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(54) DETERGENT PACKAGE UNIT WITH A HANDLE

(57) The present invention refers to a detergent package unit comprising a detergent or cleaning composition and a cardboard container comprising a handle on at least one side surface or edge allowing an easy transport and handling of said detergent or cleaning composition.

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Description

[0001] The present invention refers to a detergent package unit comprising a detergent or cleaning composition and a cardboard container comprising a handle on at least one side surface or edge allowing an easy transport and handling of said detergent or cleaning composition.

[0002] Packages made of cardboard /paperboard or plastic materials for storage and provision of detergent compositions are well known in the art. Such packages commonly are provided with handles, either made of plastic material or of cardboard / paperboard to facilitate the transport of said package for the consumer.

[0003] Several packaging producing companies describe embodiments of handle comprising packages prepared "in one piece" of cardboard or paperboard, in particular packages for granular or powder compositions, e.g. detergent compositions.

[0004] In DE 2 459 705 A1 and DE 7 441 985 U1 cardboard packages are disclosed comprising on the top surface a handle provided by press cut of one peace of a cardboard for the whole package. In this embodiment two adjacent portions of the cardboard in the ready-made package are fold up together to serve as a handle.

[0005] In FI 85840 B, in FR2 634 456 A1 and in DE42 22 531 A1 embodiments of "one piece" cardboard packages are described and shown, wherein the handle is made of a portion of the cardboard which is fold itself to serve as a handle on the top surface of the package.

[0006] EP 634 333 A1 refers to a package of paperboard having on the top surface a separate fixed handle made as well completely from paper.

[0007] It was an object of the present invention to provide a package for a detergent or cleaning composition avoiding as far as possible any plastic material, allowing a comfortable transport and storage of said detergent or cleaning composition and improving the handling of said package and its content.

[0008] This object is met by a detergent package comprising (i) a cardboard container having an upper top surface (1), a bottom (2) and at least three side surfaces, wherein on one of said side surface (3) a handle (4) is provided, wherein said handle (4) is made of a rigid cardboard material and spans at least the half of the length of said side surface, and (ii) a detergent or cleaning composition including at least one type of a builder, at least one type of a non-ionic and/or anionic surfactant and at least one enzyme.

[0009] In an alternative embodiment the invention refers to a detergent package comprising (i) a cardboard container having an upper top surface (1), a bottom (2) and at least three side surfaces, wherein on one edge (E) a handle (4) is provided, wherein said handle (4) is made of a rigid cardboard material and spans at least the half of the length of said edge (E), and (ii) a detergent or cleaning composition including at least one type of a builder, at least one type of a non-ionic and/or anionic surfactant and at least one enzyme.

[0010] The package is prepared essentially as a whole from cardboard, paperboard and/or paper. Preferably the package is prepared from corrugated cardboard, e.g. single wall double faced corrugated cardboard; or a double wall corrugated cardboard or triple wall corrugated cardboard having paper sheets at least on both outer surfaces ("faced cardboard"), wherein the use of a single wall double faced corrugated cardboard is preferred.

[0011] Said cardboard preferably comprises a vapor or moisture barrier layer, preferably "inside" the cardboard, which means that said barrier layer is provided between the both outer surface layers. Said vapor or moisture barrier layer may be a layer provided attached to or applied to one of the surfaces of the paper sheets used for preparation of the corrugated cardboard, wherein said layered surface is then faced to the inner side of the cardboard, or said barrier layer is provided as a separate film, sheet or layer, which is included into the corrugated cardboard during its preparation. Furthermore, also a "solid" cardboard may be used, e.g. a cardboard laminate including a vapor or moisture barrier layer sandwiched between two cardboard sheets, between a cardboard and a paper sheet or between two paper sheets, or a cardboard laminate comprising only a cardboard sheet and a barrier layer, however due to the weight, rigidity and comfort the use of corrugated cardboard panels is preferred.

[0012] According to the present application the term "cardboard" is used for a material commonly also described as "paperboard". It should be agreed that these terms can be used synonymously, not providing a noticeable difference in the material suitable for the present invention.

[0013] In the following it should be understood, that when the term "cardboard" is used, this means as well and in particular a corrugated cardboard, wherein said corrugated cardboard particularly preferred comprises a vapor or moisture barrier layer.

[0014] The vapor or moisture barrier layer can be provided in form of a film, e.g. a film of a material known in the art for such barrier layers. Examples of suitable materials are polyethylene (PE), like high density polyethylene or low density polyethylene; polyethylene terephthalate (PET); polyvinyl alcohol (PVOH); polyvinyl acetate (PVA); polypropylene (PP), polylactic acid (PLA) and/or polyamide (PA), which can be used as single polymers, mixture of polymers or copolymers of the mentioned, wherein PE films are particularly preferred. Furthermore, an oiled paper may be used as a vapor or moisture barrier sheet.

[0015] Further, the moisture barrier layer can be provided as a coating on at least one surface of a sheet used for preparation of the cardboard or the package of the present invention. Such coatings may comprise at least one of: (i) a wax compound, (ii) a surfactant, in particular a surfactant solid 20°C (iii) a polymer, (iv) a triazine-containing compound; (v) a nano-cellulose material; (vi) a nanoclay material; and/or (vii) an inorganic oxide material. Presence of at least one of compounds (i), (ii) or (iii) is preferred

[0016] The thickness of the barrier film or layer typically ranges from about 5 nanometers to about 100 μm, preferably from 10 nm to 50 μm, 20 nm to 25 μm, 30 nm to 10 μm, 40 nm to 5 μm or 50 nm to1 μm.

[0017] Examples of wax compounds (i) are natural waxes, in particular wax esters or wax alcohols. Examples for such waxes are lanolin, paraffine, carnauba wax, candelilla wax or bees wax, wax alcohols may be represented by cetyl alcohol, carnaubyl alcohol, ceryl alcohol and myricyl alcohol, examples of waxy acids are myristinic acid, palmic acid, stearic acid, laurinic acid, lignoceric acid, cerotinic acid, montanic acid and melissic acid, without being restricted to the mentioned.

[0018] Examples of suitable surfactants (ii) are nonionic or anionic surfactants which are solid at room temperature (defined being 20°C), preferably which are solid up to a temperature of 35°C. Due to their characteristics nonionic surfactants are preferred, in particular fatty alcohols or esters, optionally comprising EO or PO groups. Such surfactants are disclosed in detail below as part of the detergent composition.

[0019] Suitable polymers (iii) are those as mentioned above for the barrier film and further copolymers including styrene butadiene copolymers, modified styrene butadiene copolymers, styrene/acrylate copolymers, carboxylated polystyrene, acrylic/polyacrylic polymers, polyvinylacetate-ethylene, polyvinyl acrylic polymer, soy protein polymer; corn zein (protein), starch, a polyolefin dispersion (e.g., modified propylene-based dispersion), polyvinylidene chloride, polylactic acid, polyhydroxyalkanoate polymers, polybutylene succinate, plasticized cellulose acetate, and mixtures thereof.

[0020] Triazine compounds (iv) that can be included are 1,3,5-triazines such as melamine, ammeline, ammelide, cyanuric acid, 2-ureidomelamine, melam, melem, melon, melamine salts such as, for example, melamine cyanurate, melamine phosphate, dimelamine pyrophosphate or melamine polyphosphate and functionalized melamines, such as for instance hexamethoxymethyl melamine or acrylate-functionalized melamine.

[0021] An example for a suitable cellulose material (v) is nano-fibrillated or nanocrystalline cellulose (NCC). The barrier layer may comprise nanocrystalline cellulose which is a uniform, redispersible 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 CELLUFORCE™ of Montreal, Quebec, Canada.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 is light weight, biodegradable, non-toxic, cost-efficient, and recyclable.

[0022] Suitable nanoclay materials (vi) include platey kaolins, nanoclays, clay nanocomposite, and polymer-clay nanocomposite structures including hyper-platey, nano-dimensional thickness crystals. Nanoclay materials as described herein can be e.g. dispersed within a polymer-based or water-based matrix.

[0023] Suitable inorganic oxide materials (vii) that perform as a barrier layer or coating include aluminum oxide (AlOx), silicon oxide (SiOx), and magnesium oxide (MgOx). In the aforementioned oxide materials, "x" is a suitable number or fraction for the stoichiometric amount of oxygen (e.g., Al_2O_3, SiO_2, MgO). Such oxide coatings may be prepared using plasma-assisted deposition on a substrate.

[0024] The thickness of the cardboard (laminate) including the (preferably corrugated) cardboard and the vapor/moisture barrier layer preferably should be in the range of from 1 mm to 5 mm, preferred from 1,5 mm to 4,5 mm, more preferred 1,8 mm to 4 mm, even more preferred 2 mm to 3,5 mm and most preferred 2,2 mm to 3,3 mm to provide suitable strength to the container.

[0025] In one preferred embodiment the container is folded from one continuous piece of cardboard, cut in a form allowing the folding into the container of the present invention. In another, however less preferred embodiment the container is made of two pieces of cardboard, wherein one piece is cut in form of the container without said handle (4) and the other piece is cut in form of an element for providing the handle (4) and said two pieces are thereafter combined to provide the container of the invention. In the last embodiment it is also preferred, that both parts of the container are made from the same cardboard material. Thus, the handle (4) is either integrally formed as part of the cardboard cut in the form of the container, or is prepared of the same material as the remainder of the container. If the handle (4) is separately formed, it is applied on one panel surface (3) of the container by means of an adhesive, a fixing material or a fixing device.

[0026] The handle (4) according to the invention is provided on one side surface (3) of the container. With "side surface" a surface is meant which is positioned either in front, in back, on the left or on the right side, when the package is placed on a surface after opening the container for discharging its content. This means that the handle (4) is not positioned at the same surface as a provided opening of the container. If e.g. an opening is provided on the top surface (1) of the container (being horizontal / parallel to a surface whereon said container is placed), the handle (4) is provided on the side surface (3) being in contact with, e.g. being normal to said horizontal top surface. If an opening is provided on one side surface (3'), the handle (4) is provided at the surface (3) opposing said surface (3') having or providing the opening. Said construction has the advantage that the handle (4) doesn't hinder free access to the opening and/or discharging the content of the container.

[0027] According to the invention side surfaces (3) and (3') are surfaces opposing each other and preferably are the "smaller surfaces" if the container is cuboid, but has side surfaces of different sizes. In such a cuboid container surfaces (3") and (3"') also oppose each other and can also be described as being the "front" and "back" surfaces. The side surfaces (3) and (3') or (3") and (3"'), respectively, are not necessarily parallel to each other, however, preferably are. Most preferred in one embodiment the container is a rectangular block. Such an embodiment is shown in FIG. 1 and in FIG. 8.

[0028] In another embodiment the container has a triangular upper top surface (1) and bottom surface, so that the side surface (3) providing the handle (4) has no opposing side surface (3'), but instead an opposing edge (6). Such an embodiment is shown in FIG.2. In this embodiment the side surfaces (3") and (3"') together are forming said edge (6).

[0029] In still another embodiment the container has a triangular upper top surface (1) and bottom surface, so that the side surface (3') has no opposing side surface (3), but instead an opposing edge (E) providing the handle (4). Such an embodiment is shown in FIG.3. In this embodiment the side surfaces (3") and (3"') together are forming said edge (E).

[0030] In all the embodiments of the container described herein said container provides an opening or at least one means for opening (7) the container, wherein said opening is either provided on the top surface (1) of the container or on the upper region of surface (3') or edge (6) opposing the side (3)/ edge (E) providing the handle (4). With "upper region" is meant that said opening is provided in the region clearly above the "midway" of the side panel / surface, when the container is positioned on a surface in a way that the handle (4) is provided on one side. Preferably the opening is provided in the side surface (3') or edge (6) in the upper 2/3, the upper 3/4, the upper 4/5, the upper 7/8 or at the upper end of surface (3') or edge (6).

[0031] A means for preparing the opening (7) may be a thread, a filament, a flap, a clip, an ear, a pull tab, a tear flap or any other suitable device for opening the container.

[0032] According to the invention the handle (4) spans at least the half of the length of side surface (3) or edge (E). Preferably the handle (4) spans at least 60% of the length of said side surface (3) or said edge (E), respectively, preferably at least 75%, more preferred at least 85%, even more preferred at least 90% of the length, most preferred the whole length of the side surface (3) or edge (E), respectively. Said handle (4) provides an opening for inserting the hand, however, preferably the remainder of said handle is of continuous cardboard material essentially without further perforation sites to maintain rigidity of the handle.

[0033] Before the consumer uses the handle (4) the first time, said handle (4) preferably is provided adjacent to side surface (3) and can be fold up for usage (shown in FIG.4a), or the handle (4) is provided adjacent to a front or back side surface (3" or 3"') and can be fold up for usage (shown in FIG 4b). The last option particularly is preferred, when the handle(4) is provided at edge (E).The opening for inserting the hand (O) in the fold up handle (4) preferably is positioned essentially in the middle of the length of said side surface (3) or said edge (E), respectively, thus, allowing to carry the container during transport like a suitcase. If the handle (4) is positioned on surface (3), it is preferred that the opening for inserting the hand (O) in the fold up handle (4) is positioned essentially in the middle of the length and essentially within the inner half of the width of said side surface (3. With "inner half of the width" is meant the area between ¼ and ¾ of the full width of side surface (3) supporting the handle (4). The particular position of said fold-up handle (4) may mainly arise from the total height (H) of the handle (4), which, before it is fold up preferably is lying adjacent to said side surface (3).Thus, said handle also can be provided in a position so that the opening for inserting the hand (O) in the fold up handle (4) is positioned essentially in the center of side surface (3).

[0034] Due to the present invention said handle (4) preferably is provided by folding a cardboard panel or by adhering two cardboard panels to each other, so that the fold-up handle is represented by an at least two-ply (thus "rigid") cardboard stack. The cardboard panel providing the handle (4), i.e. said two (or more)-ply stack, at the lower end (i.e. the end coming in contact with side surface (3)) of said fold-up handle (4) is flexed so that said flexed portion (8) comes in plain contact with side surface (3). The flexed portion (8) contacting the side surface (3) is attached to said surface (3) by any suitable adhesive or fixing material. If the handle is attached to said side surface (3) by two flexed portions (8a, 8b), at least one of said flexed portions (8a, 8b) is attached to said side surface (3) by means of an adhesive or fixing material. FIG. 6 shows a view of handle (4) from the front end, illustrating the two-ply stack of the cardboard and flexed portions (8a) and (8b) at the bottom of handle (4), wherein at least one is adhesively attached to side surface (3).

[0035] It is particularly preferred, even if not necessary, that the handle (4) has sloped and/or rounded handle edges (5) at its ends as exemplified in FIGs. 5a, 5b and 5c. Sloping and / or rounding the terminal handle edges (5) of the handle (4) has the advantage that during folding and filling of the container said handle edges are less hindering the processes carried out.

[0036] In a preferred embodiment the package container is formed of one continuous panel of cardboard, cut in a suitable form to allow folding said panel accordingly to obtain said container. FIG: 7 shows an embodiment of such a cut cardboard panel, FIG. 8 illustrates an accordingly folded package container.

[0037] To avoid that the content of the container may trickle out during transport, the container preferably is provided with "trickling protection". Said protection is provided by the following: the upper top surface (1) and the bottom (2) of the ready-made (folded) container is built by overlapping flaps (exemplified by 1a, 1b, 1c and 1d; or 2a, 2b, 2c and 2d, respectively in FIG. 7), wherein said flaps are all cut in a length allowing at least 80%, preferably at least 85%, more preferred at least 90%, even more preferred at least 95%, at least 98% or at least 99% of a maximal overlap of said flaps, referring to the maximal potential overlap of said flaps in reference to the shape of the container. If e.g. a cuboid container as exemplified in FIG. 1, FIG. 7 or FIG. 8 is provided, the maximal potential overlap of the flaps 1a-d or 2a-d, respectively is that all the flaps have a length corresponding to the width of side surfaces (3) and/or (3'). To still allow an easy discharge of the content of the container, when once opened, it is preferred that the smaller flaps (1b) and (1d) of the top surface are provided with a perforation line (PL), allowing the removal of at least a portion of said flaps (1b) and (1d) after opening of the top surface (1) to extend the space providing access to the content.

[0038] Furthermore, it is preferred that the top surface (1) may be re-closable after the first opening, e.g. after removal of the opening device (7). To enable re-closure of the container, the flap lying as the uppermost of the folded flaps (1a-d), e.g. flap (1c) in FIG. 7, can be provided with an ear (9) protruding from the front edge of the remainder of uppermost flap (1c) after removal of the opening device (7). Said ear (9) can be inserted into a slit (10) provided in the flap lying below said uppermost flap, e.g. flap (1a) in FIG. 7, to close said top surface (1).

[0039] Bottom flaps (2a), (2b), (2c) and (2d) are commonly not intended to be opened as long as the container is filled. Therefore, these flaps are suitably folded and combined with an adhesive, a fixing material or fixing device in a way minimizing any tackling out of the content of the container. The usage of an adhesive is particularly preferred. The flaps building top surface (1) preferably are also combined with an adhesive, wherein at the top of the container said adhesive should be provided in a pattern allowing the opening of the container. If, e.g. the container is provided with a pull tap (7) on top surface (1), the uppermost flap (e.g. flap (1c)) should be fixed to the flap below (e.g. flap (1a)) only at its front end, remaining adhered to the flap below (e.g. flap (1a)) after removal of the pull tap (7), thus, the adhesive should not hinder the opening of the container.

[0040] Any suitable adhesive can be used to adhere any of the flaps (1a), (1b), (1c), 1d) and / or (2a), (2b), (2c), (2d) in a suitable manner, as well as to adhere the flexed portion (8) or flexed portions (8a) and (8b), respectively, to side surface (3). Preferably, to ensure desired adhesive strength the adhesive can be selected from hotmelt adhesives (HMA), also known as hot glues, which are solid at room temperature and can be softened, reshaped, and dispensed upon heating above their softening point. Solidification takes only seconds after dispensing, or in other word, these thermoplastic adhesives reach full strength once they cool to room temperature. High performance structural hot melts may be formulated with many (advanced) thermoplastics, including ethyl vinyl acetate (EVA), polyolefin, styrene block copolymers (SBC), polyamides, reactive urethanes and silicones. These thermoplastics may be blended with a variety of additional raw materials including tackifying resins, waxes, plasticizers, fillers, and antioxidants, which can be incorporated into the base hot melt resins to enhance adhesive performance. The adhesive also can be selected from polymerizing and/or crosslinking polymer adhesives, like cyanoacrylate adhesives, methyl methacrylate adhesives, unsaturated polyesters, epoxy resins, polyurethanes, polyimides, phenolic resins etc. or from dispersion adhesives, emulsion adhesives, contact adhesives or similar. Also, cold sealing adhesives might be used. It is also possible to use different types of adhesives at different sites of the container. In particular in the area(s) of "trickling protection" preferably a hot melt adhesive is used.

[0041] The container as presented herein has the advantage that due to the positioning of the handle (4) at one side surface (3) or edge (E) said container can be easily carried during transport by the consumer, and, when opened and placed on a horizontal surface, the container can be used / handled with one hand to discharge the content, e.g. simply by pouring the content out of the opening. Since the handle (4) spans at least the half of the side surface (3) or edge (E) and is made of (preferably a two-ply stack of) cardboard, it is rigid enough to allow the handling of the filled container. Furthermore, the container is environment-friendly since the cardboard after emptying the container can be fully recycled.

FIGURES

[0042] The figures show illustrative embodiments of the container of the present invention, without restricting the invention exactly to what is shown. In all the figures dashed lines - - - - refer to subject matter not visible in a view as provided, nonetheless present, wherein lines -' -' -'-' stand for perforation lines, which can be opened/ripped by the consumer.

FIG. 1 shows a cuboid container having a (fold up) handle (4) at one side surface (3) and a means for opening (7) the container on the top surface (1).

FIG.2 shows an embodiment of the container having a triangular top (1) and bottom (2) surface, resulting in an edge (6) providing a means for opening (7). The (fold up) handle (4) is on the side surface (3) opposing said edge (6).

FIG. 3 shows and embodiment of the container having a triangular top (1) and bottom (2) surface, resulting in an edge (E) bearing the handle (4). Opposing said edge (E) is side surface (3’) providing a means for opening (7).

FIG. 4 shows embodiments of the container, wherein the handle (4) is not yet fold up, but is lying adjacent to surface (3) (FIG. 4a), or surface (3") (FIG. 4b), respectively.

FIGs. 5a, 5b and 5c show three embodiments of the handle (4) having sloped and/ or rounded edges.

FIG. 6 shows a view from a front side of a handle (4) attached to side surface (3), said handle (4) is in a fold-up position, and at least one of flexed portions (8a, 8b) is attached to said side surface (3) by means of an adhesive or fixing material.

FIG. 7 shows an embodiment of a cardboard panel cut in a form allowing the folding of a package container according to the invention, wherein the container and the handle (4) are provided by one continuous cardboard panel. In said figure cut edges are shown with fat lines, thin lines stand for folding grooves.

FIG. 8 shows a cuboid cardboard container in an "upright" position (FIG. 8a) and in a "suitcase" position (FIG 8b) having a (fold up) handle (4) with flexed portions (8a, 8b) attached to side surface (3) and a means for opening (7) the container on the top surface (1).

DETERGENT OR CLEANING COMPOSITION

[0043] The detergent or cleaning composition of the present invention is preferably a laundry cleaning composition or a dishwashing composition, more preferably a solid laundry or automatic dishwashing composition.

[0044] The cleaning composition can be provided in form a powder, granulates, particles, a monolayer tablet, a multilayer or multiphase (e.g. tab in tab) tablet, a bar, a pouch, a pouch with different compartments or any other suitable form or combinations thereof. Particularly preferred the cleaning composition is provided as a powder, in particulate or in granulate form.

INGREDIENTS OF THE DETERGENT OR CLEANING COMPOSITION

[0045] The cleaning composition(s) of the present invention may comprise any of the ingredients known in the art as common ingredients in cleaning compositions, particularly in laundry or automatic dishwashing compositions. Such ingredients are selected from the group consisting of e.g. builders, surfactants, preferably non-ionic and/or anionic surfactants, polymers/cobuilders, enzymes, complexing agents, bleaching agents, dispersing agents, optical brighteners, stabilizers, colorants, odorants, anti-redeposition agents, anti-corrosion agents, tableting agents, desintegrants, silver protecting agents, dyes, and perfume, without any restriction.

[0046] According to the invention the cleaning composition comprises at least one type of a builder, at least one type of a surfactant, preferably non-ionic and/or anionic surfactants and at least one enzyme.

[0047] Furthermore, all of the optional ingredients known in the state of the art to be effective or usable in cleaning compositions, particular in laundry or in automatic dishwashing compositions might be included. Said further ingredients are not limiting the present invention.

[0048] The following ingredients represent examples of ingredients which can be included in a cleaning composition of the present invention, however should not be considered as limited to the mentioned.

BUILDER(S), CO-BUILDER(S)

[0049] The composition of the present invention preferably comprises one or more builder(s).

[0050] The main functions of the builders are to soften the washing water, to provide alkalinity and a buffering capacity to the washing liquid and to have an anti-redeposition or dispersing function in the cleaning composition. The physical properties of the cleaning composition are also depending on the builders that are used.

[0051] For controlling the pH of the composition, as well as its mineral hardness, inorganic as well as organic builders may be incorporated into the composition. In addition, these builders may assist in the removal of particulate soil. If present in the composition according to the present invention, the builder or the mixture of builders preferably will be present in an amount of from 0,1 to 90 wt.-%, preferably in an amount of from 5 - 80 wt.-%, more preferably in an amount of 8 - 70 wt.-%, and even more preferably in an amount of from 10 - 50 wt.-%, based on the whole composition.

[0052] Included among the builders in this context are, in particular, the silicates, aluminosilicates, carbonates, sulfates, organic co-builders, and - in cases where no environmental prejudices against their use exist - also the phosphates, which, however, are not preferred. Phosphate builders include alkaline, ammonium or alkanolammonium salts of polyphosphates, including tripolyphosphates, pyrophosphates and polymeric meta-phosphates. In one embodiment, the composition of the present invention comprises less than 5 wt.-% of a polyphosphate builder, based on the whole composition.

[0053] Among the plurality of commercially obtainable phosphates, the alkali metal phosphates have the highest importance for the agents according to the present invention, with particular preference for pentasodium triphosphate, $Na_5P_3O_{10}$ (sodium tripolyphosphate) resp. pentapotassium triphosphate, $K_5P_3O_{10}$ (potassium tripolyphosphate).

[0054] If phosphates are used, the weight proportion of the phosphate in terms of the total weight of the cleaning composition is preferably from 1 to 70 wt.-%, more preferably from 10 to 60 wt.- %, and most preferred from 20 to 50 wt.-%.

[0055] In addition to or instead of an inorganic builder the composition of the present invention may as well comprise an organic builder, including polycarboxylate builders in the form of their acid or a salt, including alkali metal salts such as potassium, sodium and lithium salts.

[0056] The group of preferred builders includes in particular the citrates as well as the carbonates and the organic co-builders. The term "citrate" hereby includes both citric acid as well as its salts, in particular its alkali metal salts.

[0057] Carbonate(s) and/or hydrogen carbonate(s), preferably alkali metal carbonate(s), particularly preferably sodium carbonate, are particularly preferably added in quantities of 5 to 70 wt.-%, preferably 10 to 40 wt.-% and especially 15 to 60 wt.-%, each relative to the weight of the detergent composition.

[0058] Polycarboxylates/polycarboxylic acids and phosphonates may be particularly mentioned as the organic co-builders. These classes of substances are described below.

[0059] Useful organic builders are, for example, the polycarboxylic acids that can be used in the form of the free acid and/or their sodium salts, polycarboxylic acids in this context being understood to be carboxylic acids that carry more than one acid function. These include, for example, adipic acid, succinic acid, glutaric acid, malic acid, tartaric acid, maleic acid, fumaric acid, sugar acids, amino carboxylic acids, nitrilotriacetic acid (NTA) and mixtures thereof. Besides their building effect, the free acids also typically have the property of an acidifying component and hence also serve to establish a relatively low and mild pH of the inventive agents. Succinic acid, glutaric acid, adipic acid, gluconic acid and any mixtures thereof are particularly to be mentioned in this regard.

[0060] Usable organic builder substances are, for example, the polycarboxylic acids usable in the form of the free acid and/or sodium salts thereof, "polycarboxylic acids" being understood as those carboxylic acids that carry more than one acid function. These are, for example, citric acid, adipic acid, succinic acid, glutaric acid, malic acid, tartaric acid, maleic acid, fumaric acid, sugar acids, aminocarboxylic acids, nitrilotriacetic acid (NTA), provided such use is not objectionable for environmental reasons, as well as mixtures thereof. The free acids typically also possess, besides their builder effect, the property of an acidifying component, and thus also serve to establish a lower and milder pH for washing or cleaning agents. To be recited in this context are, in particular, citric acid, succinic acid, glutaric acid, adipic acid, gluconic acid, and any mixtures thereof.

[0061] Citric acid or salts of citric acid are used with particular preference as a builder substance.

[0062] A further particularly preferred builder substance is methylglycinediacetic acid (MGDA). According to the invention it is particularly preferred to add MGDA as at least one builder / complexing agent into the composition.

[0063] Oxydisuccinates and other derivatives of disuccinates, preferably ethylenediamine disuccinate, are additional suitable co-builders. Ethylenediamine-N,N'-disuccinate (EDDS might be used, preferably in the form of its sodium or magnesium salts. Also preferred in this context are glycerol disuccinates and glycerol trisuccinates.

[0064] In order to improve cleaning performance and/or to adjust viscosity, liquid cleaning agents may contain at least one hydrophobically modified polymer, preferably a hydrophobically modified polymer containing carboxylic acid groups, the weight amount of the hydrophobically modified polymer in terms of the total weight of the cleaning agent being preferably 0,1 to 10 wt.-%, preferably between 0,2 and 8,0 wt.-%, and in particular 0,4 to 6,0 wt.-%.

SURFACTANTS

[0065] The cleaning composition of the present invention comprises one or more surfactants. Said surfactants may be selected from anionic, non-ionic, cationic or amphoteric surfactants, however, are preferably anionic and/or non-ionic.

[0066] The main functions of surfactants are changing the surface tension, dispersing, foam controlling and surface modification.

[0067] Examples of possible surfactant as at least one ingredient can be selected from the group consisting of anionic, cationic, non-ionic as well as amphoteric surfactants, and preferably may be selected from the group consisting of anionic or non-ionic surfactants or mixtures thereof. More preferably, the composition of the present invention comprises a mixture of anionic and non-ionic surfactants. If surfactants are present in the composition of the present invention, their total amount preferably may be in the range of from 0,1 to 50 wt.-%, more preferably of from 1 to 30 wt.-%, even more preferably of from 1,5 to 25 wt.-%, even more preferably of from 1,5 to 20 wt.-%, and most preferably of from 1,5 to 15 wt.-%, based on the whole composition. Preferably the composition comprises at least one nonionic surfactant and optionally at least one anionic surfactant.

[0068] Anionic surfactants suitable to be used in cleaning compositions, in particular in combination with enzymes are well known in the state of the art and include for example alkylbenzenesulfonic acids or salts thereof and alkylsulfonic acids or salts thereof.

[0069] Suitable anionic alkylbenzene sulfonic or alkylsulfonic surfactants include in particular C_5-C_{20}, preferably C_{10}-C_{16}, even more preferably C_{11}-C_{13} alkylbenzenesulfonates, in particular linear alkylbenzene sulfonates (LAS), alkylestersulfonates, primary or secondary alkenesulfonates, sulfonated polycarboxylic acids and any mixtures thereof. Alkylethersulfates may be used as well.

[0070] Further preferred surfactants are non-ionic, in particular low foaming non-ionic surfactants. Washing or cleaning agents, particularly laundry cleaning agents or dishwashing and among this preferably automatic dishwashing compositions, are especially preferred when they comprise non-ionic surfactants from the group of the alkoxylated alcohols. Preferred non-ionic surfactants are alkoxylated, advantageously ethoxylated, particularly primary alcohols preferably containing 8 to 18 carbon atoms and, on average, 1 to 12 moles of ethylene oxide (EO) per mole of alcohol, in which the alcohol group may be linear or, preferably, methyl-branched in the 2-position or may contain e.g. linear and methyl-branched residues in the form of the mixtures typically present in Oxo alcohol residues. Particularly preferred are, however, alcohol ethoxylates with linear groups from alcohols of natural origin with 6 to 22 carbon atoms, e.g. from coco-, palm-, tallow- or oleyl alcohol, and an average of 2 to 8 EO per mole alcohol. Exemplary preferred ethoxylated alcohols include C_{12-14} alcohols with 3 EO or 4 EO, C_{9-11} alcohols with 7 EO, C_{13-15} alcohols with 3 EO, 5 EO or 7 EO, C_{12-18} alcohols with 3 EO, 5 EO or 7 EO and mixtures thereof, such as mixtures of C_{12-14} alcohols with 3 EO and C_{12-18} alcohols with 5 EO. The cited degrees of ethoxylation constitute statistically average values that can be a whole or a fractional number for a specific product. Preferred alcohol ethoxylates have a narrowed homolog distribution (narrow range ethoxylates, NRE). In addition to these non-ionic surfactants, fatty alcohols with more than 12 EO can also be used. Examples of these are tallow fatty alcohol with 14 EO, 25 EO, 30 EO or 100 EO.

[0071] Accordingly, ethoxylated non-ionic surfactant(s) prepared from C_{6-20} monohydroxy alkanols or C_{6-20} alkylphenols or C_{12-20} fatty alcohols and more than 12 mole, preferably more than 12 mole and especially more than 20 mole ethylene oxide per mole alcohol, are used with particular preference. A particularly preferred non-ionic surfactant is obtained from a straight-chain fatty alcohol containing 16 to 20 carbon atoms (C_{16-20} alcohol), preferably a C_{18} alcohol, and at least 12 moles, preferably at least 15 moles and more preferably at least 20 moles of ethylene oxide. Of these non-ionic surfactants, the so-called narrow range ethoxylates are particularly preferred.

[0072] Moreover, surfactant(s) that comprise one or more tallow fat alcohols with 20 to 30 EO may be used in combination with a silicone defoamer.

[0073] A special type of surfactants used in automatic dishwasher cleaning compositions is a 'carry-over' surfactant. A 'carry-over' surfactant has the property that some amount of the surfactant used remains in the machine after the rinsing cycles to give a performance during the final rinsing cycle and the (optional) drying phase of the whole washing cycle of the dishwashing machine. This type of surfactant is described in EP 1 524 313 in more detail.

[0074] Further, for cleaning compositions alkoxylated nonionic surfactants and Gemini surfactants are commonly used. The alkoxy groups mostly consist of ethyleneoxide, propyleneoxide and butyleneoxide or combinations thereof. Also, amphoteric surfactants are known to be used in cleaning compositions. Further, alkylpolyglucoside surfactants can also be used, preferably in a low foaming form.

[0075] Examples of further surfactants are selected from a group consisting of gemini surfactants with a short C-Chain (C8-C12) as spacer and two times 5-40EO groups as hydrophilic headgroups (e.g. Dehypon GRA, Dehypon E 127, Genapol EC 50, Genapol EC 65) and Long Chain (C12-22) high ethoxylateted (20-100EO) carry over surfactant Lutensol AT Types.

[0076] Further, all surfactants commonly known to be used in cleaning compositions can be part of the composition, this includes all anionic, non-ionic, cationic and amphoteric surfactants known in the art. The present invention is not limited by any of the surfactants commonly used in detergent compositions.

POLYMERS

[0077] Supplementing the builders described above, polymers having cleaning activity can be contained in the cleaning agent. The weight proportion of the polymers having cleaning activity in terms of the total weight of automatic cleaning agents according to the present invention is preferably from 0,1 to 20 wt.-%, preferably 1,0 to 15 wt.-%, and in particular 2,0 to 12 wt.-%.

[0078] Suitable polymers are known to those skilled in the art and comprise e.g. polymeric polycarboxylates; these are, for example, the alkali metal salts of polyacrylic acid or of polymethacrylic acid, for example those having a relative molecular weight from 500 to 70.000 g/mol or derivatives thereof.

[0079] The molecular weight indicated for polymeric polycarboxylates are herein weight-average molecular weights Mw of the respective acid form that were determined in principle by means of gel permeation chromatography (GPC), a UV detector having been used. The measurement was performed against an external polyacrylic acid standard that yields realistic molecular weight values because of its structural affinity with the polymers being investigated.

[0080] Suitable polymers are, in particular, polyacrylates that preferably have a molecular weight from 2.000 to 20.000 g/mol. Of this group in turn, the short-chain polyacrylates, which have molecular weights from 2.000 to 10.000 g/mol and particularly preferably from 3.000 to 5.000 g/mol, may be preferred because of their superior solubility.

[0081] Also suitable are copolymeric polycarboxylates, in particular those of acrylic acid with methacrylic acid and of acrylic acid or methacrylic acid with maleic acid. Copolymers of acrylic acid with maleic acid that contain 50 to 90 wt.-% acrylic acid and 50 to 10 wt.-% maleic acid have been found particularly suitable. Their relative molecular weight, based on free acids, is equal to in general 2.000 to 70.000 g/mol, preferably 20.000 to 50.000 g/mol, and in particular 30.000 to 40.000 g/mol.

[0082] Sulfonic acid group-containing polymers, in particular those from the group of the copolymeric polysulfonates, are used preferably as polymers having cleaning activity. These copolymeric polysulfonates contain, besides sulfonic acid group-containing monomer(s), at least one monomer from the group of the unsaturated carboxylic acids.

[0083] Unsaturated carboxylic acids of the formula $R^1(R^2)C=C(R^3)COOH$ are used with particular preference as (an) unsaturated carboxylic acids(s), in which formula R^1 to R^3, mutually independently, denote -H, $-CH_3$, a straight-chain or branched saturated alkyl residue having 2 to 12 carbon atoms, a straight-chain or branched, mono- or polyunsaturated alkenyl residue having 2 to 12 carbon atoms, alkyl or alkenyl residues as defined above substituted with $-NH_2$, -OH, or -COOH, or denote -COOH or $-COOR^4$ where R^4 is a saturated or unsaturated, straight-chain or branched hydrocarbon residue having 1 to 12 carbon atoms.

[0084] Particularly preferred unsaturated carboxylic acids are acrylic acid, methacrylic acid, ethacrylic acid, α-chloroacrylic acid, α-cyanoacrylic acid, crotonic acid, α-phenylacrylic acid, maleic acid, maleic acid anhydride, fumaric acid, itaconic acid, citraconic acid, methylenemalonic acid, sorbic acid, cinnamic acid, or mixtures thereof. The unsaturated dicarboxylic acids are of course also usable.

[0085] In the context of the sulfonic acid group-containing monomers, those of the formula $R^5(R^6)C=C(R^7)\text{-}X\text{-}SO_3H$, in which R^5 to R^7, mutually independently, denote -H, $-CH_3$, a straight-chain or branched saturated alkyl residue having 2 to 12 carbon atoms, a straight-chain or branched, mono- or polyunsaturated alkenyl residue having 2 to 12 carbon atoms, alkyl or alkenyl residues substituted with $-NH_2$, -OH, or -COOH, or denote -COOH or $-COOR^4$, where R^4 is a saturated or unsaturated, straight-chain or branched hydrocarbon residue having 1 to 12 carbon atoms, and X denotes an optionally present spacer group that is selected from - $(CH_2)_n$- where n=0 to 4, $-COO-(CH_2)_k-$ where k=1 to 6, $-C(O)-NH-C(CH_3)_2-$, $-C(O)-NH-C(CH_3)_2-CH_2-$, and $-C(O)-NH-CH(CH_2CH_3)-$, are preferred.

[0086] Among these monomers, those of the formulas

$$H_2C=CH\text{-}X\text{-}SO_3H$$

$$H_2C=C(CH_3)\text{-}X\text{-}SO_3H$$

$HO_3S\text{-}X\text{-}(R^6)C=C(R^7)\text{-}X\text{-}SO_3\text{-}H$, in which R^6 and R^7, mutually independently, are selected from -H, $-CH_3$, $-CH_2CH_3$, $-CH_2CH_2CH_3$, $-CH(CH_3)_2$, and X denotes an optionally present spacer group that is selected from $-(CH_2)_n-$ where n=0 to 4, $-COO-(CH_2)_k-$ where k=1 to 6, $-C(O)-NH-C(CH_3)_2-$, $-C(O)-NH-C(CH_3)_2-CH_2-$, and $-C(O)-NH-CH(CH_2CH_3)-$, are preferred.

[0087] Particularly preferred sulfonic acid group-containing monomers in this context are 1-acrylamido-1-propanesulfonic acid, 2-acrylamido-2-propanesulfonic acid, 2-acrylamido-2-methyl-1-propanesulfonic acid, 2-methacrylamido-2-methyl-1-propanesulfonic acid, 3-methacrylamido-2-hydroxypropanesulfonic acid, allylsulfonic acid, methallylsulfonic acid, allyloxybenzenesulfonic acid, methallyloxybenzenesulfonic acid, 2-hydroxy-3-(2-propenyloxy)propanesulfonic acid, 2-methyl-2-propene-1-sulfonic acid, styrenesulfonic acid, vinylsulfonic acid, 3-sulfopropylacrylate, 3-sulfopropylmethacrylate, sulfomethacrylamide, sulfomethylmethacrylamide, and mixtures of the aforesaid acids or water-soluble salts thereof.

[0088] The sulfonic acid groups can be present in the polymers entirely or partly in neutralized form. The use of partly or entirely neutralized sulfonic acid group-containing copolymers is preferred.

[0089] The molecular weight of the sulfo-copolymers can be varied in order to adapt the properties of the polymers to the desired application. Preferred detergent compositions are characterized in that the copolymers have molecular weights from 2.000 to 200.000 $gmol^{-1}$, preferably from 4.000 to 25.000 $gmol^{-1}$, and in particular from 5.000 to 15.000 $gmol^{-1}$.

[0090] The copolymers can also encompass, besides carboxyl group-containing monomers and sulfonic acid group-containing monomers, at least one nonionic, preferably hydrophobic monomer. The use of these hydrophobically modified polymers allows to improve, in particular, the rinsing performance of automatic dishwashing agents.Cleaning agents containing a copolymer encompassing

i) carboxylic acid group-containing monomer(s),
ii) sulfonic acid group-containing monomer(s),
iii) optionally (a) nonionic monomer(s), are preferred according to the present invention.

[0091] The use of these terpolymers has made it possible to improve the rinsing performance of automatic dishwashing agents.

[0092] The nonionic monomers used are preferably monomers of the general formula $R^1(R^2)C=C(R^3)-X-R^4$, in which R^1 to R^3, mutually independently, denote -H, $-CH_3$, or $-C_2H_5$, X denotes an optionally present spacer group that is selected from $-CH_2-$, -C(O)O-, and -C(O)-NH-, and R^4 denotes a straight-chain or branched saturated alkyl residue having 2 to 22 carbon atoms or an unsaturated, preferably aromatic residue having 6 to 22 carbon atoms.

[0093] Particularly preferred nonionic monomers are butene, isobutene, pentene, 3-methylbutene, 2-methylbutene, cyclopentene, hexene, hexene-1, 2-methlypentene-1, 3-methlypentene-1, cyclohexene, methylcyclopentene, cycloheptene, methylcyclohexene, 2,4,4-trimethylpentene-1, 2,4,4-trimethylpentene-2, 2,3 -dimethylhexene-1,2,4-dimethylhexene-1, 2,5-dimethlyhexene-1, 3,5-dimethylhexene-1, 4,4-dimethylhexane-1, ethylcyclohexyne, 1-octene, a-oiefins having 10 or more carbon atoms such as, for example, 1-decene, 1-dodecene, 1-hexadecene, 1-octadecene, and C22-α-olefin, 2-styrene, α-methylstyrene, 3-methylstyrene, 4-propylstryene, 4-cyclohexylstyrene, 4-dodecylstyrene, 2-ethyl-4-benzylstyrene, 1-vinylnaphthalene, 2-vinylnaphthalene, acrylic acid methyl ester, acrylic acid ethyl ester, acrylic acid propyl ester, acrylic acid butyl ester, acrylic acid pentyl ester, acrylic acid hexyl ester, methacrylic acid methyl ester, N-(methyl)acrylamide, acrylic acid 2-ethylhexyl ester, methacrylic acid 2-ethylhexyl ester, N-(2-ethylhexyl)acrylamide, acrylic acid octyl ester, methacrylic acid octyl ester, N-(octyl)acrylamide, acrylic acid lauryl ester, methacrylic acid lauryl ester, N-(lauryl)acrylamide, acrylic acid stearyl ester, methacrylic acid stearyl ester, N-(stearyl)acrylamide, acrylic acid behenyl ester, methacrylic acid behenyl ester, and N-(behenyl)acrylamide, or mixtures thereof.

[0094] The weight proportion of the sulfonic acid group-containing copolymers in terms of the total weight of cleaning agents according to the present invention is preferably from 0,1 to 15 wt.- %, preferably from 1,0 to 12 wt.-%, and in particular from 2,0 to 10 wt.-%.

[0095] Organic co-builders that may be recited are in particular polycarboxylates/polycarboxylic acids, polymeric polycarboxylates, aspartic acid, polyacetals, dextrins or further organic co-builders.

ENZYMES

[0096] The composition of the present invention further comprises at least one enzyme.

[0097] In general, enzymes are often used to aid the removal of stains. In most cases enzymes react with the soiling and break it down into pieces that have increased water solubility or are better dispersible in the washing liquid.

[0098] The enzymes that can be used in cleaning compositions include, but are not limited to, proteases, amylases, lipases, cellulases, mannanase, peroxidase, oxidase, xylanase, pullulanase, glucanase, pectinase, cutinase, hemicellulases, glucoamylases, phospholipases, esterases, keratanases, reductases, phenoloxidases, lipoxygenases, ligninases, tannases, pentosanases, malanases, arabinosidases, hyaluronidase, chondroitinase, laccase or mixtures thereof. These enzymes are known to the skilled artisans.

[0099] Particularly preferred enzymes are selected from a group consisting of amylases, lipases, proteases, cellulases or mixtures thereof, most preferred at least one enzyme is a protease. Each of said enzymes can be added to the composition in an amount of 0,001 to 10 wt.% (referring to pure enzyme), preferably from 0,005 to 5 wt.%, more preferred from 0,01 to 2 wt.%, even more preferred from 0,1 to 1 wt.% of pure enzyme (meaning the active enzyme).

[0100] The enzyme(s) can be added to the composition in form of granules, e.g. as granulates comprising a binder and the enzyme or the enzyme and any further suitable detergent ingredient. In such granules at least 2 wt.-% of a granule is represented by the enzyme(s). In a preferred embodiment of the invention the enzyme(s) are provided in form of such granules, wherein at least 5 wt.-% of a granule is represented by the enzyme(s), preferably at least 10 wt.-%, more preferred at least 20 wt.-%, even more preferred at least 40 wt.-%. If no support is used in the inner core, the core of the granules may consist of the enzyme(s) or up to 90 wt.-%, up to 80 wt.-% or up to 70 wt.-% are represented by the enzyme(s).

COMPLEXING AGENT

[0101] A further preferred ingredient of cleaning compositions is at least one complexing agent. The cleaning composition of the present invention may optionally comprise one or more complexing agent(s) as at least one further ingredient.

[0102] Complexing agents are commonly used as co-builders to support the performance of the builders.

[0103] A function of complexing agents is to capture trace metal ions like, Cu(II), Fe(II), Fe(III), Mn(II), Cd(II), Co(II), Cr(III), Hg(II), Ni(II), Pb(II), Pd(II), Zn(II), Ca(II), Mg(II) These ions can interfere with or disturb certain processes of the cleaning in the washing machine, like e.g. the bleach performance.

[0104] The complexing agent(s) that are known to be used in cleaning compositions include, but are not limited to S,S-ethylenediamine-N,N'-disuccinic acid (S,S-EDDS), ethylenediaminetetraacetic acid (EDTA), diethylene triamine penta(methylene phosphonate) (DETPMP), nitrilotriacetic acid (NTA), ethanol diglycine (EDG), imino disuccinic acid (IDS), methylglycine diacetic acid (MGDA), diethylene triamine pentaacetic acid (DTPA), ethylene diamine dihydroxyphenyl acetic acid (EDDHA), N-(hydroxyethyl) ethylenediamine triacetic acid (HEDTA), hydroxyethylidene-1,1-diphosphonic acid (HEDP), phytic acid, diethylene triamine (DETA), triethylene tetramine (TETA), tetraethylene pentamine (TEPA), aminoethyl ethanolamine (AEEA), glutamic acid N,N-diacetic acid (GLDA), 1,3-propylenediamine tetraacetic acid (PDTA), glucoheptonic acid, dipicolinic acid, ethylene diamine tetra (methylene phosphonic acid) (EDTMPA), 2-hydroxyethyliminodiacetic acid (HEIDA) or water soluble salts thereof or mixtures thereof.

[0105] Further, phosphonates are preferred complexing agents. Useful phosphonates encompass, besides 1-hydroxyethane-1,1-diphosphonic acid, a number of different compounds such as, for example, diethylenetriaminepenta(methylenephosphonic acid) (DTPMP). Hydroxyalkane-or aminoalkanephosphonates are preferred in this Application. Among the hydroxyalkanephosphonates, 1-hydroxyethane-1,1-diphosphonate (HEDP) is of particular importance as a co-builder. It is used preferably as a sodium salt, the disodium salt reacting neutrally and the tetrasodium salt in alkaline fashion (pH 9). Suitable aminoalkanephosphonates are, e.g. ethylenediaminetetramethylenephosphonate (EDTMP), diethylenetriaminepentamethylenephosphonate (DTPMP), as well as higher homologs thereof. They are used preferably in the form of the neutrally reacting sodium salts, e.g. as a hexasodium salt of EDTMP resp. as a hepta- and octasodium salt of DTPMP. Of the class of the phosphonates, HEDP is preferably used as a builder. The aminoalkanephosphonates moreover possess a pronounced ability to bind heavy metals. It may accordingly be preferred, in particular if the agents also contain bleaches, to use aminoalkanephosphonates, in particular DTPMP, or mixtures of the aforesaid phosphonates.

[0106] Particularly preferred are one or more phosphonate(s) from the group of

a) aminotrimethylenephosphonic acid (ATMP) and/or salts thereof,
b) ethylenediaminetetra(methylenephosphonic acid) (EDTMP) and/or salts thereof,
c) diethylenetriaminepenta(methylenephosphonic acid) (DTPMP) and/or salts thereof,
d) 1-hydroxyethane-1,1-diphosphonic acid (HEDP) and/or salts thereof,
e) 2-phosphonobutane-1,2,4-tricarboxylic acid (PBTC) and/or salts thereof,
f) hexamethylenediaminetetra(methylenephosphonic acid) (HDTMP) and/or salts thereof,
g) nitrilotri(methylenephosphonic acid) (NTMP) and/or salts thereof.

[0107] Washing- or cleaning compositions that contain 1-hydroxyethane-1,1-diphosphonic acid (HEDP) or diethylenetriaminepenta(methylenephosphonic acid) (DTPMP) as phosphonates are particularly preferred.

[0108] The cleaning compositions according to the present invention can of course contain two or more different phosphonates.

[0109] Preferred cleaning compositions may contain at least one complexing agent from the group above in terms of the total weight of the cleaning agent in a range from 0,01 to 8,0 wt.-%, preferably 0,02 to 5,0 wt.-%, and in particular 0,05 to 3,0 wt.-%.

[0110] Builders and co-builders can generally be added to the composition in acid form, neutralized or in a partly neutralized form. When used in a partly or completely neutralized form alkali metal salts are preferred, like sodium, potassium and lithium or ammonium salts.

BLEACHING

[0111] The composition of the present invention may comprise a bleaching system.
Bleaching agents can be used in a cleaning composition either alone or in combination with a bleach activator and/or a bleach catalyst. The function of the bleaching agent is the removal of bleachable stains and to achieve an antibacterial effect on the load and inside of the laundry or the dish washing machine.

[0112] Bleaching agents that can be used in cleaning compositions include, but are not limited to, active chlorine compounds, inorganic peroxygen compounds and organic peracids. Examples are sodium percarbonate, sodium perborate monohydrate, sodium perborate tetrahydrate, hydrogen peroxide, hydrogen peroxide based compounds, persulfates, peroxymonosulphate, peroxodisulphate, ε-phthalimido-perox-caproic acid, benzoyl peroxide, sodium hypochlorite, sodium dichloroisocyanurate, etc. as well as mixtures thereof. Preferably at least one bleaching agent is selected from inorganic bleaching agents, preferably from sodium perborate or sodium percarbonate or a mixture thereof.

[0113] The weight proportion of the bleaching agent in terms of the total weight of the cleaning composition is preferably from 1 to 40 wt.-%, more preferably from 2 to 30 wt.-%, and most preferred from 3 to 20 wt.-%.

[0114] The composition of the present invention may further comprise at least one bleach catalyst, preferably a metal containing bleach catalyst that is selected from bleach-boosting transition metal salts or transition metal complexes such as, for example, manganese-, iron-, cobalt-, ruthenium- or molybdenum-salen or -carbonyl complexes. Manganese, iron, cobalt, ruthenium, molybdenum, titanium, vanadium and copper complexes with nitrogen-containing tripod ligands, as well as cobalt-, iron-, copper- and ruthenium-ammine complexes may also be employed as the bleach catalysts. Such catalysts are broadly described in the state of the art and well known by skilled artisans.

[0115] In U.S. Pat. 4,430,243 one type of metal-containing bleach catalyst is disclosed which is a catalyst system comprising a transition metal cation of defined bleach catalytic activity, such as copper, iron, titanium, ruthenium tungsten, molybdenum, or manganese cations, an auxiliary metal cation having little or no bleach catalytic activity, such as zinc or aluminum cations, and a sequestrate having defined stability constants for the catalytic and auxiliary metal cations, particularly ethylenediaminetetraacetic acid, ethylenediaminetetra (methylenephosphonic acid) and water-soluble salts thereof.

[0116] Other types of bleach catalysts include the manganese-based complexes disclosed in U.S. Pat. 5,246,621 and U.S. Pat. 5,244,594. Preferred examples of theses catalysts include $\text{Mn}^{\text{IV}}_2(\mu\text{-O})_3(\text{1,4,7-trimethyl-1,4,7-triazacyclononane})_2\text{-}(\text{PF}_6)_2$ ("MnTACN"), $\text{Mn}^{\text{III}}_2(\mu\text{O})_1(\mu\text{-OAc})_2(\text{1,4,7-trimethyl-1,4,7-triazacyclononane})_2\text{-}(\text{ClO}_4)_2$, $\text{Mn}^{\text{IV}}_4(\mu\text{O})_6(\text{1,4,7-triazacyclo nonane})_4\text{-}(\text{ClO}_4)_2$, $\text{Mn}^{\text{III}}\text{Mn}^{\text{IV}}_4(\mu\text{-O})_1(\mu\text{-OAc})_2(\text{1,4,7-trimethyl-1,4,7-triazacyclononane})_2\text{-}(\text{ClO}_4)_3$, and mixtures thereof. See also European patent application 549,272. Other ligands suitable for use herein include 1,5,9-trimethyl-1,5,9-triazacyclododecane, 2-methyl-1,4,7-triazacyclononane, 2-methyl-1,4,7-triazacyclononane, and mixtures thereof and mixtures of pentaamineacetate cobalt (III) nitrate and MnTACN.

[0117] The bleach catalysts useful in automatic dishwashing compositions and concentrated powder detergent compositions may also be used in present invention. For examples of suitable bleach catalysts see U.S. Pat. 4,246,612 and U.S. Pat. 5,227,084, or U.S. Pat. 5,194,416 which teaches mononuclear manganese (IV) complexes such as $\text{Mn}(\text{1,4,7-trimethyl-1,4,7-triazacyclononane}(\text{OCH}_3)_3\text{-}(\text{PF}_6)$.

[0118] Still another type of bleach catalyst, as disclosed in U.S. Pat. 5,114,606, is a water-soluble complex of manganese (II), (III), and/or (IV) with a ligand which is a non-carboxylate polyhydroxy compound having at least three consecutive C-OH groups. Preferred ligands include sorbitol, iditol, dulsitol, mannitol, xylitol, arabitol, adonitol, meso-erythritol, meso-inositol, lactose, and mixtures thereof.

[0119] U.S. Pat. 5,114,611 teaches a bleach catalyst comprising a complex of transition metals, including Mn, Co, Fe, or Cu, with a non-(macro)-cyclic ligand. Said ligands are of the formula: $R^1R^2N{=}C\text{-}B(R^3)\text{-}C{=}NR^4$, wherein R^1, R^2, R^3, and R^4 can each be selected from H, substituted alkyl and aryl groups such that each $R^1\text{-}N{=}C\text{-}R^2$ and $R^3\text{-}C{=}N\text{-}R^4$ form a five or six-membered ring. Said ring can further be substituted. B is a bridging group selected from O, S, CR^5R^6, NR^7 and C=O, wherein R^5, R^6, and R^7 can each be H, alkyl, or aryl groups, including substituted or unsubstituted groups. Preferred ligands include pyridine, pyridazine, pyrimidine, pyrazine, imidazole, pyrazole, and triazole rings. Optionally, said rings may be substituted with substituents such as alkyl, aryl, alkoxy, halide, and nitro. Particularly preferred is the ligand 2,2'-bispyridylamine. Preferred bleach catalysts include Co, Cu, Mn, Fe,-bispyridylmethane and-bispyridylamine complexes. Highly preferred catalysts include $\text{Co}(\text{2,2'-bispyridylamine})\text{Cl}_2$, Di(isothiocyanato)bispyridylamine-cobalt (II), trisdipyridylamine-cobalt(II) perchlorate, $\text{Co}(\text{2,2-bispyridylamine})_2\text{O}_2\text{ClO}_4$, Bis-(2,2'-bispyridylamine) copper(II) perchlorate, tris(di-2-pyridylamine) iron(II) perchlorate, and mixtures thereof.

[0120] Other examples include Mn gluconate, $\text{Mn}(\text{CF}_3\text{SO}_3)_2$, $\text{Co}(\text{NH}_3)_5\text{Cl}$, and the binuclear Mn complexed with tetra-N-dentate and bi-N-dentate ligands, including $\text{N}_4\text{Mn}^{\text{III}}(\mu\text{-O})_2\text{Mn}^{\text{IV}}\text{N}_4)^+$ and $[\text{Bipy}_2\text{Mn}^{\text{III}}(\mu\text{O})_2\text{Mn}^{\text{IV}}\text{bipy}_2]\text{-}(\text{ClO}_4)_3$.

[0121] Complexes of manganese in the valence state II, III, IV or V which preferably comprise one or a plurality of macrocyclic ligands with the donor functions N, NR, PR, O and/or S are particularly preferably employed. Ligands having nitrogen donor functions are preferably employed. In this regard, it is particularly preferred to select the at least one bleach catalyst from such having a group 1,4,7-trimethyl-1,4,7-triazacyclononane (Me-TACN), 1,4,7-triazacyclononane (TACN), 1,5,9-trimethyl-1,5,9-triazacyclododecane (Me-TACD), 2-methyl-1,4,7-trimethyl-1,4,7-triazacyclononane (Me/Me-TACN) 1,2,4,7,-tetramethyl-1,4,7-triazacyclo nonane and/or 2-methyl-1,4,7-triazacyclononane (Me/TACN) as the macromolecular ligands.

[0122] Preferred manganese complexes are for example $[\text{Mn}^{\text{III}}_2(\mu\text{-O})_1(\mu\text{-OAc})_2(\text{TACN})_2](\text{ClO}_4)_2$ $[\text{Mn}^{\text{III}}\text{Mn}^{\text{IV}}(\mu\text{-O})_2(\mu\text{-OAc})_1(\text{TACN})_2](\text{BPh}_4)_2$, $[\text{Mn}^{\text{IV}}_4(\mu\text{-O})_6(\text{TACN})_4](\text{ClO}_4)_4$, $[\text{Mn}^{\text{III}}_2(\mu\text{-O})_1(\mu\text{-OAc})_2(\text{Me-TACN})_2](\text{ClO}_4)_2$, $[\text{Mn}^{\text{III}}\text{Mn}^{\text{IV}}(\mu\text{-O})_1(\mu\text{-OAc})_2(\text{Me-TACN})_2](\text{ClO}_4)_3$, $[\text{Mn}^{\text{IV}}_2(\mu\text{-O})_3(\text{Me-TACN})_2](\text{PF}_6)_2$ (MnTACN), $[\text{Mn}^{\text{IV}}_2(\mu\text{-O})_3(\text{Me/Me-TACN})_2](\text{PF}_6)_2$ $(\text{OAc}{=}\text{OC(O)CH}_3)$ and the complex of Mn^{VI} with 1,2,4,7,-tetramethyl-1,4,7-triazacyclononane.

[0123] In a particularly preferred embodiment at least one metal containing bleach catalyst is MnTACN.

[0124] The bleach catalyst may amount from at least 0.002 wt.-%, preferably at least 0.004 wt.-%, more preferably from 0.008 to 0.23 wt.-%, more preferably from 0.012 to 0.15 wt.-%, even more preferably from 0.016 to 0.12 wt.-%, most preferably from 0.016 to 0.08 wt.-% of the cleaning composition. These amounts are represented e.g. by a dosis of at least 0,5 mg, preferably at least 1 mg, more preferred 2 to 30 mg, more preferred 3 to 20 mg, even more preferred 4 to 15 mg, most preferred 4 to 10 mg of bleach catalyst added with a 13 to 25 gram dosis of the remaining cleaning composition (as one wash load).

[0125] The bleach catalyst can be added in form of granules, e.g. granules comprising MnTACN and a binder. In a preferred embodiment said binder can be CMC. In other embodiments the binder might be any other suitable binder, like organic polymers or carboxylate compounds, water soluble inorganic and organic salts, silicates, organic compounds having a molecular weight of less than 500 g/mol e.g. sugars, citrate, succinate, maleate and organic polymers having a molecular weight of 800 - 1.000.000 g/mol preferably selected from the group consisting of homo- and co-polymers, including graft co-polymers, more preferred from polyacrylic acid or derivatives thereof, polyethylene glycols or derivatives thereof, polyvinyl alcohol or derivatives thereof, polyvinylpyrrolidone or derivatives thereof, starch or derivatives thereof, cellulose or derivatives thereof, a polyvinyl alcohol-polyethylene glycol graft co-polymer, polyethylene, polysaccharides, polyglucose, guargum, pectin, lignin, cerragen gum, proteins others than enzymes, or mixtures of any of the mentioned. In case that such granules comprising the bleach catalyst and CMC as a binder is used, the amount described below for the addition of CMC can be either provided solely by said granules, or the granules are provided side by side to the addition of further CMC. Further the bleach catalyst can be provided in form of enzyme-comprising granules as described below.

[0126] The cleaning composition according to the present invention may comprise carboxymethylcellulose (CMC), e.g. in an amount of at least 0,02% (w/w), preferably of at least 0.05% of the cleaning composition, preferably in a range of 0,05 to 5%, more preferred in the range of 0,1 to 4%, even more preferred 0.15 to 3%. The CMC has preferably an average degree of substitution (ds) of at least 0.1, preferably between 0.1 to 2.5, preferably between 0.2 and 2.0, more preferably between 0.3 and 1.5 and most preferably between 0.4 and 1.0.

[0127] Said CMC may be added to the cleaning composition in form of free flowing powder, in form of granules or as part of granules (e.g. by serving as a binder).

[0128] According to the present invention the composition may comprise a bleach activator. With bleach activator any compound is meant providing the possibility to use a comparatively low temperature to achieve the desired bleaching performance when inorganic peroxygen based bleaching agents are applied. Such a bleach activator reacts with the peroxygen to form an organic peracid. Depending from the used bleach activator these peracids can have a hydrophobic or a hydrophilic character.

[0129] Examples of bleach activators agents commonly used in cleaning compositions include, but are not limited to, tetraacetylethylenediamine (TAED), sodium nonanoyloxybenzene sulfonate (NOBS), acetyl caprolactone, N-methyl morpholinium acetonitrile and salts thereof, sodium 4-(2-decanoyloxyethoxycarbonyloxy)benzenesulfonate (DECOBS) and salts thereof, lauryloxybenzylsulfonate (LOBS), iso-lauryloxybenzylsulfonate (I-LOBS), N-methylmorpholinum-acetonitril (MMA), Pentaacetylglucose, Nitrilquats, Benzoylcaprolactam (BzCL), 4-nitrobenzoylcaprolactam, 3-clorobenzoylcaprolactam, benzoyloxybenzylsulfonate (BOBS), phenylbenzoate (PhBz), decanoyloxybenzylsulfonate (C10-OBS), benzoylvalerolactam (BZVL), octanoyloxybenzylsulfonate (C8-OBS), 4-[N-(nonanoyl)aminohezanoyloxy]-benzylsulfonate-sodium salt (NACA-OBS), 10-undecenoyloxybenzylsulfonate (UDOBS), decanoyloxybenzoec acid (DOBA), perhydrolyzable ester, perhydrolytic enzyme combined with an by this enzyme hydrolysable substrate, acetyl caprolactone, Acetyl caprolactam (N-acetylhexanelactam) (e.g. Peractive LAC) N-methyl morpholinium acetonitrile and salts thereof (such as Sokalan BMG from BASF). TAED is preferred.

[0130] The following further ingredients can be added in commonly used amounts:

ANTI-REDEPOSITION AGENT(S)

[0131] The cleaning composition of the present invention may optionally comprise one or more anti-redeposition agent(s) as at least one further ingredient.

[0132] The main function of anti-redeposition agents is the aid to prevent the soil from redepositioning on the washing substrate when a washing liquor provides insufficient soil anti-redeposition capacity.

[0133] Anti-redeposition agent(s) can provide their effect by becoming adsorbed irreversibly or reversibly to the soil particles or to the substrate. Thereby the soil becomes better dispersed in the washing liquor or the substrate is occupied with anti-redeposition agent(s) on those places the soil could redeposit.

[0134] The anti-redeposition agent(s) that are known to be used in cleaning compositions besides CMC include, but are not limited to, polyester-PEG co-polymer, polyvinyl pyrrolidone based polymers etc..

ANTI-COROSSION AGENT(S)

[0135] The cleaning composition of the present invention may optionally comprise one or more anti-corrosion agent(s) as one further ingredient.

[0136] The main function of anti-corrosion agents is to minimize the amount of material damage caused during laundry or automatic dishwashing.

[0137] Glass corrosion occurs because metal ions are dissolved out of the glass surface. This occurs more intensively when soft tap water is used for the cleaning. In this case the builders and complexing agents can only bind a limited amount of hardness ions from the tap water and extract then (alkaline earth) metals from that glass surface. Also of influence for glass corrosion are the washing temperature, the quality of the glassware and the duration of the cleaning program.

[0138] Glass corrosion becomes visible in white lines or white clouds on the glass surface. The glass corrosion damage can be repaired by replacing the extracted metal ion, however preferably the glassware can be protected against glass corrosion.

[0139] Metal corrosion occurs in many cases when oxide, sulphide and/or chlorides are present in the washing liquid, which normally is a mixture of tap water, soil and a cleaning composition. The anions react with the metal or metal alloy surface of articles or the washing drum that are contained in the (dish)washing machine. In the case of silver the silver salts which are formed give a discoloration of the silver metal surface which becomes visible after one or more cleaning cycles in an automatic dishwashing machine.

[0140] The occurrence of metal corrosion can be slowed down or inhibited by use of detergent ingredients that provides the metal with a protective film or ingredients forming compounds with the oxide, sulfide and/or chlorides to prevent them from reacting with the metal surface.

[0141] The protective film can be formed because the inhibitor ingredient may become insoluble on the metal or metal alloy surface, or because of adsorption to the surface by aid of free electron pairs of donor atoms (like N, S, O, P). The metals can be silver, copper, stainless steel, iron, etc.

[0142] The types of anti corrosion agents which often are used in cleaning compositions or which are described in literature include, but are not limited to, triazole-based compounds (like tolyltriazole and 1,2,3-benzotriazole), polymers with an affinity to attach to glass surfaces, strong oxidizers (like permanganate), cystine (as silver-protector), silicates, organic or inorganic metal salts, or metal salts of biopolymers. The metal of these metal salts can be selected from the group aluminum, strontium, barium, titanium, zirconium, manganese, lanthanum, bismuth, zinc, wherein the latter two are most commonly applied for the prevention of glass corrosion. Further compounds to be added e.g. are manganese compounds as described e.g. in WO2005/095570.

SILVER PROTECTING AGENTS

[0143] The cleaning composition of the present invention may optionally comprise one or more silver protecting agent(s) as one further ingredient.

[0144] Several silver protection agents that reduce silver corrosion have been described in the patent literature. The British patent GB 1131738 discloses dishwashing agents which use benzotriazoles as a corrosion inhibitor for silver. Benzotriazoles in the context of silver corrosion protection are also disclosed in the U.S. patent 2,549,539 and the European patents EP 135 226 and EP 135 227.

[0145] Another group of compounds used as silver corrosion protection agents comprises manganese salts or manganese complex compounds. The German patent number DE 4315397 discloses organic and anorganic redox compounds containing manganese(II) compounds, e.g. manganese(II)sulfate, manganese(II)acetoacetate and manganese(II)acetylacetonate. These low valent manganese compounds preferably have to be coated prior to their use in cleaning compositions containing bleaching agents in order to avoid their oxidation or decomposition during storage. EP 530 870 A1 discloses dinuclear manganese complexes in machine dishwashing compositions, wherein the manganese is in the III or IV oxidation state. EP 697 035 A1 describes automatic dishwashing compositions comprising at least partly water-soluble metal salts and/or metal complexes comprising manganese salts or complexes.

[0146] Examples of further corrosion inhibitors or anti-tarnish aids are paraffin oil, typically a predominantly branched aliphatic hydrocarbon having a number of carbon atoms in the range of from about 20 to about 50; preferred paraffin oil is selected from predominantly branched C 25-45 species with a ratio of cyclic to noncyclic hydrocarbons of about 32:68. A paraffin oil meeting those characteristics is sold by Wintershall, Salzbergen, Germany, under the trade name WINOG 70. When present, such protecting materials are preferably incorporated at low levels, e.g., from about 0,01 wt.-% to about 5 wt.-% of the automatic dishwashing composition.

[0147] Other corrosion inhibitor compounds include benzotriazole, tolyltriazole and comparable compounds; mercaptans or thiols including thionaphtol and thioanthranol; and finely divided Aluminium fatty acid salts, such as aluminium tristearate. The formulator will recognize that such materials will generally be used judiciously and in limited quantities so as to avoid any tendency to produce spots or films on glassware or to compromise the bleaching action of the compositions. For this reason, mercaptan anti-tarnishes which are quite strongly bleach-reactive and common fatty carboxylic acids which precipitate with calcium in particular are preferably avoided.

DYES

[0148] The composition of the present invention may optionally comprise one or more dyes as at least one further ingredient. The dye is used to colour the cleaning composition, parts of the composition or speckles in the composition. This might render the product more attractive to the consumer.

[0149] Dyes that can be used in cleaning compositions include, but are not limited to, Nylosan yellow N-7GL, Sanolin brilliant flavine 8GZ, Sanolin yellow BG, Vitasyn quinoline yellow 70, Vitasyn tartrazine X90, Puricolor yellow AYE23, Basacid yellow 232, Vibracolor yellow AYE17, Simacid Eosine Y, Puricolor red ARE27, Puricolor red ARE14, Vibracolor red ARE18, Vibracolor red ARE52, Vibracolor red SRE3, Basacid red 316, Ponceau SX, Iragon blue DBL86, Sanolin blue EHRL, Sanolin turquoise blue FBL, Basacid blue 750, Iragon blue ABL80, Vitasyn blue AE90, Basacid blue755, Vitasyn patentblue V 8501, Vibracolor green AGR25. These dyes are available at the firms Clariant or BASF.

PERFUMES

[0150] The composition of the present invention may optionally comprise one or more perfumes as at least one further ingredient. The perfume is added to the cleaning composition to improve the sensorial properties of the product or of the machine load after cleaning.

[0151] The perfume can be added to the cleaning composition as a liquid, paste or as a co-granulate with a carrier material for the perfume. To improve the stability of the perfume it can be used in an encapsulated form or as a complex like for example a perfume-cyclodextrine complex.

[0152] Also perfumes that have a deodorizing effect can be applied. Such perfumes or raw materials encapsulate malodours by binding to their sulphur groups.

Claims

1. A detergent package comprising

(i) a cardboard container having an upper top surface (1), a bottom (2) and at least three side surfaces, wherein on one of said side surfaces (3) a handle (4) is provided, wherein said handle (4) is made of cardboard and spans at least the half of the length of said side surface (3), and
(ii) a detergent or cleaning composition including at least one type of a builder, at least one type of a non-ionic and/or anionic surfactant and at least one enzyme.

2. A detergent package comprising

(iii) a cardboard container having an upper top surface (1), a bottom (2) and at least three side surfaces, wherein on one edge (E) of the container a handle (4) is provided, wherein said handle (4) is made of cardboard and spans at least the half of the length of said edge (E), and
(iv) a detergent or cleaning composition including at least one type of a builder, at least one type of a non-ionic and/or anionic surfactant and at least one enzyme.

3. Detergent package of claim 1 or 2, wherein said handle (4) of the cardboard container is prepared of the same material as the remainder of said container.

4. Detergent package according to any of claims 1 to 3, wherein said handle (4) is integrally formed as part of the cardboard cut in the form of the container.

5. Detergent package according to any of claims 1 to 3, wherein said handle (4) is separately formed and applied on one surface (3) of the container by means of an adhesive, a fixing material or fixing device.

6. Detergent package of any of the preceding claims, wherein at least one of the following features is fulfilled:

(i) the handle (4) spans at least 60% of the length of said side surface (3) or said edge (E), respectively, preferably at least 75%, more preferred at least 85%, most preferred at least 90% of the length of the side surface (3) or edge (E),
(ii) the handle (4) is provided adjacent to said side surface (3) and can be fold up for usage,
(iii) the handle (4) is provided adjacent to a front or back side surface (3" or 3"') and can be fold up for usage,
(iv) the opening for inserting the hand (O) in the fold up handle (4) is positioned essentially in the middle of the length of said side surface (3) or said edge (E), respectively,
(v) the opening for inserting the hand (O) in the fold up handle (4) is positioned essentially in the middle of the length and width of said side surface (3),
(vi) the handle (4) has sloped and/or rounded handle edges (5) at its ends.

7. Detergent package of any of claims 1 or 3 to 6, wherein the cardboard container has an opening or a means for preparing an opening (7)

(i) at the top surface (1), or
(ii) at the upper region of a side surface (3') opposing the surface (3) providing the handle (4), or
(iii) at the upper region of an opposing edge (6) opposing the surface (3) providing the handle (4),

said opening allowing taking out or discharging the detergent or cleaning composition from said container.

8. Detergent package of any of claims 2 to 6, wherein the cardboard container has an opening or a means for preparing an opening (7)

(i) at the top surface (1), or
(ii) at the upper region of a side surface (3') opposing the edge (E) providing the handle (4),

said opening allowing taking out or discharging the detergent or cleaning composition from said container.

9. Detergent package of any of the preceding claims, wherein said cardboard container is prepared from corrugated cardboard or a cardboard laminate, comprising at least two layers of paper, paperboard or cardboard and at least one layer serving as a moisture barrier or vapor barrier.

10. Detergent package of claim 9, wherein said moisture barrier or vapor barrier is made of or comprises at least one of: (i) a wax compound, (ii) a surfactant, in particular a surfactant solid 20°C (iii) a polymer, (iv) a triazine-containing compound; (v) a nano-cellulose material; (vi) a nanoclay material; and/or (vii) an inorganic oxide material, or is an oiled paper, wherein presence of at least one of compounds (i), (ii) or (iii) is preferred, most preferred the moisture barrier is a polymer film, in particular a polyethylene film.

11. Detergent package of any of the preceding claims, wherein said detergent or cleaning composition is a laundry composition or a dishwashing composition, like an automatic dishwashing composition.

12. Detergent package of any of the preceding claims, wherein the detergent or cleaning composition is on particulate, granulate or powder form.

13. Detergent package of any of the preceding claims, wherein said detergent or cleaning composition comprises 0,1 - 90 wt.-% builder, 0,1 - 30 wt.-% anionic and/or nonionic surfactant, preferably low-foaming non-ionic surfactant, 0 - 40 wt.-% of sodium percarbonate or sodium perborate, an enzyme, and 0,1 - 20 wt.-% of a polymer based on the entire cleaning composition.

14. Detergent package of any of the preceding claims, wherein said detergent or cleaning composition further comprises at least one component selected from (i) a metal-containing bleach catalyst, preferably selected from cobalt (Co) containing or manganese (Mn) containing bleach catalysts, more preferred MnTACN, (ii) a bleaching compound, (iii) a bleach activator.

15. A cardboard container as defined in any of claims 1 to 9, cut from one piece of a corrugated cardboard or cardboard laminate panel having a thickness of from 1 to 5 mm.

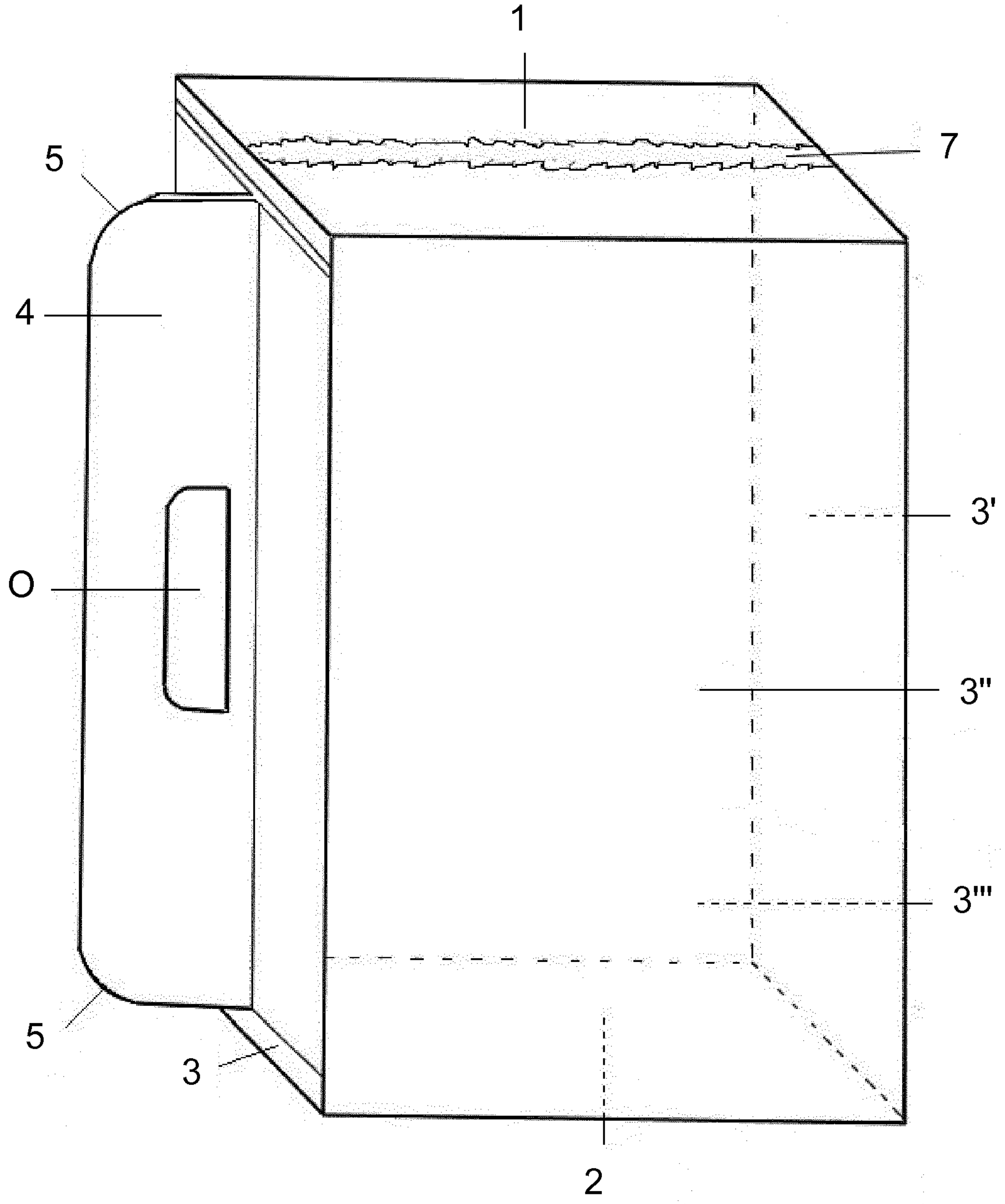

Fig. 1

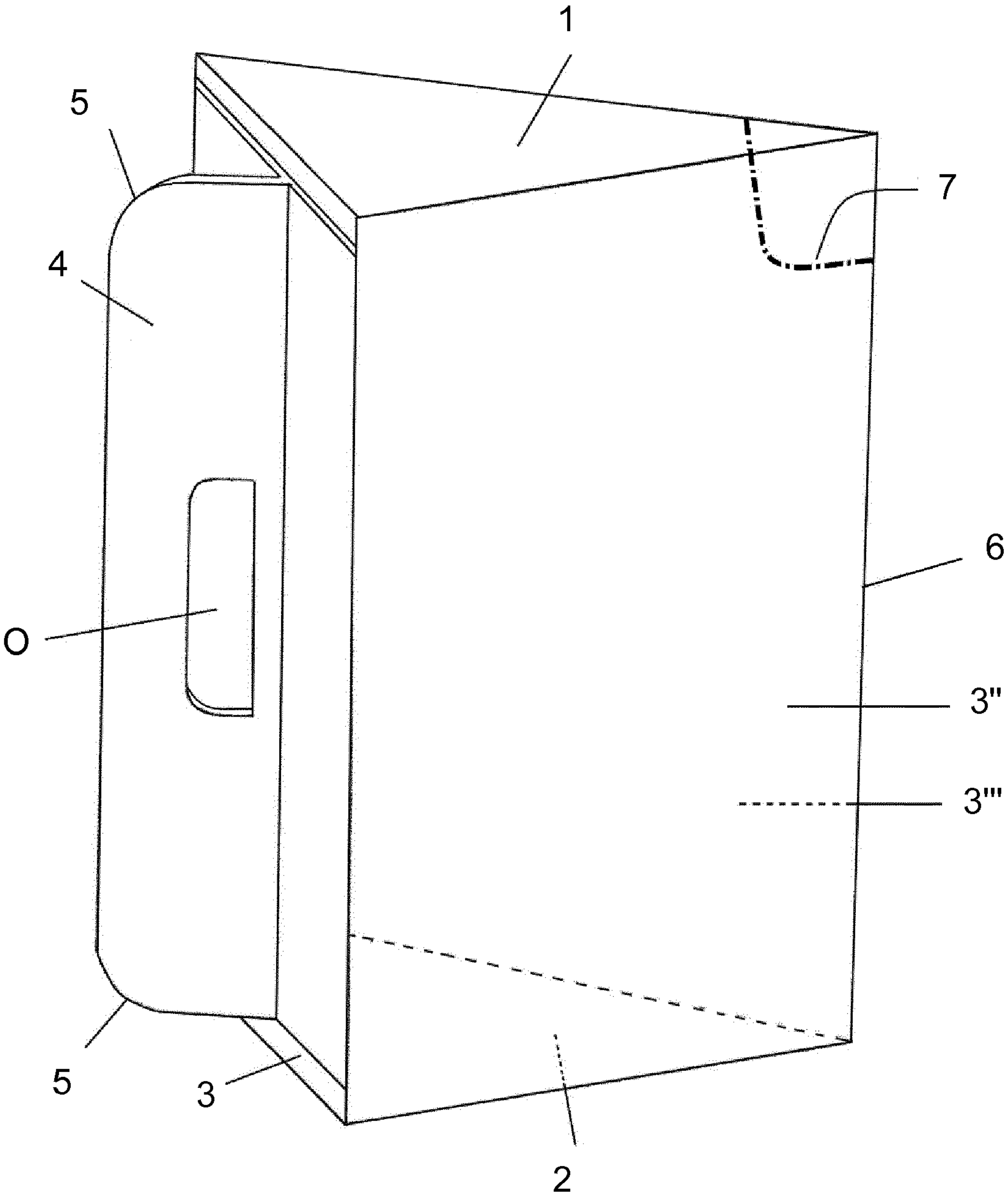

Fig. 2

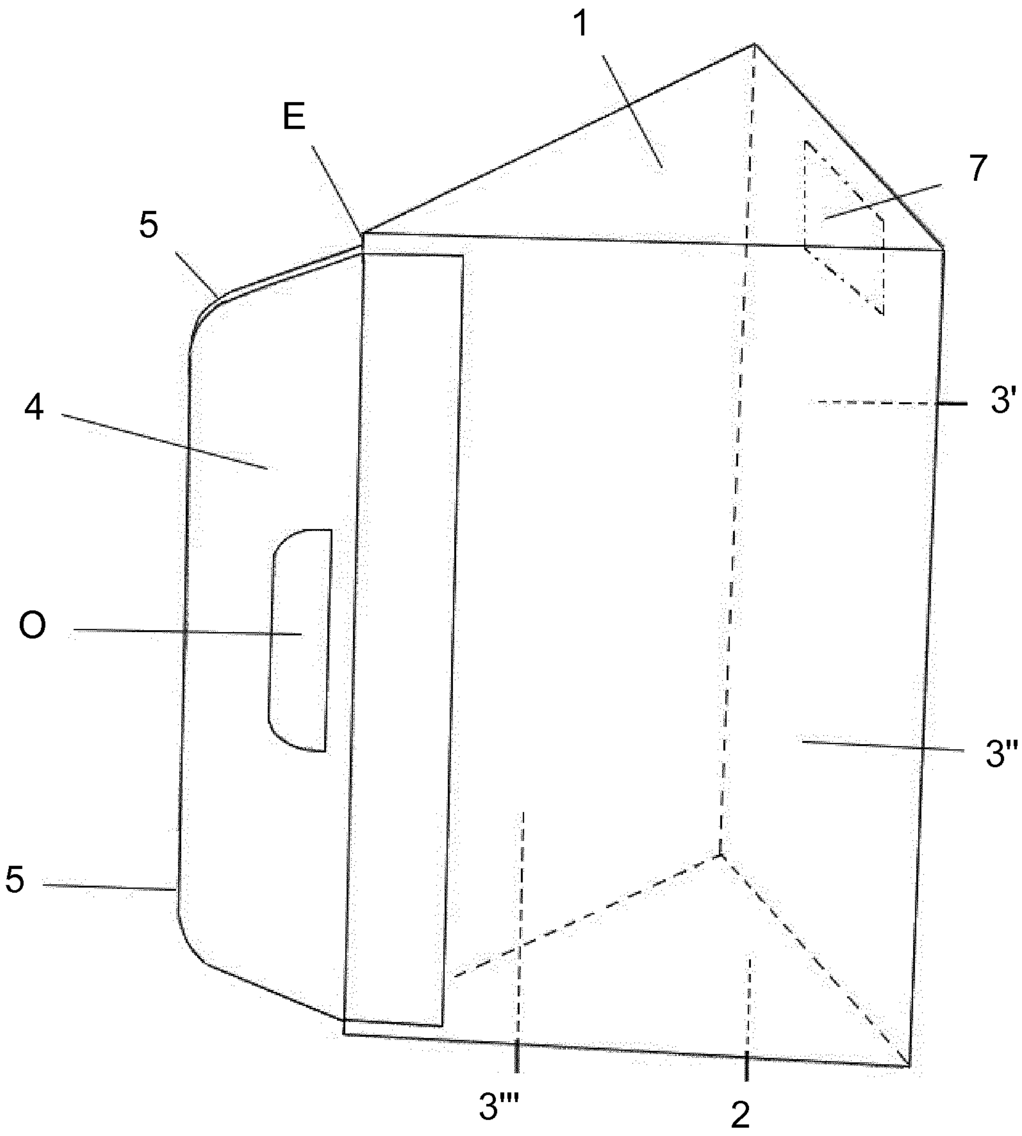

Fig. 3

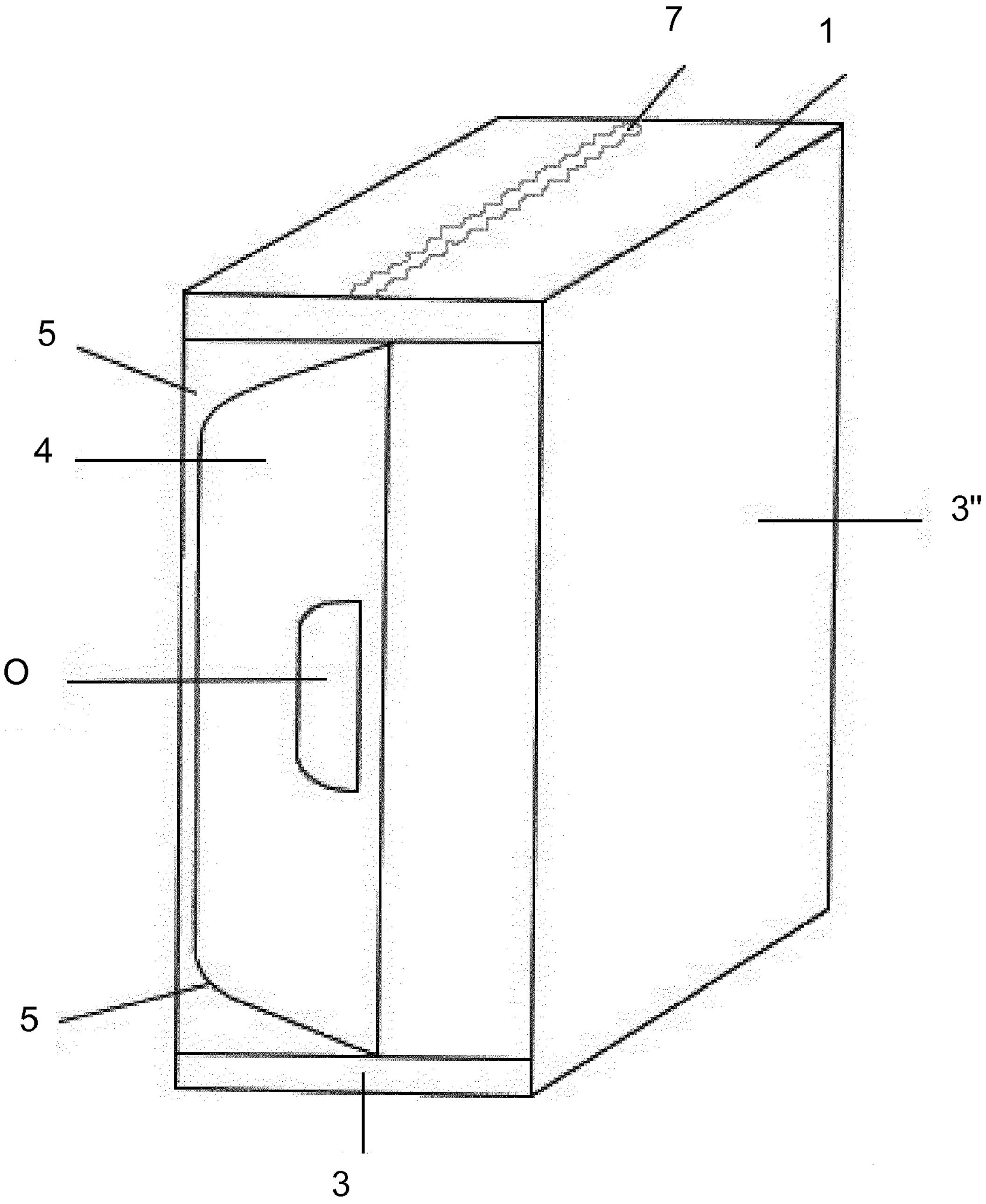

Fig. 4a

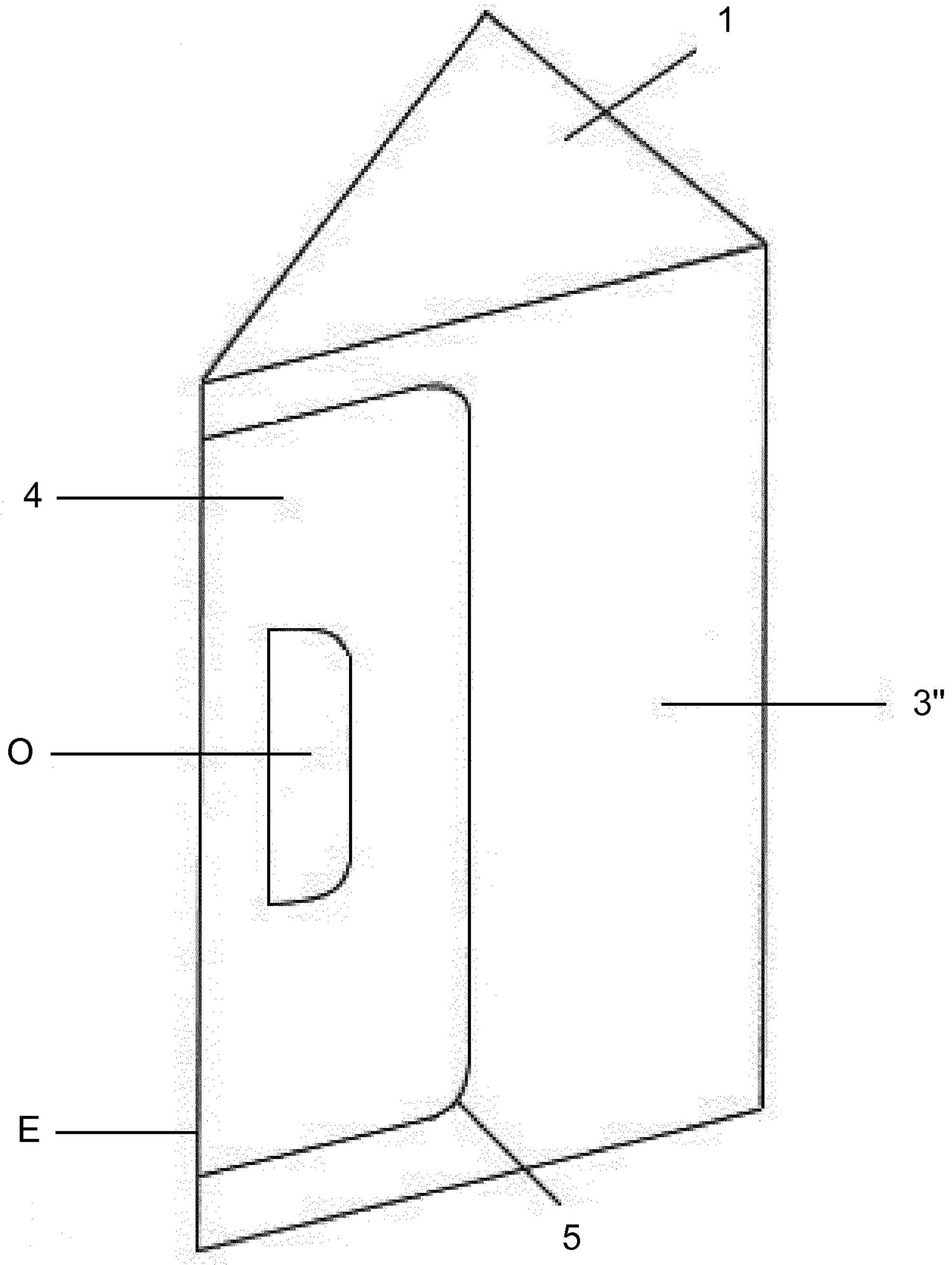

Fig. 4b

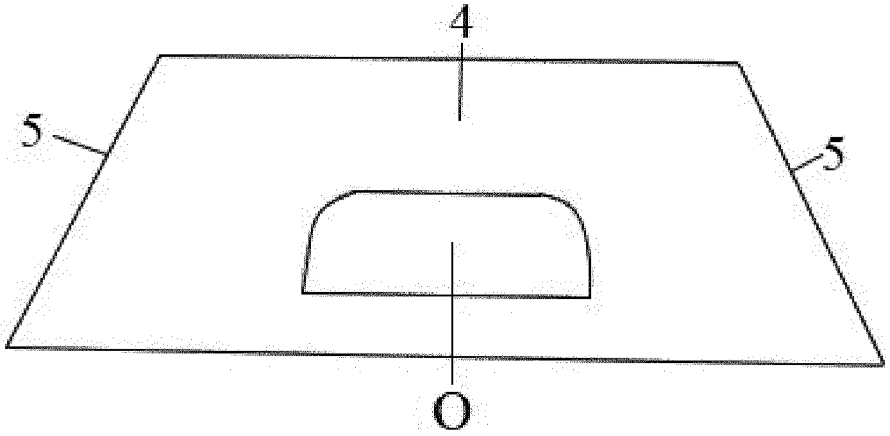

Fig. 5a

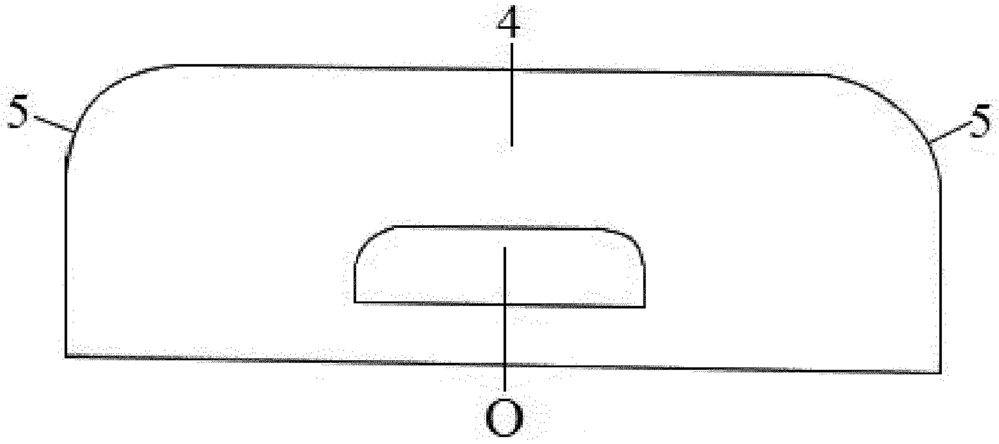

Fig. 5b

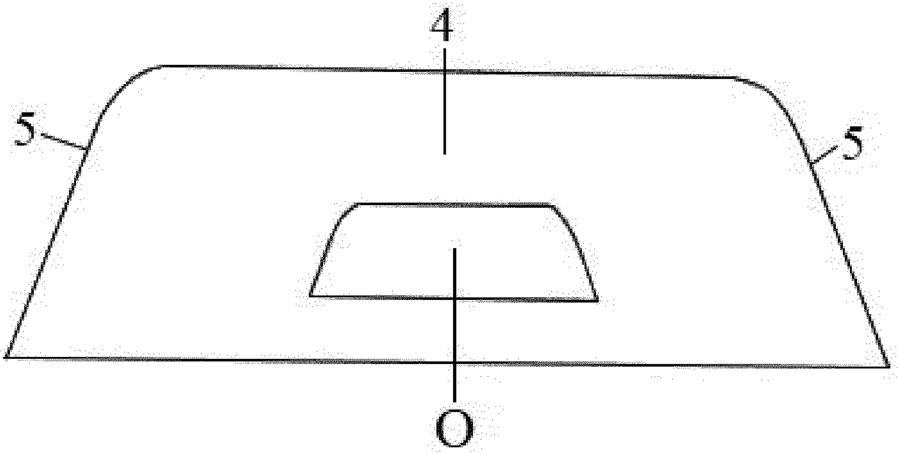

Fig. 5c

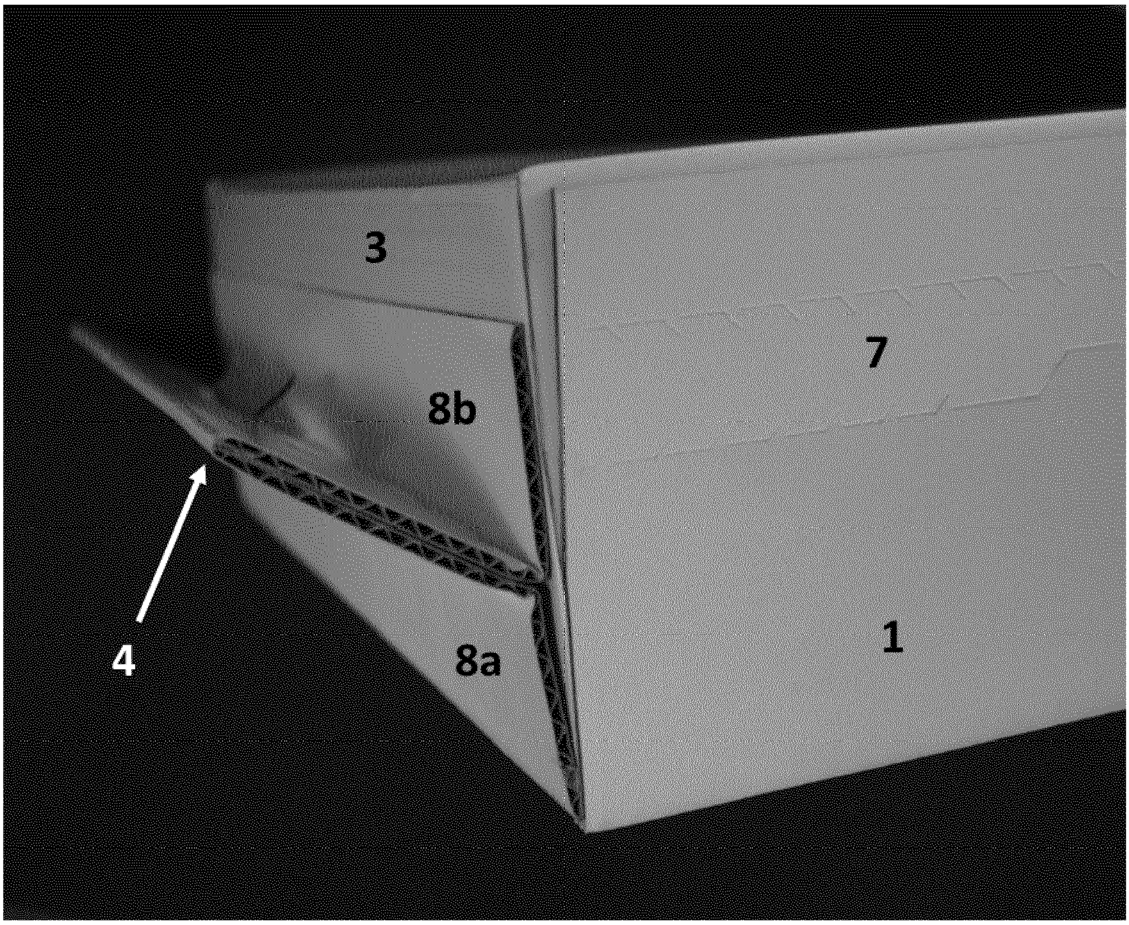

Fig. 6

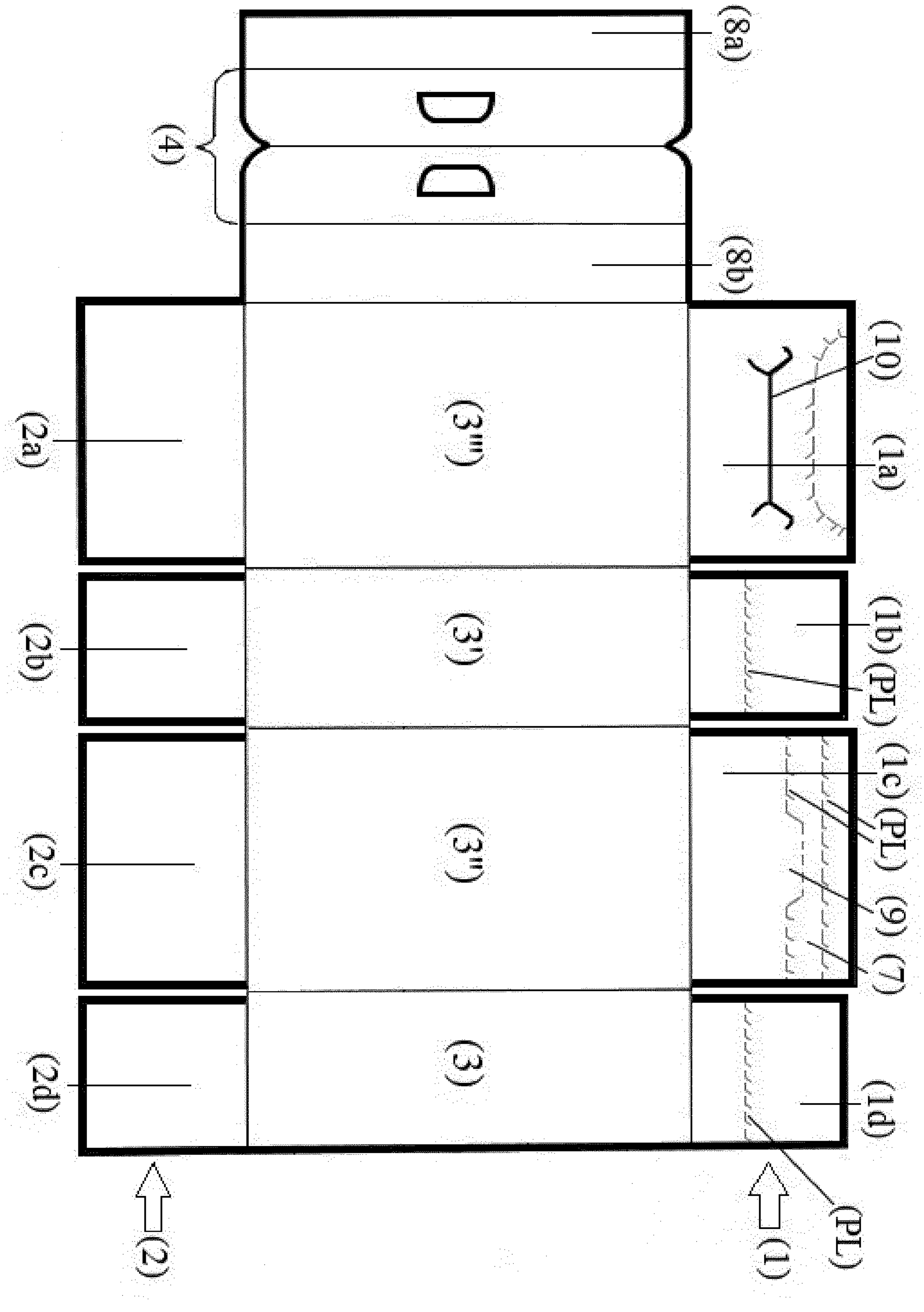

Fig. 7

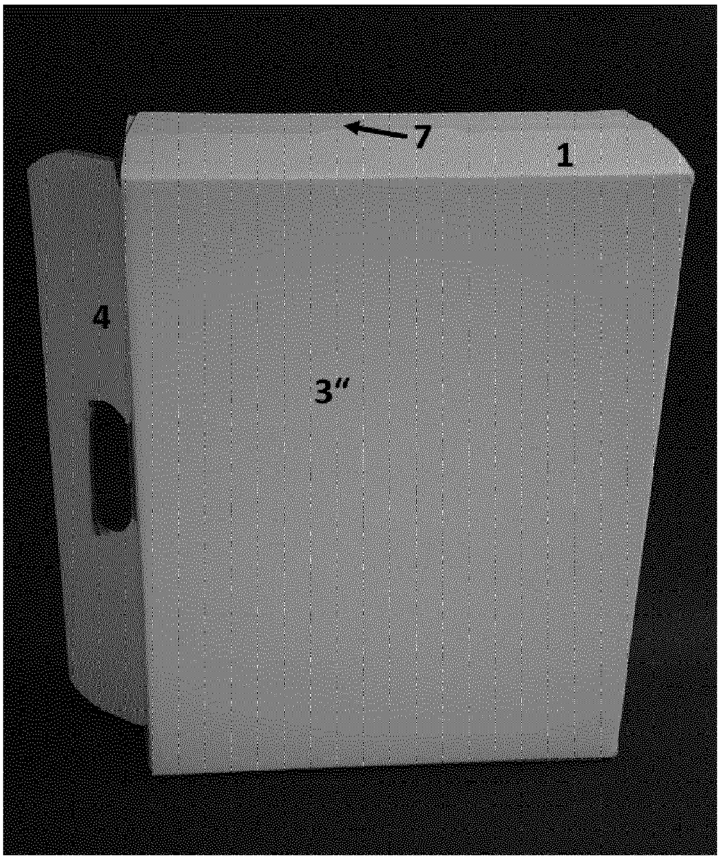

Fig. 8a

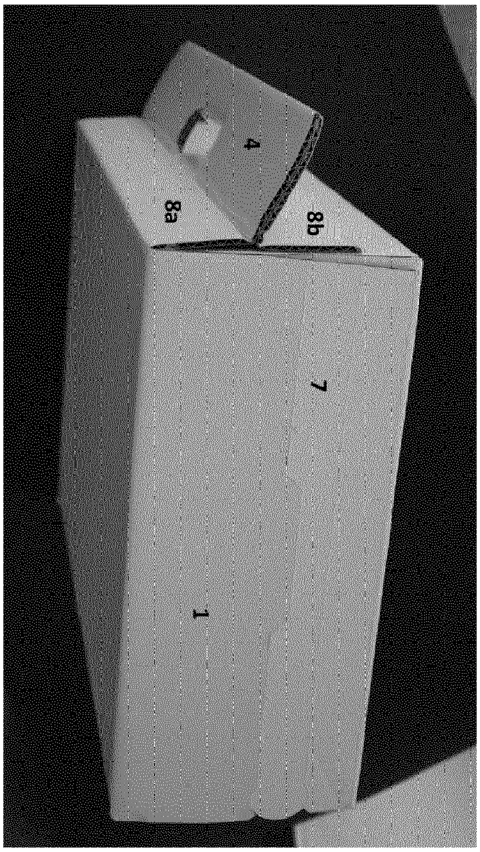

Fig. 8b

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EUROPEAN SEARCH REPORT

Application Number
EP 19 18 1600

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X,D	DE 24 59 705 A1 (CASIMIR KAST FA) 1 July 1976 (1976-07-01) * claims 1-10; figures 1-3 * -----	1-15	INV. C11D1/02 C11D1/66 C11D1/83 C11D3/386 C11D17/04 B65D5/46
A,D	DE 42 22 531 A1 (WOLFENSBERGER AG [CH]) 21 January 1993 (1993-01-21) * claims 1-5; figure 1 * -----	1-15	
A	EP 3 153 425 A1 (PROCTER & GAMBLE [US]) 12 April 2017 (2017-04-12) * whole document * -----	1-15	
A	US 2013/292279 A1 (BENGTSSON BRUCE [US] ET AL) 7 November 2013 (2013-11-07) * claim 1 * -----	9,10	
A	US 5 832 869 A (FRANCZAK RICHARD M [US] ET AL) 10 November 1998 (1998-11-10) * claim 6 * -----	10	
A	US 2012/006818 A1 (FESTER TOM [US] ET AL) 12 January 2012 (2012-01-12) * paragraph [0002]; claim 20 * -----	10	**TECHNICAL FIELDS SEARCHED (IPC)** C11D B65D
A,D	FR 2 634 456 A1 (NICOLLET HUGUES SA [FR]) 26 January 1990 (1990-01-26) * figures 1-4 * -----	1	
A,D	EP 0 530 870 A1 (UNILEVER NV [NL]; UNILEVER PLC [GB]) 10 March 1993 (1993-03-10) * claims 1-10 * -----	13,14	

The present search report has been drawn up for all claims

1

Place of search	Date of completion of the search	Examiner
The Hague	2 December 2019	Richards, Michael

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO.

EP 19 18 1600

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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02-12-2019

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 2459705 A1	01-07-1976	NONE	
DE 4222531 A1	21-01-1993	CH 684638 A5 DE 4222531 A1	15-11-1994 21-01-1993
EP 3153425 A1	12-04-2017	EP 3153425 A1 US 2017096250 A1 WO 2017062560 A1	12-04-2017 06-04-2017 13-04-2017
US 2013292279 A1	07-11-2013	US 2013292279 A1 WO 2013166285 A1	07-11-2013 07-11-2013
US 5832869 A	10-11-1998	NONE	
US 2012006818 A1	12-01-2012	CA 2745548 A1 US 2012006818 A1	08-01-2012 12-01-2012
FR 2634456 A1	26-01-1990	NONE	
EP 0530870 A1	10-03-1993	AU 645440 B2 BR 9203271 A CA 2076297 A1 DE 69222250 D1 DE 69222250 T2 EP 0530870 A1 ES 2107495 T3 JP H0774359 B2 JP H06287600 A NZ 244020 A US 5246612 A ZA 9206326 B	13-01-1994 30-03-1993 19-02-1994 23-10-1997 08-01-1998 10-03-1993 01-12-1997 09-08-1995 11-10-1994 26-08-1994 21-09-1993 21-02-1994

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

REFERENCES CITED IN THE DESCRIPTION

Patent documents cited in the description

- DE 2459705 A1 **[0004]**
- DE 7441985 U1 **[0004]**
- FR 2634456 A1 **[0005]**
- DE 4222531 A1 **[0005]**
- EP 634333 A1 **[0006]**
- EP 1524313 A **[0073]**
- US 4430243 A **[0115]**
- US 5246621 A **[0116]**
- US 5244594 A **[0116]**
- EP 549272 A **[0116]**
- US 4246612 A **[0117]**
- US 5227084 A **[0117]**
- US 5194416 A **[0117]**
- US 5114606 A **[0118]**
- US 5114611 A **[0119]**
- WO 2005095570 A **[0142]**
- GB 1131738 A **[0144]**
- US 2549539 A **[0144]**
- EP 135226 A **[0144]**
- EP 135227 A **[0144]**
- DE 4315397 **[0145]**
- EP 530870 A1 **[0145]**
- EP 697035 A1 **[0145]**