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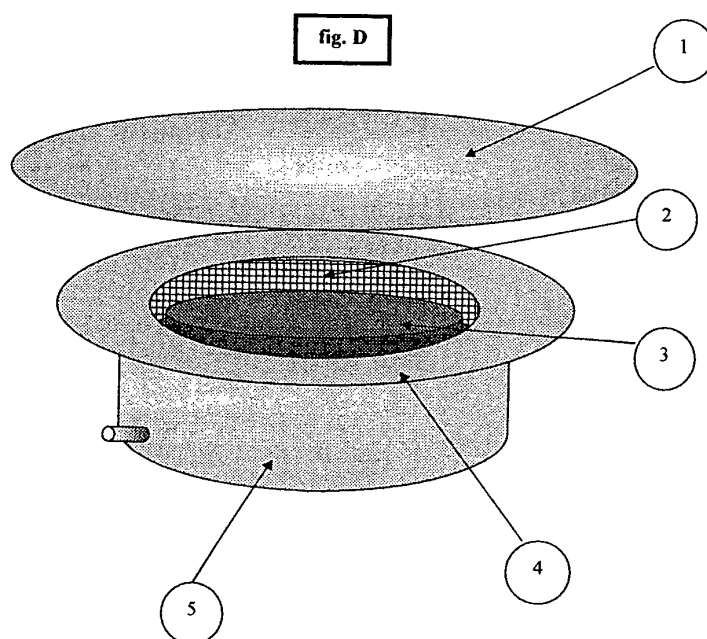
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(54) **Defrosting detector label**

(57) The present Idea has as object a label to be applied on the packages of the foods to be deep-frozen. It is made by a grid or net fixed on a base covered by a cap, contains a coloured liquid, filled through a hole which is then closed by a film or a plate. The liquid contained in the "**defrosting detector label**", is made by a mixture composed by water, alcohol and/or salt and/or sugar further to the coloring agent which has the feature (in com-

pliance of the elements mixing) of remaining liquid also at temperatures below centigrade zero. And to consolidate only at a prefixed temperature. The label is applied to the food packages before the deep-freezing. After the deep-freezing the label will have an icicle kept by the net reservoir without the cap. In case of defrosting, the icicle will melt at the prefixed temperature, revealing the defrosting.



Description

[0001] The present Idea has, as object, a label to be applied on the packaging of foods to be frozen. It is constituted by a grid fixed to a base covered by a reservoir (or cover) containing a colored liquid, the whole is closed by a film or a plate.

[0002] Everybody knows that one of the major problems relevant to food safety of the consumers, is foods preservation.

[0003] Particularly regarding deep-frozen foods and the risks connected with the cold chain interruption, the consumer cannot know if the product he is buying at the seller has been well preserved and has not suffered damages caused by the defrosting and the refreezing.

[0004] Up to now, the freezing temperature control of foods and the relevant monitoring and verification of the cold chain interruption, was made only with tracking systems and control in the refrigerators and transport means, but it was not possible to verify the correct preservation of the food by mean of a defrosting detector applied directly on the single package; the control was made only on big quantities, sometimes thousands of packages.

[0005] The task which intends this Idea is to offer to the producer and to the deep-frozen food reseller a valid and economic instrument to be applied on the packages of food on sale which grants to the consumer the continuity of the cold chain and allows him to verify this.

[0006] Further features of this Idea will be better pointed out through an analysis of the description of a preferred way of execution and application, but not exclusive, of a "defrosting detector label" described in indicative, but not limitative, way with the help of the annexed tables, in which:

- **Table. 1, fig A)** represents the three-dimensional view of the Idea with the cap applied on the net reservoir
fig B) represents the three-dimensional exploded view of the Idea
- **Table. 2, fig C)** represents the axonometric view of the Idea in section with the o-ring gasket mounted on the cap
fig D) represents the three-dimensional view of the Idea open on the sealing film side
- **Table. 3 fig E)** represents the three-dimensional view of the Idea sealed
fig F) represents the three-dimensional view of the Idea with the compartments variant
- **Table. 4, fig G)** represents the three-dimensional view of the Idea with the compartments variant containing the coloured mixtures
fig H) represents the three-dimensional view of the Idea applied on a box after having removed the cover
- **Table. 5, fig I)** represents the three-dimensional view of the Idea sealed with applied a clip for the application to the bags

fig L) represents the three-dimensional view of the Idea with more reservoirs

- **Table. 6, fig M)** represents the axonometric view of the Idea in section with the o-ring gasket mounted on the base

fig N) represents the axonometric view of the Idea in section with the cap closed by mean of threading

- **Table. 7, fig O)** represents the axonometric view of the Idea in section with the cap closed by mean of bayonet system

fig P) represents the axonometric view of the Idea in section with the grilled reservoir closed by mean of the thermo retractile film

[0007] The liquid contained in the "defrosting detector label", is made by a mixture of water, alcohol and colouring agent.

[0008] The quantity of alcohol is in percentage on the mixture and changes depending from the desired freezing temperature degree, also the colouring agent quantity will be in varying percentage depending from the desired chromatic intensity.

[0009] The "defrosting detector label" is individually manufactured, it is preferably made in plastic. The "defrosting detector label" is made by a grilled or net reservoir (**fig. B 2 and fig. C 3**), fixed to a flat base (**fig. B 5 and fig. C 5**) perforated in the center (**fig. B 4 and fig. C 7**).

[0010] **Defrosting detector label**, as per the previous claims, where the unique body obtained by welding the reservoir on the base plate, can be obtained by mean of thermo plastic moulding, metal drawing or by mean of other systems which allow to obtain a sole object without intermediate assembling phases.

A cap o cover (**fig. B 1 and fig. C 1**) is applied with gaskets (**fig. B 8 and fig. C 2**) to the seat made in the base (**fig. B 7 and fig. C 6**).

[0011] The whole makes a reservoir (**fig. D**) which, if reversed and kept in horizontal position can be filled with a mixture of water, alcohol and coloring agent (**fig. D, 3**).

[0012] Once made the filling operation with the desired liquid, it is possible to proceed to the sealing operation (**fig. E**) applying a film or a plate (**fig. D 1 and fig. E 1 and fig. C 8**) to the base (**fig. D 4**) on the opposite side of the cap (**fig. B 6 and fig. D 5**)

[0013] The "defrosting detector label", can also be made with the reservoir containing the liquids divided in more compartments (**fig. F 5**) in this case the filling of each compartment, separated one from the other (**fig. F 1, 2, 3, 4**), will be made with single mixtures of different colours and different compositions (**fig. G 1, 2, 3, 4**)

[0014] The result will be a special label to be applied by mean of glue or welding (**fig.H 1**) or staples (**fig.H 2**) or clips (**fig.I 1**) or by mean of other systems both on boxes (**fig.H 6**) and on bags.

[0015] The containing cap on the mixture, which covers the net reservoir, can be fixed to the base plate in

hermetic way by mean of o-ring gasket, mounted on the cap rim (**fig. B 8 and fig. C 2**) and fixed to the plate by mean of a suitable groove (**fig. B 7 and fig. C 6**).

[0016] Another system could be using a base plate modified such a way to be shaped instead of flat (**fig. M 3**) in this way it will be possible to apply the o-ring gasket on the external vertical rim (**fig. M 2**) in order to allow the cap to be hermetically fixed to it (**fig. M 1**) and allow to the sealing film or plate (**fig. M 4**), to be welded to the underneath predisposed rim (**fig. M 6**) to completely close the liquid entrance hole (**fig. M 5**).

[0017] Another system could be the one where the cap can be screwed by mean of a thread (**fig. N 1 and 2**) which pressing on the shape opportunely predisposed on the base plat, allows its hermetic closure. Obviously in this case the cap will be removed by unscrewing it.

[0018] Further it would be possible to decide for the closure of the cap on the grilled reservoir with the bayonet system, (**fig. O 1 and 2**) also in this case the cap will be removed by unscrewing.

[0019] Another system to seal the net reservoir allowing it to be filled, is to use a coating obtained by applying a thermo retractile plastic film (**fig. P 1**), it will be equipped with a grip (**fig. P 3**), which by mean of the tang pulling (**fig. P 2**), will allow the total removing of the coating (in the same way that happens with the cap or cover before described).

[0020] Once the "defrosting detector label" has been manufactured and filled with the desired mixture, it will be applied on the package which will contain the food to be deep-frozen, then it will proceed to the phase of temperature abatement.

[0021] At the end of the deep-freezing process, the cover or cap will be removed by pulling the suitable lever or tangs (**fig. B 9 and fig. H 4**) of the "defrosting detector label", in this way we will have the mixture (water, alcohol and coloring agents) consolidated, or an icicle (**fig. B 3, C 4 and H 3**), kept by the grid (**fig. H 5**) by which is made the grilled or net keeping reservoir (**fig. B 2 , C 3 and D 2**).

[0022] In the case when the deep-frozen food is exposed to such temperatures to start the defrosting process, automatically also the mixture contained as ice in the net reservoir of the "defrosting detector label", will start to melt. Consequently if the defrosting process does not stop quickly, the icicle of colored mixture will melt leaving empty the net reservoir; this will allow everybody to verify the defrosting of the food.

[0023] It is possible to manufacture the "defrosting detector label", also with a variant made by several compartments (**fig. F 5**) which can contain mixtures composed by solutions of water with percentages of alcohol and coloring agents different one from the other (**fig. G 1, 2, 3, 4**); marked by the possibility of defrosting (each mixture) at different temperatures.

[0024] As simple example, if in one compartment will be poured a mixture with deep-freezing and consequent consolidation at -18 centigrade degrees temperature

(**fig. G 1**) in the others can be poured mixtures with higher deep-freezing points: - 12 centigrade degrees (**fig. G 2**); - 8 centigrade degrees (**fig. G 3**); - 2 centigrade degrees (**fig. G 4**).

5 [0025] In this way, in case of defrosting, it will be possible to verify the temperature at which occurred the phenomenon (because each icicle will melt at the prefixed temperature) so that the user can understand if the food defrosted in an irreparable way or if it is still edible or in
10 any case still inside the food safety limit.

[0026] Considering that the normal drinkable water deep-freezes at zero centigrade degrees, adding to it alcohol and/or salt and/or sugar, there will be an "icing" process at below centigrade zero temperatures, the "icing" point will change depending from the composition of the mixture or of the proportion of water with alcohol;
15 or/and with sugar; or/and with salt diluted in it.

[0027] The liquid forming the mixture contained in the "defrosting detector label", can be composed also by
20 mixtures different from those above indicated of other chemical/physical nature, but each one of them must necessarily have the feature of remaining liquid also at temperatures below centigrade zero and deep-freezing only from a settled temperature degrees and below.

25 [0028] For example: if it is desired that the mixture deep-freezes and consolidate at - 10, up to that temperature it will have to- remain liquid and anyhow do not consolidate and deep-freeze and ice from -10 centigrade degrees and beyond, this mean at lower temperature.

30 [0029] From what above described, it is possible to see that the Idea reaches the desired aims. The same Idea as it is designed and studied is susceptible of variants and changes, in compliance with the technical needs, all included inside the inventive concept.

35 [0030] The colors of the used liquids can be different from those above described and the defrosting temperatures can change in compliance with the needs.

[0031] The "defrosting detector label", can be made with only one reservoir containing only one liquid (**fig.D**),
40 or with a reservoir with 2 or more compartments separately containing liquids, each one with a different color (**fig. E**) and different defrosting point. Or the "defrosting detector label", can also be composed by more reservoirs similar or different in shape and dimensions, put beside in order to make an unique body; each reservoir can contain a liquid different in color and kind of mixture with a different defrosting thermal degree, in compliance with the needs. (fig. L).

[0032] The material used for the building of the "defrosting detector label", (except for the liquid constituent the mixture) can be plastic or similar, metal, glass, backed clay, or of any kind in nature and value, which allow its making, granting the above said features.

45 [0033] The shape, the sizes, the mixture colors and the way to apply the label can change in compliance with the needs requested by the user, settled the inventive concept.

Claims

1. **Defrosting Detector Label**, composed by a base made with a center perforated flat plate, possibly in flat shape modeled in different ways. 5
2. **Defrosting Detector Label**, as per the previous claim, where a perforated reservoir, made by a net or a grid, is fixed or welded, along its rim, in a permanent way on the perforated plate, around the central hole. 10
3. **Defrosting Detector Label**, as per the previous claims, where the unique body obtained by welding the reservoir on the base plate, can be obtained by mean of thermo plastic moulding, metal drawing or by mean of other systems which allow to obtain a sole object without intermediate assembling phases. 15
4. **Defrosting Detector Label**, as per the previous claims, where the grid or net is closed by a cover or a cap equipped with an o-ring gasket, mounted on the rim, which fits in the groove made on the plate in correspondence with the external perimeter of the net reservoir. 20 25
5. **Defrosting Detector Label**, as per the previous claims, where the hermetic closure of the cap or cover on the net reservoir, can be done by mean of a threading cut on the cap and on the base plate (opportunely modified) with the gasket mounted on the base plate in correspondence with the stop on the cap edge. 30
6. **Defrosting Detector Label**, as per the previous claims, where the o-ring gasket is mounted directly on the vertical central and circular stud of the base plate (opportunely modified) and the cap or cover will have fixing systems suitable for the specific gasket. 35 40
7. **Defrosting Detector Label**, as per the previous claims, where the hermetic closure of the cap or cover on the net reservoir, can be done also by mean of bayonet binding. 45
8. **Defrosting Detector Label**, as per the previous claims, where in the upper side of the cap are mounted pins or tangs which make easier the unscrewing or the mechanical and pull removing. 50
9. **Defrosting Detector Label**, as per the previous claims, where in order to seal the net reservoir (in alternative to the cap) allowing it to be filled with the desired mixture, it is possible to use a coating by mean of the application of a thermo retractile plastic film this will be equipped with a tang to remove it by pulling the tang. 55
10. **Defrosting Detector Label**, as per the previous claims, where by reversing the label, will be obtained a double reservoir to contain liquids composed by a net perforated reservoir covered by a cap or a film.
11. **Defrosting Detector Label**, as per the previous claims, where the double reservoir can also be divided in two or more compartments.
12. **Defrosting Detector Label**, as per the previous claims, where the double net reservoir is filled with a liquid composed by a coloured mixture with the feature of frosting and becoming solid creating a coloured icicle at a temperature of several degrees below zero centigrade.
13. **Defrosting Detector Label**, as per the previous claims, where the composition of the mixture is on the base of water coloured with pigments with the addition, in solution, of alcohol and/or salt and/or sugar, in variable quantities established on the base of the wished cryogenic point. The mixture to be frosted can be composed also by other liquids and mineral salts different than those indicated, but allowing the mixture to consolidate because of the temperature below zero centigrade. Namely, if it is desired to have the mixture frosted at -10 centigrade degrees, it has to be composed a mixture which does not consolidate but remains liquid up to that temperature; it will consolidate at lower temperatures.
14. **Defrosting Detector Label**, as per the previous claims, in the version built with more compartments, the mixtures can be of different colors on the base of the different composition and different frosting temperature degree and relevant desired consolidation.
15. **Defrosting Detector Label**, as per the previous claims, where a sealing film or plaque will hermetically close by mean of welding or gluing or pressure the entrance hole (of the liquid/s composing the coloured mixture) in the double reservoir.
16. **Defrosting Detector Label**, as per the previous claims, where the sole label can be mounted on any packaging and on boxes, to which will be applied by gluing or welding or stapling or other mechanical fixing systems, and on bags by mean of the special clip or string provided for the purpose on the label.
17. **Defrosting Detector Label**, as per the previous claims, where the label containing the liquid composed by the coloured mixture will be applied to the packaging before the frosting process, when the frosting of the product will be completed, the protection cover or cap will be removed by pulling or unscrewing it. In this way it will remain a colored icicle

kept by the net reservoir, fixed to the base of the label applied to the packaging.

18. Defrosting Detector Label, as per the previous claims, where in case of defrosting because of temperature increase, the colored icicle will defrost at its temperature degree, dispersing and leaving empty the net reservoir. 5

19. Defrosting Detector Label, as per the previous claims, where the materials used for the building can be plastic or similar, glass and/or by products, backed clay, metal but also of any kind in nature and value, on condition that they allow its making, respecting the inventive concept. 10
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fig. A

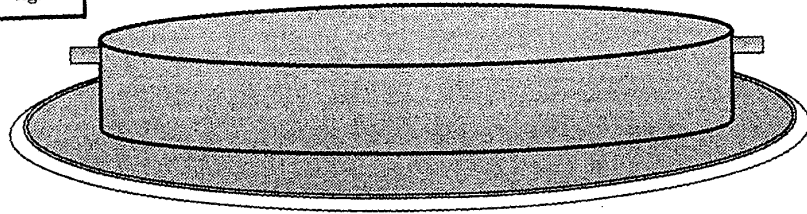


fig. B

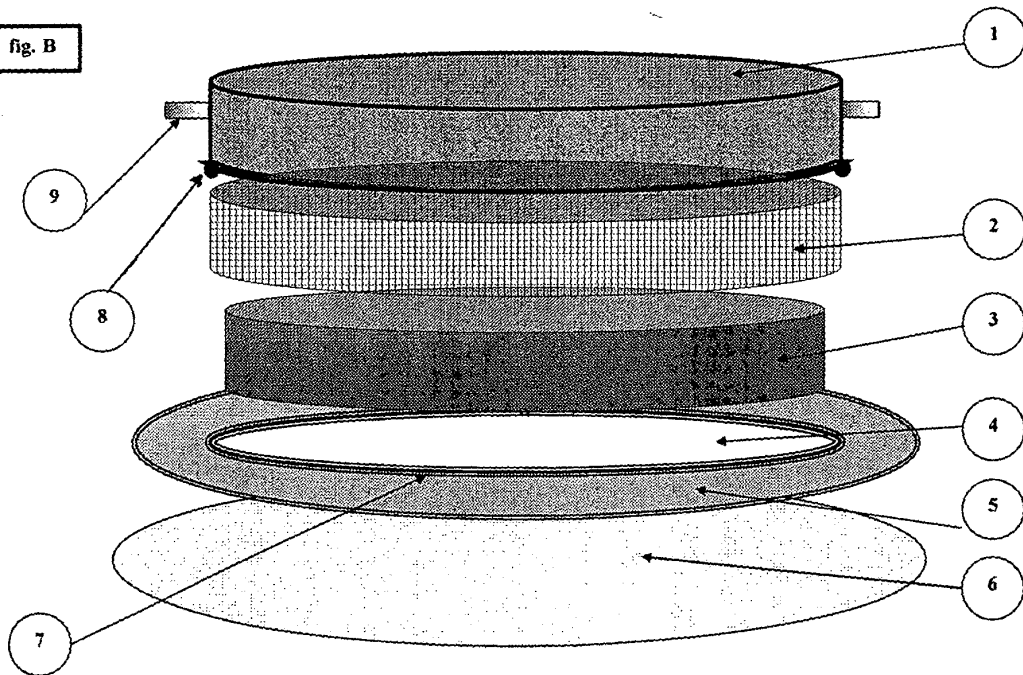


fig. C

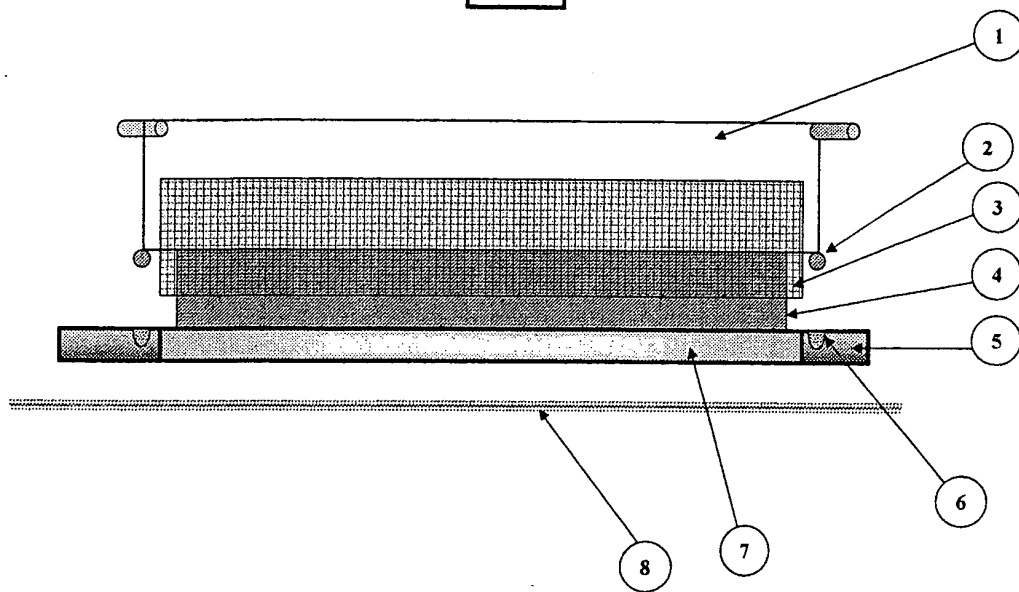


fig. D

