



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) **EP 1 283 179 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
12.02.2003 Bulletin 2003/07

(51) Int Cl.7: **B65D 81/34, B65D 75/00**

(21) Application number: **01118968.5**

(22) Date of filing: **06.08.2001**

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

(72) Inventor: **Bergerioux, Claude**
1008 Jouxkens-Mezery (CH)

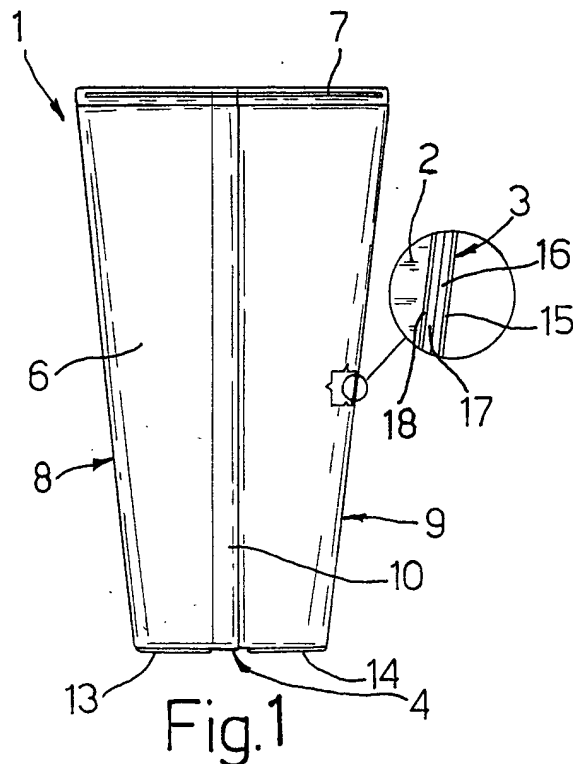
(74) Representative: **Franzolin, Luigi et al**
STUDIO TORTA S.r.l.,
Via Viotti, 9
10121 Torino (IT)

(71) Applicant: **Tetra Laval Holdings & Finance SA**
1009 Pully (CH)

(54) **Microwave-heatable food product package**

(57) A microwave-heatable package(1) containing a food product (2) to be consumed hot; the package (1) is made from a web packaging material (3) having a barrier layer (17) pervious to microwave radiations and is substantially wedge-shaped with a base wall (4), a front wall

(5) and a back wall (6) extending from opposite sides of the base wall (4) and joining together at a top transversal seal (7); the top transversal seal (7) is adapted to open upon exposure of the package (1) to microwave radiations.



EP 1 283 179 A1

Description

[0001] The present invention relates to a microwave heatable food product package.

[0002] As is known, many food products, in particular pourable food products such as fruit juice, UHT (ultra-high-temperature processed) milk, wine, tomato sauce, etc., are sold in packages made of sterilized packaging material.

[0003] The packaging material has a multilayer structure comprising a layer of fibrous material, e.g. paper, covered on both sides with layers of heat-seal plastic material, e.g. polyethylene, and, in the case of aseptic packages for long-storage products, such as UHT milk, also comprises a layer of oxygen-barrier material defined, for example, by an aluminium film which is superimposed on a layer of heat-seal plastic material and is in turn covered with another layer of heat-seal plastic material eventually defining the inner face of the package contacting the food product.

[0004] A typical example of such a package is the parallelepiped-shaped package for liquid or pourable food products known as Tetra Brik Aseptic (registered trademark), which is formed from a continuous tube of packaging material obtained by bending and longitudinally sealing a web packaging material; the web of packaging material is sterilized on the packaging machine itself, e.g. by applying a chemical sterilizing agent, such as a hydrogen peroxide solution, which, after sterilization, is removed, e.g. vaporized by heating, from the surfaces of the packaging material; and the web of packaging material so sterilized is maintained in a closed sterile environment, and is folded and sealed longitudinally to form a vertical tube.

[0005] The tube is filled with the sterilized or sterile-processed food product, and is sealed and cut at equally spaced cross sections to form pillow packs, whose ends are then folded mechanically to form a pair of bottom triangular flaps folded and heat-sealed against the bottom surface of the package and a pair of upper flaps folded and heat-sealed against respective lateral walls of the package.

[0006] A similar process may be used to produce wedge-shaped packages, such as the packages commercially available under the trade name Tetra Wedge Aseptic (registered trademark). A wedge-shaped package is obtained from a pillow pack by mechanically folding only the two bottom flaps, and leaving the top transversal seal of the pack linear and flat, so as to define the edge of the wedge shape.

[0007] The wedge-shaped packages are relatively inexpensive, have excellent stand-up capability and may be provided with a prelaminated hole (i.e. made in the paper layer but not in the barrier layer of the packaging material) or with a hole internally protected by a breakable patch of oxygen barrier material, in the upper part near the top transversal seal, so as to allow the use of a drinking straw.

[0008] Parallelepiped packages are generally used for different food products, including drinks and relatively dense or viscous products such as sauces, e.g. cooking cream or tomato sauce, in a wide variety of dimensions (e.g. from 125 to 2000 ml). Known wedge-shaped packages are generally used for single portions of liquid food products, in particular drinks, ranging from 50 to 400 ml.

[0009] In conclusion, packages of the above-described types, obtained from laminated web packaging materials, have been widely used in connection with food products to be consumed cold.

[0010] In case the food product is adapted to be heated or cooked, e.g. by means of microwaves, it must be removed from the package and heated in a suitable container.

[0011] An aim of the present invention is to provide a food product package made from web packaging material, which can be easily and quickly microwave-heated without opening the package beforehand. Within this aim, an object of the invention is to provide a microwave-heatable package which has a built-in safety function, thereby dispensing with the need to incorporate safety valves or the like.

[0012] This aim and object are achieved by a microwave-heatable package containing a food product to be consumed hot, said package being made from a web packaging material including at least one layer adapted to provide mechanical strength, a barrier layer pervious to microwave radiations, and at least an outer and an inner heat seal layers, said package being substantially wedge-shaped and including a rectangular base wall, a front wall and a back wall extending from opposite sides of the base wall and joining together at a top transversal seal, said top transversal seal being adapted to open upon exposure of said package to microwave radiations.

[0013] It has been surprisingly found that the wedge shape in a package made from concentrates both mechanical stress due to internal pressure and temperature increase on the top seal, which opens when the food product is hot.

[0014] Consequently, the seal opens up and releases the internal pressure without significant product spills, and with no need to provide a steam valve or similar safety device.

[0015] A preferred, non-limiting embodiment of the present invention will be described by way of example with reference to the accompanying drawings, in which:

Figure 1 is a back view of a package according to the present invention;

Figure 2 is a side elevational view of the package of Figure 1;

Figure 3 is a perspective view of the package of figure 1 subjected to a microwave heating process; and

Figure 4 is a perspective view of the package of fig-

ure 1 after the microwave heating process.

[0016] With reference to figures 1 to 4, numeral 1 references a package products according to the present invention containing a food product 2 to be consumed hot, for example a hot drink or a baby food product or a pediatric nutritional product, or a dense or viscous fluid such as a sauce containing oils or fats or a soup.

[0017] Package 1 is made from a web packaging material 3 (figure 5) - hereinafter "material 3" - and is substantially wedge-shaped. More particularly, package 1 includes a rectangular base wall (not shown) 4, a front wall 5 and a back wall 6 of substantially isosceles trapezoidal shape with their respective shorter bases adjacent to base wall 4 and their respective longer bases sealed together by a top transversal seal 7, and a pair of lateral walls 8, 9 of substantially triangular shape.

[0018] Package 1 is obtained, in a manner known per se, by longitudinally bending and sealing a web (not shown) of material 3 to form a continuous tube; the longitudinal seal is referenced 10 in figure 1 and extends along back wall 6. The continuous tube is then filled with the food product 2 and transversally sealed at constant intervals to form pillow packs (not shown).

[0019] Material 3 is provided with a crease pattern, not shown as known in itself, which allows the material to be easily folded along inclined lateral corners and along base corners, to form lateral bottom flaps 13, 14 which are folded and sealed against base wall 4 to ensure shape stability of the package.

[0020] Material 3 (see enlarged detail of fig. 1) is a multi-layer laminated material basically including a heat seal outer layer 15, preferably made of PE, a paper layer 16 adapted to provide some mechanical strength, a barrier layer 17 and a heat seal inner layer 18 preferably made of LDPE (Low Density PE) or Metallocene. Additional mechanical strength is imparted to the packaging material structure by the barrier material which has a high melt temperature, whereby to maintain a high mechanical strength, even at high temperatures (e.g., 120°C). In this way, stresses are transferred to the heat seal inner layer during heating. Adhesive layers of known type (not shown) may be further provided between the paper layer and the barrier layer, as well as between the barrier layer and the inner layer.

[0021] According to a feature of the present invention, barrier layer 15 is pervious to microwave radiation, so as to allow microwave radiation to reach the food product 2; conveniently, barrier layer is made from a polymer or a mineral coated polymer having a high melting temperature, e.g. over 130°C. Preferably, the barrier layer is made from a material chosen in the group including SiOx-coated PET, SiOx-coated PA, SiOx-coated EVOH; alternatively, if the barrier effect is sufficient, EVOH alone may be used. Other suitable coatings for the barrier layer include silicon nitride, aluminium oxide, diamond-like carbon coatings or combinations thereof.

[0022] According to the present invention, the pack-

age 1 can be microwave-heated without opening the package. The combination of the shape of the package 1 and the pressure increase inside the package due to steam evolution consequent to microwave irradiation brings about the surprising effect that the top transversal seal 7 unseals, i.e. the package opens automatically along the top transversal seal 7, when the food product is hot (fig. 4). This happens because the wedge shape of the package concentrates mechanical and thermal stress onto the top transversal seal 7.

[0023] Preferably, the barrier layer has a higher melt strength than the heat-seal inner layer, and the wedge shape transfers stresses exerted on the package, during heating, to the top transversal seal.

[0024] For example, tests performed have shown that a package containing 200 g of a fatty sauce will open after a microwave treatment at 900 W power for about 1-5 minutes, with a sauce average temperature of about 70-80°C.

[0025] It has been observed that the wedge shaped geometry produces temperature gradients in the food product; in particular, the product in the central zone near the base wall 4 of the package has the lowest temperature (40-50°C), whilst the product in the central zone near the top surface reaches the highest temperature (up to 120° in case of fatty sauces); the product in the vicinity of lateral walls 8, 9 ranges from about 60°C near the base wall to about 80°C near the top surface.

[0026] It has been observed that the product gently boils at its top surface, when the package opens; the self-opening at the top transversal seal 7 releases the pressure inside the package (fig. 4) without any spill of the product since the opening is above the product level.

[0027] According to the present invention, the combination of the wedge shape and a microwave-pervious barrier layer allows the food product to be safely heated without any risk of explosion or spill, and without any need to open the package before heating. No safety device such as a pressure release valve is necessary, which would be very difficult to provide in an aseptic package.

[0028] After heating, the package is open and ready for use, and can be safely handled both because of its excellent stability, due to its geometry, and because of the good heat insulating properties of the packaging material, which remains relatively fresh at its outer surface.

[0029] Finally, it should be noted that the package described may be modified without departing from the scope of the present invention as defined by the claims.

In particular, the layer of the packaging material adapted to provide mechanical strength may be made from a polymeric material rather than from paper material.

55 Claims

1. A microwave-heatable package (1) containing a food product (2) to be consumed hot, said package

- (1) being made from a web packaging material (3) including at least one layer (16) adapted to provide mechanical strength, a barrier layer (17) pervious to microwave radiations, and at least an outer and an inner heat seal layers (15, 18), said package (1) being substantially wedge-shaped and including a rectangular base wall (4), a front wall (5) and a back wall (6) extending from opposite sides of the base wall (4) and joining together at a top transversal seal (7), said top transversal seal (7) being adapted to open upon exposure of said package (1) to microwave radiations. 5
2. A package as claimed in claim 1, **characterised in that** said barrier layer (17) pervious to microwave radiations has a melt strength higher than said inner heat seal layer (18). 15
3. A package as claimed in claim 1 or 2, **characterised in that** said barrier layer (17) pervious to microwave radiations includes a material chosen in the group including SiOx-coated PET, SiOx-coated PA, EVOH, SiOx-coated EVOH. 20
4. A package as claimed in any of the preceding claims, **characterised in that** said layer (16) adapted to provide mechanical strength includes a paper material. 25
5. A package as claimed in any of the preceding claims, **characterised in that** said food product (2) is a dense or viscous fluid. 30
6. A package as claimed in any of the preceding claims, **characterised in that** said food product (2) includes oils or fats. 35
7. A package as claimed in any of the preceding claims, **characterised in that** said food product (2) is a sauce. 40
8. A package as claimed in any of claims from 1 to 6, **characterised in that** said food product (2) is a soup. 45
9. A package as claimed in any of claims from 1 to 6, **characterised in that** said food product (2) is a drink. 50
10. A package as claimed in any of claims from 1 to 6, **characterised in that** said food product (2) is a pediatric nutritional product. 50
11. A method of heating a package (1) as claimed in any of the preceding claims, **characterised by** including the step of exposing said package (1) to a microwave radiation until said transversal top seal (7) opens. 55
12. The use of a package as claimed in any of claims 1 to 10 for packaging a microwave-heatable food product (2) to be consumed hot.

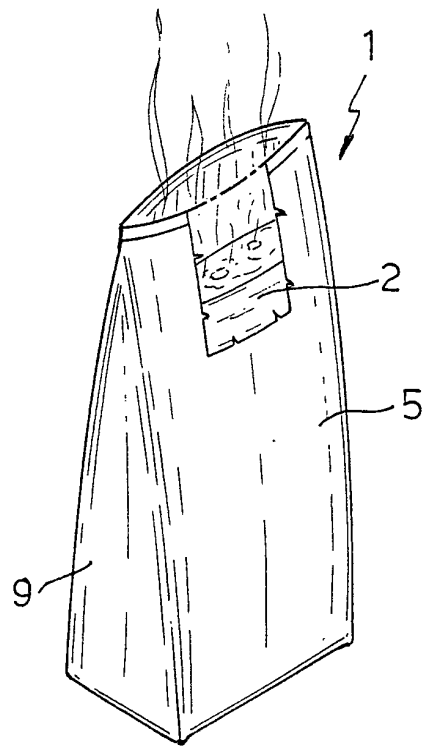
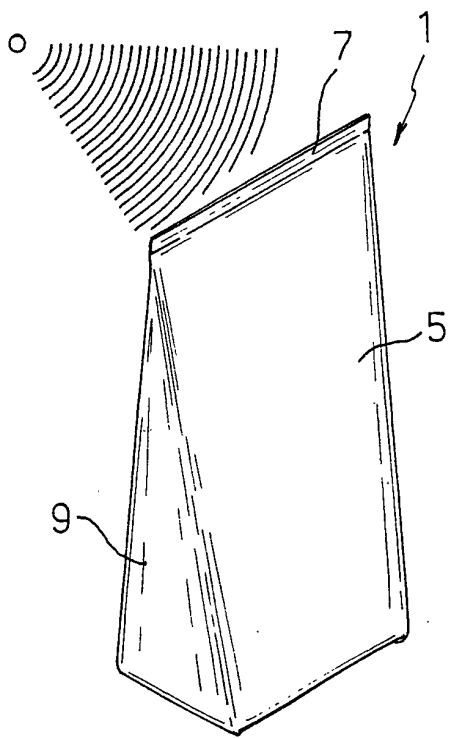
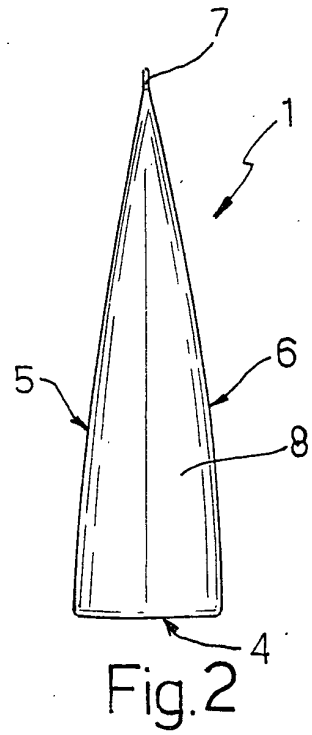
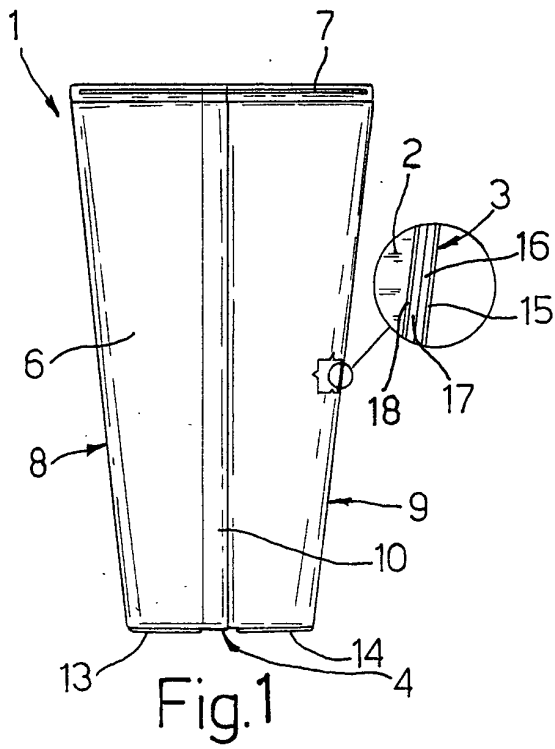


Fig. 1

Fig. 2

Fig. 3

Fig. 4



European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 01 11 8968

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
Y	EP 0 537 109 A (ALUSUISSE LONZA SERVICES AG) 14 April 1993 (1993-04-14) * the whole document *	1-12	B65D81/34 B65D75/00
Y	FR 2 796 047 A (DANISCO FLEXIBLE FRANCE) 12 January 2001 (2001-01-12) * the whole document *	1-12	
Y	FR 2 769 006 A (PESCANOVA FRANCE SA) 2 April 1999 (1999-04-02) * the whole document *	4	
A	PATENT ABSTRACTS OF JAPAN vol. 016, no. 206 (M-1248), 15 May 1992 (1992-05-15) & JP 04 031273 A (TOYO ALUM KK), 3 February 1992 (1992-02-03) * abstract; figures 1-9 *	1-12	
A	EP 0 768 248 A (SHIMAYA CO LTD) 16 April 1997 (1997-04-16) * the whole document *	1-12	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			B65D
Place of search	Date of completion of the search	Examiner	
THE HAGUE	21 January 2002	Pernice, C	
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			

EPO FORM 1503 03/92 (P4)C01

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 01 11 8968

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

21-01-2002

Patent document cited in search report		Publication date		Patent family member(s)	Publication date
EP 0537109	A	14-04-1993	CH	683836 A5	31-05-1994
			CA	2078709 A1	26-03-1993
			EP	0537109 A2	14-04-1993
FR 2796047	A	12-01-2001	FR	2796047 A1	12-01-2001
FR 2769006	A	02-04-1999	FR	2769006 A1	02-04-1999
JP 04031273	A	03-02-1992	NONE		
EP 0768248	A	16-04-1997	JP	2688734 B2	10-12-1997
			JP	7291366 A	07-11-1995
			EP	0768248 A1	16-04-1997

EPO FORM P468

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82