FOAM OR MOUSSE-PRODUCING DEVICE

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The invention relates to a device for the production of foam by emulsion of a liquid substance (9) placed in a reservoir (1+2) consisting of a deformable resilient sealed container (1) and an end piece (2), wherein the device is hand-held and produces foam when a manual pressure is exerted to deform the container (1).

The device according to the invention comprises a magazine (5) which includes two orifices (51,52) enabling exchanges of air and liquid substance between the reservoir and the magazine; a non-return valve (54) being associated with the second orifice, in such a way as to keep a quantity of liquid substance permanently in the magazine.

The device according to the invention makes it possible to obtain a quality foam, in a very responsive manner and in a controlled quantity, quasi-independently of the force or of the period of the manual pressure. The dimensioning of the magazine (5) enables an optimal respiration of the reservoir between two manual presses.
FOAM OR MOUSSE-PRODUCING DEVICE

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application is a continuation of International Application No. PCT/EP2012/057294 filed Apr. 20, 2012 which claims the foreign priority benefit of French Application No. 1153917 filed May 6, 2011, both of which are hereby incorporated by reference.

BACKGROUND

[0002] The present invention relates to the field of devices for production of foam, the foam being produced by emulsion of a liquid substance placed in a reservoir, wherein the device is hand-held and produces foam when a manual pressure is exerted to deform the deformable reservoir.

[0003] The WO2004/078359 publication (filed on Jul. 11, 2003) describes a foam pump of which the top for dispensing the foam is movable in vertical translation, wherein a pressure on this movable head causes foam to be dispensed. A spring return system enables the head to rebound automatically. Inside the pump, the rebound of the head causes the feeding of a dose of liquid product and a dose of air coming from the ambient environment. Pressing on the head then causes the expulsion of the liquid product emulsified with air by the mixer.

[0004] FR20050007949 (filed on Jul. 26, 2005) discloses a device for adaptation of non-specific pumps to the production of foam, in order to transform them into foam pumps. The device is composed of several elements which are added to the structure of a pump for fluids. The elements added are in particular a feed tube which runs from the inlet of the pump to a bend below the level of foaming liquid and comes back up to above the level of the liquid in order to open the air, the tube having an intake hole which enables intake of the liquid when air circulates in front of the hole.

[0005] However, these systems enable only the delivery, with each press on the dispensing head, of a dose of foam calibrated according to the dimensions of the pump.

[0006] Other systems exist for the production of foam.

[0007] The WO93/13829 publication (filed on Jan. 10, 1993) discloses a system which comprises at least two reservoirs, at least one reservoir for the liquid product which mixes with air and at least one reservoir containing compressed air. This system delivers foam when a user presses on the dispensing head, the quantity of foam being defined by the duration of the pressure. However, this system necessitates the integration of a compressed air reservoir, which complicates the installation. In addition, this type of system cannot be refilled.

[0008] FR20050003972 (filed on Apr. 20, 2005) discloses a refillable foam pump by which the expulsion of foam takes place when pressure is exerted on a deformable container connected to an end piece in order to constitute a reservoir for the basic liquid substance. The foam is formed by a phenomenon of emulsion between the liquid substance and the ambient air. However, the quantity and the quality of foam produced by this pump depend substantially upon the force and the duration of the pressure exerted by the user on the deformable container.

SUMMARY

[0010] A device for the production of foam is represented by an exemplary embodiment having a deformable sealed container made of resilient material and containing a liquid substance including one or more foaming agents, and air. The container is fixed by a sealing device to a rigid end piece in order to form a reservoir communicating with the exterior by at least one closure valve and by a dispensing orifice. The dispensing orifice communicates with the interior of the reservoir by foam forming elements and a variable flow rate passage associated with a needle.

[0011] The closure valve closes air intake orifices in the end piece when the container is deformed by pressure and opens the air intake orifices to allow air to pass from the exterior to the interior of the reservoir when the container resumes its initial shape.

[0012] The variable flow rate passage communicates with a magazine of U-shaped cross-section which is open on its upper part and closed on the rounded base of the U by a non-return valve. The magazine containing a liquid substance and air and comprising two orifices of which a first orifice is provided approximately half-way up the magazine and a second orifice is provided at the bottom of the magazine in its rounded base in order to receive the non-return valve.

[0013] The first orifice serves for the passage of air from the container to the magazine when the container is deformed by pressure and/or serves for discharge of the liquid substance from the magazine to the container when the level of the liquid substance in the magazine exceeds the level of the first orifice. The second orifice is extended by a dip tube down to the bottom of the container.

[0014] According to another feature of the exemplary embodiment, a cover is mounted on the end piece and has several functional elements including a connecting element between the cover and the end piece, a conduit chamber communicating on the one hand with an outlet and on the other hand with the foam dispensing orifice, as well as bosses for closure of the air intake orifices and the dispensing orifice.

[0015] According to another feature of the exemplary embodiment, the variable flow rate passage consists of a sleeve of external cylindrical shape of which the internal shape is adapted to provide stop elements for the needle at a top end of the sleeve and a seat for the needle at a bottom end. Accordingly, when the needle is in the stop position on the stop elements the flow rate of liquid substance is at a maximum and when the needle is supported on the seat the throughput of liquid substance is zero.

[0016] According to another feature of the exemplary embodiment, the foam forming elements consist of two grids with dimensions and shape adapted to the outlet passage and spaced apart from one another by a perforated cylinder.

[0017] According to another feature of the exemplary embodiment, the variable flow rate passage consists of a sleeve of external cylindrical shape of which the internal shape is adapted to provide stop elements for the needle at an end of the sleeve and a seat for the needle at a distance from said end. Accordingly, when the needle is in the stop position on the stop elements the flow rate of liquid is at a maximum and when the needle is supported on the seat the throughput of liquid is zero.
According to another feature of the exemplary embodiment, the closure valve has a membrane.

According to another feature of the exemplary embodiment, the closure membrane valve is situated in the interior of the reservoir facing the air intake orifices and rests on a retaining device when it is open.

According to another feature of the exemplary embodiment, the non-return valve has a ball.

According to another feature of the exemplary embodiment, the foam forming elements consist of two grids with dimensions and shape adapted to the dispensing orifice and spaced apart from one another by a perforated cylinder.

According to another feature of the exemplary embodiment, the foam forming elements consist of a succession of rigid wires distributed in a cylinder and retained with one another by a central element in order to give a bottle-brush shape.

According to another feature of the exemplary embodiment, the connecting element between the cover and the end piece enables a translational movement of the cover relative to the end piece so that the bosses hermatically close off the reservoir at the air intake orifices and the dispensing orifice thereof.

According to another feature of the exemplary embodiment, the reservoir is composed of two parts; a rigid part forming the end piece and a soft part forming the container, the rigid part being adapted to flexible parts having different volumes.

The exemplary embodiment of the claimed invention, its characteristics and its advantages will become clearer by reading the following description which is given with reference to the drawings referred to herein.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 shows a front elevational view of an embodiment of the foam production device according to the invention.

FIG. 2 shows a front elevational view of the FIG. 1 embodiment of the foam production device without the cover.

FIG. 3 shows a partial, front elevational view of an enlargement of the embodiment illustrated in FIG. 2.

DESCRIPTION OF THE SELECTED EMBODIMENTS

For the purpose of promoting an understanding of the principles of the invention, reference will now be made to the embodiments illustrated in the drawings and specific language will be used to describe the same. It will nevertheless be understood that no limitation of the scope of the invention is thereby intended. Any alterations and further modifications in the described embodiments, and any further applications of the principles of the invention as described herein are contemplated as would normally occur to one skilled in the art to which the invention relates. One embodiment of the invention is shown in great detail, although it will be apparent to those skilled in the relevant art that some features that are not relevant to the present invention may not be shown for the sake of clarity.

Referring to FIGS. 1, 2 and 3, a deformable sealed resilient container (1) is illustrated and includes a circular (20) orifice on which an end piece (2) is fixed removably in a sealed connection between the end piece (2) and the container (1) provided by a sealing device (21). The end piece (2) thus fixed by a removable sealed connection to the container (1) forms a reservoir (1+2) with the latter. The end piece (2) comprises air intake orifices (10) in the reservoir and a dispensing orifice (11). In a non-limiting manner the reservoir does not include any other passage between the interior of the reservoir and the external environment.

As illustrated in FIG. 1, a cover (3) is mounted on the end piece (2). The cover (3) has several functional elements including a connecting element (17) between the cover (3) and the end piece (2), a conduit chamber (12) communicating on the one hand with an outlet (18) of the foam forming device and on the other hand with the foam dispensing orifice, as well as bosses (15) for closure of the orifices of the reservoir (1+2). In fact, the connecting element (17) between the cover (3) and the end piece (2) is arranged in order to allow the cover (3) at least a translational movement upwards with respect to the end piece (2) in such a way that the bosses (15) of the cover (3) hermatically obstruct the air intake orifices (10) and the dispensing orifice (11) of the reservoir (1+2). Consequently, outside phases of use of the device for the production of foam, the passages between the interior of the reservoir and the external environment are obstructed in order to avoid any flow of the liquid substance (9), for example due to an accidental reversal of the device. During phases of use of the device, the user must of course lift the cover (3) to free the passages between the interior of the reservoir and the external environment. The connecting element (17) is provided for example by a screw connection. In another embodiment, the cover (3) is in sliding pivot connection with the end piece (2) and the low position of the cover (3) relative to the end piece (2) is maintained by an engagement system, replacing the screw connection.

As illustrated on FIG. 2, in the interior of the reservoir (1+2) and more particularly in the end piece (2), a closure valve (4) is situated facing the air intake orifices (10) and rests on a retaining device (22) when it is not biased in the closure position of the air intake orifice (10). In a non-limiting manner, the closure valve is provided by a membrane forming a single disc-shaped part.

As illustrated on FIG. 3, a foam forming device in the interior of the reservoir (1+2) comprises foam forming elements (7a,7b), a variable flow rate passage (6) in a non-limiting manner of a needle (14), a sleeve for the needle (14) of external cylindrical form and a stop (16) for the needle (14), and comprises a magazine (5) fixed to the external periphery of the passage (6) and disposed towards the interior of the container (1). The foam forming elements (7a,7b) consist for example of two grids with dimensions and shape adapted to the dispensing orifice (11) and spaced apart from one another by a perforated cylinder (13). Moreover, a succession of rigid wires retained with one another by a central element and distributed along this element is central, for example, disposed in the cylinder (13) between the two grids constituting the said foam forming elements (7a,7b); the said central element being disposed along the axis of symmetry of the cylinder (13). The variable flow rate passage (6) is vertical and communicates on the one hand with the foam forming elements (7a,7b), and on the other hand with the magazine (5). The inner shape of the bottom of the sleeve is adapted to form a seat (19) for the needle (14) and stop elements (16) are disposed in the upper part of the sleeve in order to prevent the needle (14) from leaving its sleeve; the relative dimensions of the needle and of the sleeve being adapted in order to enable the retention of the needle (14) in
the axis of the passage (6), including when the needle (14) is in abutment against the stop elements (16).

[0034] The magazine (5) has approximately, but in a non-limiting manner, the shape of a test tube, open on its upper cylindrical part and closed by a rounded U-shaped base. The magazine is fixed to the variable flow rate passage (6), for example by bonding of its open upper part on the cylindrical external periphery of the passage (6). The magazine (5) includes two orifices which enable exchanges of liquid substance (9) and air between the magazine (5) and the reservoir (1+2). A first orifice (51) is produced, for example, approximately halfway up the magazine (5). This orifice (51) makes it possible on the one hand to discharge the overflow of liquid substance (9) in the magazine (5), the quantity of liquid substance in the magazine being thus controlled by the position of the orifice (51), and on the other hand enabling exchanges of air between the reservoir (1+2) and the magazine (5), the magazine being located within the reservoir. For the effective functioning of the device, it is a matter of course that the level of the liquid substance (9) in the reservoir (1+2) should not exceed the level of the orifice (51) of the magazine (5). A second orifice (52) is provided at the bottom of the magazine (5), for example in its rounded base. This orifice (52) is extended by a dip tube (53) fixed to the magazine (5) for example by an interference fit so as to be easily removable and changeable. In particular, the more or less long tubes are adapted to deformable containers (1) which are more or less deep. Preferably, in order to use all of the liquid substance (9) contained in the reservoir (1+2), the dip tube (53) goes down to the bottom of the container (1), below the level of liquid substance (9) in the container (1), and the device remains functional as long as the tube (53) is dipped in the liquid substance (9). The orifice (52) is also equipped with a non-return valve (54) preventing the liquid substance (9) contained in the magazine (5) from flowing into the container through the dip tube (53). The non-return valve (54) is provided for example with a ball.

[0035] The driving force of the device for the production of foam is the pressure exerted by the user on the deformable container (1) and the property of resilience of the material constituting the container (1) giving this latter the capacity to return to its initial shape after relation of the pressure exerted by the user. The manipulation of the device for the production of foam is effected by a respiration cycle, each cycle comprising a phase of compression of the deformable container (1) and a phase of release of the pressure exerted on the resilient container (1) in order to enable this latter to return to its initial shape.

[0036] In the following description, we explain the operation of the device for the production of foam according to the invention by describing successively one after the other the two phases of a manipulation cycle of the device according to the invention.

[0037] We consider the device in the following initial configuration: the container (1), which is not deformed, and the magazine (5) are half filled with liquid substance (9), the needle (14) rests on its seat (19), the closure valves (4) of the air intake orifices (10) rest on their retaining device (22) and the non-return valve (54) closes the orifice (52), thus keeping the liquid substance (9) contained in the magazine (5).

[0038] When the user exerts a pressure on the container (1), which becomes deformed, a flow of air starts which exits through the orifices (10). According to the physical intake phenomenon, the closure valve (4) is then held flat against the air intake orifices (10). The pressure in the reservoir then keeps the membrane against the orifice and a resilient property of the material constituting the valve enables this latter to achieve the sealing and to prevent the circulation of air towards the exterior of the reservoir (1+2).

[0039] At the same time, the magazine (5) is supplied with liquid substance (9) and with air from the reservoir (1+2). On the one hand, the liquid substance (9) rises up in the dip tube (53). The liquid substance (9) exerts a pressure proportional to the pressure exerted by the user, this pressure raising the non-return valve (54) and enabling the supply of liquid substance (9) to the magazine (5). On the other hand, part of the compressed air circulates from the reservoir (1+2) into the magazine (5) through the orifice (51) provided in the magazine (5) approximately halfway up.

[0040] Next, a first mixture of liquid substance (9) and air is formed and rises in level in the magazine (5) until the needle is raised from its seat (19) by pressure. The needle thus raised butts against the stop elements (16) and is agitated with the passage of the mixture. As the passage of the mixture. As the passage (6) is narrower than the width of the magazine (5), the propagation of the mixture accelerates within this passage (6), which has the advantageous effect of stirring the liquid substance and the air. In addition, as the passage (6) is divergent with respect to the direction of propagation of the mixture it creates a phenomenon of backwash at the outlet of the passage (6) which advantageously increases the stirring of the liquid substance and the air. Thus, a partially emulsified premix of the liquid substance (9) is obtained at the outlet of the variable flow rate passage (6).

[0041] Next, the premix passes through the foam forming element (7a), rises in level in the perforated cylinder (13) through the succession of rigid wires forming a bottlebrush, then passes through the foam forming element (7b) in order to finally leave the reservoir (1+2) via the dispensing orifice (11). Thus, a very abundant foam is produced in the region of the dispensing orifice (11). This orifice is connected to the foam conduit chamber (12) which is itself connected to the outlet (18) of the device for the production of foam, this outlet (18) guiding the output of foam to facilitate the reception thereof by the user.

[0042] When the user relaxes the pressure on the container (1), this container returns to its initial shape, by virtue of the resilient properties of the deformable material of the container (1). The return to its initial shape creates a negative pressure in the reservoir (1+2) relative to the external pressure. Each closure valve (4) falls back into the rest position on its retaining device (22), thus opening the corresponding air intake orifice (10). Air is drawn into the reservoir (1+2) via the air intake orifices (10). Therefore air can only circulate between the interior and the exterior of the reservoir (1+2) through the orifices (10) in the incoming direction.

[0043] At the same time, as the liquid substance (9) and the air are no longer propelled in the direction of the foam forming device, the device for the production of foam according to the invention relaxes. On the one hand, the needle (14) and the non-return valve (54) fall back by gravity, the first on its seat (19), thus closing the variable flow rate passage (6), and the second at the bottom of the magazine (5), thus closing the orifice (52) of the magazine (5) and keeping the liquid substance (9) contained in the magazine (5). On the other hand, the overflow of liquid substance (9) in the magazine (5) spreads in the container (1) through the orifice (51) and the liquid substance (9) present in the dip tube (53) is kept in the
The deforming container (1) of the device is provided in order to be removed from the end piece (2). The deforming container (1) comprises for example a rigid ring in the region of its circular orifice so that the end piece (2) can engage at the top. When the reservoir is removed, the user can then fill it with the liquid substance (9). Thus the device is refillable by the user. A non-limiting embodiment comprising a horizontal filling marker on the container which allows the level of the product to be visible by transparency.

In one embodiment, a utensil is added in the region of the foam dispensing head. The utensil is for example a grid made of plastic which filters the foam produced in order to change the consistency of the foam. Another example of a device is a cross which separates the jet of foam for example into four smaller jets. Thus the invention enables adjustments to produce different quantities but also different consistencies of foam depending on the accessories used or added.

The foam production device preferably functions by being held in place by the user.

The quantity of foam produced is not unlimited but a large-capacity reservoir (1+2) makes it possible to expel a large quantity of air and liquid substance (9) in order to produce a large quantity of foam. The end piece (3) is adapted to a deforming container (1) by being hermetically sealed by a sealing device (21) in the region of the circular orifice (20) of the deforming container (1). A user can therefore adapt deforming containers (1) having a different volume, but with an orifice of the same dimension, to one and the same container end piece (2). The dimension of the deforming container varies for example depending upon whether the container is more or less convex or more or less flat. The different reservoir sizes are adapted to particular uses. In order to produce an abundant foam a large-capacity reservoir will be used, and in order to produce only a small quantity of foam, for example to economize on an expensive product, a small reservoir will be used. The more or less flexible nature of the reservoir also changes the flow rate and the type of foam produced.

The device according to the exemplary embodiment of the invention has several advantages. First of all, the emulsion of the liquid substance with the air starting in the magazine (5) and the variable flow rate passage (6), in other words before the first foam forming element (7a), increases the quality of the foam finally obtained. Consequently, the quantity and the quality of foam produced by this pump depends slightly upon the force and the duration of the pressure exerted by the user. Then, the device does not need any priming phase and has a high reactivity because of the proximity between the foam forming device and the reserve of liquid substance constituted by the magazine (5), and because the liquid substance is permanently retained in the dip tube (53). Accordingly, of small actuations make it possible to obtain a well controlled quantity of foam. Finally, as the magazine (5) is of larger dimensions than the dip tube (53), the relaxation of the device after release of the pressure exerted on the container is facilitated, and the respiration of the reservoir is greatly improved, relative to a device for the production of foam without a magazine (5).

It should be obvious to persons skilled in the art that the present invention allows embodiments in numerous other specific forms without departing from the scope of the invention as claimed. Consequently, the present embodiments should be considered as illustrative but can be modified in the field defined by the scope of the appended claims.

1. A device for the production of foam, comprising:
   - a resiliently deforming container to contain in use a foamable liquid, with air in the container above the foamable liquid;
   - an end piece sealingly fixed to the container and defining a dispensing orifice and one or more air intake orifices, the end piece and container defining a reservoir;
   - one or more foam forming elements, structure defining a variable flow rate passage, and a magazine communicating with said passage, the interior of the reservoir communicating with the dispensing orifice through said magazine, said passage and said one or more foam forming elements;
   - the magazine having an upper part connecting to the variable flow rate passage, a first orifice part-way up the magazine and a second orifice at the bottom of the magazine;
   - the first orifice serving for the passage of air from the reservoir interior into the magazine when the container is deformed by pressure and for discharge of liquid from the magazine back into the container when a level of the liquid in the magazine exceeds the level of the first orifice; and
   - the second orifice communicating with a dip tube extending downward to the container to admit liquid into the magazine from the container via a non-return valve.

2. The device according to claim 1 wherein said variable flow rate passage comprises a needle movable in a sleeve between a seat and a stop, whereby the needle is raised from the seat when the container is deformed to pressurize its interior and drive a mixture of liquid and air through the passage from the magazine.

3. The device according to claim 2 wherein the variable flow rate passage is divergent with respect to the direction of movement of the liquid and air mixture from the magazine.

4. The device according to claim 1 wherein said non-return valve is a ball valve in the bottom of the magazine.

5. The device according to claim 1 wherein the magazine has a U-shaped cross section with a rounded base.

6. The device according to claim 1 further comprising, as said foam forming elements, two grids spaced apart from one another.

7. The device according to claim 6 further comprising, located in a cylinder between the two grids constituting the foam forming elements, multiple rigid wires distributed along a central element in the form of a bottlebrush.

8. The device according to claim 1 further comprising a closure valve for said one or more air intake orifices.

9. The device according to claim 8 wherein the closure valve comprises a membrane inside the end piece facing the one or more air intake orifices, and a retaining device on which the membrane rests when the closure valve is open.

10. A device for the production of foam, comprising:
   - a resiliently deformable container to contain liquid and air;
   - an end piece sealingly fixed to the container and defining a dispensing orifice;
   - one or more foam forming elements, structure defining a variable flow rate passage, and a magazine communicat-
ing with said variable flow rate passage, the interior of the reservoir communicating with the dispensing orifice through said magazine, said variable flow rate passage and said one or more foam-forming elements;
the magazine having an upper part connecting to the variable flow rate passage, a first orifice part-way up the magazine serving for the passage of air from the container into the magazine and a second orifice at the bottom of the magazine to admit liquid from the container via a non-return valve, whereby on applying manual pressure to deform the container in use a mixture of liquid and air from the container passes through the variable flow rate passage from the magazine to form foam; and
said structure defining the variable flow rate passage comprising a sleeve and a needle movable in the sleeve between a seat and a stop, whereby the needle is raised from the seat when the container is deformed to drive said mixture of liquid and air through the passage from the magazine.

11. The device according to claim 10 wherein the variable flow rate passage is divergent with respect to the direction of movement of the liquid and air mixture from the magazine.

12. The device according to claim 10 wherein the end piece has one or more air intake orifices and a closure valve for said one or more air intake orifices which closes when the container is deformed by pressure and opens to allow air to pass from the exterior to the interior of the container when the container resumes its initial shape.

13. The device according to claim 12 further comprising a cover mounted on the end piece, the cover comprising:
a connecting element connecting between the cover and the end piece;
a conduit chamber having a foam outlet for the device and communicating between said outlet and said foam dispensing orifice; and
closure parts movable with said cover to close said one or more air intake orifices and/or the dispensing orifice.

14. The device according to claim 13 wherein the connecting element between the cover and the end piece enables a translational movement of the cover relative to the end piece whereby said closure parts in the form of bosses move to hermetically close off the one or more air intake orifices and the dispensing orifice.

15. The device according to claim 10 wherein said sleeve of the structure defining the variable flow rate passage has external cylindrical shape, and an internal shape adapted to provide a stop element for the needle at a top end of the sleeve and a seat for the needle at a bottom end of the sleeve, whereby when the needle is in the stop position on the stop element the flow rate for liquid is at a maximum and when the needle is supported on the seat the throughput of liquid is zero.

16. An end piece device for the production of foam, adapted to be fixed sealingly to a resiliently deformable container containing a liquid including one or more foaming agents and air, to form foam in said device from the liquid and air when the container is deformed by hand pressure, the device comprising:
a rigid end piece having a dispensing orifice, air intake orifices and a closure valve;
foam-forming elements and a variable flow rate passage associated with a needle, through which the dispensing orifice communicates with the interior of the container in use;
the closure valve being operable to close the air intake orifices in the end piece when in use the container is deformed by pressure and to open the air intake orifices to allow air to pass from the exterior to the interior when the container resumes its initial shape;
a magazine of generally U-shaped cross-section, the magazine communicating at its open upper part with the variable flow rate passage and having a closed rounded base comprising a non-return valve, the magazine being to contain liquid and air and comprising a first orifice approximately half-way up the magazine and a second orifice at the bottom of the magazine in its rounded base to receive the non-return valve;
wherein the first orifice serves for the passage of air from the container into the magazine when the container is deformed by pressure and/or for discharge of liquid from the magazine to the container when the level of the liquid in the magazine exceeds the level of the first orifice, and
the second orifice serves for connection to a dip tube.

17. The end piece device according to claim 16 further comprising a cover mounted on the end piece, the cover comprising:
a connecting element connecting between the cover and the end piece;
a conduit chamber having a foam outlet for the device and communicating between said outlet and said foam dispensing orifice; and
closure parts movable with said cover to close said one or more air intake orifices and/or the dispensing orifice.

18. The end piece device according to claim 17 wherein the connecting element between the cover and the end piece enables a translational movement of the cover relative to the end piece whereby said closure parts in the form of bosses move to hermetically close off the one or more air intake orifices and the dispensing orifice.

19. The end piece device according to claim 16 wherein structure defining the variable flow rate passage comprises a sleeve of external cylindrical shape, and an internal shape adapted to provide a stop element for the needle at a top end of the sleeve and a seat for the needle at a bottom end of the sleeve, whereby when the needle is in the stop position on the stop element the flow rate for liquid is at a maximum and when the needle is supported on the seat the throughput of liquid is zero.

20. The end piece device according to claim 16 wherein the foam-forming elements consist of two grids with dimensions and shape adapted to the dispensing orifice and spaced apart from one another by a cylinder.