

Food Packaging and Salmonella Prevention through Packaging

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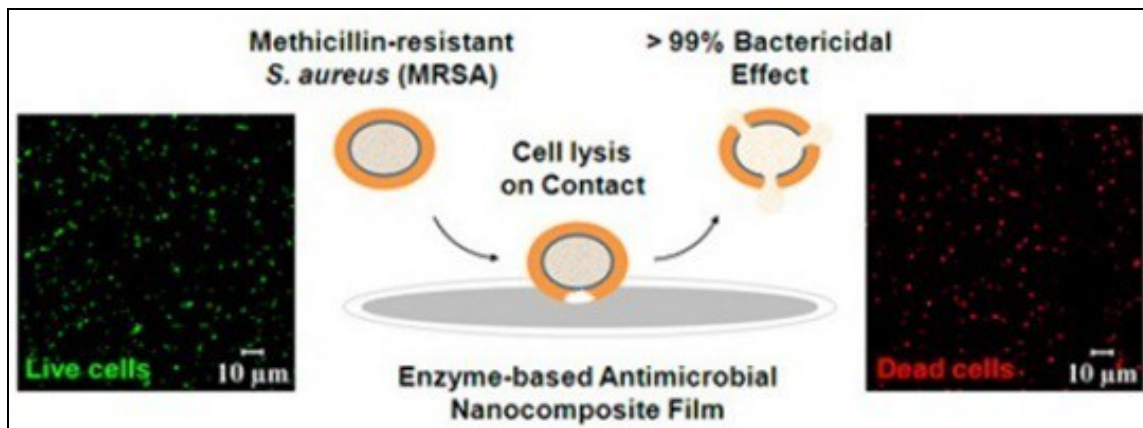
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Objective

The objective is to provide a landscape of the latest Food Packaging technologies that provide added consumer benefits. We will explore patent data bases to extract these technologies and highlight any claims mentioned that discuss new and beneficial consumer benefits. In addition, this final report will show where this technology is being developed, who is developing technologies in food packaging and white space potential.

Background

The major role of packaging is to protect the food product it contains against water, water vapor, air, oxygen, microorganisms, insects, other intruders, dirt, pilferage, etc. Besides protection, containment, communication, unitization, sanitation, dispensing, convenience, are some of the other package functions. One major benefit to the consumer from packaging is the safety of the product that it holds. [Book on Development of Packaging for Food Products](#). Active packaging interacts with a product by releasing or absorbing substances to/from the packed food product and thereby extending shelf-life and improving food safety and quality. Some of the active packaging concepts include anti-microbial films, anti-oxidant films, and scavenging concepts such as oxygen scavenging, ethylene scavenging, moisture regulation etc. to preserve the freshness of the food product. [Paperimpact](#). Researchers have also shown the migration of the antimicrobial compound such as ethyl lauryl arginate (LAE) to chicken breast to be within the regulated limits when using an active packaging. LAE has been shown to be effective against *Listeria*. [FoodProduction Daily](#). Release of salicylic acid from polymer films can prevent the formation of *Salmonella typhimurium* biofilms. [Review article of Rutgers University](#).



Food Packaging

Old Sample patents

Revised Sample patents

Revised Sample patents-Consumer Perspective

Patent/Publication No.	Publication Year	Assignee / Applicant	Title	Dolcera summary	Image
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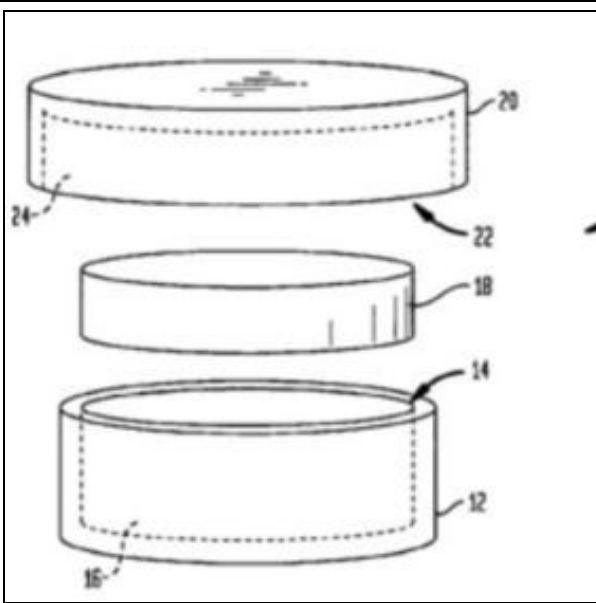
[US8481134B2](#)

2013

L?oreal, |
atis, balanda
| pradier,
fran?ois |
kanji,
mohamed |
brereton,
evelyn |
gavin, linda

Biodegradable
moisture-impermeable
packages for
consumer goods

Biodegradable and
moisture
impermeable



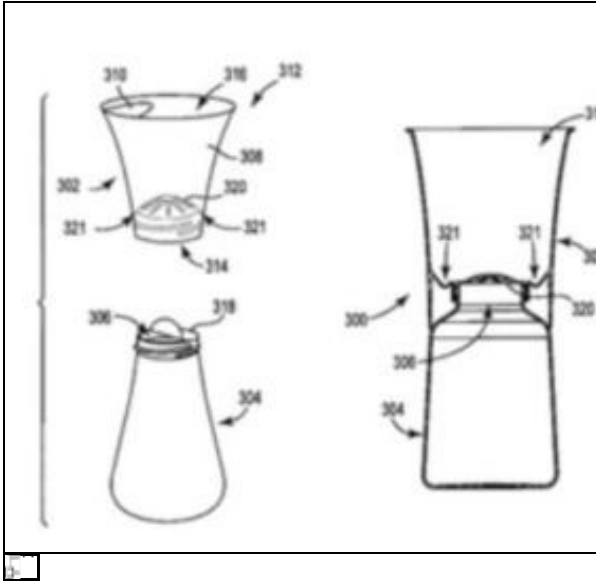
[US8485378B2](#)

2013

General mills,
inc. | zoss,
robert a. |
scholtes,
bryan |
genord, dan

Multi-container
packages for
dispensing liquid and
dry food

Package for
multi-component
such as cereal and
milk



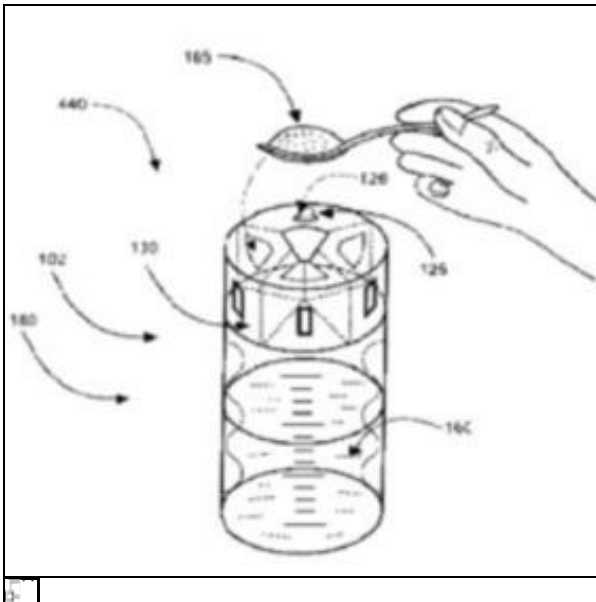
[US8475856B2](#)

2013

Sheehan,
andrew |
sheehan,
andrew

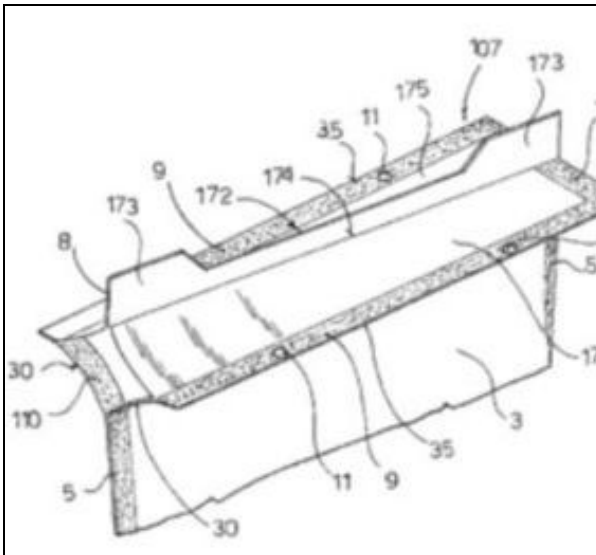
OTG (on the go)
specialty
multi-beverage
container systems

On the go specialty
multicontainer for
mixing and
transporting a
variety of
powder-based
beverages

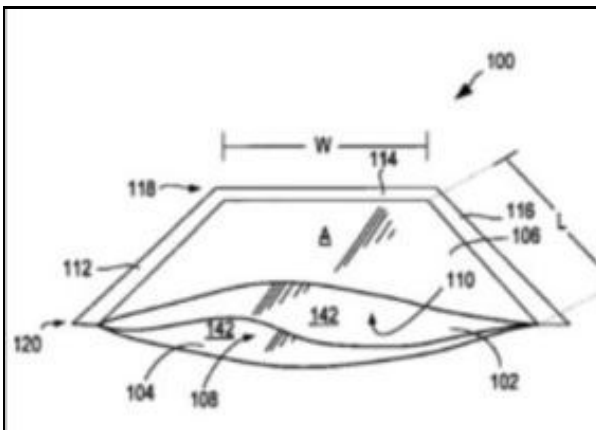


<p>US8403164B2</p>	<p>2013</p>	<p>Samson, ilan</p>	<p>Cap for a spill-proof beverage container</p>	<p>Cap for a spill-proof cup with a reliable seal between the rigid and flexible members of the demand valve.</p>	
<p>US8377529B2</p>	<p>2013</p>	<p>Cryovac, inc. bekele, solomon</p>	<p>Ultra high barrier aseptic film and package</p>	<p>A coextruded film with good oxygen barrier properties for pouches made in a VFFS aseptic system, that exhibits extended shelf life for the contained product by providing</p>	<p>N/A</p>
<p>WO2013085911A2</p>	<p>2013</p>	<p>Sepehr, cyrus, a.</p>	<p>Consumer oriented system for delivery of product including single serving package for preservative-free fruit pieces</p>	<p>Single serve packaging for preservative free fruit pieces</p>	
<p>US8231272B2</p>	<p>2012</p>	<p>Goglio s.p.a.</p>	<p>Stand-up, easy-open and easy-close package of flexible material, particularly for liquid, viscous, pasty, granular or powdered products</p>	<p>Flexible package for viscous, granular or powdered substances with peelable closure for easy open and close</p>	

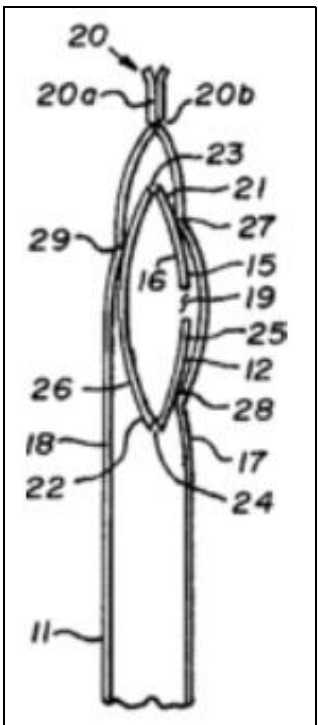
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US8198571B2	2012	Graphic packaging international, inc.	Multi-compartment microwave heating package	A microwave package for heating, browning, and/or crisping a food
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US8167487B2	2012	Milprint, inc.	Secure access easy opening tamper evident feature for sealable bags	Bags with a tamper evident feature having an easy rupturable opening
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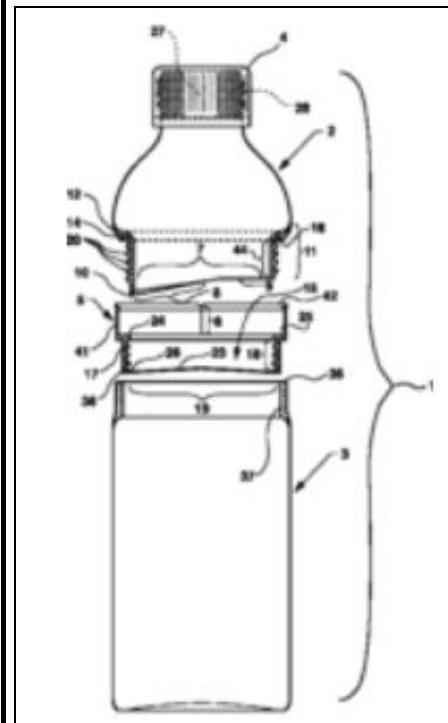
[US8151985B2](#)

2012

None

Containers for storing at least two substances for subsequent mixing

Disposable recyclable container for keeping two substances separate until mixed. The container can be enclosed in a tamper-evident film that includes a perforated pull strip



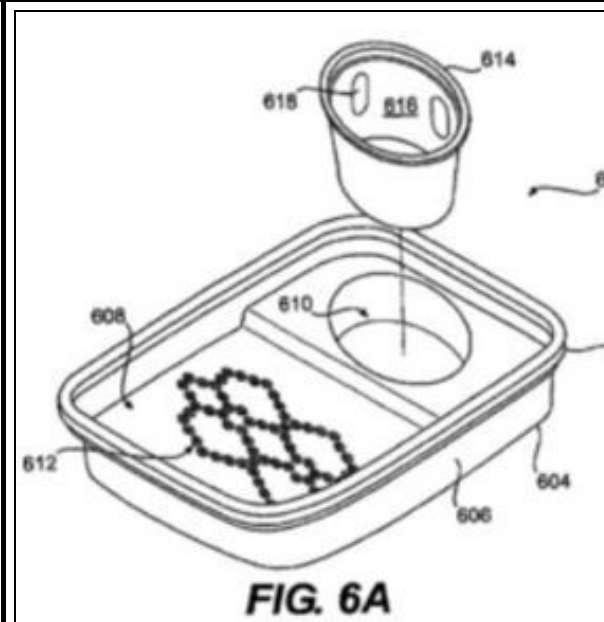
[EP2284099B1](#)

2012

Graphic packaging international, inc.

Microwave packaging for multi-component meals

Packaging constructs in the form of trays, and other package forms for heating, browning, and/or crisping at least one food item in a microwave oven



[EP2208604B1](#)

2012

Ancor flexibles kreuzlingen ltd.

Packaging pouch with food flow properties

Packaging pouch made of a flexible mono or multilayer film for packaging viscous jelly and/or gravy matrix food in a thermo cycle such as retort, pasteurisation, hot filling or aseptic conditions

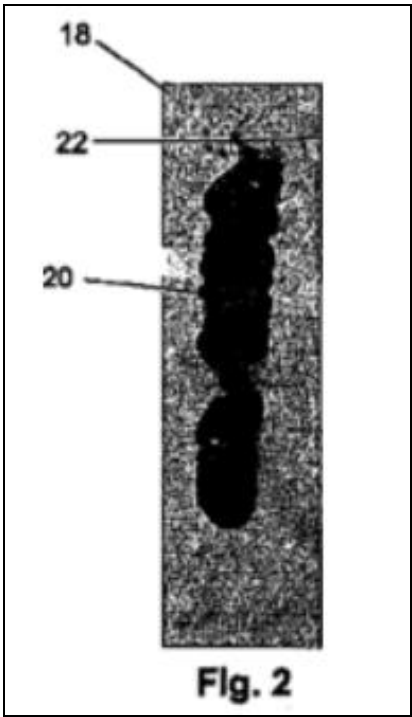


Fig. 2

1

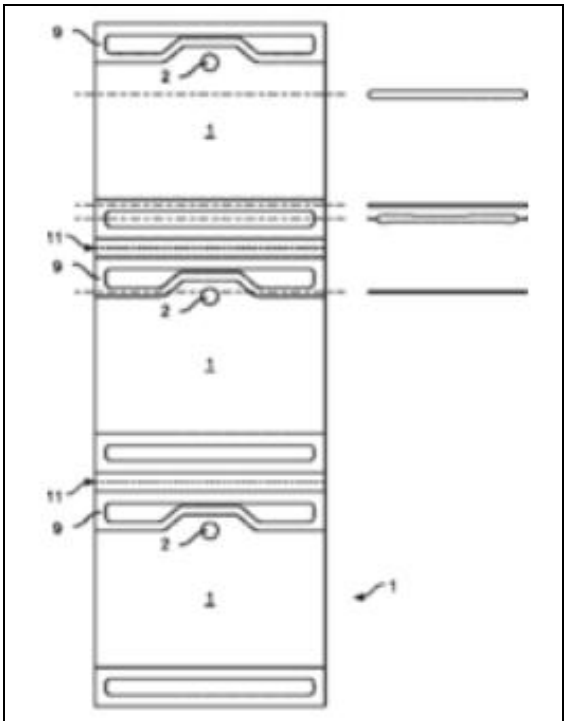
[US20120168025A1](#)

2012

Nestec s.a.

Disposable very lightweight package

A biodegradable flexible pouch-like disposable package with a hermetic seal



1

[EP2459463A1](#)

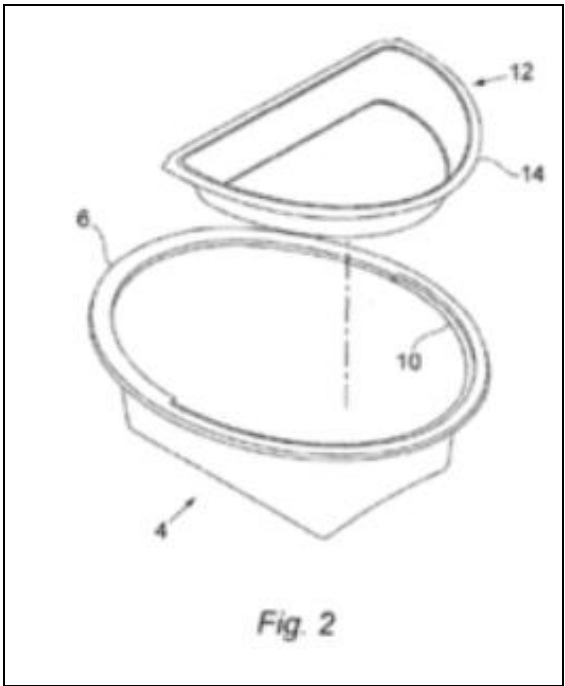
2012

Nestec s.a.

Easy opening packaging for liquid or gel products

A flexible package for a food product such as gel having a closure which is suitable for one hand operation

					<p>FIG. 3</p>
US8080770B2	2011	Ball corporation	Microwavable metallic container	A metallic microwavable container which is hermetically sealed and capable of storing foodstuffs for long periods of time	
US7981408B2	2011	Boston brands, inc.	Method of preserving food using antimicrobial packaging	Antimicrobial film for food packaging	N/A
EP1888430B1	2011	Graphic packaging international, inc.	Microwavable food package having an easy-open feature	Package construct for cooking or heating a food item in a microwave oven.	N/A
GB2476365A	2011	Avondale foods, limited	Food packaging for two different food products to be stored separately	A Microwaveable food packaging containing a first outer bowl for a first food and a separable insert tray for a second food where the insert tray fits within the first bowl.	



1

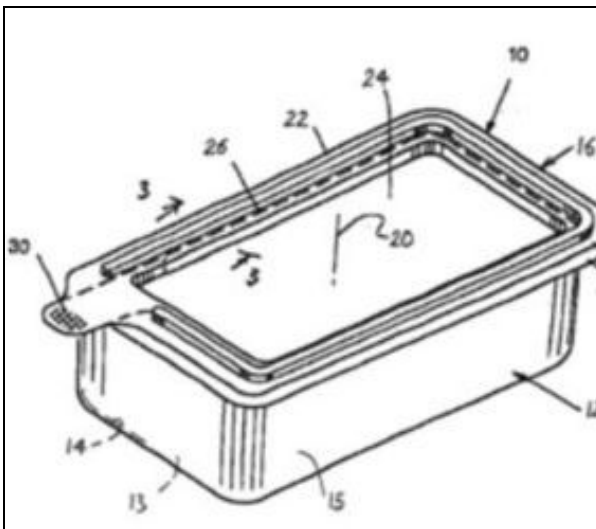
[US20100108680A1](#)

2010

None

Enhanced tamper evident container with tear-apart parts

Easily openable tamper evident container where a large sustained pull force has to be applied to separate a lid from a peripheral cover portion that is fixed to a peripheral base portion of the base



1

[EP1777173B1](#)

2010

Mora negrin, pedro ramon

Easily opened flexible vacuum packaging for single portions of pasty fluids

Easy-open flexible vacuum container for single doses of viscous fluids

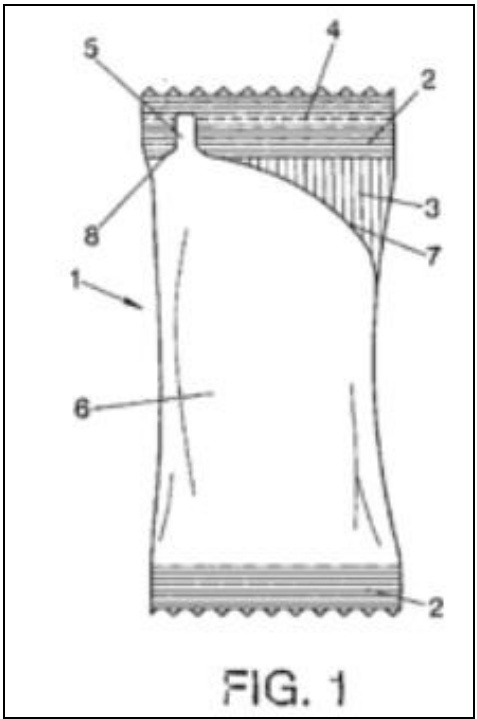


FIG. 1

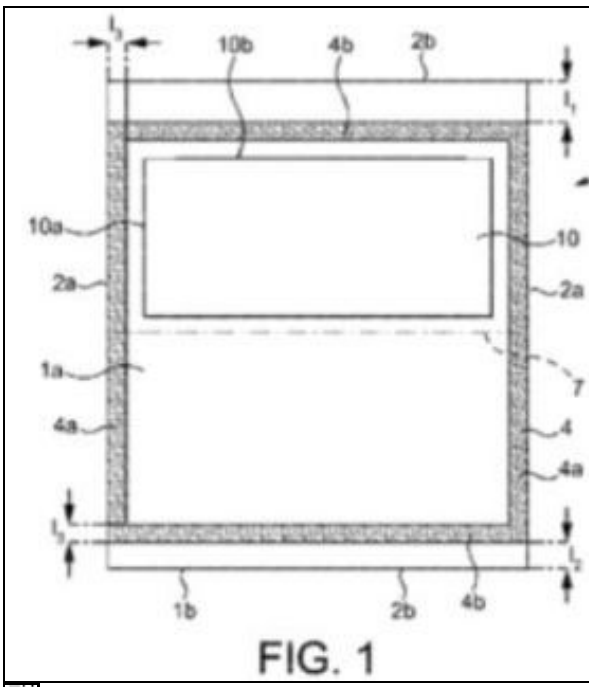
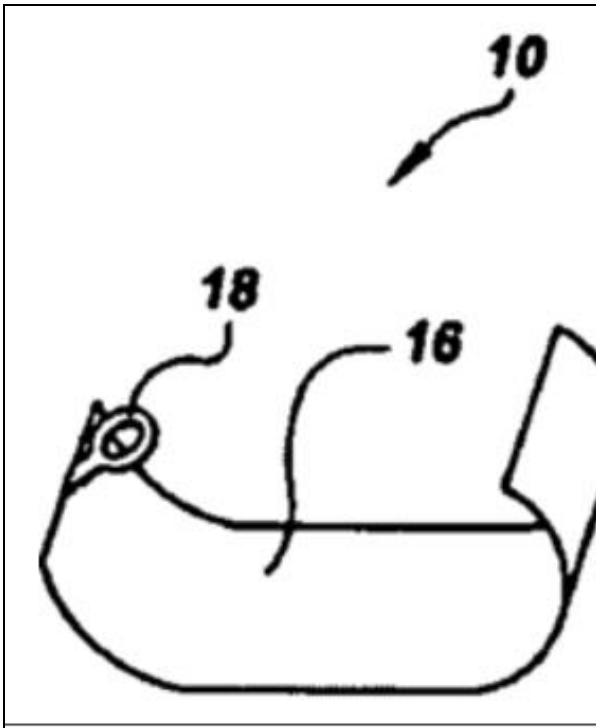


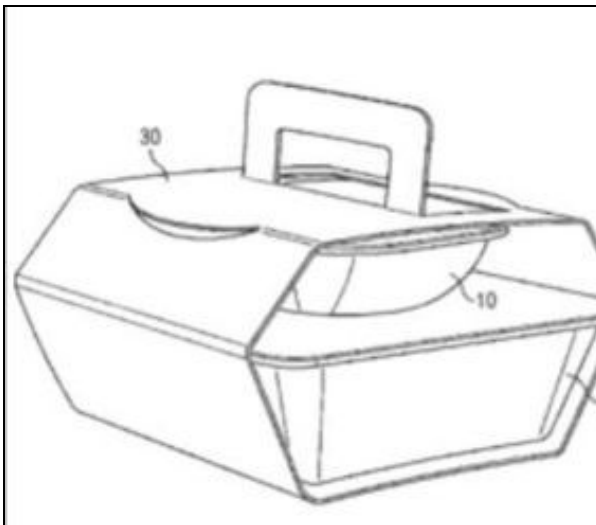
FIG. 1

<p>EP2141085A1</p>	<p>2010</p>	<p>Nestec s.a.</p>	<p>Easy opening packaging for food products</p>	<p>Easy open flexible packaging for energy bars providing a bigger surface for consumer information</p>	
<p>US20090285941A1</p>	<p>2009</p>	<p>None</p>	<p>Combination package of liquid and solid foodstuff</p>	<p>A multi-compartment package for convenience and portability to a favorite snack such as cookies and milk</p>	

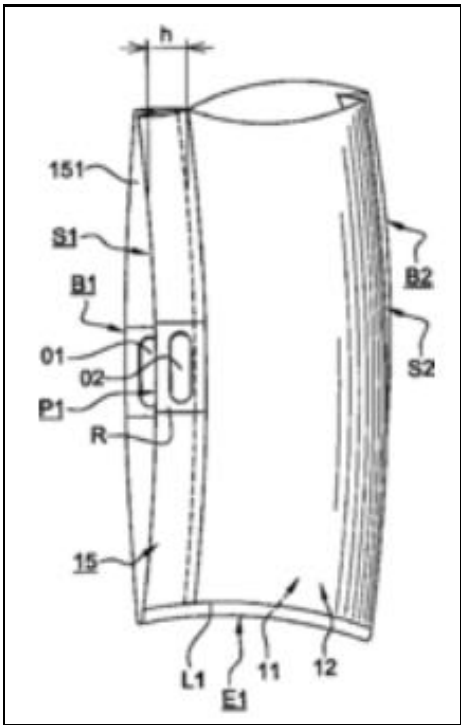
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US20090214723A1	2009	None	Two component package for simultaneous heating	A package for simultaneous heating of a crispy food product and a non-crispy food product in microwave.
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US20090032487A1	2009	Stephen s. Rekstad	Spill resistant caps and container systems	A spill resistant cap for a standard commercially available beverage bottle containing water, milk, juice, soda or other beverage.
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An ergonomic bag assembly for granular foods contains two bags mutually joined by a gripping element comprising a handle

[US7494279B2](#)

2009

Mars incorporated

Ergonomic bag assembly for foods

Search Methodology

Relevant Class Codes and Definitions

IPC/ECLA

Class	Definition
A23L	Foods, foodstuffs, or non-alcoholic beverages
A23L0001*	Foods or foodstuffs; their preparation or treatment
B32B*	Layered products, i.e. Products built-up of strata of flat or non-flat, e.g. Cellular or honeycomb, form

B65B*	Machines, apparatus or devices for, or methods of, packaging articles or materials; unpacking
B65D*	Containers for storage or transport of articles or materials, e.g. Bags, barrels, bottles, boxes, cans, cartons, crates, drums, jars, tanks, hoppers, forwarding containers; accessories, closures, or fittings therefor; packaging elements; packages
C09J*	Adhesives; non-mechanical aspects of adhesive processes in general; adhesive processes not provided for elsewhere; use of materials as adhesives
D21H*	Pulp compositions; preparation
G01N*	Investigating or analysing materials by determining their chemical or physical properties

US Class

Class	Definition
428*	Stock material or miscellaneous articles

Patent search

Revised Patent Search

- Search Engine: Thomson Innovation
- Time line: 1836-01-01 to 2013-07-22
- Databases: US Grant, WO App, FR App, US App, GB App, DE Util, EP Grant, DE Grant, EP App, DE App, JP Util, CN Util, JP Grant, CN App, JP App, Other

S. No.	Scope	Concept	Query	No. of hits
1	Any IPC or CPC or US class	Food class	AIC=(A23L0001*) OR UC=(426*) AND	550686
	Title	Packaging KW	(TI=((*Packag* or *container* or *receptacl* or bag* or sack* or pouch*2 or sachet* or *carton* or barrel* or bottle* or closure* or cap or caps or lid* or *seal or reseal* or *clos* or reclos* or zipper* or slide* or dispens*))) AND (DP>=(18360101) AND DP<=(20130722));	
2	Any IPC or CPC or US class	Packaging class	(AIC=(B65D* or B65B* or B32B* or D21H* or G01N* or C09J*) OR UCC=(428*))	866669
	Title	Packaging KW	(TI=((*Pack* or *container* or *receptacl* or bag* or sack* or pouch*2 or sachet* or *carton* or tray* or tub* or barrel* or bottle* or closure* or cap or caps or lid* or *seal or reseal* or *clos* or reclos* or tamper or zipper* or slide* or dispens*))) AND (DP>=(18360101) AND DP<=(20130722));	
3	CTAB	Food KW	CTB=(*food* or *beverage* or snack* or past* or meal*1 or entree*1 or *soup*) AND DP>=(18360101) AND DP<=(20130722);	1970718
4	Combined query		2 and 3	95607
5	Combined query		1 or 4	640980(14971)
6	CTAB	KW of customer interest	CTB=((barrier near2 propert*3) or (shelf adj2 life) or (Unique near2 (shape*1 or design*1) or aseptic*4 or retort*4 or microwave*4 or light-weight*3 or (environmentally adj2 friendly) or biodegrad*4 or recycl*4 or ((dual or duplex) adj2 (dispens* or chamber* or discharg*4) or (single adj2 serve) or ((individual or single) adj2 (serving or portion*1)) or unitized or (eas*3 near3 (carry*4 or tear*4 or peel*4 or grip*4 or tilt*4 or open*3 or handl*3 or pour* or dispens* or transport*4) or convenien*4 or (consumer near3 (appeal*3 or acceptance or safety or orient*2 or favour*4) or (one adj2 hand adj2 (open*3 or operat*4) or "OTG" or "on the go" or ergonomic or (tamper adj2 (proof or resist*4 or prevent*4) or (child adj2 proof) or (single adj1 handed) or dripless or ((leak*3 or spill*3 or mess or drip*3 or splash*4) adj2 (prevent*3 or resistan*2 or proof) or nonspill*3 or (non adj2 spill*3) or ((enhanc*3 or colorful or colourful) near2 graphics)) AND DP>=(18360101) AND DP<=(20130722);	1277116
7	Combined query		5 and 6	34465(17463)
8	Time restriction for 5 years		DP>=(20080722) AND DP<=(20130722);	9329(6056)
9	Time restriction for 4 years		DP>=(20090722) AND DP<=(20130722)	7774(5298)

10	Time restriction for 3 years	DP>=(20100722) AND DP<=(20130722)	5625(3872)
11	Time restriction for 2 years	DP>=(20110722) AND DP<=(20130722)	3047(2088)
12	Time restriction for 1 year	DP>=(20120722) AND DP<=(20130722)	1336(1081)

Taxonomy of Food Packaging

Interactive Taxonomy

Revised Interactive Taxonomy

```
.markmap-node {
  cursor: pointer;
}

.markmap-node-circle {
  fill: #fff;
  stroke-width: 1.5px;
}

.markmap-node-text {
  fill: #000;
  font: 10px sans-serif;
}

.markmap-link {
  fill: none;
}

pre, .mw-code{
  background-color: transparent;
}
d3.xml("https://www.dolcera.com/wiki/images/Revised_Food_Packaging_Colgate.mm", function(error, data) {
  if (error) throw error;

  markmap("svg#mindmap_0e3a9eea39f8a9a1d3238d00a0dc0420", data, {
    preset: "colorful",
    linkShape: "diagonal"
  }, "xml");
});
```

Sample Analysis Sheet

◇ Click here to download [Sample patent analysis sheet](#)

◇ Click here to download [Revised Sample patent analysis sheet](#)

Dashboard link

Please click for the [dashboard link](#)

NOTE: You need to install Internet Explorer 8.0 and Adobe Flash Player to view the Dashboard.

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Note:

- Use the mouse(click and drag/scroll up or down/click on nodes) to explore nodes in the detailed taxonomy
- Click on the red arrow adjacent to the node name to view the content for that particular node in the dashboard

Antimicrobial films

Sample Patents

S. No.	Patent/Publication No.	Publication Year	Assignee / Applicant	Title
1	US8318282B2	2012	3m innovative properties company	Microstructured antimicrobial film
2	US20120087968A1	2012	Cryovac inc.	Antimicrobial Packaging Material and Methods of Making and Using the Same
3	US8017667B2	2011	Victoria university technion research and development foundation ltd.	Antimicrobial packaging material
4	US7915325B2	2011	Kuhne anlagenbau gmbh	Antimicrobial food packaging
5	US7705078B2	2010	Dupont tejijn films u.s. Limited partnership	Antimicrobial polymeric film

6	GB2450475A	2008	Nottingham trent university	Antimicrobial polymer nanocomposite
7	GB2449876A	2008	Post harvest solutions, limited	Active packaging materials incorporating micro-porous solids and essential oils

Search Methodology

Relevant Class Codes and Definitions

IPC/ECLA

Class	Definition
A23L	Foods, foodstuffs, or non-alcoholic beverages
A23L0001*	Foods or foodstuffs; their preparation or treatment
A01N*	Preservation of bodies of humans or animals or plants or parts thereof; biocides, e.g. As disinfectants, as pesticides, as herbicides
B32B*	Layered products, i.e. Products built-up of strata of flat or non-flat, e.g. Cellular or honeycomb, form

Patent search

- Search Engine: Thomson Innovation
- Time line: 18.June.2008 to 18.June.2013
- Databases: US Grant, WO App, FR App, US App, GB App, DE Util, EP Grant, DE Grant, EP App, DE App, JP Util, CN Util, JP Grant, CN App, JP App, Other

S.no.	Concept	Scope	Search query	No. of hits
1	Preservation or layered products class	Any IPC or CPC	A01N* or B32B*	615(358)
	Antimicrobial film kw	Title	(antimicrobial or antibacterial or (anti adj2 (bacterial or microbial)) or smart) AND (packag* or film* or sheet* or laminat* or polymer* or *composite*)	
2	Food Kw	Full text	Food*	707301
3	Combined query		1 and 2	269(148)
4	Food Class	Any IPC or CPC	A23L0001*	8(7)
	Antimicrobial film kw	Title	(antimicrobial or antibacterial or (anti adj2 (bacterial or microbial)) or smart) AND (packag* or film* or sheet* or laminat* or polymer* or *composite*)	
5	Combined query		3 or 4	273(152)
6	Control patents		US8318282B2 US8017667B2 US7705078B2 US7915325B2 US20120087968A1 GB2450475A GB2449876A	7
7	Combined query		5 and 6	7

Taxonomy of Antimicrobial films

Interactive Taxonomy

```
.markmap-node {
  cursor: pointer;
}

.markmap-node-circle {
  fill: #fff;
  stroke-width: 1.5px;
}

.markmap-node-text {
  fill: #000;
  font: 10px sans-serif;
}

.markmap-link {
  fill: none;
}

pre, .mw-code{
  background-color: transparent;
}
d3.xml("https://www.dolcera.com/wiki/images/Antimicrobial_films-Colgate.mm", function(error, data) {
```

```
if (error) throw error;

markmap("svg#mindmap_890805e4424c6b77393e4aa1142a8ea8", data, {
  preset: "colorful",
  linkShape: "diagonal"
}, "xml");
});
```

Sample Analysis with Problem Solution Approach

Revised Sample Analysis Sheet

◇ [Click here to download Revised Sample patent analysis sheet](#)

Dashboard link

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- *Click on the red arrow adjacent to the node name to view the content for that particular node in the dashboard*