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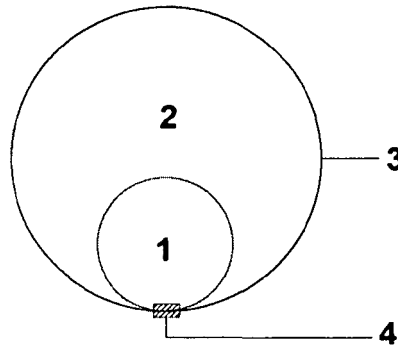
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(54) **Multi-compartment pouch and method for making it**

(57) The present invention relates to a multi-compartment pouch with one or more inner compartments surrounded by one or more outer compartments, a method

for making such a multi-compartment pouch as well as to the use of said pouch in methods for washing or cleaning an article or a surface.

Figure 1a:



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Description

[0001] The present invention relates to a multi-compartment pouch with one or more inner compartments surrounded by one or more outer compartments, a method for making such a multi-compartment pouch as well as to the use of said pouch in methods for washing or cleaning an article or a surface.

[0002] Detergent and cleaning products are commercially available in various different forms, including for example tablets as well as powdery, granular, pasty, gel-like and liquid compositions. In recent years unit-packaged detergent compositions have become increasingly popular due to the convenience of dosing them and the improved safety for the user as the risk of unintended contact with said compositions is diminished. If a water-disintegrable packing is used, e.g. a water-soluble foil, any unintended contact with the composition may be completely avoided, as during manual handling the composition is protected by said packing which will only disintegrate upon contact with water, e.g. inside the dosing chamber of a laundry or a dishwashing machine.

[0003] When the packing comprises several compartments, it is even possible to simultaneously dose two different compounds or compositions at the same time in one single step, which otherwise are not compatible with each other during storage. Using a multi-compartment packing wherein each compartment is packed in different packing material it is also possible to provide pouches that sequentially release the contents of the individual compartments.

[0004] From the state of the art several types of multi-compartment pouches or containers for detergents are known. In EP 0 236 136 A2 for instance embodiments are described wherein the compartments are located adjacent to each other and are separated by a seam or a partition wall. The pouches described therein are either made of water-permeable material so that a solution of the contents of the compartments surrounded by said material will leak from said compartment upon contact with water or they may be made of a water-impermeable material which is sealed with a water-sensitive seal so that these compartments will open upon contact with water to release their content. As the material surrounding the compartments does not disintegrate in water, the empty pouch has to be manually removed from the laundry or dishwashing machine after treatment. A further drawback of multi-compartment pouches wherein the compartments are arranged solely in an adjacent manner is the fact, that compartments comprising a liquid content are always in risk of being damaged or even bursting during handling or under mechanical impact, thus leaking their liquid content. The same drawback is found in multi-compartment pouches wherein a liquid-containing compartment is located on the outside of said pouch above another compartment. The same is true for hygroscopic contents.

[0005] To solve the problem of this mechanical insta-

bility WO 02/42408 A2 discloses water-soluble containers of essentially rectangular outer shape comprising a plurality of internal partitioning walls to separate the different compartments from one another. Said containers are made by thermoforming or vacuum-forming. Even though these pouches provide a good mechanical stability even for liquid contents if said liquid contents are filled into an inner compartment, the process of making these pouches by thermoforming or vacuum-forming is rather expensive.

[0006] It was therefore an object of the present invention to provide a multi-compartment pouch made of water-disintegrable material which is suitable to receive even water-sensitive and/or liquid contents but nevertheless may be prepared in a cost-effective manner.

[0007] This problem is solved by the multi-compartment pouch and the method for producing such a pouch of the present invention.

[0008] The present invention provides a multi-compartment pouch comprising one or more inner compartment(s) and one or more outer compartment(s), the latter surround(s) at least 75 % of the outer surface of said inner compartment(s). Water-sensitive and/or liquid compounds or components preferably may be filled into said inner compartment(s) and thus are protected from environmental humidity and/or mechanical impact by both the additional water-disintegrable film or foil surrounding the outer compartment(s) as well as the content of said outer compartment(s). Thus even if an inner compartment comprising liquid content is damaged, for example due to mechanical impact, said content leaks into said outer compartment, there being absorbed by the preferably solid content of said outer compartment. Due to this additional stabilizing effect of the outer compartment(s), the whole multi-compartment pouch maybe formed from rather thin water-disintegrable film or foils, e.g. having a thickness of less than 1 mm, for example in form of a sachet. Accordingly, the pouches of the present invention preferably represent a sachet and not a rectangular container, made by moulding, thermoforming or vacuum-forming.

[0009] Thus, the present invention provides a method for making a multi-compartment pouch comprising one or more inner compartments and one or more outer compartments, the latter surrounding at least 75 % of the outer surface of said inner compartment(s), each compartment being completely surrounded by at least one water-disintegrable film or foil, comprising the steps of: (i) providing an assembly of essentially tubular shape comprising at least one inner tube, which optionally may already be filled with at least one detergent or cleaning adjuvant, and at least one outer tube, the latter surrounding at least 75 % of the outer surface of said inner tube (s), by forming said tubes from at least one water-disintegrable film or foil having a set of opposed lateral edges and sealing said lateral edges either to each other or another part of the lateral surface of said tube (vertical seal) to fix said tubes, (ii) filling in at least one of the inner

and/or the outer tubes a portion of detergent and/or cleaning adjuvant, (iv) introducing at least one seal below and/or above said portion of detergent and/or cleaning adjuvant (horizontal seal).

[0010] Said outer compartment(s) preferably surround(s) at least 80 % of the outer surface of the said inner compartment(s), more preferably at least 85 %, even more preferably at least 90 %, particularly preferably at least 95 % and most preferably essentially the whole outer surface of said inner compartment(s) (except for the small part of the surface at which the horizontal seals are located).

[0011] In terms of the present invention a film or foil is water-disintegrable if it dissolves, disperses, melts or ruptures upon contact with water or an aqueous solution. Preferably the water-disintegrable film or foil used for making the multi-compartment pouch of the present invention does not leave more than 20 wt.-%, even more preferably not more than 10 wt.-% and most preferably less than 5 wt.-% of solid residue when 10 grams of said material are placed in a vessel, completely covered with 100 mL of water having a temperature of max. 50°C, preferably of max. 40°C, more preferably of max. 30°C and most preferably of 20°C or below, and the resulting mixture is stirred on a magnetic stirrer set at 500 rotations per minute (rpm) for 20 minutes, preferably for 15 minutes, more preferably for 10 minutes and most preferably for 5 minutes or less.

[0012] It may also be preferred to use different films or foils for making the different compartments in a multi-compartment pouch of the present invention. It may for example be preferred to use a cold water-soluble film or foil, i.e. a film or foil which disintegrates at a temperature of 25 °C or below under conditions described above, to cover the outer surface of the outer compartments, i.e. to form the outer tube(s) of the assembly of essentially tubular shape used in the method of the present invention, while a film substantially insoluble in water having a temperature of 25°C or below, but being soluble in water having a temperature of 40 °C or above may be used for surrounding one or more of the inner compartments, i.e. for forming one or more of the inner tube(s). In this way, retarded release of the content of said inner compartments may be achieved.

[0013] The velocity of disintegration may also be controlled by the thickness of the film or foil. Preferably the thickness of the film or foil used is in the range of from 10 μm to 100 μm, both for the thickness of the film before it is formed into an essentially tubular shape as well for the thickness of the films or foils in the multi-compartment pouch, i.e. after having been formed into tubular shape.

[0014] When films or foils of different disintegration behavior in water are used they may be either made of a different basic film or foil material, i.e. comprise different polymers, or they may be made of the same basic foil material, wherein a part of said foil material is treated on its surface by physical or chemical means to control the disintegration behavior.

[0015] Preferably the multi-compartment pouches of the present invention represent a sachet, i.e. usually they more or less have a pillow shape having at least two flat outer edges formed by horizontal top and bottom seals, whereas the middle part of the sachet lying between said flat edges is extended in volume due to the filling of the compartment(s).

[0016] Pouches of said type may be produced in a cost-effective manner by the so-called vertical form-film-seal (VFFS) technique. Thus, in the present invention the assembly of essentially tubular shape preferably is formed from at least one continuous flat roll or sheet of the aforementioned films or foils using the VFFS technique by flapping said film or foil around a preferably hollow forming tube, more preferably an essentially conical hollow forming tube and vertically sealing said edges either to each other or to another part of the lateral surface of said tube to fix the tubular shape of the foil. Preferably a vertical form-film-seal machine is used which is continuously operated. From a continuous roll the film or foil approaches the back of the hollow forming tube and is formed around said forming tube into an essentially tubular shape for example by forming collars. The film or foil is then guided downwards along said forming tube, for example by low friction rollers and vertically sealed, for example by heat-sealing bar clamps on its edges. If the vertical form-film-seal technique is used it is preferred to introduce one horizontal seal before starting filling of the film tube to create an open bag which then may be filled with substances dispensed through the hollow forming tube into the center of the bag. When filling is completed, the bag, i.e. the compartment in terms of the present invention, may be closed by introducing a further horizontal seal above the filled-in material.

[0017] Another advantage of the present invention is that for forming a multi-compartment pouch of the present invention no thermoforming, vacuum-forming or filling on a rotary drum as described for example in US 3,057,127 is needed. Hence the use of all of these methods preferably is excluded in the process of making the multi-compartment pouch of the present invention.

[0018] A further advantage of the VFFS-technique is the fact that the compartments usually are not completely filled and thus remain more flexible and deformable than a pouch which is completely filled. This higher flexibility and deformability ensures that the multi-compartment pouches of the present invention can be easily fit into dosing chambers of different shape.

[0019] The remaining space in the compartments above the filling with detergent and/or cleaning adjuvant may be filled with a gas or a mixture of gases, including for example air, nitrogen, noble gases and the like, without being limited to them, either at atmospheric, positive or negative pressure. The gas or the mixture of gases may be inert towards the contents of the compartment, but it may as well be suitable to trigger a chemical reaction with the composition or one or more of its ingredients. If a gas or a mixture of gases is filled into at least one com-

partment, preferably said gas or gas mixture does not leak out of the multi-compartment pouch, neither through the seals nor through the foil itself.

[0020] The sealing in the machine direction, i.e. the direction in which the foil material is moved during making of the tube(s) in a traditional VFFS machine, is called the vertical seal due to its vertical position in said traditional VFFS machine. By such a vertical seal a folded strip of film or foil may be closed to fix a tubular shape and/or the vertical seal may divide a preformed tube into two compartment tubes. The vertical seal may be a rim protruding from the outer surface or the inner surface of the tube or the vertical seal may be an integrated part of the outer wall of the tube or an inner sidewall which divides the tubes into two compartments. For example, a tube already fixed by a vertical seal may be further divided into three compartments by adding two additional vertical seals. Each of said vertical seals may be independently form an angle of from above 0 to 90° with one or more horizontal seals, including 10, 15, 30, 45, 60, 75, 80 and 85°. Each vertical seal may be arranged to another vertical seal to include an angle in the range of from 0 to 90°, including 5, 10, 15, 30, 45, 60, 75, 80 and 85°.

[0021] The seals closing the bottom and the top end of each compartment as well as the whole pouch are called horizontal seals due to their horizontal position in a traditional VFFS machine. A horizontal seal closes the bottom side of a tube to create an open chamber (or a plurality of open chambers if the tube had previously been divided into more than one tube by adding additional vertical seals). After filling said compartments with the desired amount of detergent and/or cleaning adjuvant and optionally filling additional gas into said compartments, the compartments are closed by introducing a further horizontal seal at the top, i.e. above the filling level of said compartments. Said top seal may simultaneously create a further open chamber (or plurality of further open chambers) above the filled and closed compartment, i.e. in a continuous process a bottom seal can be introduced as well when introducing a top horizontal seal. This may be used to create a further compartment inside the same pouch or the horizontal seal may be divided for instance by cutting to produce one multi-compartment pouch and start a new open chamber for a further multi-compartment pouch. Each horizontal seal may be arranged to another horizontal seal to include an angle in the range of from 0 to 90°, including 5, 10, 15, 30, 45, 60, 75, 80 and 85°.

[0022] Thus, the method of the present invention preferably may comprise the steps of iii) filling at least one gas into at least one of the compartments before horizontally sealing it, and/or v) removing the sealed pouch from the remaining film or foil. Removing the sealed pouch from the remaining film or foil may for example be achieved by cutting through a horizontal seal forming the bottom seal of one pouch and the top seal of a further pouch.

[0023] The multi-compartment pouch according to the

present invention comprises one or more inner compartment(s) and one or more outer compartment(s), the latter surrounding at least 75 % of the outer surface of said inner compartment(s), the compartments being filled with detergents or cleaning adjuvants wherein each compartment is completely surrounded by at least one layer of at least one water-disintegrable film or foil and wherein the number of vertical seals per number of compartments in the pouch is above 0 but below 2.

[0024] As the pouches of the present invention may be easily made by the VFFS technique the compartments inside said multi-compartment pouch preferably are essentially fixed in their relative position to each other at least by the horizontal top and bottom seals of the pouch. Thus, the pouch of the present invention preferably does not comprise any freely movable inner compartments inside the outer compartments.

[0025] Due to the technique of folding the film or foil in the method of the present invention, which will be further explained with reference to the figures below, the number of vertical seals necessary to form and seal compartments is reduced in comparison to conventional methods of forming multi-compartment sachets by introducing a preformed sachet into a further sachet, as described for example in EP 0 132 726 A2. This further reduces the efforts with respect to time and costs in the production process.

[0026] Preferably at least one and more preferably all of the compartments in the pouch of the present invention are filled with a compound or a composition independently selected from the group comprising detergents, cleaning adjuvants and mixtures thereof, even more preferably independently selected from the group comprising dish-washing detergents, laundry detergents, machine cleaning and maintenance detergents, components of the aforementioned detergents, water softening compounds or compositions, lime-scale-preventing compounds or compositions, rinse-aid compounds or compositions or mixtures thereof, wherein most preferably each compartment comprises a different compound or composition.

[0027] In terms of the present invention the term "detergent" includes both fully formulated and ready to use detergent composition as well as components thereof, including for example anionic, cationic, nonionic and amphoteric surfactants, soaps, builders, enzymes, polymers, bleaching agents, bleach activators, bleach catalysts, optical brighteners, sud suppressors, dispersants, anti-redeposition agents, soil release agents, metal ion sequestrants, corrosion inhibitors, crystal growth inhibitors, colorants, dyes, perfumes, organic solvents, and the like as well as mixtures thereof without being limited to these.

[0028] Since the pouch of the present invention is a multi-compartment pouch, it is possible to provide a fully formulated detergent composition wherein interfering compounds may be separated during transport and storing and are mixed only upon the start of the washing

cycle. It may for example be preferable to separate compounds having bleaching activity from enzyme composition by filling them into different compartments. As well e.g. combinations of for example detergents and rinse aids or detergents and lime scale preventing compositions are possible.

[0029] The compounds or compositions filled into each compartment independently may represent a solid, including powders, granules, crystals, pellets, beads, compressed solids, blocks, a paste, a cream, a wax, a gel, a liquid, a gas or a mixture thereof. For example said inner compartment(s) may be filled with at least one pasty, creamy, waxy, gel-like or liquid compound or composition and said outer compartment(s) may be filled with at least one solid compound or composition. By filling said pasty, creamy, waxy, gel-like or liquid water-sensitive compounds or compositions into said inner compartment(s) these substances are stabilized against mechanical impact and environmental humidity both by the content of the outer compartment as well as the additional film or foil surrounding the outer compartment.

[0030] As well said outer compartment(s) may be filled with at least one pasty, creamy, waxy, gel-like or liquid compound or composition while said inner compartment(s) may be filled with at least one solid compound or composition. This may in particular be preferable if, for instance, said solid substances are hygroscopic and thus are stabilized against environmental humidity both by the content of the outer compartment as well as the additional film or foil surrounding the outer compartment.

[0031] As already mentioned above, the pouch may be divided into a plurality of compartments by introducing additional vertical and/or horizontal seals.

[0032] The water-disintegrable film or foil preferably comprises a polymer selected from the group comprising polyvinyl alcohols (PVA), polyvinyl pyrrolidone (PVP), polyvinyl acetate, polyacrylic acid and salts thereof, polyacrylamide (PAA), polyacrylonitrile (PAN), polyalkylene oxides, polyethylene imine, cellulose ethers, hydroxyalkylcelluloses, carboxyalkylcelluloses, alkylcelluloses, polyalkylene glycols, alginates, casein, polysaccharides including gelatines and starches, natural gums including guar gum, copolymers thereof and blends thereof. Preferably, said polymer has a molecular weight in the range of from 1,000 to 750,000 g/mol.

[0033] Each seal independently may be established by applying any of heat, steam, radiation, ultrasonics, pressure, solvents, adhesives or a combination thereof to the contact surface of the parts of said film or foil to be sealed. Preferably the width of each seal independently is in the range of from 0.3 to 30 mm. Optionally the edges of a seal may be folded for making the seal smaller and/or the edges less sharp or jagged. Optionally the two edges of a film to be sealed to fix its tubular shape may be pushed inwards before sealing them, for example by pressurized air, to obtain a smaller seal which at the edge is four film or foil layers thick instead of two.

[0034] Each seal independently may also be folded to-

wards or pressed against the body of the multi-compartment pouch and further may be fixed with a sealing aid.

[0035] In one embodiment of the present invention all of the film or foil present in the pouch consists of exactly one type of film or foil. Preferably, the whole pouch is formed from the same roll or sheet of film or foil. Herein, the compartments present in the pouch may be formed by (i) spirally rolling or folding the film or foil to form at least one inner tube surrounded by at least one outer tube and then fixing this assembly by sealing a part the film or foil forming the inner tube with a part of the film or foil forming the outer tube before filling the tubes and horizontally sealing them according to steps (ii) and (iv) of the method described above.

[0036] The film or foil preferably may be folded in such a way that a narrow tube is located inside a wider tube, for example an "o-in-O"-shape. The vertical seal may be introduced preferably at that point where the lateral edges of the folded film or foil are overlaid, said seal thus fixing three layers of film or foil material to each other.

[0037] A view of a cross-section through an assembly of essentially tubular shapes made in that way is schematically shown in figure 1 a showing one sheet of water-disintegrable film or foil **3** folded to form an inner tube **1** essentially completely surrounded by an outer tube **2**, wherein the lateral edges of the film or foil sheet are fixed by a vertical seal **4**.

[0038] Figure 1b shows a plan view on a multi-compartment pouch according to the present invention made from the assembly shown in figure 1 a by introducing horizontal top and bottom seals **5**. The vertical seal **4** on the back of said pouch is indicated by dotted lines. The pouch comprises one inner compartment **6a** and one outer compartment **7a**, obtained by horizontally sealing the top and bottom of both the inner tube **1** and the outer tube **2** of the assembly of figure 1 a. To indicated that the inner compartment **6a** is surrounded by at least two layers of foil in each direction, it is represented in light grey.

[0039] If a further horizontal seal **5** is introduced, both, the inner compartment as well as the outer compartment are further divided to form four compartments in total, namely two inner compartments **6a** and **6b** as well as two outer compartments **7a** and **7b**, as shown in figure 1 c. (The vertical seal **4** is not shown in figure 1 c.)

[0040] When introducing a further vertical seal **4**, for example opposed to the first vertical seal already shown in figure 1a, the assembly is divided into three tubes, namely one inner tube **1** and two outer tubes **2a** and **2b**. A cross-sectional as well as a plan view of this embodiment are shown in figure 2a and 2b, respectively. The vertical seals **4** are not shown in the plan view of figures 2b and 2c.

[0041] The pouch of the present invention may be made from at least two different films or foils as well. In this case the films or foils surrounding the inner compartment(s) preferably have a disintegration behavior in water different from that of the film or foil surrounding said outer compartment(s). Preferably, the film or foil sur-

rounding the outer compartment(s) does more readily disintegrate in water than that surrounding the inner compartments, thus leading to an even more retarded release of the content of the inner compartments. If more than one inner compartment is present, even said inner compartments may comprise different films or foils. It may for example be preferable to use a film or foil which readily disintegrates in water having a temperature of 20 °C or less for surrounding the outer compartments, while a film or foil which only disintegrates in water at temperatures equal to or above 30 °C may be used for surrounding one or more of the inner compartments.

[0042] The compartments of these embodiments preferably may be formed by (i) separately forming and vertically sealing each tube, before placing the inner tube(s) inside the outer tube(s) to obtain an essentially tubular assembly before filling the tubes and horizontally sealing them according to steps (ii) and (iv) of the method described above.

[0043] An example of an assembly according to this embodiment made by a "tube-in-tube" process is shown in figure 3a. A first film **3** is folded into a tube and closed with a vertical seal **4**. Another tube of different diameter is prepared in the same way. Optionally further vertical seals may be introduced into the tube having the smaller diameter, i.e. the tube to be used as the inner tube **1** to create even more compartments. The tube of smaller diameter, i.e. the inner tube **1** is placed into the tube of larger diameter, i.e. the outer tube **2**.

[0044] The inner tube is fixed to the outer tube by introducing a horizontal seal **5**, thus creating two different open chambers, which may be filled and then sealed by further horizontal seals **5**. Figure 3b shows a plan view on a multi-compartment pouch according to this embodiment (vertical seals not shown).

[0045] Of course at least one further horizontal seal may be introduced over the whole width of the pouch to double the number of compartments and obtain an arrangement similar to that already schematically represented in figure 1 c.

[0046] It is, however, also possible to fill and seal the tube having smaller diameter, i.e. the inner tube, before placing it into the empty tube of larger diameter, i.e. the outer tube (sachet in tube). In this way either a multi-compartment pouch as shown in figure 3b or as shown in figure 3c may be obtained, having one outer compartment **7a** and one or more inner, e.g. three inner compartments **6a**, **6b** and **6c**.

[0047] Of course it is also possible to place more than one tube of small diameter into a tube of larger diameter, such as for example two inner tubes **1a** and **1b** as shown in figure 4a. Filling and sealing leads to a multi-compartment pouch as depicted in figure 4b, having one outer and two inner compartments.

[0048] It should be understood that the figures only serve to illustrate some embodiments of the present invention and that the present invention is not limited to the embodiments shown in said figures. Rather, a person

skilled in the art can easily derive multiple ways of arranging one or more inner tubes and introducing compartments into said assembly by various combinations of vertical and horizontal seals. It is for example also possible to provide a concentric assembly, wherein one small tube is placed into a tube or having a larger diameter and placing said assembly into yet another tube of even larger diameter before introducing vertical seals, filling the open bags and horizontally sealing them to obtain multi-compartment pouches.

[0049] Neither a single compartment nor the whole pouch of the present invention generally is limited to a certain size. However, it is preferable that the total amount of detergent and/or cleaning adjuvants present in the compartments of the pouch is in the range of from 5 to 100 g, more preferably of from 7.5 to 50 g and most preferably of from 10 to 30 g.

[0050] The amount of detergent and/or cleaning adjuvant present in one compartment depends upon the detergent and/or cleaning adjuvant as well as the total number of compartments per pouch and may for example be in the range of from 0.1 to 99.5 g, more preferably of from 0.5 to 95 g, and even more preferably of from 1 to 75 g.

[0051] Accordingly, the volume of the pouch preferably may be in the range of from 3 to 250 mL, more preferably of from 4 to 150 mL, and most preferably of from 5 to 50 mL.

[0052] The pouch of the present invention preferably is made by the method of the present invention.

[0053] It should be understood that the method for making the multi-compartment pouch of the present invention may comprise further steps. For example, the pouches formed by the method as described above may be further packed individually and/or in larger containers for shipment. The pouches also may be folded in order to arrange the compartments present in said pouch in a superposed position or attached to each other to provide a more compact form. Such folded forms may be fixed using an adhesive material, a casing, a mantle, a tape, a cord, a string, a rope, a thread or the like. It may be preferable that the material used for fixing said arrangement disintegrates in water as well.

[0054] Further, the present invention also provides a method for washing or cleaning an article or a surface comprising the steps of:

- i) contacting a multi-compartment pouch as described above with water to form an aqueous solution comprising detergent(s) and/or cleaning adjuvant(s),
- ii) contacting the article or surface to be washed and/or cleaned with said aqueous solution.

[0055] The articles or surfaces to be washed or cleaned include laundry, tableware made of porcelain, ceramics, glass material and the like, cutlery, hard surfaces such as floors, sanitary surfaces and the like, with-

out being limited to these. Thus, the pouches of the present invention may be used in washing and/or cleaning said articles or surfaces, both in manual as well as in automatic washing and/or cleaning.

List of reference signs

[0056]

- 1 inner tube
- 2 outer tube
- 3 water-disintegrable film or foil
- 4 vertical seal
- 5 horizontal seal
- 6 inner compartment
- 7 outer compartment

Claims

1. A method for making a multi-compartment pouch comprising one or more inner compartments (6a - 6c) and one or more outer compartments (7a - 7d), the latter surrounding at least 75 % of the outer surface of said inner compartment(s) (6a - 6c), each compartment (6a - 7 d) being completely surrounded by at least one water-disintegrable film or foil (3), comprising the steps of:
 - i) providing an assembly of essentially tubular shape comprising at least one inner tube (1), which optionally may already be filled with at least one detergent or cleaning adjuvant, and at least one outer tube (2), the latter surrounding at least 75 % of the outer surface of said inner tube(s) (1), by forming said tubes from at least one water-disintegrable film or foil (3) having a set of opposed lateral edges and sealing said lateral edges either to each other or another part of the lateral surface of said tube (vertical seal 4) to fix said tubes,
 - ii) filling in at least one of the inner and/or the outer tubes a portion of detergent and/or cleaning adjuvant,
 - iv) introducing at least one seal below and/or above said portion of detergent and/or cleaning adjuvant (horizontal seal 5).
2. The method according to claim 1, wherein said assembly of essentially tubular shape is formed from at least one continuous flat roll or sheet of said film or foil using the vertical form-film-seal (VFFS) tech-

nique by flapping said film or foil around a preferably hollow tube and vertically sealing said edges to each other or another part of the lateral surface of said tube.

- 5
3. The method according to claim 1 or 2, further comprising the steps of:
 - i) filling at least one gas into at least one of the compartments (6a - 7d) before horizontally sealing it, and/or
 - ii) removing the sealed pouch from the remaining film or foil.
- 10
4. A multi-compartment pouch comprising one or more inner compartment(s) (6a - 6c) and one or more outer compartment(s) (7a - 7d), the latter surrounding at least 75 % of the outer surface of said inner compartment(s), the compartments (6a - 7d) being filled with detergents or cleaning adjuvants wherein each compartment (6a - 7d) is completely surrounded by at least one layer of at least one water-disintegrable film or foil (3) and wherein the number of vertical seals (4) per number of compartments (6a - 7d) in the pouch is above 0 but below 2.
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- 20
- 25
5. The method or the pouch according to any of the preceding claims, wherein at least one and preferably all of the compartments (6a - 7d) in said pouch are filled with a compound or a composition independently selected from the group comprising detergents and cleaning adjuvants and mixtures thereof, even more preferably independently selected from the group comprising dish-washing detergents, laundry detergents, machine cleaning and maintenance detergents, components of the aforementioned detergents, water softening compounds or compositions, lime-scale-preventing compounds or compositions, rinse-aid compounds or compositions or mixtures thereof, wherein most preferably each compartment comprises a different compound or composition.
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- 55
6. A method or a pouch according to any of the preceding claims, wherein the compounds or compositions filled into each compartment independently may represent a solid, a paste, a cream, a wax, a gel, a liquid, a gas or a mixture thereof.
7. A method or a pouch according to any of the preceding claims wherein the pouch is divided into a plurality of compartments (6a - 7d) by introducing additional vertical (4) and/or horizontal seals (5).
8. A method or a pouch according to any of the preceding claims, wherein the water-disintegrable film or foil (3) comprises a polymer selected from the group comprising polyvinyl alcohols (PVA), polyvinyl pyr-

rolidone (PVP), polyvinyl acetate, polyacrylic acid and salts thereof, polyacrylamide (PAA), polyacrylonitrile (PAN), polyalkylene oxides, polyethylene imine, cellulose ethers, hydroxyalkylcelluloses, carboxyalkylcelluloses, alkylcelluloses, polyalkylene glycols, alginates, casein, polysaccharides including gelatines and starches, natural gums including guar gum, copolymers thereof and blends thereof.

9. A method or a pouch according to any of the preceding claims, wherein each seal independently is established by applying any of heat, steam, radiation, ultrasonics, pressure, solvents, adhesives or a combination thereof to the contact surface of the parts of said film or foil to be sealed, wherein preferably the width of each seal independently is in the range of from 0.3 to 30 mm. 10 15
10. A method or a pouch according to any of the preceding claims, wherein the film or foil (3) present in the pouch consists of exactly one type of film or foil and wherein the compartments (6a - 7d) preferably are formed by (i) spirally rolling or folding the film or foil (3) to form at least one inner tube (1) surrounded by at least one outer tube (2) and then fixing this assembly by sealing a part the film or foil (3) forming the inner tube (1) with a part of the film or foil forming the outer tube (2) before filling the tubes and horizontally sealing them according to steps (ii) and (iv) of the method according to claims 1 to 3 or 5 to 9. 20 25 30
11. A method or a pouch according to any of claims 1 to 9, wherein the pouch comprises at least two different films or foils (3a, 3b) and wherein preferably the film or foil (3a) surrounding the inner compartment(s) (6a - 6c) has a disintegration behavior in water different from that of the film or foil (3b) surrounding said outer compartment(s) (7a) and wherein the compartments preferably are formed by (i) separately forming and vertically sealing each tube, before placing the inner tube(s) (1) inside the outer tube(s) (2) to obtain an essentially tubular assembly before filling the tubes and horizontally sealing them according to steps (ii) and (iv) of the method according to claims 1 to 3 or 5 to 9. 35 40 45
12. A method or a pouch according to any of the preceding claims, wherein the total amount of detergent and/or cleaning adjuvants present in the compartments (6a - 7d) of the pouch is in the range of from 5 to 100 g, more preferably of from 7.5 to 50 g and most preferably of from 10 to 30 g. 50
13. A method according to any of the claims 2, 3 or 5 to 12, wherein the number of vertical seals (4) per number of compartments (6a - 7d) in the pouch is above 0 but below 2. 55
14. A pouch according to any of the claims 4 to 12 made by method according to any of claims 1 to 3 or 5 to 13.
15. A method for washing or cleaning an article or a surface comprising the steps of:
- i) contacting a multi-compartment pouch according to any of claims 4 to 12 or 14 with water to form an aqueous solution comprising detergent(s) and/or cleaning adjuvant(s),
 - ii) contacting the article or surface to be washed and/or cleaned with said aqueous solution.

Figure 1a:

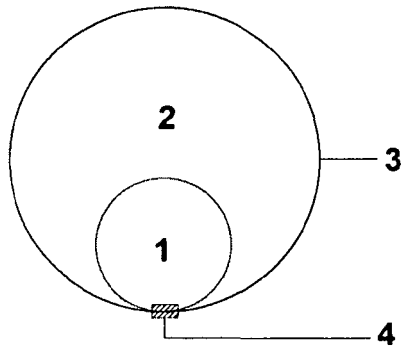


Figure 1b:

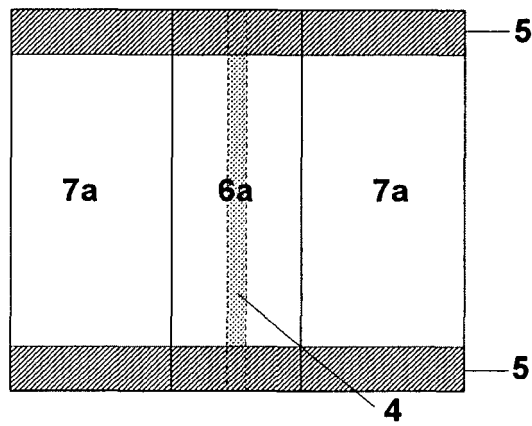


Figure 1c:

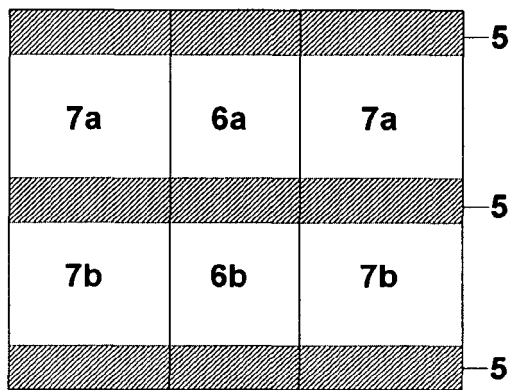


Figure 2a:

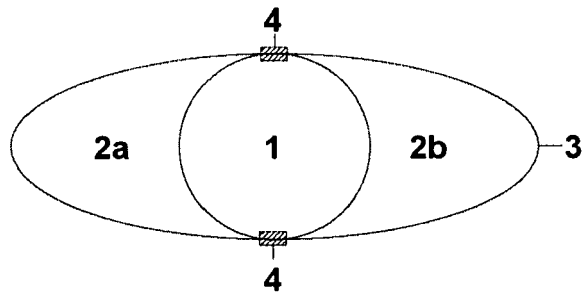


Figure 2b:

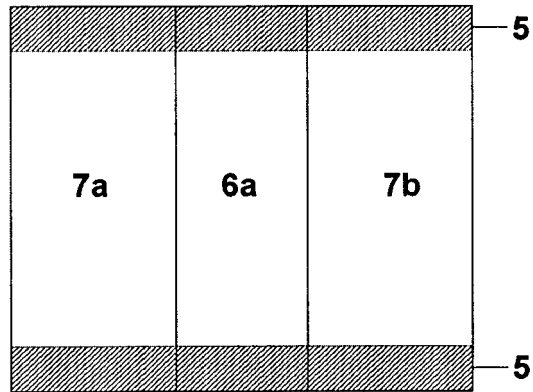


Figure 2c:

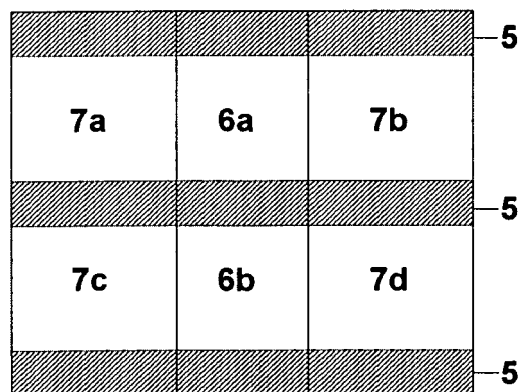


Figure 3a:

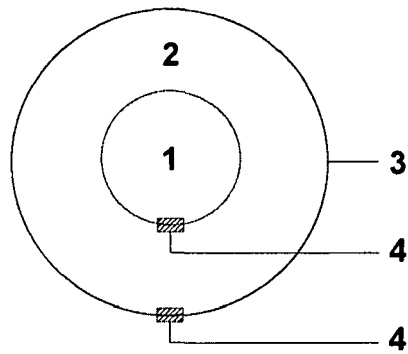


Figure 3b:

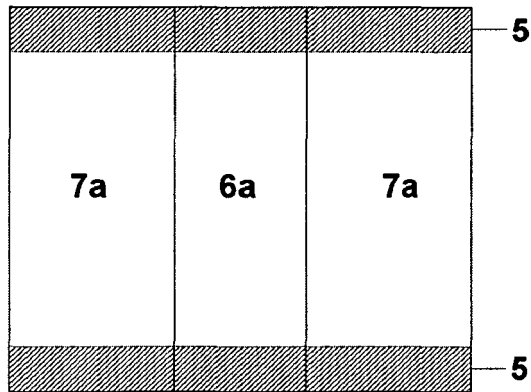


Figure 3c:

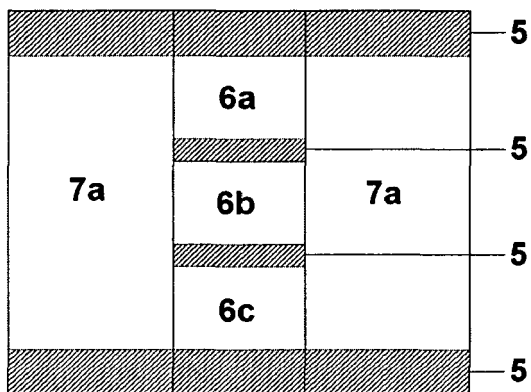


Figure 4a:

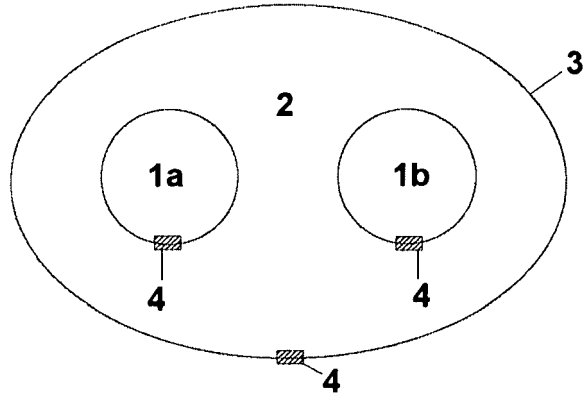
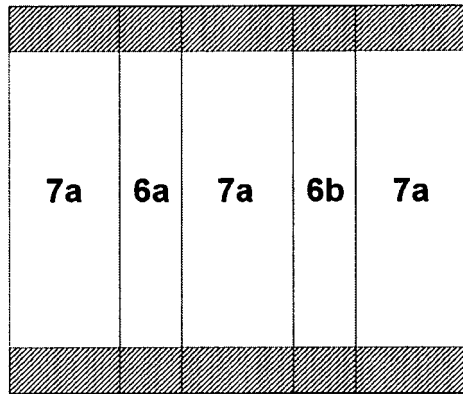


Figure 4b:





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EP 11 00 7384

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1	Place of search Munich	Date of completion of the search 17 February 2012	Examiner Kulhanek, Peter
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			

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17-02-2012

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