

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
26 May 2006 (26.05.2006)

PCT

(10) International Publication Number
WO 2006/054060 A1

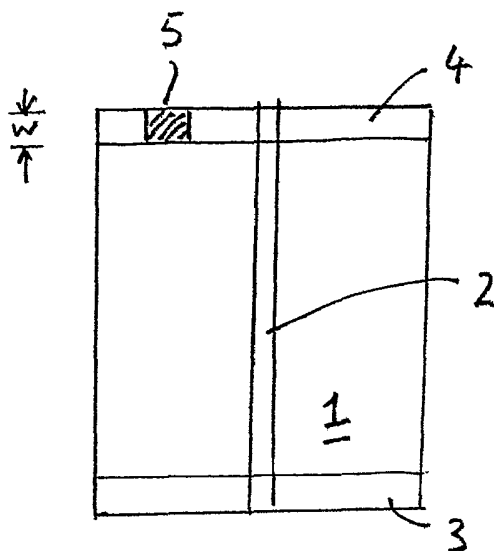
- (51) International Patent Classification:
B65D 33/01 (2006.01) *B65D 65/40* (2006.01)
- (21) International Application Number:
PCT/GB2005/004393
- (22) International Filing Date:
15 November 2005 (15.11.2005)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
04257147.1 18 November 2004 (18.11.2004) EP
- (71) Applicant (for all designated States except US): **AMCOR FLEXIBLES EUROPE A/S** [DK/DK]; 10 Hattingvej, DK-8700 Horsens (DK).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): **JONES, Beth** [GB/GB]; 27 Courtlands, Bradley Stoke, Bristol BS32 9BA (GB). **BURKE, Andrew** [GB/GB]; 218 Bloomfield Road, Brislington, Bristol BS4 3QU (GB).
- (74) Agents: **HOGG, Jeffery, Keith** et al.; Withers & Rogers LLP, Goldings House, 2 Hays Lane, London SE1 2HW (GB).

- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: PACKAGING WITH A VENT REGION



(57) Abstract: 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).

WO 2006/054060 A1

Technical Field

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.

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.

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

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

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

Figure 1 illustrates packaging according to the invention;

Figure 2 shows a section through a vent seal of the packaging in Figure 1.

Mode of carrying out the Invention

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.

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.

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.

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.

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 ~ 30g/25mm. 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.

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.

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.

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.

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

Claims

1. Packaging for food stuff intended to be heated comprising polymer film (1) 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 (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 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 (5) between said lacquer layers (6).
2. Packaging as claimed in claim 1 in which said enclosure is formed by sealing portions of the film (1) together along multiple seams (2, 3, 4) with a vent region (5) formed in one or more seams (4).
3. Packaging as claimed in claim 2 in which said enclosure is formed by sealing portions of the film together along multiple seams (2, 3, 4) with said vent region (5) formed along the whole of one seam (4), but not along the whole of the length of all seams (2,3).
4. Packaging as claimed in any one of the preceding claims in which the lacquer (6) is applied to the film by a gravure or flexo printing process.
5. Packaging as claimed in any one of the preceding claims in which the film (1) 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 (6) comprises an EVA based resin.

7. Packaging as claimed in claim 6 in which the lacquer (6) comprises a combination of solvents comprising alcohols, esters and hydrocarbons.
8. Packaging as claimed in any one of claims 1 to 5 in which the lacquer (6) comprises a water-based EVA lacquer or an epoxy/acrylic solvent based lacquer.
9. Packaging as claimed in any one of the preceding claims in which the film (1) 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 any one of claims 1 to 9 in which at least one region of the film (1) adapted to be incorporated in a packaging seal between two portions of the film is coated with a lacquer (6) comprising an EVA based resin.

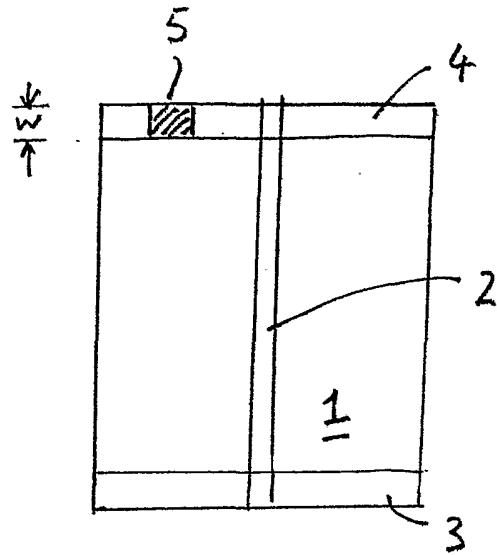


FIG. 1.

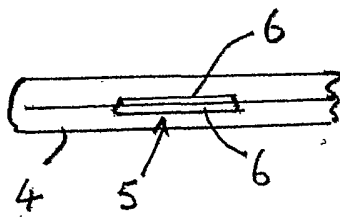


FIG. 2.

INTERNATIONAL SEARCH REPORT

national application No
T/GB2005/004393

A. CLASSIFICATION OF SUBJECT MATTER B65D33/01 B65D65/40		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols) B65D		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practical, search terms used) EPO-Internal, WPI Data, PAJ		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 6 582 123 B1 (TANG LUEN SING) 24 June 2003 (2003-06-24) column 6, line 20 - line 46; figures -----	1,2,5
A	EP 0 890 521 A (DAIWA GRAVURE CO., LTD) 13 January 1999 (1999-01-13) column 2, line 50 - line 56; figures -----	1,2,6
X	US 2001/031348 A1 (JUD WILFRIED ET AL) 18 October 2001 (2001-10-18) paragraph '0034! -----	10
A	GB 1 292 583 A (CROWN ZELLERBACH CORPORATION) 11 October 1972 (1972-10-11) -----	10
<input type="checkbox"/> Further documents are listed in the continuation of Box C.		
<input checked="" type="checkbox"/> See patent family annex.		
* Special categories of cited documents :		
A document defining the general state of the art which is not considered to be of particular relevance		
E earlier document but published on or after the international filing date		
L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)		
O document referring to an oral disclosure, use, exhibition or other means		
P document published prior to the international filing date but later than the priority date claimed		
T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention		
X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone		
Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.		
& document member of the same patent family		
Date of the actual completion of the international search	Date of mailing of the international search report	
9 February 2006	17/02/2006	
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Authorized officer SERRANO GALARRAGA, J	

INTERNATIONAL SEARCH REPORT

Information on patent family members

national application No
T/GB2005/004393

Patent document cited in search report	Publication date	Patent family member(s)	Publication date	
US 6582123	B1	24-06-2003	AU 2892701 A	24-07-2001
			CN 1358151 A	10-07-2002
			GB 2358174 A	18-07-2001
			HK 1038725 A1	14-03-2003
			JP 2001199481 A	24-07-2001
			WO 0151371 A1	19-07-2001
			TW 530018 B	01-05-2003
EP 0890521	A	13-01-1999	US 5902046 A	11-05-1999
US 2001031348	A1	18-10-2001	NONE	
GB 1292583	A	11-10-1972	BE 744342 A1	15-06-1970
			DE 2001032 A1	23-07-1970
			FR 2028212 A1	09-10-1970
			JP 54011351 B	14-05-1979
			NL 7000331 A	15-07-1970
			US 3655503 A	11-04-1972