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(54) Title: DEVICE FOR NEBULISATION OF A PHYSIOLOGICAL LIQUID

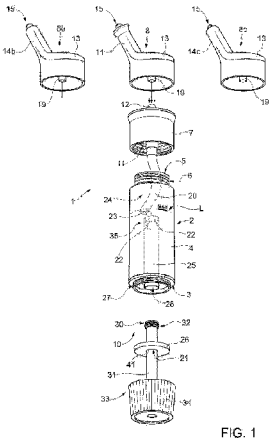

FIG. 1

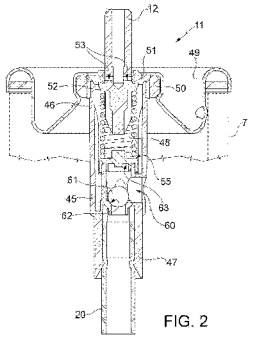

FIG. 2

(57) Abstract: Device (1) for nebulisation of a physiological liquid including a cup-shaped body (2) defining a reservoir for the physiological liquid; a cap (7) couplable in a fluid-tight manner to a lateral wall (4) of the cup-shaped body; at least one nebulisation nozzle (8) carried by the cap; and pumping means (10) integrally carried by the cup-shaped body; in which the cap (7) integrally carries a dispensing valve (11) with press-opening provided with a nipple (12) which projects cantilevered from the cap to removably receive the nebulisation nozzle and which is provided, on the opposite side of the nipple, with a tube (20) connected to the nipple and which extends within the cup-shaped body; the pumping means including a suction opening (21) for ambient air and a delivery opening (22) closed by a non-return valve (23) and which opens within the cup-shaped body, beyond a maximum filling level thereof (L).

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"DEVICE FOR NEBULISATION OF A PHYSIOLOGICAL LIQUID"

TECHNICAL FIELD

The present invention concerns a device for nebulisation of a physiological liquid, such as a saline solution, said device being highly effective and versatile in use, so that it can be used for both nasal nebulisation and auricular nebulisation, i.e. in the ear canal, and can be indefinitely reused.

BACKGROUND ART

It is known that, in particular in the winter months, both adults and children use a great variety of devices to perform nasal or ear washes, in order to remove secretions stagnating in the nasal cavities and/or in the ear canal.

In general, these washes are performed by nebulizing more or less concentrated saline solutions, contained in sterile pressurised spray cans provided with dispensing nozzle, which acts on a valve with pressure opening. By pressing the dispensing nozzle after inserting it into the cavity to be cleaned, the valve is opened allowing the physiological liquid to be dispensed in the cavity to be cleaned (nasal/auditory) until the manual pressure by the user on the dispensing nozzle is removed.

These devices are, however, costly, potentially dangerous if perforated, due to the internal pressure, and become gradually less effective as the internal pressurization is reduced due to repeated dispensing actions. Furthermore, the liquid is dispensed by the force of a pressurized propellant fluid which can, in some cases, be contaminating.

Other known devices are simple non-pressurized containers that contain the liquid to be dispensed and dispense nebulized liquid as a result of the manual pressure exercised by the

user on the dispensing nozzle, which incorporates a manual pump operated by the pressure exerted on the nozzle. These devices, however, are not very effective due to the low level of pressurization they can reach. Furthermore, they can only work with the dispensing nozzle pointing upwards, which makes it impossible for the user to use them for cleaning the ear canal, for example.

WO2009128109 concerns a device for washing the nasal cavities formed of a body containing a motorized pump and a reservoir for a treatment liquid. The pump creates a pressurization that entails dispensing of the treatment liquid via a nozzle, the treatment liquid being sucked from the tank by entrainment by a flow of pressurized air via lateral passages arranged at the base of the reservoir.

This device is cumbersome, heavy, costly due to its complex mechanism and, above all, it must be used in a vertical position, otherwise it is completely inoperative. Furthermore, the reservoir is difficult to clean and impossible to sterilize and therefore risks becoming a source of infection.

DISCLOSURE OF INVENTION

The object of the invention is to overcome the drawbacks of the known art, providing a device to perform nebulisation of a physiological liquid, such as a saline solution, as defined in the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

Further characteristics and advantages of the device of the invention will appear clear from the following description of a non-limiting embodiment thereof, provided purely by way of example, with reference to the figures of the accompanying drawings, in which:

- figure 1 illustrates a bottom-up three-quarter perspective

view of a nebulisation device produced according to the present invention, illustrated in an exploded configuration;

- figure 2 illustrates on an enlarged scale a longitudinal cut-away view of a fundamental component of the device of figure 1;

- figures 3 and 4 illustrate the same cut-away view of different embodiments of part of a second component of the device of figure 1; and

- figure 5 illustrates on an enlarged scale a detail of a further component of the device of figure 1.

BEST MODE FOR CARRYING OUT THE INVENTION

With reference to the figures from 1 to 5, the number 1 indicates overall a device for nebulisation of a physiological liquid, such as a saline solution, in particular in a nasal cavity and/or in an ear canal of a user. The device 1 comprises a cup-shaped body 2 delimited by a bottom wall 3, for example substantially flat, by a lateral wall 4, cylindrical in the non-limiting case illustrated, arranged immediately adjacent to the bottom wall 3, and by an open mouth or inlet opening 5, opposite the bottom wall 3 and delimited by a threaded end stretch 6 of the lateral wall 4.

The cup-shaped body 2 defines a reservoir adapted to contain in use the physiological liquid to be nebulized. For said purpose, the cup-shaped body 2 is made of a synthetic food-grade hot-sterilizable plastic material, preferably transparent at least at the lateral wall 4.

Preferably, the bottom wall 3 and the lateral wall 4 are made as two elements independent of each other, for example by moulding with different synthetic plastic materials; said elements are subsequently integrally fixed to each other in one piece, for example by gluing, ultrasonic welding or heat sealing. According to this embodiment, the lateral wall 4 can also be made as a tubular glass element. According to an

embodiment not illustrated for the sake of simplicity, the bottom wall 3 and lateral wall 4 can also be removably fixed integral with each other, for example screw-coupled, on condition that a perfect hydraulic seal is ensured.

The device 1 further comprises a first cap 7, for example of cylindrical shape and made by moulding in a synthetic plastic material, internally threaded and couplable in a fluid-tight manner to the threaded end stretch 6 of the lateral wall 4; the device 1 also comprises at least one nebulisation nozzle 8 of generally known type, removably couplable to the cap 7 as will be shown; lastly, the device 1 comprises pumping means, indicated overall by the number 10, integrally carried by the cup-shaped body 2.

In particular, according to one aspect of the invention, the device 1 comprises a plurality of nebulisation nozzles, for example three nebulisation nozzles, indicated respectively by 8, 8b and 8c, interchangeable, adapted to be mounted selectively, one at a time, on the cap 7. For example, the nebulisation nozzle 8 is made so as to be optimized for gentle dispensing, with moderate pressure, and is suitable for cleaning the nasal cavities of small children and infants. The nozzle 8b is made so as to be optimized for dispensing in the ear canal; and the nozzle 8c is made so as to be optimized for dispensing at high pressure and with high force, for cleaning nasal cavities of adult users.

According to a further and more important aspect of the invention, the cap 7 is integrally provided with a press-opening dispensing valve 11 (illustrated in detail in figure 2) which crosses in a fluid-tight manner the cap 7 ending on the opposite side of the cup-shaped body 2 with a nipple 12 which axially projects cantilevered from the cap 7 and which is adapted to removably receive and in a fluid-tight manner, one at a time, each of the nebulisation nozzles 8, 8b, 8c.

Each nebulisation nozzle 8, 8b, 8c comprises, in particular, a button 13 adapted to couple with the nipple 12 for actuating in the manner that will be shown the press-opening dispensing valve 11 when pressed by a user towards the cup-shaped body 2; and a tubular element 14 projecting cantilevered from the button 13 and ending on the opposite side of the button 13 with one end 15 provided with at least one through hole 16 (figures 3 and 4).

In particular, the nebulisation nozzle 8 has a tubular element 14 having a first predetermined anatomical shape, the nozzle 8b has a tubular element 14b having a second predetermined anatomical shape and the nozzle 8c has a tubular element 14c having a third predetermined anatomical shape; in any case, all three tubular elements 14,14b,14c have at their free end 15 a hole (or several holes) 16, with shape and diameter different from nozzle to nozzle; the end 15 of each tubular element 14,14b,14c further accommodates within it nebulisation means 18 of known type (figures 3 and 4) which, together with the dimensions (and if necessary the shape) of the hole/holes 16 determines, with the same internal pressurization in the cup-shaped body 2, the shape and force of the nebulised jet of physiological liquid/saline solution.

Internally, the button 13 of each nozzle 8, 8b, 8c is provided with a hydraulic insert coupling 19 (figure 1) adapted to removably press-couple in a fluid-tight manner with the nipple 12, for example the hydraulic coupling 19 is defined by a sleeve made of plastic material, like the entire nozzle 8,8b,8c, so as to be elastically deformable, which can be press-fitted onto the nipple 12. The hydraulic coupling 19 is then hydraulically connected to the end 15 and the nebulisation means 18 within it by means of internal canals 17 of the button 13 and of the tubular element 14,14b,14c.

According to a further aspect of the invention, and in combination with what has been described so far, the press-opening dispensing valve 11 is provided, on the opposite side of the nipple 12, with a tube 20, which extends within the cup-shaped body 2 up to the bottom wall 3; the tube 20 is hydraulically connected to the nipple 12 and is a flexible tube made of a synthetic food-grade plastic material or silicone.

According to another aspect of the invention, the pumping means 10 comprise (figure 5) at least one suction opening 21 for ambient air and at least one delivery opening 22 closed by a non-return valve 23 and which opens within the cup-shaped body 2, in an inner portion 24 of the same opposite the bottom wall 3 and arranged beyond a maximum filling level L of the cup-shaped body 2, for example indicated on the lateral wall 4.

In particular, the pumping means 10 comprise a tubular body 25 illustrated in a partially exploded view in figure 1, arranged inside the cup-shaped body 2 and up to the inner portion 24, and a second cap 26 removably couplable in a fluid-tight manner to the cup-shaped body 2, externally to the same, on the side of the bottom wall 3. In the non-limiting example illustrated, the bottom wall 3 is provided, on the outside of the cup-shaped body 2, with a threaded collar 27 which receives in use the cap 21, also internally threaded and made of a synthetic plastic material.

In this way, the cup-shaped body 2 can be easily separated from the caps 7 and 26 provided respectively with the press-opening dispensing valve 11 and at least part of the pumping means 10; said caps 7 and 26 are simply screwed onto the cup-shaped body 2, if necessary with the interposition of suitable seals not illustrated for the sake of simplicity, if necessary.

In the non-limiting example illustrated, the tubular body 25, which is internally hollow, is integrally obtained in one piece with the bottom wall 3, in the same material as the bottom wall 3 and can be accessed via a through hole 28 of the bottom wall 3.

The pumping means 10 consist, in the preferred embodiment, of a manually actuated piston pump, so as to limit the weight and the cost of the device 1. The pump 10 comprises the tubular body 25, which extends cantilevered from the bottom wall 3 within the cup-shaped body 2, parallel to the lateral wall 3 and towards the mouth 5, a piston 30 accommodated axially sliding in a fluid-tight manner within the tubular body 25 and a stem 31 slidingly carried through the tubular body 25 and through the cap 26 and provided at one first end 32 of the piston 30 and at a second end 33, opposite to the end 32, with a handle 34.

The tubular body 25 terminates with a free end 35 provided with the cited at least one delivery opening, which in this case is defined by a series of frontal through holes 22, and with the non-return valve 23 which is made as a flap or rubber membrane resting frontally on the end 35 provided with the holes 22; the flap or membrane 23 is fixed integral with the end 35 in its centre, while its peripheral edge covers and closes the holes 22, which are obtained in a crown, but it is free to be raised, by opening the holes 22, due to a pressure inside the tubular body 25 greater than that in the cup-shaped body 2.

The piston 30 is defined by an O-ring 36 mounted axially floating (i.e. free to move axially) and with radial clearance on the stem 31, between a first axial shoulder 37 of the stem 31, circumferentially continuous and arranged on the side of the handle 34, and a second axial shoulder 38 of the stem 31,

circumferentially discontinuous and arranged on the side opposite to the handle 34. The suction opening 21 is consequently defined by the axial shoulder 38, made discontinuous by the presence of grooves 40 obtained radially and axially on the same, together with the radial clearance between O-ring 36 and stem 31, and by a through hole 41 made across the cap 26 and which through hole is crossed in a through manner and with radial clearance by the stem 31.

For the sake of simplicity, stem 31, tubular body 25, cup-shaped body 2, and caps 7 and 26 are all elements with cylindrical symmetry, all coaxial with one another, so as to make assembly and disassembly of the device 1 by a user easy and rapid.

With specific reference to figure 2, the press-opening dispensing valve 11 comprises a sleeve 45, made of synthetic plastic material or metal, supporting the nipple 12 at a first end 46 thereof and the tube 20 at a second end 47 thereof, opposite the end 46.

The nipple 12, which is also cylindrical and coaxial with the cup-shaped body 2, is mounted axially movable within the sleeve 45 and against the action of a spring 48, which keeps the nipple 12 in a position extracted from the sleeve 45.

The valve 11 further comprises a metal flange 49 fixing the valve 11 to the cap 7, with the nipple 12 projecting in an extracted position through said flange; a fixing ring 50 makes the flange 49 integral with the first end 46 of the sleeve and a seal 51 is arranged between the flange 49, the fixing ring 50 and a terminal edge of the end 46, about the nipple 12.

The nipple 12 is in particular provided with a collar 52 radially external and radially projecting from the nipple 12; said collar 52, in the extracted position of the nipple 12,

which is the one illustrated in figure 2, is in abutment against the seal 51, so that the seal 51 closes respective lateral openings 53 of the nipple 12 made at the collar 52; the spring 48 rests arranged against the collar 52 on the side opposite the face of the collar 52 facing towards the lateral openings 53, mounted pack-like between the collar 52 and a second shoulder 55 accommodated in/towards the second end 47 of the sleeve 45.

In this way the nipple 12 can take in use also a retracted position in the sleeve 45 (not illustrated for the sake of simplicity), in which the nipple 12 projects again axially from the flange 49 and from the sleeve 45, but in which the lateral openings 53 of the nipple 12 are no longer intercepted by the seal 51 and can therefore be reached by any pressurized fluid present in the tube 20 and, through the latter, within the sleeve 45, to allow said fluid to enter the nipple 12, from which it can then reach the dispensing nozzle 8,8b,8c.

To allow dispensing of the physiological liquid contained in use in the cup-shaped body 2 in any position of the device 1, for example when the cap 7 is facing downwards, instead of being in the normal operating position in which the cap 7 is facing upwards, the sleeve 45 is provided, on the side of the second end 47, with a lateral opening 60 arranged so as to open within the cup-shaped body 2 and in particular within the portion 24; when the cap 7 is in use facing upwards, portion 24 is without physiological liquid, since it is arranged beyond the level L, whereas when the cap 7 is in use facing downwards, it is filled with physiological liquid which, conversely, abandons the inner portion of the cup-shaped body 2 nearest the bottom wall 3, leaving it empty.

Within the sleeve 45 a shutter element 61 is further accommodated, defined in the case illustrated by a spherical metal bowl or metal ball, which is accommodated within the

sleeve 45, movable as a result of the force of gravity between two opposite seats 62 and 63 obtained within the second end 47 of the sleeve 45.

In this way the shutter element or metal ball 61 is adapted in use to take selectively, by gravity, a first and a second configuration: in the first configuration, which is the one illustrated in figure 2, the metal ball 61 is arranged against the seat 62, opposite the tube 20, where it intercepts the flow of physiological liquid coming in use from the tube 20. In this configuration, therefore, the shutter element 61 is in use pushed to plug the lateral opening 60 following a dispensing of physiological liquid through the sleeve 45 and towards the nipple 12, leaving the passage towards the nipple 12 free.

In the second configuration, not illustrated for the sake of simplicity, the ball 61 is arranged in the seat 63; in this configuration the liquid contained in the inner portion 24 of the cup-shaped body 2 can enter within the sleeve 45 through the lateral opening 60, while the shutter element 61, retained by gravity in the seat 63, on one side allows the fluid contained in the sleeve 45 to pass through towards the nipple 12 and, on the other side, leaves the lateral opening 60 permanently unplugged, allowing new liquid to flow into the sleeve 45.

In use, the cup-shaped body 2 is filled with sterile physiological liquid by the user, up to the level L. Having arranged a more suitable dispensing nozzle 8,8b,8c on the nipple 12, the user operates the manual pump 10 repeatedly, pressurizing the inside of the cup-shaped body 2 and, in particular, the portion 24 without liquid.

Once a satisfactory pressure has been reached, signalled also by the progressive “stiffening” of the reciprocating motion of

the stem 31, the user places the nozzle 8,8b,8c in the cavity to be cleaned and presses the button 13. This produces a retraction of the nipple 12 in the retracted position, thus allowing the physiological liquid present in the cup-shaped body 2, due to the pressure present in the reservoir portion 24, to flow along the tube 20, cross the sleeve 45, moving the ball 61 which consequently closes the opening 60, and reach the inside of the nipple 12 and from here, the dispensing nozzle.

If the plug 7 is facing downwards, when the button 13 is actuated, the physiological liquid present in the reservoir defined by the cup-shaped body 2 is pressurized due to the previous actuation of the pump 10 and therefore penetrates directly into the sleeve 45 through the lateral opening 60, then being dispensed to the dispensing nozzle, while the tube 20 remains dry.

After use, the device 1 is emptied by removing the cap 7, and the tank defined by the cup-shaped body 2 is then separated also from the cap 26 and from the component elements of the pump 10, apart from the tubular body 25 with relative valve 23. It can therefore be easily sterilized and cleaned, using a disinfecting solution or by boiling it or by using a steam disinfection system, like those used for sterilizing babies' bottles.

The objects of the invention are therefore all achieved.

CLAIMS

1. A device (1) for nebulisation of a physiological liquid, such as a saline solution, in particular in a nasal cavity and/or in an ear canal of a user, comprising: a cup-shaped body (2) delimited by a bottom wall (3), by a lateral wall (4) adjacent to the bottom wall and by an open mouth (5), opposite to the bottom wall and delimited by an end stretch (6) of the lateral wall, the cup-shaped body defining a reservoir adapted to contain in use the physiological liquid; a first cap (7) coupled fluid-tight to said end stretch of the lateral wall; at least one nebulisation nozzle (8, 8b, 8c) removably coupled on the first cap; and pumping means (10) integrally carried by the cup-shaped body; characterized in that, in combination:

i)- the first cap (7) is integrally provided with a press-opening dispensing valve (11) which crosses in a fluid-tight manner the first cap ending on the opposite side of the cup-shaped body with a nipple (12) which axially projects cantilevered from the first cap and which is adapted to removably receive said at least one nebulisation nozzle;

ii)- the nebulisation nozzle comprising a button (13) adapted to couple with the nipple (12) for actuating said press-opening dispensing valve (11) when pressed by a user toward the cup-shaped body; and a tubular element (14) projecting cantilevered from the button and ending on the opposite side of the button with one end (15) provided with at least one through hole (16);

iii)- the press-opening dispensing valve (11) being provided, on the opposite side of the nipple, with a tube (20) which extends within the cup-shaped body and up to the bottom wall, the tube being hydraulically connected to the nipple; and

iv)- the pumping means (10) comprising at least one suction opening (21) for ambient air and at least one delivery opening (22) closed by a non-return valve (23) and which opens within the cup-shaped body, in an inner portion (24) of the same opposite to the bottom wall and arranged beyond a maximum

filling level (L) of the cup-shaped body.

2. A device according to claim 1, characterized in that the pumping means (10) comprise a tubular body (25) arranged within the cup-shaped body (2) and up to said inner portion (24) of the cup-shaped body arranged beyond the maximum filling level of the cup-shaped body, and a second cap (26) which can be coupled in a fluid-tight manner to the cup-shaped body, externally to the same, on the side of the bottom wall, so that the cup-shaped body (2) can be separated from the first and second cap (7, 26) provided with the press-opening dispensing valve and at least part of the pumping means, respectively.

3. A device according to claim 2, characterized in that said first and said second cap (7, 26) are screwed on said cup-shaped body (2).

4. A device according to claim 2 or 3, characterized in that the pumping means consist of a manually actuated piston pump (10) comprising: said tubular body (25), which is integrally obtained in one piece with the bottom wall (3) of the cup-shaped body and which extends cantilevered from the bottom wall of the cup-shaped body within the latter and toward the mouth (5), ending with a free end (35) provided with the at least one delivery opening (22) and with the non-return valve (23); a piston (30) accommodated axially sliding in a fluid-tight manner within the tubular body; and a stem (31) slidingly carried through the tubular body and through said second cap (26) and provided at a first end (32) with said piston and at a second end (33), opposite to the first one, with a handle (34); the piston being defined by an o-ring (36) mounted axially floating and with radial clearance on the stem (31), between a first axial shoulder (37) of the stem, circumferentially continuous and arranged on the side of the handle (34), and a second axial shoulder (38) of the stem,

circumferentially discontinuous and arranged on the side opposite to the handle, the suction opening (21) being defined by the second axial shoulder (38) together with the radial clearance between o-ring (36) and stem (31).

5. A device according to any of the preceding claims, characterized in that the press-opening dispensing valve (11) comprises: a sleeve (45) supporting said nipple at a first end (46) thereof and said tube at a second end (47) thereof, opposite to the first one; the nipple (12) being mounted axially movable within the sleeve and against the action of a spring (48), which keeps the nipple in a position extracted from the sleeve; a flange (49) for fixing the valve to the first cap, through which the nipple projects in extracted position; a ring (50) for fixing the flange to the first end of the sleeve; a seal (51) arranged between fixing ring and flange, about the nipple, against which a collar (52) of the nipple is in abutment in the extracted position so that the seal closes respective lateral openings (53) of the nipple made at the collar; and a second shoulder (55) accommodated within the second end of the sleeve and against which the spring (48) rests, mounted pack-like between the second shoulder (55) and the collar (52) of the nipple; the nipple being able to take a position retracted within the sleeve, in which it still axially projects from the flange and the sleeve, but the lateral openings (53) of the nipple are no longer intercepted by the seal (51).

6. A device according to claim 5, characterized in that the sleeve (45) is provided, on the side of the second end, with a lateral opening (60) which opens within the cup-shaped body; and in that a shutter element (61) is accommodated inside the sleeve, adapted in use to selectively take, by gravity, a first and a second configuration; in the first configuration the shutter element (61) being pushed to plug the lateral opening (60) in response to a dispensing of physiological

liquid through the sleeve and towards the nipple; and in the second configuration, the shutter element (61) leaving the lateral opening (60) permanently unplugged.

7. A device according to claim 6, characterized in that the shutter element is a metal ball (60) movable within the sleeve (45) between two opposite seats (62, 63) obtained within the second end of the sleeve.

8. A device according to any of the preceding claims, characterized in that said tube (20) which extends within the cup-shaped body and up to the bottom wall is a flexible tube.

9. A device according to any of the preceding claims, characterized in that at least said cup-shaped body (2) is made of a synthetic food-grade, hot-sterilizable plastic material, preferably transparent at least at the lateral wall (4).

10. A device according to claim 9, characterized in that the bottom wall (3) of the cup-shaped body (2) is made as an element independent of the lateral wall (4) of the cup-shaped body and which is integrally fixed to the lateral wall (4) of the cup-shaped body, such as by gluing, ultrasonic welding or heat sealing.

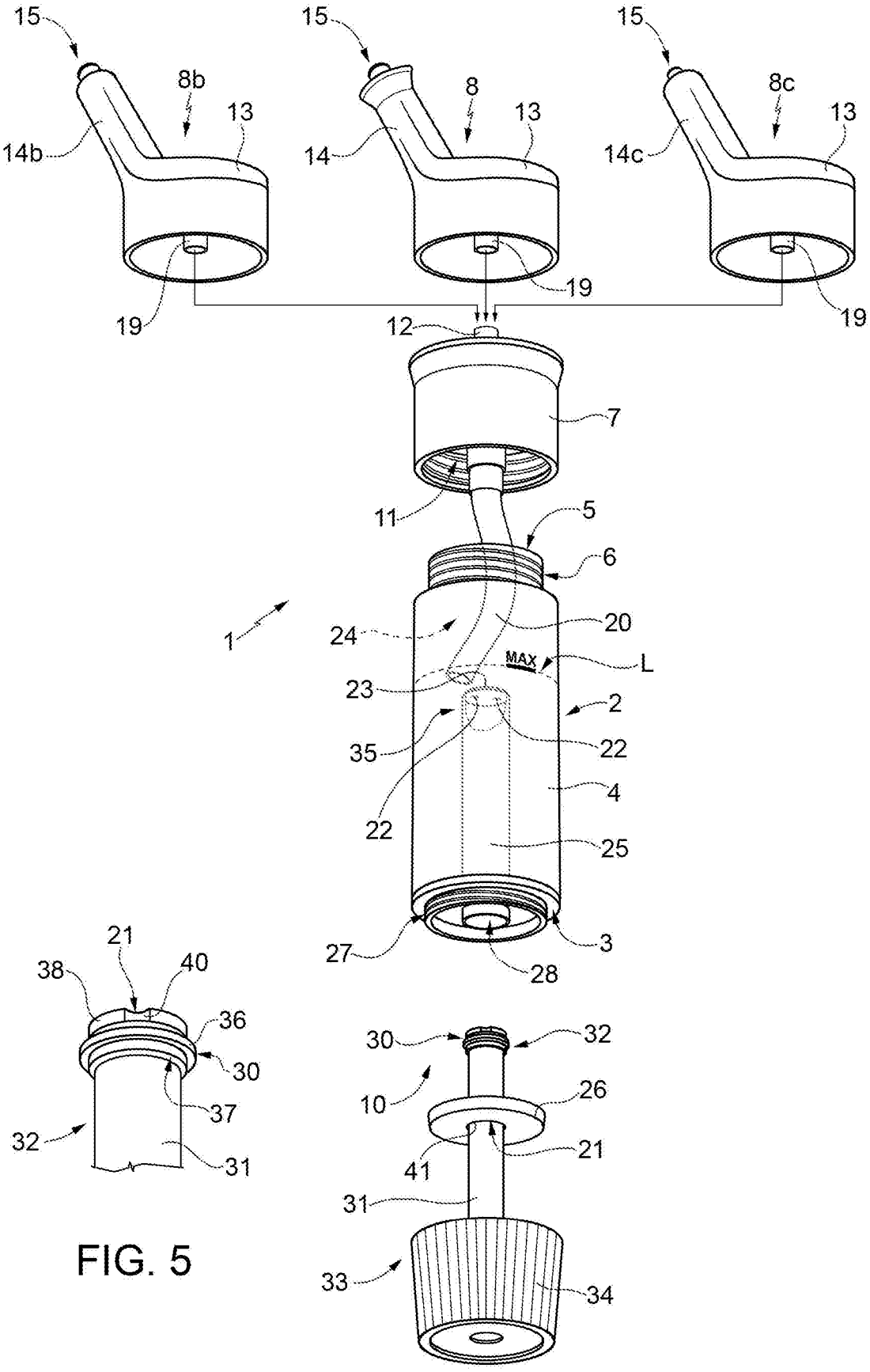
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FIG. 1

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FIG. 5

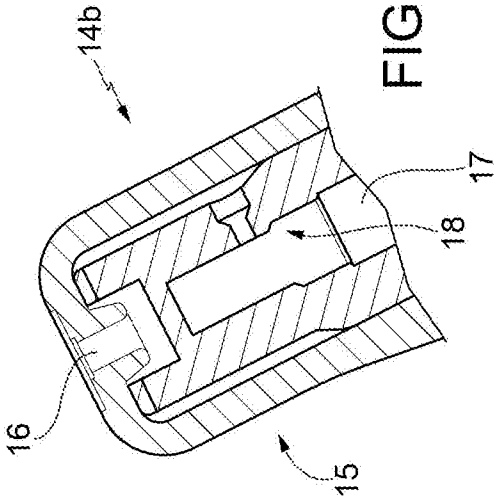

FIG. 3

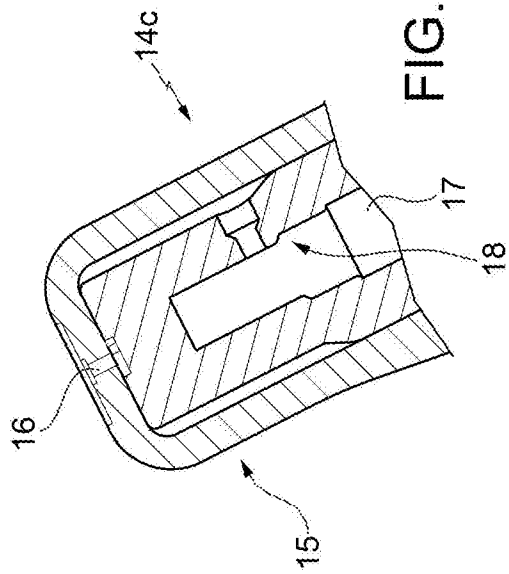

FIG. 4

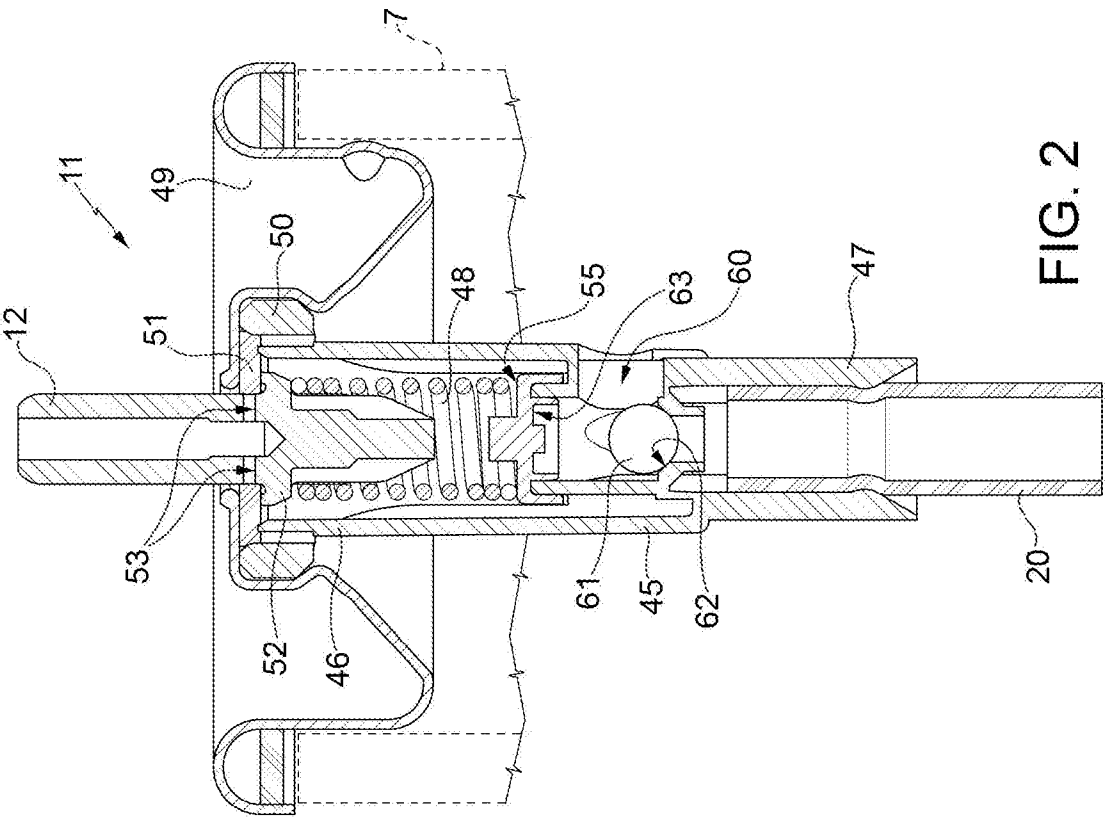

FIG. 2

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2015/051523

A. CLASSIFICATION OF SUBJECT MATTER
INV. A61M11/02 A61M15/00 A61M15/08 A61M11/08
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A61M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	KLOCKER N ET AL: "Antimicrobial safety of a preservative-free nasal multiple-dose drug administration system", EUROPEAN JOURNAL OF PHARMACEUTICS AND BIOPHARMACEUTICS, ELSEVIER SCIENCE PUBLISHERS B.V., AMSTERDAM, NL, vol. 57, no. 3, 1 May 2004 (2004-05-01), pages 489-493, XP027111815, ISSN: 0939-6411 [retrieved on 2004-04-13] figure 1 paragraph [01.2]	1-10
A	WO 2013/157878 A1 (YONWOO CO LTD [KR]) 24 October 2013 (2013-10-24) figures 2,4,5	1

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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
1 June 2015	10/06/2015

Name and mailing address of the ISA/	Authorized officer
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INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2015/051523

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 355 873 A (DEL BON FRANCO [CH] ET AL) 18 October 1994 (1994-10-18) figures 2a,2b column 5, line 32 - column 7, line 39 -----	1

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/IB2015/051523

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		US 5355873 A	18-10-1994
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