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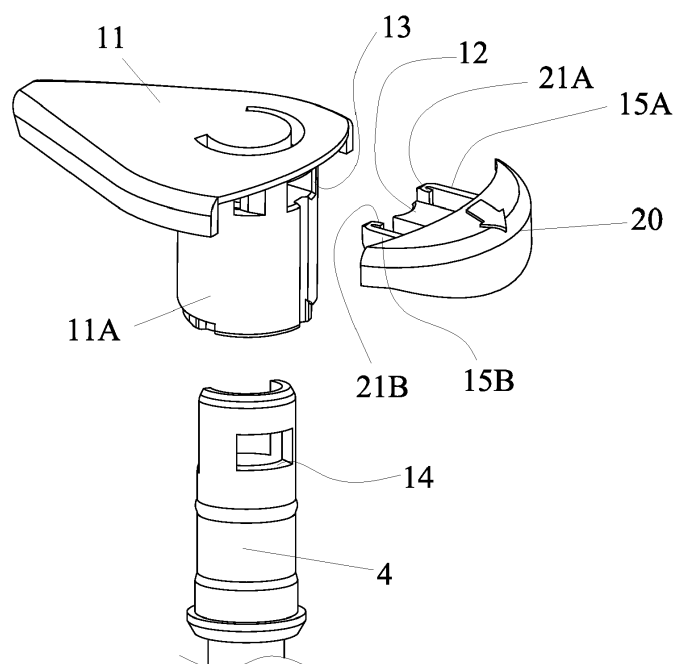
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(54) A FLUID SUBSTANCE DISPENSING DEVICE

(57) A device (1) for dispensing a fluid substance, comprising a cup-shaped body (2) inside which a piston (3) can move between a lower stroke limit position and an upper stroke limit position, sliding in a sealed manner over the cup-shaped body (2), operated by means of a hollow stem (4), the cup-shaped body (2) featuring a supply passage (7) to a compression chamber (9) which is at least partially defined by the cup-shaped body (2) and the piston (3), the supply passage (7) being coupled with a first valve element (6), and a second valve element (8)

coupled to a discharge passage (10) from the said compression chamber (9), the hollow stem (4) being fastened to a dispensing button (11) which comes into contact with a first end of a spring (5), the spring (5) being arranged so as to bring the said piston (3) back to the upper stroke limit position, characterised by the fact that the button (11) is fastened to the stem (4) by means of a pin (12) which may be removed so that when the button (11) is uncoupled from the stem (4), the spring (5) can be extracted from the device (1).

**FIG.1****EP 3 900 842 A1**

Description

FIELD OF THE INVENTION

[0001] The present invention relates to a device for dispensing a fluid substance.

[0002] In particular, it refers to a device for dispensing a fluid substance, such as soap, deodorant, cream, etc., by means of a hand-operated pump.

BACKGROUND ART

[0003] Known dispensing devices are formed of multiple parts made of different materials, which are difficult to recycle.

SUMMARY OF THE INVENTION

[0004] The object of the present invention is to overcome the drawbacks of the commonly known technique.

[0005] A further object of the invention is to provide a dispensing device which is more effectively recyclable than the conventional ones.

[0006] This and other objects are achieved by means of a dispensing device produced according to the technical teachings of the claims annexed hereto.

BRIEF DESCRIPTION OF THE FIGURES

[0007] Further features and advantages of the innovation will become clearer in the description of a preferred but not exclusive embodiment of the device, illustrated - by way of a non-limiting example - in the drawings annexed hereto, in which:

Figure 1 is an exploded perspective view of a part of the device according to the present invention;

Figure 2 is a perspective section view along the line II-II in Figure 3;

Figure 3 is an axial section of the dispensing device according to the present invention, in a first operational position;

Figure 3A is the device in Figure 3 shown in a second operational position;

Figure 4 shows a partial perspective view of a variant of a dispensing button on the device in Figure 3; and

Figure 5 shows a partial perspective view of a still further variant of a dispensing button on the device in Figure 3.

DETAILED DESCRIPTION OF THE INVENTION

[0008] With reference to the figures stated, reference

number 1 is used to denote, as a whole, a fluid substance dispensing device.

[0009] In this text, the term 'fluid substance' refers to any - preferably liquid - substance that can be used for personal or home care, such as liquid soap, shampoo, disinfectant, perfume, cream, paste etc.

[0010] The fluid substance dispensing device 1 comprises (see Figure 3) a cup-shaped body 2 inside which a piston 3 can move between a lower stroke limit position and an upper stroke limit position, sliding in a sealed manner over the cup-shaped body 2, operated by means of a hollow stem 4.

[0011] The cup-shaped body 2 features a supply passage 7 to a compression chamber 9 which may be at least partially defined by the cup-shaped body 2 and the piston 3.

[0012] The supply passage 7 is coupled with a first valve element 6, which may be, for example, a ball 34 (preferably made of plastic) or other suitable valve means.

[0013] The ball 34 may be conventionally inserted into a compartment 35 which limits movement thereof in the axial direction, by means of stops 36, for example.

[0014] Advantageously, the supply passage 7 may be in fluid passage communication with a suction tube 32.

[0015] The piston 3 may be of the type featuring a double sealing lip.

[0016] It may also be fitted onto the rod 4 in a slidable manner, so that travel of the piston 3 is limited with respect to the rod 4 (for example by a pair of abutments made on the said rod).

[0017] For example, the piston 3 may be fitted at a free end of the rod 4, where there is a discharge passage 10 in communication with a cavity 4A in the said rod.

[0018] When starting from an upper stroke limit position, the rod 4 is pushed (downwards) with respect to the piston 3 and the passage 10 is cleared, which allows the dispensing of the fluid present in the compression chamber 9.

[0019] Essentially, the rod/piston coupling near the discharge passage 10 may form a second valve element 8 at the outlet of the said compression chamber 9.

[0020] The hollow stem 4 is fastened to a dispensing button 11, which comes into contact with one end of a return spring 5.

[0021] The spring 5 is arranged in such a way as to return the rod 4 (and therefore the piston 3) to the upper stroke limit position.

[0022] Starting from a bottom stroke limit condition, the upward sliding of the rod 4 with respect to the piston 3 (operated by the spring 5) re-closes the passage 10, so as to create a vacuum in the compression chamber which sucks in the fluid (through the supply passage 7), thereby refilling it.

[0023] The cup-shaped body 2 may be fastened to an intermediate element 30, 31 which comes into contact with a second end of the spring 5.

[0024] The intermediate element may be formed of two

pieces, and specifically by a closure element 30 on the cup-shaped body 2 which is fastened to an at least partial spring 5 containment element 31.

[0025] For example, the closure element 30 may be a substantially discoidal element which is snap-fastened to the cup-shaped body 2. The closure element 30 therefore features an axial passage 30A for the stem 4.

[0026] Advantageously, the passage 30A is not sealedly coupled with the stem 4, but features channels to allow the passage of air inside a bottle to which the device is coupled.

[0027] When the piston 3 is in the upper stroke limit position (Fig.3), the latter may come into sealed contact with the closure element 30 at T. When the piston 3 is away from the upper stroke limit position, the air passage between the stem 4 and the closure element 30 may be in communication with a venting hole 37 which allows access to the bottle. In this way, no vacuum is created inside the bottle during pump operation.

[0028] The closure element 30 may comprise a tubular member 30B equipped with at least one protuberance 30C which allows a snap-coupling with an axial hole on the bottom of the containment element 31, which may also have a cup-shaped configuration.

[0029] The containment element 31 may feature a flange 31A and snap-fitted elements 31B which enable coupling with a (possibly threaded) ring nut 38 on the device 1 to a container (not shown but of a conventional kind). The coupling may be made tight by means of an annular seal 39 featured at the flange 31A, which comes into contact with a free end of the mouth of the bottle.

[0030] According to the invention, the button 11 is fastened to the stem 4 by means of a pin 12 (or plug) which can be removed (at least from the stem 3) so that the button 11 can be uncoupled from the stem 4 by simply pulling (obviously, when the pin 12 is uncoupled from the stem 4).

[0031] Thus, the spring 5 (which is normally made of metal) may be extracted from the device 1, or rather from the containment element 31, and then recycled appropriately and separately from the rest of the device 1.

[0032] Advantageously, the entire device 1 (with the exception of the spring 5) is made of plastic, or in any case of materials that can be easily separated to allow recycling.

[0033] It should be noted that the spring 5 can be fitted around the stem 4, which can protrude heightwise with respect to a free edge of the containment element 31.

[0034] The pin 12 can extend from a handle 20, which may also be configured so as to be integrated into the said button 11 in terms of the design. In other words, when the pin 12 is in a first operating position (Fig.3), the handle 20 may be part of the button 11.

[0035] Advantageously, the pin 12 may have a free curved end, copying the perimeter profile of the stem 4, which facilitates the uncoupling of the button 11 when the pin is in the second operating position, i.e. retracted (Fig.3A).

[0036] The pin 12 may be coupled (for example, by means of the handle 20) to constraining means 15A, 15B, 16A, 16B, and 19 for securing to the button 11, the said means being configured to make the said pin movable between a first position (Fig.3), in which it mutually constrains the button and the stem, and a second position (Fig.3A) in which the pin is uncoupled from at least the said stem 4 while remaining connected to (and not separable from) the button 11.

[0037] In this way, the button 11 can be detached from the stem, thereby also allowing the user to access to the spring 5, but the plug remains connected to the button 11.

[0038] Advantageously, the constraining means comprise at least one elongated element 15A, 15B, which is engaged, in an undercut arrangement and in a shiftable manner, in an appropriate seat 16A, 16B in the button.

[0039] The appropriate seat 16A, 16B may be obtained in correspondence with a skirt 11A, which extends from the button 11 and surrounds the spring 5 (hiding it from view).

[0040] The skirt 11A may be configured in such a way as to retract (in an almost telescopic manner) into the containment element 31 at least when the piston 3 is in a lower stroke limit position. However, the skirt 11A is preferably configured (i.e. the height thereof is such) that it retracts slightly into the containment element 31 (thus hiding the spring 5) even when the piston 3 is in an upper stroke limit position.

[0041] Advantageously, the at least one elongated element 15A, 15B extending from the said handle 20 comprises a hooked end 21A, 21B which engages with an edge of the said appropriate seat 16A, 16B so as to prevent the pin 12 (or handle) completely uncoupling from the button 11.

[0042] In this way, the handle 20 always remains coupled with the button 11, both when the pin 12 is securing the button and the stem, and when the pin 12 is in a retracted position and the button is released from the stem 4.

[0043] To achieve this effect, the pin 12 may be housed in a first seat 13 in the dispensing button 11 and in a second seat 14 in the stem, when it is in the first operating position.

[0044] The pin is only coupled to the first seat 13 when it is in the second position (see Figure 3A).

[0045] Advantageously, the second seat 14 in the stem may be configured so as to house the free end of the pin 12 in a slightly forced manner, so that the handle 20 is firmly coupled with the button 11 during normal button use. For example, the second seat may have walls which are tapered towards a central axis of the stem.

[0046] Furthermore, the second seat 14 and at least the free end of the pin 12 may be configured so that the pin 12 fits into the seat 14 in a sealed manner.

[0047] Obviously, the stem 4 may also be sealedly coupled to the button 11.

[0048] The first seat 13 and the second seat 14 may be configured to couple with the pin 12 so as to prevent

both an axial translation of the button 11 with respect to the stem, but also so as to provide a torsional coupling between the elements (obviously, when the pin is inserted into the first and second seats).

[0049] It must be noted that the spring 5 features a slight precompression when in the use configuration. Therefore, extraction of the pin 12 could cause a violent detachment of the button 11, which could spring out.

[0050] To prevent or minimise the effects of this situation, means may be envisaged (for example between the containment element 31 and the button 11) which tend to prevent unexpected decoupling of the button from the containment element 31.

[0051] These means may feature, for example, an undercut coupling which is released by slightly rotating the button 11 with respect to the containment element 31.

[0052] Or, furthermore, these means may feature a pair of rings (or protrusions) in an undercut arrangement (one inside the button 11 and one on the outside of the stem 4) to limit how much the button slides over the stem, through a mutual constraint.

[0053] To uncouple the button 11, one (the user) simply pulls it slightly by hand, to detach it in order to be able to extract the spring 5.

[0054] Essentially, a slightly forced coupling may be featured (for example between the stem 4 and the button 11 or between the containment element 31 and the button 11), so that the forcing of the said coupling, when the pin 12 is extracted, prevents or minimises the effects of an unexpected uncoupling of the button 11 and the stem 4 as a result of the precompression thrust of the spring 5.

[0055] Figures 4 and 5 show possible variants of the button 11. In these, the same reference numbers used earlier are used to denote parts that are functionally similar to those already illustrated. They will not, therefore, be described again.

[0056] In Figure 4, the pin 12 is coupled with the button by means of a hinge 19.

[0057] In this case, the button and the plug 12 (including the handle 20) are made from a single moulded piece, advantageously by plastic injection moulding.

[0058] The hinging 19 may be made by having a part which is thinner and therefore made flexible. The pin 12 may have a curved configuration, which facilitates the extraction thereof when it is necessary to uncouple the button 11 and the stem 4, in order to be able to remove the spring 5.

[0059] In this, as in the other embodiments already described, the pin 12 may have a tapered configuration (for example, a truncated cone) in order to facilitate mutual centring of the first seat 13 and the second seat 14, when the pin is inserted therewithin.

[0060] The tapered shape is particularly useful in the event that the pin features a curved longitudinal axis and in the presence of the hinging 19. This configuration facilitates centring during the movement of the pin 12 as it 'rotates' around the axis defined by the hinging.

[0061] In the present configuration, the tapered shape

of the pin 12 will copy the curved profile thereof, while in the previous configurations the longitudinal axis of the pin may be simply straight, although the external configuration of the pin may be tapered.

[0062] Advantageously, both in this and in the previous configurations, the button 11 may be equipped (before being installed on the stem 4) with the pin 12 in a partial pre-insertion position in the seat 13 in the button, so as to contain the overall dimensions (in plan) and reduce the chances of entanglement.

[0063] This configuration also allows for smoother handling before mounting the button on the device.

[0064] The configuration in Figure 5 is quite similar to that in Figure 3 or 1, but in this case the pin 12 (together with the handle 20) may be completely uncoupled from the button 11, since the projections 15A and 15B are not present.

[0065] Various embodiments of the innovation have been disclosed herein, but further embodiments may also be conceived using the same innovative concept.

Claims

1. A device (1) for dispensing a fluid substance, comprising a cup-shaped body (2) inside which a piston (3) is movable between a lower end position and an upper end position, the piston (3) sealedly slides on the cup-shaped body (2) and is driven by a hollow stem (4), the cup-shaped body (2) having a supply passage (7) of a compression chamber (9), the compression chamber (9) being at least partially defined by the cup-shaped body (2) and from the piston (3), the supply passage (7) being associated with a first valve element (6), and a second valve element (8) associated with a discharge passage (10) from said compression chamber (9), the hollow stem (4) being fixed to a dispensing button (11) which encounters a first end of a spring (5), the spring (5) being configured so as to return said piston (3) to the upper stroke position, **characterized in that** the button (11) is fixed to the stem (4) by means of a removable plug (12), so that when the button (11) is disconnected from the stem (4) the spring (5) can be extracted from the device (1).
2. Device (1) according to claim 1, wherein the plug (12) is associated with constraining means (15A, 15B, 16A, 16B, 19) to the button configured to make the plug movable between a first position in which it binds each other the button and the stem, and a second position in which the plug is dissociated at least from said stem (4) while remaining connected to the button (11).
3. Device according to the preceding claim, wherein said constraining means comprise at least one elongated element (15A, 15B) engaged in undercut and

translatable manner in a special seat (16A, 16B).

4. Device according to claim 2, wherein the constraining means comprise a hinging (19) between the plug and the button (11). 5
5. Device (1) according to claim 1, wherein the plug (12) is housed in a first seat (13) of the dispenser button (11) and in a second seat (14) of the stem. 10
6. Device according to claim 1, wherein the plug (12) extends from a handle (20) possibly configured to integrate into the button (11) itself.
7. Device according to claims 3 and 6, wherein the at least one elongated element (15A, 15B) extends from said handle (20) and comprises a hooked end (21A, 21B) which engages with an edge of said special seat (16A, 16B). 15
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8. Device according to claim 4, wherein the plug (12) is curved.
9. Device according to claim 1, wherein the cup-shaped body (2) is fixed to an intermediate element (30, 31) which encounters a second end of the spring (5). 25
10. Device according to the previous claim wherein the intermediate element is formed by a closure (30) of the cup body (2) fixed to a containment element (31) at least partial of the spring (5). 30

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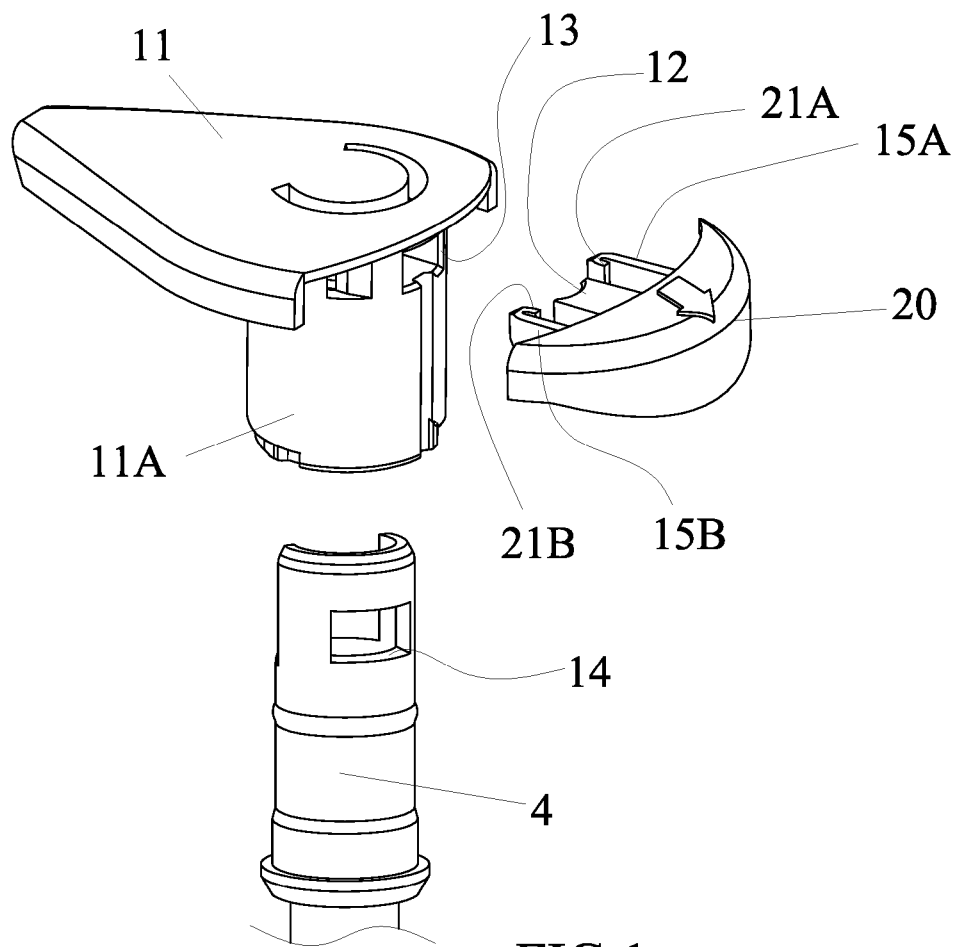


FIG.1

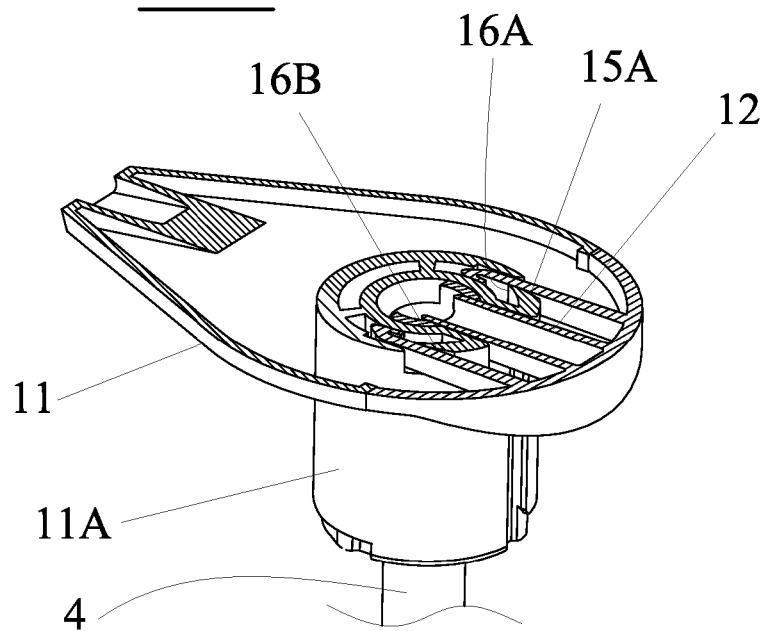
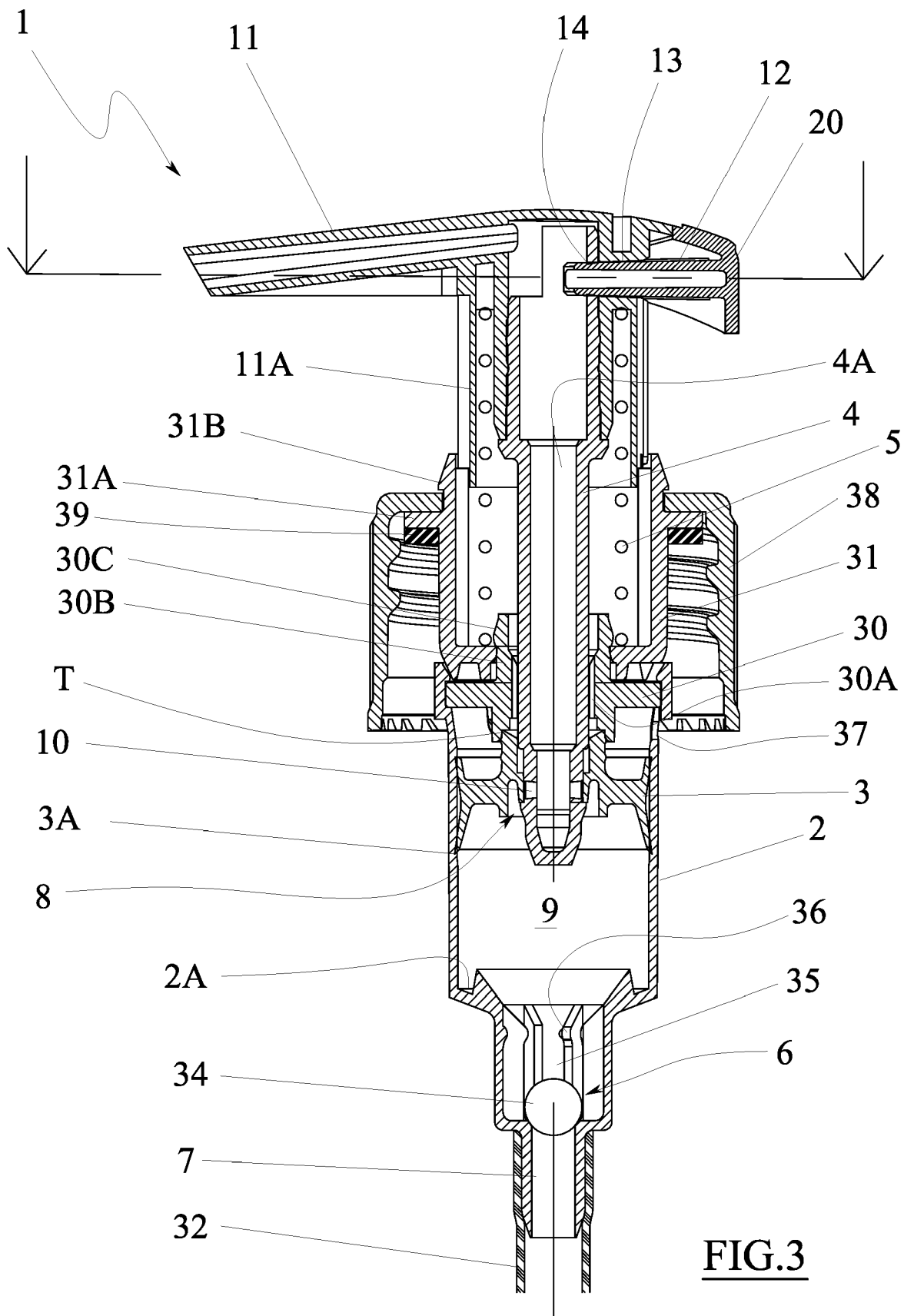


FIG.2



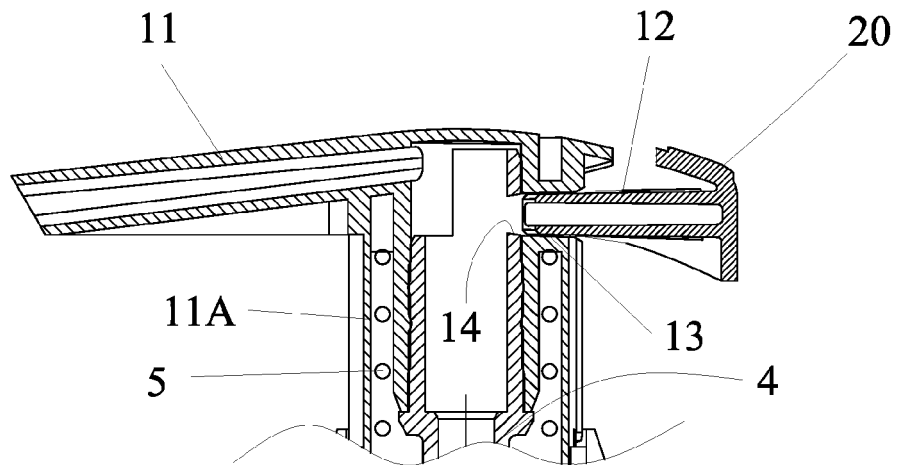


FIG.3A

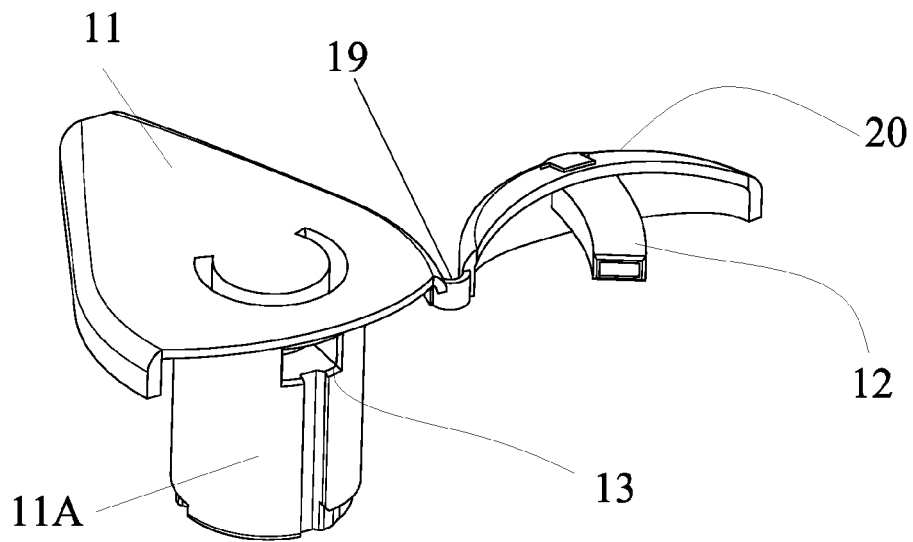


FIG.4

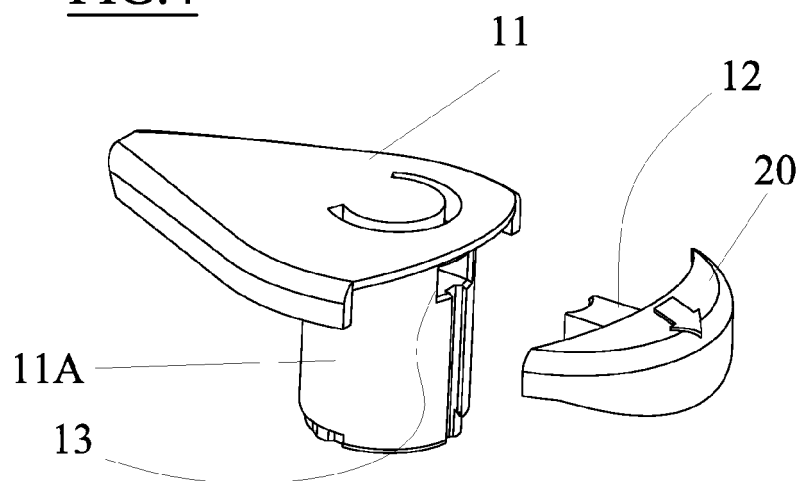


FIG.5



EUROPEAN SEARCH REPORT

Application Number
EP 21 16 9100

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DOCUMENTS CONSIDERED TO BE RELEVANT			
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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 27 August 2021	Examiner Eberwein, Michael
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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