A dispenser comprises a reservoir containing a pressurized product and the reservoir has an opening in which a valve is mounted. The valve comprises an closure element disposed within the reservoir. In response to an actuation of the dispenser, the closure element moves to an open position and allows the product to be dispensed under pressure from the reservoir through at least one outlet of the dispenser. When actuation of the dispenser ceases, the closure element returns to a closed position preventing flow communication between the outlet and the reservoir. The closure element moves to the closed position substantially by the pressure inside the reservoir acting on the closure element. The closure element is integral with a valve stem of the valve.
DISPENSER AND METHOD FOR DISPENSING A PRODUCT UNDER PRESSURE

[0001] The present invention relates to a dispenser for the dispensing of a product under pressure, such as a liquid product, for example, that can be used in numerous applications such as cosmetics, food processing, and dermatopharmacology.

[0002] Conventional aerosol containers may comprise a reservoir, formed by a can, usually of metal or plastic, with a free edge defining an opening in which a valve may be mounted. The valve generally is mounted on a dome-like structure and is "crimped" or "rolled" onto the free edge of the can. Inside the can is the product to be dispensed, which generally is in liquid form, and a propellant gas, which may or may not be mixed with the product to be dispensed.

[0003] The valve includes an essentially cylindrical valve body with an inlet orifice and an outlet orifice. Inside the valve body is an opening/closing member which may be in the form of a stem having one part disposed inside the valve body while another part emerges from the valve body. Mounted on the emerging part of the valve stem is an actuating member in the form of a pushbutton containing at least one orifice through which the product can be released. The valve stem contains an axial channel communicating, via at least one radial portion, with the interior of the valve body.

[0004] In one possible configuration, when the valve is closed, the open end of the radial portion of the channel is level with the inner annular edge of a seal mounted around the outlet orifice of the valve body. The opening/closing member is constrained in this closed position by a spring inside the valve body. To dispense the product, the user applies pressure to a bearing surface of the pushbutton, which pressure is sufficient to overcome the return force of the spring and depress the valve stem until the radial portion or portions of the channel running through the valve stem are no longer level with the seal. The pressurized product inside the valve body then flows up inside the valve stem and is channeled toward the outlet orifice of the actuating member via at least one passage connecting the outlet orifice with the valve stem. When the pressure on the bearing surface of the actuating member is released, the spring returns the opening/closing member to the closed position to cease the dispensing of the product.

[0005] Aside from the additional costs, the spring complicates the assembling of such a valve. Moreover, the material selected for the spring must be compatible with the composition to be dispensed. The presence of the spring also necessitates the use of a valve body to keep the spring in engagement with the opening/closing member.

[0006] To alleviate the problems associated with a spring, one proposal has been to use a valve with a valve body made of elastomeric material. The elasticity of the material forming the valve body is exploited to constrain the opening/closing member toward the closed position. One of the problems with such an arrangement is the difficulty of material incompatibility. Such incompatibility can arise in certain situations between the elastomer of the valve body and the product to be dispensed.

[0007] U.S. Pat. No. 5,623,920 discloses an aerosol container having a valve mounted with axial mobility inside an external enclosure. In certain embodiments, the return of the valve to the closed position may be the result of a return force associated with a spring mounted between the bottom of the container and the external enclosure, the valve stem having a fixed axial position relative to the container.

[0008] U.S. Pat. No. 4,852,867 discloses a neoteric aerosol valve in which the valve does not include a valve body. The valve stem is located in a structure, part of which forms a resilient diaphragm so as to return the valve to the closed position when the actuation is discontinued.

[0009] FR-A-1 379 202 discloses a valve device in which an elastic element fixed to the container returns the valve to the closed position when the actuation is discontinued.

[0010] U.S. Pat. No. 3,990,613 also discloses an aerosol container fitted with a valve that comprises an elastic element to return the valve to the closed position. Valve closure is the result of the contact between a seal (integral with the valve) and the inside wall of the container.

[0011] U.S. Pat. No. 3,682,355 discloses an container with a pressure actuated valve which under the action of the pressure inside the container returns it to the closed position when the actuation is discontinued. The valve includes a valve stem moved by a lever. A valve member inside the container seals the container. The valve member is kept pressed against a seat by the action of the pressure inside the container and is separated from the valve seat by the stem pressing on it when the lever is tilted. The valve member is not integral with the valve stem. Such a device comprises several independent parts. Furthermore, the valve member and the stem are not integral and move relative to one another, which results in a gap between these two parts such that actuation does not result in an immediate opening of the valve.

[0012] As embodied and broadly described herein, the invention includes a dispenser, which may be of the aerosol type. This dispenser may optionally solve some or all of the problems discussed above with reference to conventional dispensers.

[0013] In one optional aspect, the return to the closed position of a valve closure element, and its retention in the closed position, can be brought about, at least partially, by the pressure inside the container. In one optional embodiment, the dispenser may lack a spring or any other elastic return member associated with the valve. Optionally, the valve may also lack a valve body.

[0014] It should be understood that the invention could be practiced without performing one or more of the optional aspects and/or advantages described herein. Certain other optional aspects of the invention will become apparent from the detailed description which follows.

[0015] According to an embodiment of the invention, a dispenser comprises a reservoir for containing a pressurized product, the reservoir defining an opening. The dispenser further includes a sealing member positioned on the reservoir and a valve mounted in the opening of the reservoir. The valve includes a closure element disposed within the reservoir. The closure element is configured to move between a closed position wherein the closure element engages the sealing member to prevent flow communication between an outlet of the dispenser and the reservoir and an open position
wherein the outlet is in flow communication with the reservoir. The closure element is moved to the closed position substantially by pressure inside the reservoir and is moved to the open position in response to an actuation of the dispenser.

[0016] In another embodiment according to the invention, a dispenser for dispensing a product comprises a reservoir configured to contain a product under pressure. The dispenser further comprises a valve mounted on the reservoir. The valve includes a valve stem and a closure element disposed within the reservoir and integrally formed with the valve stem. The closure element is configured to be moved between a closed position wherein flow communication between an outlet of the dispenser and the reservoir is prevented and an open position wherein the outlet is in flow communication with the reservoir. The closure element is moved to the closed position substantially by the pressure in the reservoir.

[0017] In yet another embodiment according to the invention, a dispenser for dispensing a product comprises a reservoir for containing a product under pressure and a valve mounted on the reservoir. The valve includes a valve stem and a closure element disposed within the reservoir and fixed to the valve stem so as to prevent relative motion between the closure element and the valve stem. The closure element is configured to move between a closed position wherein flow communication between an outlet of the dispenser and the reservoir is prevented and an open position wherein the outlet is in flow communication with the reservoir. The closure element is moved to the closed position substantially by the pressure in the reservoir.

[0018] Optional embodiments may lack a valve spring, and optionally the valve body, of prior dispensers. In addition, some optional embodiments may lack certain elastomeric materials which can cause problems of compatibility with certain products. Furthermore, the valve may be relatively easy to assemble. Also, the closure element on which the pressure acts may be either integral with the valve stem or fixed to the valve stem so as to prevent relative motion with respect to the valve stem. This may allow for the immediate opening of the valve upon actuation of the dispenser, thereby producing a reliable device.

[0019] The closure element may be moved to the closed position substantially by pressure inside the reservoir. The term “substantially” indicates that other forces tending to move the closure element toward the closed position, such as a contributory action of a seal (typically an elastomeric seal) that may be disposed in the reservoir, are negligible compared with that exerted by the pressure inside the container. According to embodiments of the invention, the pressure in the reservoir contributes to the movement of the closure element to the closed position by more than 50%, preferably by more than 75%, and even more preferably by more than 90%.

[0020] The term “integral” as used herein to describe the relationship between certain elements of the dispenser according to certain optional embodiments of the invention indicates that the elements are formed as a single, unitary structure.

[0021] A propellant may be used to pressurize the dispenser and may include a liquefied or unliquefied gas. If a liquefied or unliquefied gas is used, it may be generally lighter than the product to be dispensed, so that in order to use the dispenser with an actuation mechanism at the top of the dispenser, a dip tube may be connected to the valve. For this purpose, the valve may have a valve body with an inlet orifice connected to the dip tube, and a free end of the dip tube situated close to the bottom of the container. In the case of using the dispenser with an actuator at the bottom, such a dip tube and valve body might be provided. Alternatively, the propellant gas may be separated from the product by a piston, or by a flexible-walled bag defining an internal volume containing the product.

[0022] The portion of the closure element on which the pressure inside the reservoir is exerted is advantageously integral only with the valve stem. In other words, the closure element may be free of any connection other than its attachment to the valve stem. This arrangement facilitates the fitting of the valve to the reservoir. Moreover, the pressure inside the reservoir for shutting the valve is less when this portion is free than when it is fixed to other elements of the dispenser. It therefore may be possible not to have any type of elastic return for valve closure and essentially only the pressure inside the container may be used for such closure.

[0023] Moreover, the closure element may comprise a valve stem able to slide in a leaktight manner in a passage formed in a seal situated in the opening of the reservoir. The stem may contain an axial channel that is in flow communication with at least one radial channel designed to be placed in flow communication with the pressurized product inside the reservoir in response to actuation of the dispenser.

[0024] The closure element may be in the form of a base member formed continuously or discontinuously around a bottom portion of the valve stem disposed in the reservoir so as both to retain the valve on the dispenser and, where applicable, to create a seal. The base member may be an annulus with an annular ring extending vertically from an edge of the annulus toward a top of the dispenser. Alternatively, the base member may include a plurality of radially extending leg members. The base member may be inscribed in a circle whose cross-sectional area $S_3$ is greater than the cross-sectional area $S_2$ of the valve stem. Because of a pressure gradient within the reservoir, the pressure at a face of the annular base member facing a bottom of the reservoir, and thus the force exerted on that face, may be greater than the pressure at the opposite face of the annular base member facing a top of the reservoir, and thus the force exerted on the opposite face, (assuming the pressure inside the container to be greater than atmospheric pressure). There may be thus a first force differential contributing to the return of the closure element to the closed position.

[0025] In addition, and still assuming that the pressure inside the container is greater than atmospheric pressure, the pressure at the end of the valve stem inside the container, and thus the force exerted on the cross-sectional area $S_2$ at the end of the valve stem inside the container, may be greater than the pressure at the end of the valve stem situated outside the container, and thus the force exerted on the cross-sectional area $S_3$, of the end of the valve stem situated outside the container. There may be a second force differential that also contributes to the return of the closure element to the closed position.
[0026] The second force differential depends on the pressure gradient inside an axial channel passing through the valve stem. The average pressure inside the axial channel may be a pressure whose value lies somewhere between atmospheric pressure and the pressure inside the reservoir. Whatever its value, the force differential may be such that the closure element is constrained to assume its closed position.

[0027] Inside the reservoir, the pressure may be such that, throughout the life of the product, the pressure may be at least greater than atmospheric pressure. The pressure difference may be decided by such factors as, for example, the desired speed of closure and the desired resistance to opening in order to minimize the risk of accidental spraying. In practice, an excess of pressure also may be provided to counterbalance other forces acting to move the closure element to the open position, such as the friction between the outer surface of the valve stem and the seal, as well as the weight of the valve stem and of a pushbutton actuation mechanism, and other similar structural components of the dispenser, which are generally negligible.

[0028] In certain embodiments, actuation includes axially depressing the valve stem. Alternatively, actuation may include tilting the valve stem. On its portion situated outside of the container, the valve stem may include a stop mechanism that limits the axial depression of the valve stem toward a bottom of the reservoir in response to actuation. The valve preferably may be mounted in an opening defined by the reservoir.

[0029] In another embodiment of the dispenser according to the invention, when the closure element is in a closed position, the open end of at least one radial channel in the valve stem is level with an inner annular edge of a sealing member, which may be disposed in an upper portion of the reservoir. An axial depression of the valve stem in response to actuation causes a displacement of the at least one radial channel relative to the inner annular edge of the sealing member, which places the outlet of the dispenser in flow communication with the reservoir via the radial and axial channels.

[0030] In yet another embodiment according to the invention, the open end of the at least one radial channel is level with an annular zone bounded by an annular ring, which, when the closure element is in a closed position, engages in a leaktight manner against a surface of the sealing member. The axial depression or the tilting of the valve stem in response to actuation causes a disengagement of at least a portion of the annular ring relative to the surface of the sealing member to place the outlet of the dispenser in flow communication with the reservoir via the radial and axial channels.

[0031] Actuation of the dispenser may occur via an actuating mechanism, which may be in the form of a pushbutton, for example. The pushbutton may be mounted on the valve stem and define at least one outlet of the dispenser. The outlet may be formed in a nozzle, which may include swirl channels. The outlet may be in flow communication with the axial channel of the valve stem.

[0032] The sealing member preferably defines a passage in which the valve stem is slideably disposed. At least a portion of a surface of an edge bounding the passage defined by the sealing member may be covered with a coating, such as silicone or Teflon, to facilitate the axial sliding of the stem through the sealing member’s passage.

[0033] The dispenser according to certain embodiments of the invention can be used for the pressurized packaging and dispensing of a cosmetic product, such as a hair product (styling lacquer, spray), care product, make-up product or personal hygiene product, for example. The reservoir may contain the cosmetic product and a pressurized propellant.

[0034] Another optional aspect of the invention includes a method of dispensing a product comprising providing a dispenser of one of the various types discussed above, actuating the dispenser to move the closure element to the open position, dispensing a product under pressure from the dispenser in response to the actuating, ceasing the actuating, and moving the closure element to the closed position substantially by the pressure in the reservoir. The moving the closure element to the closed position may include moving the closure element by the pressure on a face of the closure element facing a bottom of the reservoir. The actuating preferably includes one of axially depressing and tilting a valve stem of the valve. The actuating preferably causes immediate movement of the closure element to the open position. The actuating may include inverting the dispenser.

[0035] In another embodiment, the method includes dispensing the product by flowing the product through the outlet of the dispenser. The dispensing may further include flowing the product through at least one channel defined by the valve and in flow communication with the outlet.

[0036] In yet another embodiment, the method includes engaging the closure element with a sealing member of the dispenser.

[0037] Aside from the structural and procedural arrangements set forth above, the invention could include a number of other arrangements, such as those explained hereinafter. It is to be understood that both the foregoing description and the following description are exemplary, and are intended to provide further explanation of the invention as claimed.

[0038] The accompanying drawings are included to provide a further understanding of the invention and are incorporated in and constitute a part of this specification. The drawings illustrate embodiments of the invention and, together with the description, serve to explain the principles of the invention. In the drawings,

[0039] FIG. 1 is a side cross-sectional view of a first embodiment of the dispenser according to the invention, adapted for head-down dispensing;

[0040] FIG. 2 is a view of the upper portion of the dispenser of FIG. 1 showing the operation of the dispenser;

[0041] FIG. 3 is a perspective view of the closure element of the valve used in the dispenser of FIGS. 1 and 2; and

[0042] FIG. 4 is a perspective view of the closure element of the valve in accordance with a second embodiment of the invention.

[0043] Reference will now be made in detail to certain present embodiments of the invention, examples of which are illustrated in the accompanying drawings. Wherever possible, the same reference numbers are used in the drawings and the description to refer to the same or like parts.
The dispenser 1 illustrated in FIG. 1 comprises a cylindrical reservoir 2 of axis X. Reservoir 2 may be a can made of aluminum or tinplate, for example. One end of the can 2 is closed by a bottom 3. Inside the reservoir 2 is a product to be dispensed along with a propellant gas, such as butane, for example. The initial pressure inside the reservoir may be on the order of a few bars. The end of the reservoir 2 opposite to the bottom 3 includes a rolled edge 4 defining an opening. A cap 6 containing a valve 7 is cramped onto the rolled edge 4 of the reservoir 2. Inside the cap 6 is an annular sealing member 8 whose outer edge is held between the rolled edge 4 and the cap 6 supporting the valve 7, thereby ensuring sealed assembly of the cap 6 relative to the reservoir 2. Inside a central passage 9 defined by an inner edge 10 of the annular sealing member 8 slides a valve stem 12. The valve stem 12 slides in a leaktight manner through the passage 9 in the sealing member 8, and emerges on the outside of the cap 6 through an orifice lying over the passage 9 passing through the sealing member 8.

When it emerges from the reservoir 2, the valve stem 12 comprises a portion 25 whose cross section is greater than that of the passage 9 passing through the sealing member 8 in order to ensure that, before the container is pressurized and before the pushbutton (to be discussed later) is fitted on the valve, the valve stem 12 cannot fall into the reservoir 2.

The valve stem 12 defines an axial channel 13 ending in the vicinity of a lower end of the valve stem 12 disposed within the reservoir 2. A channel 14 also passes radially through the stem 12 and emerges at two substantially diametrically opposite points of the stem 12, intersecting the axial channel 13 at the lower end of the valve stem 12 so as to be in fluid communication with the axial channel 13.

A closure element 15 is disposed inside the reservoir 2. The closure element 15 may be in the form of a base member, as shown, integrally formed with the valve stem 12 at the end of the valve stem 12 disposed within the reservoir 2. The closure element 15 shown in FIG. 1 includes a base member having a transverse wall of cross-sectional area $S_2$ greater than the cross-sectional area $S_3$ of the valve stem 12. The face of the base member turned away from the bottom 3 of the container 2 forms a peripheral annular ring 16 defining a free edge which, under the action of the pressure inside the container 2, presses with a sealing action on a corresponding face 17 of the sealing member 8. The closure element 15 according to this embodiment is shown in the perspective view of FIG. 3. When the valve 7 is closed, the radial channel 14 communicates with an annular space bounded by the annular base member surrounding the valve stem 12, the annular ring 16 and the sealing member 8, but is closed from flow communication with the product in the reservoir.

Force-fitted on the valve stem 12 at the opposite end from the closure element 15 is a pushbutton 20 containing a passage 21 leading to a nozzle 22. The nozzle 22 defines an outlet 23 of the dispenser. The pushbutton 20 has a bearing surface 24, allowing the user to operate the valve 7 and dispense the product held inside the container. In certain embodiments, both the pushbutton 20 and the valve 7 may be moldings of a thermoplastic material, such as a polypropylene or a polyethylene, for example.

In the closed position illustrated in FIG. 1, the pressure inside the container acting on the cross-sectional area $S_2$ of the closure element 15 causes the annular ring 16 to press with a sealing action on the face 17 of the sealing member 8.

As illustrated in FIG. 2, a force exerted by a user (more or less in the direction of the X axis) on the surface 24 of the pushbutton may be sufficient to overcome the force acting on the cross-sectional area $S_3$ due to the pressure inside the reservoir 2. The valve stem 12 is therefore depressed axially, breaking the seal formed by the annular ring 16 and the sealing member 8. The product located in the vicinity of the valve 7 flows into the radial channel 14, along the axial channel 13 of the valve stem, into the passage 21 of the pushbutton 20, and is dispensed through the outlet 23. To position the product in the vicinity of the valve 7 for dispensing, the dispense may be inverted if the dispense is disposed within the reservoir 2 and the propellant is lighter than the product. When the user releases the force on the surface 24, the force differentials required to earlier push the closure element 15 axially toward the opening of the reservoir until the annular ring 16 again presses with a sealing action against the face 17 of the sealing member 8.

The above embodiment is suitable both for operation of the valve by axial depression or by lateral tilting. The closure element 15 illustrated in FIG. 4 differs from that discussed with reference to the above embodiment in that the base member is formed by a plurality of radially oriented legs 30, 31, 32 spaced out regularly around the bottom portion of the valve stem 12. The radial channel 14 is at such a distance from the lower end of the valve stem 12 that, when the valve 7 is closed, the open end (or ends) of the radial channel 14 is level with the inner edge 10 of the sealing member 8. In the absence of an actuation of the dispenser, the radial channel is kept level with the inner edge 10 of the sealing member 8 by the pressure inside the reservoir, which acts both on the cross-sectional area $S_3$ of end of the valve stem 12 disposed within the reservoir and on the total cross-sectional area of the legs 30, 31, 32. With this configuration, the dispenser is actuated to open the valve by axially depressing the valve stem 12.

When a sufficient force is applied to the bearing surface 24 of the pushbutton 20, the radial channel 14 is no longer level with the edge 10 of the sealing member 8, and the product is distributed via the radial channel 14, the axial channel 13, the passage 21, and the outlet 23. When the user releases the force on the surface 24 of the pushbutton 20, the closure element returns to the closed position in the same way as in the previous embodiment, that is, in response to force differentials resulting from pressure differentials within the reservoir, and flow communication between the reservoir 2 and the channels 14, 13, the passage 21, and the outlet 23 is prevented.

Preferably, the dispenser contains a cosmetic, pharmaceutical, dermo-pharmaceutical, personal hygiene, or hair care product. However, in its broadest aspects, the present invention could be used to store and dispense many different types of flowable substances. Furthermore, sizes of various structural parts and materials used to make these parts are illustrative and exemplary only and one of ordinary skill in the art would recognize that these materials and sizes
can be changed to produce different effects or desired characteristics of the dispensing assembly.

[0054] It will be apparent to those skilled in the art that various modifications and variations can be made to the structure and methodology of the present invention. Thus, it should be understood that the invention is not limited to the examples discussed in the specification. Rather, the present invention is intended to cover modifications and variations.

What is claimed is:

1. A dispenser for dispensing a product, comprising:
   a reservoir for containing a product under pressure, said reservoir defining an opening;
   a sealing member positioned on the reservoir; and
   a valve mounted in the opening, said valve including a closure element disposed within the reservoir, said closure element being configured to move between a closed position wherein the closure element engages the sealing member to prevent flow communication between an outlet of the dispenser and the reservoir and an open position wherein the outlet is in flow communication with the reservoir,
   wherein the closure element is moved to the closed position substantially by pressure inside the reservoir and is moved to the open position in response to an actuation of the dispenser.

2. The dispenser of claim 1, wherein the valve includes a valve stem and the closure element is integral with the valve stem.

3. The dispenser of claim 2, wherein the closure element is integral only with the valve stem.

4. The dispenser of claim 2, wherein the valve stem is slidably disposed within a passage defined by the sealing member.

5. The dispenser of claim 4, wherein the valve stem is slidably disposed within the passage in a leaktight manner.

6. The dispenser of claim 4, wherein at least a portion of the sealing member defining the passage includes a coating to facilitate the sliding of the valve stem through the passage.

7. The dispenser of claim 6, wherein the coating is silicone.

8. The dispenser of claim 2, wherein the valve stem defines at least one axial channel configured for flowing a product therethrough.

9. The dispenser of claim 8, wherein the axial channel is in flow communication with the outlet of the dispenser.

10. The dispenser of claim 8, wherein the valve stem further defines at least one radial channel in flow communication with the at least one axial channel.

11. The dispenser of claim 10, wherein the radial channel is placed in flow communication with the reservoir when the closure element is in the open position.

12. The dispenser of claim 10, wherein the valve stem is slidably disposed within a passage defined by the sealing member, the sealing member sealing the radial channel from flow communication with the reservoir when the closure element is in the closed position.

13. The dispenser of claim 12, wherein the radial channel moves axially relative to the sealing member, placing the radial channel in flow communication with the reservoir when the closure element is in the open position.

14. The dispenser of claim 2, wherein the valve stem is configured to be one of depressed axially and tilted in response to the actuation of the dispenser.

15. The dispenser of claim 14, wherein the valve stem is configured to be depressed axially and the valve stem comprises a stop mechanism configured to limit axial movement of the valve stem toward a bottom of the dispenser.

16. The dispenser of claim 10, wherein the closure element includes a base member extending around a bottom portion of the valve stem.

17. The dispenser of claim 16, wherein the base member is in the form of an annulus having an annular ring extending vertically from the edge of the annulus toward the opening of the reservoir.

18. The dispenser of claim 17, wherein the annular ring engages with the sealing member when the closure element is in the closed position, preventing flow communication between the outlet and the reservoir.

19. The dispenser of claim 18, wherein at least a portion of the annular ring disengages with the sealing member when the closure element is in the open position, allowing flow communication between the outlet and the reservoir.

20. The dispenser of claim 19, wherein the valve is configured to be one of tilted and depressed axially for actuating the dispenser and disengaging the annular ring of the closure element from the sealing member.

21. The dispenser of claim 17, wherein the radial channel opens into an annular zone bounded by the annular ring and the annulus.

22. The dispenser of claim 1, further comprising an actuating mechanism for moving the closure element to the open position.

23. The dispenser of claim 22, wherein the actuating mechanism includes a push-button mounted on a valve stem of the valve.

24. The dispenser of claim 23, wherein the pushbutton defines the outlet of the dispenser.

25. The dispenser of claim 1, wherein the reservoir contains a cosmetic product and a pressurized propellant.

26. The dispenser of claim 25, wherein the cosmetic product is chosen from a hair care product, a personal hygiene product, and a make-up product.

27. A dispenser for dispensing a product, comprising:
   a reservoir configured to contain a product under pressure; and
   a valve mounted on the reservoir, said valve having a valve stem and a closure element disposed within the reservoir and integrally formed with the valve stem, said closure element being configured to be moved between a closed position wherein the outlet of the dispenser and the reservoir is prevented and an open position wherein the outlet is in flow communication with the reservoir,

28. The dispenser of claim 27, wherein the valve stem is configured to be one of depressed axially and tilted in response to the actuation of the dispenser.

29. The dispenser of claim 27, further comprising a sealing member disposed in an upper portion of the reservoir.
30. The dispenser of claim 29, wherein the sealing member defines a passage in which the valve stem is slidably disposed.

31. The dispenser of claim 27, wherein the valve stem defines at least one axial channel configured to allow a flow of product therethrough.

32. The dispenser of claim 31, wherein the valve stem defines at least one radial channel in flow communication with the axial channel.

33. The dispenser of claim 32, wherein the radial channel is in flow communication with the reservoir when the closure element is in the open position.

34. The dispenser of claim 27, wherein the closure element includes an annulus surrounding a bottom portion of the valve stem.

35. The dispenser of claim 34, wherein an annular ring extends vertically from the edge of the annulus toward a top of the dispenser.

36. The dispenser of claim 35, wherein the annular ring engages with a sealing member disposed in a top portion of the reservoir when the closure element is in the closed position.

37. The dispenser of claim 36, wherein the valve stem includes a radial channel, the radial channel opening into an annular zone defined by the annulus and the annular ring.

38. The dispenser of claim 36, wherein at least a portion of the annular ring disengages with the sealing member when the closure element is in the open position.

39. The dispenser of claim 27, wherein the valve stem is configured to be one of axially depressed and tilted for moving the closure member to the open position.

40. The dispenser of claim 27, wherein the closure element includes a plurality of radially extending leg members disposed around a bottom portion of the valve stem.

41. The dispenser of claim 40, wherein the valve stem defines a radial channel in a bottom portion of the valve stem.

42. The dispenser of claim 41, wherein the radial channel is in flow communication with the reservoir when the closure element is in the open position.

43. The dispenser of claim 42, wherein the radial channel is sealed from flow communication with the reservoir by a sealing member when the closure element is in the closed position.

44. The dispenser of claim 43, wherein the sealing member defines a passage in which the valve stem is slidably disposed.

45. The dispenser of claim 44, wherein the valve stem is configured to be axially depressed for moving the closure element to the open position.

46. The dispenser of claim 45, wherein the radial channel is displaced axially relative to the sealing member when the valve stem is axially depressed.

47. The dispenser of claim 27, wherein the closure element is configured to be inscribed in a circle having a cross-sectional surface area that is greater than a cross-sectional area of the valve stem.

48. The dispenser of claim 27, wherein the pressure inside the reservoir decreases from a bottom of the reservoir toward the opening of the reservoir when the dispenser is in an upright position.

49. The dispenser of claim 27, further comprising an actuating mechanism for moving the closure element to the open position.

50. The dispenser of claim 49, wherein the actuating mechanism comprises a push-button mounted on the valve stem.

51. The dispenser of claim 50, wherein the push-button is configured to be axially depressed.

52. The dispenser of claim 50, wherein the push-button defines the outlet of the dispenser.

53. The dispenser of claim 27, wherein the closure element includes a first face facing a bottom of the reservoir and a second face facing a top of the reservoir, the pressure at the first face being greater than the pressure at the second face.

54. The dispenser of claim 27, wherein the pressure moving the closure element to the closed position includes a pressure acting on a face of the closure element facing the bottom of the reservoir and a pressure acting on an end of the valve stem disposed within the reservoir.

55. The dispenser of claim 27, wherein the pressure within the reservoir is greater than atmospheric pressure.

56. The dispenser of claim 27, wherein the pressure within the reservoir moving the closure element to the closed position exceeds counterbalancing forces acting on the closure element.

57. The dispenser of claim 56, wherein the counterbalancing forces include the weight of various structural components of the dispenser.

58. The dispenser of claim 27, wherein the reservoir contains a cosmetic product and a propellant.

59. The dispenser of claim 58, wherein the cosmetic product is chosen from a hair care product, a make-up product, and a personal hygiene product.

60. The dispenser of claim 27, wherein the reservoir defines an opening in a top portion of the reservoir and the valve is mounted in the opening.

61. A dispenser for dispensing a product, comprising:

- a reservoir for containing a product under pressure;
- a valve mounted on the reservoir, said valve having a valve stem and a closure element disposed within the reservoir and fixed to the valve stem so as to prevent relative motion between the closure element and the valve stem, said closure element being configured to move between a closed position wherein flow communication between an outlet of the dispenser and the reservoir is prevented and an open position wherein the outlet is in flow communication with the reservoir, wherein the valve is configured such that the closure element is moved to the closed position substantially by the pressure in the reservoir.

62. The dispenser of claim 61, wherein the valve stem defines at least one channel in flow communication with the reservoir when the closure element is in the open position.

63. The dispenser of claim 61, further comprising a sealing member disposed in an upper portion of the reservoir.

64. The dispenser of claim 63, wherein the sealing member defines a passage in which the valve stem is slidably disposed.

65. The dispenser of claim 61, wherein the valve stem defines at least one axial channel configured to allow a flow of product therethrough.

66. The dispenser of claim 65, wherein the axial channel is in flow communication with the outlet of the dispenser.
67. The dispenser of claim 66, wherein the valve stem defines at least one radial channel in flow communication with the axial channel.
68. The dispenser of claim 67, wherein the radial channel is in flow communication with the reservoir when the closure element is in the open position.
69. The dispenser of claim 61, wherein the closure element includes an annulus surrounding a bottom portion of the valve stem.
70. The dispenser of claim 69, wherein an annular ring extends vertically from an edge of the annulus toward a top of the dispenser.
71. The dispenser of claim 70, wherein the annular ring engages with a sealing member when the closure element is in the closed position.
72. The dispenser of claim 71, wherein the valve stem includes a radial channel which opens into an annular zone defined by the annulus and the annular ring.
73. The dispenser of claim 71, wherein at least a portion of the annular ring disengages with the sealing member when the closure element is in the open position.
74. The dispenser of claim 61, wherein the valve stem is configured to be one of axially depressed and tilted for moving the closure member to the open position.
75. The dispenser of claim 61, wherein the closure element includes a plurality of radially extending leg members disposed around a bottom portion of the valve stem.
76. The dispenser of claim 75, wherein the valve stem defines a radial channel in a bottom portion of the valve stem.
77. The dispenser of claim 76, wherein the radial channel is in flow communication with the reservoir when the closure element is in the open position.
78. The dispenser of claim 77, wherein the radial channel is sealed in flow communication with the reservoir by a sealing member when the closure element is in the closed position.
79. The dispenser of claim 78, wherein the sealing member defines a passage in which the valve stem is slidably disposed.
80. The dispenser of claim 79, wherein the valve stem is configured to be axially depressed for moving the closure element to the open position.
81. The dispenser of claim 80, wherein the radial channel is displaced axially relative to the sealing member when the valve stem is axially depressed.
82. The dispenser of claim 61, wherein the closure element is configured to be inscribed in a circle having a cross-sectional surface area that is greater than a cross-sectional area of the valve stem.
83. The dispenser of claim 61, wherein the pressure inside the reservoir decreases from a bottom of the reservoir toward a top of the reservoir when the dispenser is in an upright position.
84. The dispenser of claim 61, further comprising an actuating mechanism for moving the closure element to the open position.
85. The dispenser of claim 84, wherein the actuating mechanism comprises a push-button mounted on the valve stem.
86. The dispenser of claim 85, wherein the push-button is configured to be axially depressed.
87. The dispenser of claim 61, wherein the closure element includes a first face facing a bottom of the reservoir and a second face facing a top of the reservoir, the pressure on the first face being greater than the pressure on the second face.
88. The dispenser of claim 61, wherein the pressure moving the closure element to the closed position includes a pressure acting on a face of the closure element facing a bottom of the reservoir and a pressure acting on an end of the valve stem disposed within the reservoir.
89. The dispenser of claim 61, wherein the pressure within the reservoir is greater than atmospheric pressure.
90. The dispenser of claim 61, wherein the pressure within the reservoir moving the closure element to the closed position exceeds counterbalancing forces acting on the closure element.
91. The dispenser of claim 90, wherein the counterbalancing forces include the weight of various structural components of the dispenser.
92. The dispenser of claim 61, wherein the reservoir contains a cosmetic product and a propellant.
93. The dispenser of claim 92, wherein the cosmetic product is chosen from a hair care product, a make-up product, and a personal hygiene product.
94. The dispenser of claim 61, wherein the reservoir defines an opening in a top portion of the reservoir and the valve is mounted in the opening.
95. A method of dispensing a product, comprising:
   providing the dispenser of claim 1;
   actuating the dispenser to move the closure element to the open position;
   dispensing a product under pressure from the dispenser in response to the actuating;
   ceasing the actuating; and
   moving the closure element to the closed position substantially by the pressure in the reservoir.
96. The method of claim 95, wherein the pressure contributes by more than approximately 50 percent to the moving of the closure element to the closed position.
97. The method of claim 95, wherein the pressure contributes by more than approximately 75 percent to the moving of the closure element to the closed position.
98. The method of claim 95, wherein the pressure contributes by more than approximately 90 percent to the moving of the closure element to the closed position.
99. The method of claim 95, wherein the pressure in the reservoir is greater than atmospheric pressure.
100. The method of claim 95, wherein the pressure within the reservoir at a first face of the closure element facing a bottom of the reservoir is greater than the pressure at a second face of the closure element facing a top of the reservoir.
101. The method of claim 95, wherein the moving the closure element to the closed position includes moving the closure element by the pressure on a face of the closure element facing a bottom of the reservoir.
102. The method of claim 95, wherein the actuating includes one of axially depressing and tilting a valve stem of the valve.
103. The method of claim 102, wherein the one of axially depressing and tilting the valve stem causes immediate movement of the closure element to the open position.
104. The method of claim 95, wherein the actuating includes inverting the dispenser.
105. The method of claim 95, wherein the dispensing includes flowing the product through the outlet of the dispenser.

106. The method of claim 105, wherein the dispensing further includes flowing the product through at least one channel defined by the valve, the channel being in flow communication with the outlet.

107. The method of claim 95, wherein the dispensing the product includes dispensing a cosmetic product and a pressurized propellant.

108. The method of claim 107, wherein the cosmetic product is chosen from a hair care product, a personal hygiene product, and a make-up product.

109. The method of claim 95, further comprising engaging the closure element with the sealing member.

110. A method of dispensing a product, comprising:

- providing the dispenser of claim 27;
- actuating the dispenser to move the closure element to the open position;
- dispensing a product under pressure from the dispenser in response to the actuating;
- ceasing the actuating; and
- moving the closure element to the closed position substantially by the pressure in the reservoir.

111. The method of claim 110, wherein the pressure contributes by more than approximately 50 percent to the moving of the closure element to the closed position.

112. The method of claim 110, wherein the pressure contributes by more than approximately 75 percent to the moving of the closure element to the closed position.

113. The method of claim 110, wherein the pressure contributes by more than approximately 90 percent to the moving of the closure element to the closed position.

114. The method of claim 110, wherein the pressure in the reservoir is greater than atmospheric pressure.

115. The method of claim 110, wherein the pressure within the reservoir at a first face of the closure element facing a bottom of the reservoir is greater than the pressure at a second face of the closure element facing a top of the reservoir.

116. The method of claim 110, wherein the moving the closure element to the closed position includes moving the closure element by the pressure on a face of the closure element facing a bottom of the reservoir and by the pressure on an end of the valve stem disposed within the reservoir.

117. The method of claim 110, wherein the actuating includes one of axially depressing and tilting the valve stem.

118. The method of claim 117, wherein the one of axially depressing and tilting the valve stem causes immediate movement of the closure element to the open position.

119. The method of claim 110, wherein the actuating includes inverting the dispenser.

120. The method of claim 110, wherein the dispensing includes flowing the product through the outlet of the dispenser.

121. The method of claim 120, wherein the dispensing further includes flowing the product through at least one channel defined by the valve stem, the channel being in flow communication with the outlet.

122. The method of claim 110, wherein the dispensing the product includes dispensing a cosmetic product and a pressurized propellant.

123. The method of claim 122, wherein the cosmetic product is chosen from a hair care product, a personal hygiene product, and a make-up product.

124. The method of claim 110, further comprising engaging the closure element with a sealing member.

125. A method of dispensing a product, comprising:

- providing the dispenser of claim 61;
- actuating the dispenser to move the closure element to the open position;
- dispensing a product under pressure from the dispenser in response to the actuating;
- ceasing the actuating; and
- moving the closure element to the closed position substantially by the pressure in the reservoir.

126. The method of claim 125, wherein the pressure contributes by more than approximately 50 percent to the moving of the closure element to the closed position.

127. The method of claim 125, wherein the pressure contributes by more than approximately 75 percent to the moving of the closure element to the closed position.

128. The method of claim 125, wherein the pressure contributes by more than approximately 90 percent to the moving of the closure element to the closed position.

129. The method of claim 125, wherein the pressure in the reservoir is greater than atmospheric pressure.

130. The method of claim 125, wherein the pressure within the reservoir at a first face of the closure element facing a bottom of the reservoir is greater than the pressure at a second face of the closure element facing a top of the reservoir.

131. The method of claim 125, wherein the moving the closure element to the closed position includes moving the closure element by the pressure acting on a face of the closure element facing a bottom of the reservoir and by the pressure acting on an end of the valve stem disposed within the reservoir.

132. The method of claim 125, wherein the actuating includes one of axially depressing and tilting the valve stem.

133. The method of claim 132, wherein the one of axially depressing and tilting the valve stem causes immediate movement of the closure element to the open position.

134. The method of claim 125, wherein the actuating includes inverting the dispenser.

135. The method of claim 125, wherein the dispensing includes flowing the product through the outlet of the dispenser.

136. The method of claim 135, wherein the dispensing further includes flowing the product through at least one channel defined by the valve stem, the channel being in flow communication with the outlet.

137. The method of claim 125, wherein the dispensing the product includes dispensing a cosmetic product and a pressurized propellant.

138. The method of claim 137, wherein the cosmetic product is chosen from a hair care product, a personal hygiene product, and a make-up product.

139. The method of claim 125, further comprising engaging the closure element with a sealing member.