripheral sealing join could also be produced as well. The ring-shaped member may be formed from a discontinuous rolled up band or in an alternative from a continous ring as well.

[0021] The ring-shaped member 6 is also chosen in a material having sealing compatibility with the top web. More preferably, the ring-shaped member is made of the same material as the material constituting the top web. For example, a composite laminate of PET/PE of thickness comprised between 0.150 to 1.2 mm, preferably 0.200 to 0.800 mm has shown good result both on rigidity and adhesive properties.

[0022] Other pinching means can be envisioned to replace the ring-shaped support member 6 that represents the preferred embodiment. For example, discrete mechanical pinching means such as local spacing elements can be inserted to support the bottom foil against the bottom portion of the tray. Pinching means provide the advantage to preserve the integrity of the closure of the package member while conferring an efficient way of removably attaching the bottom foil. In other alterna-

tives, the bottom foil can be stapled on the bottom portion. However, this last solution is not recommended, as it would affect the integrity of the impervious package. In another alternative, the bottom foil can be heat sealed to the bottom portion of the tray. In that case, the bottom foil will have a lower surface made of a material adapted to be heat sealed such as a thermofusible plastic layer.

[0023] FIG. 2 and 3 show a preferred detail of the invention in which the ring-shaped support member is further held by a main central depression 26 protruding in relief inside the cavity. Other off-set centring elements 64, 65, 66, 67 are positioned in each corner of the tray inside the interior cavity. Preferably, each centring element is positively shaped in the wall of the bottom portion itself so as to protrude inside the interior of the cavity along an effective depth that confers sufficient side support to the ring-shaped member. The centring means can be arranged to closely fit with the support member 6 so as to play a certain function in laterally pinching the portions of the bottom foil that extends beyond the support member 50 as illustrated in FIG. 3.

[0024] In a variant shown in FIG. 4 and 5 of the attached drawings, the bottom foil is removably attached to the tray by means of an edible sticky material that connects in a removable manner the lower surface of the bottom foil to the bottom portion of the tray. More particularly, a plurality of discrete pieces of an edible sticky material is provided between the bottom foil and the tray. Preferably, the pieces 70, 71, 72, 73 are evenly distributed under the bottom foil so as to produce a uniform attachment of the dough within the package in all possible standing positions the package may be turned. In another possibility (not shown), the bottom foil can be attached by a substantially continuous layer of the edible material so that it covers a major part of the lower surface of the bottom foil. Preferably, the edible sticky material is selected from the group consisting of fats and oils, e.g., margarine, butter, lard and combinations thereof. Good results so far have been obtained with standard baking margarine distributed on the bottom foil.

[0025] The advantage of a sticky material such as those listed above is that it remains substantially solid and of a relatively stiff and consistent texture at chilled conditions to provide a resistant bond suited for the purpose of the invention. At the same time, the foil can be removed without excessive effort by a manual pulling action on the foil. Removal is even facilitated without risks of tearing the foil after a short period at rest of the package in ambient or warm conditions until the sticky material is softened.

[0026] As previously explained, the raw dough is adhered onto the bottom foil by tackiness which level is mainly controlled by regulating the humidity level within the interior cavity and particularly at the interface between the dough and the bottom foil. As the cavity is preferably made impervious to low pressurised gas including water vapour, the humidity can be maintained at a sufficiently high level within the package. An effective way to reach the suitable humidity level at the interface between the foil and the dough is to submit the foil to water spraying illustrated in FIG. 6, the foil being previously attached to the tray as aforementioned. The foil is preferably made of an absorbent cellulose-based material that is capable of durably keeping a certain humidity level. After the foil has absorbed the required water quantity, the raw dough is placed in contact with the foil (FIG. 7). In another alternative, the dough water activity could be set to a sufficiently high value that makes the dough stuck to the foil without any need to spray water thereon.

[0027] FIG. 8 gives a schematic representation for manufacturing the packaged dough product of the invention according to a form-fill-seal device. A thermoformable material is supplied within a step-by-step thermoforming device 81 by a reel 80. The thermoforming occurs by heating and shaping the thermoformable material under vacuum to produce series of trays. Water spraying is then carried out in the moulded tray. After cooling, a pre-garnished dough 3 and its bottom foil 50 are deposited within the tray. Optionally, the bottom foil is positioned within the tray before the dough and water spraying is carried out directly on the upper surface of the bottom foil after positioning. Chilled conditions are simultaneously ensured at this stage of the process to prevent possible contamination to arise.

[0028] A reel 82 continuously supplies top web or sealing member. Then, the continuous top web layer is provided on the top of the continuous series of trays. An individual ring-shaped support member 6, if necessary, is properly introduced within its allocated tray before the top web is sealed. The assembly enters a sealing device 84 where the simultaneous sealing of the top web and support 6 onto the top web surface takes place. This sealing occurs first by evacuating air under vacuum, second by gas flushing with nitrogen or any suitable inert gas or CO_2 and third by heat sealing the top web on the flanges of the tray. Cutting each individual packaged dough product is carried out at a final stage by a cutting tool 85. Storage of the packaged dough product is maintained under refrigerated conditions between 0 to +8°C, preferably at +4°C. Under certain circumstances, it may be important to allow the packaged dough product to pause in a horizontal position during 2 to 5 days until the bottom foil is fully saturated of moisture so as to ensure a good adhesion of the dough onto the bottom foil. Then, the packaged dough product can be displayed in a standing position. When possible, the horizontal position of the packaged dough product can advantageously be maintained during transport to the distributing facilities.

[0029] FIG. 9 illustrates the sealing operation within the sealing device 84. The sealing device comprises a sealing plate 86 having two spaced apart sealing contact surfaces 87, 88 that respectively apply pressure while hot sealing onto the lateral flange 24 of the tray

and onto the region where the upper surface of the support member contacts the top web inner surface. A counterform of support 90 located below the flange 24 ensures a proper support of the flange and the top web 40 together during sealing.

[0030] The present invention is particularly suitable for packaging pre-garnished raw dough such as pizza, "Quiche Lorraine" and the like. The dough is preferably garnished with toppings including ham or tuna pieces, pepperoni, cheese, olive, vegetable pieces, eggs, etc. A sauce such as tomato sauce concentrate having a controlled viscosity makes the matrix on the top of the dough to prevent the toppings to fall down when the product is exposed in a standing vertical position.

[0031] FIG. 10 illustrates another embodiment of the invention in which the bottom foil 50 is attached to the bottom portion 21 of the tray by hanging means 68, 69. These means may advantageously be formed during the thermoforming operation of the tray. In the illustrated example, the hanging means may have a hooked shape. However, other configurations can be envisioned such as rods, spikes, needles, etc. They can be placed under the dough or in the area outside the contour of the dough.

[0032] In another embodiment (not shown), the bottom foil could be an integral part of the bottom portion of the tray. For that, the tray is made of a material withstanding oven temperatures ordinarily encountered in baking dough products. If a microwaveable dough is intended to be sold in a tray of the invention, the material used to form this tray obviously would be safe and adapted for use in a microwave oven.

[0033] Although the invention has been described in connection with a number of preferred embodiments, it is not so limited. Numerous variations within the scope of the appended claims will be apparent to those skilled in the art.

Claims

1. A chilled packaged dough product (1) wherein it comprises

a package member (2) comprising a tray (20) with a bottom portion (21) and a peripheral wall portion (22), said portions (21, 22) defining an interior cavity (23) and a sealing member (4) attached to the tray and covering the interior cavity,
a raw dough (3) positioned within the interior cavity,
holding means arranged to maintain the dough (3) substantially adjacent to the bottom portion when the package is exposed in a standing position in which the bottom portion (21) is substantially vertically oriented.

2. Packaged dough product according to claim 1, wherein the holding means comprises a bottom foil (50) onto which the dough is adhered by tackiness.

3. Packaged dough product according to claim 2, wherein the bottom foil (50) has a contact layer with the dough having a humidity content at a level sufficient to have the dough durably attached onto it when the bottom portion of the tray is substantially vertically oriented at display.

4. Packaged dough product according to claim 3, wherein the bottom foil (50) is removably attached to the bottom portion (21) of the tray and is made of a food-acceptable material adapted to be baked together with the dough.

5. Packaged dough product according to claim 4, wherein the bottom foil (50) comprises at least one layer of baking paper.

6. Packaged dough product according to claim 5, wherein the layer of baking paper is made of a water absorbent material.

7. Packaged dough product according to claim 6, wherein the baking paper is substantially at a degree of water saturation.

8. Packaged dough product according to any of claims 4 to 7, wherein the bottom foil (50) is removably attached to the bottom portion (21) of the tray by means of an edible sticky material that connects in a removable manner the lower surface of the bottom foil to the bottom portion of the tray.

9. Packaged dough product according to claim 8, wherein the edible sticky material is selected from the group consisting of margarine, butter, lard, fat, oil and wax.

10. Packaged dough product according to claim 8 or 9, wherein the bottom foil is attached by a plurality of discrete pieces (70, 71, 72, 73) of edible sticky material substantially uniformly distributed under the bottom foil (50).

11. Packaged dough product according to claim 8 or 9, wherein the bottom foil is attached by a substantially continuous layer of edible sticky material covering a major part of the lower surface of the bottom foil.

12. Packaged dough product according to any of claims 4 to 7, wherein the bottom foil is sealed to the bottom portion of the tray.

13. Packaged dough product according to claim 12, wherein the bottom foil is heat sealed to the bottom

portion of the tray.

14. Packaged dough product according to any of claims 4 to 7, wherein the bottom foil is attached by a release adhesive to the bottom portion of the tray.

15. Packaged dough product according to any of claims 4 to 7, wherein the bottom foil is maintained to the bottom portion of the tray by mechanical attaching means.

16. Packaged dough product according to claim 15, wherein the mechanical attaching means are pinching means of the bottom foil onto the tray.

17. Packaged dough product according to claim 16, wherein the mechanical pinching means comprises at least one spacing member positioned in contact between the sealing member and the bottom foil; the spacing member being oriented so as to confer a rigidity sufficient in direction toward the bottom foil.

18. Packaged dough product according to claim 17, wherein the mechanical pinching means is a ring-shaped spacing member (6) that circumferentially delimits the outer contour of the dough.

19. Packaged dough product according to claim 18, wherein the ring-shaped spacing member (6) is attached to the sealing member by heat seals (61, 62, 63, 64).

20. Packaged dough product according to claim 18 or 19, wherein the bottom foil extends beyond the limit of the ring-shaped member.

21. Packaged dough product according to claim 15, wherein the mechanical attaching means comprises means (68, 69) for hanging the bottom foil against the bottom portion of the tray.

22. Packaged dough product according to any of claims 4 to 7, wherein the bottom foil is an integral part of the tray.

23. Packaged dough product according to any of the preceding claims wherein the dough has a substantially rounded flat configuration comprising an upper surface garnished with toppings.

24. Packaged dough product according to any of the preceding claims, wherein the interior cavity is sized so as to leave a headspace between the dough upper surface and the sealing member.

25. Packaged dough product according to claim 24, wherein the headspace is at least partly filled by inert gas.

26. Packaged dough product according to any of the preceding claims, wherein dough comprises leavening agent which generates gas over time; the package member being made of an impervious material to oxygen and comprising valve means operatively associated with the housing for allowing exit of gas from the interior cavity when the gas pressure exceeds a certain minimum value to prevent entry of oxygen into the housing.

27. Packaged dough product (1) suitable for substantial vertical displaying comprising

a sealed package member (2) having a tray (20) closed by a sealing member (4) so as to define an interior cavity (23),
a dough (3) positioned within the interior cavity (23), the dough having a raw configuration, the dough having a top surface with toppings and sauce,
holding means arranged to have the dough adhered to the package member when substantially vertically oriented.

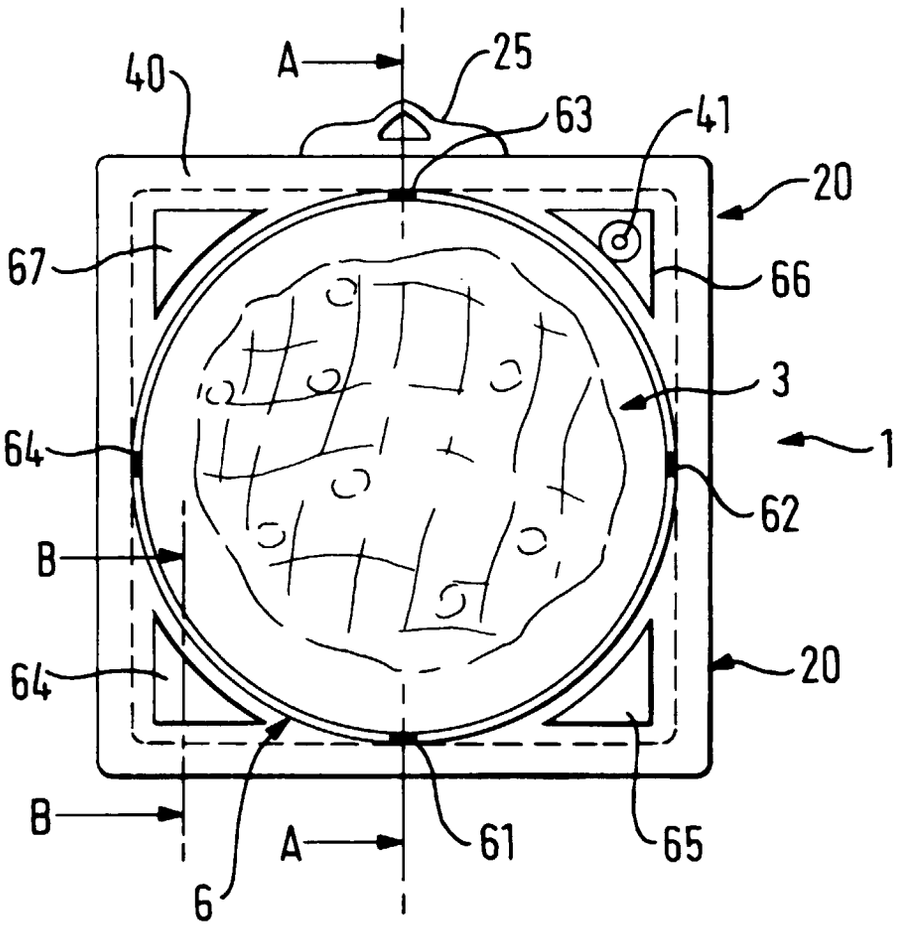

FIG. 1

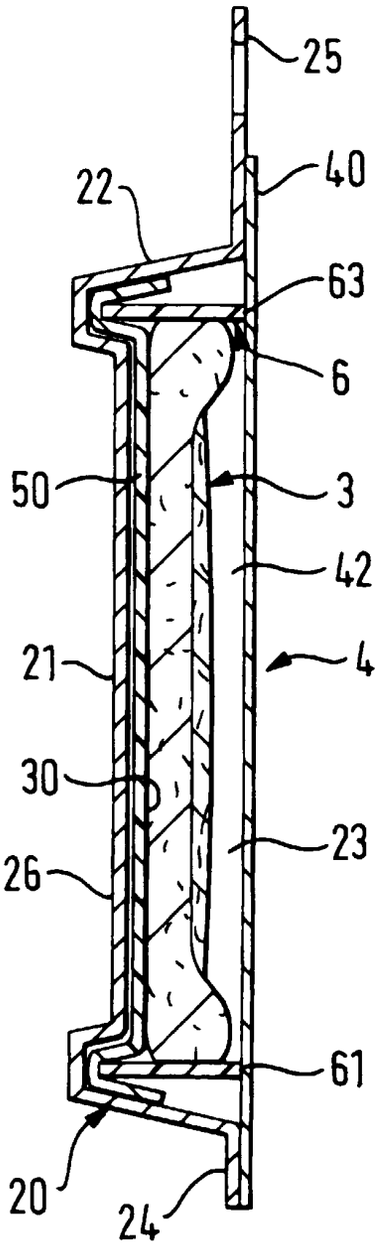

FIG. 2

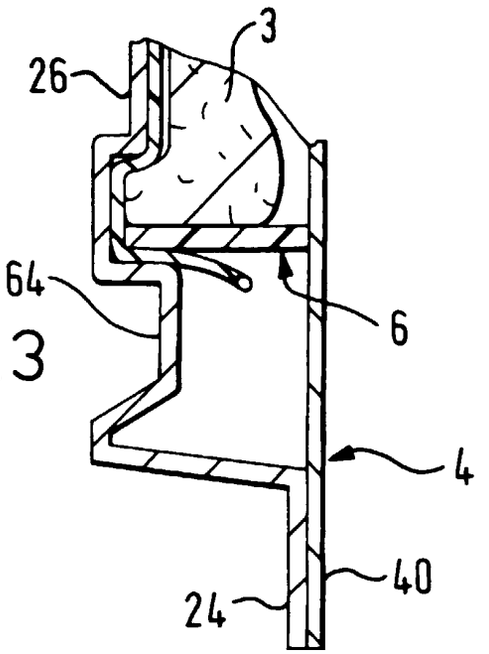

FIG. 3

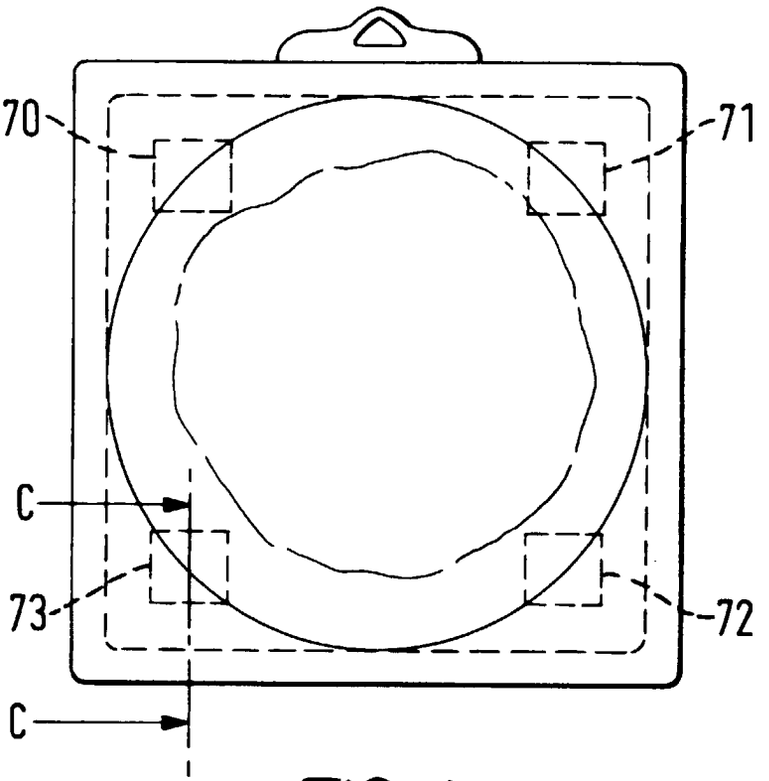

FIG. 4

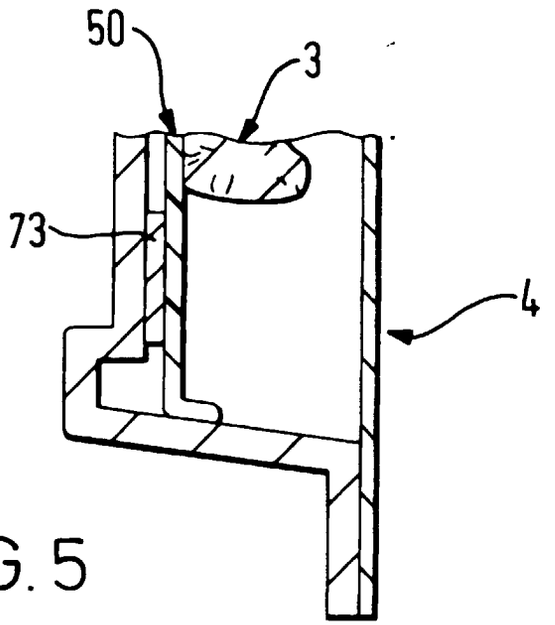

FIG. 5

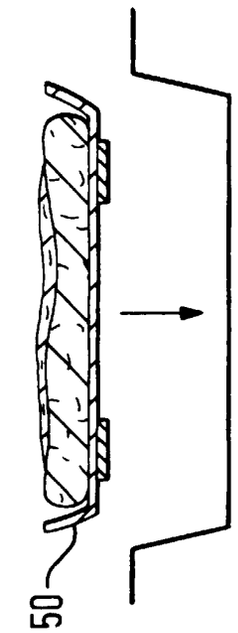

FIG.7

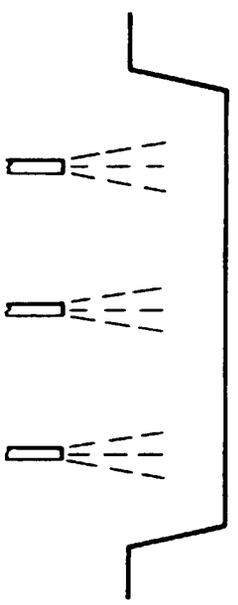

FIG.6

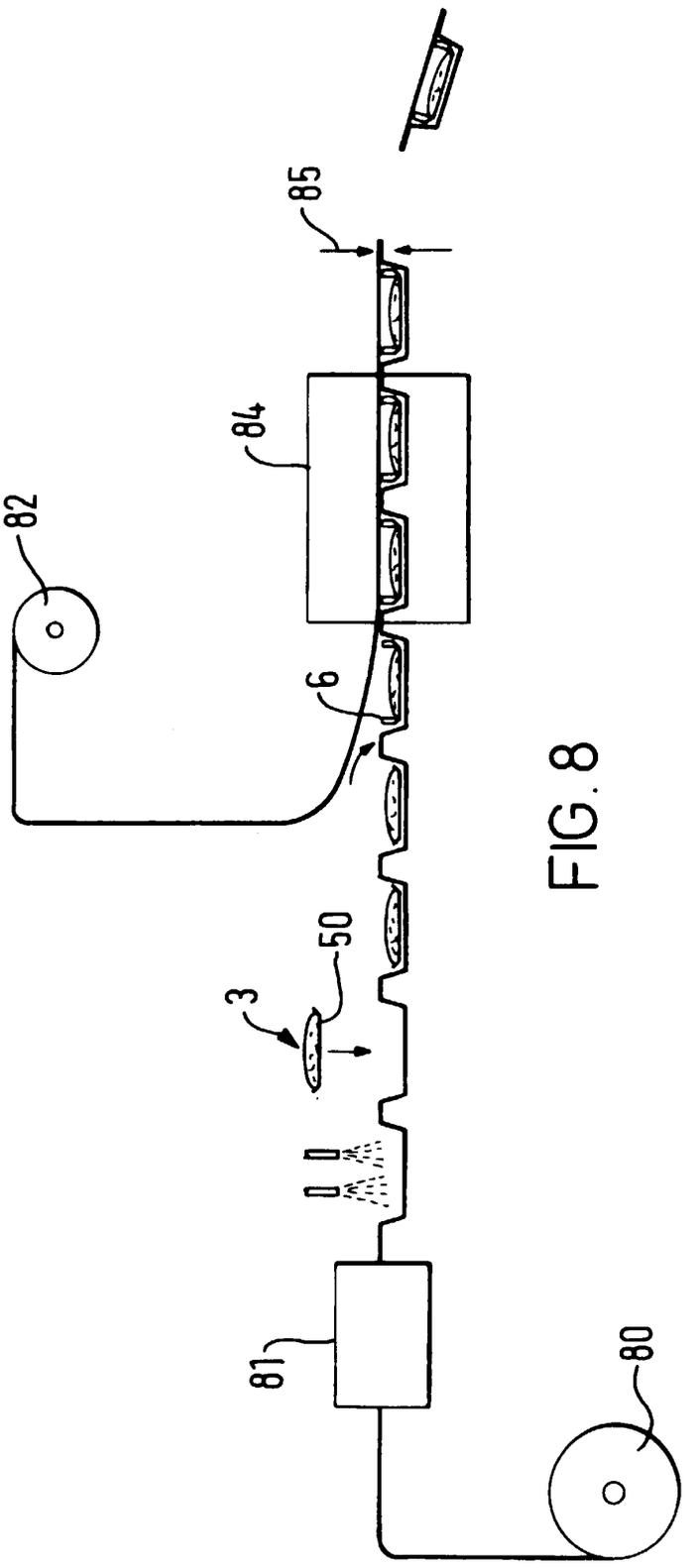

FIG.8

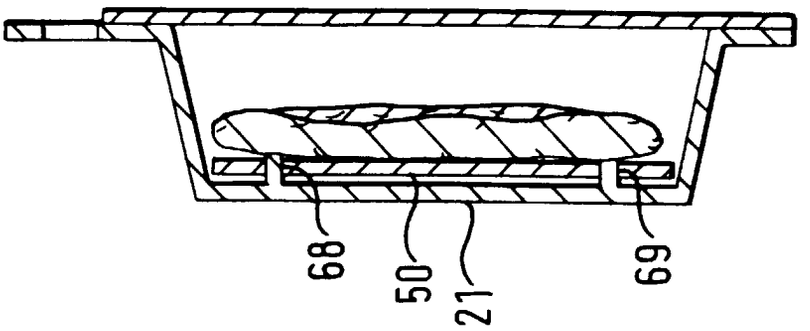

FIG. 10

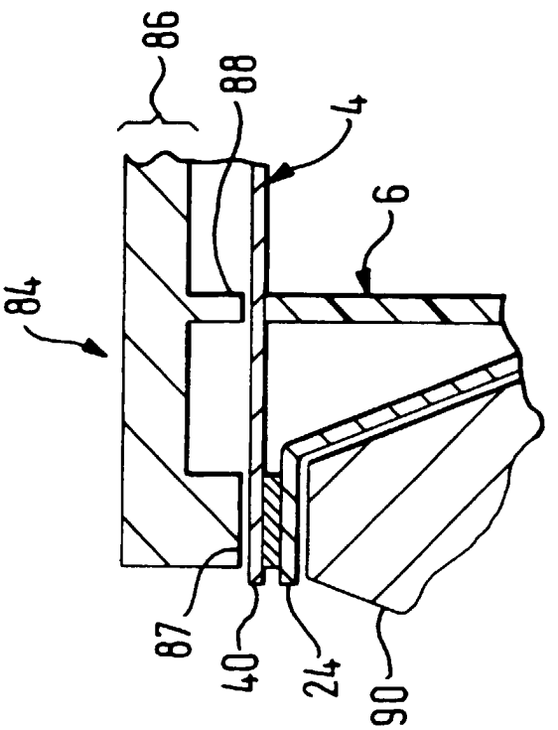

FIG. 9

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EUROPEAN SEARCH REPORT

Application Number
EP 99 20 1084

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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	14 September 1999	Berrington, N

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