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CHARLOTTE, NC 28280-4000 (US)**(52) **U.S. Cl. 428/34.8**(57) **ABSTRACT**(21) Appl. No.: **11/719,655**(22) PCT Filed: **Nov. 15, 2005**(86) PCT No.: **PCT/GB05/04393**

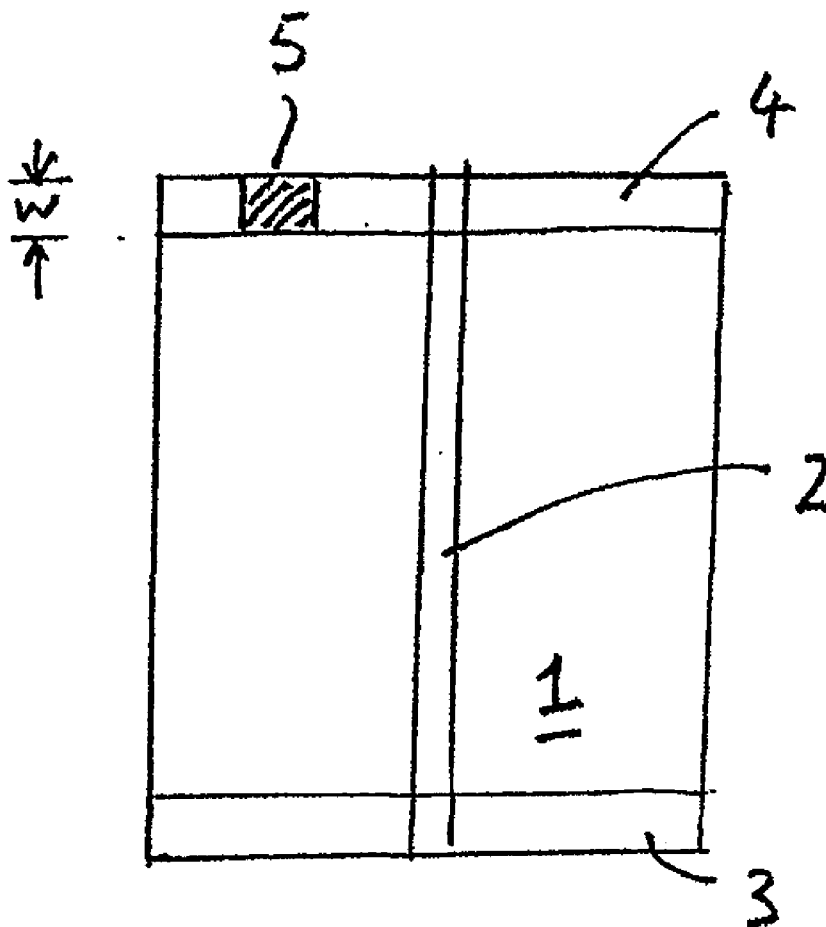
§ 371 (c)(1),

(2), (4) Date: **Mar. 27, 2009**

Packaging comprises polymer film (1) with portions of the film (1) sealed together to form an enclosure for the food stuff, said sealed portions being sealed by a film-to-film seal except in a vent region (5) where a lacquer layer (6) is bonded to each portion of film before said portions are sealed together with the lacquer layers cohering, the seal strength of the lacquer-to-lacquer interface (6) being similar to that of the film-to-film interface under predetermined storage conditions, and the seal strength of said lacquer-to-lacquer interface (6) being reduced compared with that of the film-to-film interface at temperatures above those expected under said predetermined storage conditions so that the enclosure is vented to atmosphere by a cohesive peel action in the vent region (5) between said lacquer layers (6).

(30) **Foreign Application Priority Data**

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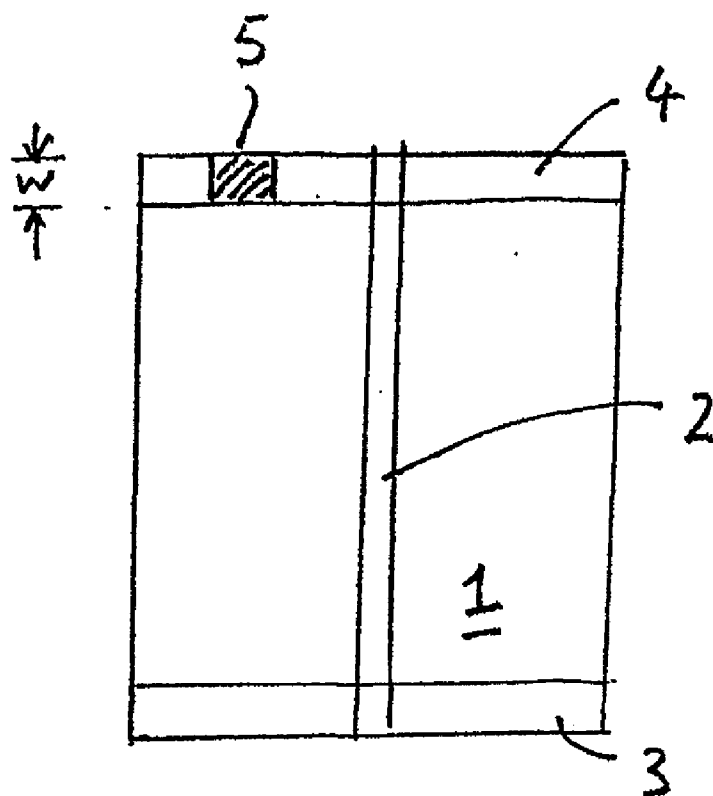


FIG. 1.

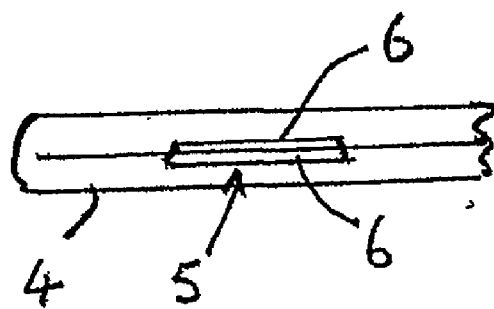


FIG. 2.

PACKAGING WITH A VENT REGION

TECHNICAL FIELD

[0001] This invention relates to packaging of the type suitable for use with food stuff to allow the food stuff to be cooked, say in a microwave oven, with the packaging still in place.

[0002] Packaging of this type must form a sealed enclosure to contain the food stuff and prevent it from becoming contaminated during storage. Also, for convenience, it must be adapted to allow venting of steam from the sealed enclosure as the food stuff is cooked, without having to first pierce the packaging. Various venting arrangements have been provided for microwave packaging including wax plugs, weakened seals and leak paths which all vent at increased temperatures and/or pressures.

[0003] An object of the present invention is to provide an improved packaging of the aforesaid type which is especially suitable for fresh foods.

DISCLOSURE OF THE INVENTION

[0004] According to the invention, packaging comprises polymer film with portions of the film sealed together to form an enclosure for the food stuff, said sealed portions being sealed by a film-to-film seal except in a vent region where a lacquer layer is bonded to each portion of film before said portions are sealed together with the lacquer layers cohering, the seal strength of the lacquer-to-lacquer interface being similar to that of the film-to-film interface under predetermined storage conditions, and the seal strength of said lacquer-to-lacquer interface being reduced compared with that of the film-to-film interface at temperatures above those expected under said predetermined storage conditions so that the enclosure is vented to atmosphere by a cohesive peel action in the vent region between said lacquer layers.

DESCRIPTION OF THE DRAWINGS

[0005] The invention will be described by way of example with reference to the accompanying drawings in which:

[0006] FIG. 1 illustrates packaging according to the invention;

[0007] FIG. 2 shows a section through a vent seal of the packaging in FIG. 1.

MODE OF CARRYING OUT THE INVENTION

[0008] The illustrated microwave packaging comprises a sheet 1 of Orientated Polypropylene (OPP) film which is folded on itself to bring together opposite edges which are heat sealed together along a back seal 2 to form a tube. The lower open end of the tubular sheet is closed by bringing together opposite portions of the lower edge and heat sealing them together to form a lower seal 3. The packaging is then filled with food stuff and the open upper end closed by bringing together opposite portions of the upper edge and heat sealing them together to form an upper seal 4.

[0009] However, a portion 5 of the upper seal 4 incorporates a lacquer-to-lacquer interface between the two portions of the sheet 1 so as to form a peelable seal which extends across the full width W of the seal 4. The lacquer is a coating 6 adhering to the inner face of each of the opposite portions of the sheet 1, which may be applied by a gravure or flexo printing process in advance of the sheet being formed into the final enclosure illustrated.

[0010] The lacquer coating 6 comprises a colourless, coloured or opaque coating made up of resins or cellulose derivatives and a plasticizer in a solvent. The resin comprises a synthetic polymeric compound physically resembling natural resin, such as polyvinyl, polystyrene or epoxy. A preferred example comprises a composition of EVA based resins and a mixture of solvents comprising ethyl acetate, isopropyl acetate and hydrocarbon such as non-aromatic naphtha. Such a lacquer is available as "Sovereign Proxseal J9683A" comprising an EVA copolymer dispersed in a solvent mix of ethyl acetate and aliphatic hydrocarbon.

[0011] The properties of the seals, both those portions comprising OPP sheet sealed face-to-face, and those portions which incorporate the layer-to-lacquer interface, are similar in strength at ambient, chill and freezer temperatures such as apply when the packaging is in use to store food stuff. Also, high humidity conditions caused by the food stuff within the packaging does not adversely affect the strength of the seal under ambient, chill and freezer conditions. High humidity conditions might comprise those up to 100% at 5-8° C., but typical humidity conditions comprise 85% or 95% at 5-8° C.

[0012] However, when the packaging is heated in a microwave oven to cook the food stuff, the strength of that portion of the seal 5 incorporating the lacquer coatings 6 is significantly reduced at the elevated temperatures that are generated up to 100° C. or above, the strength being only ~30 g/25 mm. This reduced strength of the lacquer-to-lacquer seal is such as to allow cohesive peeling, and provides an open vent path between the two portions of the OPP sheet to allow pressurised steam and gases to escape from within the packaging. In contrast, the strength of the seal where the OPP sheet is sealed face-to-face without the intermediate lacquer coatings, remains strong enough to hold the seal closed. Thus, venting of the packaging is controlled to occur only in the lacquer coated region 5 of the upper seal 4. Typically, the seal strength of the lacquer-to-lacquer is reduced significantly at temperatures of 60° C. and above.

[0013] The size of the lacquered vent region 5 is selected to give an appropriated vent cross-section. If required the vent region 5 could extend the full length of the seal 4. Alternatively, the position of the lacquered region 5 can be varied to suit the particular application and it may be located in one or more of the other seals 2 and 3. Alternatively, multiple vent regions 5 may be provided in one or more of the seams 2, 3, 4.

[0014] In alternative embodiments of the invention, the film may comprise any one of the following: polypropylene, polyethylene, polyester, polyamide, regenerated cellulose, polylactic acid, or combination of any of the preceding. The film may also comprise films with a heat seal coating.

[0015] The film may be adapted for modified atmosphere packaging by forming microperforations in it which are small enough to control the oxygen/carbon dioxide gas atmosphere within the bag. The food stuff will have a respiration rate which is matched to the natural permeability of the film and the additional permeability of the microperforations so as to produce the required modified atmosphere within the packaging. However, the total area of the microperforations would be too small to have any significant effect on the water vapour permeability of the film or the need to provide a separate vent.

[0016] Also, in alternative embodiments of the invention, the lacquer may comprise a water-based EVA lacquer or an epoxy/acrylic solvent based lacquer.

1. Packaging for food stuff intended to be heated comprising polymer film with portions of the film sealed together to

form an enclosure for the food stuff, said sealed portions being sealed by a film-to-film seal except in a vent region where a lacquer layer is bonded to each portion of film before said portions are sealed together with the lacquer layers cohering, the seal strength of the lacquer-to-lacquer interface being similar to that of the film-to-film interface under predetermined storage conditions, and the seal strength of said lacquer-to-lacquer interface being reduced compared with that of the film-to-film interface at temperatures above those expected under said predetermined storage conditions so that the enclosure is vented to atmosphere by a cohesive peel action in the vent region between said lacquer layers.

2. Packaging as claimed in claim 1 in which said enclosure is formed by sealing portions of the film together along multiple seams with a vent region formed in one or more seam.

3. Packaging as claimed in claim 2 in which said enclosure is formed by sealing portions of the film together along multiple seams with said vent region formed along the whole of one seam, but not along the whole of the length of all seam.

4. Packaging as claimed in claim 1 in which the lacquer is applied to the film by a gravure or flexo printing process.

5. Packaging as claimed in claim 1 in which the film comprises polypropylene, polyethylene, polyester, polyamide, regenerated cellulose, polylactic acid, or combination of any of the preceding.

6. Packaging as claimed in claim 5 in which the lacquer comprises an EVA based resin.

7. Packaging as claimed in claim 6 in which the lacquer comprises a combination of solvents comprising alcohols, esters and hydrocarbons.

8. Packaging as claimed in claim 1 in which the lacquer comprises a water-based EVA lacquer or an epoxy/acrylic solvent based lacquer.

9. Packaging as claimed in claim 1 in which the film is formed with microperforations to support a modified atmosphere within the packaging when it contains respiring food stuff.

10. Film for the production of packaging of claim 1 in which at least one region of the film adapted to be incorporated in a packaging seal between two portions of the film is coated with a lacquer comprising an EVA based resin.

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