Containers for smokeless tobacco products and other consumer and food products are provided. The containers include a layer of fibrous material, wherein the layer of fibrous material includes a moisture barrier layer imbedded within the layer of fibrous material or carried on an outer surface of the layer of fibrous material as a coating, the moisture barrier layer incorporating at least one of: (i) a triazine-containing compound; (ii) a nano-cellulose material; (iii) a nanoclay material; (iv) a polymer composition comprising one or more of a salt of one or more of myristic, palmitic and stearic acid, polyvinyl alcohol, and a C_{16}-C_{18} fatty acid complex of a metal ion having an oxidation state of at least three; and (v) an inorganic oxide material.
TRANSPARENT MOISTURE BARRIER COATINGS FOR CONTAINERS

FIELD OF THE DISCLOSURE

[0001] The present disclosure relates to containers for packaging a variety of consumer goods and methods of use thereof. More particularly, the disclosure relates to packaging for products that are derived from or that otherwise incorporate tobacco, and which are intended for human use or consumption.

BACKGROUND OF THE DISCLOSURE

[0002] Various types of containers for dispensing solid objects, particularly solid products intended for human consumption, are known in the art. Such containers are often characterized by a hand-held size that can be easily stored and transported. Exemplary consumable products that are often packaged in such containers include a wide variety of consumer products, including smokeless tobacco-related products.


[0004] Representative smokeless tobacco products that have been marketed include those referred to as CAMEL Snus, CAMEL Orbs, CAMEL Strips and CAMEL Sticks by R. J. Reynolds Tobacco Company; GRIZZLY moist tobacco, KODIAK moist tobacco, LEVI GARRETT loose tobacco and TAYLOR’S PRIDE loose tobacco by American Snuff Company, LLC; KAYAK moist snuff and CHATTANOOGA CHEW chewing tobacco by Swisher International, Inc.; REDMAN chewing tobacco by Pinkerton Tobacco Co. LP; COPENHAGEN moist tobacco, COPENHAGEN Pouches, SKOAL Bandits, SKOAL Pouches, RED SEAL long cut and REVEL Mint Tobacco Packs by U.S. Smokeless Tobacco Company; and MARLBORO Snus and Taboka by Philip Morris USA.

[0005] Representative types of smokeless products, commonly referred to as “snus,” are manufactured in Europe, particularly in Sweden, by or through companies such as Swedish Match AB, Fiedler & Lundgren AB, Gustavus AB, Skandi-navisk Tobakscompagni A/S and Rocker Production AB. Snus products available in the U.S.A. are marketed under the trade names such as CAMEL Snus Frost, CAMEL Snus Original and CAMEL Snus Spice by R. J. Reynolds Tobacco Company.

[0006] Various types of containers for dispensing tobacco products are known. Smokeless tobacco products are typically sold in hand-held tins or pucks constructed of fiberboard, metal, or molded plastic (e.g., polypropylene), and which have an outer paper or plastic seal enclosing the container. Such containers generally have a shallow cylindrical shape with a detachable lid. See, for example, the containers set forth in U.S. Pat. Nos. 4,098,421 to Foster; 4,190,170 to Boyd; and 7,798,319 to Bried et al., each of which is incorporated herein by reference. Other tobacco products such as cigarettes are stored or packaged in containers such as those set forth in U.S. Pat. Nos. 5,699,903 to Focke et al.; 5,161,733 to Latif; 7,484,619 to Boriani et al.; and US Pub. No. 2005/0252796, each of which is incorporated herein by reference.

[0007] A desirable feature for certain containers is the protection of the product from environmental effects and moisture ingress or egress, particularly those effects that may degrade the product stored in the container. For example, in humid environments, moisture may invade the storage space housing the product, thereby damaging the product or otherwise rendering the product unusable. Alternatively, moisture within the product may escape the packaging leaving the product prematurely dry and difficult to dispense. Further, current fiberboard cans have poor sealing attributes thereby posing a challenge to ensure fresh product for consumer use. For example, moist tobacco products packaged in current fiberboard cans have a shorter shelf life compared to tobacco products packaged in a plastic canned product. The inside of the current fiberboard cans are coated with a wax to control the moisture loss. This wax coating is prone to stress cracking and therefore is not fully effective.

[0008] It would thus be desirable to provide an improved packaging for smokeless tobacco products and other consumer and food product packaging, wherein the packaging provides various advantageous features, such as protection from environmental effects and moisture variability.

BRIEF SUMMARY OF THE DISCLOSURE

[0009] The present invention provides packaging or containers for smokeless tobacco products and other consumer and food products. The containers include at least one wall structure in the body or top thereof that includes a barrier material that provides advantageous features, such as protection against environmental effects and moisture variability.

[0010] According to one aspect, a container is provided that includes a body having a bottom wall and a side wall, the bottom wall and the side wall defining an internal storage compartment adapted for storage of a product, and a top configured to be engaged with the body. At least one of the bottom wall, side wall, and top includes a layer of fibrous material which, in turn, includes a moisture barrier layer imbedded within the layer of fibrous material or carried on an outer surface of the layer of fibrous material as a coating. The moisture barrier layer includes at least one of (i) a triazine-containing compound; (ii) a nano-cellulose material; (iii) a nanoclay material; (iv) a polymer composition comprising one or more of a salt of one or more of myristic, palmitic and stearic acid, polyvinyl alcohol, and a C8-C18 fatty acid complex of a metal ion having an oxidation state of at least three;
and (v) an inorganic oxide material. According to one embodiment, the moisture barrier layer is transparent. According to one embodiment, the moisture barrier layer is biodegradable. According to another embodiment, the moisture barrier layer is both transparent and biodegradable.

0011 The polymer composition comprises a polymer, copolymer, or a mixture of polymers and copolymers. According to one embodiment, the polymer composition can include styrene butadiene copolymers, modified styrene butadiene copolymers, styrene/acyrylate copolymers, carboxylated polystyrene, acrylic/polyacrylic polymers, polyvinyl acetate; polyvinyl alcohol, polyvinylacetate-ethylene, polyvinyl acrylate, soy protein polymer; corn zein (protein), starch, polyolefin dispersion, polyvinylidene chloride, polylactic acid, polyhydroxalkanoate polymers, polyethylene succinate, plasticized cellulose acetate, or blends thereof.

0012 According to one embodiment, the triazine-containing compound is melamine, ammelide, amgelide, cyanuric acid, 2-ureido-4-methylaminomethane, melamin, melum, oligo-melamine cyanurate, melamine phosphate, dimelamine pyrophosphate, melamine polyphosphate, hexamethylenimine melamine, or acrylate-functionalized melamine. According to one embodiment, the nano-cellulose material is a nano-fibrillated or nanocrystalline cellulose. The nanoclay material can be plate-like kaolins, nano-clays, clay nanocomposite, or a polymer-clay nanocomposite. According to one embodiment, the inorganic oxide material comprises AIOx, SiOx, or MgOx.

0013 The fibrous material is typically fiberoard, cardboard, paper, or a combination thereof. The container may further include a wrapping material made from fiberoard, cardboard, paper, plastic, metal, or a combination thereof that extends about a perimeter of the container. The internal storage compartment can include a plurality of products such as cigarettes, smokeless tobacco products, or food products. According to one embodiment, the container is a smokeless tobacco container or a cigarette pack. The top of the container can be either fully removable from the body or engaged with the body, such as through latched engagement.

0014 According to another embodiment, a container for smokeless tobacco products is provided that includes a body having a bottom wall and a side wall, the bottom wall and the side wall defining an internal storage compartment adapted for storage of smokeless tobacco, and a top configured to be engaged with the body. At least one of the bottom wall, side wall, and top include a layer of fibrous material which, in turn, includes a moisture barrier layer imbedded within the layer of fibrous material or carried on an outer surface of the layer of fibrous material or coating. The moisture barrier layer includes at least one of: (i) a triazine-containing compound; (ii) a nano-cellulose material; (iii) a nanoclay material; (iv) a polymer composition comprising one or more of a salt of one of more of myristic, palmitic and stearic acid, polyvinyl alcohol, and a C_8-C_18 fatty acid complex of a metal ion having an oxidation state of at least three; and (v) an inorganic oxide material. According to one embodiment, the bottom wall and side wall are manufactured from fiberoard. Optionally, the top is also manufactured from fiberoard. In an alternative embodiment, the top is manufactured from metal or a polymer. The top and the body are generally cylindrical in one embodiment. The smokeless tobacco product container can include any of the specific barrier materials noted herein.

0015 These and other features, aspects, and advantages of the disclosure will be apparent from a reading of the following detailed description together with the accompanying drawings, which are briefly described below.

BRIEF DESCRIPTION OF THE DRAWINGS

0016 Having thus described the disclosure in general terms, reference will now be made to the accompanying drawings, which are not necessarily drawn to scale, and wherein:

0017 FIG. 1 is a sectional view of an embodiment of a container wall of the present disclosure;

0018 FIG. 2 is a perspective, exploded view of a smokeless tobacco container embodiment of the present disclosure;

0019 FIG. 3 is a perspective view of a cigarette container embodiment of the present disclosure.

DETAILED DESCRIPTION OF THE DISCLOSURE

0020 The present disclosure now will be described more fully hereinafter with reference to certain preferred aspects. These aspects are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the disclosure to those skilled in the art. Indeed, the disclosure may be embodied in many different forms and should not be construed as limited to the aspects set forth herein; rather, these aspects are provided so that this disclosure will satisfy applicable legal requirements. As used in the specification, and in the appended claims, the singular forms “a”, “an”, “the”, include plural referents unless the context clearly dictates otherwise.

0021 The present invention provides a container exhibiting strong moisture barrier characteristics. The containers of the invention include at least one moisture barrier layer in the wall structure of the container (e.g., any or all of the sidewalls, top or lid, and bottom wall of the container). The moisture barrier layer is advantageous characterized by one or more of good moisture and vapor barrier properties, biodegradability, and a high degree of transparency. The containers of the invention can include various materials as the base structural material of the container wall, as noted in greater detail hereinafter, but the moisture barrier layer of the invention is particularly well-suited for use with fiberoard wall structures which are inherently deficient in moisture barrier properties.

0022 Container wall structures manufactured from a fibrous material have achieved consumer acceptance in certain product areas, such as smokeless tobacco products, but suffer from inherently low moisture and vapor barrier properties. As used herein, the term “fiberoard” is used to refer to any solid, supportive wall material manufactured from a fibrous or cellulosic material such as, for example, fiberoard, cardboard, paper, or paper product. Conventional solutions to improve the barrier performance of fiberoard containers suffer from drawbacks previously noted herein. In certain embodiments, the present invention provides a container comprising a fiberoard wall structure carrying at least one moisture barrier layer as set forth herein. The moisture barrier layer enhances the barrier properties of the fiberoard container without significant reduction in biodegradability or the aesthetic appearance of the container.

0023 The moisture barrier layer of the invention is typically characterized as a film-forming coating material capable of application to a container wall surface during
production thereof. The composition of the barrier layer material can vary, but typically includes a solvent (e.g., water) and/or a film-forming polymer as a primary component. The barrier layer material further includes one or more functional ingredients that provide enhanced barrier properties, as described more fully below. In addition to the functional components related to the barrier properties, the barrier layer materials used in the present invention further include other conventional film/coating ingredients, such as pigments or dyes, antioxidants, surfactants, fillers, defoaming agents, slip agents, biocides, flame retardants, and the like.

[0024] According to one embodiment, the barrier layer as disclosed herein includes one or more triazine compounds which form a durable barrier to gases, in particular oxygen. Such a triazine-containing coating is set forth in U.S. Pat. Nos. 6,632,519 to Shahab et al. and 6,893,679 to Shahab et al., each of which is incorporated herein by reference in their entirety. Suitable exemplary triazine-containing coating products include products under the FRESHURE™ technology platform available from Knowfort Technologies BV of Geleen, The Netherlands.

[0025] A triazine-containing coating exhibits excellent sealability and further provides scratch and crack resistance. Crack resistance is especially favorable in that the product is further protected from environmental pressures and moisture egress thereby aiding in product freshness. The minimum barrier layer thickness, however, would provide a continuous monomolecular layer of the triazine, and more preferably, would have a thickness of typically from about 5 nanometers to about 50 microns (50,000 nanometers).

[0026] Examples of triazine compounds that can be included in a triazine-containing coating are 1,3,5-triazines such as melamine, ammelide, ammelide, cyanuric acid, 2-ureidomelamine, melam, melem, melon, melamine salts such as, for example, melamine cyanurate, melamine phosphate, melamine pyrophosphate or melamine polyphosphate and functionalized melamines, such as for instance hexamethyloxyethyl melamine or acrylate-functionalized melamine.

[0027] According to one embodiment, an adhesive or adhesion layer is utilized for attaching the triazine-containing coating to a container wall. The triazine compound itself may act as the adhesive or may serve as a major component of the adhesive. The triazine-containing coating may be applied to a substrate using known vapor deposition techniques and equipment. Vapor deposition of the triazine-containing coating on the substrate may take place under elevated pressure or atmospheric pressure, but reduced pressures are preferred (e.g., less than 1000 Pa). The temperature necessary to vaporize the triazine compound depends on both the type of triazine compound selected and the pressure at which the deposition is conducted. The rate at which the selected triazine compound is vaporized is temperature and pressure dependent, with higher temperatures and lower pressures providing increased vaporization. Through selection of appropriate temperature and pressure combinations, the vaporization rate, or sublimation rate, of the triazine-containing coating can be adjusted to control the rate at which the resulting barrier is formed on the substrate.

[0028] According to another embodiment, the barrier layer as disclosed herein includes at least one polymer composition that is capable of being deposited on a solid surface such as fiberboard, cardboard, or other paper-based product. An exemplary polymer composition is available from Retec F3 Technologies, Inc. of Granby, Quebec, Canada and is disclosed in WO2009/070895 and WO2010/139070, both to Dandenault et al., each of which is incorporated herein by reference. According to one embodiment, the polymer composition forms a water-based coating that is resistant to water vapor, moisture, gases, oil, and grease.

[0029] When applied, the resulting fiberboard, fiberboard, or paper container is repulpable, compostable and recyclable. According to a preferred embodiment, the polymer composition contains: i) 5% to 30% of a salt of one or more of myristic, palmitic and stearic acid; ii) 0.5% to 3% of at least one of: a) polyvinyl alcohol and b) a C₃₋C₁₈ fatty acid complex of a metal ion that has an oxidation state of at least three; and iii) 25% to 80% of a polymeric composition comprising a polymer, copolymer, or a mixture of polymers and copolymers. Suitable salts include calcium stearate and zinc stearate. The metal ion is suitably chromium, such as in chromium pentahydroxy(tetradecanoato) di-, tetradecanoato chronic chloride hydroxide, and octadecoanoato chronic acid hydroxide. Chromium metal complexes of fatty acids are available under the trade name QUILON® from Zaelon L.L.C. Suitable polymers and copolymers include styrene butadiene copolymers, modified styrene butadiene copolymers, styrene/acrylate copolymers, carboxylated polyethylene, acrylic/polyacrylic polymers, polyvinyl acetate; polyvinyl alcohol, polyvinylacetate-ethylene, polyvinyl acrylic, styro polyolzimer; corn zein (protein), starch, polyolefin dispersion (e.g., modified propylene-based dispersion), polyvinylidene chloride, polyacrylic acid, polyhydroxyalkanoate polymers, polybutylene succinate, plasticized cellulose acetate, and blends thereof.

[0030] According to one embodiment, the barrier layer as disclosed herein includes at least one nano-cellulose material such as, for example, nano-fibrillated or nanocrystalline cellulose (NCC). The barrier layer can include nanocrystalline cellulose which is a uniform, dispersible natural nanoparticle obtained from the crystalline regions of cellulose fibers. The cellulose can be derived from natural cellulose such as wood or wheat straw. Alternatively, the cellulose can be derived from a regenerated source such as rayon or viscose. Exemplary nanocrystalline cellulose is available from CEL-LUFORCE™ of Montreal, Quebec, Canada.

[0031] Nanocrystalline cellulose is typically about 100 nm to 200 nm long and is typically about 5 nm to 10 nm in diameter. During manufacture, cellulose is milled and hydrolyzed to remove amorphous regions. The resulting nanocrystalline cellulose is then separated and concentrated before being modified for coating applications. Nanocrystalline cellulose can form stable suspensions or slurries with a latex or polymer solution that self-assemble into oriented films or coatings upon drying. Nanocrystalline cellulose provides structural reinforcement, reduced wear, and gas impermeability. Nanocrystalline cellulose is light weight, biodegradable, non-toxic, cost-efficient, and recyclable. Nano-fibrillated cellulose can be prepared according to known methods (see e.g., Zhu, J. Y. et al. Integrated production of nanofibrillated cellulose and cellulose biofuel by enzymatic fractionation of wood fibers. Green Chem., 2011, 13, 1339—incorporated herein by reference in its entirety).

[0032] According to yet another embodiment, the barrier layer as disclosed herein includes at least one layer of a nanoclay material. Suitable nanoclay materials include platey kaolins, nanoclay, clay nanocomposite, and polymer-clay nanocomposite structures including hyper-platey, nano-di-
imensional thickness crystals. Nanoclay materials as described herein can be dispersed within a polymer-based or water-based matrix. According to one embodiment, the nanoclay material is present (e.g., loading) in an amount of typically from about 50% to about 65% weight. According to one embodiment, platey kaolin is utilized and creates a tortuous path that reduces the penetration rate of a permeating material and, thus, provides effective barrier performance against liquid, moisture, vapor, and gas penetration. Such materials are marketed under the BARRISURFTM trademark and available from Inemys of Paris, France. Nanoclay materials can be prepared by surface treating clay via cation exchange, mixing the resulting clay with a suspension of polymer latex and associated additives, and subjecting the resulting nanoclay material to ultrasonication. Other methods of preparation are provided by Sun Q., et al. Water-based polymer/clay nanocomposite suspension for improving water and moisture barrier in coating. Composites Science and Technology 67 (2007) 1823-1829, the contents of which are incorporated herein by reference in its entirety.

According to yet another embodiment, the barrier layer as disclosed herein includes at least one layer of a plasma-based inorganic oxide material. Suitable inorganic oxide materials that perform as a barrier layer or coating include aluminum oxide (Al2O3), silicon oxide (SiO2), and magnesium oxide (MgO). In the aforementioned oxide materials, “x” is a suitable number or fraction for the stoichiometric amount of oxygen (e.g., Al2O3, SiO2, MgO). Such oxide coatings may be prepared using plasma-assisted deposition on a substrate according to various methods (Transparen

FIG. 1 is a sectional view of an embodiment of a container wall 100 of the present disclosure. The wall 100 may be incorporated into any portion of the container embodiments disclosed herein. In one embodiment, the wall 100 serves as a top, bottom, side wall, or all of the above. As shown, the wall 100 is typically multi-layer, with any or all of the layers carrying or containing a barrier layer material as described herein. According to the embodiment shown in FIG. 1, the wall includes three layers. Each of the first layer 102, second layer 104, and third layer 106 includes a solid, supportive material with at least one layer or coating of a barrier layer material 101 as disclosed herein. According to one embodiment, each of the layers is manufactured from a fibrous material such as, for example, fiberboard, cardboard, or other paper product. According to one embodiment, the third layer 106 optionally includes a label or wrapper (not shown). The label material is selected based on aesthetics, branding or advertising, and desired barrier properties.

As illustrated, the barrier layer material 101 (e.g., particulate materials such as the nanocellulose materials or clay materials described herein) can optionally be dispersed in a random fashion within one or more of each of the layers 102, 104, and 106 upon manufacture. Alternatively, the barrier layer material 101 can be present as a layer adjacent to one or more of the structural layers 102, 104, 106. Note that FIG. 1 illustrates a barrier layer material 101 applied between layers 106 and 104, between layers 104 and 102, and also on the exterior surface of layer 102. The presence of these barrier layer materials 101 is merely to show the various places where such materials can be used. The invention is not limited to container walls containing a barrier layer material in every location set forth in FIG. 1. Instead, the invention includes container walls containing only a single barrier layer material 101 in a single location or any combination of barrier layer materials shown in the figure.

The containers of the present disclosure can be prepared by any known manufacturing process, such as the spiral bound manufacturing processes set forth in U.S. Pat. Nos. 5,556,365 to Drummond et al.; 5,829,669 to Drummond et al.; and 6,036,629 to Rea et al., each of which are herein incorporated by reference in their entirety. In a spiral bound process, a first innermost fiberboard or paperboard layer is wound onto a stationary mandrel while simultaneously winding one or more exterior fiberboard or paperboard layers successively radially outwardly from the exterior of the first ply. In one embodiment, the container can be manufactured in a manner to produce a single ply paperboard container according to the process forth in U.S. Pat. No. 5,856,963 to Lowry et al., which is incorporated herein by reference in its entirety. In another embodiment, the container can be manufactured in a manner to produce a multi-ply paperboard container according to the process as set forth in U.S. Pat. No. 6,558,306 to Lowry et al., which is incorporated herein by reference in its entirety.

According to one embodiment of the invention, at least one barrier layer is applied to an exterior face or surface of the paperboard ply and/or to the interior face of the adjacent exterior paperboard ply via mist, spray, vapor deposition, or other acceptable deposition techniques. The at least one barrier layer is applied during manufacture of the side wall, bottom wall, and cover (i.e., simultaneously) or after each component is prepared such that the resulting container’s interior receives at least one barrier layer. As a result, radially adjacent plies forming separate layers adhere strongly to each other so that the container exhibits considerable strength. Although each of the spirally wound layers includes a continuous helical seam, the walls or casing material formed from several layers does not readily unravel because the seams in adjacent paperboard layers are offset radially from each other and because of the substantial surface bonding between adjacent tube layers. In another embodiment, the at least one barrier layer is applied to a separate fiber or paper substrate which is, in turn, applied to the fiberboard or paperboard middle layer that was manufactured via one of the aforementioned processes. The steps of coating the substrate and applying the substrate may be carried out in sequential or simultaneous manner.

The container embodiments described in the present application can be used to store any solid products, but are particularly well-suited for products designed for human use or oral consumption. Exemplary consumable products that are often packaged in such containers include a wide variety of consumer products, food products, and tobacco products. The number of solid product units stored in the containers of
the disclosure can also vary, depending on the size of the container and the size of the product units. Consumer products and food products include any product that is susceptible to environmental pressures and exhibit moisture sensitivity. Exemplary consumer products include, but are not limited to, baby powder, beverages, potato chips, nuts, juice, baby formula, powdered cleansers or detergents, cereal, pizza, hamburgers, chicken, french fries, cookies, crackers, danishes, and cookie dough.

[0039] Exemplary tobacco products include cigarettes, cigars, pelletized tobacco products (e.g., compressed or molded pellets produced from powdered or processed tobacco, such as those formed into the general shape of a coin, cylinder, bean, pellet, sphere, orb, strip, obloid, cube, bead, or the like), extruded or cast pieces of tobacco (e.g., as strips, films or sheets, including multilayered films formed into a desired shape), products incorporating tobacco carried by a solid substrate (e.g., where substrate materials range from edible grains to inedible cellulosic sticks), extruded or formed tobacco-containing rods or sticks, tobacco-containing capsule-like materials having an outer shell region and an inner core region, straw-like (e.g., hollow formed) tobacco-containing shapes, sachets or packets containing tobacco (e.g., snus-like products), pieces of tobacco-containing gum, and the like. Further, exemplary tobacco products include tobacco formulations in a loose form such as, for example, a moist snuff product. Exemplary loose form tobacco used with the containers of the present disclosure may include tobacco formulations associated with, for example, commercially available GRIZZLY moist tobacco products and KODIAK moist tobacco products that are marketed by American Snuff Company, LLC.

[0040] Exemplary smokeless tobacco compositions that can be packaged in the containers of the present disclosure are set forth in, for example, U.S. Pat. Nos. 1,376,586 to Schwartze; 3,368,567 to Speer; 4,513,856 to Pittman et al.; 4,606,357 to Dusseke et al.; 4,821,749 to Toft et al.; 5,167,244 to Kjerstad; 5,387,416 to White; 6,688,839 to Williams; 7,810,507 to Dube et al.; 7,819,124 to Strickland et al.; U.S. Patent Nos. 2005/0244521 to Strickland et al.; 2006/0191548 to Strickland et al.; and 2008/029116 to Robinson et al. Examples of tobacco-containing gum are set forth in U.S. Pat. Nos. 4,624,269 to Story et al.; 4,975,270 to Keloe; and 4,802,498 to Ogren. Various manners or methods for packaging smokeless tobacco products are set forth in U.S. Patent Nos. 2004/0217024 and 2006/0118589 to Amarp et al.; and 2009/014450 to Bjorkholm; and PCT Pub. Nos. WO 2006/034450 to Budd; WO 2007/017761 to Kutsch et al.; and WO 2007/067953 to Sheveley et al. All of the above-cited references are incorporated by reference herein in their entirety.

[0041] Smokeless tobacco compositions utilized as the product contained in the containers of the disclosure will often include such ingredients as tobacco (typically in particulate form), sweeteners, binders, colorants, pH adjusters, fillers, flavoring agents, disintegration aids, antioxidants, oral care additives, and preservatives. See, for example, U.S. Pat. No. 7,861,728 to Holton et al., which is incorporated by reference herein in its entirety.

[0042] Individual tobacco product units can be contained within a pouch or bag, such as the type commonly used for the manufacture of snus types of products (e.g., a sealed, moisture permeable pouch that is sometimes referred to as a “portion”). A representative moisture permeable pouch can be composed of a “fleece” type of material. The tobacco formulation is in turn contained within a package, such as the containers of the present disclosure described more fully hereinbelow. The package is sealed tightly, and is composed of a suitable material, such that the atmospheric conditions within that sealed package are modified and/or controlled. That is, the sealed package can provide a good barrier that inhibits the passage of compositions such as moisture and oxygen therethrough. In addition, the atmosphere within the sealed package can be further modified by introducing a selected gaseous species (e.g., nitrogen, argon, or a mixture thereof) into the package prior to sealing or by drawing a vacuum therein (vacuum sealing). As such, the atmospheric conditions to which the tobacco composition is exposed are controlled during conditions of preparation, packing, storage and handling. Descriptions of various components of snus products and components thereof are set forth in U.S. Pat. Pub. No. 2004/0118422 to Lundin et al., which is incorporated herein by reference. See, also, for example, U.S. Pat. Nos. 4,607,479 to Lindem; 4,631,899 to Nielsen; 5,346,734 to Wydick et al.; and 6,162,516 to Derr, and U.S. Pat. Pub. No. 2005/0061359 to Hansson et al.; each of which is incorporated herein by reference. See, also, the representative types of pouches, and pouch material or fleece, set forth in U.S. Pat. No. 5,167,244 to Kjerstad, which is incorporated herein by reference. Snus products can be manufactured using equipment such as that available as SB 51-1/T, SBL 50 and SBL 53-2/T from Merz Verpackungsmaschinen GmbH. G.D SpA out of Italy also supplies tobacco pouching equipment. Snus pouches can be provided as individual pouches, or a plurality of pouches and can be connected or linked together (e.g., in an end-to-end manner) such that a single pouch or individual portion can be readily removed for use from a one-piece strand or matrix of pouches.

[0043] The shape of the outer surface of the containers of the disclosure can vary. Although the container embodiments illustrated in the drawings have certain contours, containers with other exterior surface designs could also be used. For example, the sides or edges of the containers of the disclosure could be flattened, rounded, or beveled, and the various surfaces or edges of the container exterior could be concave or convex. Further, the opposing sides, ends, or edges of the container can be parallel or non-parallel such that the container becomes narrower in one or more dimensions.

[0044] The dimensions of smokeless tobacco container embodiments described herein may vary without departing from the disclosure. However, in preferred embodiments, the containers of the disclosure can be described as having a cylindrical size suitable for handheld manipulation and operation. Exemplary dimensions for such handheld cylindrical embodiments include diameters in the range of about 50 mm to about 100 mm, and more typically about 60 mm to about 80 mm. Exemplary wall thicknesses include the range of about 0.5 mm to about 1.5 mm, and more typically about 0.8 mm to about 1.4 mm. Exemplary depths for handheld container embodiments of the present disclosure range from about 5 mm to about 50 mm, more typically about 8 mm to about 30 mm, and most often about 15 mm to about 25 mm. An exemplary general outward appearance of the container is that used for commercially available GRIZZLY and KODIAK products that are marketed by American Snuff Company, LLC.

[0045] FIG. 2 illustrates one embodiment of a container in accordance with the present disclosure. In this embodiment, a smokeless tobacco container 10 is illustrated. The container
10 may be formed by an open-ended body 20 and a cover 40. The body 20 has a bottom wall which, in some instances, may be substantially circular, and a side wall 24 having an inner surface 25 facing the tobacco product. The side wall 24 depends from a bottom wall 22 which has an inner surface 23 and, in some instances, may be cylindrical as shown. The side wall 24 defines a peripheral portion of the container 10 such that the side wall 24 includes an outer peripheral surface 28. The bottom wall 22 and the side wall 24 cooperate to define an internal storage compartment 26 for storage of a plurality of units of the product. In some instances, an upper portion 30 of the side wall 24 may define a lip 32 in such a manner that the upper portion 30 of the side wall 24 has a reduced diameter (as compared to the diameter of the remainder of the outer surface of the side wall).

The cover 40 may be provided for enclosing the units of product within the internal storage compartment 26. In this regard, the cover 40 is typically removably secured to the body 20 by a snap-fit or an interference fit. As shown in FIG. 2, the cover 40 has a top wall 42 having an inner surface 43, which, in some instances, may be substantially planar, and a peripheral flange 44 depending from the top wall 42 which, in some instances, may be cylindrical. The peripheral flange 44 of the cover 40 is received over the side wall 24 of the body 20 so as to form an enclosure therebetween. In an alternative embodiment, protrusions, projections, or ribs (not shown) may interlock with the outer peripheral surface 28 of the side wall 24 of the body 20.

The cover 40 will typically have the same approximate size or diameter as the side wall 24 of the body 20 such that the cover 40 and body 20 form a smooth exterior surface when the cover is placed over the top of the lip 32 and fully seated upon the body. Hence, the container 10 may be compact and flat so as to be suitable for storage and transportation by a user.

The material of construction of the container 10 can vary. Exemplary materials include metal, wood, fiberoard or cardboard, polymeric, and synthetic plastic materials. Polymeric materials that can be extruded and/or molded into desired shapes include polyethylene, polystyrene, polynide, polyacrylic acid, polyhydroxyalkanoate polymers, polybutylene succinate, plasticized cellulose acetate, and blends or copolymers thereof. In a preferred embodiment, the body 20 and cover 40 are each formed from a fiberoard material. Such a configuration is advantageous in that it provides an aesthetically appealing appearance, while also allowing the body to be produced by an economical and environmentally-friendly process. Alternatively, the body 20 is a formed of a fiberoard material and the cover 40 is metal.

FIG. 3 is a perspective view of another container embodiment of the present disclosure. In this embodiment, a cigarette container or “carton” 60 is illustrated. The container 60 has an outer casing 62 and an inner frame 64 having an inner frame surface 66. The inner frame 64 protrudes from the upper end of the outer casing 62 and forms an opening 68 in cooperation with the outer casing 62. In this illustrated, exemplary embodiment, the container 60 further includes a lid 70 having an inner lid surface 72, which is integrally joined to a rear edge of the opening 68 of the inner frame 64 with a self hinge. The lid 70 is therefore rotatable around an axis of the self hinge. In an alternative embodiment (not shown), the lid is completely removable and replaceable.

The outer casing 62 and inner frame 64 may be manufactured from fiberoard, cardboard, or thin foil or metal. The outer casing 62 may optionally include a label or wrapper on an outer face. Typically, the selection of the packaging outer layer, label or wrapper is dependent upon factors such as aesthetics, branding or advertising, and desired barrier properties so as to provide additional protection from exposure to the atmosphere and ingress or regress of moisture. The outer casing 62 and inner frame 64 may be prepared by known processes from a “blank” as described in U.S. Pat. Nos. 5,699,903 to Focke et al.; 5,161,733 to Latif; 5,484,619 to Boriani et al.; and US Pub. No. 2005/0252796, each of which is incorporated by reference herein. In one embodiment, the outer casing 62 is manufactured separately and subsequently superimposed and adhered to the inner frame 62. Alternatively, the outer casing 62 and inner frame 64 are manufactured simultaneously as one blank.

According to one embodiment, the inner frame surface 66 and inner lid surface 72 each include at least one barrier layer as described herein. According to one embodiment, a barrier layer composition as described herein may be randomly disbursed within the outer casing and inner frame during manufacture of the outer casing 62 and inner frame 64 which is present either in addition to the barrier layer of the inner frame surface 66 and inner lid surface 72 or dispersed alone. In any of the aforementioned embodiments, a barrier layer composition as described herein can be applied to an inner surface of the outer casing 62.

According to one embodiment, the resulting containers can then be sealed via application of a circumferential outer layer. The outer layer may optionally include a label or wrapper on an outer face. Typically, the selection of the packaging outer layer, label or wrapper is dependent upon factors such as aesthetics, branding or advertising, and desired barrier properties so as to provide additional protection from exposure to oxygen and ingress or regress of moisture. In an alternative embodiment, the outer layer is directly applied to the middle layer during manufacture of the middle layer.

Many modifications and other aspects of the disclosure set forth herein will come to mind to one skilled in the art to which the disclosure pertains having the benefit of the teachings presented in the foregoing descriptions and the associated drawings. Therefore, it is to be understood that the disclosure is not to be limited to the specific aspects disclosed and that modifications and other aspects are intended to be included within the scope of the appended claims. Although specific terms are employed herein, they are used in a generic and descriptive sense only and not for purposes of limitation.

That which is claimed:

1. A container, comprising:
a body having a bottom wall and a side wall, the bottom wall and the side wall defining an internal storage compartment adapted for storage of a product, and a top configured to be engaged with the body, wherein at least one of the bottom wall, side wall, and top comprises a layer of fibrous material, wherein the layer of fibrous material comprises a moisture barrier layer imbedded within the layer of fibrous material or carried on an outer surface of the layer of fibrous material as a coating, the moisture barrier layer comprising at least one of: (i) a triazine-containing compound; (ii) a nano-cellulose material; (iii) a nanoclay material; (iv) a polymer composition comprising one or more of a salt of one or more of myristic, palmitic and stearic acid, polyvinyl alcohol, and a C₆₋₁₈ fatty acid complex of a metal ion having an oxidation state of at least three; and (v) an inorganic oxide material.
2. The container of claim 1, wherein the fibrous material is a fiberboard, cardboard, paper, or a combination thereof.

3. The container of claim 1, further comprising a wrapping material extending about a perimeter of the container.

4. The container of claim 3, wherein the wrapping material comprises fiberboard, cardboard, paper, plastic, metal, or a combination thereof.

5. The container of claim 1, wherein the polymer composition comprises a polymer, copolymer, or a mixture of polymers and copolymers.

6. The container of claim 5, wherein the polymer composition comprises a polymer selected from the group consisting of styrene butadiene copolymers, modified styrene butadiene copolymers, styrene/acylate copolymers, carboxylated polystyrene, acrylic/polyacrylic polymers, polystyrene acrylate, styrene/acylate, vinyl alcohol, polyvinylacetate-ethylene, polyvinyl acrylate, soy protein polymer, corn zein (protein), starch, polyolefin dispersion, polyvinylidene dichloride, polylactic acid, polyhydroxyalkanoate polymers, polybutylene succinate, and blends thereof.

7. The container of claim 1, wherein the at least one triazine-containing compound is selected from the group consisting of melamine, ammonia, ammelide, cyanuric acid, 2-ureidomelamine, melam, melamine cyanurate, melamine phosphate, dimelamine pyrophosphate, melamine polyphosphate, hexamethylenimine melamine, and acrylate-functionalized melamine.

8. The container of claim 1, wherein the nano-cellulose material is a nano-fibrillated or nanocrystalline cellulose.

9. The container of claim 1, wherein the nanoclay material is a platey kaolin, nanoclay, clay nanocomposite, or polymer-clay nanocomposite.

10. The container of claim 1, wherein the inorganic oxide material comprises AlOx, SiOx, or MgOx.

11. The container of claim 1, wherein the internal storage compartment contains a plurality of products selected from the group consisting of cigarettes, smokeless tobacco products, and food products.

12. The container of claim 1, wherein the top is removable from the body.

13. The container of claim 1, wherein the top is engaged with the body.

14. The container of claim 1, wherein the container is a smokeless tobacco container or a cigarette pack.

15. A container for smokeless tobacco products, comprising:
   - a body having a bottom wall and a side wall, the bottom wall and the side wall defining an internal storage compartment adapted for storage of smokeless tobacco, and a top configured to be engaged with the body, wherein at least one of the bottom wall, side wall, and top comprises a layer of fibrous material, wherein the layer of fibrous material comprises a moisture barrier layer imbedded within the layer of fibrous material or carried on an outer surface of the layer of fibrous material as a coating, the moisture barrier layer comprising at least one of: (i) a triazine-containing compound; (ii) a nano-cellulose material; (iii) a nanoclay material; (iv) a polymer composition comprising one or more of a salt of one or more of myristic, palmitic and stearic acid, polyvinyl alcohol, and a C8-C14 fatty acid complex of a metal ion having an oxidation state of at least three; and (v) an inorganic oxide material.

16. The container of claim 15, wherein the top is removable from body.

17. The container of claim 15, wherein the bottom wall and side wall comprise fiberboard.

18. The container of claim 17, wherein the top comprises fiberboard.

19. The container of claim 17, wherein the top comprises a metal or polymer.

20. The container of claim 15, wherein the polymer composition comprises a polymer selected from the group consisting of styrene butadiene copolymers, modified styrene butadiene copolymers, styrene/acylate copolymers, carboxylated polystyrene, acrylic/polyacrylic polymers, polyvinyl acrylate, polystyrene, styrene/acylate, vinyl alcohol, polyvinylacetate-ethylene, polylactic acid, polyhydroxyalkanoate polymers, polybutylene succinate, plasticized cellulose acetate, and blends thereof.

21. The container of claim 15, wherein the at least one triazine-containing compound is selected from the group consisting of melamine, ammonia, ammelide, cyanuric acid, 2-ureidomelamine, melam, melamine, melamine cyanurate, melamine phosphate, dimelamine pyrophosphate, melamine polyphosphate, hexamethylenimine melamine, and acrylate-functionalized melamine.

22. The container of claim 15, wherein the nano-cellulose material is a nano-fibrillated or nanocrystalline cellulose.

23. The container of claim 15, wherein the nanoclay material is a platey kaolin, nanoclay, clay nanocomposite, or polymer-clay nanocomposite.

24. The container of claim 15, wherein the inorganic oxide material comprises AlOx, SiOx, or MgOx.

25. The container of claim 15, wherein the top and body are generally cylindrical.