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(54) ADAPTOR FOR SHAVING CARTRIDGE

(57) The present invention relates to an adaptor (1) for a shaving cartridge (2) comprising a frame (3) configured to surround a shaving cartridge (2) having at least one shaving blade (4) being provided with a cutting edge (4a), the adaptor (1) being mountable on the shaving cartridge (2), wherein the frame (3) has an upper surface (5), and the adaptor (1) further comprising: a first layer (32) comprising a hydrochromic material, located on top of the upper surface (5) of the frame (3), wherein the first layer (32) reversibly changes appearance from a first state in the absence of water to a second state in the presence of water; and a second layer (33) comprising a hydrophobic material, located on top of the first layer (32). The present invention further relates to a shaving assembly comprising said adaptor, to a razor and to a kit of parts. The present invention further relates to a method for manufacturing the adaptor (1).

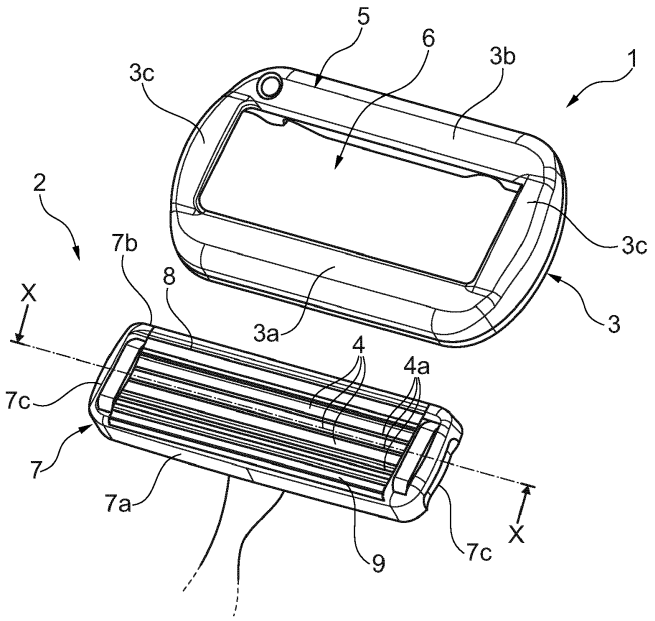

Fig. 1

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Description

Technical Field:

[0001] The present disclosure relates to an adaptor for a shaving cartridge and to a method for manufacturing said adaptor. The present disclosure further relates to a shaving assembly comprising said adaptor and a shaving cartridge, a razor comprising the shaving assembly and a razor handle, and a kit of parts comprising a razor handle and a razor cartridge holder.

Technical Background:

[0002] It is known over the years in the shaver industry to use skin adaptors surrounding the razor (blade) assembly. These skin adaptors allow to maintain a smooth relation between the blades and the skin during shaving in such way that they can prevent any hard pressure from the blades to the skin. This allows to improve the shaving conditions and avoid any damage to the skin resulting from shaving.

[0003] Additionally, during shaving, the razor comes in contact with water. Even though the use of water makes shaving a more pleasant experience by allowing the skin to be lubricated and moisturized, and by allowing skin debris and cut hair to be rinsed out of the blades, residual water that remains for a prolonged time on the razor after its use and while in storage, may lead to unwanted effects. Such unwanted effects can be for example the leaching of the shaving aid, the development of rust on the blades or even the promotion/facilitation of the growth of bacteria or of mold. These effects not only affect the shaving experience and notably the lubrication and cutting properties of the razor, but also reduce the use-life of the razor.

[0004] Furthermore, storing a wet razor, for example in a toiletry bag, not only results in wetting the whole bag (and thus products for which contact with water should be avoided) but also to the proliferation of bacteria or mold in the bag, which lead to unhygienic conditions.

[0005] Therefore, there is still a need for a razor that allows to inform the user that the razor is sufficiently dry to be stored properly so as to increase its use-life and improve the shaving experience and hygiene of the user.

Summary of the Invention:

[0006] It is a first object of the present disclosure to provide an adaptor for a shaving cartridge comprising a frame configured to surround a shaving cartridge having at least one shaving blade being provided with a cutting edge, the adaptor being mountable on the shaving cartridge, wherein the frame has an upper surface, and the adaptor further comprises:

- a first layer comprising a hydrochromic material, located on top of the upper surface of the frame, wherein the first layer reversibly changes appearance from a first state in the absence of water to a second state in the presence of water; and
- a second layer comprising a hydrophobic material, located on top of the first layer.

[0007] According to some embodiments, the frame has a first wall, a second wall parallel to the first wall, and two side walls parallel to each other and perpendicular to the first wall and the second wall, and an opening formed by the first wall, the second wall and the two side walls, such that the cutting edge of the at least one shaving blade is uncovered and accessible through the opening, when the adaptor is mounted on the shaving cartridge.

[0008] According to some embodiments, the first layer has a first color in the absence of water and a second color different from the first color in the presence of water.

[0009] According to some embodiments, the first layer is opaque in the absence of water and is transparent or translucent in the presence of water.

[0010] According to some embodiments, the frame is made from a non-biodegradable material.

[0011] According to some embodiments, the frame is made from a non-porous material.

[0012] According to some embodiments, the frame is made from a plastic material.

[0013] According to some embodiments, the plastic material is chosen from styrenic polymers, polyolefins and mixtures thereof, more specifically chosen from polyethylene, polypropylene, methyl methacrylate acrylonitrile butadiene styrene, acrylonitrile butadiene styrene, high impact polystyrene, styrene-acrylonitrile copolymer, styrene-butadiene copolymer, blends of acrylonitrile butadiene styrene with polyethylene terephthalate, and blends of acrylonitrile butadiene styrene with a polycarbonate polymer, and in particular chosen from acrylonitrile butadiene styrene and methylmethacrylate acrylonitrile butadiene styrene.

[0014] According to some embodiments, the hydrophobic material is chosen from a silicon containing polymer and from a silicon containing long chain alkane, notably a chain comprising more than 8 carbon atoms.

[0015] According to some embodiments, the hydrophobic material is chosen from polydimethylsiloxane, octadecyltrichlorosilane, octadecyldimethylchlorosilane, octyldimethylchlorosilane, heptadecafluorodecyltrimethoxysilane and combinations thereof, more specifically the hydrophobic material is chosen from octadecyltrichlorosilane and/or polydimethylsiloxane and even more specifically the hydrophobic material is octadecyltrichlorosilane.

[0016] According to some embodiments, the hydrophobic material is present in the second layer at an amount of at least 0.1 % by weight, more specifically from 5 to 100 %, more specifically from 10 to 100 %, even more specifically from 20 to 100 %, and in particular from 50 to 100 %, by weight relative to the weight of the second

layer.

[0017] According to some embodiments, the second layer has a thickness from 50 to 5000 μm, more specifically from 100 to 3000 μm, and in particular from 200 to 2500 μm.

[0018] According to some embodiments, the hydrochromic material is chosen from a hydrochromic pigment or a hydrochromic dye.

[0019] According to some embodiments, the hydrochromic material is present in the first layer at an amount of at least 0.1 % by weight, more specifically from 5 to 100 %, more specifically from 10 to 100 %, even more specifically from 20 to 100 %, and in particular from 50 to 100 %, by weight relative to the weight of the first layer.

[0020] According to some embodiments, the first layer has a thickness from 50 to 5000 μm, more specifically from 100 to 3000 μm, and in particular from 200 to 2500 μm.

[0021] According to some embodiments, at least a portion of the frame comprises a coloring agent.

[0022] According to some embodiments, the coloring agent is incorporated in the frame, notably in the material of the frame.

[0023] According to some embodiments, the adaptor further comprises a colored layer located between the upper surface of the frame and the first layer, said colored layer comprising the coloring agent.

[0024] It is a second object of the present disclosure to provide a shaving assembly comprising:

- a shaving cartridge comprising at least one blade, said blade being provided with a cutting edge; and
- an adaptor as disclosed above, wherein the adaptor is mountable on the shaving cartridge.

[0025] It is a third object of the present disclosure to provide a razor comprising:

- a razor handle, and
- the shaving assembly disclosed above.

[0026] According to some embodiments, the razor cartridge is either releasably attached to the razor handle via a pivotable or non-pivotable connection, integrally formed with the razor handle via a non-pivotable connection, or integrally formed with the razor handle via a pivotable connection.

[0027] It is a fourth object of the present disclosure to provide a kit of parts comprising:

- a razor handle, and
- a razor cartridge holder comprising at least two shaving assemblies as disclosed above.

[0028] It is a fifth object of the present disclosure to provide a method for manufacturing the adaptor disclosed above, comprising:

- providing an adaptor comprising a frame configured to surround a shaving cartridge having at least one shaving blade being provided with a cutting edge, the adaptor being mountable on the shaving cartridge and the frame having an upper surface;
- forming a first layer comprising a hydrochromic material on the upper surface of the frame, wherein the first layer reversibly changes appearance from a first state in the absence of water to a second state in the presence of water; and
- forming a second layer comprising a hydrophobic material on top of the first layer.

[0029] According to some embodiments, the first layer is formed by applying a hydrochromic composition comprising the hydrophobic material on the upper surface of the frame.

[0030] According to some embodiments, the hydrochromic composition comprises the hydrochromic material and a solvent.

[0031] According to some embodiments, the hydrochromic material is present in the hydrochromic composition at an amount from 1 to 90 %, more specifically from 5 to 60%, and in particular from 10 to 40 % by weight relative to the weight of the hydrochromic composition.

[0032] According to some embodiments, the solvent present in the hydrochromic composition is an aqueous solvent, in particular water.

[0033] According to some embodiments, the step of forming a first layer is repeated, more specifically repeated at least one more time, and in particular repeated from one to three times.

[0034] According to some embodiments, the second layer is formed by applying a hydrophobic composition comprising the hydrophobic material.

[0035] According to some embodiments, the hydrophobic material is present in the hydrophobic composition at an amount from 0.1 to 25 %, more specifically from 0.1 to 15 %, more specifically from 0.5 to 10 %, and in particular from 0.5 to 5 % by weight relative to the weight of the hydrophobic composition.

[0036] According to some embodiments, the hydrophobic composition further comprises a solvent, more specifically an organic solvent, even more specifically an organic solvent chosen from a ketone, an ether, and an alcohol, and in particular the organic solvent is chosen from ethanol, isopropyl alcohol, diethylether, acetone.

[0037] According to some embodiments, the solvent is present in the hydrophobic composition at an amount from 75 to 99.9 %, more specifically from 85 to 99.9 %, more specifically from 90 to 99.5 %, and in particular from 95 to 99.5 % by weight relative to the hydrophobic composition.

[0038] According to some embodiments, the step of forming a second layer is repeated, more specifically repeated at least one more time, and in particular repeated from one to three times.

[0039] According to some embodiments, the method

further comprises a step of applying a colored composition comprising a coloring agent on the upper surface of the frame, said step being carried out prior to the step of forming a first layer.

[0040] According to some embodiments, the method further comprises a step of modifying the upper surface of the frame, said step being carried out prior to the step of forming a first layer.

[0041] According to some embodiments, the method further comprises a step of heating the frame (3), said step being carried out after the step of forming a first layer (32) and/or after the step of forming a second layer (33).

[0042] According to some embodiments, the step of heating is carried out after the step of forming a first layer (32) at a temperature from 30 to 150°C, more specifically from 40 to 120°C, and in particular from 60 to 100°C.

[0043] According to some embodiments, the step of heating is carried out after the step of forming a first layer (32) for a duration of 30 seconds to 10 hours, more specifically from 1 minute to 6 hours, more specifically from 1 minute to 2 hours, and in particular from 1 to 15 minutes.

[0044] According to some embodiments, the step of heating is carried out after the step of forming a second layer (33) at a temperature from 25 to 150°C, more specifically from 30 to 120°C, and in particular from 30 to 100°C.

[0045] According to some embodiments, the step of heating is carried out after the step of forming a second layer (33) for a duration of 30 seconds to 15 hours, more specifically from 1 minute to 10 hours, and more specifically from 1 minute to 8 hours. The present disclosure makes it possible to address the need mentioned above. In particular, the present disclosure relates to a razor that allows to inform the user that the razor is sufficiently dry to be stored properly so as to increase its use-life and improve the shaving experience and hygiene of the user.

[0046] This is achieved with the adaptor (or skin adaptor) of the present disclosure. More particularly, the adaptor of the present invention comprises a frame that is mountable on the shaving cartridge and that is configured to surround the shaving cartridge (once mounted on the shaving cartridge). The frame may be made of a material such as plastic material and comprises an upper surface (or else skin contact surface i.e. the surface that faces towards the skin and is in contact with the skin during shaving). This upper surface has a first layer comprising a hydrochromic material which is located on top of the upper surface. The layer comprising a hydrochromic material allows to reversibly change appearance in the presence of water. In other words, the hydrochromic material (and thereby the first layer) has a first state in a dry state. Once the adaptor is in contact with water, the layer comprising the hydrochromic material changes appearance from the first state to a second state that indicates that the adaptor (thus the razor) is wet. Such change may be observed in a few minutes or more specifically in a few seconds. It shall be noted that, surprisingly, such rapid state change cannot be observed in case the hydrochromic material is dispersed/impregnated in the material, in particular the plastic material, of the frame, as the reaction time would be significantly slower. Once the first layer comprising the hydrochromic material is allowed to dry, its appearance changes back to its first state. In other words, the hydrochromic material is a reversible hydrochromic material.

[0047] It shall also be noted that in case the frame is made of (synthetic) plastic and not from natural polymers such as cellulosic polymers, PHA, PHB or other natural-derived polyesters, this is advantageous for the state (or appearance) change to be reversible. In fact, in case of a natural-deriving polymeric material, water can form hydrogen bonds with said material and as a result the water cannot be desorbed back to the atmosphere. This means that the state (or appearance) change could, in this case be irreversible. In case of the present disclosure, once the adaptor is dry, the layer of hydrochromic material returns back to its initial first state so as to indicate to the user that the razor can be properly stored.

[0048] Furthermore, the frame also comprises a second layer comprising a hydrophobic material on top of the first layer. Due to the presence of the hydrophobic material, this layer allows for less water to enter in the first layer, and thus for less water to be evaporated. This layer thus makes it possible to reduce the reversibility time in comparison to an adaptor devoid of such second layer, so that the razor returns to its initial state/appearance more quickly. In addition, this also allows for water to be desorbed more rapidly so that the user does not wait for a long period of time to store the razor. More specifically, the first layer can return to its initial state in less than 30 minutes, and in particular in less than 20 minutes from the moment the adaptor is no longer in contact with water during shaving.

Brief Description of the Drawings:

[0049]

Figure 1 illustrates a perspective view of an adaptor and a shaving cartridge according to the invention.

Figure 2 illustrates a schematical cross-sectional view representing the different layers of an adaptor according to the invention.

Detailed Description:

[0050] The invention will now be described in more detail without limitation in the following description.

[0051] According to a first aspect, and by making reference to **Figures 1** and **2**, the disclosure relates to an adaptor (or skin adaptor) 1 for a shaving cartridge 2. Said adaptor 1 is mountable on a shaving cartridge 2. The adaptor 1 according to the first aspect comprises a frame 3 that is configured to surround the shaving cartridge 2

once the adaptor 1 is mounted on the shaving cartridge 2. Said shaving cartridge 2 (that will be described in more detail below) has at least one shaving blade 4 being provided with a cutting edge 4a.

[0052] The adaptor 1 can be a separate member provided with a frame 3 and thus be attachable to the shaving cartridge 2. The frame 3 has an upper surface 5. By "*upper surface*" is meant the surface that in use faces towards (and is in contact with) the shaving surface (skin). Thus, by "*lower surface*" is meant the surface that faces at the opposite direction of the shaving surface. The adaptor 1 may receive preferably frictionally the shaving cartridge 2 such that it can be mounted and naturally maintained on the shaving cartridge 2; this means that the frame 3 of the adaptor 1 is designed to cooperate with friction with the shaving cartridge 2. The adaptor 1 can also be elastically mountable on the shaving cartridge 2 more precisely the frame 3 of the adaptor 1 might deform elastically during its connection to the shaving cartridge 2. This means that the elasticity of the frame 3 is higher than that of the shaving cartridge 2. According to the friction forces and to the elasticity of the adaptor 1, after mounting, the adaptor 1 can be permanently connected to the shaving cartridge 2 or preferably releasably (i.e. detachably) connected to the shaving cartridge 2. When the adaptor 1 is releasably connected to the shaving cartridge 2, the friction between the adaptor 1 and shaving cartridge 2 might be such that the adaptor 1 is maintained on the shaving cartridge 2 such that it allows the shaving without any risk of detachment. Besides, the voluntary release/detachment of the adaptor 1 from the shaving cartridge 2 can be realized without using a significant force (the separation of the adaptor 1 from the shaving cartridge 2 can be obtained without the help of any tool). In any case, the adaptor 1 may be motionless secured to the shaving cartridge 2. The adaptor 1 can for instance be snap-fitted to the shaving cartridge 2 (for example via protrusions present on the frame). Thus, when attached to the shaving cartridge 2, the adaptor 1 cannot move and/or deflect with regard to the shaving cartridge 2. An example of the geometry of an adaptor 1 according to the present disclosure is described in the document WO 2014/202139 which is incorporated by reference herein.

[0053] According to some embodiments, the frame 3 of the adaptor 1 has a first wall (front wall) 3a and a second wall (rear wall) 3b. The terms "*front wall*" and "*rear wall*" make reference to the part of the frame 3 that once mounted on the shaving cartridge 2 and during shaving, comes to contact with the skin of the user before and after the blade 4 respectively. The second wall 3b may be parallel (and opposite) to the first wall 3a. In addition, the frame 3 may further comprise two side walls 3c parallel to each other and perpendicular to the first wall 3a and the second wall 3c. Thus, an opening 6 may be formed by the first wall 3a, the second wall 3b and the two side walls 3c, such that the cutting edge 4a of the at least one shaving blade 4 is uncovered and accessible through the opening 6, when the adaptor 1 is mounted on the shaving cartridge 2. It is preferable that the opening 6 is shaped in order to fit the shaving cartridge 2.

[0054] According to some embodiments, the frame 3 may be made from a non-biodegradable material. By "*biodegradable*" is meant that the material can be decomposed by the action of living organisms, usually microbes, into water, carbon dioxide, and biomass, in particular decomposed in a reasonably small amount of time for example in less than 2 years from the moment it is disposed. Thus, the frame 3 according to the present disclosure may not disintegrate, in other words it may not break down into substances found in nature; it may be chemically stable.

[0055] According to some embodiments, the frame 3 may be made from a non-porous material. In other words, the material may be devoid of pores. The fact that the material is non-porous allows, when the razor is in contact with water, for the water not to enter in the plastic part but only remain on its surface (the surface of the frame 3).

[0056] The frame 3 of the adaptor 1 may be plastic i.e. may be made of a plastic material. By "*plastic material*" is meant a material made of synthetic or semi-synthetic polymers. In other words, the term plastic, in the context of the present invention does not include natural polymers or material deriving from natural polymers such as cellulosic material, polyhydroxyalcanoates (PHA) such as polylactic acid, and polyhydroxybutyrate or other natural-derived polyesters such as polylactide, and polyglycolide.

[0057] According to some embodiments, the plastic material is chosen from styrenic polymers, polyolefins and mixtures thereof. More specifically, the plastic material is chosen from polyethylene, polypropylene, methylmethacrylate acrylonitrile butadiene styrene, acrylonitrile butadiene styrene, high impact polystyrene, styrene-acrylonitrile copolymer, styrene-butadiene copolymer, blends of acrylonitrile butadiene styrene with polyethylene terephthalate, and blends of acrylonitrile butadiene styrene with a polycarbonate polymer. In preferred embodiments, the plastic material is chosen from acrylonitrile butadiene styrene and methylmethacrylate acrylonitrile butadiene styrene.

[0058] According to some embodiments, at least a portion of the frame 3, notably at least one portion of the plastic, and more specifically the whole portion of the frame (notably of the plastic), comprises a coloring agent. The coloring agent can be one or more pigments or one or more dyes.

[0059] The term "*dyes*" should be understood as meaning colored, mineral or organic particles of any form, which are soluble in the medium in which they are solubilized, i.e. the aqueous medium of the aqueous gel ink. Advantageously, the dye is not a thermochromic dye or a photochromic dye or a pressure sensitive dye.

[0060] The dye may be chosen for example in the group consisting of direct dyes (for example C.I direct black 17, 19, 22, 32, 38, 51, 71; C.I direct yellow 4, 26, 44,

50; C.I direct red 1, 4, 23, 31, 37, 39, 75, 80, 81, 83, 225, 226, 227; C.I direct blue 1, 15, 41, 71, 86, 87, 106, 108, 199, and the like), acid dyes (for example C.I acid black 1, 2, 24, 26, 31, 52, 107, 109, 110, 119, 154; C.I acid yellow 1, 7, 17, 19, 23, 25, 29, 38, 42, 49, 61, 72, 78, 110, 127, 135, 141, 142; C.I acid red 8, 9, 14, 18, 26, 27, 33, 35, 37, 51, 52, 57, 82, 83, 87, 92, 94, 111, 129, 131, 138, 186, 249, 254, 265, 276; C.I acid violet 15, 17, 49; C.I acid blue 1, 3, 7, 9, 15, 22, 23, 25, 40, 41, 43, 62, 78, 83, 90, 93, 100, 103, 104, 112, 113, 158; C.I acid green 3, 9, 16, 25, 27; C.I acid orange 56, and the like), food dyes (such as C.I. food yellow 3, and the like), Malachite green (C.I 4200) Victoria blue FB (C.I. 44045) methyl violet FN (C.I. 42535), rhodamine F4G (C.I. 45160), and rhodamine 6GCP (C.I 45160), and mixtures thereof.

[0061] The term "*pigment*" should be understood as meaning white or colored, mineral or organic particles of any form, which are insoluble in the medium in which they are solubilized.

[0062] The pigment may for example be an inorganic pigment such as a carbon black, ultramarine and titanium dioxide pigment, an organic pigment such as an azo-based pigment, phthalocyanine-based pigment, indigo pigment, thioindigo pigment, thren pigment, quinacridone-based pigment, anthraquinone-based pigment, thron-based pigment, diketopyrrolopyrrole-based pigment, dioxazine-based pigment, perylene-based pigment, perinone-based pigment and isoindolinone-based pigment, a fluorescent pigment, light-storing pigment, a pearlescent pigment, synthetic mica, glass flake, alumina and transparent film with a metal oxide such as titanium oxide, and the like. The pigments are also generally contained in a dispersion, where the grinding down or particle size reduction is accompanied by appropriate dispersants to achieve stable dispersions. The pigment is specifically a pigment dispersion, more specifically chosen in the group consisting of pigment black 7 (such as Flexiverse III black 7 by SunChemical®), pigment blue 15:3 (such as APE FRE BL 15:3 DISP by SunChemical®), pigment red (such as Pigment red 210 by SunChemical®), pigment green 7 (such as Sunsperse Eco green, Flexiverse FD Green, Flexiverse Green 7, Flexiverse HC GRN 7 by SunChemical®), pigment violet 23 (such as Cellusperse® A Violet 4 BP by SunChemical®), pigment yellow 74 (such as FG Yellow 1SL by SunChemical®) and mixtures thereof. In a specific embodiment, the pigment is chosen in the group consisting of pigment black 7 (such as Flexiverse III black 7 by SunChemical®), pigment blue 15:3 (such as APE FRE BL 15:3 DISP by SunChemical®), and mixtures thereof.

[0063] In some embodiments, the diameter of the pigment in the pigment dispersion is less than 1 μm, and preferably less than 0.7 μm.

[0064] More specifically, according to some embodiments, the coloring agent may be incorporated/impregnated in the (plastic) material on the frame 3. This allows for the frame 3 to be colored. For example, this can be achieved by mixing the material from which the frame 3 is made with a coloring agent during the manufacture process of the adaptor 1. In this case, it is preferable that the whole frame 3 comprises a coloring agent.

[0065] According to additional or alternative embodiments (and as illustrated in **Figure 2**), the coloring agent may form a colored layer 31 located on the upper surface 5 of the frame 3. Such layer 31 may be present on the whole area of the upper surface 5 of the frame 3 (thus it may cover the whole upper surface 5 of the frame 3) or only on part of the area of the upper surface 5 of the frame 3 (thus covering only a part of the upper surface 5 of the frame 3). This allows for a pattern/design/logo to be formed on the upper surface 5 of the frame 3. Such pattern/design/logo can be formed for example by printing the colored pattern on the upper surface 5 of the frame 3 (notably by inkjet printing or screen printing or pad printing) or by heat transfer or mold labeling of a pattern on the upper surface 5 of the frame 3.

[0066] The adaptor 1 according to the present disclosure further comprises a first layer 32 located on the frame 3, and more particularly on top of the upper surface 5 of the frame 3 (or on top of the colored layer 31 if such layer is present).

[0067] According to some embodiments, the first layer 32 may be present on a part of the area of the upper surface 5 of the frame 3, i.e. may cover only a part of the upper surface 5 of the frame 3, preferably the part comprising the colored layer 31 if present.

[0068] According to other preferred embodiments, the first layer 32 may be present on the whole the area of the upper surface 5 of the frame 3, i.e. may cover the whole upper surface 5 of the frame 3.

[0069] The first layer 32 comprises a hydrochromic material. By "*hydrochromic material*" is meant a material that allows to reversibly change its state and thus the appearance/state of the first layer 32, notably color or opacity, when exposed to water or moisture. In other words, by "*hydrochromic material*" is meant a material that allows to reversibly change its state and thus the appearance/state of the first layer 32, notably color or opacity, depending on the presence of water. By "*changing appearance*" is meant that the hydrochromic material has a first state in its dry state (i.e. in the absence of water) and a second state different from the first state in its wet state (i.e. in the presence of water).

[0070] According to some embodiments, such state (and appearance) may make reference to a color change. In other words, the first layer 32 comprising the hydrochromic material (and thus the hydrochromic material itself) may have a first color in the absence of water (dry state) and a second color different from the first color in the presence of water (wet state).

[0071] According to other embodiments, such state (and appearance) may make reference to a change in the opacity of the material. In other words, the first layer 32 comprising the hydrochromic material (and thus the hydrochromic material itself) may be opaque in the absence of water (dry state) and transparent or translucent

in the presence of water (wet state). By "*transparent*" is meant a material that allows light to pass through so that the color/design/pattern behind can be distinctly see. By "*translucent*" or semitransparent is meant a material that allows light to pass but detailed shapes cannot be distinguished. This embodiment is advantageous in case the frame 3 comprises a coloring agent (either incorporated in the plastic or as a layer/coating 31 on the upper surface 5 of the frame 3 as detailed above). Thus, when in the dry state, the first layer 32 is opaque, and once wet it becomes transparent and reveals the color/pattern beneath.

[0072] In the context of the present invention, this change of appearance i.e. this hydrochromic behavior is reversible. Thus, the hydrochromic material is a reversible hydrochromic material. This means that its appearance (and thus the appearance of the first layer 32) changes from a first state in the absence of water to a second state in the presence of water and from the second state in the presence of water to the first state in the absence of water. Therefore, in the case of the present invention, when the initial appearance/state of the adaptor has return, this would mean that the user can properly store the razor. It shall be noted that as the adaptor 1 dries up, some areas of the first layer 32 remain wet while others have already dried up, therefore at some point while drying, the first layer 32 of the frame 3 (and thus of the adaptor) may comprise two different appearances/states. This state would be indicative that the adaptor 1 is starting to dry up and that it could soon be stored.

[0073] The hydrochromic materials used in the context of this invention are not limited, a variety of hydrochromic materials can be used to achieve the adaptor 1 according to the present disclosure. According to some embodiments, the hydrochromic material used can derive from a hydrochromic composition comprising one or more hydrochromic materials such as a hydrochromic pigment or a hydrochromic dye in a carrier medium.

[0074] According to some embodiments, the hydrochromic material can change its refractive index in the presence of water/moisture. The result of such change is the change in appearance (color or opacity, preferably opacity) of the hydrochromic material (pigment or dye). Exemplary hydrochromic piments may include one or more of diammonium zinc biscarbonate, sodium aluminum silicate, alumina trihydrate, and/or micronized amorphous silica gel. In some examples, the hydrochromic pigment may be comprised in an aqueous solution, an alcohol-based solution, in an emulsion (e.g., an acrylic acid ester copolymer emulsion), or another suitable formulation. For example, the hydrochromic composition may comprise hydrochromic pigment(s) suspended in an acrylic polymer emulsion, preferably in an aqueous based acrylic polymer emulsion. Said compositions may further comprise other components such as solvents, binders, humectants, surfactants, biocides, buffers, lubricants, dyes or non-hydrochromic pigments. For example, as hydrochromic pigments silica or a silica/aluminum dioxide/sodium oxide mixture can be used. The hydrochromic composition may further comprise other materials, such as photoinitiators. For purely indicative purposes, the "*Hydro-Chromic White C-1224*" ink from the company Matsui Shikiso Chemical can thus be used. The same goes for "*C.I.N.O*" ink from New Color Chemical and for the Water Based Wet & Reveal Screen Ink "Cham. WB Sc. Wet & Rev. White/Clear" (1410HY-DREV40) from Hallcrest. According to other embodiments, the hydrochromic material has a structure that allows for it to undergo a conjugate acid-base reaction in the presence of an aqueous solution or a polar solvent. For example, the hydrochromic material may be present as an acid in the first layer 32 and contact with an aqueous solution may convert the hydrochromic material to its conjugate base. In this case, the hydrochromic material may change from a first color to a second color depending on the presence of water. According to some embodiments, the hydrochromic material may derive from a composition comprising the hydrochromic material and a solvent. The hydrochromic material may be a hydrochromic dye, more specifically chosen from Malachite green, brilliant green, crystal violet, erythrosine B, methyl green, methyl violet 2D, picric acid, naphthol yellow S, quinaldine red, eosine Y, metanil yellow, m-cresol purple, thymol blue, xylenol blue, basis fuchsin, eosin B, 4-p-aminophenol(azo)benzenesulphonic acid-sodium salt, cresol red, martius yellow, phloxine B, methyl yellow, bromophenol blue, congo red, methyl orange, bromochlorophenol blue (water soluble or free acid form), ethyl orange, fluorocene WS, bromocresol green, chrysoidine, methyl red sodium salt, alizarine red S- H20, cochineal, chlorophenol red, bromocresol purple, 4-naphtha, alizarin, nitrazine yellow, bromothymol blue, brilliant yellow, neutral red, rosalic acid, phenol red, 3-nitro phenol, orange II, phenolphthalein, o-cresolphthalein, nile blue A, thymolphthalein, aniline blue WS, alizarine yellow GG, mordant orange, tropaolin O, orange G, acid fuchsin, thiazol yellow G, indigo carmine and combinations thereof. Said hydrochromic dyes may preferably be complexed with a first-row transition metal such as Vanadium (V), Chromium (Cr), Manganese (Mn), Iron (Fe), Cobalt (Co), Nickel (Ni), and Copper (Cu). The solvent present in this hydrochromic composition can be selected from methanol, ethanol, n-propanol, isopropanol, butanol, octanols, acetonitrile, diacetone alcohol, benzyl alcohol, methoxy propanol, butyl glycol, glycol ethers including but not limited to ethylene glycol monomethyl ether, ethylene glycol monoethyl ether, diethylene glycol monobutyl ether, ethylene glycol monophenyl ether, dipropylene glycol monomethyl ether, propylene glycol monoethyl ether, propylene glycol monobutyl ether, and propylene glycol monophenyl ether, methoxy butanol, ethylene glycol, propylene glycol, dioxane, tetrahydrofuran, methyl cellulose, ethyl cellulose, butyl cellulose, methoxy propyl acetate, methyl acetate, ethyl acetate, propyl acetate, butyl acetate, 3-methoxybutyl acetate, butyl gly-

collate, butyl butoxyacetate, dibutyl 2,2'-oxybisacetate, dibasic esters, ethyl lactate, acetone, methylethylketone, methylisobutylketone, cyclohexanone, terpineol, acetic acid, dimethyl sulfoxide and combinations thereof. Other components/additives that can be present in said composition include surfactants, wetting agents, opacifiers, waxes, slip agents, drying rate modifiers, crosslinkers, ionic species, surface tension modifiers, matting agents, organic anhydrides, leveling agents, UV stabilizers and combinations thereof.

[0075] In all the above compositions, non hydrochromic pigment or dyes can also be present in the hydrochromic composition for adjusting the color of the coating. For example, the non hydrochromic pigment or dye may be selected from the group consisting of titanium dioxide, aluminum oxide, iron oxide, FD&C Blue No. 1, FD&C Blue No. 2, FD&C Green No. 3, FD&C Red No. 40, FD&C Red No. 4, FD&C Yellow No. 5, FD&C Yellow No. 6, C.I. Food Blue 5, and C.I. Food Red 7, D&C Yellow No. 10, D&C Yellow No. 7, D&C Yellow No. 2, D&C Yellow No. 8, D&C Orange No. 4, D&C Red No. 22, D&C Red No. 28, D&C Red no. 33, D&C Green No. 8, D&C Green No. 5, D&C Brown No. 1 , Pigment Red 122, Pigment Red 53:1, Pigment Red 48:2, Pigment Red 48:3, Pigment Red 57:1, Pigment Red 184, Pigment Red 289, Pigment Black 7, Pigment Violet 19, Pigment Violet 23, Pigment Blue 15:3, Pigment Blue 15:4, Pigment Green 7, Pigment Green 38, Pigment Yellow 13, Pigment Yellow 14, Pigment Yellow 74, Pigment Yellow 83, Pigment Orange 5, Pigment Orange 34, Pigment Orange 36, and combinations thereof.

[0076] According to some embodiments, the hydrochromic material may be present in the first layer 32 at an amount of at least 0.1 % by weight, more specifically from 5 to 100 %, more specifically from 10 to 100 %, even more specifically from 20 to 100 %, and in particular from 50 to 100 %, by weight relative to the weight of the first layer 32.

[0077] The first layer 32 may have a thickness from 50 to 5000 μm, more 100 to 3000 μm, and in particular from 200 to 2500 μm. The above-disclosed thickness is advantageous as it allows to optimally cover/conceal the pattern or color of the frame 3 in the dry state and to clearly reveal the pattern or color of the frame 3 in the wet state (notably when the first layer 32 is opaque in the absence of water and transparent in the presence of water).

[0078] The adaptor 1 according to the present disclosure further comprises a second layer 33 located on the frame 3, and more particularly on top of the first layer 32. The second layer 33 comprises a hydrophobic material. By "*hydrophobic*" is meant a material that repels water, i.e. has no affinity for water. As explained above, the second layer 33 comprising the hydrophobic material allows for less water to enter in the first layer 32, and thus for less water to be evaporated. This layer 33 thus makes it possible to reduce the reversibility time in comparison to an adaptor 1 devoid of such second layer 33. In addition, this also allows for water to be desorbed lower amount of time so that the user does not wait for a long period of time to store the razor. More specifically, the first layer 32 can return to its first state in less than 30 minutes, and in particular in less than 20 minutes from the moment the adaptor 1 is no longer in contact with water during shaving.

[0079] According to some embodiments, the second layer 33 may be present on a part of the area of the upper surface 5 of the frame 3 i.e. it may cover only a part of the upper surface 5 of the frame 3, preferably it may cover the whole part of the upper surface 5 comprising the first layer 32 (if the first layer 32 is only present in a part of the area of the upper surface 5 of the frame 3).

[0080] According to other preferred embodiments, the second layer 33 is present on the whole area of the upper surface 5 of the frame 3, notably on the whole area of the first layer 32, i.e. may cover the whole upper surface 5 of the frame 3 and the whole first layer 32.

[0081] According to some embodiments, the hydrophobic material may comprise at least one silicone atom. It may be for example chosen from a silicon containing polymer and from a silicon containing long chain alkane. By "*long chain*" is meant an alkane chain comprising more than 8 carbon atoms. According to preferred embodiments, the hydrophobic material may be chosen from polydimethylsiloxane (PDMS), octadecyltrichlorosilane (OTS), octadecyldimethylchlorosilane, octyldimethylchlorosilane, heptadecafluorodecyltrimethoxysilane and combinations thereof. In particular, the hydrophobic material may be chosen from octadecyltrichlorosilane and/or polydimethylsiloxane and more specifically the hydrophobic material may be octadecyltrichlorosilane.

[0082] According to some embodiments, the hydrophobic material may be present in the second layer 33 at an amount of at least 0.1 % by weight, more specifically from 5 to 100 %, more specifically from 10 to 100 %, even more specifically from 20 to 100 %, and in particular from 50 to 100 %, by weight relative to the weight of the second layer 33.

[0083] The second layer 33 may have a thickness from 50 to 5000 μm, more specifically from 100 to 3000 μm, and in particular from 200 to 2500 μm. Said thickness of the second layer 33 is advantageous for achieving the optimal/desired hydrophobicity and thus the desired reversibility time. As a matter of fact, it was surprisingly discovered that above the disclosed thickness, the hydrophobic effect may decrease.

[0084] According to a second aspect, the present disclosure relates to a shaving assembly comprising the adaptor 1 described above. The shaving assembly according to the invention further comprises a shaving cartridge 2 comprising at least one blade 4, said blade 4 being provided with a cutting edge 4a. The shaving cartridge 2 may comprise a housing 7. The housing 7 may comprise a front part, and a rear part. As used herein, the terms "*front*/*forward*", "*back*/*rear*"," and derivatives there-

of may refer to an orientation or direction of the housing with respect to the shaving direction. By "*front part*" is meant the part of the housing 7 that, during shaving, comes to contact with the skin of the user prior to the blade. By "*rear part*" is meant the part of the housing 7 that during shaving, comes to contact with the skin of the user after the blade.

[0085] The housing 7 may be defined by a front wall 7a, and a rear wall 7b parallel (and opposite) to the front wall 7a, and two side walls 7c parallel to each other and perpendicular to the front wall 7a and the rear wall 7b. Again, the terms "*front wall*" and "*rear wall*" make reference to the part of the housing 7 that during shaving, comes to contact with the skin of the user before and after the blade 4 respectively. Thus, an opening may be formed by the front wall 7a, the rear wall 7b and the two side walls 7c, into which the one or more shaving blades 4 are located. The (shaving) blades 4 might be movably mounted on elastic fingers provided on the housing 7 or might be fixed. The number of shaving blades 4 may be between one and five for instance, and more specifically from three or four.

[0086] The housing 7 may be elongated, extending along a longitudinal axis X-X i.e. the front wall 7a and rear wall 7b may have a higher length than the two sidewalls 7c. The cutting edge 4c of the razor blade(s) 4 may extend longitudinally along the front wall 7a and the rear wall 7b.

[0087] The housing 7 may further comprise a cap 8, notably located at the rear part (wall) 7b of the housing 7. Said cap 8 may comprise one or more lubrication members. The housing 7 may further comprise one or more guard structures 9, notably located at the front part (wall) 7a of the housing 7. Thus, the one or more guard structures 9 may be positioned in front of the blades 4 and may be joined to or integral with the housing 7.

[0088] The adaptor 1 may be slidably mountable and/or mountable by snap-fit and/or mountable by encasing on a shaving cartridge 2.

[0089] According to some embodiments, the frame 3, and thus the adaptor 1 may be reversibly mountable (detachable) on the shaving cartridge 2. By "*reversibly mountable*" it means that after the adaptor 1 being mounted (i.e. attached) on the shaving cartridge 2, it can be released/detached from the shaving cartridge 2. This makes it possible for the user to remove/detach a first adaptor 1, having for example a specific color and/or pattern and/or design, and attach to the shaving cartridge 2 a second adaptor 1 having a different color and/or pattern and/or design.

[0090] According to some alternative embodiments, the adaptor 1 according to the present invention is the housing 7 itself. In this case, the shaving cartridge 2 does not comprise an additional housing.

[0091] The shaving assembly may also be provided with connecting means for connecting the shaving assembly a razor handle. More precisely, either the shaving cartridge 2 or the adaptor 1 can be provided with connecting means for connecting the shaving assembly to a razor handle (such means are not illustrated in the figure). Depending on the connecting means, the connection between the razor handle and the shaving assembly is fixed or pivotable (as explained below).

[0092] According to a third aspect, the present disclosure relates to a razor comprising the shaving assembly disclosed above and a razor handle. The handle can extend in a handle direction between a proximal end and a distal end. The shaving assembly can be coupled with the distal end of the handle.

[0093] According to some embodiments, the shaving assembly can be releasably attached to the razor handle via a pivotable or non-pivotable connection. Such releasably attachment can be carried out for example by a lock and release mechanism.

[0094] According to other embodiments, the shaving assembly can be integrally formed with the razor handle, such that the shaving assembly is not configured to be removably coupled with or selectively separated from the handle. In this case, the connection between the shaving assembly and the handle may be a pivotable connection or a non-pivotable connection.

[0095] The handle may be any suitable shape to allow a user to securely grip the handle. It is foreseen that the handle may include one continuous curve or include one straight portion or several curved and/or straight portions extending along an entirety of or a substantial portion of the handle without deviating from the scope of the present inventive concept.

[0096] According to a fourth aspect, the present disclosure relates to a kit of parts comprising a razor handle (as described above) and a razor cartridge holder. The razor cartridge holder comprises at least two shaving assemblies as described above.

[0097] According to a fifth aspect, the present invention relates to a method for manufacturing the adaptor 1 described above. Said method comprises a step of providing an adaptor 1 comprising a frame 3 configured to surround a shaving cartridge 2 described above once mountable on the shaving cartridge 2. The geometry of the adaptor 1 is described above. According to some embodiments, the frame 3 comprises a coloring agent incorporated therein (in the material of the frame 3). According to other (less preferred) embodiments, the frame 3 is devoid of coloring agent incorporated in it.

[0098] The method according to the present disclosure may comprise a step of applying a composition comprising a coloring agent on the upper surface 5 of the frame 3. Said composition may comprise at least one coloring agent and at least one solvent. The coloring agent is detailed above. The solvent may be an aqueous or organic solvent depending on the nature of the coloring agent. This step allows to form a colored layer 31 on the upper surface 5 of the frame 3. In fact, as explained above, this step allows to print a design/pattern on the upper surface 5 of the frame 3. The application of said composition can be carried out by inkjet printing, or by

screen printing or by pad printing of the design/pattern on the upper surface 5 of the frame 3. Alternatively, the application of said composition can be carried out by heat transfer or mold labeling of a pattern on the upper surface 5 of the frame 3. As detailed above, the composition comprising a coloring agent can be applied either on a part or preferably on the whole upper surface 5 of the frame 3.

[0099] According to some embodiments, the method for manufacturing the adaptor 1 may also comprise a step of modifying the upper surface 5 of the frame 3. For example, said step may be carried out by plasma surface treatment or a flame treatment. The aim of this step is to improve the attachment/adhesion of the first layer 32 on the upper surface 5 of the frame 3.

[0100] Said step may either be carried out directly on the upper surface 5 of the (plastic) frame 3 or (preferably) on the design/pattern printed on the upper surface 5 of the (plastic) frame 3 (if present).

[0101] Furthermore, the method according to the present disclosure comprises a step of applying a hydrochromic composition on the upper surface 5 of the frame 3 so as to form a first layer 32. Thus, said layer 32 comprises a hydrochromic material. The hydrochromic composition and the hydrochromic material that can be used are detailed above. It shall be noted that the solvent that is present in the hydrochromic composition is absent in the final product (adaptor 1).

[0102] According to some embodiments, the hydrochromic material may be present in the hydrochromic composition at an amount from 1 to 90 %, more specifically from 5 to 60%, and in particular from 10 to 40 % by weight relative to the weight of the hydrochromic composition.

[0103] According to some embodiments, the solvent may be present in the hydrochromic composition at an amount from 10 to 99 %, more specifically from 10 to 50 %, and in particular from 15 to 45 % by weight relative to the weight of the hydrochromic composition.

[0104] According to some embodiments, the hydrochromic composition may further comprise one or more additional components (as detailed above). Such component(s) may be present at an amount from 0.1 to 90 %, more specifically from 5 to 70 %, and in particular from 15 to 60 % by weight relative to the weight of the hydrochromic composition.

[0105] The step of forming the first layer 32 may be carried out by spray coating, dip coating or spin coating of the hydrochromic composition on the upper surface 5 of the frame 3. As detailed above, the hydrochromic composition (and thus the hydrochromic material) can be applied either on a part or preferably on the whole upper surface 5 of the frame 3.

[0106] According to some embodiments, this step may be carried out only once. According to other embodiments, this step may be repeated two or more times. This allows to adjust the thickness of the first layer 32. For example, said step may be repeated at least one more time, more specifically repeated from one to five times and and in particular from one to three times. This allows to achieve the desirable thickness of the first layer 32 without increasing the cost of the process (due to a high number of repetitions).

[0107] Thus, the first layer 32 can be applied either directly on the upper surface 5 of the (plastic) frame 3 or on the design/pattern (colored layer 31) printed on the upper surface 5 of the frame 3 (if present) or on the modified upper surface 5 of the frame 3.

[0108] According to some embodiments, the method according to the present disclosure may further comprise a step of heating the frame 3, notably the frame comprising the first layer 32 (and prior to the step of forming the second layer 33). Thus, said step may be carried out after the step of forming a first layer 32. This step may allow to evaporate and thus remove the solvent present in the first layer 33. This step may be carried out at a temperature from 30 to 150°C, more specifically from 40 to 120°C, and in particular from 60 to 100°C. Additionally or alternatively, this step may be carried out for a duration of 30 seconds to 10 hours, more specifically from 1 minute to 6 hours, more specifically from 1 minute to 2 hours, and in particular from 1 to 15 minutes. In case the step of forming the first layer 32 is carried out more than once (i.e. is repeated as explained above), the step of heating the frame 3 may be carried out either after each step of forming the first layer 32 or (advantageously) only once, after all the (repeating) steps of forming the first layer 32.

[0109] The method according to the present disclosure further comprises a step of forming a second layer 33 on top of the first layer 32. Said second layer 33 is formed by applying a hydrophobic composition on top of the first layer 32. The hydrophobic composition may comprise a hydrophobic material (such material being detailed above). The hydrophobic material may be present in the hydrophobic composition at an amount from 0.1 to 25 %, more specifically from 0.1 to 15 %, more specifically from 0.5 to 10 %, and in particular from 0.5 to 5 % by weight relative to the weight of the hydrophobic composition. The above amounts of hydrophobic material are advantageous as they allow to improve the hydrophobic properties of the composition.

[0110] In addition, the hydrophobic composition may further comprise a solvent. The solvent may be an aqueous solvent or an organic solvent but more specifically the solvent is an organic solvent. The organic solvent may be chosen from a ketone, an ether, and an alcohol and in particular the organic solvent may be chosen from ethanol, isopropyl alcohol, diethylether, acetone. According to preferred embodiments, the solvent is an alcohol, in particular isopropanol. It shall be noted that the solvent that is present in the hydrophobic composition is absent in the final product (adaptor 1).

[0111] The solvent may be present in the hydrophobic composition at an amount from 75 to 99.9 %, more specifically from 85 to 99.9 %, more specifically from 90 to 99.5 %, and in particular from 95 to 99.5 % by

weight relative to the weight of the hydrophobic composition.

[0112] The hydrophobic composition may further comprise one or more additives. Such additives can be for example glass microparticles. The additives may be present in an amount from 0.01 to 5 %, and more specifically from 0.01 to 1 % by weight relative to the weight of the hydrophobic composition.

[0113] The step of forming the second layer 33 may be carried out by dip coating of the frame 3 in the hydrophobic composition. Alternatively, this step may be carried out by spin coating or spray coating of the hydrophobic composition on the frame 3. As detailed above, the hydrophobic composition (and thus the hydrophobic material) can be applied either on a part or preferably on the whole upper surface 5 of the frame 3 (and thus of the first layer 32).

[0114] According to some embodiments, this step may be carried out only once. According to other embodiments, this step may be repeated two or more times, more specifically repeated from one to five times and and in particular from one to three times. This allows to adjust the thickness of the second layer 33.

[0115] According to some embodiments, the method according to the present disclosure may further comprise a step of heating the frame 3, notably the frame comprising the first layer 32 and the second layer 33. Thus, said step may be carried out after the step of forming a second layer 33. This step may allow to evaporate and thus remove the solvent present in the second layer 33. This step may be carried out at a temperature from 25 to 150°C, more specifically from 30 to 120°C, and in particular from 30 to 100°C. Additionally or alternatively, this step may be carried out for a duration of 30 seconds to 15 hours, more specifically from 1 minute to 10 hours, and more specifically from 1 minute to 8 hours. For example, the duration of this step may depend on the temperature. Thus, for a temperature from 25 to 70°C, and in particular from 30 to 60°C, the duration may be from 1 minute to 10 hours, more specifically from 1 to 10 hours, and in particular from 2 to 8 hours. For a temperature from 40 to 150°C, and in particular from 60 to 100°C, the duration may be from 30 seconds to 10 hours, more specifically from 1 minute to 2 hours, and in particular from 1 to 15 minutes. In case the step of forming the second layer 33 is carried out more than once (i.e. is repeated as explained above), the step of heating the frame 3 may be carried out either after each step of forming the second layer 33 or (advantageously) only once after all the (repeating) steps of forming the second layer 33.

Examples:

Example 1 (according to the invention):

[0116] An adaptor for a shaving cartridge comprising a plastic frame was first printed by digital printing with a pattern representing colored slices of fruit. A hydrochromic composition was applied on the adaptor by spray coating. The hydrochromic composition used is Cham. WB Sc. Wet & Rev. White/Clear (1410HYDREV40) from Hallcrest. The resulting adaptor was then heated at 70°C for 5 minutes, and then dip coated in a solution of 1 % octadecyltrichlorosilane in isopropanol, and then heated for 5 minutes at 80°C.

[0117] The adaptors were immersed in water for approximately 20 seconds. The hydrochromic material which was opaque at the dry state became transparent once immersed in the water and the printed pattern was revealed. The (wet) adaptors were then placed on ambient temperature and pressure. Once the adaptors started to dry, the hydrochromic material became opaque (therefore concealing the printed pattern). The hydrochromic material returned to its initial state (opaque) after 20 minutes. By "*returned to its initial state*" it is meant that the printed pattern was completely concealed (no longer visible) by the hydrochromic layer/material.

Example 2 (comparative example):

[0118] An adaptor for a shaving cartridge comprising a plastic frame was first printed by digital printing with a pattern representing colored slices of fruit. A hydrochromic composition was applied to the adaptor by spray coating. The hydrochromic composition used is Cham. WB Sc. Wet & Rev. White/Clear (1410HYDREV40) from Hallcrest. The resulting adaptor was then heated at 70°C for 5 minutes.

[0119] The adaptors were immersed in water for approximately 20 seconds. The hydrochromic material which was opaque at the dry state became transparent once immersed in the water and the printed pattern was revealed. The (wet) adaptors were then placed on ambient temperature and pressure. Once the adaptors started to dry, the hydrochromic material became opaque. The hydrochromic material returned to its initial state (opaque) after 47 minutes. By "*returned to its initial state*" it is meant that the printed pattern was completely concealed (no longer visible) by the hydrochromic layer/material. Therefore, it can be concluded that the reversibility time is significantly reduced when the hydrochromic layer is combined with a hydrophobic layer.

Embodiments:

[0120] Although the present invention is defined in the attached claims, it should be understood that the present invention can also (alternatively) be defined in accordance with the following embodiments:

1. An adaptor (1) for a shaving cartridge (2) comprising a frame (3) configured to surround a shaving cartridge (2) having at least one shaving blade (4) being provided with a cutting edge (4a), the adaptor (1) being mountable on the shaving cartridge (2), wherein the frame (3) has an upper surface (5), and

the adaptor (1) further comprising:

- a first layer (32) comprising a hydrochromic material, located on top of the upper surface (5) of the frame (3), wherein the first layer (32) reversibly changes appearance from a first state in the absence of water to a second state in the presence of water; and
- a second layer (33) comprising a hydrophobic material, located on top of the first layer (32).

2. The adaptor (1) according to embodiment 1, wherein the frame (3) has a first wall (3a), a second wall (3b) parallel to the first wall (3a), and two side walls (3c) parallel to each other and perpendicular to the first wall (3a) and the second wall (3b), and an opening (6) formed by the first wall (3a), the second wall (3b) and the two side walls (3c), such that the cutting edge (4c) of the at least one shaving blade (4) is uncovered and accessible through the opening (6), when the adaptor (1) is mounted on the shaving cartridge (2).

3. The adaptor (1) according to any one of embodiments 1 or 2, wherein the first layer (32) has a first color in the absence of water and a second color different from the first color in the presence of water.

4. The adaptor (1) according to any one of embodiments 1 or 2, wherein the first layer (32) is opaque in the absence of water and is transparent or translucent in the presence of water.

5. The adaptor (1) according to any one of embodiments 1 to 4, wherein the frame (3) is made from a non-biodegradable material.

6. The adaptor (1) according to any one of embodiments 1 to 5, wherein the frame (3) is made from a non-porous material.

7. The adaptor (1) according to any one of embodiments 1 to 6, wherein the frame (3) is made from a plastic material.

8. The adaptor (1) according to embodiment 7, wherein the plastic material is chosen from styrenic polymers, polyolefins and mixtures thereof, more specifically chosen from polyethylene, polypropylene, methylmethacrylate acrylonitrile butadiene styrene, acrylonitrile butadiene styrene, high impact polystyrene, styrene-acrylonitrile copolymer, styrene-butadiene copolymer, blends of acrylonitrile butadiene styrene with polyethylene terephthalate, and blends of acrylonitrile butadiene styrene with a polycarbonate polymer, and in particular chosen from acrylonitrile butadiene styrene and methylmethacrylate acrylonitrile butadiene styrene.

9. The adaptor (1) according to any one of embodiments 1 to 8, wherein the hydrophobic material is chosen from a silicon containing polymer and from a silicon containing long chain alkane, notably a chain comprising more than 8 carbon atoms.

10. The adaptor (1) according to any one of embodiments 1 to 9, wherein the hydrophobic material is chosen from polydimethylsiloxane, octadecyltrichlorosilane, octadecyldimethylchlorosilane, octyldimethylchlorosilane, heptadecafluorodecyltrimethoxysilane and combinations thereof, more specifically wherein the hydrophobic material is chosen from octadecyltrichlorosilane and/or polydimethylsiloxane and even more specifically wherein the hydrophobic material is octadecyltrichlorosilane.

11. The adaptor (1) according to any one of embodiments 1 to 10, wherein the hydrophobic material is present in the second layer (33) at an amount of at least 0.1 % by weight, more specifically from 5 to 100 %, more specifically from 10 to 100 %, even more specifically from 20 to 100 %, and in particular from 50 to 100 %, by weight relative to the weight of the second layer (33).

12. The adaptor (1) according to any one of embodiments 1 to 11, wherein the second layer (33) has a thickness from 50 to 5000 μm, more specifically from 100 to 3000 μm, and in particular from 200 to 2500 μm.

13. The adaptor (1) according to any one of embodiments 1 to 12, wherein the hydrochromic material is chosen from a hydrochromic pigment or a hydrochromic dye.

14. The adaptor (1) according to any one of embodiments 1 to 13, wherein the hydrochromic material is present in the first layer (32) at an amount of at least 0.1 % by weight, more specifically from 5 to 100 %, more specifically from 10 to 100 %, even more specifically from 20 to 100 %, and in particular from 50 to 100 %, by weight relative to the weight of the first layer (32).

15. The adaptor (1) according to any one of embodiments 1 to 14, wherein the first layer (32) has a thickness from 50 to 5000 μm, more specifically from 100 to 3000 μm, and in particular from 200 to 2500 μm.

16. The adaptor (1) according to any one of embodiments 1 to 15, wherein at least a portion of the frame (3) comprises a coloring agent.

17. The adaptor (1) according to embodiment 16, wherein the coloring agent is incorporated in the

frame (3), notably in the material of the frame (3).

18. The adaptor (1) according to embodiments 1 to 17, further comprising a colored layer (31) located between the upper surface (5) of the frame (3) and the first layer (32), said colored layer (31) comprising the coloring agent.

19.A shaving assembly comprising:

- a shaving cartridge (2) comprising at least one blade (4), said blade being provided with a cutting edge (4a); and
- an adaptor (1) according to any one of embodiments 1 to 18, wherein the adaptor (1) is mountable on the shaving cartridge (2).

20. A razor comprising:

- a razor handle, and
- the shaving assembly according to embodiment 19.

21. The razor according to embodiment 20, wherein the razor cartridge is either releasably attached to the razor handle via a pivotable or non-pivotable connection, integrally formed with the razor handle via a non-pivotable connection, or integrally formed with the razor handle via a pivotable connection.

22. A kit of parts comprising:

- a razor handle, and
- a razor cartridge holder comprising at least two shaving assemblies according to embodiment 19.

23. A method for manufacturing the adaptor (1) according to any one of embodiments 1 to 18, comprising:

- providing an adaptor comprising a frame (3) configured to surround a shaving cartridge (2) having at least one shaving blade (4) being provided with a cutting edge (4a), the adaptor (1) being mountable on the shaving cartridge (2) and the frame (3) having an upper surface (5);
- forming a first layer (32) comprising a hydrochromic material on the upper surface (5) of the frame (3), wherein the first layer (32) reversibly changes appearance from a first state in the absence of water to a second state in the presence of water; and
- forming a second layer (33) comprising a hydrophobic material on top of the first layer (32).

24. The method according to embodiment 23, wherein the first layer (32) is formed by applying a hydrochromic composition comprising the hydrophobic material on the upper surface (5) of the frame (3).

25. The method according to embodiment 24, wherein the hydrochromic composition comprises the hydrochromic material and a solvent.

26. The method according to any one of embodiments 24 to 25, wherein the hydrochromic material is present in the hydrochromic composition at an amount from 1 to 90 %, more specifically from 5 to 60 %, and in particular from 10 to 40 % by weight relative to the weight of the hydrochromic composition.

27. The method according to any one of embodiments 24 to 26, wherein the solvent present in the hydrochromic composition is an aqueous solvent, in particular water.

28. The method according to any one of embodiments 23 to 27, wherein the step of forming a first layer (32) is repeated, more specifically repeated at least one more time, and in particular repeated from one to three times.

29. The method according to any one of embodiments 23 to 28, wherein the second layer (33) is formed by applying a hydrophobic composition comprising the hydrophobic material.

30. The method according to embodiment 29, wherein the hydrophobic material is present in the hydrophobic composition at an amount from 0.1 to 25 %, more specifically from 0.1 to 15 %, more specifically from 0.5 to 10 %, and in particular from 0.5 to 5 % by weight relative to the weight of the hydrophobic composition.

31. The method according to any one of embodiment 29 or 30, wherein the hydrophobic composition further comprises a solvent, more specifically an organic solvent, even more specifically an organic solvent chosen from a ketone, an ether, and an alcohol, and in particular the organic solvent is chosen from ethanol, isopropyl alcohol, diethylether, acetone.

32. The method according to embodiment 31, wherein the solvent is present in the hydrophobic composition at an amount from 75 to 99.9 %, more specifically from 85 to 99.9 %, more specifically from 90 to 99.5 %, and in particular from 95 to 99.5 % by weight relative to the weight of the hydrophobic composition.

33. The method according to any one of embodi-

ments 23 to 32, wherein the step of forming a second layer (33) is repeated, more specifically repeated at least one more time, and in particular repeated from one to three times.

34. The method according to any one of embodiments 23 to 33, further comprising a step of applying a colored composition comprising a coloring agent on the upper surface (5) of the frame (3), said step being carried out prior to the step of forming a first layer (32).

35. The method according to any one of embodiments 23 to 34, further comprising a step of modifying the upper surface (5) of the frame (3), said step being carried out prior to the step of forming a first layer (32).

36. The method according to any one of embodiments 23 to 35, further comprising a step of heating the frame (3), said step being carried out after the step of forming a first layer (32) and/or after the step of forming a second layer (33).

37. The method according to embodiment 36, wherein the step of heating is carried out after the step of forming a first layer (32) at a temperature from 30 to 150°C, more specifically from 40 to 120°C, and in particular from 60 to 100°C.

38. The method according to any one of embodiments 36 or 37, wherein the step of heating is carried out after the step of forming a first layer (32) for a duration of 30 seconds to 10 hours, more specifically from 1 minute to 6 hours, more specifically from 1 minute to 2 hours, and in particular from 1 to 15 minutes.

39. The method according to any one of embodiments 36 to 38, wherein the step of heating is carried out after the step of forming a second layer (33) at a temperature from 25 to 150°C, more specifically from 30 to 120°C, and in particular from 30 to 100°C.

40. The method according to any one of embodiments 36 to 39, wherein the step of heating is carried out after the step of forming a second layer (33) for a duration of 30 seconds to 15 hours, more specifically from 1 minute to 10 hours, and more specifically from 1 minute to 8 hours.

Claims

1. An adaptor (1) for a shaving cartridge (2) comprising a frame (3) configured to surround a shaving cartridge (2) having at least one shaving blade (4) being provided with a cutting edge (4a), the adaptor (1) being mountable on the shaving cartridge (2), wherein the frame (3) has an upper surface (5), and the adaptor (1) further comprising:

- a first layer (32) comprising a hydrochromic material, located on top of the upper surface (5) of the frame (3), wherein the first layer (32) reversibly changes appearance from a first state in the absence of water to a second state in the presence of water; and
- a second layer (33) comprising a hydrophobic material, located on top of the first layer (32).

2. The adaptor (1) according to claim 1, wherein the first layer (32) has a first color in the absence of water and a second color different from the first color in the presence of water.

3. The adaptor (1) according to claims 1, wherein the first layer (32) is opaque in the absence of water and is transparent or translucent in the presence of water.

4. The adaptor (1) according to any one of claims 1 to 3, wherein the frame (3) is made from a non-biodegradable material, and/or wherein the frame (3) is made from a non-porous material.

5. The adaptor (1) according to any one of claims 1 to 4, wherein the frame (3) is made from a plastic material, and more specifically wherein the plastic material is chosen from styrenic polymers, polyolefins and mixtures thereof, more specifically chosen from polyethylene, polypropylene, methylmethacrylate acrylonitrile butadiene styrene, acrylonitrile butadiene styrene, high impact polystyrene, styrene-acrylonitrile copolymer, styrene-butadiene copolymer, blends of acrylonitrile butadiene styrene with polyethylene terephthalate, and blends of acrylonitrile butadiene styrene with a polycarbonate polymer, and in particular chosen from acrylonitrile butadiene styrene and methylmethacrylate acrylonitrile butadiene styrene

6. The adaptor (1) according to any one of claims 1 to 5, wherein the hydrophobic material is chosen from a silicon containing polymer and from a silicon containing long chain alkane, notably a chain comprising more than 8 carbon atoms, in particular wherein the hydrophobic material is chosen from polydimethylsiloxane, octadecyltrichlorosilane, octadecyldimethylchlorosilane, octyldimethylchlorosilane, heptadecafluorodecyltrimethoxysilane and combinations thereof, more specifically wherein the hydrophobic material is chosen from octadecyltrichlorosilane and/or polydimethylsiloxane and even more specifically wherein the hydrophobic material is octadecyltrichlorosilane.

7. The adaptor (1) according to any one of claims 1 to 6, wherein the second layer (33) has a thickness from 50 to 5000 μm, more specifically from 100 to 3000 μm, and in particular from 200 to 2500 μm.

8. The adaptor (1) according to any one of claims 1 to 7, wherein the hydrochromic material is chosen from a hydrochromic pigment or a hydrochromic dye.

9. The adaptor (1) according to any one of claims 1 to 8, wherein the first layer (32) has a thickness from 50 to 5000 μm, more specifically from 100 to 3000 μm, and in particular from 200 to 2500 μm.

10. The adaptor (1) according to any one of claims 1 to 9, wherein at least a portion of the frame (3) comprises a coloring agent, more specifically wherein the coloring agent is incorporated in the frame (3), notably in the material of the frame (3) and/or wherein the adaptor comprises a colored layer (31) located between the upper surface (5) of the frame (3) and the first layer (32), said colored layer (31) comprising the coloring agent.

11. A shaving assembly comprising:

- a shaving cartridge (2) comprising at least one blade (4), said blade being provided with a cutting edge (4a); and
- an adaptor (1) according to any one of claims 1 to 10, wherein the adaptor (1) is mountable on the shaving cartridge (2).

12. A razor comprising:

- a razor handle, and
- the shaving assembly according to claim 11,

more specifically wherein the razor cartridge is either releasably attached to the razor handle via a pivotable or non-pivotable connection, integrally formed with the razor handle via a non-pivotable connection, or integrally formed with the razor handle via a pivotable connection.

13. A kit of parts comprising:

- a razor handle, and
- a razor cartridge holder comprising at least two shaving assemblies according to claim 11.

14. A method for manufacturing the adaptor (1) according to any one of claims 1 to 10, comprising:

- providing an adaptor comprising a frame (3) configured to surround a shaving cartridge (2) having at least one shaving blade (4) being provided with a cutting edge (4a), the adaptor being mountable on the shaving cartridge (2) and the frame (3) having an upper surface (5);
- forming a first layer (32) comprising a hydrochromic material on the upper surface (5) of the frame (3), wherein the first layer (32) reversibly changes appearance from a first state in the absence of water to a second state in the presence of water; and
- forming a second layer (33) comprising a hydrophobic material on top of the first layer (32).

15. The method according to claim 14, further comprising a step of applying a colored composition comprising a coloring agent on the upper surface (5) of the frame (3), said step being carried out prior to the step of forming a first layer (32).

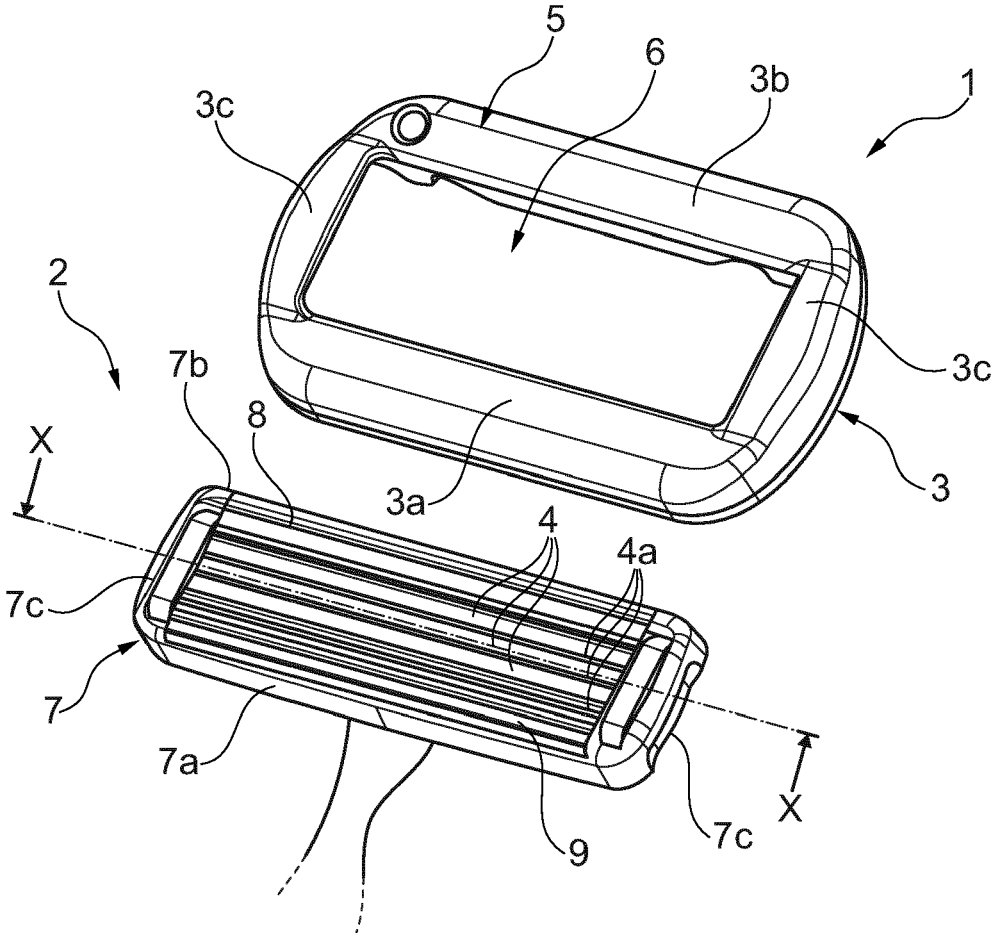

Fig. 1

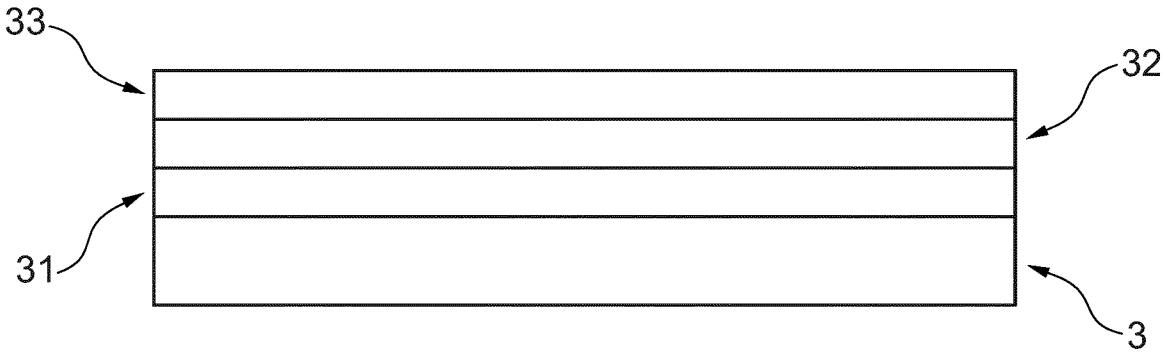

Fig. 2

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EUROPEAN SEARCH REPORT

Application Number
EP 23 22 0362

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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
Munich	31 May 2024	Schouten, Adri

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