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(54) **Actuator for dispensing aerosol hair care products closer to the scalp**

(57) An actuator (1) useful for applying an aerosolized hair care product close to or onto the scalp includes an elongated tubular member (8) with proximal end configured to sealingly fit to a male or female valve aerosol valve and a distal end terminating in a distributor head comprising internal channels and at least two exit orifices for distributing the aerosolized product in a vertical, angled or entirely lateral direction to evenly reach the portions of the hair closest to the scalp or the scalp directly.

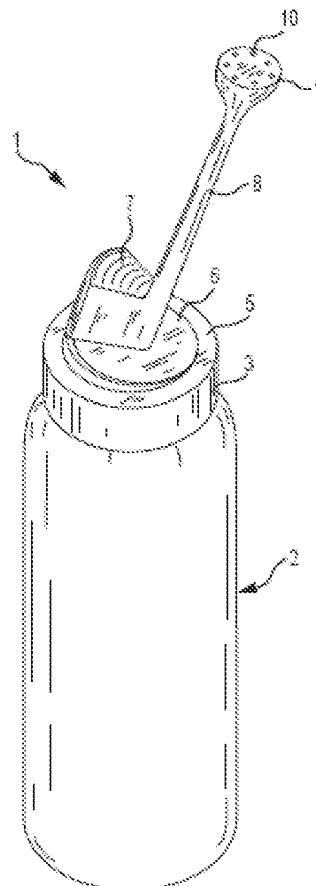


FIG.1

Description

FIELD OF INVENTION

[0001] The present invention relates to actuators for aerosol valves and in particular to an actuator comprising an extended tubular member and a multiple orifice distributor head.

BACKGROUND

[0002] Hair care products have been in the retail and professional markets for many decades and now include a wide assortment of products that appeal to consumers of all ages, gender and demographics. For example, hair styling has evolved far beyond the traditional "hair spray," (i.e., aerosol hair setting spray), and now include products for shine, spiking, conditioning, cleaning, scenting, and coloring hair. Many of these products are available in a variety of physical forms such as gels, foaming mousses, pomades, creams, liquids, and aerosol sprays. Aerosol sprays include unique products such as dry shampoos that are sprayed into the hair, allowed to dry, and then brushed out. Early versions of dry shampoos appeared decades ago and were rice starch dry-powder aerosols. Some hair care products need to be applied only to the outer portions of the hair shafts (such as color streaking), whereas some hair care products such as conditioners and cleaners need to reach all portions of the hair, including the portions of the hair closest the scalp. For consumers having very full, long, and/or thick hair, application of hair care products close to the scalp is very problematic since it is difficult to tease the hair apart and to reach in through thick hair to the portions of the hair shafts closest to the scalp. Furthermore, packages and dispensers for hair care products tend to either focus application of hair care products too narrowly or tend to spray product too broadly into the air with little actually in the hair. Most problematic are the traditional aerosols that seem to put more hair care product, (e.g. setting sprays or dry shampoos), into the air and on only the outer surfaces of fuller hair.

[0003] Multiple orifice actuator buttons are a simple and intuitive way to direct an aerosol effluent into a particular spray distribution pattern. Such multiple orifice actuators have been described in the art, both for hair care products and for unrelated technologies such as paint. Some of these inventions are useful for distributing hair care products into human hair and/or pet hair. For example, US Patent No. 7,278,590 (Greer, Jr., et al.) discloses a multiple orifice actuator where the pathway of the aerosol effluent (in this case a wall-texturing material) may be selected by the user for a particular application. US Patent No. 6,877,924 (Mears, et al.) discloses an applicator where the aerosol effluent mixes and expels from what appear to be hollow tines of a brush. US Patent No. 6,035,806 (Lorenzo) claims a fluid applicator useful for applying medication to the skin of a pet. The Lorenzo

invention comprises a brush wherein each of the tines of the brush is hollow to provide a pathway for liquid. US Patent No. 4,848,946 (Goncalves) discloses an aerosol dispenser wherein the aerosol effluent passes directly into and through the bristles of a small brush attached to the aerosol actuator. US patent No. 3,767,125 (Gehres, et al.) discloses a simple multiple orifice aerosol actuator that is constructed with an insert fitting into an actuator button, obviating manufacturing problems that would arise when trying to mold such an actuator as a single plastic part. Lastly, US Patent No. 3,572,591 (Brown) discloses a marking device that includes a multiple orifice aerosol actuator such that the aerosol effluent, (in this case paint), distributes into a unique and predetermined pattern that is useful in paint marking.

[0004] Extension of aerosol actuators is also known in the hair care prior art and in unrelated fields. For example, US Patent No. 5,772,077 (Tafur) discloses a unique attachment to an aerosol package that includes a combination of a hair styling implement and a valve actuator. The Tafur invention does not necessarily extend the outlet point of the aerosol effluent but it does provide a method for teasing the hair apart while simultaneously spraying hair care product. US Patent No. 5,765,601 (Wells, et al.) discloses an extension to an aerosol can for an aerosol tire inflator. The extension of the aerosol valve pursuant to the Wells invention allows for easy inflation of a tire because the extension not only permits the user to reach the tire valve but also to depress it to inject the tire with sealant. US Patent No. 5,307,964 (Toth) discloses a general purpose actuator extender for use on domestic and industrial aerosol spray cans. The extension includes a flexible, elongated tubular member that provides accurate/targeted delivery of the aerosol effluent. The Toth invention should find particular use in the insecticide and lubricant industry since the fine tube extension inevitably provides "pin-point" delivery of aerosolized product. Another general purpose extension for use on an aerosol can is described in US Patent No. 3,784,063 by Otis, et al. The Otis invention includes a bent tubular extender that may be rotated around to infinite positions in order to deliver the aerosol effluent in any direction. Lastly, EP0244293 (Goncalves) discloses an extension for use on an aerosol hair mousse product. The Goncalves invention provides a plastic extension that is easily operated by finger depression to deliver foaming mousse at the outlet tip of the long, tapered extension.

[0005] Delivery of dry-powder aerosols presents unique problems in the aerosol industry. For example, powder tends to get in between gaskets, preventing full closing of the bias spring to shut off an aerosol valve that has just been depressed. The result is an aerosol can that will vent itself empty in between uses. Laundry spray starch and starch-based dry shampoos for hair care are examples of problematic aerosols that prevent the full sealing of aerosol valves in the closed/biased position. Aerosol valves that are specifically configured for dis-

pensing dry powder aerosols have been described in US Patent No. 6,394, 321 (Bayer); 5,975,378 (Bayer); and, 3,586,216 (Jordan).

[0006] Lastly, dry powder aerosol formulas tend to clog actuator buttons, and a number of ingenious self-cleaning buttons have been developed over the years to remedy this problem. For example, US Patent No. 3,838,822 (Ewald) discloses a self-cleaning spray button designed especially for use on aerosol valves for the spraying of starch. US 3,711,031 (Ewald) discloses another concept of the self-cleaning spray button designed for use with spray starch. US Patent No. 3,595,483 (Gehres) discloses an aerosol actuator with an annular conduit that is especially adapted for use with dry powder aerosols. In the Gehres invention, the aerosol formulation effluent is directed in such a manner that it is dispensed through the annular conduit in a spiral path.

[0007] Examples of dry shampoo formulations include the herbal dry shampoo composition disclosed in US Patent No. 5,872,087 (Neelakantan), and a chitin based composition disclosed in US Patent No. 4,035,267 (Gleckler, et al.). Powder aerosols in general have been described by Gunning, et al. in US 3,081,223 and Shinozawa in US 4,450,151. Any of these compositions, if aerosolized into a conventional aerosol package with a simple button actuator, will be difficult to deliver to the portions of the hair near the scalp.

[0008] What is clearly lacking in the prior art is an elongated actuator configured specifically to distribute aerosol hair care products closer to the scalp, where such actuator may be attached to an aerosol package intended to be used in the inverted configuration for deep application of aerosol powders.

SUMMARY OF THE INVENTION

[0009] In general, and by way of summary description and not by way of limitation, an exemplary embodiment of the present invention is an actuator mountable on an aerosol valve that provides not only a physical extension of the outlet of the aerosol valve but also a distribution system for directing the aerosolized effluent through a multiple channel/orifice structure. As such, the actuator functions as an applicator for aerosolized products.

[0010] In accordance with other exemplary embodiments, the actuator of the present invention may be mounted atop a depression-actuated valve (vertical valve) or a tilt-valve, and may be equipped on an up/down aerosol valve configured to operate either upright or inverted.

[0011] In accordance with another exemplary embodiment of the present invention, the actuator may be mounted on an up/down aerosol valve of an aerosol package where the composition within the aerosol package is a dry shampoo. The present actuator comprising a long tubular member terminating in a distributor head minimizes the "fly away" seen when a dry shampoo is dispensed from a conventional aerosol package having only

a standard actuator button.

[0012] In accordance with another exemplary embodiment of the present invention, the actuator comprises a mechanical break-up actuator (MBU) with the incorporation of at least one mechanical break-up insert positioned in the fluid stream at any position between the aerosol valve exit and the exit orifices on the distributor head.

[0013] In accordance with another exemplary embodiment of the present invention, the actuator comprises a non-mechanical break-up actuator (NMBU).

[0014] In accordance with another exemplary embodiment of the present invention, the distributor head of the present actuator comprises laterally directed orifices that enable distribution of aerosolized hair care products at right angles to the scalp.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] **FIGURE 1** is a perspective view of one embodiment of the present actuator attached to an aerosol can.

[0016] **FIGURE 2** is a cross-sectional view of another embodiment of the present actuator attached to a depression-actuated/vertical valve, where the elongated tubular member of the actuator terminates in a 4-orifice distribution head.

DETAILED DESCRIPTION OF THE INVENTION

[0017] The following description is of exemplary embodiments only and is not intended to limit the scope, applicability or configuration of the invention in any way. Rather, the following description provides a convenient illustration for implementing exemplary embodiments of the invention. Various changes may be made in the function, size, and arrangement of the elements described without departing from the scope of the invention as set forth in the appended claims. Changes in shape and size of the overall actuator do not depart from the intended scope of the invention. The actuator of the present invention may be non-mechanical break-up (NMBU) or mechanical break-up (MBU) in overall configuration, the configuration chosen with regard to the physical form of the aerosol product to be dispensed (e.g. single phase, multiple phase, or propellant physically separated from the liquid/powder ingredients) and/or the need for a particular spray pattern and/or particle size effluent. The present actuator may dispense pressurized product in any direction depending on the location of the exit orifices around the distributor head, (e.g. vertical or lateral, or any other angled direction). Although the preferred material of construction of the present actuator is plastic, other materials may be envisioned for constructing the actuator. Lastly, the present invention may be constructed from a single piece of fabrication material (e.g. a single injection molded plastic part) with contiguous portions or it may comprise an assembly of separately manufactured elements (of same or different materials of fabrication) that are snug or snap-fit, glued, or sonically welded to-

gether to form the completed actuator. Separate elements that may make up the overall actuator structure may be irreversibly or reversibly fit together. When components are reversibly fit together, the option remains that the consumer may modify the actuator at home as needed from a set of substitute pieces provided with the aerosol can and base parts of the actuator. The actuator of the present invention may be used on top of any aerosol valve, be it a tilt-valve or a vertical valve. The present actuator may be situated on an aerosol valve assembly that is equipped with a conventional dip tube that reaches to the bottom of the aerosol can, or on an "up/down" valve that operates from any orientation of the can. The configuration of the aerosol package (everything besides the present actuator) is beyond the scope of the present invention, but include such configurations as (1) an aerosolized can where propellant is mixed with product in single phase or multiple phase compositions, or (2) bag-in-can, or (3) bag-on-valve systems where the propellant is physically separate from the dispensing product.

[0018] That being said, the actuator of the present invention minimally comprises an elongated tubular member having a first, or proximal, end configured dimensionally to fit sealingly to an aerosol valve (either a male proximal end of the actuator fitting into a female valve, or a female proximal end of the actuator fitting onto a valve stem of a male aerosol valve) and a second, or distal, end that terminates and merges in a distributor head comprising a system of internal channels and two or more exit orifices. The actuator optionally comprises at least one mechanical break-up insert positioned within the aerosol effluent flow. The details of this general description become clearer with reference to the drawing figures.

[0019] Referring now to FIGURE 1, an exemplary embodiment of the actuator 1 of the present invention comprises an elongated tubular shaped portion 8 and a multiple orifice distributor head 9 integral with the elongated portion. The exemplary embodiment illustrated includes seven (7) distributing orifices 10 located on the head portion 9. Preferably there are at least two such orifices 10 for distribution of the aerosol effluent, but any number of orifices greater than two is within the scope of the invention. An upper limit of exit orifices may be the point where there is no practical way to fabricate the head portion 9 of the actuator. The preferred number of orifices is between 2 and 10, with 2 to about 5 orifices being more preferred. The preferred distributor head may be of a bulbous shape as in the illustrated embodiment, similar to a home shower head or the end of a plant watering can. The exit orifices 10 may be configured on the top surface of the distributor head (as in the illustrated embodiment), resulting in a nearly vertical dispensation of the aerosol effluent (aerosol effluent distributing in a co-axial direction with respect to the direction of the axis of the elongated tubular member), or they may be arranged circumferentially around the side of the distribution head 9 such that the aerosolized effluent is expelled nearly lateral in relation to the long axis of the vertical tubular

member 8. The exit orifices 10 function to distribute the pressurized aerosol stream that originates from the aerosol can 2 into multiple directions within the hair of the user. In a preferred embodiment, the exit orifices 10 are configured on the side of the distributor head such that the aerosolized product may be expelled laterally from the tubular member 8 in order to reach hair shafts adjacent to the scalp without concomitant soaking of the scalp itself. The aerosolized product stream may be propelled under pressure with a propellant that is mixed with the formulation in the aerosol can 2. Such intimately mixed aerosols (propellant(s) plus liquid and/or powder hair care ingredients) may be single phase or multiple phases depending on the ingredients and propellant(s). Alternatively, the composition to be dispensed under pressure may be inside a bag within the can and the propellant(s) injected between the can and bag, usually through a port provided in the bottom of the can. As an example of the directional distribution of product, if there are only two orifices 10 on the distributor head of the actuator, the stream of product may bifurcate into two equal outputs. A central/axial bore within the elongated portion 8 (not shown in FIG. 1) allows the aerosol effluent to travel in fluidic communication from the aerosol container 2 out to the exit orifices 10. As mentioned, the actuator 1 of the present invention may be comprised of a single molded plastic piece, or may be an assemblage of two or more subcomponents each having various functions. For example, the distributor head 9 may be a piece that is separately molded and then press-fit, glued or screw-threaded to the elongated tubular portion 8 of the actuator, reversibly or irreversibly as needed. The actuator of the present invention may be a mechanical break-up actuator by the presence of a mechanical break-up insert positioned in the effluent stream. For example, the distributor head 9 may be separated from the elongated portion 8 of the actuator by an intervening mechanical break-up (MBU) insert that helps to create turbulence and mechanically break-up the aerosol stream originating from the aerosol can before the aerosol is propelled through the distributor head and out the orifices 10. Alternatively, such an intervening mechanical break-up insert may be placed further up-stream in the actuator of the present invention, such as close to, or even at the exit to the aerosol valve. These preferred embodiments may be achieved by a three piece actuator comprising an elongated tubular portion, a mechanical break-up insert, and the distributor head. All of these pieces may be configured to fit together such that the aerosol effluent travels from its exit from the aerosol valve, through the axial bore within the tubular member, through any optional MBU inserts, to eventually exit from the orifices 10 and onto the hair of the user. Mechanical break-up inserts used in conjunction with aerosol actuators are amply disclosed in the literature, including in U.S. Patent Nos.: 3,129,893 (Green); 3,519,210 (Du Plain); 3,652,018 (Focht); 3,669,359 (Focht); 4,036,439 (Green); 4,583,692 (Sheffler); and, 5,992,765 (Smith), each incorporated herein

in their entireties. Any of these MBU inserts may be incorporated within the actuator of the present invention depending on the composition of the product to be dispensed and the desired particle size of the effluent. These references discuss the preferred diameters of the inlet passages to the MBU insert, the size and configurations for the swirl chambers to create the desired turbulence and particle break-up, and the sizes of the exit orifices. These diameters may be incorporated as the preferred diameters of the various passageways, channels, swirl chambers, and exit orifices of the present actuator.

[0020] The distributor head 9 may also comprise its own separate insert(s) (MBU or NMBU) when there are several orifices 10 desired at the distributor head 9. As disclosed by Gehres in U.S. Patent No. 3,595,483 and incorporated by reference herein, actuators with multiple exit orifices are more easily constructed with a separately molded insert that is pressed into the body of the actuator, and the Gehres method may be the more preferred way to construct the distributor head portion 9 of the present actuator because of the preferred multiple numbers of channels and orifices in the head 9. Furthermore, inserts would be preferred for the construction of a distributor system that can change the direction of the effluent originating in a axial/vertical direction through the tubular member 8 to a lateral direction out the exit orifices 10 (i.e. configuring appropriate channels within the distributor head 9 that function to turn the effluent direction at right angles from elongated direction of the tubular member 8).

[0021] "Molded" refers generally to the simple pour/cast molding, injection molding, blow molding, or injection blow molding of plastic parts and is not intended to mean a particular method of fabrication for the present actuator. As mentioned, the actuator 1 of the present invention may be constructed in part or in whole of materials other than plastic. For example, a metal distributor head 9 may be attached to a plastic elongated tubular portion 8, giving rise to mixed materials of construction for the present actuator. Or for example, the tubular portion 8 may be a long metal tube and both the mechanical break-up insert and the distributor head (and its separate insert(s)) may comprise plastic injection molded parts that are fit to the tubular member.

[0022] Still referring to FIG. 1, the present actuator comprises a movable actuating button 7 further comprised of one or more additional structural elements as needed for operation of the aerosol valve. The actuating button 7 preferably comprises a finger-sized platform (i.e. relatively flat surface) configured on a top/horizontal surface or configured on a side/vertical of the button structure that the user may depress or pull laterally with a finger or thumb, in order to operate the aerosol valve and dispense aerosolized product. In the exemplary embodiment illustrated in FIG. 1, depression on a ribbed platform configured on the horizontal top surface of the actuating button 7 depresses a vertical aerosol valve beneath the actuator with subsequent distribution of the aer-

osolized product through the distributor head 9 and out the orifices 10. The moveable actuating button 7 may be comprised of a wedge-shaped or other three-dimensionally shaped structure depending on a number of considerations such as: (1) the nature of the aerosol valve, e.g. vertical actuated or tilt actuated; (2) what material(s) the actuator is made from; and, (3) ornamental design effects. For example, in the exemplary embodiment illustrated in FIG. 1, the actuating button 7 may comprise a three-dimensional wedge shape (like a slice of pie), and may be molded plastic and hollow. This three-dimensional wedge shape may be positioned offset to only one side of the elongated tubular member 8. Alternatively, the actuating button 7 may be smaller in size than the embodiment illustrated in FIG. 1 and may be arranged circumferentially around the base of the tubular member 8 rather than off to one side of it. The actuating button 7 may comprise any other practicable shape besides a three-dimensional wedge so long as an approximately finger-sized platform is provided on a vertical face or on the uppermost horizontal top of the button such that the thumb or the finger of the operate may interact with the button 7 to depress it axially or leverage it radially.

[0023] Still referring to FIG. 1, the present actuator 1 preferably includes a movable plate, 6 incorporated as an integral element of the actuating button 7 (essentially a base to the button) to hide the recessed valve cup beneath, and it may be molded contiguously with both the actuating button 7 and elongated tubular member 8 of the actuator. In a preferred configuration, the plate 6, button 7 and tubular member 8 are collectively a single molded piece of plastic, and the tubular member 8 is at the center of the plate 6. In the most preferred configuration, the plate 6 is of a substantially disc-shape, with an axis and radius, and the elongated tubular member 8 and the plate 6 together form a wheel and axle arrangement, wherein the tubular member 8 extends axially out from the center axis of the disc-shaped plate 6, and a right angle is formed between the flat surface of the plate 6 and the tube 8. This arrangement is preferred because the tubular member 8 needs to be coupled onto the aerosol valve and the valve is necessarily at the center axis of the aerosol can. The plate 6 may also take the shape of the footprint of the actuating button 7, and does not necessarily need to be disc-shaped. Where the plate 6 is not disc-shaped, the tubular member 8 may extend off from the plate 6 from a position close to a "center point" of the plate, such that the actuator 1 will fit onto the aerosol valve.

[0024] A cap structure comprising a horizontally disposed ring 5 and circumferential skirt 3 may also be part of the present actuator, and this cap structure is also usable to hide the recessed valve cup present at the top of a steel aerosol can. Aerosol cans typically have a mounting cup as part of the aerosol valve assembly, and that mounting cup is peripherally crimped to the open top of the aerosol can to create an annular bead. The cap structure comprising ring 5 and skirt 3 elements may be

dimensioned in diameter and form to appropriately snap over the annular bead of an aerosol package and to assist with alignment of the tubular member 8 into a female valve or onto the valve stem of a male valve assembly present on the aerosol package. In a preferred configuration, the skirt 3 may include an inwardly extending annular lip adapted to engage under the annular bead of a crimped aerosol can. As can be seen in the drawing figure, the top edge of the circumferential skirt 3 is attached integrally to and around the outer circumference of the horizontal ring 5, as expected for the horizontal top and vertical skirt elements that form a cap or closure. The ring 5 has a circular outer circumference, as is necessary to conform to the annular bead of the aerosol can, and it has an aperture therethrough. If the ring 5 is shaped like a flat washer, then the aperture therethrough is outlined by a circular circumference herein referred to as the inner circumference of the ring 5. However, the aperture through the ring 5 need not be disc-shaped, and as mentioned above it may be in the shape of the footprint of the actuating button 7. The ring 5 is most preferably in the shape of a flat washer and will necessarily have both an outer circumference/diameter and an inner circumference/diameter. Ideally the relatively flat plate 6 is molded in hinging relationship with a portion of ring 5, for example through a weakened area often referred to as a "living hinge." That connection point between the ring 5 and the plate 6 may be from about 2° to about 180° around the outline of the aperture of the ring 5. To be precise, the cap structure of the present actuator, configured to snap fit over the annular bead of an aerosol can, may be seen as having a horizontal top with a cut-out that defines an aperture in which the plate 6 resides and pivots by hinging at a connection with the ring 5. As mentioned, the plate 6 may take the shape of the footprint of the actuating button 7, such that other shapes that are not necessarily perfectly disc-shaped are anticipated for the plate 6. The shape of the flat plate 6 takes the shape of the aperture in the ring 5, such that the plate 6 and the aperture of the ring 5 are complementary shapes (i.e. the plate 6 preferably takes the shape of what was cut out from the cap structure to form the aperture). Since the actuating button 7 is preferably molded on top of the plate 6, pressing down on, or leveraging against, the actuating button 7 concomitantly pivots the plate 6 within the aperture of the ring 5. Similar structural elements are disclosed by Pierre-Andre Lasserre in US Patent No. 6,202,899, incorporated in its entirety herein by reference.

[0025] The actuator is preferably dimensioned to fit securely over the circular valve cup crimped to the top of the can and to fit sealingly to the valve exit. The internal fit of the aerosol valve stem from a male aerosol valve assembly up into the first/proximal end of the elongated tubular member 8 of the actuator should be snug enough such that no product can leak at this connection when the aerosol valve is actuated. Therefore, the inner diameter of the proximal end of the tubular member 8 must

be configured to accept in sealing arrangement the male valve stem of a male valve assembly. Alternatively, the actuator may comprise a proximal male end to the tubular member 8 that fits into a female aerosol valve.

[0026] The aerosol can 2 may be of any size and construction and its features are not within the scope of the present invention. For example, the can 2 may be extruded aluminum or steel, and it may be slim and tall or otherwise fat and stout. It is presumed that the aerosol package will comprise some sort of crimped structure at the top, and a valve assembly will include a typical aerosol valve, such as a vertical depression-actuated valve or a tilt-valve and the valve assembly will be crimped to the open end of the can. The present invention is intended to fit onto the valve of the aerosol package and to coordinate with the operation of the aerosol valve through depression or leverage of the actuating button 7. For example, the present actuator should fit sealingly onto the valve stem of a male valve or into a female valve and may be operable with downward pressure on the platform of the actuating button to actuate the aerosol valve, or the actuating button of the present actuator may be leveraged laterally (by pulling against a vertical wall of the button structure) in order to cooperate with a tilt-valve supplied on the aerosol package.

[0027] Referring now to FIGURE 2, a cross-sectional view of another preferred embodiment of the actuator 1 of the present invention is illustrated wherein the actuator 1 is coupled to an aerosol can 2 and is snugly fit onto the male valve stem 17 of the male valve assembly 13. In this exemplary embodiment illustrated, the aerosol valve 13 is a vertical valve having a spring that biases the valve in the closed position until the valve stem 17 is vertically depressed. Such valves are amply disclosed in U.S. Patent No. 3,866,804 (Stevens) incorporated herein in its entirety by reference. As shown in FIG. 2, the actuator 1 preferably comprises an extended tubular member 8 that further includes a central/axial bore 15 through it lengthwise. As a "tube," this member necessarily comprises a relatively narrow diameter compared to its axial length, and the axial length is hollow by definition. The tubular portion 8 has a first end proximal to the aerosol package that is configured with appropriate internal diameter to fit sealingly to the male valve stem of an aerosol valve. A sealing arrangement means that aerosolized product will not leak at this connection point. A second/distal end of the elongated tubular member 8 (i.e. the end furthest away from the aerosol can) ends and merges into the distributor head portion 9 mentioned above. Importantly, if the aerosol valve is "female" in configuration, then the actuator of the present invention may be configured with a "male" end at the first end of the tubular member 8 such that the first end of the tubular member 8 of the present actuator will fit through the female valve cup and the cup gasket and fit onto the stem seat. This is the arrangement typically seen in aerosol spray paint cans where the valve is female and the button actuator includes a slotted male stem that will fit down into the female valve assembly of

the spray paint can. Similarly, the proximal end of the tubular member 8 may comprise such a slotted male configuration in order to dimensionally fit within a female valve assembly.

[0028] The exemplary embodiment illustrated in FIG. 2 comprises four (4) outlet orifices 10 that distribute the aerosol effluent evenly into quarter (1/4) volumetric portions. The top view FIG. 2a depicts the preferred evenly spaced, radial arrangement of the four orifices 10 on the substantially round distributor head 9 when the exit orifices 10 are configured on the top of the bulbous shaped distributor head 9. As mentioned above, the exit orifices 10 may be positioned circumferentially around the side of the distributor head 9 such that the exiting aerosolized product is directed lateral to the scalp, (i.e. approximately at right angles to the length of the elongated member 8). The cross-sectional view of FIG. 2 is taken through two of the symmetrically arranged four orifices, thus showing two of the fluid channels 4 in cross-section that connect the central/axial bore 15 of the tubular member 8 to the exit orifices 10 such that the aerosol effluent may travel up through the axial bore 15 where it can be distributed between the multiple internal channels 4 and ejected out from the exit orifices 10. As mentioned, anywhere from 2-10 orifices are preferred, and this illustrated configuration having four orifices is more preferred. As mentioned, the aerosol effluent traveling up through the central bore 15 may already be mechanically broken up into aerosol particles (nebulized) by an intervening MBU insert positioned in the effluent stream proximal to the valve stem. As mentioned, such an insert will comprise a swirl chamber to help create turbulence to break up the product into smaller droplets. Alternatively, the effluent may be mechanically broken up with an MBU insert positioned just where the internal channels 4 of the distributor head branch from the axial bore 15. In such an arrangement, the internal channels 4 may be branched off from a single exit orifice of an MBU swirl chamber where the distal end of the central bore 15 acts as the inlet to the swirl chamber. In yet another embodiment, the aerosol effluent may be mechanically broken up with the aid of separate MBU inserts that are fit into each of the outlet orifices 10. In other words, each exit orifice 10 on the distributor head 9 (four in this illustrated embodiment) may have an MBU insert, resulting in a total of four separate MBU's with swirl chambers, and where the orifices 10 are the outlet orifices from each of the MBU swirl chambers. In general, the distributor head 9 is comprised of internal channels 4 and outlet orifices 10 that together function to distribute the aerosolized effluent both volumetrically and directionally. One or more optional MBU inserts may be positioned anywhere in the fluid flow, for example as close as directly adjacent to the valve assembly or as far downstream as just before the exit orifices 10. Optional MBU insert(s) are used to convert an otherwise non-mechanical break-up actuator into a mechanical break-up actuator in instances where the effluent will emerge as a stream and where smaller spray particles are desired.

[0029] The operation of the exemplary embodiment of the actuator illustrated in FIG. 2 comprises the steps of pressing down on the upper ribbed platform 7a of the actuating button 7 which effectively pushes the entire actuator 1 down, simultaneously depressing the valve stem 17 to operate the vertical-action valve 13. No leverage is required for this arrangement since the vertical valve 13 is operable by a straight downward depression of the valve stem that forces the spring of the aerosol valve out from its biased-closed position. Plate 6 may flex or otherwise hinge on the ring 5 as necessary when pressure is applied to surface 7a by the operator since the plate 6 is preferably in a hinging relationship to ring 5. Furthermore, the axial bore 15 through the length of the tubular member 8 must extend through the plate 6 such that the tubular member 8 may be coupled to the male valve stem of a male aerosol valve. Alternatively, the tubular member 8 must also extend through the plate 6 if the tubular member is configured to fit within the valve seat of a female valve assembly. As mentioned, plate 6, ring 5, and skirt 3 together form a cap structure dimensioned to snap snugly over the crimped annular bead 12 formed between the valve cup 11 and the aerosol can 2, effectively closing off the view of the valve cup 11. Also as mentioned, plate 6 is in effect the cut-out portion from the horizontal top of a cap, and plate 6 moves within the cut-out in the cap, that cut-out now defined by the dimension of the aperture through ring 5. If a tilt-valve is used for the aerosol valve, then pressure against surface 7b (a lateral movement in relation to the vertical axis through the aerosol can) rather than vertical depression against 7a will start product release through the valve by a tilting the entire actuator laterally and simultaneously tilting the valve stem to actuate the valve to release product under pressure. A ribbed structure may be molded into vertical platform 7b to direct the user's attention to this surface to be moved laterally rather than to the horizontal top of the button 7. Lastly, the flow of product is illustrated in FIG. 2 with a number of vertically oriented arrows drawn therein, beginning with the inlet flow 16 into the lower opening 14 of the valve assembly 13. When the actuator 1 is depressed by finger pressure to the actuating button 7, the pressurized product will flow in the direction indicated by 16 and enter the opening 14 of the valve 13, propelling up through the axial bore 15 of the elongated tubular member 8, diverging at the small internal channels 4 and lastly, exiting out from the multiple orifices 10 into the environment. In the exemplary embodiment illustrated in FIG. 2, there is no MBU insert provided anywhere in the central bore 15 or in the internal channels 4, and therefore this particular embodiment illustrated comprises a non-mechanical break-up (NMBU) actuator.

[0030] The length of the elongated portion 8 of the present invention is widely variable. It may be as short as 1 inch, or may be as long as 12 inches. For application of hair care products close to the scalp of the user, the length of the elongated portion 8 of the present actuator may be from about 1 inch to about 6 inches. The actuator

may be included with the aerosolized hair care product as a separate part, perhaps taped or otherwise temporarily banded to the side of the aerosol can 2, or included within a secondary carton along with the can 2, where it is expected that the consumer will attach the actuator 1 to the aerosol can 2. This embodiment eliminates the worry that insufficient shelf clearance in the store may not accommodate the length of tubular member 8 and the fully assembled aerosol package may be too tall to be practicably merchandised. Similarly, the diameter of the elongated tubular portion 8 is entirely variable, although the preferred width/diameter should be just thick enough such that the elongated stem 8 won't easily snap off when run in between thick hair. For example, the outside diameter of the elongated tubular member 8 may be from about 1/16 to about 1/2 inch. It is preferable that the tube 8 have a circular cross section to simplify adapting the first end as a female opening to fit a circular male valve stem or as a slotted male end to fit within a female valve assembly. The axial bore 15 is most preferably circular in cross-section, and the bore may be initially molded within the elongated member 8, or coaxially drilled therethrough as part of a later manufacturing step.

[0031] As recited above, the actuator 1 of the present invention may be used in conjunction with a tilt-valve rather than a depression-actuated (vertical) valve. Tilt-valves are amply described in the prior art, including U.S. Patent No. 3,658,294 (Ewald) and U.S. Patent No. 5,957,342 (Gallien), both of which are incorporated herein in their entireties. Referring to FIG. 2 once more, if the aerosol package is equipped with a tilt-valve, then the actuator 1 may actuate the aerosol valve by a lateral pressure placed against a vertically disposed platform 7b rather than by downward pressure on a horizontally disposed platform 7a.

[0032] In practice, the elongated tubular member 8 functions as a tool for teasing apart thick hair while working the distributor head 9 in closer toward the scalp of the user. The spray emanating from the distributor head will necessarily be close to the scalp, and hair care or personal care product will be evenly distributed across many hair shafts without undesired "fly away" and concomitant wasting of product. The exit orifices on the distributor head may allow for right-angled spray of product from the scalp, or for vertical application of hair care or other personal care product directly onto the scalp, depending whether the orifices are configured on the top or along the sides of the distributor head. Products that may find more effective application by way of the present invention include, but are not limited to, perfumes, scalp conditioners, anti-dandruff treatments, hair spiking compositions, hair setting compositions, hair coloring products, hair shine products, hair conditioners, and hair cleansers.

[0033] One of the most useful applications for the actuator 1 of the present invention may be in conjunction with a dry shampoo aerosol. Dry shampoos are hair cleansing products that are sprayed into the hair, allowed

to dry, and then brushed out, with no water required in the hair cleaning operation. The ingredients, for example rice starch, absorb hair oils and other soil and such soils are then brushed out along with the dried starch residue. These products are convenient for cleansing the hair on the go when no shower or other means is available to wash the hair in the traditional fashion. The biggest problem with dry shampoo aerosols is that they cannot be easily applied to the entire length of the hair, particular if the consumer has thick and/or long hair. The "fly away" from such products is enormous, and most of the aerosolized product ends up in the air. Whatever amount does reach the hair, it is only reaching the outer surfaces of the hair and not the portions of the hair shafts closer in to the scalp. For hair setting spray this may be acceptable, but for cleansing the hair with a dry shampoo it is essential to get the dry shampoo onto the entire length of each hair shaft, even close to the scalp. The present invention offers the user a way to distribute a dry shampoo aerosol into a full head of hair, getting the cleansing product in close to the scalp and across all the hair shafts. Right angle application of dry shampoo lateral to the scalp is possible by orifices positioned on the sides of the distribution head. The user may tease apart the hair with the elongated tubular member, reach to the scalp with the distribution head of the actuator, and then distribute the dry shampoo aerosol at right angles to the scalp. Touching the top of the distributor head onto the scalp is an indication to the user that operation of the actuator will give good distribution of dry shampoo to the hair shafts close to the scalp. Once the user feels the distributor head touching the scalp, actuation of the aerosol package will cause dry shampoo to distribute at right angles to the scalp, but very close to the scalp.

[0034] In further exemplary embodiments, a dry-powder aerosol may be dispensed through the actuator of the present invention. For such application, the valve assembly used on the aerosol package may be an improved valve that is custom configured for use with dry-powder aerosols. Aerosol valves that are specifically configured for dispensing dry-powder aerosols have been described in US Patent Nos. 6,394,321 (Bayer); 5,975,378 (Bayer); and, 3,586,216 (Jordan), each of which are incorporated herein in their entireties. The most useful adaptation of the present actuator for use with an aerosolized dry shampoo product is with an aerosol package that may be used in the inverted position. "Up/down" aerosol valves that function in any orientation are known in the prior art. Such a valve is disclosed in U.S. Patent No. 3,587,929 (Usen), incorporated herein in its entirety. Other inverted packages are disclosed in U.S. Patent No. 6,491,187 (Walters), also incorporated herein in its entirety. Any of these arrangements may be used with the actuator 1 of the present invention to spray an aerosol with the aerosol can in the inverted position.

[0035] In yet another exemplary embodiment of the present invention, the distributor head of the actuator may be detachable and interchanged with other distrib-

utor heads by the manufacturer or even by the end user consumer. For example, two or more distributor heads may be supplied and the consumer is given the option to interchange these distributor heads to meet his/her particular needs. The consumer may be given heads that have different numbers of exit orifices, or orifices that are positioned to dispense aerosol in different directions. That is, the optional distributor heads may provide for different spray patterns. One distributor head supplied to a consumer may be attached by the consumer to the distal end of the elongated tubular member to create an MBU actuator, whereas a second distributor head supplied to the consumer may be attached by the consumer to the distal end of the elongated member to create a NMBU actuator.

[0036] In yet another exemplary embodiment of the present invention, two or more fully complete actuators of the present invention may be supplied to the consumer. One non-limiting example would be to supply different length actuators to the consumer with a single aerosol product. For this particular embodiment, the consumer may choose which of the included actuators to use, and then snap the chosen actuator onto the aerosol package depending on fullness of the consumer's hair.

[0037] We have thus described a unique actuator for use on an aerosol package that functions as an applicator for aerosol hair care products, effectively applying product to those portions of the hair shafts closer to the scalp of the user and optionally directly onto the scalp itself. The elongated tubular member of the present actuator functions as a tool to tease apart the hair while simultaneous working the distributor head of the actuator closer to the scalp, allowing application of hair care formulation to hair close to the scalp or directly to the scalp. The distributor head of the present actuator allows for wider distribution and lateral distribution of product close to the scalp without undesired and wasteful product "fly away." Various configurations of the elongated tubular member and the distributor head allow for construction of overall MBU and NMBU actuators, and choice in the direction of aerosolized effluent. A preferred use for the actuator of the present invention is in conjunction with an aerosol package comprising an up/down valve that may be operated in either the upright or the inverted position, (e.g. by provision of alternative entry points into the aerosol valve using slide/ball valves for bypassing the inlet of the dip tube), and in particular where the aerosol hair-care formulation is a dry shampoo product for cleansing the hair without water rinsing.

Claims

1. An aerosol actuator comprising:

a. an elongated tubular member comprising a first end, a second end, and an axial bore there-through, said first end dimensioned to fit seal-

ingly onto a valve stem of a male aerosol valve or to fit sealingly into a valve seat of a female aerosol valve;

b. a distributor head integral to said second end of said elongated tubular member, said distributor head further comprising at least two internal channels within said head and at least two exit orifices configured on said head, said axial bore of said tubular member in fluidic communication with said channels, said channels in fluidic communication with said exit orifices;

c. a cap structure comprising:

i. a ring having an outer circumference, said ring having an aperture therethrough;

ii. a relatively flat plate having a center location through which said axial bore of said tubular member extends, said plate movable within the aperture of said ring; and

iii. a circumferential skirt contiguous with the outer circumference of said horizontal ring, said skirt configured to fit over an aerosol can; and

d. an actuating button, the movement of which actuates said valve, the button being molded onto said plate and comprising a finger-sized platform for the depression or the leverage of said button.

2. The actuator of Claim 1 wherein said distributor head includes from 2 to 10 exit orifices.

3. The actuator of Claim 1 wherein said aerosol valve comprises a vertical valve.

4. The actuator of Claim 1 wherein said aerosol valve comprises a tilt-valve.

5. The actuator of Claim 1, wherein said plate is in hinging arrangement with said ring and substantially within said aperture.

6. The actuator of Claim 1 further including at least one mechanical break-up insert positioned in said axial bore of said elongated tubular member.

7. The actuator of Claim 1 further including at least one mechanical break-up insert positioned in at least one of said internal channels of said distributor head.

8. The actuator of Claim 6, wherein said insert is positioned at the first end of said elongated tubular member.

9. The actuator of Claim 6 wherein said insert is positioned at the second end of said elongated tubular member.

10. The actuator of Claim 7 wherein said insert is positioned at each of the said exit orifices.
11. A method for applying an aerosolized hair-care product to portions of hair close to a scalp, said method comprising the steps of: 5
- a. providing a hair-care product in an aerosol package, said package comprising a propellant, an aerosol can, a male or female valve assembly, and the actuator of Claim 1, said actuator positioned sealingly onto a valve stem of a male valve or into a valve seat of a female valve; 10
 - b. teasing apart hair with said actuator and positioning said distributor head close to a scalp; 15
 - and
 - c. actuating said package by depression or lateral movement of said actuating button to distribute said hair-care product through said distributor head onto hair. 20
12. A method for applying an aerosolized personal care product onto a scalp, said method comprising the steps of: 25
- a. providing a personal care product in an aerosol package, said package comprising a propellant, an aerosol can, a male or female valve assembly, and the actuator of Claim 1, said actuator positioned sealingly onto a valve stem of a male valve or into a valve seat of a female valve; 30
 - b. teasing apart hair with said actuator and positioning said distributor head close to a scalp; 35
 - c. actuating said package by depression or lateral movement of said actuating button to distribute said product through said distributor head directly onto a scalp.
13. The method of Claims 11 or 12 wherein said product is selected from the group consisting of perfumes, hair colorants, hair styling aids, hair conditioners, scalp conditioners, anti-dandruff treatments, and hair shampoos, and mixtures thereof. 40
14. The method of Claim 11 wherein said product is a dry shampoo for hair. 45
15. The method of Claim 14 wherein said valve comprises an up/down valve. 50

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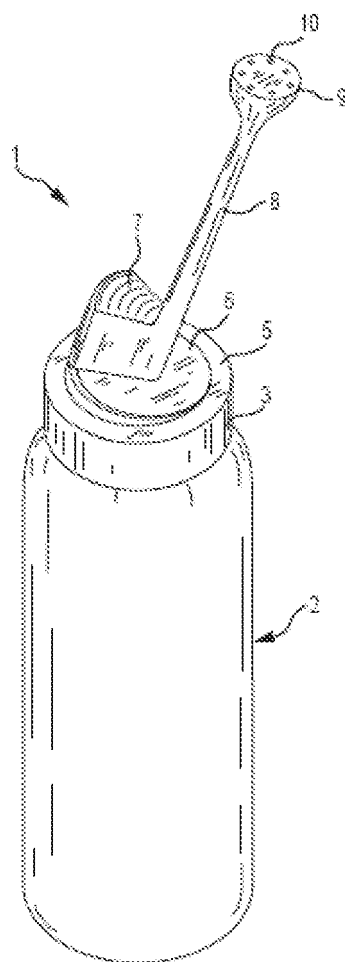


FIG.1

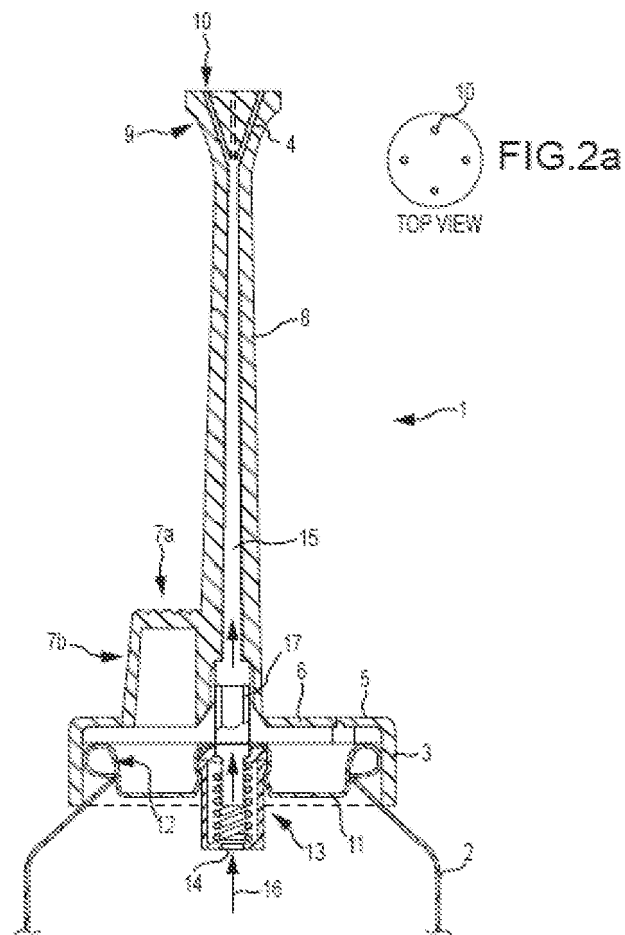


FIG.2



EUROPEAN SEARCH REPORT

Application Number
EP 11 17 5679

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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 15 February 2012	Examiner Eberwein, Michael
CATEGORY OF CITED DOCUMENTS 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 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			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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