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(54) **CHILDPROOF PACKAGE UNIT**

(57) A Package unit comprising (i) a cardboard container having an upper top surface (1), a bottom (2) and at least three side surfaces (3), wherein at one of said top (1) or side surfaces (3) a childproof closure (4) is provided, wherein said closure (4) is made of cardboard and is slidely movable between a position closing the container and a position providing an opening (0) allowing the removal, discharge, pouring or taking out of the content of said container, and (ii) shaped or granular item(s), comprising a detergent or cleaning composition, or a water softener composition

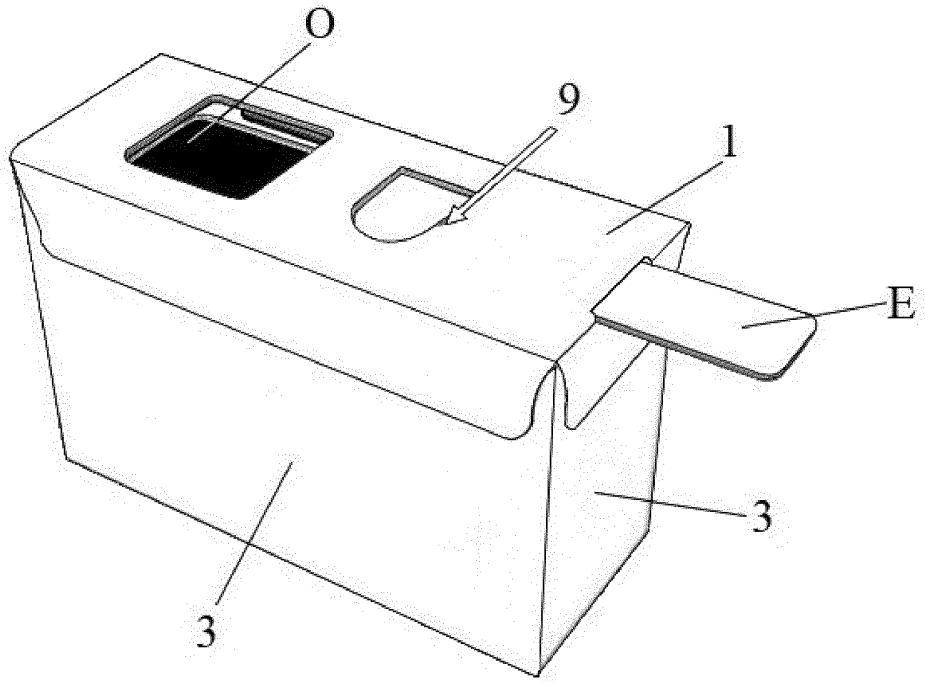

Fig. 2

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Description

[0001] The present invention refers to a package unit comprising shaped or granular item(s) and a cardboard container having a childproof closure to avoid that children have undesired access to said item(s).

[0002] Detergent compositions or water softener compositions commonly comprise a variety of components which are to be avoided to have contact with human skin, eyes or mucosa. During the last years an increasing consumer interest could be seen to use pre-portioned quantities of consumer products like e.g. detergent or cleaning compositions to avoid incorrect dosing or unneeded high amounts of said product. To comply with this desire pre-dosed portions of detergent compositions commonly are offered in form of a tablet, a pouch, a sachet or similar, wherein said portions may comprise one, but also two, three or more different partial compositions provided as separate layers or regions of a tablet or in separate chambers of a pouch or sachet.

[0003] To provide - besides handling comfort and reliable dosing - an attractive appearance to said pre-dosed portions the producers tend to give the portioned (partial) compositions a special design or shape. This, however, also piques children's curiosity and children are interested in touching and tasting the sometimes nicely colored small packages or tablets.

[0004] To meet this problem there are several approaches provided by the producers to prevent children from coming in undesired contact with harmful compounds. Most of the package systems including childproof closure systems involve plastic materials offering relatively reliably locking systems. However, due to increasing awareness of environmental problems the requirement to save plastic materials in consumer goods is coming to the force.

[0005] The state of the art provides also childproof packages made of cardboard, in particular in the area of packaging pharmaceutical tablets. Most of these childproof systems are working with the principle of a "locked drawer", thus, an arresting block has to be unlocked by one or two fingers to pull a drawer out of a cover. Such systems are described e.g. in EP1 002 744 A1, US 7,090,079 B2, WO 2005/049437 A1 and US 5,275,291.

[0006] The principle of a drawer, however, are for larger systems like the packaging of detergent compositions not very comfortable and further quite material-consuming.

[0007] A similar solution for detergent unit doses describes Anne M. Mohan in the article "keeping kids safe from single-dose detergent packets", published on the Packaging Word Web site on March 6, 2017, wherein a tear-resistant outer carton has a locking blister-tray inside. The blister-tray is kept inside by engaging hooks and slots. By pressing said hooks near opposite corners of the package the blister-tray can be pulled out from the carton.

[0008] In all the before-mentioned solutions at least a part of the packaging system is still made of plastic material, e.g. the blister trays inside the package, further all of said packages realize a principle wherein much packaging material is needed.

[0009] Thus, it was an object of the present invention to provide a package for shaped or granular items avoiding as far as possible any plastic material, providing a childproof closure to bar children from contact with said items without making production and / or handling of said package and its content too difficult or extensive.

[0010] This object is met by a package unit comprising (i) a cardboard container having an upper top surface (1), a bottom 2) and at least three side surfaces (3), wherein on one of said top (1) or side surfaces (3) a childproof closure (4) is provided, wherein said closure (4) is made of cardboard and is slidely movable between a position closing the container and a position providing an opening (O) allowing the removal, discharge, pouring or taking out of the content of said container, and (ii) shaped or granular items, comprising (a) a detergent or cleaning composition, or (b) a water softener composition.

[0011] The package container is prepared essentially as a whole from cardboard, paperboard and/or paper. Preferably the container 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.

[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 further may optionally comprise a vapor or moisture barrier layer.

[0014] 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.

[0015] 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.

[0016] 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 container 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

[0017] 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.

[0018] 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.

[0019] 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.

[0020] 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.

[0021] 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.

[0022] 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.

[0023] 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.

[0024] 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.

[0025] The thickness of the cardboard (laminate) including the (preferably corrugated) cardboard and the optional vapor/moisture barrier layer preferably should be in the range from 0,5 mm to 3 mm to provide suitable stability to said container, more preferred 0,8 mm to 2,5 mm, even more preferred 1 mm to 2 mm.

[0026] According to the invention the cardboard container comprises a top surface (1), a bottom (2) and at least three, preferably at least four side surfaces (3) and a closure (4) slidely movable between a position closing the container and a position providing an opening (O), see FIG. 1 and Fig. 2.

[0027] Preferably the cardboard container comprises a main container body which is preferably folded from one continuous piece of a cardboard panel, cut in a form allowing the folding into the container main body of the present invention. Said container main body has at least three, preferably four side surfaces (3) an upper surface (11) and a

bottom (2). In a particularly preferred embodiment said upper surface (11) comprises a perforation or pre-cut for an opening (O1), which can be removed by pushing it so that opening (O1) is obtained. In FIG. 3a an embodiment is shown wherein said container main body has only one flap representing upper surface (11). The main body may have two overlapping flaps (11a, 11b) providing together surface (11), wherein one of it (11a) has said perforation or pre-cut for said opening (O1) and the other one (11b) has a punched hole (12) corresponding in size and position to openings (O) and (O1) (FIG. 3b), or is shorter in length (FIG 4a) or width (FIG. 4b), so that the area below the perforation or pre-cut for said opening (O1) is kept free from container material. Said perforation or pre-cut for opening (O1) serves as a proof for non-use of the package, thus, the consumer can be sure that the package comprises all of and only those items originally filled in by the producer.

[0028] In another embodiment said main body of the container comprises only one flap representing an upper surface (11) which is not fully spanning the length of the container, so that the area below punched hole (8) / opening (O) of the top surface (1) is free of cardboard material. In still another embodiment said main body of the container comprises an upper surface (11) which is not fully spanning the width of the container, so that the area below punched hole (8) / opening (O) of the top surface (1) is free of cardboard material, e.g. surface (11) is provided by two small flaps supporting the closure (4) / top surface (1), however, leaving the area below punched hole (8) / opening (O) free of cardboard material. In these embodiments a "non-use proof" may be realized e.g. by applying a paper strip on top surface (1) spanning at least embossment (6) and punched hole (8).

[0029] The cardboard container further comprises a top surface (1) having at least two punched holes (8, 9) and further preferably a passage (10) allowing a terminal end (E) of the flat panel (5) of closure (4) to move through said passage (10) in an outward direction to allow movement of the closure (4) (FIG, 5). In a preferred embodiment the punched holes (8, 9) are lying "in-line" in a direction of movement of closure (4), i.e. both punched holes (8, 9) are positioned in the plane area of top surface (1), not on the edges.

[0030] As a further component the cardboard container comprises a closure (4), comprising a flat panel (5) having on one surface at least two embossments (6, 7) which are shaped in a form so that they fit into the punched holes (8, 9) of the top surface (1) to close the container. Further said flat panel (5) has a front end (F) which is close to embossment (6) and an opposing terminal end (E), which is the end farest away from embossment (6), Said closure is mounted slidably movable below said top surface (1), or "sandwiched" between the upper surface (11) of the main body and top surface (1) in an orientation so that in the "closed " position the embossments (6, 7) fill the punched holes (8, 9). Between the front end (F) and terminal end (E) the flat panel (5) preferably includes a stop element (S), e.g. a shoulder, avoiding that said closure (4) is moved / pulled out too far from the container. A suitable embodiment of such a closure (4) is shown in FIG. 6 and FIG. 7.

[0031] The top surface (1) may be an integral part of the continuous panel cut in form of the container main body, however, preferably is an independent panel cut in a suitable shape to fit on top of the container main body and to be fastened in its position. Said top surface panel is preferably applied to the main body in a distance allowing to "sandwich" the closure (4) between surface (11) of the main body and said top surface (1), so that closure (4) after pushing the embossments (6, 7) is slidely movable between said surfaces. In a preferred embodiment at least one of the side surfaces (3) provides at the edge between the upper surface (11) and said side surface (3) at least one suitable small bulge (B) ensuring said distance between said upper surface (11) and said top surface (1) when it is placed and combined with said container main body by means of an adhesive, fixing material or fixing device.

[0032] It is possible that all parts of the container of the present invention, i.e. said main body, said independent top surface (1) and said closure (4), are made from the same cardboard material. It is, however, also possible to prepare the main body of the container from a cardboard material comprising said moisture barrier, wherein said independent top surface (1) and/or said closure (4) are made of a cardboard panel (having preferably similar thickness and construction), having no moisture barrier included. Due to environment protection and cost advantages the last embodiment might be preferred.

[0033] In all described embodiments of the cardboard container punched hole (8) is closed by embossment (6) when the closure (4) is fully inserted into the container, thus lying with its full length directly below surface (1), or between surface (1) and surface (11). This is described as the "closed" position. If the closure (4) is moved laterally in an outward direction, so that its terminal end (E) leaves the container, e.g. by passing through passage (10), said punched hole (8) represents opening (O), which allows the removal, discharge, pouring or taking out of the content comprised in said container. Indeed, it is to be understood that opening (O1) or the perforation / precut for opening (O1) is placed in accordance with opening (O), thus, any content removed, discharged, poured or taken out from the container is passing both openings placed at the similar position. The position where embossment (6) of closure (4) is not engaging with punched hole (8), but leaves said hole open to provide opening (O), is defined as the "open" position.

[0034] A similar construction as what is described above as being realized at the "top surface (1)" also can be positioned accordingly at any of the "side surfaces (3)", meaning that the closure (4) is not placed on top of the container, but at one of the side surfaces, however, has the equivalent construction.

[0035] With "top surface" a surface is meant being at the uppermost end of the container when said container is placed

(stored) as usual for using it. 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 / container is placed (e.g. for storage) on a surface.

[0036] It is preferred according to the invention that the punched holes (8, 9) are spaced apart from each other by a distance (D) of at least 1 cm, preferably at least 1,5 cm, more preferred at least 2 cm, even more preferred at least 2,5 cm, said distance (D) is measured from one border of punched hole (8) to the closest boarder of punched hole (9). Accordingly, embossments (6, 7) are also spaced apart from each other by distance (D).

[0037] Further, punched hole (8), providing opening (O) in the "open" position of closure (4), has a form and diameter suitably adapted to the size and or form of the content of the package container. The form and diameter of punched hole (8) / opening (O) can be selected either to allow the content, e.g. a shaped item, to fall out unhindered, if the container is turned accordingly, or it might be selected in a way allowing the shaped item to enter opening (O), but not to fall out without some help by the consumer. If, for example, the shaped item is a pouch having several compartments comprising liquid and/or powdery composition(s), the punched hole (8) / opening (O) can be formed in a shape so that said pouch has to be turned and/or compressed a little bit to get it out of the opening. This can be a further hurdle for children to have access to the container content.

[0038] Nonetheless, the diameter at the smallest site of punched hole (8) / opening (O) preferably is at least 2 cm, more preferred at least 2,5 cm, even more preferred at least 3 cm, even more preferred at least 3,5 cm or even at least 4 cm or at least 5 cm, in particular if the content of the container is/are shaped item/s). It is, however, preferred according to the invention that punched hole (8) / opening (O) leaves a remainder of the cardboard material between the border of the hole (8) and the edge of top surface (1), said remainder may be represented by at least 0,3 cm, at least 0,5 cm, at least 0,8 cm, at least 1 cm, or at least 1,5 cm of cardboard material between the border of the hole and the edge of top surface (1).

[0039] The second punched hole (9) may have any form and size allowing to provide pressure on the engaging embossment (7) with at least one finder of a human hand, e.g. 2 to 4 cm at its smallest site.

[0040] It is preferred that punched hole (8) and embossment (6), or punched hole (9) and embossment (7) independently from each other have a form which can be easily cut by punching tools, thus, a circular, rectangular (optional with rounded corners), square (optional with rounded corners), oval, elliptic or any combination of these forms are preferred. Of course, the form of embossment (6) fits to punched hole (8) and the form of embossment (7) fits to punched hole (9).

[0041] It is particularly preferred that both punched holes (8, 9) are provided in the flat area of top surface (1) leaving a remainder of the cardboard material between the hole and the edge of top surface (1). This means that preferably both punched holes (8, 9) are not positioned at the edge of said surface (1).

[0042] The container can be opened by a consumer by applying simultaneously pressure to both embossments (6, 7) engaging into punched holes (8, 9) in the "closed" position, and by lateral movement of the closure (4) to one side. If the full length of the closure (4) is similar to the length of the top surface (4), one edge between top surface (4) and one side surface (3) preferably should provide a passage (10) allowing the terminal end (E) of the flat panel (5) to leave the container. The terminal end (E) of flat panel (5) protruding from the container when embossments (6, 7) are pressed down and closure (4) is moved laterally can further be used to pull the closure further out to open said opening (O) fully.

[0043] To stop the movement of the closure, thus, to avoid that said closure (4) is moved out too far, said closure preferably comprise a shoulder serving as a stop (S).

[0044] If desired, the container may comprise in at least one, preferably in at least two of its bottom flaps positioned at the inner side of the container (2a, 2c, as exemplified in FIG. 8) forming said bottom (2) punched holes (13) having any suitable size and form, which (i) don't destabilize said flap (2a or 2c) or bottom (2), (ii) allow to fix said flap (2a) / (2c) to at least one of the other bottom flaps (2b, 2d) and (iii) to provide some space for collecting optionally some fluid or liquid tickling out from any liquid-filled content, e.g. liquid-filled detergent pouches, comprised in the container of the invention. Preferably said punched holes (13) each have a length of 50% to 85%, preferably 60% to 80% of the length of the respective flap comprising said hole (13), and a width of 5 to 15% of the width of the respective flap.

FIGURES

[0045] 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 thick lines refers to cut edges, dash-dotted lines _._._._. refer to a perforation or pre-cut. Thin lines are folding lines (L).

FIG. 1 shows a cuboid container having the closure (4) on the top surface (1) in "closed" position.

FIG. 2 shows the cuboid container of FIG. 1 having the closure (4) in an "open" position.

FIG. 3 shows a cardboard panel cut in a form for folding a container main body according to the embodiment providing a surface (11). In FIG. 3a said surface (11) is provided only by one flap, in FIG. 3b said surface (11) is provided by

two flaps (11a, 11b), overlapping in the folded container.

FIG. 4 shows a cardboard panel cut in a form for folding a container main body according to the embodiment wherein surface (11b) is not spanning the whole length of the container (FIG. 4a), or not spanning the whole width of the container (FIG. 4b).

Fig. 5 shows a cardboard panel cut in a form for providing a top surface (1) as a separate component to be mounted on top of a container main body as shown in FIG. 3 or FIG. 4.

FIG. 6 shows one embodiment of a closure (4) as a separate component as a top view.

FIG. 7 shows the closure (4) as an inclined top view.

FIG. 8 shows an embodiment of a cardboard panel cut in form of the container main body, having punched holes (13) in the bottom flaps (2a, 2c) serving for collecting optionally liquid inside the container.

CONTENT OF THE CONTAINER

[0046] According to the invention the package container comprises shaped or granular item(s), selected from (a) detergent or cleaning agents or (b) water softeners.

[0047] With "shaped item" is meant that the composition is provided in form of a body, e.g. a tablet, capsule, sphere, pellets, beads, or as a pouch or sachet comprising a packaging film and a liquid, gelly, pasty or solid (e.g. in form of a powder, particles, granulate, pressed or sintered) detergent or cleaning composition. Said pouch or sachet can be provided with one compartment or with more than one compartment, wherein each of the compartments independent from each other can comprise a composition in a form as defined above. Thus, said pouch or sachet can comprise e.g. only liquid composition(s) (optionally differing from each other in their ingredients), a combination of liquid composition(s) and solid composition(s), a combination of liquid and gelly composition(s) or a combination of gelly and solid composition(s), or even a combination of liquid, gelly and solid composition(s) in different compartments. Further, a tablet, capsule, sphere, pellet or bead may also comprise different layers or areas, providing optionally different ingredients, e.g. a multi-layer body, a tablet having a mould filled with a solid, gelly or pasty composition or any of the embodiments known in the art commonly used for providing such detergent / cleaning compositions in form of shaped bodies.

[0048] Further, the content of the package container may be in "granulate form", that means that the composition can be provided as particles having a particle size in the range of from 0,1 mm to 2 mm, e.g. 0,2 to 1,5 mm, but having an "irregular shape", which means that not all the granules have the same size or shape.

DETERGENT OR CLEANING COMPOSITION (a)

[0049] The detergent or cleaning composition of the present invention is preferably a laundry cleaning composition or a dishwashing composition, more preferably a laundry or an automatic dishwashing composition. The cleaning composition can be provided in form a pouch comprising a liquid, a gel, a paste a, powder, granulates, particles, including pouches with different compartments comprising combinations of the mentioned, or as a mono-layer tablet, a multi-layer or multiphase (e.g. tab in tab) tablet, a bar or any other suitable form or combinations thereof. Particularly preferred the cleaning composition is provided in form of a pouch or a sachet comprising said composition in form a liquid, a gel, a paste a, powder, granulates, particles or combinations thereof or in form of a tablet, a sphere, a pressed, sintered or shaped body or in granulate form.

[0050] If the detergent or cleaning composition is provided in form of a pouch or sachet, it might be provided as a pouch having one compartment, two compartments, three compartments or four compartments, or even having more than four compartments, e.g. five, six, seven or more compartments, without any restriction. It is, however, preferred that said pouch or sachet comprises one to four, preferably two, three or four compartments.

[0051] Such type of pouches or sachets are known in the art and commonly are prepared by usage of a water-soluble film material, forming the compartment(s) which is/are filled with detergent compositions in liquid, gelly or solid (e.g. particulate, powder or granular) form. The compartments may comprise compositions having differing ingredients, providing together the "whole" detergent composition. Examples of suitable ingredients of the detergent composition are described below.

[0052] Suitable water-soluble film materials for forming the pouches are well known in the art and include commonly polyvinylalcohol polymer or a polyvinylalcohol copolymer.

[0053] The preferred material for making the pouch or sachet comprises water-soluble polyvinyl alcohol (including co-polymers thereof), wherein preferably the polymer present in the film is from 60 to 100%, more preferably 80% to 98%,

and most preferably 80% to 95% hydrolysed, to improve the dissolution of the material.

[0054] Suitable co-polymers include monomers of carboxylates, sulphonates and ethoxylates. Itaconic acid, acrylic acid, methacrylic acid are examples of suitable carboxylic acid, 2-acrylamido-2-methyl-1-propane sulphonic acid (AMPS) is an example of a preferred sulphonic acid.

[0055] The water-soluble film herein may comprise furter additive ingredients. For example, it may be beneficial to add plasticisers, for example glycerol, ethylene glycol, diethyleneglycol, propylene glycol, propane diol, sorbitol and mixtures thereof, additional water, disintegrating aids, fillers, anti-foaming agents, emulsifying/dispersing agents, and/or antiblocking agents. It may be useful that the pouch or water-soluble film itself comprises a detergent additive to be delivered to the wash water, for example organic polymeric soil release agents, dispersants or dye transfer inhibitors. Optionally the surface of the film of the pouch may be dusted with fine powder to reduce the coefficient of friction. Sodium aluminosilicate, silica, talc and amylose are examples of suitable fine powders.

[0056] Highly preferred for preparation of the pouches / sachets are polyvinyl alcohol films formed by extrusion, blow-extrusion, blow-molding, extrusion casting or solution casting into a thin film. Such a film is preferably 10 to 200 micrometers thick, more preferably from 40 to 100 micrometers thick. Particularly suitable commercially available films are provided under the tradename MonoSol® by MonoSol (Kuraray) company.

[0057] 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.

[0058] According to the invention the cleaning composition comprises preferably at least one type of a surfactant, preferably non-ionic and/or anionic surfactants, and an alkaline or acid compound and further preferably at least one type of a builder and/or at least one enzyme.

[0059] 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.

[0060] 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.

Surfactants

[0061] 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.

[0062] The main functions of surfactants are changing the surface tension, dispersing, foam controlling and surface modification.

[0063] 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.

[0064] 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.

[0065] 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.

[0066] 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.

[0067] 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.

[0068] 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.

[0069] 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.

[0070] 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.

[0071] 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.

[0072] 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 cleaning compositions.

Builder(s), Co-Builder(s)

[0073] The composition of the present invention preferably comprises one or more builder(s).

[0074] 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.

[0075] 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.

[0076] 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 metaphosphates. In one embodiment, the composition of the present invention comprises less than 5 wt.-% of a polyphosphate builder, based on the whole composition.

[0077] 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).

[0078] 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.-%.

[0079] 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.

[0080] 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. These builders are acid or alkaline and thus further can be used for adapting the pH of the composition.

[0081] Carbonate(s) and/or hydrogen carbonate(s), preferably alkali metal carbonate(s), particularly preferably sodium carbonate or bicarbonate, 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.

[0082] Polycarboxylates/polycarboxylic acids and phosphonates may be particularly mentioned as the organic co-builders. These classes of substances are described below.

[0083] 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.

[0084] 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.

[0085] Citric acid or salts of citric acid are used with particular preference as a builder substance.

[0086] 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.

[0087] 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.

[0088] 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.-%.

Polymers

[0089] 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.-%.

[0090] 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.

[0091] 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.

[0092] 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.

[0093] 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.

[0094] 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.

[0095] As monomers of said copolymers 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.

[0096] 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.

[0097] In the context of the sulfonic acid group-containing monomers, those of the formula $R^5(R^6)C=C(R^7)-X-SO_3H$, 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.

[0098] Among these monomers, those of the formula

$$H_2C=CH-X-SO_3H$$

$$H_2C=C(CH_3)-X-SO_3H$$

$$HO_3S-X-(R^6)C=C(R^7)-X-SO_3-H,$$

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.

[0099] Particularly preferred sulfonic acid group-containing monomers in this context are 1-acryiamido-1-propanesuifonic 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.

[0100] 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.

[0101] 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.

[0102] The use of these terpolymers has made it possible to improve the rinsing performance of automatic dishwashing agents with respect to comparable dishwashing agents that contain sulfopolymers without the addition of nonionic monomers.

[0103] 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.

[0104] 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, α-olefins 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.

[0105] 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.-%.

[0106] 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

[0107] The composition of the present invention further comprises at least one enzyme.

[0108] 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.

[0109] 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.

[0110] 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.

[0111] 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).

[0112] 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

[0113] 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.

[0114] Complexing agents are commonly used as co-builders to support the performance of the builders.

[0115] 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.

[0116] 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.

[0117] 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.

[0118] 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.

[0119] Washing- or cleaning compositions that contain 1-hydroxyethane-1,1-diphosphonic acid (HEDP) or diethylenetriaminepenta(methylenephosphonic acid) (DTPMP) as phosphonates are particularly preferred.

[0120] The cleaning compositions according to the present invention can of course contain two or more different phosphonates.

[0121] 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.-%.

[0122] 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

[0123] 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.

[0124] 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.

[0125] 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.-%.

[0126] 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.

[0127] 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.

[0128] 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 $Mn^{IV}_2(\mu\text{-}O)_3$(1,4,7-trimethyl-1,4,7-triazacyclononane)$_2$-$(PF_6)_2$ ("MnTACN"), $Mn^{III}_2(\mu O)_1(\mu\text{-}OAc)_2$(1,4,7-trimethyl-1,4,7-triazacyclononane)$_2$-$(ClO_4)_2$, $Mn^{IV}_4(\mu O)_6$(1,4,7-triazacyclononane)$_4$-$(ClO_4)_2$, $Mn^{III}Mn^{IV}_4(\mu\text{-}O)_1(\mu\text{-}OAc)_2$(1,4,7-trimethyl-1,4,7-triazacyclononane)$_2$-$(ClO_4)_3$, 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 mix-

tures of pentaamineacetate cobalt (III) nitrate and MnTACN.

[0129] 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. Preferred manganese complexes are for example $[Mn^{III}{}_2(\mu\text{-}O)_1(\mu\text{-}OAc)_2(TACN)_2](ClO_4)_2$, $[Mn^{III}Mn^{IV}(\mu\text{-}O)_2(\mu\text{-}OAc)_1(TACN)_2](BPh_4)_2$, $[Mn^{IV}4(\mu\text{-}O)_6(TACN)_4](ClO_4)_4$, $[Mn^{III}{}_2(\mu\text{-}O)_1(\mu\text{-}OAc)_2(Me\text{-}TACN)_2](ClO_4)_2$, $[Mn^{III}Mn^{IV}(\mu\text{-}O)_1(\mu\text{-}OAc)_2(Me\text{-}TACN)_2](ClO_4)_3$, $[Mn^{IV}{}_2(\mu\text{-}O)_3(Me\text{-}TACN)_2](PF_6)_2$(MnTACN), $[Mn^{IV}{}_2(\mu\text{-}O)_3(Me/Me\text{-}TACN)_2](PF_6)_2$ ($OAc=OC(O)CH_3$) and the complex of Mn^{VI} with1,2,4,7,-tetramethyl-1,4,7-triazacyclononane.

[0130] In a particularly preferred embodiment at least one metal containing bleach catalyst is MnTACN.

[0131] 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.

[0132] 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.

Dyes

[0133] 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.

[0134] 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

[0135] 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.

[0136] 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.

[0137] Also perfumes that have a deodorizing effect can be applied. Such perfumes or raw materials encapsulate malodours by binding to their sulphur groups.

[0138] In a preferred embodiment the detergent/cleaning composition comprises at least an anionic and/or nonionic surfactant as defined above and an alkaline and/or acid compound, preferably one or more of the builder compounds as cited above, more preferred sodium carbonate and/or sodium bicarbonate as an alkalic compound and/or citric acid or citrate as an acid compound.

WATER SOFTENER (b)

[0139] Typical water softener compositions comprise at least one of the compounds described above as builders, co-builders or complexing agents.

[0140] In preferred embodiments the water softener comprisesin addition to optional adjuvants and additives at least one of (a) one or more polycarboxylic acid homopolymer(s) or salt(s) thereof in an amount of 1 to 90 wt.-%, (b) one or more low molecular polycarboxylic acid(s) or salt(s) thereof in an amount of 1 to 90 wt.-%, and/or (c) one or more copolymer(s) based on maleic acid or (meth)acrylic acid or salt(s) thereof in an amount of 0.1 to 25 wt.-%.
The one or more comonomer(s) may be selected from the group comprising

i. hydrophobic monomers,
ii. hydrophobic monomers with hydrophilic groups, and
iii. hydrophilic monomers with hydrophilic groups,

or mixtures thereof.

a) "Polycarboxylic acid homopolymers" are defined as organic homopolymers of unsaturated mono, di- or polycarboxylic acids. Examples of polycarboxylic acid homopolymers in the sense of the present invention are polymers of acrylic acid, methacrylic acid, hydroxyacrylic acid, maleic acid, itaconic acid, mesaconic acid, acotinic acid, methylene malonic acid, citraconic acid. Also included by the term polycarboxylic acid homopolymers are the derivatives and/or salts thereof. The term "poly(meth)acrylic acid" includes polyacrylic acids, polymethacrylic acids as well as mixtures thereof. The molecular weight of the polycarboxylic acid homopolymers in context with the present invention is usually in the range of from above 1000 up to 250,000, preferably in the range from above 1000 to 70,000. A particularly preferred polymer is polyacrylic acid with a molecular weight in the range from above 1000 to 100,000, preferably in the range from above 1000 to 70,000. The polycarboxylic acid homopolymers in context with the present invention are provided either as solids or in solution, preferably in 20-90 wt.-% aqueous solution, more preferably in 30-70 wt.% aqueous solution.

b) "Low molecular polycarboxylic acids" are defined as organic carboxylic acids with 2 or more carboxylic groups and of low molecular weight. Examples of low molecular polycarboxylic acids are citric acid, lactic acid, malic acid, maleic acid, tartaric acid, agaric acid, trimellitic acid, succinic acid and the like. Also included by the term low molecular polycarboxylic acids are the derivatives and/or salts thereof. The molecular weight of the low molecular polycarboxylic acids in context with the present invention is usually up to 1000. Particular preferred acids are citric acid and/or trisodium citrate.

c) "Maleic acid or (meth)acrylic acid based copolymers" are copolymers, including also e.g. terpolymers, of (i) one or more hydrophobic monomers or (ii) one or more hydrophobic monomers with one or more hydrophilic group(s) or (iii) one or more hydrophilic monomers with hydrophilic groups or mixtures thereof with maleic acid, acrylic acid and/or methacrylic acid. The term "(meth)acrylic acid" includes acrylic acid, methacrylic acid as well as mixtures thereof. The molecular weight of the maleic acid or (meth)acrylic acid based copolymers in context with the present invention is usually in the range of from above 1000 up to 100,000, preferably in the range from above 1000 to 60,000. Also included by the term maleic acid or (meth)acrylic acid based copolymers are the derivatives and/or salts thereof. The maleic acid or (meth)acrylic acid based copolymers in context with the present invention are provided either as solids or in solution, preferably in 20-90 wt.-% aqueous solution, more preferably in 30-70 wt.-% aqueous solution.

ci) The "hydrophobic monomer(s)" of the maleic acid or (meth)acrylic acid based copolymers are monomers which have a hydrophobic character either in their monomeric form or even after their polymerisation in the polymer chain. Types of hydrophobic monomers are olefines or alpha-olefines with carbon chain lengths from 3 to 16 carbon atoms, unsaturated cyclic hydrocarbons, aryl compounds. Preferred types of hydrophobic monomers are olefins or alpha-olefins with carbon chain lengths from 3 to 16 carbon atoms and aryl compounds.
Examples of hydrophobic monomers are styrene, methyl styrene, 2-ethylhexyl acrylate, octylacrylate, lauryl acrylate, stearyl acrylate, behenyl acrylate, 2-ethylhexyl methacrylate, octylmethacrylate, lauryl methacrylate, stearyl methacrylate, behenyl methacrylate, 2-ethylhexyl acrylamide, octylacrylamide, lauryl acrylamide, stearyl acrylamide, behenyl acrylamide, propyl acrylate, butyl acrylate, pentyl acrylate, hexyl acrylate, 1-vinyl naphthalene, 2-vinyl naphthalene, 3-methyl styrene, 4-propyl styrene, t-butyl styrene, 4-cyclohexyl styrene, 4-dodecyl styrene, 2-ethyl-4-benzyl styrene, 4-(phenylbutyl) styrene, 1-propene, 2-propene, 1-butene, 2-butene, 1-pentene, 2-pentene, 1-hexene, 2-hexene, 3-hexene, 1-heptene, 2-heptene, 3-heptene, 1-octene, 2-octene, 3-octene, 4-octene. Preferred are styrene,

methyl styrene and mentioned olefins.

cii and ciii) The "hydrophilic group(s)" of the monomer(s) of the maleic acid or (meth)acrylic acid based copolymers give the monomer where it is attached to an increased hydrophilic character. The hydrophilic group(s) is/are typically one or more selected from the group comprising hydroxyl, carboxamide, amine, carboxylate, carboxyl, phosphate, phosphono, phosphino, phosphonate, sulfonyl or sulfo group and the like.

[0141] Examples of hydrophilic monomers with hydrophilic groups are (meth)allyl sulphonic acid, vinyl sulphonic acid, vinyl phosphonic acid, dimethylacrylamide, dimethylaminopropylmethacrylate, diethylaminopropylmethacrylate, vinyl formamide, vinyl acetamide, vinyl pyrrolidone, vinyl imidazole, phenyl (meth)allyl ether sulfonic acid, 2-acrylamido-2-methyl propane sulfonic acid (AMPS), sulphonated styrene, allyloxybenzene sulfonic acid, allyloxy-2-hydroxy propyl sulfonic acid, 2-acryloxypropionic acid or (meth)allyl phosphonic acid, and the like or salts thereof.

Claims

1. A Package unit comprising

(i) a cardboard container having an upper top surface (1), a bottom (2) and at least three side surfaces (3), wherein at one of said top (1) or side surfaces (3) a childproof closure (4) is provided, wherein said closure (4) is made of cardboard and is slidely movable between a position closing the container and a position providing an opening (O) allowing the removal, discharge, pouring or taking out of the content of said container, and
(ii) shaped or granular item(s), comprising

(a) a detergent or cleaning composition, or
(b) a water softener composition

2. Package unit according to claim 1, wherein said closure (4) comprises a flat panel (5) providing at least two embossments (6, 7) on its upper surface, said flat panel (5) is mounted slidably movable below the top surface (1) or one of the side surfaces (3), said top surface (1) or side surface (3) has at least two punched holes (8, 9), which, when the closure (4) is closed, are engaged by the embossments (6, 7).

3. Package unit according to any of the preceding claims, wherein said top surface (1) or side surface (3) providing the punched holes (8, 9) is formed by a separate cardboard panel and applied on the remainder of the container by means of an adhesive, a fixing material or fixing device.

4. Package unit according to any of the preceding claims, wherein said top surface (1) or side surface (3) at one edge provides a passage (10) allowing a terminal end (E) of the flat panel (5) of said closure (4) to be moved through in an outward direction.

5. Package unit of any of the preceding claims, wherein at least some of the components of said cardboard container further comprise at least one layer serving as a moisture barrier or vapor barrier, preferably at least the container main body

6. Package unit of claim 5, 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.

7. Package unit of any of the preceding claims, wherein at least one of the following features is fulfilled:

(i) the container - except said top (1) or side surface (3) providing the punched holes (8, 9) and said closure (4) - is cut out of one continuous cardboard panel,
(ii) said closure (4) of the cardboard container and / or said top (1) or side surface (3) panel providing the punched holes (8, 9) of the cardboard container is made of the same cardboard material as the remainder of said container,
(iii) said closure (4) of the cardboard container and / or said top (1) or side surface (3) panel providing the punched holes (8, 9) of the cardboard container don't comprise a moisture barrier layer,

(iv) said punched holes (8, 9) are provided in-line in the direction of movement of the closure (4)
(v) said bottom (2) comprises two bottom flaps (2a), (2c) having punched holes (13).

8. Package unit of any of the preceding claims, wherein the punched holes (8, 9) provided in the top (1) or side surface (3) are spaced apart from each other by a distance (D) of at least 1 cm, preferably at least 1,5 cm, more preferred at least 2 cm and even more preferred at least 2,5 cm, measured from one border of one hole to the closest border of the other hole.

9. Package unit of any of the preceding claims, wherein punched hole (8) is engaged by embossment (6) and punched hole (9) is engaged by embossment (7) when the closure (4) is fully inserted, thus closing the container, wherein punched hole (8) provides said opening (O), if the closure (4) is moved so that the terminal end (E) of the flat panel (5) protrudes from the container, preferably passing through passage (10).

10. Package unit of any of the preceding claims, wherein said cardboard container, said top (1) or side surface (3) providing the punched holes (8, 9) and said closure (4) all are prepared from corrugated cardboard or a cardboard laminate having a thickness of at least 0,5 mm to 3 mm, preferably 0,8 mm to 2,5 mm and even more preferred 1 mm to 2 mm.

11. Package unit of any of the preceding claims, wherein said cardboard container comprises below said top surface (1) and said flat panel (5) of the closure (4) a further surface (11) providing a perforation or pre-cut for an opening (O1) directly below opening (O) of the top surface (1) when closure (4) is in the "open" position, said perforation or pre-cut before the first discharge of any content of the container can be pushed down to obtain opening (O1) directly below opening (O).

12. Package unit of any of the preceding claims, wherein the shaped or granular item(s) comprise (a) a detergent or cleaning composition selected from a laundry composition or a dishwashing composition comprising at least an anionic and/or nonionic surfactant and an alkaline or acid compound, or (b) a water softener composition comprising an acid compound.

13. Package unit of any of the preceding claims, wherein the shaped item(s) is/are selected from formed bodies, tablets, spheres, pouches, sachets, capsules, pellets, or beads, preferably comprising or made of the (a) detergent or cleaning composition, or (b) water softener in liquid, gelly, pasty, particulate, pressed, sintered, granulate or powder form or any combination of the mentioned.

14. Package unit of any of the preceding claims, wherein said detergent or cleaning composition is a detergent pouch or sachet comprising at least one polymer film forming one, two, three, four or more independent compartments, each of them independently filled with a liquid or a particulate detergent composition, or a unit dose detergent tablet or detergent formed body.

15. A cardboard container as defined in any of claims 1 to 11, assembled of

(i) a main container body having at least three, preferably at least four side surfaces (3), an upper surface (11), and a bottom (2), cut from one continuous piece of a corrugated cardboard or a cardboard laminate panel
(ii) a top surface (1) panel having at least two punched holes (8, 9) and preferably a passage (10), and
(iii) a closure (4) comprising a flat panel (5) and two embossments (6, 7) fitting into the punched holes (8, 9) of the top surface panel,

wherein the main container body and the top surface (1) panel are connected to each other by an adhesive, a fixing material or a fixing device, whereas said closure (4) is movably sandwiched between the upper surface (11) of the main body and the top surface (1) panel,
all of the components (i), (ii) and (iii) are made of a corrugated cardboard or a cardboard laminate having a thickness of from 0,5 to 3 mm.

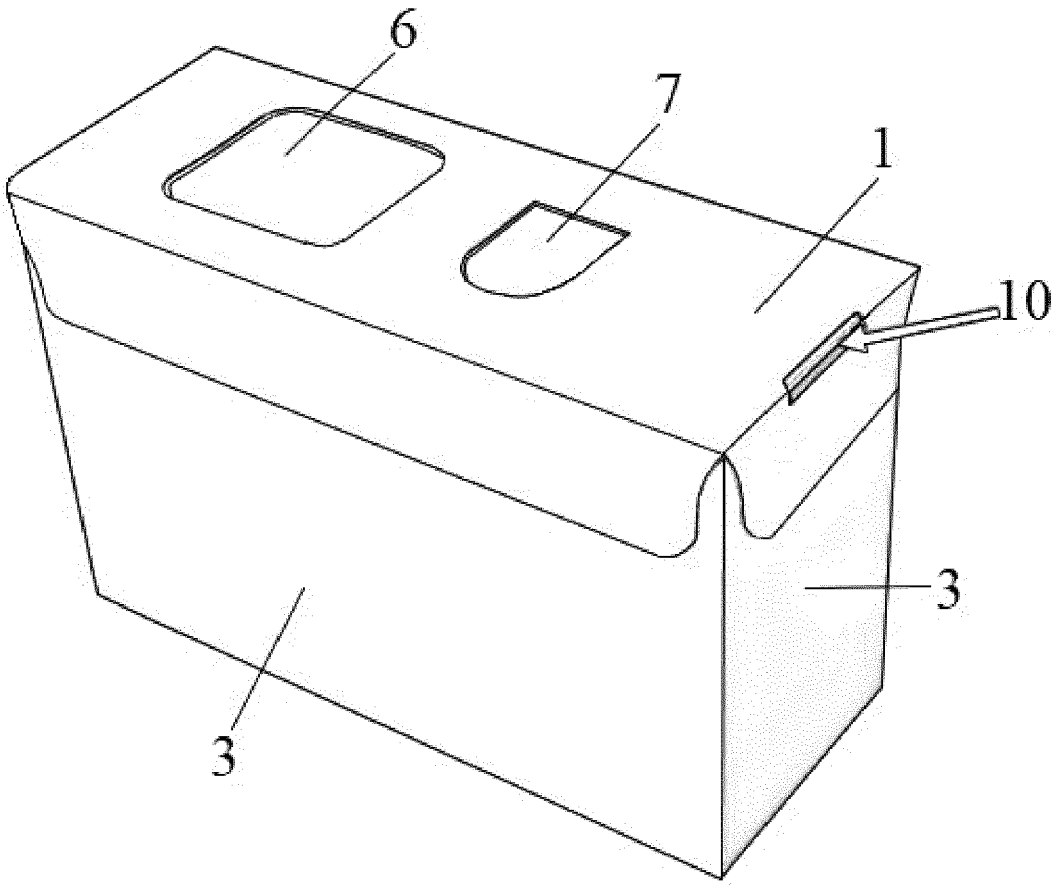

Fig. 1

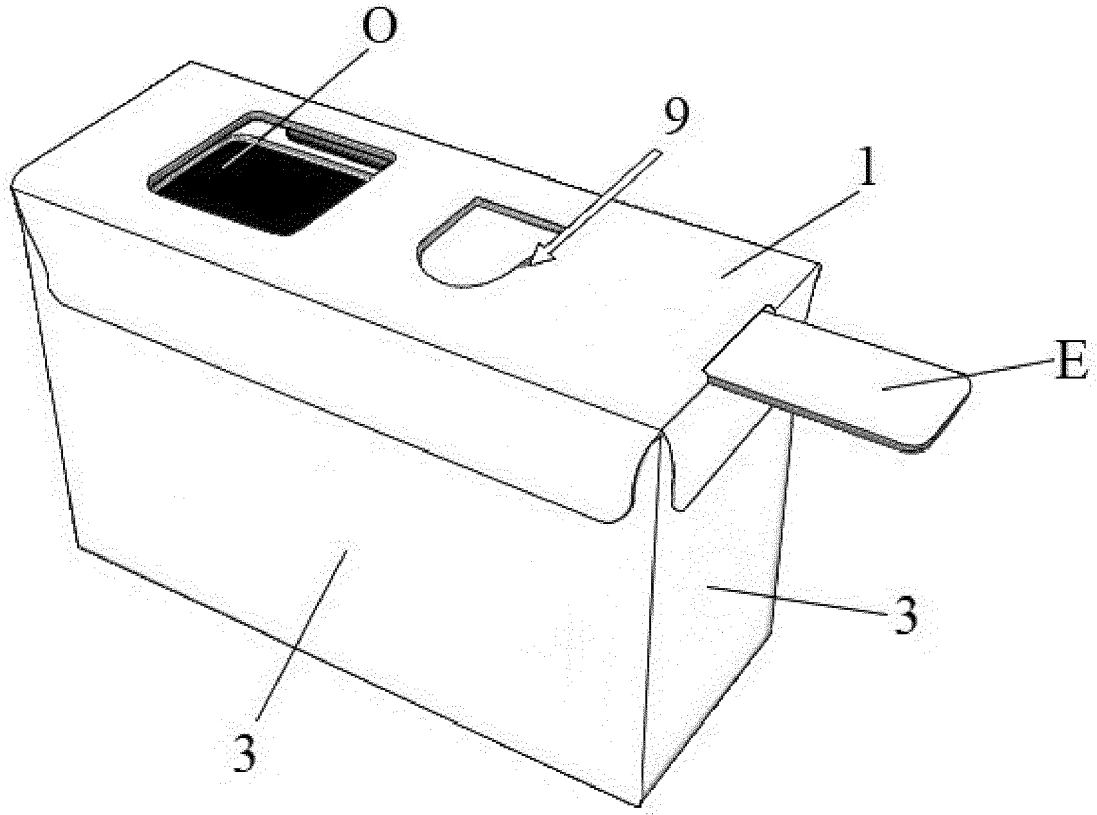

Fig. 2

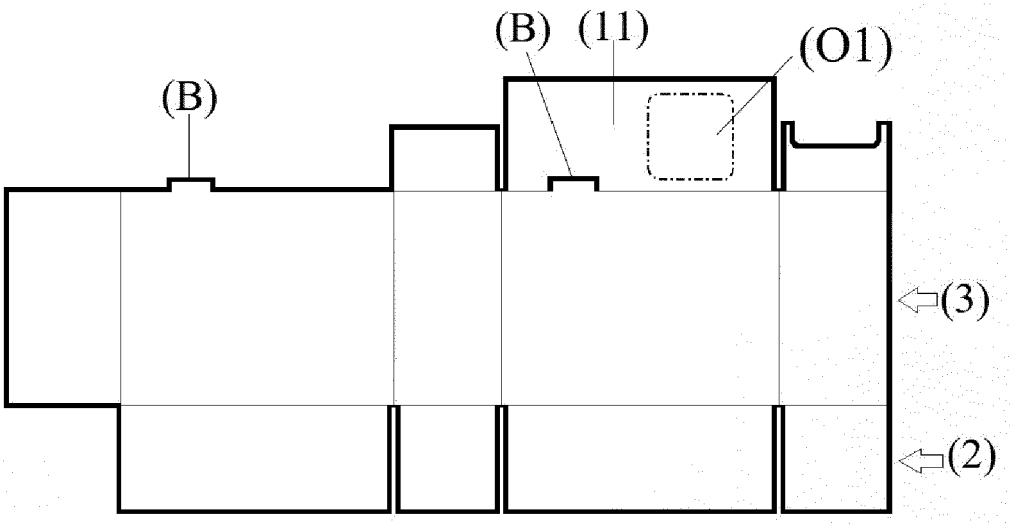

Fig. 3a

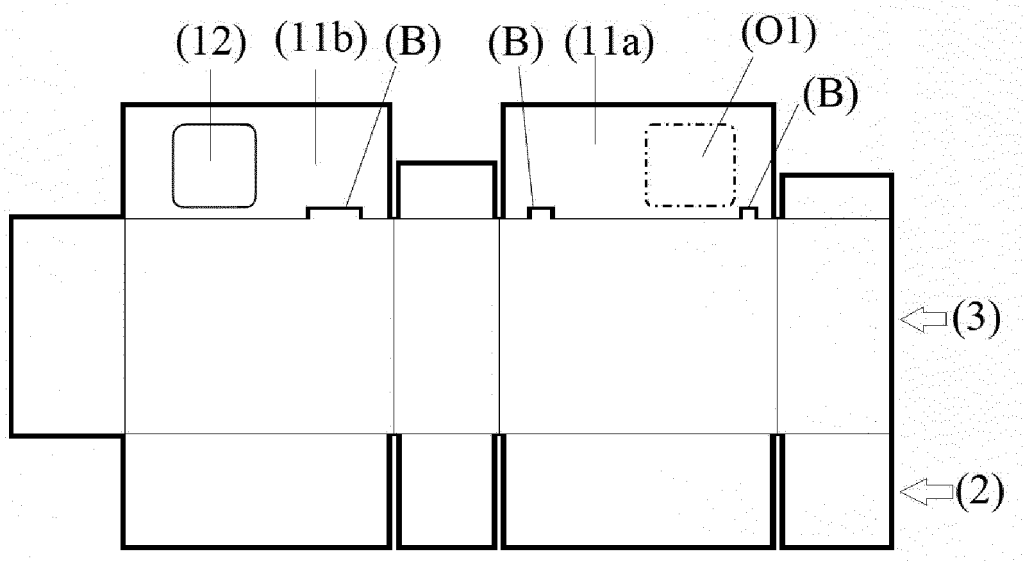

Fig. 3b

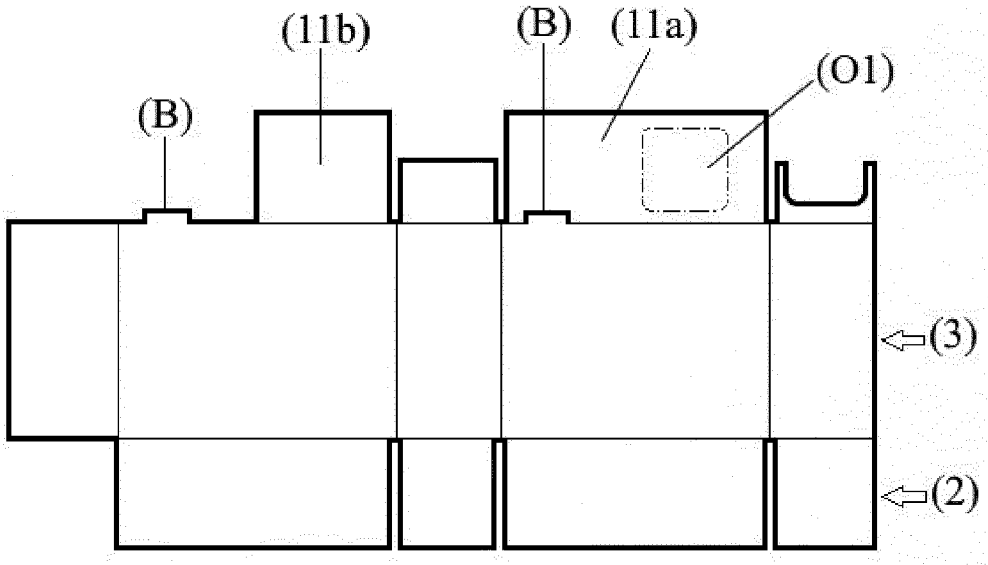

Fig. 4a

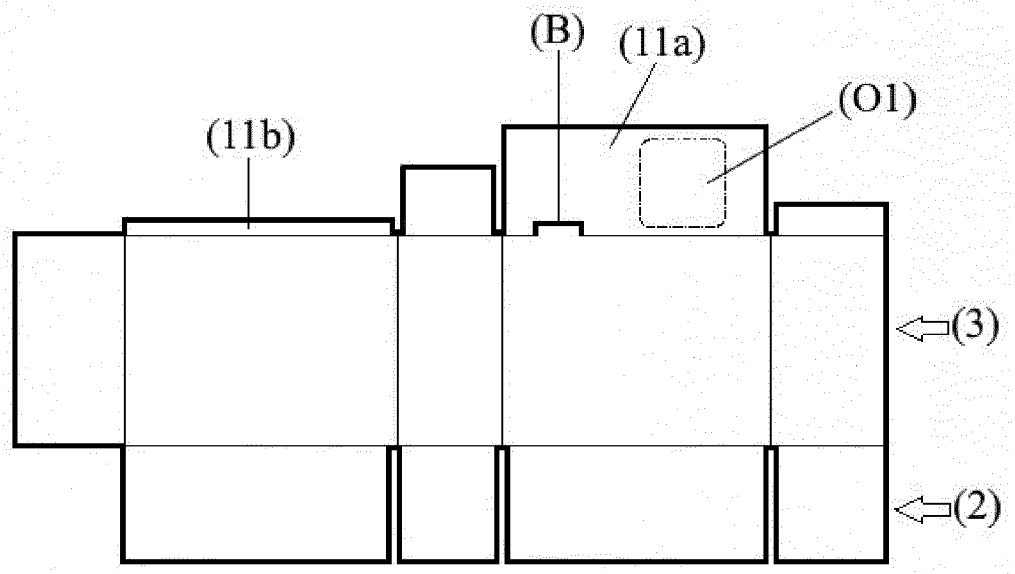

Fig. 4b

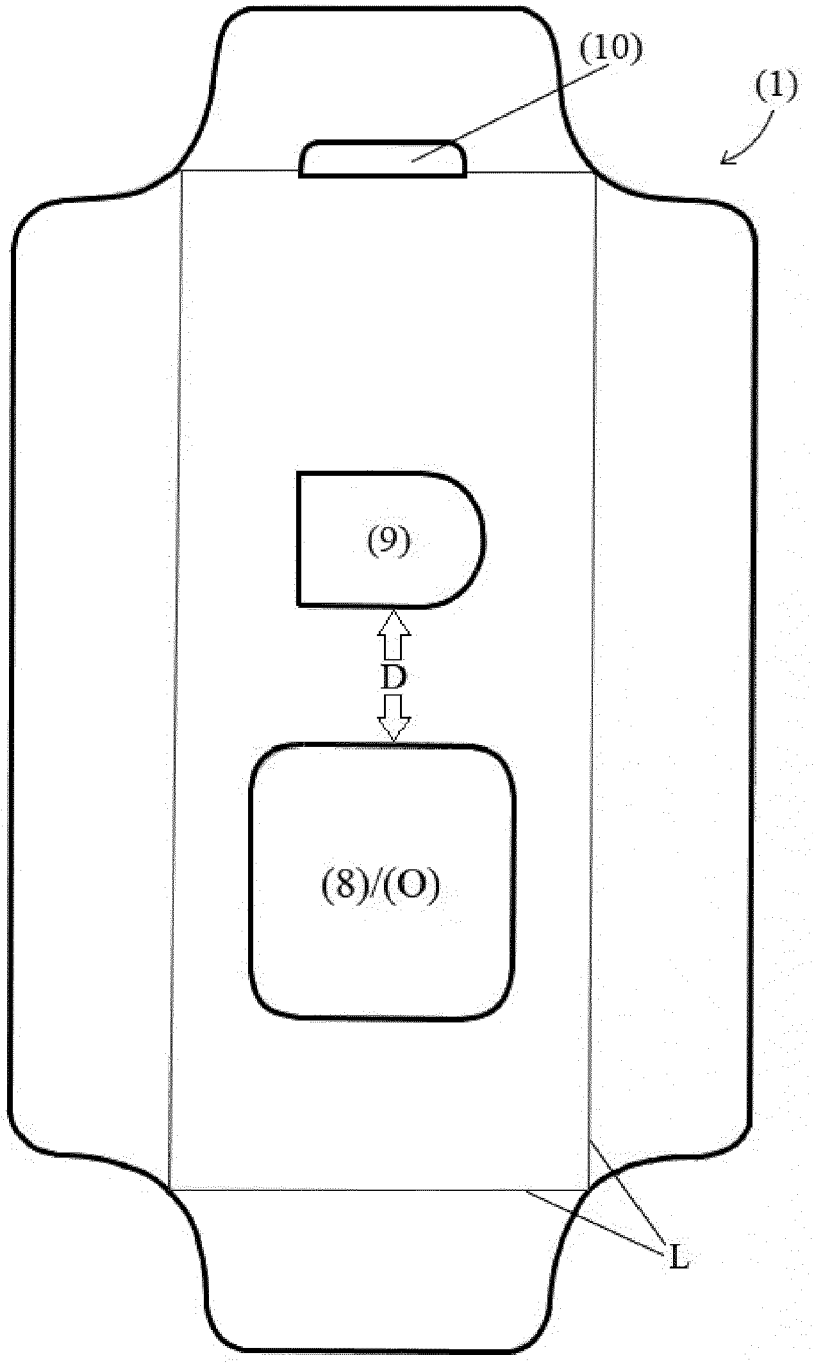

Fig. 5

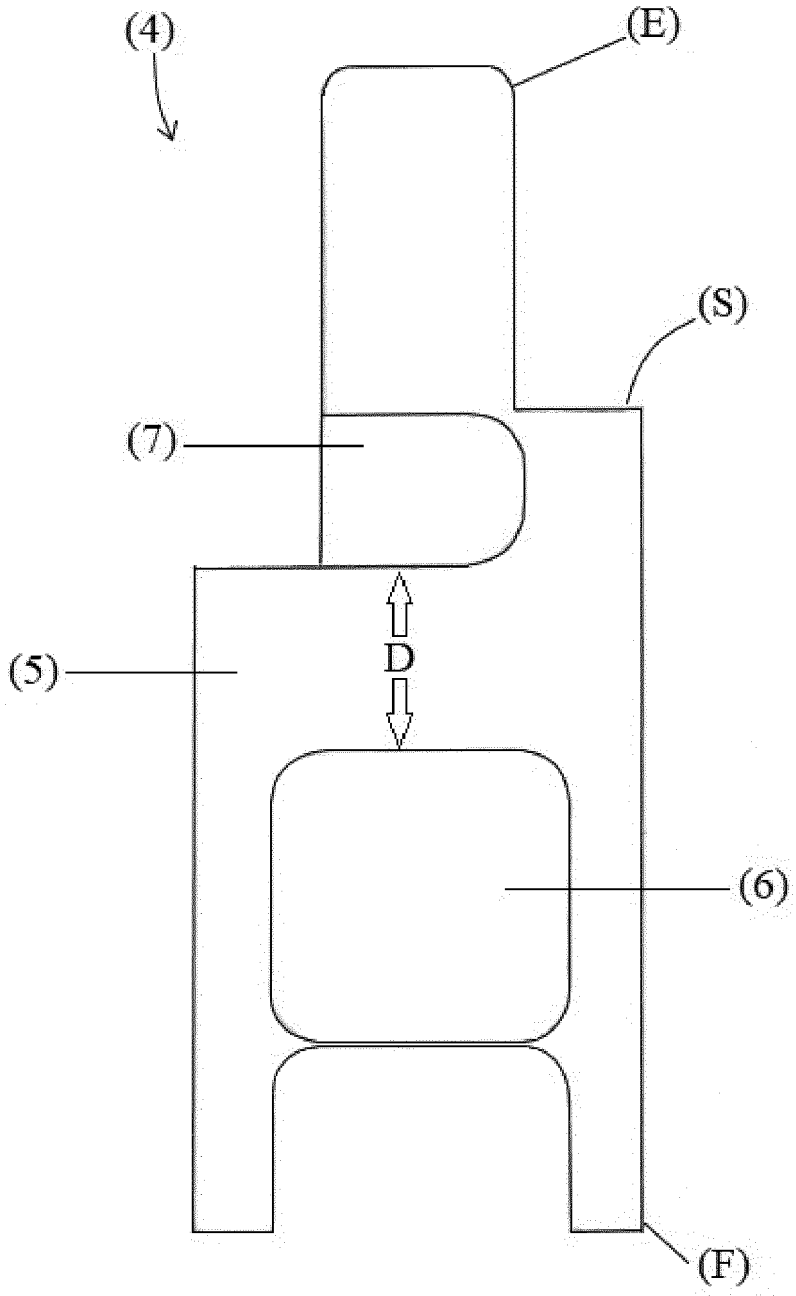

Fig. 6

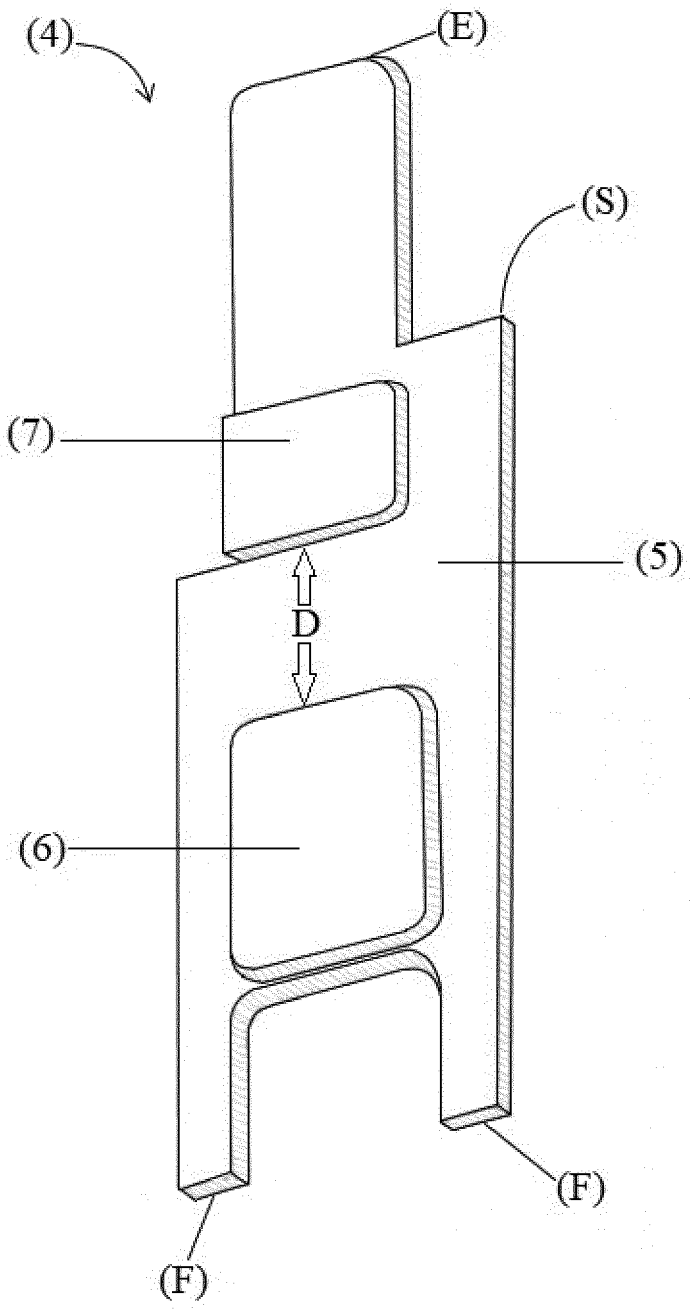

Fig. 7

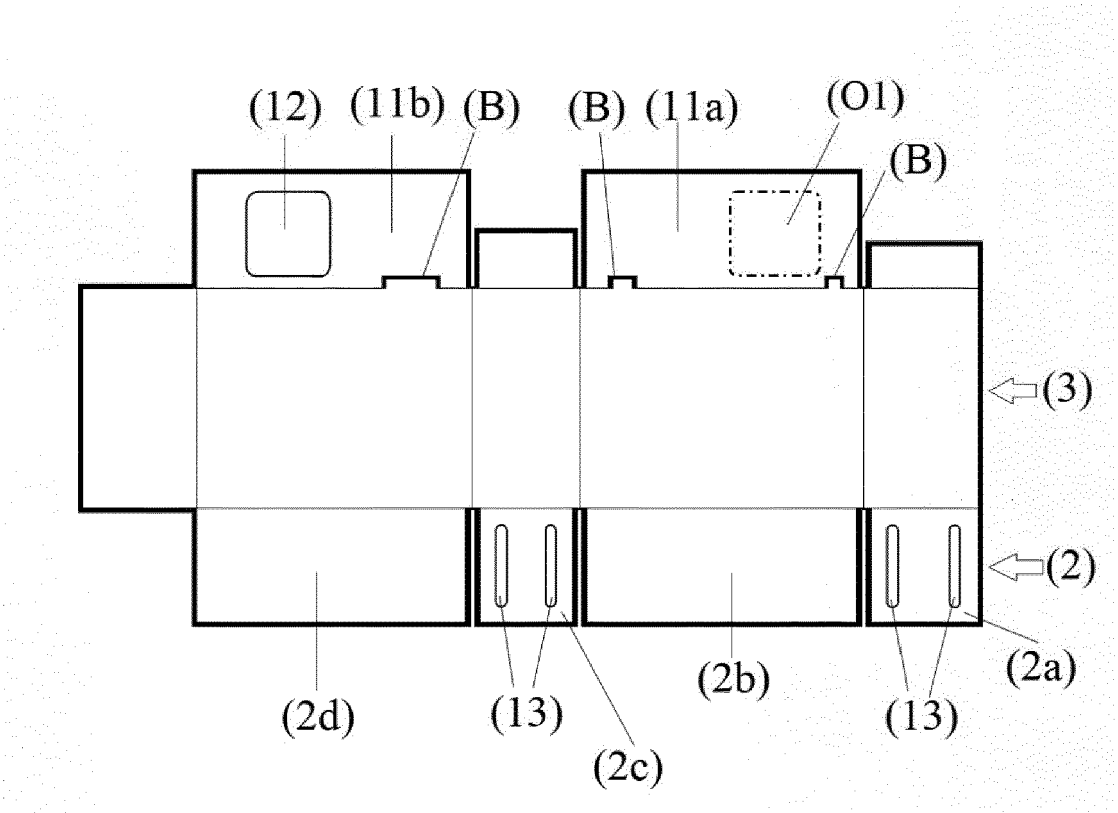

Fig. 8

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EUROPEAN SEARCH REPORT

Application Number
EP 19 18 1379

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	11 December 2019	Le Bihan, Nicolas

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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11-12-2019

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

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