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SUPERINDUSTRIA Y COMERCIO
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Referencia : Expediente No. 00.074.721
Solicitante : THE DOW CHEMICAL COMPANY
Asunto : Solicitud de patente para:
"MÉTODO PARA EMPACAR Y COCINAR ALIMENTOS EN UN
CONTENEDOR PARA USO EN HORNO"
Fecha de solicitud : 2 de octubre de 2000

TRAMITE 002 EVENTO 001 ACTUACION 329

1. Yo, Emilio FERRERO, obrando como apoderado de la solicitante en el asunto de la referencia, atentamente, presento con este escrito la copia certificada de la solicitud de patente estadounidense No. 60/156,854 del 30 de septiembre de 1999, junto con la respectiva traducción de su carátula y reivindicaciones de la cual se reclama prioridad en esta solicitud de patente.

2. Ruego a la Señora Jefe se sirva aceptar este escrito con sus anexos, y se continúe con el trámite de la solicitud.

Bogotá, 2 - Ene 2001
Señora Jefe,



EMILIO FERRERO
T.P.A. No. 31.929

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ASN-ID-1616

NIT.860.041.367-3



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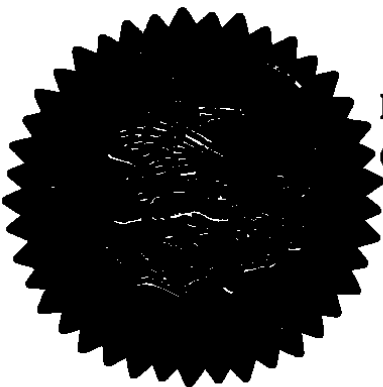
United States Patent and Trademark Office

October 17, 2000

THIS IS TO CERTIFY THAT ANNEXED HERETO IS A TRUE COPY FROM THE RECORDS OF THE UNITED STATES PATENT AND TRADEMARK OFFICE OF THOSE PAPERS OF THE BELOW IDENTIFIED PATENT APPLICATION THAT MET THE REQUIREMENTS TO BE GRANTED A FILING DATE UNDER 35 USC 111.

APPLICATION NUMBER: 60/156,854

FILING DATE: September 30, 1999



By Authority of the
COMMISSIONER OF PATENTS AND TRADEMARKS

P. R. GRANT
Certifying Officer

10670 U.S. PTO
09/30/99

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Patent and Trademark Office, U.S. DEPARTMENT OF COMMERCE

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PROVISIONAL APPLICATION FOR PATENT COVER SHEET

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53 (c).

INVENTOR(S)					
Given Name (first and middle (if any))	Family Name or Surname	Residence (City and either State or Foreign Country)			
Daniel B. David A. Harry A.	Derbyshire Spears Rubbright	Midland, MI Midland, MI Mendota Heights, MN			
☒ Additional inventors are being named on the <u>1</u> separately numbered sheets attached hereto					
TITLE OF THE INVENTION (250 characters max)					
OVENABLE CONTAINER					
Direct all correspondence to: CORRESPONDENCE ADDRESS					
☐ Customer Number				Place Customer Number Bar Code Label here	
OR Type Customer Number here					
☒ Firm or Individual Name		Kilworth, Gottman, Hagan & Schaeff, L.L.P.			
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City		Dayton	State	Ohio	ZIP 45402-2023
Country		United States of America	Telephone	937/223-2050	Fax 937/223-0724
ENCLOSED APPLICATION PARTS (check all that apply)					
☒ Specification Number of Pages		24		☐ Small Entity Statement	
☒ Drawing(s) Number of Sheets		12		☐ Other (specify)	
METHOD OF PAYMENT OF FILING FEES FOR THIS PROVISIONAL APPLICATION FOR PATENT (check one)					
☒ A check or money order is enclosed to cover the filing fees				FILING FEE AMOUNT (\$)	
☐ The Commissioner is hereby authorized to charge filing fees or credit any overpayment to Deposit Account Number:				150.00	
The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.					
☒ No.					
☐ Yes, the name of the U.S. Government agency and the Government contract number are:					

Respectfully submitted,

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Date 09/30/99

REGISTRATION NO. 38,769
(if appropriate)
Docket Number: DOW 224 MA

USE ONLY FOR FILING A PROVISIONAL APPLICATION FOR PATENT

This collection of information is required by 37 CFR 1.51. The information is used by the public to file (and by the PTO to process) a provisional application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 5 hours to complete, including gathering, preparing, and submitting the complete provisional application to the PTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, Washington, D.C., 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Box Provisional Application, Assistant Commissioner for Patents, Washington, D.C., 20231.

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Docket Number

DOW 224 MA

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Number 1 of 1

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Initial Information Data Sheet

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Application Information

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Total Drawing Sheets:: 12
Formal Drawings?:: No
Application Type:: Provisional
Docket Number:: DOW 224 MA

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Representative Information

Registration Number One::	26,397
Registration Number Two::	27,262
Registration Number Three::	29,001
Registration Number Four::	28,046
Registration Number Five::	33,579
Registration Number Six::	39,564
Registration Number Seven::	38,769
Registration Number Eight::	44,339
Registration Number Nine::	40,830
Registration Number Ten::	33,758
Registration Number Eleven::	42,695

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of

Applicant(s) : Daniel B. Derbyshire, David A. Spears, Harry A. Rubbright and
Charles J. McDonald

Title : OVENABLE CONTAINER

Docket : DOW 224 MA

BOX PROVISIONAL APPLICATION

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

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Date of Deposit September 30, 1999

I hereby certify that this paper or fee is being deposited with the
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addressed to the BOX PROVISIONAL APPLICATION, Assistant
Commissioner for Patents, Washington, D.C. 20231.


Nancy M. Mastbaum
Legal Secretary

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OVENABLE CONTAINER BACKGROUND OF THE INVENTION

The present invention relates to an ovenable container, and more particularly, to a container which may be heated to high temperatures in an oven without generating objectionable odors.

In recent years, the desire for disposable containers which can be used to package and cook food has increased. For example, disposable containers may be used to package frozen foods which may then be heated within the container. Such containers have been typically comprised of paper, paperboard, plastics such as polystyrene and polyethylene terephthalate, metals such as aluminum, or combinations of these materials. While aluminum foil can be used at high temperatures in conventional ovens (i.e., electrical or gas heating ovens), efforts have been made to provide containers formed from materials which are suitable for cooking in both conventional and microwave ovens. The art has called such containers "dual ovenable" containers.

Dual ovenable containers currently in use are typically comprised of plastic or paperboard; however, such materials are limited for use in conventional ovens at temperatures of less than about 350°F. At higher temperatures, such containers tend to degrade, darken, deform, and emit odors, resulting in an unfavorable appearance and smell, both for the container and the food contained therein.

A number of coatings have been developed for paperboard substrates to increase their heat resistance for use as ovenable containers. For example, Seung et al., U.S. Patent No. 5,494,716 teach an aqueous coating including a styrene-acrylic latex which provides heat resistance. Katsura et al., U.S. Patent No. 5,078,939, teaches a heat resistant container formed from a laminate of a paper substrate and an aqueous dispersion of a hiding pigment and a thermosetting epoxy-acrylic resin. Calvert, U.S. Patent 5,418,008, teaches a barrier coating for paperboard packing comprising a water-based emulsion coating of an acrylic copolymer resin and a high density polyethylene wax.

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However, such coatings have been found to provide heat resistance only up to about 400°F. For some applications, it is desirable to heat food for short periods of time at higher temperatures of up to 600°F.

Accordingly, there is still a need in the art for a disposable container which may be used to package and/or cook foods and which may be used in an oven at high temperatures without generating objectionable odors from the container, and without introducing an objectionable flavor to the food.

SUMMARY OF THE INVENTION

The present invention meets that need by providing an ovenable container formed from a filled composite material containing fillers, fibers, a latex and other additives which allow the container to be used to cook foods in an oven such as a conventional or microwave oven at high temperatures (i.e., greater than 400°F) without generating an objectionable odor from the container or introducing an objectionable flavor to the food.

According to one aspect of the present invention, an ovenable container is provided comprising a filled composite material comprising from about 20 to 90% by weight of a filler, from about 2 to 40% by weight of a fibrous material, and from about 2 to 25% by weight of a latex comprising at least one soft monomer or at least one hard monomer, or a combination thereof, and a polymerizable emulsion stabilizer. By "soft" monomer, it is meant a monomer whose homopolymer glass transition temperature is less than about room temperature (25°C). By "hard" monomer, it is meant a monomer whose homopolymer glass transition temperature is greater than about room temperature (25°C). In the present invention, a preferred soft monomer is methyl acrylate and a preferred hard monomer is methyl methacrylate.

The container is adapted to cook foods at temperatures of greater than about 400°F, and preferably up to about 600°F, without generating an objectionable odor, or without any substantial degradation, discoloration, or deformation of the container.

Preferably, the filled composite material comprises from about 60 to 80% by weight of the filler. The filler is preferably selected from the group consisting of calcium carbonate, talc,

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and clay. In a preferred embodiment of the invention, the filler comprises calcium carbonate.

The fibrous material may comprise organic fibers including natural fibers such as cellulose; synthetic fibers such as polyester, nylon, polypropylene, polyethylene, acrylic, aramid, rayon, or polystyrene; inorganic fibers such as glass or carbon fibers, or combinations of organic and inorganic fibers. The filled composite material may comprise from about 2 to 40% by weight total fibers, and more preferably, from about 4 to 20% by weight total fibers. In one embodiment, the filled composite material comprises from about 4 to 15% by weight cellulose fiber and from about 1 to 5% by weight polyester fiber. In an alternative embodiment, the filled composite material comprises about 4 to 15% by weight cellulose fiber and from about 1 to 5% by weight nylon fiber. In yet another embodiment, the filled composite material comprises from about 4 to 20% by weight cellulose fibers. In yet another embodiment, the filled composite material comprises from about 4 to 20% by weight nylon. In another embodiment, the filled composite material comprises from about 4 to 20% by weight polyester.

Preferably, the filled composite material further comprises from about 0.1 to 10% by weight of a coloring agent selected from the group consisting of carbon black, titanium dioxide, iron oxides, inorganic pigments, organic pigments, and dyes. Preferably, the coloring agent comprises carbon black.

The filled composite material preferably further includes a colloidal aggregation additive which functions to bind the filler, fiber and latex into a larger aggregate structure during the process of forming the container. The colloidal aggregation additive may be selected from the group consisting of flocculants, coagulants, or combinations thereof. The filled composite material preferably comprises from about 0 to 2% by weight of the colloidal aggregation additive. In one embodiment, the colloidal aggregation additive comprises a flocculant which is selected from the group consisting of cationic amine polymer-epichlorohydrin adduct, starches, gums, phenolic resins, polyamines, polyacrylamides, urea-formaldehyde, melamine-formaldehyde, polyamides, quaternary amines, polyethyleneimines, and cationic starches. The filled composite material preferably comprises from about 0 to 2% by weight of the flocculant.

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In another embodiment of the invention, the colloidal aggregation additive comprises a coagulant which is selected from the group consisting of alum, quaternary amines, colloidal silica, and bentonite clays.

In a preferred embodiment of the invention, the filled composite material comprises from about 60 to 80% by weight of the filler, from about 4 to 12% by weight cellulose fiber, from about 1 to 5% by weight nylon fiber, from about 0 to 2.5% by weight of a coloring agent, from about 0 to 2% by weight of a flocculant, from about 0 to 2% by weight of a coagulant, and from about 9 to 20% by weight of the latex. It should be appreciated that in some instances, the filler can also function as a coloring agent.

The latex preferably comprises, based on total monomers, from about 0 to 99% by weight methyl acrylate, from about 0 to 70% by weight methyl methacrylate, from about 0.1 to 5% by weight of a polymerizable emulsion stabilizer, and from about 0 to 3% by weight of a crosslinking agent. More preferably, the latex comprises from about 50 to 70% by weight methyl acrylate, from about 30 to 40% by weight methyl methacrylate, from about 0.5 to 3% by weight of a polymerizable emulsion stabilizer, and from about 0 to 3% by weight of a crosslinking agent. The crosslinking agent is preferably selected from the group consisting of glycidyl methacrylate, allyl methacrylate, and trimethylol propane triacrylate. The polymerizable emulsion stabilizer is preferably selected from the group consisting of fumaric acid, itaconic acid, acrylic acid, methacrylic acid, and maleic acid.

In a preferred embodiment of the invention, an optional barrier layer is included in or on the ovenable container to prevent grease or oils in the food from penetrating the container and/or to prevent the absorption of material from the container into the food. The barrier layer is preferably selected from the group consisting of nitrile resins, polycarbonates, polyethylene terephthalate, polyethylene terephthalate copolymers, polyolefins, and cellulose ethers.

The container of the present invention may be used to cook food by placing food in the container and heating the container in an oven at temperatures of up to 600°F for a period sufficient to cook the food; wherein no objectionable odors are generated from the container during heating.

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In another embodiment, the food container preferably comprises a container body formed from the filled composite material described above and includes a lid adapted to be mounted on the container. Preferably, the container body includes a base and surrounding sidewalls defining an opening for containing food, and the lid is adapted to be fitted onto the peripheral edge of the sidewalls. The lid may be formed from the same filled composite material as the container body, or it may be formed from a material selected from the group consisting of paperboard, pulp-molded paper, and plastic. The lid may be adapted to seal the container to maintain freshness of the food during storage and/or delivery. If desired, the lid and/or the container may be embossed or printed. The lid may also include an optional barrier layer as described above.

In a preferred embodiment of the invention, the container comprises a pizza pan which may be used to store and cook pizza.

Accordingly, it is a feature of the present invention to provide a ovenable container which may be used to cook foods at temperatures of greater than 400°F, and up to 600°F without generating objectionable odors. This, and other features and advantages of the present invention will become apparent from the following detailed description, the accompanying drawings, and the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a top view of the heat-resistant container and lid of one embodiment of the present invention;

Fig. 2 is a cross-sectional view of the container and lid where the container includes a barrier layer;

Fig. 3 is a perspective view illustrating the lid mounted on the container;

Fig. 4 is a perspective view illustrating the container and lid separately;

Fig. 5 is a side view illustrating the lid mounted on the container;

Fig. 6 is a bottom view of the container;

Fig. 7 is a top view of a container and lid illustrating an alternative embodiment of the invention;

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Fig. 8 is a cross-sectional view of the container and lid of Fig. 7;

Fig. 9 is a perspective view of the container and lid of Fig. 7;

Fig. 10 is a perspective view illustrating the container and lid of Fig. 7 separately;

Fig. 11 is a side view of the container and lid of Fig. 7; and

Fig. 12 is a bottom view of the container of Fig. 7.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to Figs. 1-6, one embodiment of the container 10 is shown which includes a floor 12 and side wall 14. A flange or peripheral edge portion 16 is formed on the top edge of the sidewall. The container may also include a lid 18 as shown in Figs. 1-5 which may be used to seal the container.

The container 10 comprises a filled composite material which is formed from a composite formulation of a filler, fibers, and a latex. The fibers may be organic or inorganic, natural or synthetic, and may include, by way of example, cellulose fibers (cotton, flax, wood pulp, other plant pulp), protein fibers (wool, silk, alginate, casein fiber), rayon fibers, cellulose acetate fibers, cellulose triacetate fibers, acetate fibers, acrylic fibers, aramid fibers (Kevlar, Nomex), azlon fibers, glass fibers, modacrylic fibers, novaloid fibers, nylon fibers (type 6, etc.), nitrile fibers, olefin fibers, (polyethylene, polypropylene, polystyrene, etc.), polyester fibers (polyethylene terephthalate, etc.), polyurethane fibers (Spandex, etc.), vinyl fibers, benzoate fibers, poly(hydroxyacetic acid ester) fibers, Teflon® fibers, carbon fibers, Kynol™ phenolic formaldehyde fibers, polybenzimidazole fibers, metallic wire, and mineral fibers (mineral wool, wollastonite). Preferred fibers for use in the present invention include cellulose, nylon, polyester, glass, polypropylene, polyethylene, acrylic, rayon, aramid, or polystyrene fibers, or blends of such fibers.

Preferred natural fibers for use in the present invention are cellulose fibers, which may comprise up to about 40% by weight of the filled composite material. The cellulose fibers (including soft and hardwood fibers), preferably have a length of about 0.5-5 mm. Preferred

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synthetic fibers are polyester fibers which have a length of about 1-10 mm, and more preferably about 2-7 mm, with a denier of about 1.5 to 6.

Suitable fillers for use in the composite formulation include any organic or inorganic, natural or synthetic filler which will withstand the high temperatures required for using the container. By way of example, suitable fillers include calcium carbonate (precipitated, ground limestone, whiting, etc.), barium carbonate, magnesium carbonate, calcium fluoride, sodium aluminum fluoride, aluminum hydroxide, aluminum, bronze, lead, zinc, aluminum oxide, aluminum trihydrate, magnesium oxide, silicon dioxide (silica: colloidal sol, diatomaceous, novaculite, pyrogenic, quartz flour, vitreous, wet process), titanium dioxide, zinc oxide, silicates (kaolin clay, calcined kaolin, calcium silicate, feldspar, glass tripolite, mica, muscovite, phlogopite, vermiculite, nephiline, pyrophyllite, perlite, talc, wollastonite), barium sulfate (barite, blac fixe), calcium sulfate (gypsum, anhydrite, precipitated), lithopone, zinc sulfide, sodium aluminosilicate, ground cork, ground corn cob, shell flour, wood flour, ground sulfur-chlorinated vegetable oil, ground vulcanized vegetable oil, polystyrene, phenol-formaldehyde resin, mineral rubber, and other ground polymeric resins.

The latex comprises at least one soft monomer, at least one hard monomer, or a combination thereof. The latex used in the present invention is preferably formed from the emulsion polymerization of methyl acrylate, methyl methacrylate, and a crosslinking agent. Preferably, the crosslinking agent comprises glycidyl methacrylate. Other suitable crosslinking agents include, by way of example, butadiene, isoprene, chloroprene, 1-pentenylene, fluoroprene, glycidyl acrylate, oxybutadiene, 1,3-butylene glycol diacrylate, 1,4-butylene glycol diacrylate, diethylene glycol diacrylate, dipropylene glycol diacrylate, ethylene glycol diacrylate, 4-methyl-1,4-pentanediol diacrylate, propylene glycol diacrylate, 1,6-hexanediol diacrylate, 1,4-butanediol diacrylate, ethylene glycol diacrylate, triethylene glycol diacrylate, tetraethylene glycol diacrylate, tripropylene glycol diacrylate, neopentyl glycol diacrylate, poly(butanediol) diacrylate, triisopropylene glycol diacrylate, polyethylene glycol diacrylate, trimethylolpropane triacrylate, pentaerythritol monohydroxy triacrylate, trimethylolpropane triethoxy triacrylate, pentaerythritol tetraacrylate, di-trimethylolpropane tetraacrylate, dipentaerythritol (monohydroxy) pentaacrylate,

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1,3-butylene glycol dimethacrylate, 1,4-butylene glycol dimethacrylate, diethylene glycol dimethacrylate, dipropylene glycol dimethacrylate, ethylene glycol dimethacrylate, 4-methyl, 1,4-pentanediol dimethacrylate, propylene glycol dimethacrylate, tetraethylene glycol dimethacrylate, bisphenol A dimethacrylate, trimethylolpropane trimethacrylate, divinyl benzene, trivinyl benzene, n-methylol acrylamide, n-methylol methacrylamide, formaldehyde, poly-functional epoxy compounds (emulsions, dispersible, or soluble components), poly-functional aziradines, poly-functional oxazolines, poly-functional carodiamides, and poly-functional silanes.

The latex also includes a polymerizable emulsion stabilizer which provides colloidal stability to the latex. The stabilizer is preferably a vinyl acid. Suitable stabilizers for use in the present invention include, by way of example, acrylic acid, methacrylic acid, crotonic acid, citriconic acid, 2-acrylamidoglycolic acid, fumaric acid, itaconic acid, maleic acid, vinyl succinic acid, aconitic acid, 1,2,3-butenetricarboxylic acid, anhydride or mono-esters for all diacids of the variety: methyl, ethyl, propyl, butyl, hexyl, heptyl, octyl, 2-ethylhexyl, amyl, vinyl, or other stabilizers including acrylamide, methacrylamide, n-butylacrylamide, n-t-butylacrylamide, n-dodecylacrylamide, N,N-dibutylacrylamide, morpholylacrylamide, carboxyphenyl methacrylamide, N-hydroxymethacrylamide, N-[N'-pyrrolidone-2)-methyl]acrylamide, sodium styrene sulfonate, styrene-4-sulfonic acid, sulfopropyl methacrylate, sulfopropyl acrylate, vinyl sulfonic acid, vinyl phosphonic acid, acrylamidoglycolic acid, 2-acrylamido-2-methylpropyl-1-sulphonic acid, sulfoethyl methacrylate, 2-hydroxyethyl acrylate, 2-hydroxyethyl methacrylate, 2-hydroxypropyl acrylate, 3-hydroxypropyl acrylate, 2-hydroxypropyl methacrylate, 3-hydroxypropyl methacrylate, 2-hydroxybutyl acrylate, 3-hydroxypentyl acrylate, 2-hydroxy-3-methacryloxypropyl acrylate, 2-hydroxy-3-methacryloxypropyl methacrylate, 2-hydroxy-3-acryloxypropyl acrylate, 2-hydroxybutyl methacrylate, hydroxyethyl vinyl sulfide, 2,3-dihydroxypropyl acrylate, glycerol monoacrylate, trimethylolpropane monoacrylate, 3-hydroxypropyl crotonate, 2-hydroxyethyl 2-octenoate, 2-hydroxyethyl 2-pentyl acrylate, diethylaminoethyl methacrylate, vinyl pyrrolidone, t-butylaminoethyl methacrylate, 2-vinylpyridine, 4-vinylpyridene, 2-aminoethyl acrylate, 2-aminoethyl methacrylate, 2-N,N-diethylaminoethyl acrylate, 2-N,N-diethylaminoethyl methacrylate, N-aminoethylaminoethyl

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acrylate, N-aminoethylaminoethyl methacrylate, dimethylaminoethyl methacrylate, ethylaminoethyl acrylate, propylaminoethyl acrylate, t-butylaminoethyl acrylate, vinyl caprolate, and any polymerizable monomers containing ethylene oxide units. A preferred polymerizable emulsion stabilizer for use in the present invention is itaconic acid.

The resulting latex should exhibit proper odor characteristics, i.e., exhibit no appreciable odor, especially at high temperatures of up to 600°F, and have a T_g in the range of from about 0 to about 100°C, and more preferably, about 30 to about 50°C. This glass transition temperature may be achieved with homopolymers whose T_g naturally falls within this range when measured by an appropriate method such as dynamic scanning calorimetry. For example, methyl acrylate homopolymer has a T_g of approximately 8°C. For monomers whose homopolymer falls outside of this range, comonomers must be added such that the Fox equation would reasonably predict a copolymer glass transition temperature in the correct range. A form of the Fox equation is as follows:

$$[1/(T_g)] = \sum[(w_i)/(T_{g_i})]$$

in which T_g = the glass transition temperature of the copolymer, w_i = the weight percent of a given monomer "i" in the copolymer, and T_{g_i} = the homopolymer glass transition temperature for a given monomer "i". It should be appreciated when using the Fox equation that some monomers render copolymers through copolymerization which deviate significantly from Fox predictions. One such example is vinylidene chloride.

A surfactant and/or an initiator may also be added to the latex composition, depending on the particular reaction conditions as will be understood by one skilled in the art. The latex may comprise from about 0.1 to 2% by weight of a surfactant, and from about 0.5 to 1% by weight of an initiator. Many surfactants and initiators are suitable for use in the present invention. An example of a suitable surfactant is Dowfax™ 2A1, commercially available from The Dow Chemical Company. A suitable initiator is sodium persulfate.

The composite formulation also preferably includes a colloidal aggregation additive which functions to bind the filler, fiber, and latex into a larger aggregate structure by

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destabilizing the latex in a process generally referred to as flocculation. Flocculation is achieved chemically by overcoming the intrinsic repulsive forces that exist to keep a heterogeneous solution in its most dispersed state. In the present invention, flocculants and coagulants may be used to overcome these forces.

Flocculants for use in the present invention may be cationic, anionic or nonionic, and may be natural or synthetic. Suitable cationic flocculants include poly(alkylene polyamines) (polyethyleneimine), poly(hydroxyalkylene polyamines), quaternary polyamines, polyaziridines, cationic cyanamide derivatives, cationic carbamoyl polymers, polycyclic amines (poly(2-vinylimidazoline), vinyl addition polymers (diallyldimethylammonium chloride), acrylic and methacrylic ester polymers, N-(dialkylaminoalkyl)acrylamide polymers, cationic polyelectrolytes, cationic starch derivatives, and cationic polysaccharide derivatives (e.g. chitosan). Anionic flocculants include polymers containing carboxyl groups (e.g. polyacrylic, polyacrylic-o-acrylamide, etc.), polymers containing sulfonic acid groups (e.g. polyethylenesulfonic acid), anionic starch derivatives, and anionic polysaccharide derivatives (e.g. xanthan). Nonionic flocculants include polyacrylamide polymers, poly(ethylene oxide) polymers, poly(vinylpyrrolidone) polymers, starches, polysaccharides, and colloidal protein (gelatin or animal glue).

Suitable commercially available flocculants include poly(ethylenamine), poly(2-hydroxypropyl-1-N-methylammonium chloride), poly(2-hydroxypropyl-1,1,-N-dimethylammonium chloride), poly[N-dimethylaminomethyl]-acrylamide- β], poly(2-vinylimidazolium bisulfate), poly(diallyldimethylammonium chloride), poly(N,N-dimethylaminoethyl methacrylate), poly[N-(dimethylaminopropyl)-methacrylamide], poly(sodium or ammonium acrylate), poly(sodium styrenesulfonate), polyacrylamide, poly(ethylene oxide), poly(vinylpyrrolidone), starches (amylose and/or amylopectin), starch derivatives, polysaccharides (e.g., guar gum, alginic acid, sodium alginate, chitosan, dextran, xanthan), sodium carboxymethyl cellulose, tannins, acrylamide-(β)-methacryloyloxyethylmethylammonium methyl sulfate copolymers, and acrylamide-(β)-acryloyloxyethyltrimethylammonium chloride polymers.

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Suitable coagulants for use in the composite formulation include metals, metal salts, hydrolyzed metals ions, low molecular weight, highly charged polymers, or any other suitable materials which function to destabilize the electrostatic repulsive forces that stabilize the dispersed system. It should be noted that while in some instances, coagulants can cause flocculation, they are typically not capable of sufficiently flocculating the dispersed composite materials when used alone. However, the use of a coagulant in combination with a flocculant aids in reducing the amount of flocculant needed to completely flocculate the dispersed composite materials. Suitable coagulants include, by way of example, aluminum, aluminum hydroxide, supersaturated aluminum hydroxide, sodium aluminate, aluminum sulfate, alum, hydrolyzed aluminum chloride ion, ferric hydroxide, supersaturated ferric hydroxide, ferric sulfate, ferric chloride, ferrous sulfate, magnesium bicarbonate, lime (calcium or calcium/magnesium oxide, dolomitic lime), sodium silicate, hydrolyzed derivatives of silicon, bentonite clay, common dispersants (tetrasodium pyrophosphate, tetrapotassium pyrophosphate, sodium hexametaphosphate, appropriate molecular weight polyacrylic acid and polyacrylic acid salts, etc.), poly(alkylene polyamines), (e.g. polyethyleneimine, poly(hydroxylalkylene polyamines), quaternary polyamines-vinyl addition polymers (e.g. dialkyldimethylammonium chloride). Many other cationic polyelectrolytes are also suitable for use.

It should also be appreciated that the latex itself may be modified to be cationic such that it performs the function of binding the filler, fiber and latex without the need for a colloidal aggregation additive.

The composite formulation may also optionally include additives such as pigments or dyes, optical brighteners, sizing agents, antioxidants, UV stabilizers, impact modifiers, dry strength additives, wet strength additives, defoamers, antimicrobials, slimicides, mildicides and fungicides.

The preferred process for making the container of the present invention may be carried out using a variety of techniques including fine pulp molding, conventional thin wall pulp molding (with or without after-press), and conventional paper making followed by dry or wet press forming with heat.

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In the fine pulp molding process, the composite materials (filler, fiber, latex, colloidal aggregation additive(s), other additives) are mixed and flocculated in the appropriate portions. Preferably, the fibers are added first, followed by the addition of the fillers, latex, and the colloidal aggregation additive(s). Any other additives or fillers may then be added prior to or after flocculation occurs. The flocculated mixture is then placed in the formation tank of a fine pulp molder. A screened mold is immersed in the mixture and a vacuum is used to draw an amount of composite material onto a mold. The mold with a layer of the composite material attached is removed from the flocculated mixture and married to a second mold which is heated. Once married, each mold uses a vacuum and a series of screens or pores to remove the remaining water from the article. This process is continued or repeated on additional molds until the article is dry. The married mold drying steps can incorporate additional pressing force if this is necessary to finish the article.

In the conventional thin-wall pulp molding process, the composite materials are mixed and flocculated, then placed in the formation tank of a conventional thin-wall pulp molding unit. A screened mold is immersed in the mixture and vacuum is used to draw an amount of composite material onto a mold. The mold with a layer of the composite material attached is removed from the flocculated mixture and transferred to a second mold. Once transferred, the second mold continues to remove water by use of vacuum and a series of screens or pores. The partially dried article may then be processed by a wet or dry after-press. In the wet method, the article is pressed in a vented press with sufficient pressure to finish the article surfaces. The article is then dried in an oven such as a conventional oven, microwave oven, combinations thereof, or any other suitable heat source. In the dry method, the article is first dried in an oven and then run through the press.

In the conventional paper-making process, the composite materials are mixed and flocculated and then placed in the headbox of a conventional paper-making unit. The headbox meters flocculated materials onto a traveling mesh such as a Fourdrinier wire at a predetermined speed. Water is removed by draining and vacuum until it is sufficiently dried to be lifted from the wire mesh. At this point, the free sheet is still wet and can be pressed in a vented press with

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sufficient pressure to finish the article surfaces. The drying process for the article is then completed in an oven or other heat source. In an alternative dry thermoforming procedure, the free sheet is dried by heated rollers, cans or drums, or an oven, and then rolled up or cut into smaller units. The dried sheet or units are then run through a press with sufficient pressure to finish the article surfaces. Trimming may occur either during or after the pressing process.

The container preferably, but not necessarily, includes a barrier layer 20 as shown in Fig. 2. The barrier layer may perform a variety of functions including the protection of food in the container from gas and vapor exchanges within the environment which could lead to loss of freshness or the introduction of an undesirable odor or taste. The barrier layer also functions to prevent oil or grease in foods from penetrating the container as well as providing a release layer for removing food from the container without sticking.

Suitable polymers which may be used to form the barrier layer include ethylene-vinyl alcohol copolymers, nitrile resins, aliphatic and aromatic polyamides, polyethyl pentene, polyethylene terephthalate, polyvinyl chloride, polyvinylidene chloride and tortuous path blends of barrier polymers and structured resins such as nitrile resins, polycarbonates, polyethylene terephthalate copolymers, polyolefins such as polyethylene or polypropylene as well as polystyrene and polyvinyl chloride, polybutylene terephthalate, polysulfones, polyethersulfones, silicones, polyketones, liquid crystal polymers, polyphthalamide, emulsion polymers (polymerized or mechanically dispersed), and cellulose ethers (with or without a filler or colorant added).

A preferred barrier layer is amorphous polyethylene terephthalate film. The barrier layer is preferably laminated to the container prior to the pressing step. Alternatively, the barrier film may be applied by coating, painting, powder coating, spraying or dipping techniques. As can be appreciated, the method of applying the barrier layer is determined by several factors including the form of the article, its thickness, sealing capability and acceptance of printing.

The barrier layer may also be treated or coated prior to lamination to the container with a surface modifier in order to impart additional properties to the barrier polymer. For example, the surface modifier may be used to facilitate the mechanical handling of the barrier layer, to induce a polar surface for ease of printing, to color the barrier layer, to harden the surface so as to

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provide scratch resistance, or to enhance adhesion of the laminate to the substrate. Modifiers such as pigments or dyes, surface-active materials such as silane coupling agents, and hot-melt adhesives can be coated onto the barrier layer.

It should also be appreciated that the barrier layer may be in the form of a composite such as a co-extruded film or multilayer laminate. For example, a multilayer barrier film may include an outer heat sealable layer, a tie layer, and an inner heat resistant layer. Other suitable composite barrier structures include a heat sealable multi-layer film with a colorant-containing layer, a deoxidizing multi-layer film with an absorbing middle layer to remove gases such as oxygen, radiation curable primer coating compositions having functional groups which crosslink on exposure to radiation, packing material for adsorption of odor comprising particulate aluminosilicate or silica molecular sieves, multilayer films with an oxygen scavenging phase with an oxidizable compound and a second phase having a catalyst effective in catalyzing an oxygen scavenging reaction, multilayer barrier materials having an inner multi-resin layer containing reclaimed materials, multilayer barrier materials having an easy peel film layer at the composite interface for facile delamination, multilayer barrier materials with a thin imbedded inner metal foil or ceramic layer for use in microwave cooking, a filled coating barrier layer having embedded adsorbing pigments for reducing migration via an adsorbing or tortuous-path type mechanism, a composite barrier layer with a liquid crystal polymer layer on which a thermoplastic polymer is laminated, and a multilayer plastic composite barrier layer having an inorganic oxide vapor deposited on its surface.

As shown in Fig. 4, the container 10 also preferably includes raised areas 30 which aid in food release as well as maintain the food above the level of any moisture, grease, or oils which may drain from the food during cooking. Such raised areas also allow heat to crisp and dry the bottom of the food being heated, e.g., pizza crust.

The lid 18 of the container may be made by the same methods described above with regard to the container. However, it should be appreciated that the lid does not have to be ovenable, i.e., food may be cooked with the lid on or off. The lid may be comprised of a number of materials such as plastic, paperboard, pulp-molded paper, and the like. The lid may be

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designed to screw onto the container, or it may be designed to snap on or form an interlocking or continuous seal with the container. The lid may also be embossed or provided with printed indicia 40 as shown in Fig. 1. The container may also be provided with embossed or printed indicia as desired. The lid may also be provided with slots or perforations as desired for cooking purposes, e.g. to control the quality of the food being cooked within the container.

An alternative embodiment of the invention is illustrated in Figs. 7-12. In this embodiment, the container 10' includes a floor 12', a sidewall 14', and a flange or peripheral edge portion 16' on the top edge of the sidewall. The container may also include a lid 18' as described above and as shown in Figs. 7-11. The container 10' may also include a barrier layer 20' as described above and as shown in Fig. 8.

As shown in Figs. 9 and 10, the container and/or lid may also contain scalloped or ridged edges 22 which add stiffness to the container/lid. Also as shown in Figs. 9 and 10, the lid and/or container may include concentric rings 21 which provide stiffness.

As shown in Fig. 10, the container 10' also preferably includes raised areas 30' which aid in food release as well as maintain the food above the level of any moisture, grease, or oils which may drain from the food during cooking. As shown in Fig. 11, the container also preferably includes legs or supports 32 which provide uniform support to the bottom of the container and also prevent the bottom surface of the container from intimate contact with an underlying surface such as a table to minimize moisture condensation on the food item.

The use of a lid with the container allows the container to be used to store food which is added to the container and refrigerated and/or frozen until such time as it is ready to be cooked. For example, the container may be used as a pizza pan in which dough may be added to the container, sealed with the lid, and frozen, and then delivered to a customer where the dough is thawed, ingredients are added, and a pizza is then cooked within the same container, and delivered to a consumer with the lid in place. The container may also be used for other applications such as packaging and heating or cooking a variety of frozen foods.

The design of the container and lid provides good thermal insulation properties to maintain heat of the cooked food, e.g., during delivery. In addition, the use of a lid formed from

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the composite material or from pulp-molded paper allows controllable absorption of moisture from chilled or heated food, i.e., no appreciable condensation. Further, the compressed container bottom wall allows better heat conduction in an oven. Finally, the container exhibits a low thermal heat transfer rate which allows manual handling of the hot container.

In addition to the above-mentioned features, the container and lid may be configured to provide a number of other desirable features. For example, the lid may be designed to interlock with the bottom of a second covered pan such that the pans and lids may be stacked for storage or transport. The lid may also be designed to be removed and fitted underneath the container so as to function as a trivet after the food is cooked. In addition, the container may be configured in a number of other shapes and sizes, for example, the container may be rectangular in shape and may include handles on opposite sides to aid in transport of the container, e.g. from an oven.

While certain representative embodiments and details have been shown for purposes of illustrating the invention, it will be apparent to those skilled in the art that various changes in the methods and apparatus disclosed herein may be made without departing from the scope of the invention, which is defined in the appended claims.

What is claimed is:

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CLAIMS

1. An ovenable container comprising:
a filled composite material comprising from about 20 to 90% by weight of a filler, from about 2 to 40% by weight of a fibrous material, and from about 2 to 25% by weight of a latex comprising at least one soft monomer, at least one hard monomer, or a combination of a hard and a soft monomer, and a polymerizable emulsion stabilizer.
2. The ovenable container of claim 1 wherein said filled composite material comprises from about 60 to 80% by weight of said filler.
3. The ovenable container of claim 1 wherein said filler is selected from the group consisting of calcium carbonate, talc, and clay.
4. The ovenable container of claim 3 wherein said filler comprises calcium carbonate.
5. The ovenable container of claim 1 in which said fibrous material is selected from the group consisting of cellulose, polyester, glass, nylon, polypropylene, polyethylene, acrylic, rayon, aramid, polystyrene, or combinations thereof.
6. The ovenable container of claim 5 in which said filled composite material comprises from about 4 to 15% by weight cellulose fiber, from about 1 to 5% by weight polyester fiber.
7. The ovenable container of claim 5 in which said filled composite material comprises about 4 to 15 % by weight cellulose fiber and from about 1 to 5% by weight nylon fiber.
8. The ovenable container of claim 5 in which said filled composite material comprises from about 4 to 20% by weight cellulose fibers.

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9. The ovenable container of claim 5 in which said filled composite material comprises from about 4 to 20% by weight nylon.
10. The ovenable container of claim 5 in which said filled composite material comprises from about 4 to 20% by weight polyester.
11. The ovenable container of claim 1 in which said filled composite material further comprises from about 0.1 to 10% by weight of a coloring agent selected from the group consisting of carbon black, titanium dioxide, iron oxides, inorganic pigments, organic pigments, and dyes.
12. The ovenable container of claim 11 wherein said coloring agent comprises carbon black.
13. The ovenable container of claim 1 in which said filled composite material further comprises a colloidal aggregation additive selected from the group consisting of flocculants, coagulants, or combinations thereof.
14. The ovenable container of claim 13 in which said colloidal aggregation additive comprises a flocculant which is selected from the group consisting of cationic amine polymer-epichlorohydrin adducts, starches, gums, phenolic resins, polyamines, polyacrylamides, urea-formaldehyde, melamine-formaldehyde, polyamides, quarternary amines, polyethyleneimines, and cationic starches.
15. The ovenable container of claim 14 in which said filled composite material comprises from about 0 to 2% by weight of said flocculant.

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16. The ovenable container of claim 13 in which said colloidal aggregation additive source comprises a coagulant selected from the group consisting of alum, quaternary amines, colloidal silica, and bentonite clays.

17. The ovenable container of claim 16 in which said filled composite material comprises from about 0 to 2% by weight of said coagulant.

18. The ovenable container of claim 1 in which said filled composite material comprises from about 60 to 80% by weight of said filler, from about 4 to 15% by weight cellulose fiber, from about 1 to 5% by weight polyester fiber, from about 0.1 to 2.5% by weight of a coloring agent, from about 0 to 2% by weight of a flocculant, from about 0 to 2% by weight of a coagulant, and from about 9 to 20% by weight of said latex.

19. The ovenable container of claim 1 in which said container includes a barrier layer in or on said ovenable container, said barrier layer selected from the group consisting of nitrile resins, polycarbonates, polyethylene terephthalate, polyethylene terephthalate copolymers, polyolefins, and cellulose ethers.

20. The ovenable container of claim 1 in which said latex comprises, based on total monomers, from about 0 to 99% by weight methyl acrylate, from about 0 to 70% by weight methyl methacrylate, from about 0.1 to 5% by weight of a polymerizable emulsion stabilizer, and from about 0 to 3% by weight of a crosslinking agent.

21. The ovenable container of claim 1 in which said latex comprises, based on total monomers, from about 50 to 70% by weight methyl acrylate, from about 30 to 40% by weight methyl methacrylate, from about 0.5 to 3% by weight of a polymerizable emulsion stabilizer, and from about 0 to 3% by weight of a crosslinking agent.

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22. The ovenable container of claim 20 in which said crosslinking agent is selected from the group consisting of glycidyl methacrylate, allyl methacrylate, and trimethylol propane triacrylate.
23. The ovenable container of claim 1 in which said polymerizable emulsion stabilizer is selected from the group consisting of fumaric acid, itaconic acid, acrylic acid, methacrylic acid, and maleic acid.
24. The ovenable container of claim 1 in which said latex further comprises from about 0.1 to 2% by weight of a surfactant.
25. The ovenable container of claim 1 in which said latex further comprises from about 0.3 to 1.5% by weight of an initiator.
26. A method of cooking food using an ovenable container comprising a filled composite material containing from about 20 to 90% by weight of a filler, from about 2 to 40% by weight of a fibrous material, and from about 2 to 25% by weight of a latex binder comprising at least one soft monomer, at least one hard monomer, or a combination thereof, and a polymerizable emulsion stabilizer, said method comprising the steps of:
- placing food in said container, and
 - heating said container in an oven at a temperature of up to 600°F for a period sufficient to cook said food.
27. The method of claim 26 in which said oven comprises a conventional or microwave oven.
28. The method of claim 26 wherein said container comprises a pizza pan.

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29. A food container comprising:

a container body formed from a filled composite material comprising from about 20 to 90% by weight of a filler, from about 2 to 40% by weight of a fibrous material, and from about 2 to 25% by weight of a latex comprising at least one soft monomer, at least one hard monomer, or a combination thereof, and a polymerizable emulsion stabilizer; and

a lid adapted to be mounted on said container.

30. The container of claim 29 in which said lid is formed from a filled composite material comprising from about 20 to 90% by weight of a filler, from about 2 to 40% by weight of a fibrous material, and from about 2 to 25% by weight of a latex comprising at least one soft monomer, at least one hard monomer, or a combination thereof, and a polymerizable emulsion stabilizer.

31. The container of claim 29 in which said lid is comprised of a material selected from the group consisting of paperboard, plastic and pulp-molded paper.

32. The container of claim 29 in which said lid is adapted to seal said container.

33. The container of claim 29 in which said lid includes a barrier layer selected from the group consisting of nitrile resins, polycarbonates, polyethylene terephthalate, polyethylene terephthalate copolymers and polyolefins, and cellulose ethers.

34. The container of claim 29 in which said lid is embossed or printed.

35. The container of claim 29 in which said lid is provided with slots or perforations.

36. The container of claim 29 in which said container body includes a base and surrounding sidewalls defining an opening for containing food therein.

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37. The container of claim 36 in which said lid is mounted on the peripheral edge of said sidewalls.
38. The container of claim 29 in which said container is embossed or printed.
39. A method of making an ovenable container comprising the steps of:
providing a mixture of a filled composite material comprising from about 20 to 90% by weight of a filler, from about 2 to 40% by weight of a fibrous material, and from about 2 to 25% by weight of a latex comprising at least one soft monomer, at least one hard monomer, or a combination thereof, and a polymerizable emulsion stabilizer;
flocculating said mixture;
forming said mixture into a shaped article; and
drying said shaped article.
40. The method of claim 39 in which said forming step comprises applying said mixture to a first mold which is then married to a second heated mold.
41. The method of claim 39 in which said forming step comprises drawing an amount of said mixture onto a first mold and transferring said mixture to a second mold.
42. The method of claim 41 including the step of pressing said article in a vented press before drying said article.
43. The method of claim 41 including the step of pressing said article in a vented press after drying said article.

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44. The method of claim 39 wherein said forming step comprises placing said flocculated mixture on a moving wire mesh and pressing said mixture in a vented press.
45. The method of claim 44 including the step of pressing said article in a vented press before drying said article.
46. The method of claim 44 including the step of pressing said article in a vented press after drying said article.

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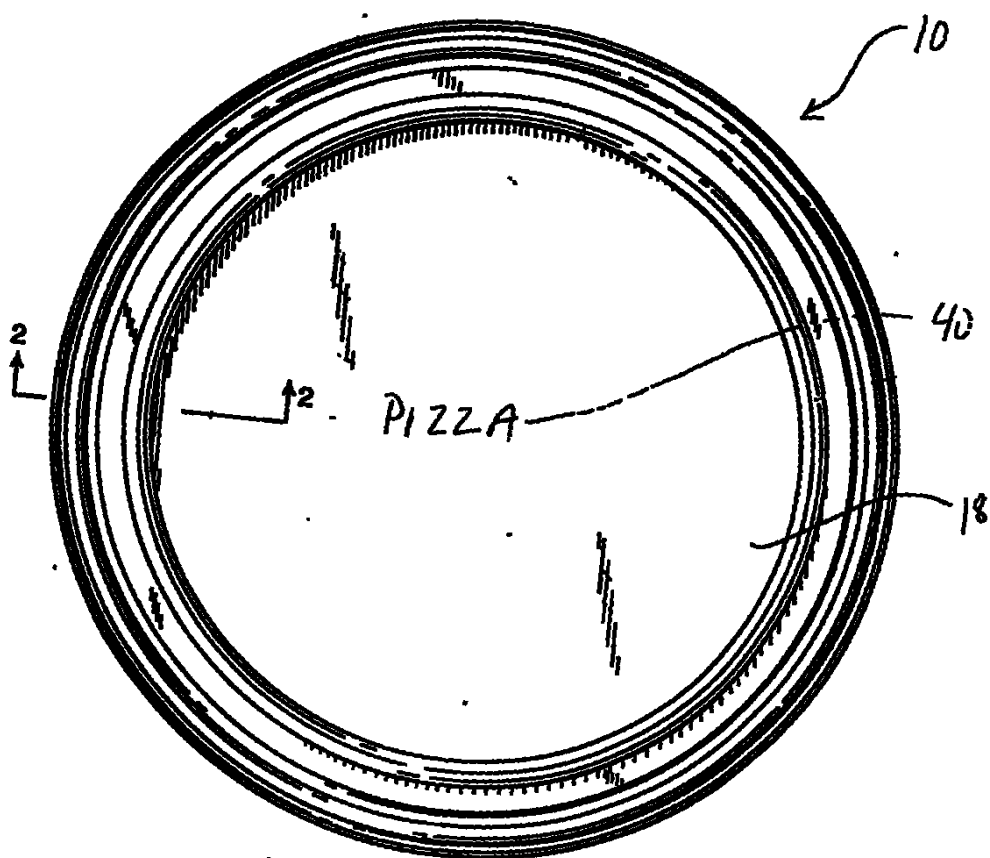
ABSTRACT

An ovenable container is provided which may be used to cook foods at temperatures of up to about 600°F without generating objectionable odors. The container comprises a filled composite material comprising from about 20 to 90% by weight of a filler, from about 2 to 40% by weight of a fibrous material, and from about 2 to 25% by weight of a latex comprising at least one soft monomer, at least one hard monomer, or a combination thereof, and a polymerizable emulsion stabilizer. The container is preferably formed by fine pulp molding, conventional thin wall pulp molding, or conventional papermaking techniques.

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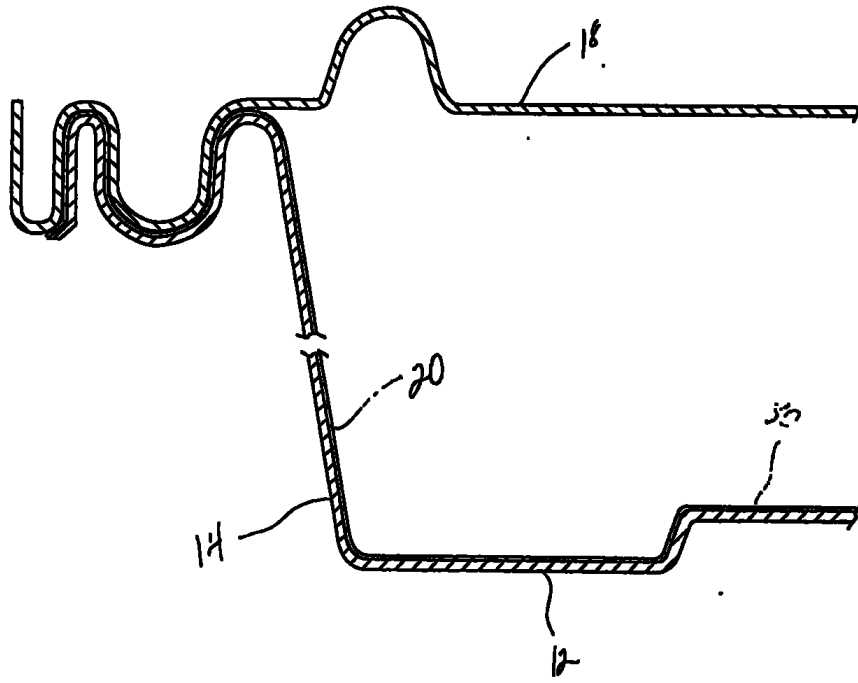
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FIG. 1



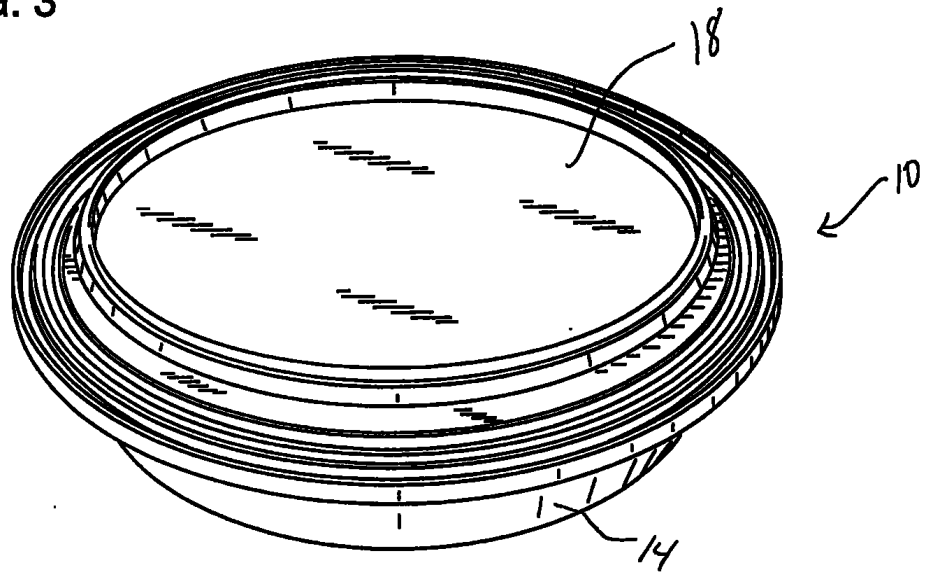
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FIG. 2



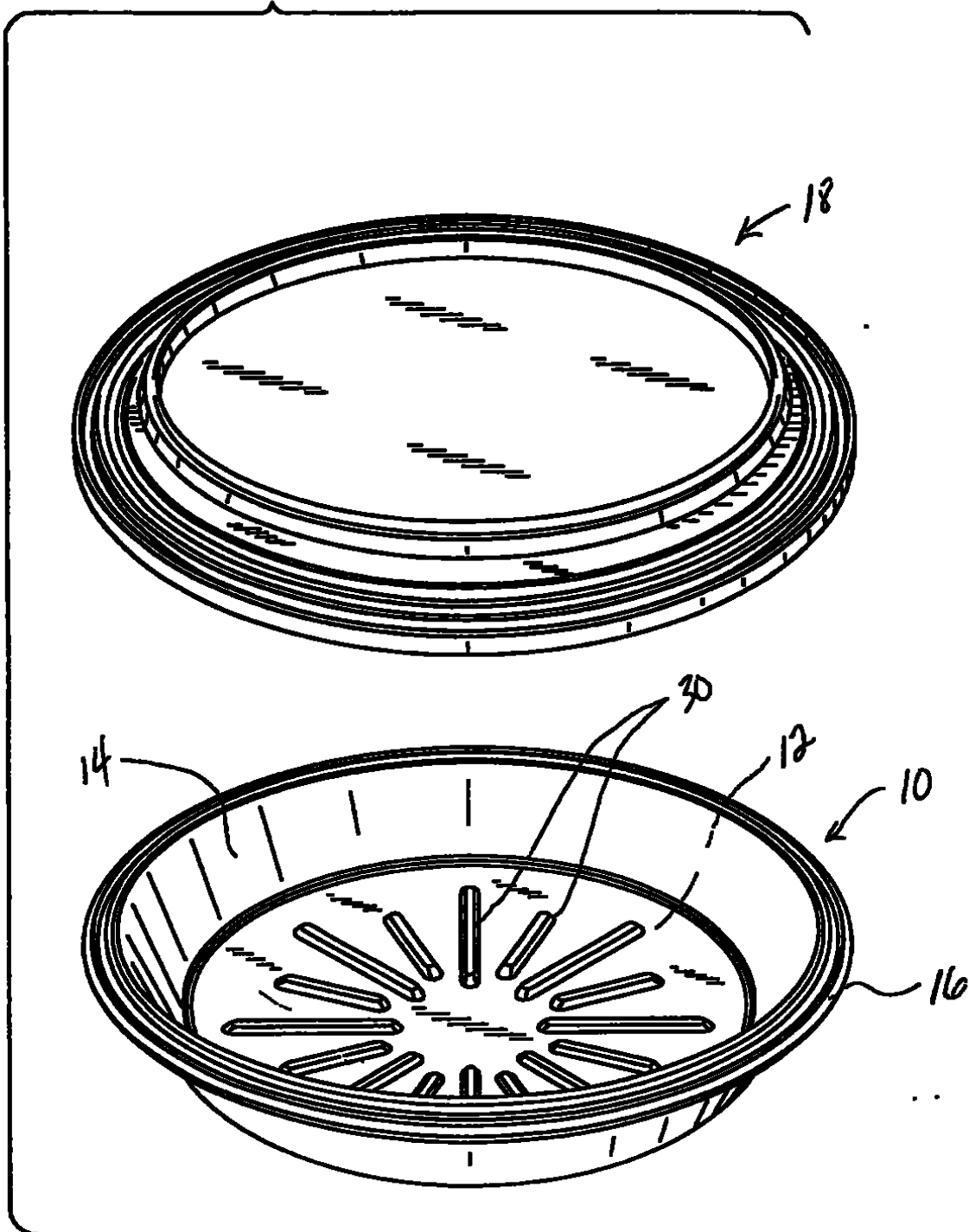
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FIG. 3



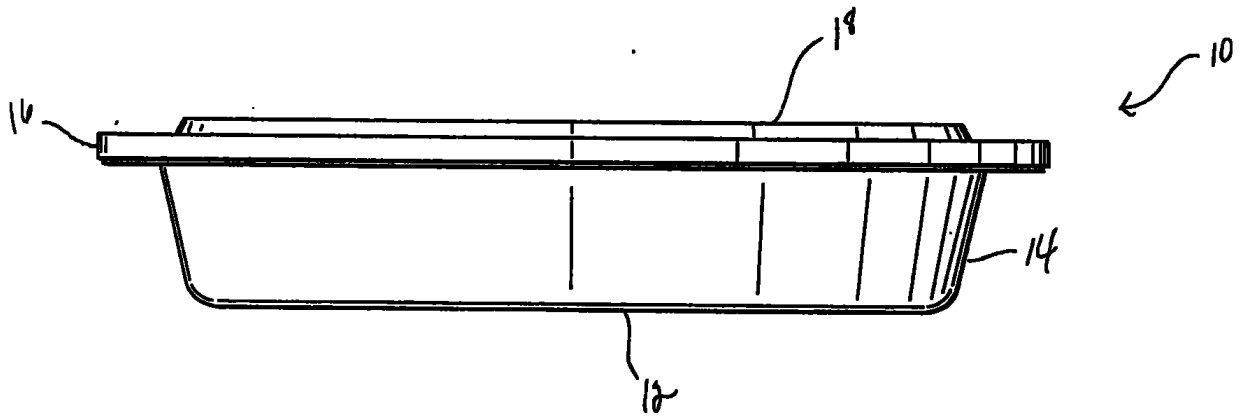
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FIG. 4



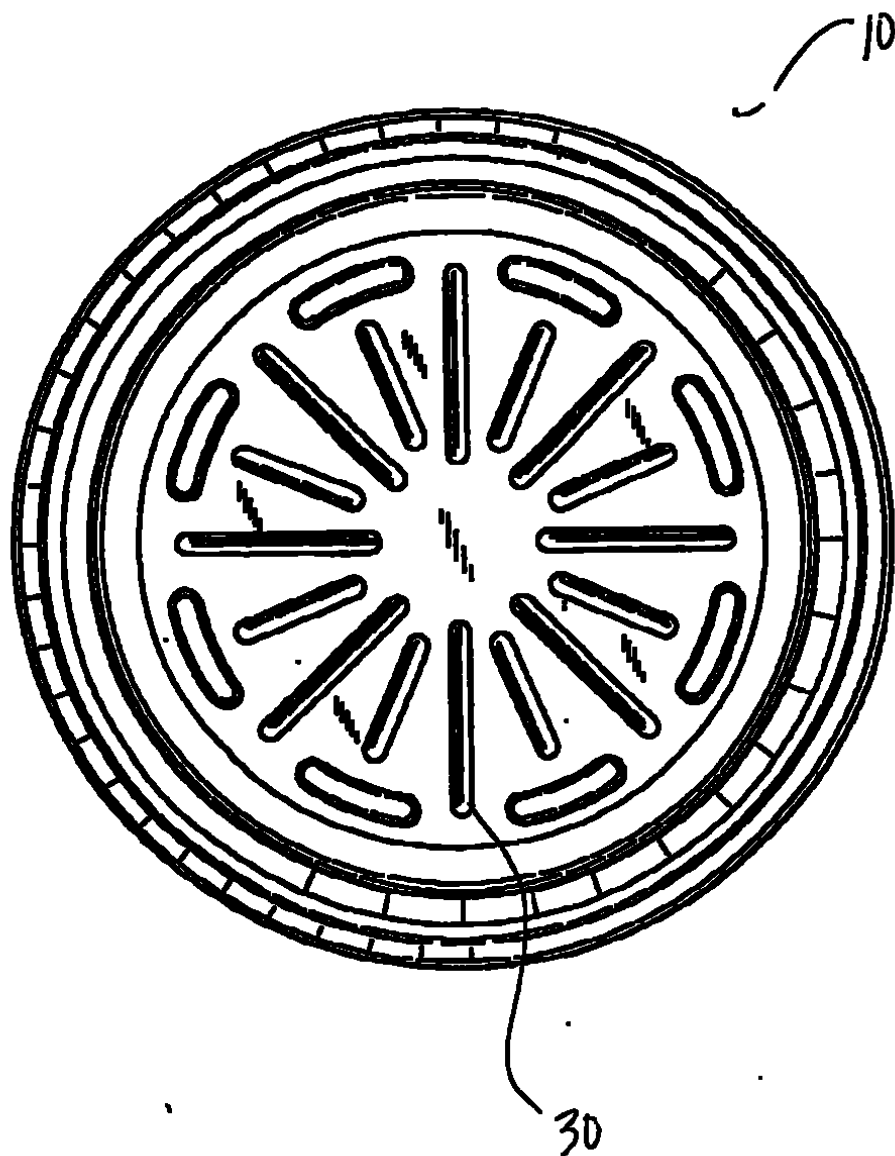
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FIG. 5



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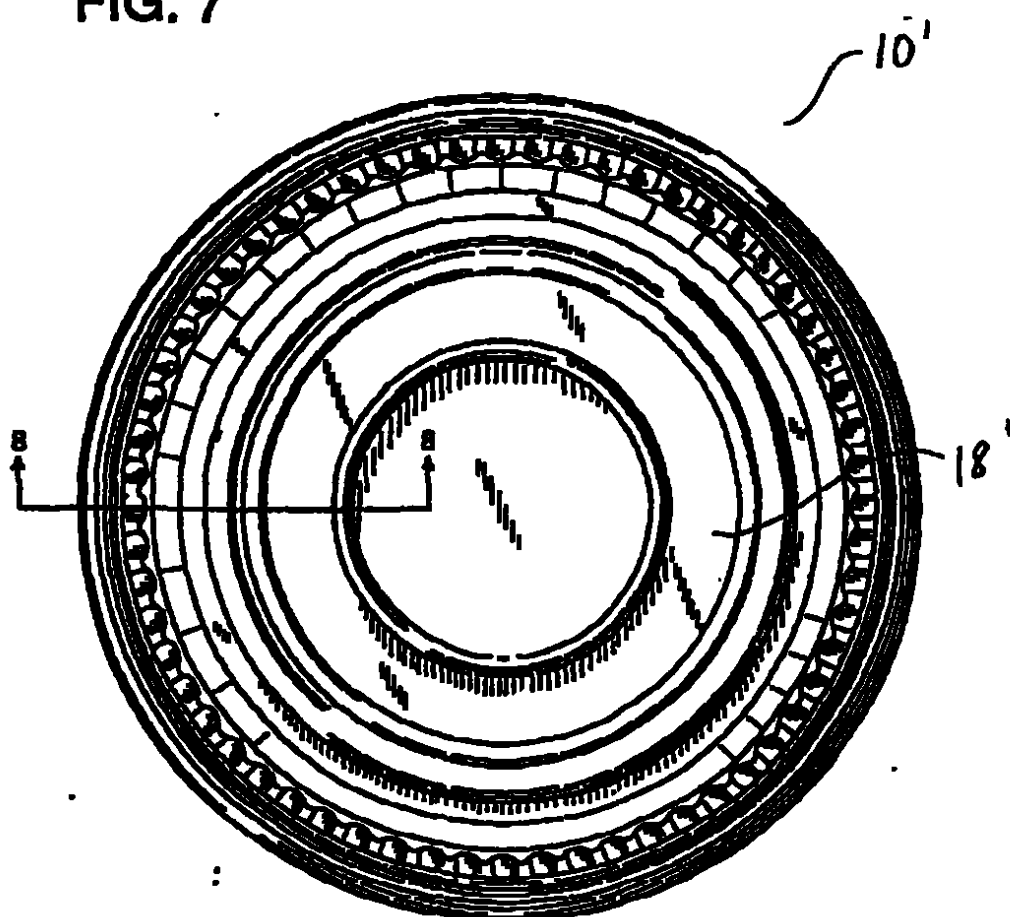
FIG. 6



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FIG. 7



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FIG. 8

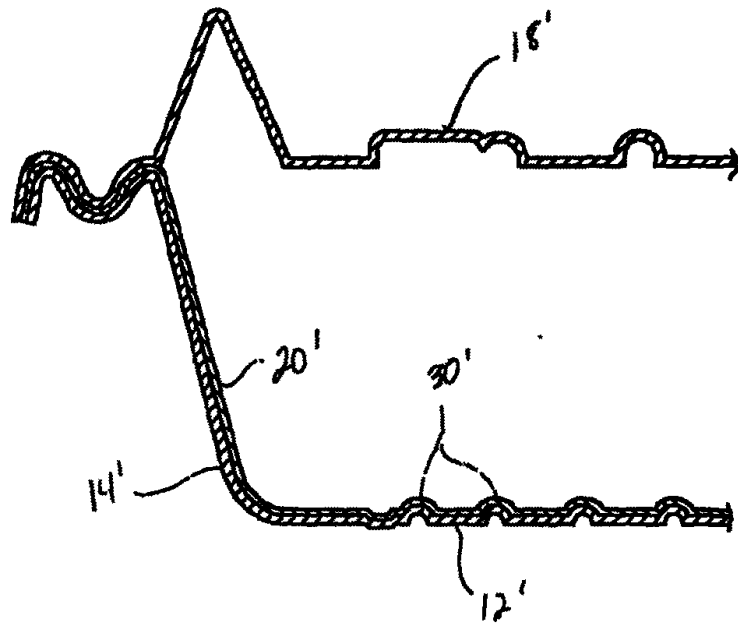


FIG. 9

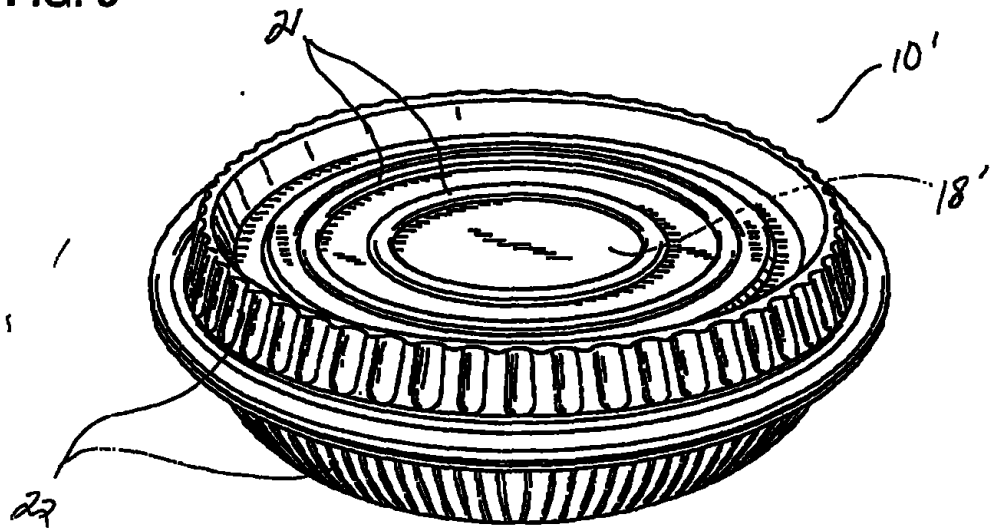


FIG. 10

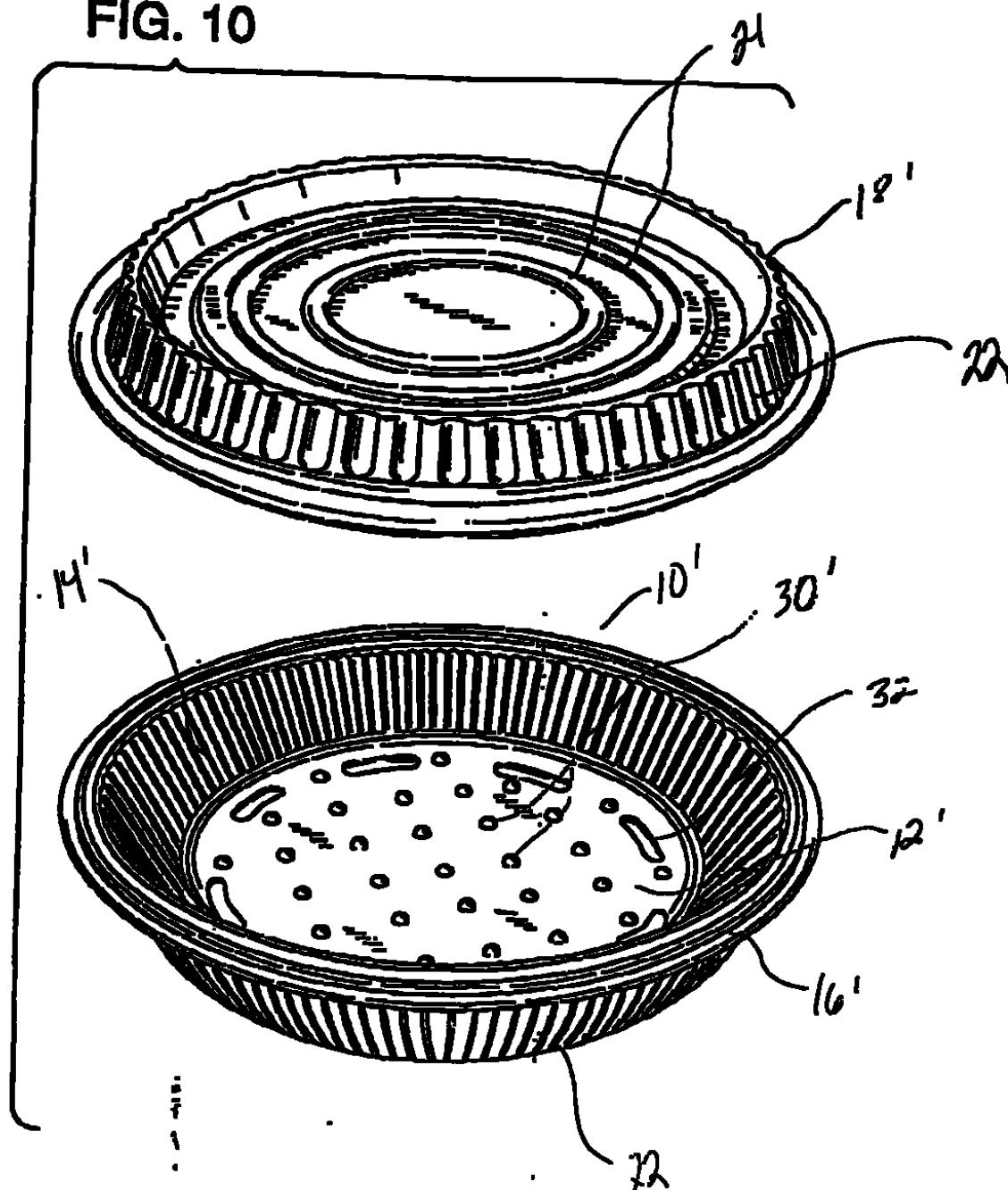


FIG. 11

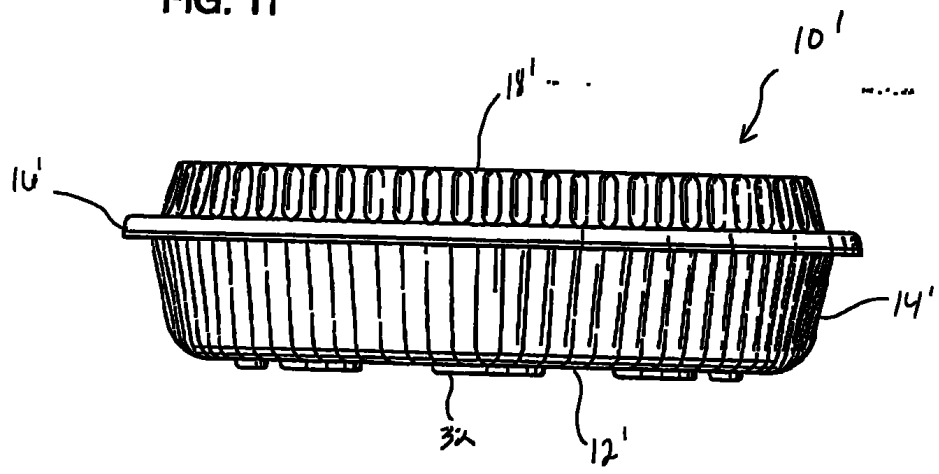
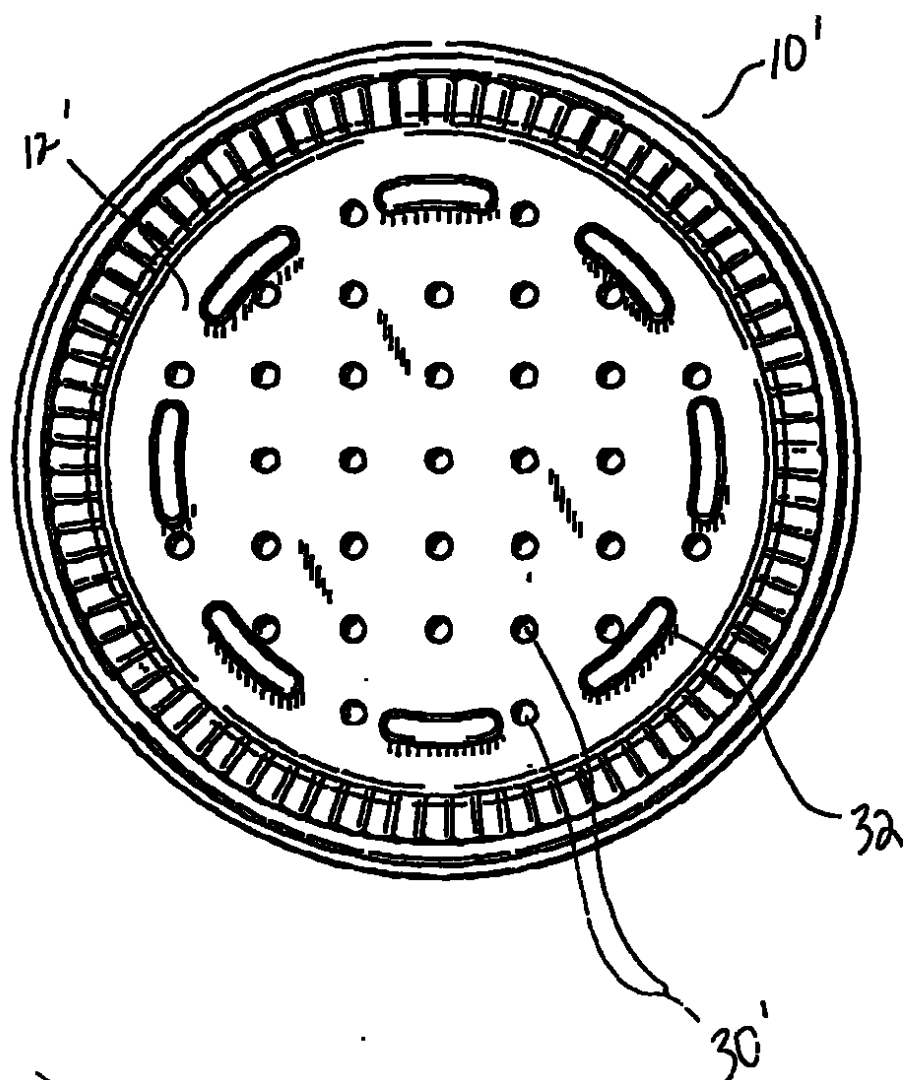


FIG. 12



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LOS ESTADOS UNIDOS DE AMERICA

**A TODOS AQUELLOS A QUIENES LA PRESENTE CONCIERNE:
DEPARTAMENTO DE COMERCIO DE LOS ESTADOS UNIDOS**

Oficina de Patentes y Marcas de los Estados Unidos

17 de octubre de 2000

**LA PRESENTE ES PARA CERTIFICAR QUE LA ANEXA A ESTA ES UNA COPIA FIEL
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ADELANTE QUE SATISFACEN LOS REQUISITOS PARA QUE SE OTORGUE UNA FECHA
DE PRIORIDAD BAJO 35 USC 111.**

SOLICITUD NUMERO: 60/156,854

FECHA DE PRESENTACION: 30 de septiembre de 1999



**Por la Autoridad del
COMISIONADO DE PATENTES Y MARCAS**

Firmado por

P.R.GRANT

Funcionario Certificador

REIVINDICACIONES

1. Un recipiente para uso en horno el cual comprende:

un material compuesto que comprende desde alrededor de 20 a 90% de peso de un material de carga, desde alrededor de 2 a 40% de peso de un material fibroso, y desde alrededor de 2 a 25% de peso de látex que comprende al menos un monómero liviano, al menos un monómero duro, o una combinación de monómero duro y liviano y un estabilizador de emulsión polimerizable.

2. El recipiente para uso en horno de la reivindicación 1 en donde dicho material compuesto comprende desde alrededor de 60 a 80% de peso de dicho material de carga.

3. El recipiente para uso en horno de la reivindicación 1 en donde dicho filtro es seleccionado del grupo que contiene carbonato de calcio, talco y arcilla.

4. El recipiente para uso en horno de la reivindicación 3 en donde dicho material de carga comprende carbonato de calcio.

5. El recipiente para uso en horno de la reivindicación 1 en donde dicho material fibroso se selecciona de un grupo que consiste en celulosa, poliéster, vidrio, nylon, polipropileno, polietileno, acrílico, rayón, aramida, poliestireno, o mezclas de las mismas.

6. El recipiente para uso en horno de la reivindicación 5 en donde dicho material compuesto comprende desde alrededor de 4 a 15% de peso de fibra de celulosa y desde alrededor de 1 a 15% de peso de fibra de poliéster.

7. El recipiente para uso en horno de la reivindicación 5 en donde dicho material compuesto

comprende desde alrededor de 4 a 15% de peso de fibra de celulosa y desde alrededor de 1 a 5% de peso de fibra de nylon.

8. El recipiente para uso en horno de la reivindicación 5 en donde dicho material compuesto comprende desde alrededor de 4 a 20% de peso de fibras de celulosa.
9. El recipiente para uso en horno de la reivindicación 5 en donde dicho material compuesto comprende desde alrededor de 4 a 20% de peso de nylon.
10. El recipiente para uso en horno de la reivindicación 5 en donde dicho material compuesto comprende desde alrededor de 4 a 20% de peso de poliéster.
11. El recipiente para uso en horno de la reivindicación 1 en donde dicho material compuesto comprende además desde alrededor de 0.1 a 10% de peso de un agente colorante que se selecciona del grupo que consiste de negro de carbón, dióxido de titanio, óxidos de hierro, pigmentos inorgánicos, pigmentos orgánicos y colorantes.
12. El recipiente para uso en horno de la reivindicación 1 en donde dicho agente colorante comprende carbón negro.
13. El recipiente para uso en horno de la reivindicación 1 en donde dicho material compuesto comprende adicionalmente un aditivo de agregación coloidal seleccionado del grupo que consiste de floculantes, coagulantes o combinaciones de las mismas.
14. El recipiente para uso en horno de la reivindicación 13 en donde dicho aditivo de agregación coloidal comprende un floculante el cual se selecciona de un grupo que consiste en aductos catiónicos de polímeros de amino epiclorohidrina, almidones, gomas, resinas fenólicas, poliaminas, poliacrilamidas, formaldehídos de urea,

formaldehídos de melanina, poliamidas, aminos cuaternarios, polietilenaminas y almidones catiónicos.

15. El recipiente para uso en horno de la reivindicación 14 en donde dicho material compuesto comprende desde alrededor de 0 a 2% de peso de dicho floculante.
16. El recipiente para uso en horno de la reivindicación 13 en donde dicha agregación coloidal comprende un coagulante seleccionado de un grupo que consiste de alumbre, aminos cuaternarios, sílice coloidal y arcillas de bentonita.
17. El recipiente para uso en horno de la reivindicación 16 en donde dicho material compuesto comprende desde alrededor de 0 a 2% de peso de dicho coagulante.
18. El recipiente para uso en horno de la reivindicación 1 en donde dicho material compuesto comprende desde alrededor de 60 a 80% de peso de dicho material de carga, desde alrededor de 4 a 15% de peso de fibra de celulosa, desde alrededor de 1 a 5% de peso de fibra de poliéster, desde alrededor de 0.1 a 2.5% de peso de agente colorante, desde alrededor de 0 a 2% de peso de un floculante, desde alrededor de 0 a 2% de peso de un coagulante, y desde alrededor de 9 a 20% de dicho látex.
19. El recipiente para uso en horno de la reivindicación 1 en donde dicho recipiente incluye una capa de barrera dentro o sobre dicho recipiente para uso en horno, dicha capa de barrera seleccionada de un grupo que consiste de resinas de nitrilo, policarbonatos, copolímeros de polietilentereftalato, poliolefinas y éteres de celulosa.
20. El recipiente para uso en horno de la reivindicación 1 en donde dicho látex comprende, basado en monómeros totales, desde alrededor de 0 a 99% de peso de

acrilato de metilo, desde alrededor de 0 a 70% de peso de metacrilato de metilo, desde alrededor de 0.1 a 5% de peso de un estabilizador de emulsión polimerizable, y desde alrededor de 0 a 3% de peso de un agente entrecruzado.

21. El recipiente para uso en horno de la reivindicación 1 en donde dicho látex comprende, basado en monómeros totales desde alrededor de 50 a 70% de peso de acrilato de metilo, desde alrededor de 30 a 40% de peso de metacrilato de metilo, desde alrededor de 0.5 a 3% de peso de un estabilizador de emulsión polimerizante y desde alrededor de 0 a 3% de peso de una agente entrecruzado.
22. El recipiente para uso en horno de la reivindicación 20 en donde dicho agente entrecruzado se selecciona del grupo que consiste en metacrilato glicidilo, metacrilato de alilo y triacrilato de trimetilol propano.
23. El recipiente para uso en horno de la reivindicación 1 en donde dicho estabilizador de emulsión polimerizable se selecciona de un grupo que consiste en ácido fumárico, ácido itacónico, ácido acrílico, ácido metacrílico y ácido maleico.
24. El recipiente para uso en horno de la reivindicación 1 en donde dicho látex comprende adicionalmente desde alrededor de 0.1 a 2% de peso de un surfactante.
25. El recipiente para uso en horno de la reivindicación 1 en donde dicho látex adicionalmente comprende desde alrededor de 0.3 a 1.55% de peso de un iniciador.
26. Un método para cocinar alimentos utilizando un recipiente para uso en horno que comprende un material compuesto que contiene desde alrededor de 20 a 90% de peso de un material de carga, desde alrededor de 2 a 40% de peso de un material fibroso y desde alrededor de 2 a 25% de peso

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de un ligante de látex que comprende al menos un monómero suave, un monómero duro o una combinación de las mismas, y un estabilizador de emulsión polimerizable, dicho método comprendiendo los pasos de:

colocar los alimentos en dicho recipiente y calentar dicho recipiente en un horno a temperaturas de hasta 600°F para un periodo suficiente de cocción de dicho alimento.

27. El método de la reivindicación 26, en donde dicho horno comprende un horno convencional o de microondas.

28. El método de la reivindicación 26, en donde dicho recipiente comprende un recipiente para pizza.

29. Un recipiente de alimentos que comprende: Una estructura de recipiente formada de un material compuesto desde alrededor de 20 a 90% de peso de un material de carga, desde alrededor de 2 a 40% de peso de un material fibroso, y desde alrededor de 2 a 25% de peso de látex que comprende al menos un monómero suave, al menos un monómero duro o una combinación de las mismas, y un estabilizador de emulsión polimerizante, y una tapa adaptada para ser ubicada en dicho recipiente.

30. El recipiente de la reivindicación 29, en donde dicha tapa se forma de un material compuesto que comprende desde alrededor de 20 a 90% de peso de un material de carga, desde alrededor de 2 a 40% de peso de un material fibroso y desde alrededor de 2 a 25% de peso de látex que comprende al menos un monómero suave, un monómero duro o una combinación de las mismas y un estabilizador de emulsión polimerizable.

31. El recipiente de la reivindicación 29 en donde dicha tapa está compuesta de material seleccionado de un grupo que consiste en cartón, plástico y papel moldeado de pulpa.

32. El recipiente de la reivindicación 29 en donde dicha tapa se adapta para sellar dicho recipiente.
33. El recipiente de la reivindicación 29, en donde dicha tapa incluye una capa de barrera seleccionada del grupo que consiste en resinas de nitrilo, policarbonatos, tereftalato de polietileno, copolímeros de tereftalato de polietileno y poliolefinas, y éteres de celulosa.
34. El recipiente de la reivindicación 29 en donde dicha tapa es repujada o impresa.
35. El recipiente de la reivindicación 29 en donde dicha tapa está provista de ranuras o perforaciones.
36. El recipiente de la reivindicación 29 en donde dicho cuerpo del recipiente incluye una base y paredes laterales las cuales definen una abertura para contener alimentos en ellos.
37. El recipiente de la reivindicación 36 en donde dicha tapa es colocada en el extremo periférico de dichas paredes laterales.
38. El recipiente de la reivindicación 29 en donde dicho recipiente es repujado o impreso.
39. Un método para hacer un recipiente para uso en horno que comprende los pasos de: proveer la mezcla de un material compuesto que contiene desde alrededor de 20 a 90% de peso de un material de carga, desde alrededor de 2 a 40% de peso de un material fibroso y desde alrededor de 2 a 25% de peso de un ligante de látex que comprende al menos un monómero suave, al menos un monómero duro o una combinación de los mismos, y un estabilizador polimerizable de las mismas; flocular dicha mezcla; formar con dicha mezcla un artículo formado; y secar dicho artículo formado.

40. El método de la reivindicación 39 en donde dicho paso de formación comprende aplicar dicha mezcla a un primer molde el cual luego casa con un segundo molde calentado.
41. El método de la reivindicación 39 en donde dicho paso de formación comprende retirar una cantidad de dicha mezcla a un primer molde y transferir dicha mezcla a un segundo molde.
42. El método de la reivindicación 41 incluyendo el paso de presionar dicho artículo en una prensa con respiradero antes de secar dicho artículo.
43. El método de la reivindicación 41 incluyendo el paso de presionar dicho artículo en una prensa con respiradero después de secar dicho artículo.
44. El método de la reivindicación 39 en donde dicho paso de formación comprende colocar dicha mezcla floculada en un tamiz de cable en movimiento y presionar dicha mezcla en una prensa con respiradero.
45. El método de la reivindicación 44 que incluye los pasos de presionar dicho artículo en una prensa con respiradero antes de secar dicho artículo.
46. El método de la reivindicación 44 que incluye los pasos de presionar dicho artículo en un una prensa con respiradero después de secar dicho artículo.