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(11)

**EP 0 875 468 A1**

(12)

**EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
**04.11.1998 Bulletin 1998/45**

(51) Int Cl.6: **B65D 81/34**

(21) Application number: **98303297.0**

(22) Date of filing: **28.04.1998**

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

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(30) Priority: **28.04.1997 GB 9708635**

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(54) **Microwave package**

(57) A microwave package (12) comprises a container with one or more double walls. There is susceptor material on an inner wall (22,24) of a double wall. There

is also susceptor material (30) on an outer wall (14) of a double wall. A food product can be present within the main cavity of the package in a tray (34) which can be metallic or non-metallic.

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## Description

### Field of the Invention

The present invention relates to microwave packages, and in particular to packages containing food intended for heating in a microwave oven.

### Background of the Invention

Metallized films are available for use in conjunction with the microwave heating of certain foods to result in a browning and crisping effect. Such films, usually termed metallized film susceptors or more simply susceptor films, will reach high temperatures during the microwave cooking process and impart an intense localised heating action to the food. The susceptor film is commonly laminated onto paper or paperboard to give a susceptor sheet which for example can be used as a base material for potato chips or pizza, so that a browning or crisping action is imparted to the food product in addition to the normal internal heating of the product resulting from direct microwave action.

Illustratively, EP 242,026 describes a package assembly including a multi-surface micro-wave interactive tray. The package assembly has an outer package body, a food item, and an inner tray member which cradles the food item and which has a layer of microwave interactive material to convert microwave energy to heat. The microwave interactive material of EP 242,026 is a susceptor material.

There is a continuing demand for convenience food products which can be prepared in a microwave oven yet which exhibit qualities normally associated with conventional oven cooking. Susceptor films and sheets have gone a long way to satisfying this demand but the use of such susceptor materials has limitations, particularly in the heating of bread and other bakery products.

### Object of the Invention

The object of the present invention is to provide a microwave package which can be used with bread and other food products to achieve control of the balance in heat supplied directly to the food by the microwave radiation, and heat indirectly supplied by the susceptor film or sheet.

### Summary of the Invention

To this end, the present invention provides a microwave package which comprises a container with one or more double walls. There is susceptor material on an inner wall of a double wall. There is also susceptor material on an outer wall of a double wall. A food product can be present within the main cavity of the package in a tray which can be metallic or non-metallic.

The double wall construction allows susceptor ma-

terial on the inside face of the inner wall to be in direct contact with the food product contained within the main cavity and also provides a high degree of heat insulation. Susceptor material on the outer wall provides control over the rate of heating and final surface temperature. Optimum results can readily be achieved for different food products.

### Preferred Embodiments of the Invention

The microwave package is preferably made of paperboard, and takes the form of an oblong box, but other shapes are suitable such as a pillow pack design.

Typically the container is closed, and usually has susceptor material on the inside surface of an inner wall of the double wall construction. For example at least one of the walls is laminated with susceptor film or susceptor sheet. The susceptor material on the inner face provides a contact susceptor face. Plain or patterned susceptor material of chosen metal type can be employed for the inner and outer walls in varying proportions depending upon the heating characteristics required for the food product. Susceptor material on an outer wall of a double wall of the package has the effect of modifying the heat output of the contact susceptor and the direct heating effect of the microwave energy.

The container can have the double wall throughout, or if desired there can be one or more walls of single wall construction. There may be more than one wall of the double construction, and the susceptor material can be on different double walls of the package. The double wall is ordinarily provided at the top and bottom walls of the container. The double wall offers the high degree of insulation necessary to obtain optimum performance from the contact susceptor. The double wall usually has an air gap preferably in the range of 1 to 10 mm, such as 2 to 5 mm. The size of this air gap will contribute to the overall heating modification. In order to prevent overheating of the base packaging materials or the product, it may be necessary to vent the air gap at appropriate spacing on the outer wall or at the perimeter of the double wall.

Heat losses by conduction can be minimised by elevating the package off the oven floor using vertical wall extensions. For instance, the package can stand on edges formed by folding the sides and/or ends of the package to extend lower than the base wall. Typically the resultant contact area is from 5 to 8% of the total base area.

The microwave package of the present invention can be used to heat a variety of foods, notably bread and bread type products, filled bread products, pastry baked products, ciabatta, and so on. Food products that are to be heated in the package may be placed into a tray before being placed in the microwave package. The tray will be formed to suit the product it is intended to carry, and may or may not have a base. The tray can be of paperboard or metal foil construction, depending on

the level of heating modification which is required.

The present invention provides not only the microwave package containing a food product, but also pre-shaped, unfolded blanks for such a microwave package.

In another aspect, the present invention is concerned with the use of susceptor material in the manufacture of a double walled microwave package.

#### Examples of the Invention

The accompanying sheets of drawings show examples of the present invention for preparing a crisped, filled bread product.

In Figure 1, the microwave package 10 takes the form of an oblong box 12 with upper double wall 14 and lower double wall 16 each having an air gap 18, 20 of 4 mm. Both inner walls 22, 24 of the microwave package 10 are laminated on the inner face with inconel susceptor film from Printpack Inc, USA; the bottom outer wall 26 is untreated; and the upper outer wall 28 has a centrally placed patch 30 of inconel film covering 50% of the area. The box has side extensions 32 to elevate the box 12.

The food product, not shown, is held in the aluminum foil tray 34 of Figure 2, which 160 mm x 120 mm x 30 mm deep. The tray has an open base with a retaining lip 36 to retain the food product. The tray 34 serves to shield the bread product from microwave penetration at the sides and ends, allowing only the transmitted radiation from above and below to heat the product.

The complete package is sealed at both ends and provided with air vent holes 38. The closed microwave pack is further shown in Figure 3.

The bread component of the food is a ciabatta-style bread. The bread is manufactured on an automatic continuous sheeting machine and stamped out with preformed dies. The dough pieces are proved and then baked before being cooled, sliced and filled. The bread, 60 g in weight, is filled with 80 g of a cheese and tomato based filling. The finished product is placed in the foil container of Figure 2, enclosed in the microwave package and can be reheated in an 800 W microwave oven for 80 seconds.

Microwave heating has a strong negative influence on the tenderness, crumb structure and mouthfeel of bread products, and a leathery texture is frequently achieved. These negative attributes are a function of complex interactions between starch and protein, and can be combated by the use of specially prepared emulsifiers and enzymes in the bread dough. These and other special ingredients in a bread recipe with a high oil content, in conjunction with the microwave package of the present invention, give rise to a bread product with a resilient crust and a light, open texture that is not prone to chewiness or leatheriness. Full use can be made of the components to give a product with an acceptable level of crispness and browning and which does not develop chewiness or leatheriness upon microwave re-

heat.

Figure 4 shows an alternative design for the package 40, with a pillow pack design. The package again has a double wall construction for the upper wall 42 and the lower wall 44, with susceptor material on the inside faces of both walls and an inconel patch 50 on the upper outer wall 52. End flaps 46 seal the package with vent holes 48.

#### Claims

1. A microwave package which comprises a container with at least one double wall and with susceptor material on an inner wall of a double wall and with susceptor material on an outer wall of a double wall.
2. A microwave package according to claim 1, where the susceptor material on an inner wall is on an inwardly facing surface.
3. A microwave package according to claim 1 or 2, where the susceptor material on an outer wall is on an outwardly facing surface.
4. A microwave package according to any preceding claim when made using paperboard to which is adhered the susceptor material.
5. A microwave package according to any preceding claim with one or more further walls of single wall construction.
6. A microwave package according to any preceding claim with an air gap between the double walls.
7. A microwave package according to any preceding claim, which takes the form of an oblong box having at least upper and lower walls of the double wall construction.
8. A microwave package according to claim 7, with vertical wall extensions to elevate the lower double wall.
9. A microwave package according to any preceding claim which contains a food product.
10. A microwave package according to claim 9, with the food product sitting in a tray with an open bottom.
11. The use of susceptor material in the manufacture of a double walled microwave package with susceptor material on an inner wall of a double wall and with susceptor material on an outer wall of a double wall.

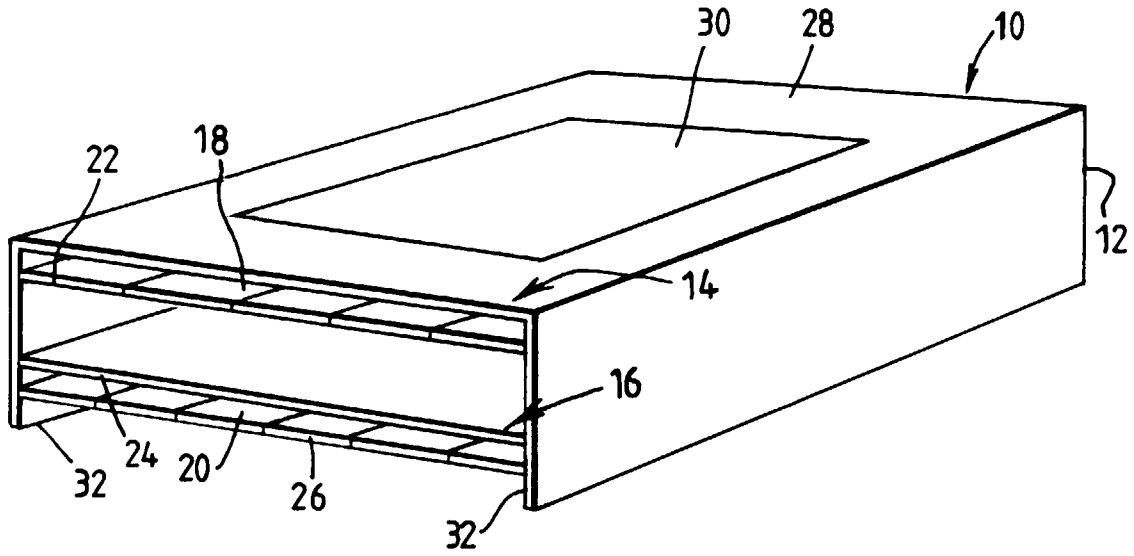


FIG. 1

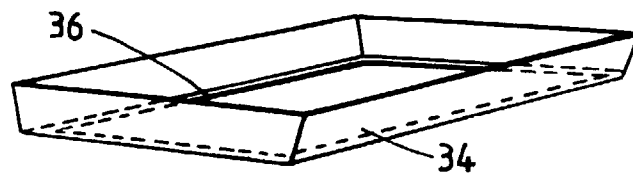


FIG. 2

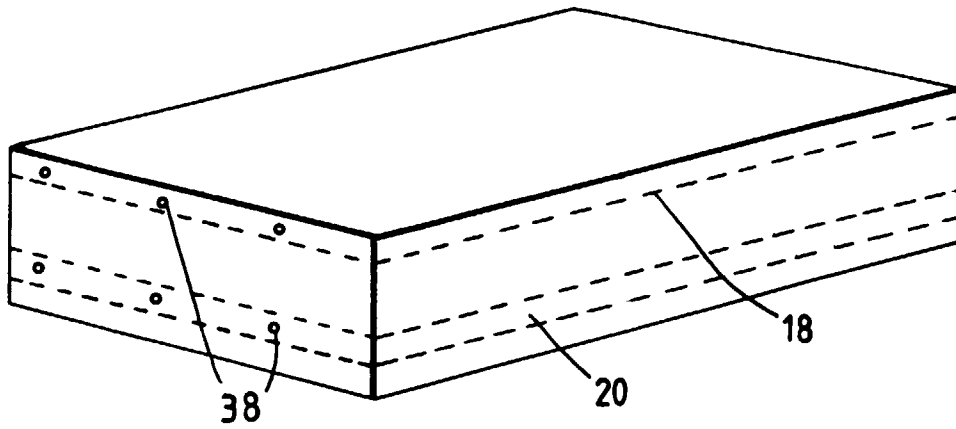


FIG. 3

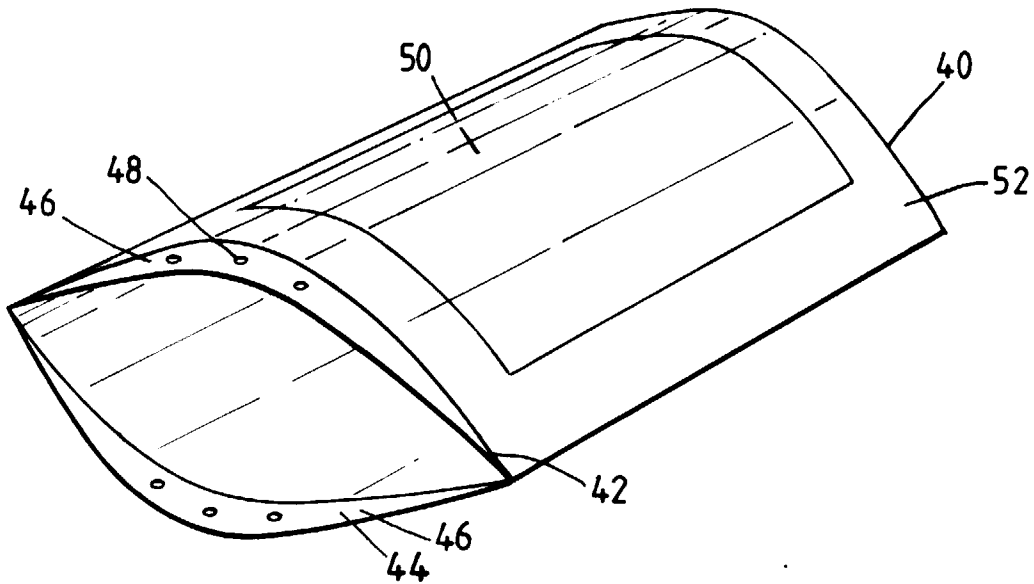


FIG. 4



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EUROPEAN SEARCH REPORT

Application Number  
EP 98 30 3297

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.6)
X	EP 0 350 660 A (NESTLE SA) 17 January 1990	1,2,4-9, 11	B65D81/34
Y	* the whole document *	3,10	
Y	US 5 053 594 A (THOTA ET AL.) 1 October 1991 * column 6, line 3 - column 6, line 20; figures 4,7 *	3	
Y	US 4 626 641 A (R. BROWN) 2 December 1986	10	
A	* the whole document *	1-8	
A	US 4 836 383 A (GORDON ET AL.) 6 June 1989 * the whole document *	1-11	
A	US 4 592 914 A (KUCHENBECKER) 3 June 1986 * the whole document *	1-11	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			B65D
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		7 August 1998	Pernice, C
CATEGORY OF CITED DOCUMENTS			
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		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	

EPO FORM 1503 (03.92) (P04C01)