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(54) Refill device for refillable spray dispenser and refillable spray dispenser

(57) The present invention relates to a refill device (4) for a refillable spray dispenser (1) comprising a generally tubular external element (7), coaxially joined to a nut screw (13) and having an end closed by a wall (9), a generally tubular internal element (8), having an end (12) closed by a wall and having at least one portion that slides within the generally tubular external element (7), adapted to rupture the wall (9) of the generally tubular external element (7), said generally tubular internal and external elements (7,8) forming a chamber for containing a liquid or solid compound. Further there are means (16,17) provided for preventing total removal of the generally tubular internal element (8) from the generally tubular external element (7), removable safety means (14) for preventing the wall (9) of the generally tubular external element (7) from being ruptured and retainer means (20) for stopping the motion of the generally tubular internal element once the wall of the generally tubular external element has been ruptured.

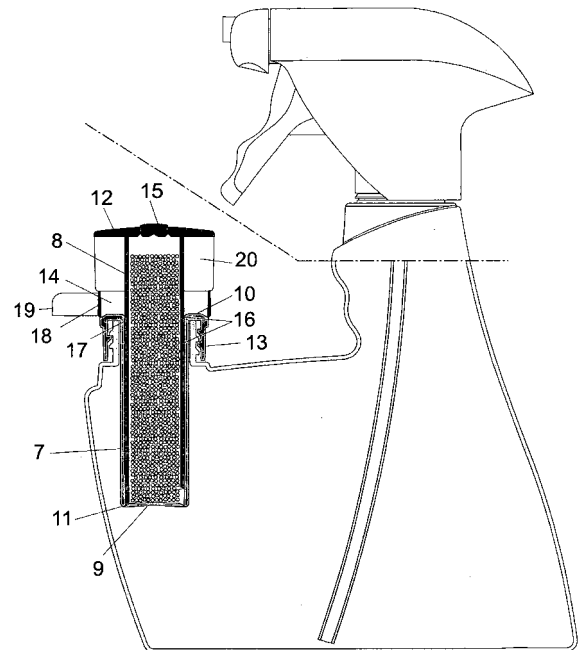


FIG. 2

EP 1 726 532 A2

Description

[0001] The present invention relates to a refill device for a refillable spray dispenser and to a manually operated refillable spray dispenser.

[0002] For proper application and adequate dosing of many aqueous solutions - such as cleaning, disinfecting, mould inhibiting products, etc - it is known to use manually operated spray dispensers.

[0003] These devices comprise a bottle containing an aqueous solution of the product, which has a mouthpiece with a threaded neck on which a lever actuated sprayer is screwed.

[0004] Once the product is used up, the empty bottle may be unscrewed and replaced by a replacement bottle, whereas the sprayer may be reused.

[0005] Nevertheless, this solution is unsatisfactory, due to the high costs for storage and transportation of refill bottles.

[0006] Aqueous solution products, generally used for home and gardening purposes, have a water content (by volume) of more than 98%.

[0007] Therefore, an alternative solution to bottle replacement may consist in purchasing the active ingredient and reconstituting the product in the bottle by mixing the active ingredient with water.

[0008] US 4,705,191 discloses a spray dispenser that may be refilled by adding water to an active ingredient refill.

[0009] To this end, the bottle has a second threaded neck opening which is used to introduce water and screw a refill cartridge whose content is discharged once the cartridge has been wholly screwed.

[0010] However, this solution also has various drawbacks.

[0011] Particularly this refill can be only mounted to the bottle when it is actually used to prevent any accidental and undesired discharge of the refill content in the bottle, due to excessive tightening of the refill.

[0012] The object of this invention is to solve at least some of prior art problems.

[0013] This object is fulfilled by a refill device for a refillable spray dispenser as defined in claim 1 and a manually operated refillable spray dispenser as defined in claim 11.

[0014] Further advantages may be obtained by the additional features of the dependent claims.

[0015] A possible embodiment of the refill device for a refillable spray dispenser and of the manually operated refillable spray dispenser, as claimed in the attached claims, will be described hereafter with reference to the drawings, in which:

- Figure 1 is a sectional front view of the manually operated refillable spray dispenser;
- Figure 2 is a partly sectional front view of the manually operated refillable spray dispenser;
- Figure 3 is a sectional front view of a detail of Figure

2;

- Figure 4 is an exploded view of the refill device for the spray dispenser.

[0016] Numeral 1 generally designates a refillable spray dispenser comprising a bottle 2 and a lever actuated sprayer 3.

[0017] The bottle 2 has two threaded necks 5, 6, which act as openings in communication with the inside of the bottle.

[0018] The first threaded neck 3 has such a size and shape as to facilitate grasp thereof by users and the lever actuated sprayer 3 is screwed thereon.

[0019] A refill device 4 is screwed onto the second threaded neck 6.

[0020] This solution allows to use the bottle 2 and the lever actuated sprayer 3 several times, by only replacing the refill device 4 and further allows to complete the refill operation and add water without removing the lever actuated sprayer 3 from its seat.

[0021] As shown in Figures 3, 4, the refill device 4 comprises a generally tubular external element 7 and a generally tubular internal element 8, at least one portion thereof sliding axially in the generally tubular external element 7.

[0022] The generally tubular external element 7 has an end closed by a pressure-rupturable wall 9 and is coaxially joined at the other end to a nut screw 13, for example by means of a flange 10, and is adapted to be screwed onto the second threaded neck 6 of the bottle 2.

[0023] The generally tubular internal element 8 has an end 12 closed by a wall, which is adapted to rupture the wall 9 of the generally tubular external element 7.

[0024] When the two generally tubular elements 7, 8 are joined together, they define a chamber containing a granular or liquid refill, which is designed to be diluted with water to provide a final product to be sprayed.

[0025] The refill device 4 further includes means 16, 17 which are adapted to prevent removal of the generally tubular internal element 8 from the generally tubular external element 7.

[0026] These means 16, 17 prevent any accidental removal of the generally tubular internal element 8, which might cause the release of the refill, and further ensure that the chamber formed by the two generally tubular elements 7, 8 is sealed.

[0027] The end of the tubular internal element 8 which comes out of the tubular external element 7 has no cover or mechanical protection elements.

[0028] Therefore, the device 4 further comprises removable safety means 14 for preventing the wall 9 of the generally tubular external element 7 from being ruptured, as long as there is no need to use the refill.

[0029] This prevents the wall 9 of the generally tubular external element 7 from being ruptured by any accidental pressure exerted on the generally tubular internal element 8, which would make the refill unusable when needed.

[0030] Only when the refill is actually used, the generally tubular internal element 8 is allowed to slide axially by removal of the means 14.

[0031] Retainer means 20 are further provided to stop the motion of the generally tubular internal element 8 once the wall 9 has been ruptured.

[0032] An end stop for the generally tubular internal element 8 is thus defined, which prevents it from further sliding when the wall 9 has been ruptured.

[0033] This prevents the generally tubular internal element 8 from falling into the bottle 2 and allows to determine in advance and with precision the stroke of the generally tubular internal element 8 in the generally tubular external element 7.

[0034] The removable safety means 14 preferably include a safety ring pull 18, which may have a tab 19 to facilitate the pull-off of the ring 18.

[0035] The safety pull ring 18 interferes with a shoulder surface 20 that is integral with the generally tubular internal element 8.

[0036] The closed end 12 of the generally tubular internal element 8 may have a relief valve 15.

[0037] The relief valve 15 allows the release of gases or vapors developed by the product in the bottle 2.

[0038] According to a preferred embodiment, the relief valve 15 consists of a rubber disk having a normally closed hole in its center, which opens any time the internal pressure exceeds atmospheric pressure.

[0039] The means 16, 17 for preventing removal of the generally tubular internal element 8 preferably consist of circular protrusions on the inner surface of the generally tubular external element 7 and on the outer surface of the generally tubular internal element 8 respectively.

[0040] Two circular protrusions 16, 17 are preferably provided on at least one of the two generally tubular elements 7, 8, and are spaced apart substantially by the stroke of the generally tubular internal element 8.

[0041] The first of these circular protrusions prevents removal of the generally tubular internal element 8 when the refill device has not yet been used, whereas the second prevents removal of the generally tubular internal element 8 after use of the refill device 4.

[0042] Upon use of the refill device 4, after removal of the removable safety means 14, by slightly forcing the generally tubular internal element 8 to slide, its circular protrusions 17 move past the circular protrusions 16 of the generally tubular external element 7 while locking the generally tubular internal element 8.

[0043] These circular protrusions also ensure a seal between the two generally tubular elements 7, 8.

[0044] The presence of the removable safety means 14 and the means 16, 17 allows to decide exactly when to use the refill device 4, which may also act as a closing cap for the threaded neck 6.

[0045] The sliding end 11 of the generally tubular internal element 8 (which faces the inside of the generally tubular external element 7) preferably has a sharp-edged section, e.g. an inclined section.

[0046] This feature reduces the effort required to rupture the wall 9.

[0047] To allow the wall 9 to be easily ruptured, it preferably has a thickness of not more than 0.4-0.5 mm.

[0048] Alternatively, the wall 9 may only have a thinner portion only, e.g. an annular recess, to form a predetermined rupturing portion.

[0049] The retainer means 20 preferably consist of a portion of the generally tubular internal element 8 having a larger radial size than the generally tubular external element 7.

[0050] The portion of the generally tubular internal element 8 having a larger radial size may be formed of a plurality of radial tabs 20.

[0051] Preferably, the generally tubular internal element 8 is made of polypropylene and the generally tubular external element 7 is made of polyethylene.

[0052] These materials facilitate the use of the refill, because polyethylene, which is softer than polypropylene, helps to tear off the ring pull 18 and rupture the wall 9.

[0053] Similarly, the harder material of the generally tubular internal element 8 provides resistance to user pressure and to the breaking of the wall 9.

[0054] The bottle 2 is preferably blow formed from synthetic resins.

[0055] The generally tubular elements 7, 8 are preferably made of a transparent material.

[0056] The partial projection of the refill 4 from the bottle 2 allows to ascertain whether the liquid or solid compound is present or not in the refill device, and to monitor discharge of the compound during use of the refill device.

[0057] It should be further appreciated that the partial projection of the refill 4 from the bottle 2 allows to use refills having a larger volume than in prior art.

[0058] In the embodiment of the figures, the generally tubular elements 7 and 8 have a circular section.

[0059] Nevertheless, this is not a binding choice, and those skilled in the art may select other shapes, e.g. oval or square sections.

[0060] In an alternative embodiment (not shown), the generally tubular internal element 8 is able to slide in a helical path within the generally tubular external element 7.

[0061] Therefore, in this alternative embodiment, the wall 9 is ruptured by a screwing motion.

[0062] The second neck 6 is preferably located at such a distance from the first neck 5 that the space above the second neck 6 does not interfere with the lever actuated sprayer 3.

[0063] This feature facilitates mounting and removal of the refill device.

Claims

1. A refill device (4) for a refillable spray dispenser (1) comprising

- a) a generally tubular external element (7)
- coaxially joined to a nut screw (13),
 - having an end closed by a wall (9);
- b) a generally tubular internal element (8)
- having an end (12) closed by a wall,
 - having at least one portion that slides within said generally tubular external element (7),
 - adapted to rupture said wall (9) of said generally tubular external element (7);
- said generally tubular internal and external elements (7, 8) forming a chamber for containing a liquid or solid compound, being there further provided
- c) means (16, 17) for preventing total removal of said generally tubular internal element (8) from said generally tubular external element (7);
- d) removable safety means (14) for preventing said wall (9) of said generally tubular external element (7) from being ruptured;
- e) retainer means (20) for stopping the motion of said generally tubular internal element (8) once said wall (9) of said generally tubular external element (7) has been ruptured.
2. A refill device (4) as claimed in claim 1, wherein said removable safety means (14) include a safety pull ring (18), which is adapted to interfere with a shoulder surface (20) that is integral with said generally tubular internal element (8).
3. A refill device (4) as claimed in claim 1 or 2, wherein said closed end (12) of said generally tubular internal element (8) has a relief valve (15).
4. A refill device (4) as claimed in claim 3, wherein said relief valve (15) includes a rubber disk with a hole therein.
5. A refill device (4) as claimed in any one of the preceding claims, wherein said means (16, 17) for preventing total removal of said generally tubular internal element (8) comprise circular protrusions on the inner surface of said generally tubular external element (7) and on the outer surface of said generally tubular internal element (8), said circular protrusions (16, 17) being adapted to interfere with each other.
6. A refill device (4) as claimed in any one of the preceding claims, wherein at least said circular protrusions of one of said generally tubular elements (7, 8) are two in number and are spaced apart by the stroke of the generally tubular internal element (8).
7. A refill device (4) as claimed in any one of the preceding claims, wherein the sliding end (11) of said generally tubular internal element (8) has an inclined section.
8. A refill device (4) as claimed in any one of the preceding claims, wherein said wall (9) of said generally tubular external element (7) has a thinner portion.
9. A refill device (4) as claimed in any one of the preceding claims, wherein the retainer means (20) consist of a portion of said generally tubular internal element (8) having a larger radial size than the cavity of said generally tubular external element (7).
10. A refill device (4) as claimed in any one of the preceding claims, wherein said flange (10) of said generally tubular external element (7) acts as a shoulder against said retainer means (20) of said generally tubular internal element (8).
11. A manually operated refillable spray dispenser (1), comprising
- a bottle (2) having a first (5) and a second threaded necks (6), which act as openings in communication with the inside of the bottle,
 - a lever actuated sprayer (3) screwed onto said first threaded neck (5),
 - a refill device (4) screwed onto said second threaded neck (6),
- said refill device (4) being as claimed in any one of claims 1 to 10.

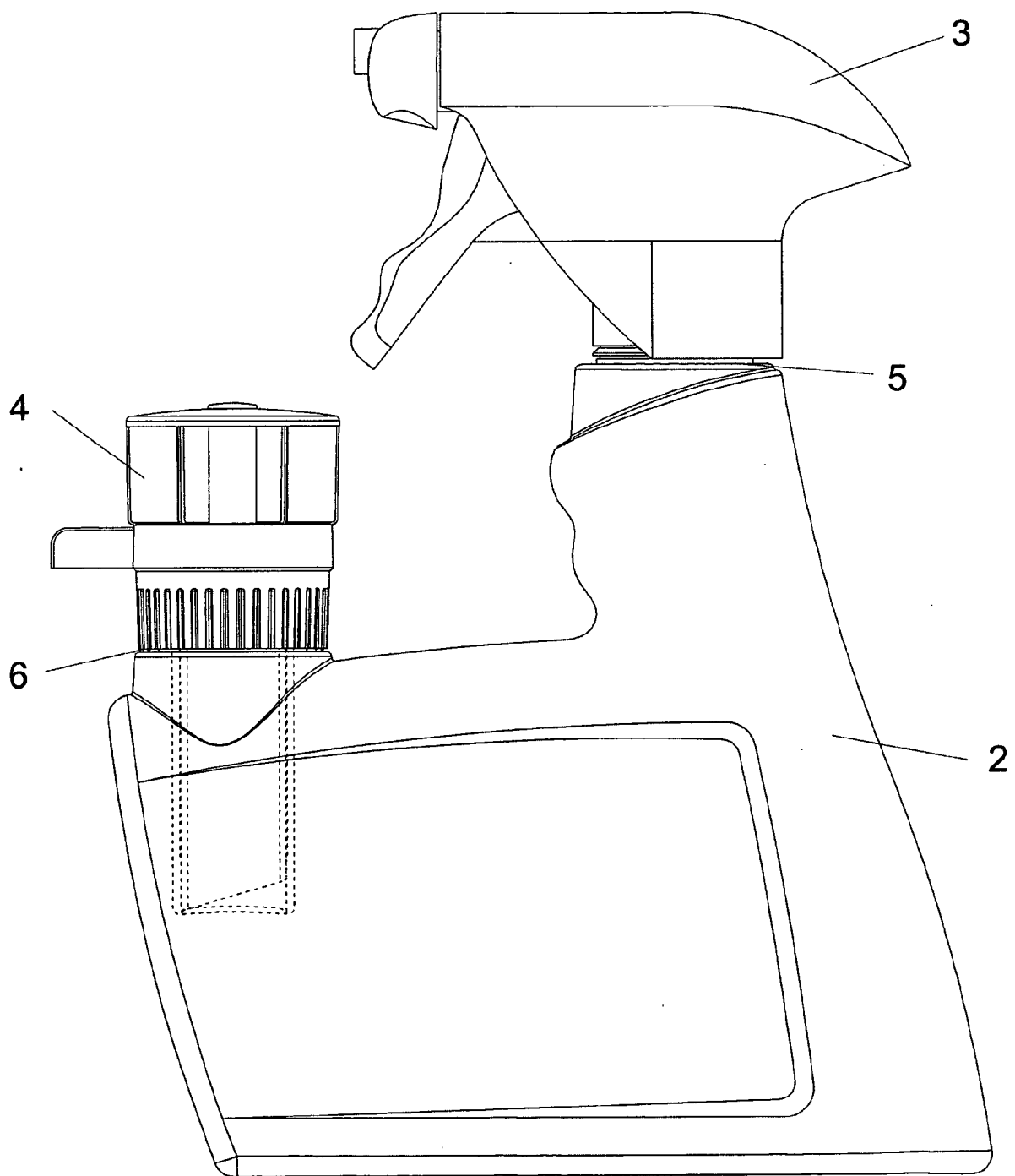


FIG. 1

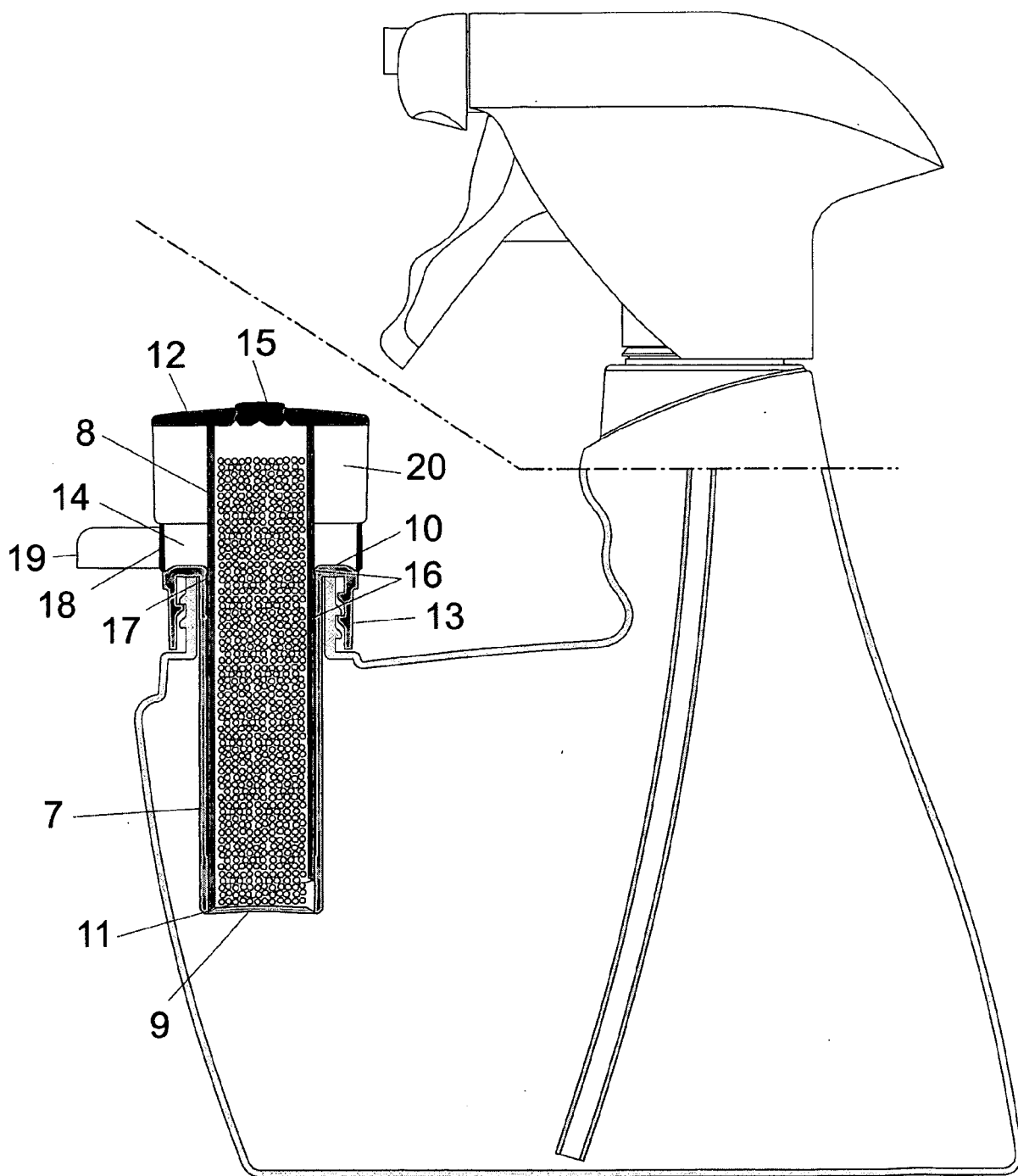


FIG. 2

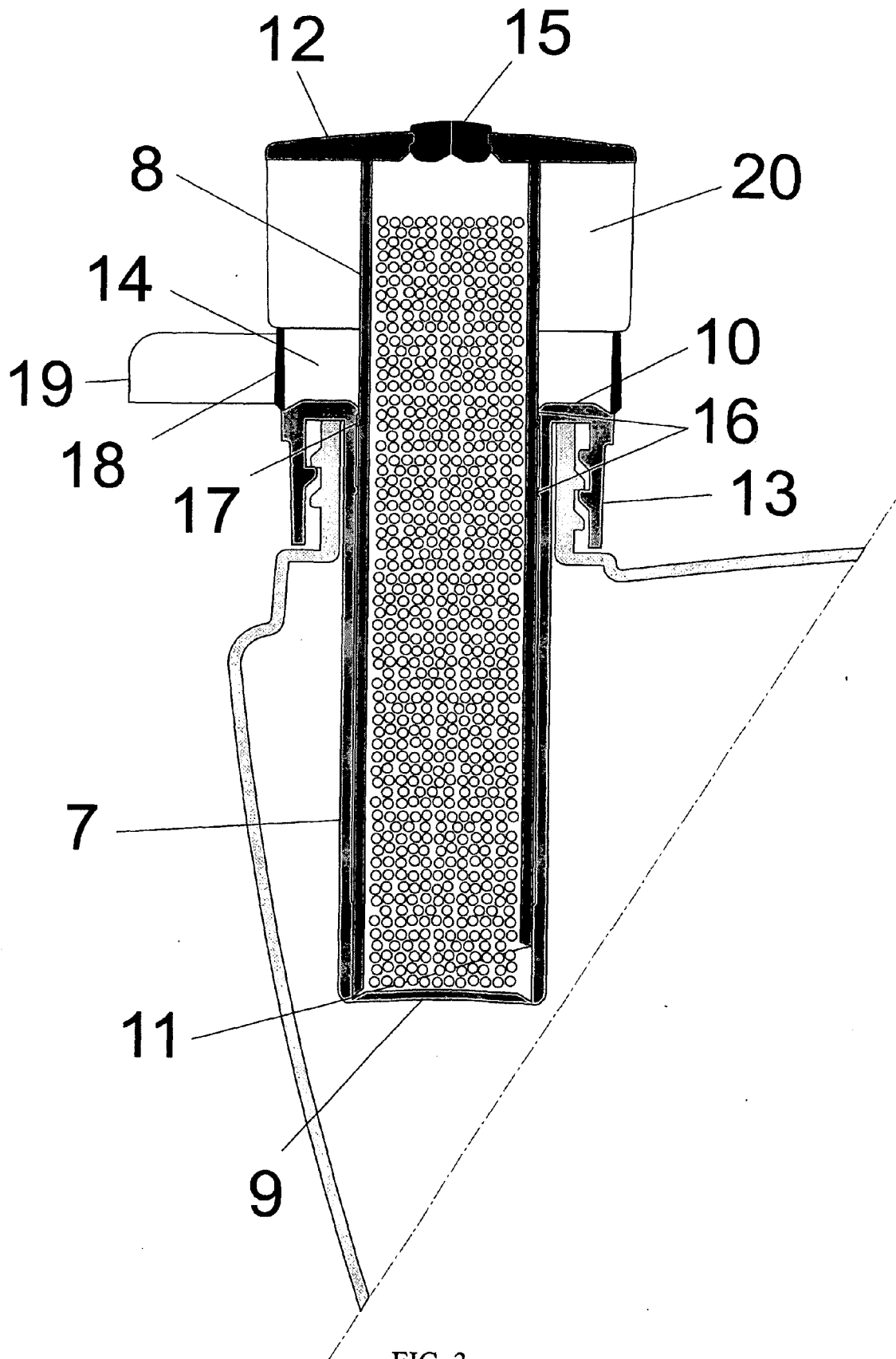


FIG. 3

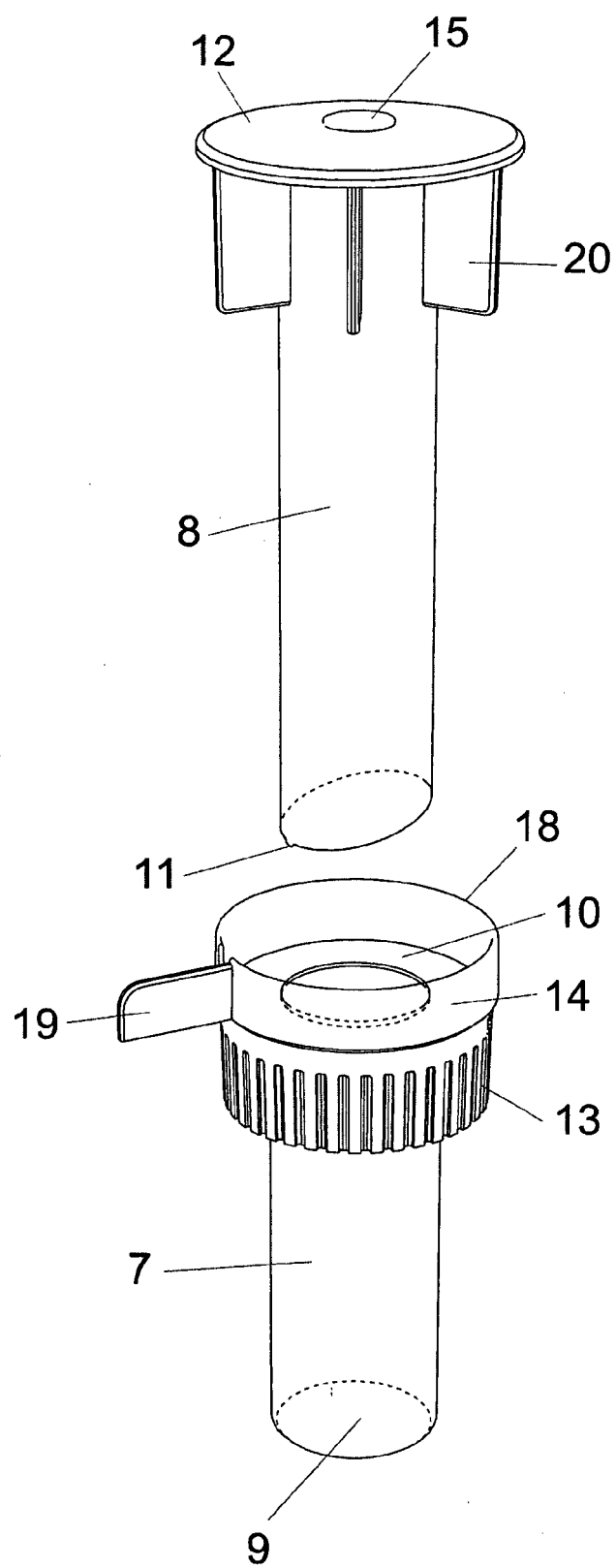


FIG. 4

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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