Office de la Propriété Intellectuelle du Canada
Un organisme d'Industrie Canada

Canadian Intellectual Property Office
An agency of Industry Canada

CA 2614517 C 2016/11/08

(11)(21) **2 614 517**

(12) BREVET CANADIEN / CANADIAN PATENT

(13) **C**

(86) **Date de dépôt PCT/PCT Filing Date:** 2006/08/14
(87) **Date publication PCT/PCT Publication Date:** 2007/03/01
(45) **Date de délivrance/Issue Date:** 2016/11/08
(85) **Entrée phase nationale/National Entry:** 2008/01/02
(86) **N° demande PCT/PCT Application No.:** EP 2006/008029
(87) **N° publication PCT/PCT Publication No.:** 2007/022898
(30) **Priorité/Priority:** 2005/08/24 (DE10 2005 039 921.5)

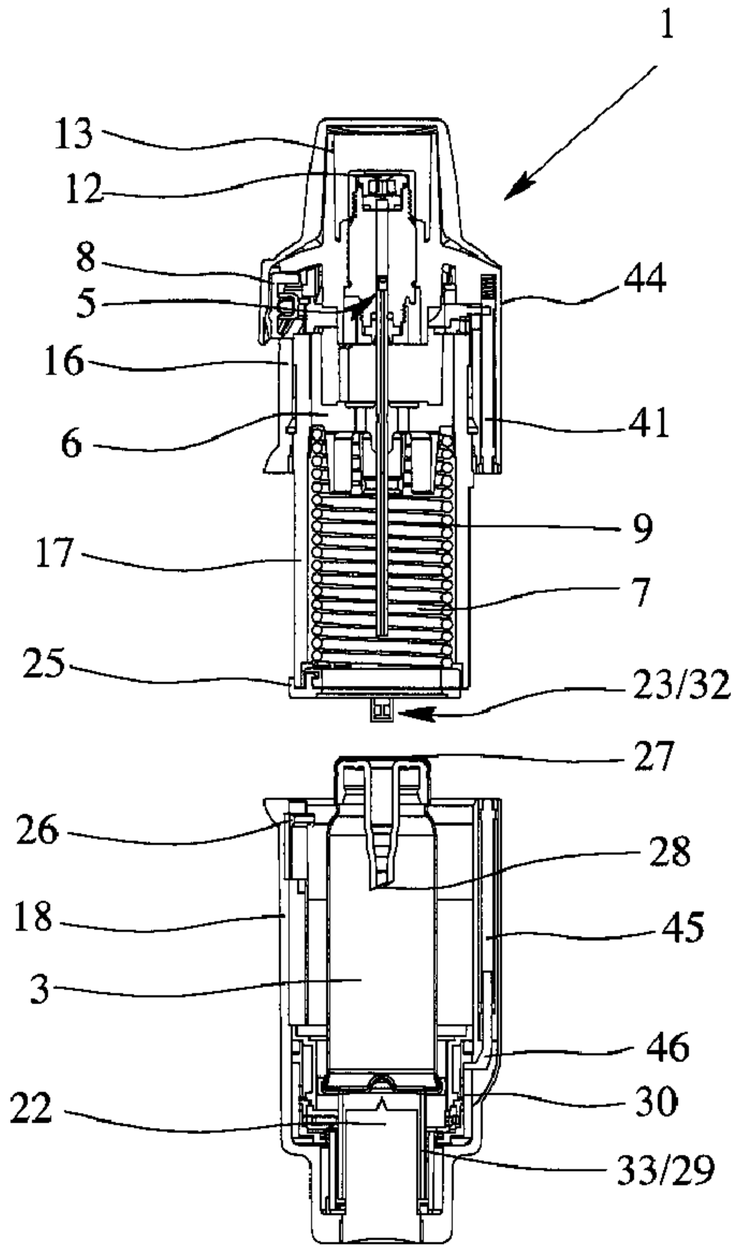
(51) **Cl.Int./Int.Cl.** ***B05B 15/00*** (2006.01), ***A61M 15/00*** (2006.01), ***B05B 11/00*** (2006.01)

(72) **Inventeurs/Inventors:**
GESER, JOHANNES, DE;
METZGER, BURKHARD P., DE;
GOLBERG, CHRISTIAN, DE;
SCHYRA, MICHAEL, DE;
THOEMMES, RALF, DE;
WESTMEIER, BIRGIT, DE;
...

(73) **Propriétaire/Owner:**
BOEHRINGER INGELHEIM INTERNATIONAL GMBH, DE

(74) **Agent:** FETHERSTONHAUGH & CO.

(54) **Titre : ATOMISEUR**
(54) **Title: ATOMISER**



(57) **Abrégé/Abstract:**
An atomiser for a fluid, in particular for medical aerosol therapy, is proposed. In order to allow simplified operation and improved safety in use, the atomiser has a counter device for counting the operations of the atomiser and the number of containers inserted,

CA 2614517 C 2016/11/08

(11)(21) **2 614 517**

(13) **C**

(72) **Inventeurs(suite)/Inventors(continued):** SCHMIEDEL, GUIDO, DE; KUNZE, HUBERT, DE; BOECK, GEORG, DE

(57) **Abrégé(suite)/Abstract(continued):**
wherein the atomiser is locked against further operation and/or against removal of the current container or insertion of a new container, if a certain number of operations of the atomiser and/or a certain number of containers inserted has/have been reached or exceeded.

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
1 March 2007 (01.03.2007)

PCT

(10) International Publication Number
WO 2007/022898 A3

(51) International Patent Classification:
B05B 11/00 (2006.01) ***A61M 15/00*** (2006.01)

(21) International Application Number:
PCT/EP2006/008029

(22) International Filing Date: 14 August 2006 (14.08.2006)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
10 2005 039 921.5 24 August 2005 (24.08.2005) DE

(71) Applicant *(for all designated States except US)*: **BOEHRINGER INGELHEIM INTERNATIONAL GMBH** [DE/DE]; Binger Strasse 173, 55216 Ingelheim am Rhein (DE).

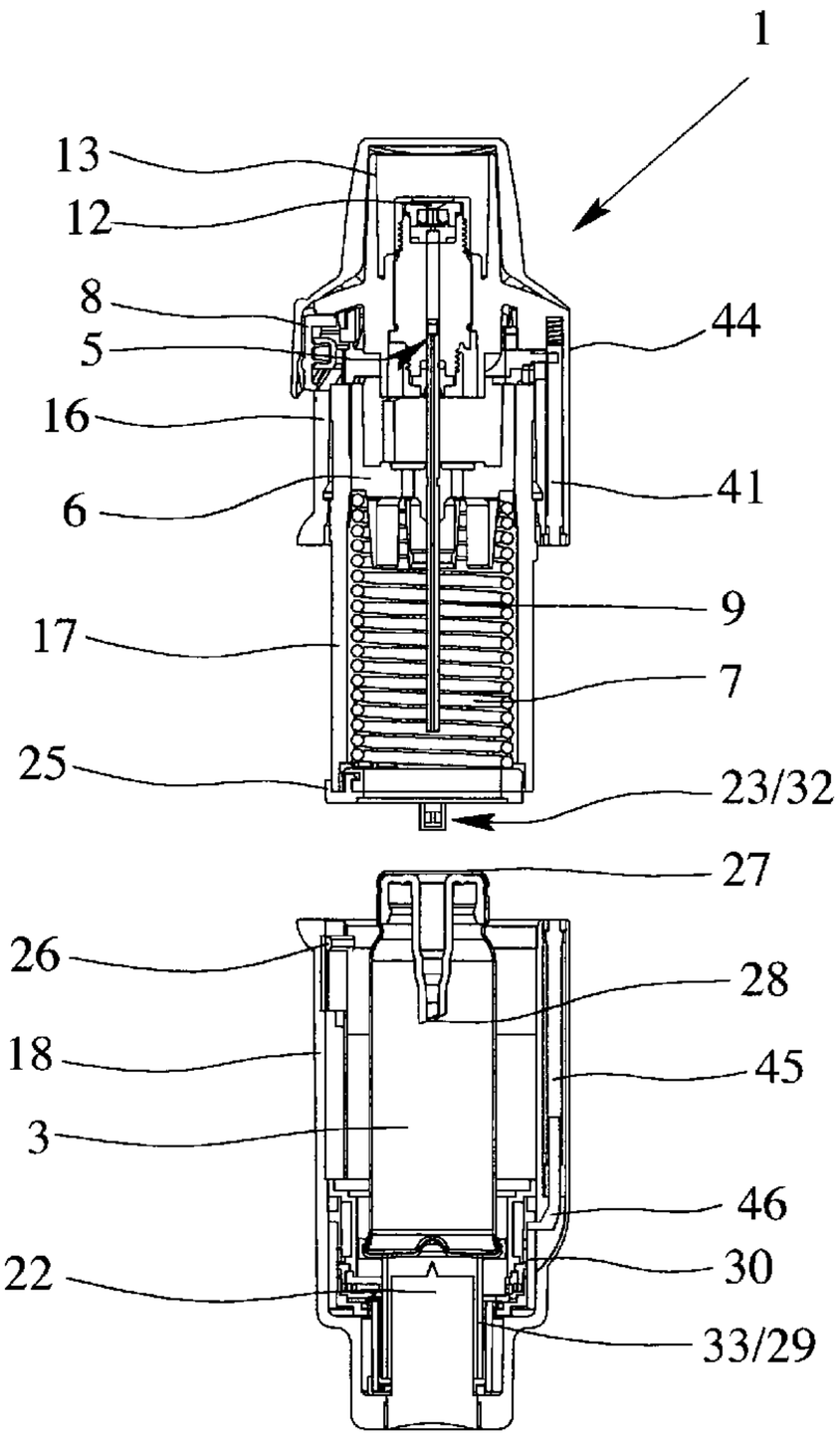
(72) Inventors; and
(75) Inventors/Applicants *(for US only)*: **GESER, Johannes** [DE/DE]; Vorderer Böhl 23, 55218 Ingelheim am Rhein (DE). **METZGER, Burkhard, P.** [DE/DE]; Hausgartenstrasse 24, 55218 Ingelheim am Rhein (DE). **GOLBERG, Christian** [DE/DE]; Bergmannstrasse 191 c, 45886 Gelsenkirchen (DE). **SCHYRA, Michael** [DE/DE]; Giselastrasse 35, 42111 Wuppertal (DE). **THÖMMES, Ralf** [DE/DE]; Honschaftsweg 2, 47877 Willich (DE). **WESTMEIER, Birgit** [DE/DE]; Kükenhöhler Weg 78, 44357 Dortmund (DE). **SCHMIEDEL, Guido** [DE/DE]; Wischlinger Weg 242, 44379 Dortmund (DE). **KUNZE, Hubert** [DE/DE]; Walter-Berg-Weg 1, 44227 Dortmund (DE). **BOECK, Georg** [DE/DE]; Ahornweg 48, 88471 Laupheim (DE).

(74) Agent: **GESTHUYSEN, VON ROHR & EGGERT**; Huyssenallee 100, 45128 Essen (DE).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT,

[Continued on next page]

(54) Title: ATOMISER COMPRISING A COUNTER AND AN END OF OPERATION LOCK



(57) Abstract: An atomiser for a fluid, in particular for medical aerosol therapy, is proposed. In order to allow simplified operation and improved safety in use, the atomiser has a counter device for counting the operations of the atomiser and the number of containers inserted, wherein the atomiser is locked against further operation and/or against removal of the current container or insertion of a new container, if a certain number of operations of the atomiser and/or a certain number of containers inserted has/have been reached or exceeded.

WO 2007/022898 A3

WO 2007/022898 A3

LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report*

— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

(88) Date of publication of the international search report:
31 May 2007

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

28245-22

Atomiser

The present invention concerns an atomiser having a container with a fluid, at least one counter device for counting at least one of the operations of the atomiser and the number of container inserted, and a housing part for at least one inserting and exchanging the container, the housing part being mounted on or detachable from the atomiser for inserting and/or exchanging the container.

An atomiser going by the trading name "Respimat" in the form of an inhaler is known, as represented by the basic principle of WO 91/14468 A1 and the specific design of WO 97/12687 A1 (Figures 6a, 6b) as well as in Figures 1 and 2 of the attached drawing. The atomiser has as a reservoir for an atomising fluid, an insertable, rigid container with an inner bag with the fluid and a pressuriser with a drive spring for feeding and atomisation of the fluid.

For the purpose of completeness of the disclosure of the present patent application, reference is made as a precaution to the full disclosure content of both WO 91/14468 A1 and WO 97/12687 A1. Generally the disclosure there preferably relates to an atomiser with a spring pressure of 5 to 200 MPa, preferably 10 to 100 MPa on the fluid, with for each stroke a fluid volume delivery of between 10 and 50 µl, preferably between 10 and 20 µl, and most preferably approximately 15 µl. Here the fluid is converted into an aerosol the droplets of which have an aerodynamic diameter of up to 20 µm, preferably between 3 and 10 µm. The disclosure there further relates preferably to an atomiser with a cylinder-like form and a size of approximately 9 cm to approximately 15 cm in length and approximately 2 cm to approximately 5 cm in width and a nozzle jet fanning of between 20° and 160°, preferably between 80° and 100°. These values also apply to the atomiser according to the theory of the present invention as particularly preferred values.

Before use for the first time the known atomiser is opened by detaching a lower housing part and the sealed container is inserted in the atomiser. Here the container is opened by a delivery tube which when the container is inserted is introduced into the latter as far as the inner bag. Then the lower housing part is pushed back on.

By rotating the lower housing part of the atomiser the drive spring can be tensioned and fluid can be sucked into a pressure chamber of the pressuriser. During tensioning the container is displaced within the atomiser with a stroke motion into the housing lower part and when tensioned for the first time the floor is pierced by a piercing element in the housing lower part for aeration. Following manual operation of a locking element the fluid in the pressure chamber is placed under pressure by the drive spring and without any propellant gas is delivered via a nozzle into a mouthpiece as an aerosol.

The empty container, following opening of the atomiser, can be exchanged for a full container and the atomiser can continue to be used.

DE 102 39 443 A1 and the corresponding US 2004/0094147 A1 disclose a blocking device for a locking tensioning mechanism with spring-operated drive. The blocking device can be used in particular for a high pressure atomiser according to WO 97/12687 A1 and after a specified number of operations to block the further use of the atomiser in that the rotation of two housing parts of the atomiser against each other is prevented, in particular through a blocking element in the form of a spring.

DE 195 49 033 C1 and the corresponding US 6,149,054, which represent the starting point for the present invention, disclose a mechanical counter for a dosing device for the dosing of powder, liquid or gas substances. The dosing unit is used in particular for atomisation of a medicine. The medicine is contained in a reservoir which is pushed into the dosing device. The counter is arranged in the dosing unit such that it cannot be detached. The counter allows counting of the number of dosings from each reservoir and the number of reservoirs that are used with the dosing unit. A problem here is that if the counter states are not noted misoperations may result such as the sucking in of air from an empty reservoir or use of more reservoirs than are permitted.

DE 100 61 723 A1 discloses a counter for counting dosed releases of fluid, paste or solid products and a device for the dosed release of such products. The counter works mechanically and has two counting rings which are arranged coaxially to a longitudinal axis of the counter. The counter also comprises an axially displaceable switch element, which runs across a

stationary curved surface in such a way that the axial displacement is converted into a rotatory movement of a counting ring. The counter can be positioned in a detachable or non-detachable manner on an aerosol container.

Some embodiments of the present invention may provide an atomiser that is simple to operate and has improved safety in use.

An initial aspect of the present invention is that the counter device or at least a first counter of the counter device for counting the number of operations of the atomiser, is arranged on a housing part of the atomiser that can be detached in order to insert and/or change the container, wherein the atomiser is locked against further operation and/or against removal of the current container or insertion of a new container, if a certain number of operations of the atomiser has been reached or exceeded. The locking under these conditions is in the following also referred to as "first locked state". The enforced locking of the atomiser on reaching or exceeding a specified number of operations of the atomiser leads to simple operation and improved safety in use, since the user, even if not noticing an optional display of the previously performed or remaining operations of the atomiser, is protected from misoperation. In particular, it is possible to prevent sucking in air from an empty or almost empty container in an undesirable manner which can, in particular, lower the dosing accuracy.

The term "operation" of the atomiser can, with the present invention, generally include fluid withdrawal, fluid delivery, pressurisation, atomisation and/or tensioning of the atomiser or any other manipulation of the atomiser associated with its use.

The term "locking" or "locked", in the case of the present invention, covers in particular both the blocking or prevention and the free running or disengagement of a drive train, of an operation, or manipulation of an operating component or similar, in order for example to block or prevent or disable an operation, tensioning of the atomiser, changing of the container, detachment of the housing part or similar.

Of particular preference is that the container can only be mounted on the atomiser, removed from the atomiser and/or changed with the housing part and with the counter device or at least

with the first counter. The inseparable connection between the container and the counter device or the first counter provides a comprehensible registration of the operations of the atomiser with the respective container. In particular, here the counter value cannot be reset or deleted, thereby allowing later checking, for example by the user or a third party such as a doctor.

According to a second, also independently achievable, aspect of the present invention, the counter device is designed in such a way that the atomiser is locked against further operation and/or against removal of the current container or insertion of a new container, if a certain number of containers used and if necessary also a certain number of operations of the atomiser with the current container have been reached or exceeded. The locking under these conditions is referred to in the following as the "second locked state". The stated container counting and locking leads to simple operation and improved safety in use, since use of the atomiser beyond a specified, permitted number of containers is excluded without the user having to take pay attention to a display of the number of containers already used or the like.

Particular preference is in the first or second locked state for a locking element, such as a button, that is operated to trigger the delivery and/or atomisation of fluid, to be locked. This may make intuitive use easier and may make it clear to the user in a simple manner that the atomiser is locked.

Alternatively or additionally, tensioning of a pressuriser or a drive spring of the atomiser in the first or second locked state can be locked. This also may make clear to a user in a simple manner that the atomiser is locked.

Alternatively or additionally removal of the housing part of the atomiser in the first or second locked state can be locked. This in turn allows intuitive identification of a locked state by a user.

According to a third, also independently achievable aspect of the present invention the container has an operating element of the counter device, so that the counter device can detect a movement or position of the container associated with fluid withdrawal, fluid delivery,

pressurisation and/or atomisation and count this as an operation of the atomiser. This may lead to a particularly safe registration of operations of the atomiser and accordingly to safe counting. This may be conducive to simple operation and improved safety in use, since misoperations or operating errors, such as repeated operation of an operating element when the atomiser is not tensioned or without withdrawal of fluid, are not detected and counted as operations of the atomiser.

According to another aspect of the present invention, there is provided an atomiser for a fluid, comprising: a container with the fluid, at least one counter device for counting a number of operations of the atomiser, and a housing part formed of a plurality of housing parts, a first one of which is detachable from the atomiser for at least one of inserting and exchanging the container, a pressure generator for pressurising the fluid from the container which is separate from the container and is mounted in a second one of the housing parts, wherein the at least one counter device comprises a counter for counting the number of operations of the atomiser, the counter being adapted to lock the atomiser against further operation of the container if a predetermined number of operations of the atomiser is reached or exceeded in a locked state, and wherein the counter is only exchangeable or replaceable with the container.

According to yet another aspect of the present invention, there is provided an atomiser for a fluid, comprising: a container with the fluid, a pressuriser for pressurising of the fluid that is separate from the container, a counter device for counting a number of operations of the atomiser, and a housing part detachable from the atomiser for at least one of inserting and exchanging the container, wherein the counter device comprises a counter for counting the number of operations of the atomiser, the counter being adapted to lock the atomiser against further operation of the container if a predetermined number of operations of the atomiser is reached or exceeded in a first locked state, and wherein the counter device is adapted to lock the atomiser against further operation if a predetermined number of containers are used or a predetermined number of total operations of the atomiser with the container is reached or exceeded in a second locked state, wherein the counter device is mechanically driven by tensioning of the pressuriser, and wherein the counter is only exchangeable or replaceable with the container.

According to still another aspect of the present invention, there is provided an atomiser for a fluid, comprising: a container with the fluid, at least one counter device for counting at least one of a number of operations of the atomiser and a number of containers inserted, and a housing part detachable from the atomiser for at least one of inserting and exchanging the container, wherein the at least one counter device comprises a first counter for counting the number of operations of the atomiser arranged on the housing part, the first counter being adapted to lock the atomiser against at least one of further operation and removal of the container or insertion of a new container if a predetermined number of operations of the atomiser is reached or exceeded in a first locked state, wherein the at least one counter device comprises a second counter adapted to lock the atomiser against further operation in a second locked state if a predetermined number of containers are used, wherein the first and second counters are drivingly coupled, and wherein the first counter is only exchangeable or replaceable with the container.

According to yet another aspect of the present invention, there is provided an atomiser for a fluid, with a container with the fluid, with a counter device for counting the operations of the atomiser and/or the number of containers inserted, with a housing part that is mountable on or is detachable from the atomiser for inserting and/or exchanging the container, wherein the counter device or at least one counter of the counter device for counting the operations of the atomiser is arranged on the housing part and is for locking the atomiser against further operation and/or against removal of the current container or insertion of a new container, if a predetermined number of operations of the atomiser is reached or exceeded, also referred to as a first locked state, wherein the counter device is for locking the atomiser against removal of the current container, if at least one of a predetermined number of inserted containers and a predetermined number of operations of the atomiser with the current container is reached or exceeded, also referred to as a second locked state.

Further advantages, features, characteristics and aspects of the present invention arise from the following description of preferred embodiments along with the drawings which show as follows:

Figure 1 a schematic cross-section of a known atomiser in the un-tensioned state;

Figure 2 a schematic cross-section, rotated by 90° compared with Figure 1, of the known atomiser in the tensioned state;

Figure 3 a schematic cross-section of an atomiser is proposed according to an initial embodiment in the delivered state, wherein a lower housing part with a container is separate from a housing upper part of the atomiser;

Figure 4 a schematic cross-section of the lower housing part with the container according to Figure 3 in the delivered state with an additional protective cap;

Figure 5 a perspective view of the housing upper part according to Figure 3 diagonally from below;

Figure 6 a schematic cross-section of the atomiser according to Figure 3 with the housing part partially drawn back;

Figure 7 a schematic cross-section of the atomiser according to Figure 3 with the housing part fully drawn back (in the tensioned state);

Figure 8 a schematic cross-section of an enlarged lower section of Figure 7 with the initial tensioning;

Figure 9 a schematic cross-section according to Figure 8 with further tensioning;

Figure 10 a schematic view of the lower end of the atomiser according to Figure 7 with a first counter of a counting device of the atomiser and with see-through lower housing part;

Figure 11 an enlargement of a section of Figure 7;

Figure 12 a schematic cross-section of a section of the atomiser according to Figure 10 in the first locked state;

Figure 13 a schematic view of the atomiser according to Figure 12 without the lower housing part;

Figure 14 a schematic cross-section, rotated by 90° compared to Figure 7, of the atomiser with a second counter of a counting device;

Figure 15 a schematic side view of a housing upper part of the atomiser according to Figure 14 with the second counter;

Figure 16 a schematic cross-section of a section of part of the second counter according to Figure 15 in the unlocked state;

Figure 17 a cross-section of the second counter in the second locked state corresponding to Figure 16;

Figure 18 a schematic view of a proposed atomiser according to a second embodiment;

Figure 19 a schematic view of a proposed atomiser according to a third embodiment in the assembled state;

Figure 20 a schematic cross-sectional view of a lower housing part of the atomiser according to Figure 19 with a protective cap in the delivered state;

Figure 21 a schematic cross-section of the atomiser according to Figure 19 in the un-tensioned state;

Figure 22 an enlarged section of Figure 21;

Figure 23 a schematic cross-section of the atomiser according to Figure 19 in the tensioned state;

Figure 24 an enlarged section of Figure 23;

Figure 25 a schematic section of a first counter of an atomiser according to a fourth embodiment in the unlocked state;

Figure 26 a section of the atomiser corresponding to Figure 25 in the first locked state;

Figures 27 a-c schematic views of a counter device with a second counter of the atomiser according to Figure 25 in various states;

Figures 28 a, b schematic cross-sections of the second counter according to Figure 27 in the unlocked state and in the second locked state;

Figure 29 a schematic cross-section of a section of a proposed atomiser according to a fifth embodiment in the unlocked state;

Figure 30 a schematic cross-section of the proposed atomiser according to Figure 29 in the first or second locked state;

Figure 31 a schematic view of part of a proposed atomiser according to a sixth embodiment in the unlocked state;

Figure 32 a further view of the proposed atomiser according to Figure 31; and

Figure 33 a schematic cross-section of the proposed atomiser according to Figure 31 in the first or second locked state.

In the Figures for the same or similar parts the same references are used, with the corresponding or comparable characteristics and advantages being arrived at even if a repeated description is dispensed with.

Figures 1 and 2 show a known atomiser 1 for atomisation of a fluid 2, in particular a highly efficacious pharmaceutical product or similar, in a schematic representation in the un-tensioned state (Figure 1) and the tensioned state (Figure 2). The atomiser 1 is in particular designed as a portable inhaler and works preferably without propellant gas.

Upon atomisation of the fluid 2, preferably a liquid, in particular a therapeutic or pharmaceutical product, an aerosol is formed which can be breathed in or inhaled by the user (not shown). Normally inhalation takes place at least once per day, in particular several times per day, preferably at defined time intervals, according to the illness of the user (patient).

The known atomiser 1 has an insertable and preferably exchangeable container 3 with the fluid 2. The container 3 thus forms a reservoir for the fluid 2 to be atomised. The container 3 preferably contains a sufficient quantity of fluid 2 or active substance, in order for example to provide up to 200 dosing units, therefore by way of example up to 200 atomisations or applications. A typical container 3, as disclosed in WO 96/06011 A1, holds a volume of approximately 2 to 10 ml.

The container 3 has an essentially cylindrical or cartridge-like design and, when the atomiser 1 has been opened, can be inserted in this and if necessary exchanged from below. It preferably has a rigid design, in particular wherein the fluid 2 is held in a collapsible bag 4 in the container 3.

The atomiser 1 also has a pressuriser 5 for delivery and atomisation of the fluid 2, in particular in each case in a defined, if necessary adjustable, dosing quantity. The pressuriser 5 has in particular a holder 6 for the container 3, a drive spring 7, shown only in part, that is assigned to it with a manually operated locking element 8 for unlocking, a delivery tube 9 with a non return valve 10, a pressure chamber 11 and a discharge nozzle 12 in the vicinity of a mouthpiece 13. The container 3 is secured in the atomiser 1 via the holder 6 so that the

delivery tube 9 inserts into the container 3. The holder 6 is preferably designed in such a way that the container 3 can be exchanged.

When the drive spring 7 is axially tensioned (tensioning stroke) the holder 6 with the container 3 and the delivery tube 9 in the illustrations is displaced downwards and fluid 2 is sucked out of the container 3 into the pressure chamber 11 of the pressuriser 5 via the non-return valve 10.

With the subsequent unlocking (atomisation stroke) of the drive spring 7 following operation of the locking element 8 the fluid 2 is placed under pressure in the pressure chamber 11, in that the delivery tube 9 with its now closed non-return valve 10 is moved back upwards again by the drive spring 7 and now serves as plunger. This pressure propels the fluid 2 through the discharge nozzle 12, by means of which it is atomised into an aerosol 14, as shown in Figure 1. The droplet size of the particles for a device of the Respimat type has already been described at the beginning.

A user, not shown, can inhale the aerosol 14, wherein air can be sucked in via at least one air vent 15 into the mouthpiece 13.

The atomiser 1 has a housing upper part 16 and an inner part 17 (Figure 2) that rotates in relation thereto with an upper part 17a and a lower part 17b (Figure 1), wherein on the inner part 17 and in particular manually operating housing part 18 is secured preferably by means of a holding element 19 in a detachable fashion, in particular by pushing it on. For insertion and/or exchanging of the container 3 the housing part 18 can be detached from the atomiser 1.

The housing part 18 can be rotated against the housing upper part 16, wherein it takes with it the lower part 17b of the inner part 17 in the illustration. In this way the drive spring 7 is tensioned via a gear (not shown) that operates on the holder 6 in the axial direction. With the tensioning the container 3 is moved axially downwards until the container 3 has adopted an end position shown in Figure 2. In this state the drive spring 7 is tensioned. During the atomisation process (atomisation stroke) the container 3 is moved back from the drive spring

7 into its starting position. The container 3 therefore performs a linear or stroke movement during the tensioning process and during the atomisation process.

The housing part 18 preferably forms a cap-like housing lower part and surrounds or overlaps if necessary a lower free end area of the container 3. When the drive spring 7 is tensioned the container 3 moves with its end area (further) into the housing part 18 or to the front end of this, wherein an axially working spring 20 arranged in the housing part 18 comes up against the container floor 21 and the container 3 or a seal in its base is pierced with a piercing element 22 during the initial contact for aeration.

The atomiser 1 has a counter device 23, which counts operations of the atomiser 1, preferably by registering the rotations of the housing part 18 or inner part 17 in relation to the housing upper part 16.

In the following, the design and the method of working of preferred embodiments of the atomiser proposed are explained in more detail, with references being made to the other figures but only essential differences compared to the atomiser 1 according to Figures 1 and 2 being emphasised. The statements concerning Figures 1 and 2 therefore apply accordingly or in addition. Furthermore, any desired combination of characteristics of the atomiser 1 according to Figures 1 and 2 and the atomiser 1 according to the embodiments described in the following or between these is possible.

Figures 3 to 17 show a proposed atomiser 1 according to a first embodiment of the present invention. Figure 3 shows an atomiser 1 in a schematic cross-section in the delivered state. The housing upper part 16 with the pressuriser 5 and other parts of the atomiser 1 is preferably separate from the housing part 18 with the container 3 in the delivered state.

Figure 4 shows a schematic cross-section of the housing part 18 with the container 3 in the delivered state, wherein the opening of the housing part 18 with the container 3 is covered by a protective cap 24 that can be removed for assembly purposes. The protective cap 24 supports the container 3 which is still sealed in its delivered state at its free end, which at the time of assembly is introduced into the housing upper part 16 or inner part 17. At its base side

the container 3 in this state is axially moved away from the piercing element 22, and thus further also sealed on the floor side. The container 3 preferably cannot be separated from the hosing part 18, but can only be exchanged with the housing part 18, in that the container 3 following initial insertion in the atomiser 1 can generally be changed or exchanged again.

Figure 5 shows the housing upper part 16 of the atomiser 1 in the delivered state, thus without the housing part 18 and without the container 3.

In order to insert the container 3 in the atomiser 1 of the housing upper part 16 the housing part 18 with the container 3 is pushed onto the housing upper part 16 in the tensioned state – thus with the tensioned pressuriser 5 or tensioned drive spring 7. Figure 6 shows the state of the initial slide-on.

Optionally, coding is provided so that only the right or permitted housing part 18, in particular only with the permitted container 3 or the permitted fluid 2 in the container 3, can be positioned on or coupled to the housing upper part 16 in this way. For optional coding in the example shown at the free end of the housing upper part 16 a first coding element 25 (see also Figure 5) is arranged, which for example forms a radial nose with a certain circumferential width extending radially to a certain circumferential position. The first coding element 25 fits a complementary second coding element 26, in particular a complementary axial groove in the housing part 18, so that the housing part 18 can only be mounted on or slid onto the housing upper part 16 if the coding is correct, as shown in Figure 6. The "interrogation" of the coding preferably takes place before the delivery tube 9 or another delivery element opens the container 3, in particular pierces a seal of the container 3.

With the further mounting or sliding of the housing part 18 on the housing upper part 16 the delivery tube 9 initially pierces the seal 27 and breaks through an optional subsequent septum 28, as shown in Figure 7, which shows the atomiser 1 with the fully mounted housing part 18 in a schematic cross-section.

In the course of the mounting or sliding-on, the head of the container 3 is gripped with the holder 6 – in particular, in a clamped latched and/or detachable manner. Since the housing

part 18 sits on the housing upper part 16 in the clamped state, in which the holder 6 that can move in a stroke-like or linear fashion into the housing upper part 16 is in a bottom position shown in Figure 7, it is ensured that the container 3 comes into contact with the holder 6 and where necessary – its floor is pushed against the piercing element 22 and is thereby pierced for aeration. Preferably, in doing so a connection is established between the for example pot- or beaker-like piercing element 22 and the container 3 such that in the subsequent linear or axial or stroke-like movements of the container 3 (together with the holder 6) for pressurisation, fluid withdrawal and or fluid delivery the piercing element 22 remains in contact with the container 3 or the container floor 21, and therefore follows the linear or axial movement of the container 3.

The partial schematic cross-section according to Figure 8 shows the atomiser 1 in the area of the container floor 21 and the free end of the housing part 18 at the time of initial tensioning. The container 3 is therefore still essentially in its upper axial end position in the illustration according to Figure 8. The piercing element in the example shown is in particular indirectly held via the connection element 29, in particular in a latched or clamped fashion by an adapter 30 arranged on the container 3, so that the piercing element 22 remains constantly in contact with the container floor 21 or keeps a corresponding air vent in the container floor 21 open. As a result of this aeration the bag 4 in the container 3 can collapse when fluid is withdrawn without a vacuum building up in the container 3.

The adapter 30 is preferably made from plastic and is in particular mounted in a non detachable fashion on the container 3, in particular being clamped, glued or moulded thereto, or cast onto it. Basically the adapter 30 can be integral with the container 3 or be formed by the latter itself. The adapter 30 is preferably made from a material that is also suitable for the following functions that have still to be explained, in particular plastic.

The counter device 23 is designed for counting the operations of the atomiser 1 and/or the number of containers 3 inserted – preferably both. In particular, the counter device 23 has a first counter 31 for counting operations of the atomiser 1, as indicated by way example in

Figure 8, and a second counter 32 for counting the number of containers 3 inserted or used, as indicated by way of example in Figure 5.

When counting the operations of the atomiser 1 in particular each withdrawal of fluid 2 from the container 3, each tensioning of the pressuriser 5 or the drive spring 7 or each atomisation is registered and counted as an operation of the atomiser 1. In particular therefore a fluid withdrawal, fluid delivery, pressurisation and/or atomisation is registered and counted as an operation. Basically, however, it is also possible to register and count any other operation of the atomiser 1. In the following the counting of operations of the atomiser 1 is also referred to as "operations counting" for short.

Particular preference is for operations counting to take place preferably by the linear, axial and/or stroke-like movement or position of the container 3 or any other part of the atomiser 1, such as the holder 6 or the delivery tube 9 being registered. Registration of the movement or position for operations counting is in particular understood to mean at least the movement in one direction and/or the leaving or arrival at, at least, an end position being registered and counted as an operation of the atomiser 1.

The greatest preference with the proposed atomiser 1 is for the tensioning stroke, the atomisation stroke or the reaching or leaving of the end position of the container 3 with the tensioned pressuriser 5 or tensioned drive spring 7 – thus the lower end position in the Figures – to be registered and counted as an operation of the atomiser 1. This results in different advantages.

The counter device 23 registers the movement of the container 3 in a preferably mechanical fashion. In particular, the counter device 23 altogether works purely mechanically. However, basically an optical, electrical, inductive, capacitive and/or other contact-free registration of the movement of the container 3 is possible.

With mechanical movement registration it is advantageous to register and count the tensioning stroke or the reaching of said end position in the tensioned state. The necessary mechanical work for mechanical registration and driving of the counter device 23 or at least the first

counter 31 must then only be provided during the tensioning. This can be achieved, since the tensioning preferably takes place manually. Accordingly during the atomisation or tension release process – thus the pressurisation and atomisation through the force of the drive spring 7 – no mechanical work is used for counting so that the spring energy can be used exclusively for achieving optimum atomisation.

If on the other hand the atomisation stroke or the leaving of said end position is registered in the tensioned state, this has the advantage that the actual atomisation process is counted as an operation of the atomiser 1.

In the following, using the first embodiment, just the registration of the tensioning stroke is explained further. Basically, however, any other registration and counting is possible, in particular also the registration of the atomisation stroke or the reaching or leaving of the end position.

The proposed atomiser 1 is tensioned according to the embodiment shown in Figure 1 and Figure 2 by the housing part 18 being rotated against the housing upper part 16, wherein the drive spring 7 is tensioned in the axial direction via a gear (not shown) that acts upon the holder 6 and the container 3 in the course of the tensioning moves from its (upper) end position in the un-tensioned state to its (lower) end position in the tensioned state in a linear or stroke-like fashion together with the holder 6 and the delivery tube 9 into the housing part 18. In the illustration according to Figure 8 the container 3 at the start of the tensioning movement is therefore still in or relatively close to its upper end position in the un-tensioned state.

In the example shown the adapter 30 is preferably mounted on the container 3 in such a way that it cannot rotate and is provided with the preferably rotating connecting element 29, which for its part has at least one preferably arm-like operating element 33. The operating element 33 transmits the linear movement to the first counter 31, in particular to a first counting ring 34 of the first counter 31. In Figure 8 a second counting ring 35 of the counter 31 is shown. The coupling of the two counting rings 34 and 35 is explained further by means of Figure 10.

The connecting element 29 or the operating element 33 is deflected via a suitable guide, in particular a sliding block guide, by which at least one guide surface 36 inclined to the direction of movement of the container 3 is signified, such that the linear or axial tensioning movement of the container 3 is converted into a rotatory movement of the connecting element 29, operating element 33 and/or at least first counting ring 34, so that the first counting ring 34 for each tensioning stroke is turned further by one increment or one counter step.

Figure 9 shows how the connecting element 29 or the at least one operating element 33 in the course of the further tensioning movement engages further in the first counting ring 34 and is rotated on the basis of the sliding block guide. In particular an enforced guidance is envisaged, so that for each tensioning the first counting ring 1 is forced to rotate further by one counter step.

As already explained, instead of the tensioning movement, however, the atomisation stroke of the container 3 can be registered during the pressurisation and atomisation. The registration can take place by a corresponding or similar mechanism. In particular the sliding block guide or another forcible guide converts the outward movement into a rotatory movement for the first counting ring 34.

The sliding block guide is preferably designed in such a way that the container 3 cannot be detached from the housing part 18, but is at least movable essentially in a stroke-like fashion only, where this is necessary for the tensioning and atomisation strokes when using the atomiser 1.

The schematic view according to Figure 10 shows a possible coupling between the first counting ring 34 and the second counting ring 35. In the example shown the first counter 31 has a transport arm 37, which is carried with it by the first counting ring 34 and when it reaches a certain counting position is deflected via a ramp 38 and for example an operating nose 39 on the housing side in such a way that its front end engages in the second counting ring 35 at the front end or in another manner. The second counting ring 35 is then further rotated along with the first counting ring 34 by one increment or one counter step. Then the

second counting ring is decoupled so that the first counting ring 34 can count a defined number of counter steps without turning with it the second counting ring 35.

In order to guard against unintentional rotation of counting rings 34 and 35, catches, detent pawls or similar which are not shown can be provided. In particular, with regard to the realization possibilities and further considerations on the design of the first and/or second counters 31, 32 reference is also made to DE 100 61 723 A1.

By preference, numbers or other symbols on the counting rings 34 and 35 and an assigned, not expressly shown window, in the housing part 18 or similar constitute a display device 40.

The first counter 31 is used for operations counting. It can preferably be reset or set or be adjusted by a user. Rather, it is provided that the first counter 31 is supplied in a preset state.

Particularly preferable is for the first counter 31 to be preset so that at the time of the first use initially a number of strokes (tensioning movements and tension release movements) can be performed in order to fill the atomiser 1, in particular the delivery tube 9, the pressure chamber 11 and similar completely with the fluid 2 before first use. These so-called priming strokes are preferably not counted by the counter 31 or indicated by the display device 40.

If required the first counter 31 or the display device 40 can be designed in such a way that the number of operations of the atomiser 1 already performed (in particular without priming strokes) or the number of operations of the atomiser 1 that are still available are displayed to the user.

The counter device 23 or at least the first counter 31 is preferably designed in such a way that the atomiser 1 is locked against further operation and/or against removal of the current container 3 or insertion of a new container 3, if a certain number of operations of the atomiser 1 is reached or exceeded. The locking under these conditions – thus if no further operation with the current container 3 should be permitted – is referred to for short as the "first locked state".

For locking in the first locked state the proposed atomiser 1 preferably has an operating lock. Figure 7 and the enlargement of a section of Figure 7 according to Figure 11 show a preferred embodiment. The operating lock has a lock part 41 which in the unlocked state shown does not block a manual operation of the locking element 8 for releasing tension in the drive spring 7 – thus a triggering of a pressurisation and atomisation stroke. Rather, in this state the preferably key-shaped locking element 8 can be pressed by the user in the atomiser 1 – in particular diagonally to the longitudinal or movement axis of the container 3 – wherein a projection or extension 42 on a circular section on the side opposite the locking element 8 is engaged in a corresponding recess 43 of the lock part 41.

The lock part 41 is pre-tensioned downwards by a spring 44 in the illustrations and is guided by a control part 45, that can be slid longitudinally or axially in the housing part 18, and is held against the force of the spring 44 in the unblocked or locked state in the position shown in Figures 7 and 11, in which the projection 42 can engage in the recess 43.

The control part 45 engages with the first counter 31, in particular the second counting ring 35, in such a way that when the number of permitted operations is reached or exceeded the first locked state is brought about, in which the control part 45 is released for an axial downward movement. As a result of the force of the spring 44 the lock part 41 is correspondingly displaced axially – in the example shown downwards - (see Figure 12), so that in this locked state, the lock part 8 with the projection 42 can no longer engage in the recess 43. This blocks any operation of the locking element 8 and thus prevents unlocking of the drive spring 7 or the holder 6. The atomiser 1 is therefore blocked in the tensioned state if it reaches or exceeds a defined number of permitted operations.

Then the housing part 18 along with the container 3 can be detached from the housing upper part 16 and exchanged. Particular preference is for the container 3 only to be changeable or replaceable with the counting device 23 or at least with the first counter 3. In the example shown this is achieved by at least the first counter 31 being arranged in the housing part 18 preferably in a non-detachable manner, in particular in a front or far end area of the housing

part 18. Furthermore, the container 3 preferably cannot be detached from the housing part 18 or the first counter 31.

Figures 3 and 6 show the lock part 41 in the pushed down and locked state on the housing upper part 18. Only after full mounting of a new housing part 18 with a new, full container 3, and a new first counter 31 is the lock part 41 displaced against the force of the spring into the unlocked, upper position again, as shown in Figures 7 and 11. Only in this state can the atomiser 1, in particular the locking element 8, be operated again, and the atomiser 1 thus have the tension released and be used once more.

The schematic representation of the atomiser 1 without housing part 18 according to Figure 13 shows a possible coupling of the control part 45 with the first counter 31 or the second counting ring 35. A section 46 of the control part 45 shown in Figure 12 rests at its front or crown or axially against the second counting ring 35. When the permitted number of operations is reached or exceeded the operational lock takes place in that a, for example, ramp-shaped recess 47 is formed on the second counting ring 35 so that the control part 45 in the rotational position shown in Figure 13 engages the second counting ring 35 in the recess 47 and is thereby displaced axially downwards. Accordingly, the lock part 41 then displaces downwards into the locking position of the locking element 8 shown in Figure 12.

Self-evidently to create the operational lock other design solutions are also possible. Furthermore, the operational lock illustrated can also be realised independently of the illustrated counter device 23, in particular also for other atomisers, dispensers or dosing devices.

Alternatively or additionally the housing part 18, which can be rotated for fluid withdrawal, fluid delivery, pressurisation and/or atomisation or for tensioning the drive spring 7 in one direction of rotation, can be locked in the first locked state against rotation for tensioning.

It is, however, also possible for the atomiser 1 to be used with a single container 3. In this case it can be envisaged that the housing part 18 after the initial complete mounting on the housing upper part 16 can no longer be detached. Accordingly the container 3 cannot be changed.

Thus an exchange of the first counter 31 is also unnecessary. Furthermore, the second counter 32 can also be dispensed with.

Figure 14 shows the proposed atomiser 1 in a schematic cross-section rotated through 90° compared with Figure 7. The second counter 32 is shown schematically here. In the example shown the second counter 32 preferably has a threaded spindle 48 with an assigned rider 49. The threaded spindle 48 can preferably be driven or rotated by the first counter 31 so that the rider 49 is displaced along the threaded spindle 48 according to the counted operations. The position of the rider 49 then represents a measure of the counter value.

Basically the second counter 32 can count the total – thus with several containers 3 – operations of the atomiser 1 performed or still possible. Since with each container 3 only a certain number of operations is permitted and, on the basis of the operational lock explained above, once the defined number has been reached or exceeded, is possible, the position of the rider 49 is also a measure of the number of containers 3 used or that can still be used.

Basically, with the present invention the total number of operations already performed or remaining with the atomiser 1 or the number of containers 3 used or still permitted can be used and understood synonymously. In each case, therefore, forward or backward counting is possible as desired.

In the case of container counting – thus the counting of the number of containers 3 already used or which it still is permitted to use – the second counter 32 is however, according to a particularly preferred design variant, not coupled in a linear fashion with the operational counting, thus the first counter 31. Rather, the container counting or the driving of the second counter 32 or the threaded spindle 48 is not linear but is such that only some of the remaining permissible operations, for example the last ten permissible operations, with the current container 3 lead to the driving of the threaded spindle and thus to container counting. This can be achieved by the appropriate arrangement of cams or other latching elements on the first counter 31, in order to allow the preferred non-linear, in particular quasi-discontinuous container counting. Other solutions are also possible here, however. For example, container counting can take place at the very start of use of a newly inserted container 3.

The optional second counter 32 is preferably driven by the first counter 31. However, it is basically also possible for the container counting to be performed fully independently of the operations counting. In this case, the second counter 32 is preferably driven or operated fully independently of the first counter 31, for example when the container 3 is inserted, the container 3 floor is pierced, the housing part 18 is fitted, or similar.

The second counter 32 is preferably arranged on the atomiser 1 or housing upper part 16 in a non-detachable fashion. Particular preference is for both counters 31 and 32 to be separable from each other, wherein for operations counting the first counter 31 can in each case be exchanged with the container 3 or – according to an alternative that is not described further – reset. In the latter case the first locked state can be cancelled by removing the housing part 18 and changing the container 3 and the first counter 31 can for example be reset to the initial setting. In this case the container 3 is detachable from the first counter 31 and preferably also from the housing part 18 to allow exchange.

The preferred arrangement of the second counter 32 on the housing upper part 16 or in a non-detachable fashion on the atomiser 1 ensures that the total number of operations already performed or the number of operations still possible of the atomiser 1 and/or the number of containers 3 used or that can still be used – including when the containers 3, the housing part 18 or similar are exchanged – remain available and in particular cannot be manipulated by a user.

The counter device 23 or the second counter 32 is preferably designed so that the atomiser 1 is locked against further operation and/or against removal of the current container 3 or the insertion of a new container 3, if a certain number of containers 3 used and if necessary also a certain number of operations of the atomiser 1 with the current container 3 are reached or exceeded. The locking under these conditions is referred to as “second locked state” for short.

From the above explanations it can be seen that instead of the criterion that a certain number of containers 3 inserted is reached or exceeded, the number of containers 3 that can still be used can also be assessed. In this case, the locking takes place, if no further containers are

permitted to be used, if applicable again only after the defined number of permitted operations of the atomiser 1 with the current container 3 has been reached or exceeded.

Alternatively or additionally, the total number of operations of the atomiser 1 with several containers 3 can be used accordingly and applied as a criterion as can be seen from the above explanations.

In the second locked state a container locking or an atomiser locking takes place which can no longer be reversed. In the following a preferred embodiment of the atomiser locking is explained in more detail using Figures 15 to 17.

Figure 15 shows a schematic side view of the housing upper part, cut away in part for illustration purposes, with the second counter 32, wherein the threaded spindle 48 and the rider 49 are concealed. In the housing upper part 16 a blocking element 50 is arranged, in particular in the form of a retaining spring.

The cut-away cross-sectional drawing of Figure 16 shows that the retaining spring in the unlocked state sits in a recess in the inner part 17, without the rotation of the inner part 17 relative to the housing upper part 16 when the atomiser 1 is tensioned being blocked. In particular in the unblocked state shown the retaining spring is held by the housing upper part 16 or an undercut on the inner part 17 in the recess in the inner part 17.

Figure 16 also shows that an axially adjustable actuator 51 is assigned to the blocking element 50 or the retaining spring and extends as far as the second counter 32 or the threaded spindle 48.

The actuator 51 is axially displaceable by the rider 49 for atomiser locking and in the illustration according to Figure 17 has already been displaced axially upwards by the rider 49. This displacement leads to the blocking element 50 blocking the relative rotation of the housing upper part 16 and inner part 17. In particular the blocking takes place in the example shown through the retaining spring that has been displaced axially upwards rebounding and engaging in a corresponding recess in the housing upper part, so that a preferably undetachable blocking or locking in the second locked state occurs.

The second locked state prevents the atomiser 1 from being used beyond its permitted usage period. Preferably in the second locked state a rotation of the inner part 17 and thus also the housing part 18 for tensioning the atomiser 1 or its drive spring 7 is blocked.

Alternatively or additionally, in the first or second locked state the detachment of the housing part 18 from the atomiser 1 and/or the operation of the locking element 8 or other operation of the atomiser 1 can also be locked.

In the first embodiment the second counter 32 does not have a display of the counter value or the position of the rider 49. However, if this is needed it can be achieved without any problem.

In the following, further preferred embodiments of the proposed atomiser 1 are explained in more detail, wherein, however, only the essential differences compared with the atomiser 1 according to Figures 1 and 2 and compared with the atomiser 1 according to the first embodiment are emphasised. The statements made so far, therefore, apply accordingly or in addition.

Figure 18 shows a schematic view of a proposed atomiser 1 according to a second embodiment. The housing part 18 is shown in a see-through manner for illustration purposes. With the second embodiment also the counter device 23 is envisaged and in particular in turn arranged – at least with a first counter 31 – in the housing part 18 or on another detachable housing part of the atomiser 1.

With the second embodiment the housing part is for axial detachment (preferably also of the container 3) rotatable in the opposite direction to the direction of rotation for tensioning the atomiser 1 or the drive spring 7 in a release direction. In particular the rotation in the release direction is only possible with the atomiser 1 tensioned. On the housing part 18 and/or on the atomiser 1 a sliding surface 52, 53 inclined to the axis of rotation (longitudinal axis) of the atomiser 1 or the direction of movement of the container 3 is arranged or formed. When the housing part 18 is rotated in the release direction according to the principle of inclined planes an axial release of the housing part 18 and preferably the container 3 from the atomiser 1 or

the housing upper part 16 takes place. Accordingly the release may be simplified substantially.

In the example shown the sliding surface 52 is formed by the diagonally cut end of the housing part 18. A complementing inclined sliding surface 53 is formed by an adapter 54, which when the housing part 18 is detached from the atomiser 1 remains on the housing upper part 16 or inner part 17. For axial detachment the housing part 18 can also be rotated relative to the adapter 54 and can thereby be forcibly moved back axially from the adapter 54.

In the course, or for the purpose, of detaching the housing part 18 from the atomiser 1 or housing upper part 16 the holding element 19, which is not shown in Figure 18, must preferably be manually operated or depressed.

The axial detachment, as explained above, of the housing part 18 and preferably the container 3 through the principle of inclined planes or through the rotation in the release direction – and thus against the tensioning direction – can if necessary also be performed independently of the proposed counting or counter device 23 in such an atomiser 1 or in other atomisers, dispensers, dosing devices or similar.

Figure 19 shows a proposed atomiser 1 according to a third embodiment. The housing part 18 is shown in a see-through manner for illustration purposes.

With the third embodiment the atomisation of fluid 2 preferably takes place as in the first and second embodiment exclusively through the force of the drive spring 7. In contrast to the first or second embodiment, however, the drive spring 7 in the third embodiment is arranged in the detachable housing part 18 and can therefore be detached with the housing part 18 from the atomiser 1 or the housing upper part 16.

Figure 20 shows a schematic cross-section of the housing part 18 with the drive spring 7 and the container 3 in the preferred delivered state, namely separate from the housing upper part 16, in particular with a protective cap 24 according to the first embodiment in accordance with Figure 4. In the housing part 18 a beaker-like seat is preferably arranged for the container 3. In the example shown the drive spring 7 is supported on the one side by the seat and on the

other, in the example shown, by the floor of the housing part 18. The spring 20 and the piercing element 22 correspond in the third embodiment at least in essence to the design according to Figures 1 and 2.

In the delivered state the drive spring 7 is not tensioned. Following removal of the protective cap 24 the housing part 18 can be mounted on or slid onto the housing upper part 16, wherein the container 3 – as with the first and second embodiment – is pierced or opened by the delivery tube 9 and brought into contact with the holder 6. The schematic cross-section according to Figure 21 shows this state, thus the un-tensioned atomiser 1 with inserted and opened container 3.

In the third embodiment the holder 6 is preferably extended in a sleeve-like manner to the free end of the housing upper part 16 or to the inlet opening for the holder 3, in particular beyond the delivery tube 9. This offers a number of advantages.

The delivery tube 9 is protected by the sleeve-like extension against damage.

The sleeve-like extension leads to better guidance of the container 3 when coupling to the holder 6.

The sleeve-like extension is adapted to the seat in the housing part 18 so that good mutual guidance is achieved. Thus, in particular during tensioning a possible tilting of the container 3 is at least minimised.

Following insertion of the container 3 when tensioning for the first time the piercing on the floor side takes place by the piercing element 22 in the manner already explained previously, in order to aerate the container 3 accordingly.

In the third embodiment the counter device 23 or the functionality is preferably at least essentially designed to correspond to the first embodiment. The difference is, however, that the first counter 31 is preferably not arranged in the area of the lower end of the housing part 18, but in the housing part 18 in the area of the middle of the atomiser 1 or adjacent to the opening of the housing part 18 for accommodating the container 3. The holder 3 and the drive

spring 7 are preferably coaxially surrounded by the first counter 3 or the counting rings 34, 35.

The counting, locking or blocking functions correspond preferably to those of the first embodiment. However, the counter device 23 with its two counters 31 and 32 is only provided as an option. If necessary the counter device 23 can therefore be dispensed with or provided for in another way, for example as in the embodiment according to Figures 1 and 2.

A particular advantage of the arrangement of the drive spring 7 in the detachable housing part 18 according to the third embodiment is that with each change of container the drive spring 7 is also changed. Thus, in the case of very high multiple use possible fatigue of the drive spring 7 and thus an undefined pressurisation or atomisation behaviour can be avoided.

In order to guarantee a secure connection of the housing part 18 with the housing upper part 16, in the third embodiment a so-called two-finger opener or at least a double lock is preferably provided for. In the example shown, in order to detach the housing part 18 two unlocking elements 57 arranged on preferably opposite sides must be operated simultaneously, in particular pressed in. Thus latching or retaining arms 58 of the housing part 18 from the latching or retaining position shown in figures 21 and 22, in which the housing part 18 is retained in an interlocked manner on the housing upper part 16, can in the example shown be deflected elastically inwards, in order to cancel the interlock and allow the housing part 18 to be removed from the housing upper part 16. Figure 22 is an enlargement of a section of Figure 21, in order to show the connection of the housing part 18 with the housing upper part 16 by means of the retaining arms 58.

The atomiser 1 is preferably designed so that the housing part 18 can only be removed from the housing upper part 16 when the drive spring is relaxed. This represents a safety measure so that the housing part 18 cannot be removed from the housing upper part 16 when the drive spring 7 is tensioned, since in this case the housing part 18 could be catapulted away as the drive spring 7 relaxes.

The locking against detachment or unlocking in the example shown provides for at least a safety bolt 59. Each retaining arm 58 has a safety bolt 59 assigned to it so that – in the unlocked state – when the unlocking element 57 is operated and the retaining arm 58 swivels, the assigned safety bolt 59 is pushed radially inwards into an assigned opening 60 in the sleeve-like extension of the holder 6. In order to release the interlock between the housing part 18 and the housing upper part 16 the retaining arm 58 must be swivelled a long way and the assigned safety bolt 59 displaced a long way radially inwards so that it has to engage in the assigned opening 60. This radial displacement of the safety bolt 59 is only possible in the untensioned state shown in Figures 21 and 22 if the openings 60 align with the safety bolts 59.

Figures 23 and 24 are illustrations corresponding to Figures 21 and 22 of the atomiser 1 in the tensioned state. Here the openings 60 have been displaced downwards. Accordingly the safety bolts 59 cannot be displaced radially inwards but block a swivelling of the retaining arms 58 when the unlocking elements 57 are operated. Accordingly the atomiser 1 in this state cannot be opened or locked. Rather the unlocking and detachment of the housing part 18 is only possible in the (fully) un-tensioned state of the atomiser 1.

Figures 25 and 26 show sections of a proposed atomiser 1 according to a fourth embodiment, wherein the housing part 18 is shown in a see-through manner for illustration purposes.

The fourth embodiment corresponds extensively to the third embodiment, but instead of a blocking of the operation of the locking element 8 in the first locked state in the fourth embodiment a blocking of operation preferably takes place by free running of the rotation of the housing part 18 to the housing upper part 16 or the housing inner part 17.

In the normal, unlocked state (Figure 25) the housing part 18 is coupled with the inner part 17 secured against rotation, so that through rotation of the inner part 17 via a gear that has already been mentioned but is not shown the holder 6 can be moved axially against the force of the drive spring 7 and the drive spring 7 can thereby be tensioned. In the fourth embodiment the rotating coupling is created by means of a coupling element 61, in particular in the form of a feather key. In the illustration of Figure 25 in order to create the rotating coupling the coupling element 61 engages axially or at the end in a recess on the inner part 17.

The coupling element 61 is preferably guided axially in an axial groove on the housing part 18 in a displaceable manner and coupled with the counter device 23, in particular the first counter 31 or the second counting ring 35 to determine the axial position.

In the example shown the counter 31 or the second counting ring 35 has a ring section 62 with a gap 63 assigned to it. In particular, the coupling element 61 is supported axially on the ring section 62 in the engaging state.

When the gap 63 is aligned with the coupling element 61 or the feather key, thus in the first locked state, the coupling element 61 can expand in the axial direction – in particular because of its inherent elasticity – as shown in Figures 26 and 30, and thereby release the engagement in the recess in the inner part 17. Thus the rotating coupling between the housing part 18 (not shown) and the inner part 17 in the first locked state is released in order to lock the atomiser 1 against undesired operation, namely undesired tensioning of the atomiser 1 or the drive spring 7 in the first locked state. Instead of blocking here, therefore, a release or free running of the rotation of the operational lock takes place.

In the tensioned state the housing part 18 with the container 3 can be detached from the housing upper part 16 and exchanged for a new housing part 18 with a new container 3. The exchanged first counter 31 is then reset, so that the necessary rotating coupling between the housing part 18 and the inner part 17 is created or recreated and the permitted number of operations of the atomiser 1 or fluid withdrawals from the container 3 can be carried out.

Self-evidently other design solutions for creating the rotating coupling and decoupling in the first locked state or for other free running in the locked state are also possible.

Figures 27 a to c show sections of the fourth embodiment, wherein the housing part 18 is left out for illustration purposes and the housing upper part 16 is shown cut away or in a see through manner for illustration purposes.

For container counting the counter device 23 or the second counter 32 in the fifth embodiment has a counter element 64 which by means of an assigned pin 65 or similar can be displaced in increments or individual counter steps – preferably in the axial direction. The current counter

number is visible to the user through a suitable recess or window 66 in the housing upper part 16. The display of the container number can also be performed through colours, symbols or similar, in particular, rather than numbers.

The second counter 32 in the fourth embodiment is preferably in turn coupled with the first counter 31.

In the example shown the pin 65 slides on a ring 67 of the first counter 31 or second counting ring 35. Figure 27 a shows an atomiser 1 or the counter device 23 prior to the final permitted operation. After a defined number of permitted operations of the atomiser 1 a ramp 68 on the ring 67 engages below the pin 65 and leads to an axial displacement, as shown in Figure 27 b, wherein the counter element 64 is displaced further by one increment or counter step. Only after the housing part 18 and the first counter 31 have been exchanged does the pin 65 revert to its starting position shown in Figure 27 c, wherein the counter element 64 as a result of latching (not shown) or similar retains its previous counter value and its previous position. Other design solutions are also possible here, however.

Figures 28 a and b show schematic representations of the preferred design of the locking of the atomiser 1 in the second locked state.

Figure 28 a shows the not yet locked state. The counter element 64 is still not engaged or is distanced from a preferably radially displaceable blocking element 50.

If the second locked state is reached, thus in particular if a certain number of used containers 3 and if necessary also a certain number of operations of the atomiser 1 with the current container 3 have been reached or exceeded, the counter element 64 is further displaced axially by the pin 65 – in the representation of Figure 28 upwards – and the blocking element 50 is thereby brought into the locking position. In particular, the bolt-like blocking element 50, because of a corresponding sliding slope is displaced radially – in particular inwards – and a rotation of the inner part 17 relative to the housing upper part 16 is blocked by a corresponding engagement. The blocking element 50 serves here as a locking bolt. In this way

the atomiser 1 is locked against further tensioning. This locking is preferably no longer reversible. The entire atomiser 1 must then be exchanged.

In the third and fourth embodiments the driving of the counter device 23, in particular the first counter 31, if necessary also directly by the rotation of the housing part 18 relative to the inner part 17 or the sleeve-like extension of the holder 6, can take place via a corresponding engagement or similar.

Figure 29 shows a partial cross-section of a proposed atomiser 1 according to a fifth embodiment in the unlocked state; Figure 30 shows the atomiser 1 in the first or second locked state.

The second counter 32 is coupled via a coupling 69, in particular a claw coupling, with the first counter 31. Figure 29 shows the coupled state. In the example shown a bottom shaft 70 that can be driven by the first counter 31 is supported axially by a ring section 71 against the force of a spring 72, so that the shaft 70 via the coupling 69 engages with the second counter 32 in a driving fashion, in particular with an upper shaft 73 of the second counter 32, which for its part rotates a drive ring 74 in the housing upper part 16.

The drive ring 74 can serve as a counting ring of the second counter 32. Preferably, however, via an internal or external thread it drives the counter element 64 in an axial direction, so that the axial position of the counter element 64 indicates the counter value – in particular also in the form of a colour coding, symbols or similar – of the second counter 32, which is visible through the window 66.

Further, Figure 29 shows the coupling element 61 according to the fourth embodiment for rotating coupling, as it connects secured against rotation the housing part 18 with the inner part 17 and is axially supported by the ring section 62.

In the first or second locked state (Figure 30) the coupling 69 is opened, and thus the driving connection between the first counter 31 and the second counter 32 is interrupted. Further, the rotating coupling between the housing part 18 and the inner part 17 is released. This is achieved by corresponding gaps in the rotating ring sections 62 and 71 which in the first or

second locked states align with the coupling element 61 or the shaft 70, so that the coupling element can release the axial engagement in a recess in the inner part 17 and the shaft 70 through the force of the spring 72 can retract axially from the upper shaft 73 and thereby open the coupling 69.

In the said state the housing part 18 with the container 3 and the first counter 31 can be exchanged (in the case of the first locked state), wherein the driving connection between the first counter 31 and the second counter 32 is then recreated, the coupling is thus closed again and the rotating connection is again created via the coupling element 61 between the housing part 18 and the inner part 17 and so the tensioning or operational lock is released.

It is obvious that other design solutions for creating the explained or similar functions are possible.

In the following, using Figures 31 to 33, a sixth embodiment of the proposed atomiser 1 is explained, wherein in particular essential differences compared with the previous embodiments are emphasised. The statements made previously therefore apply accordingly or in addition.

In the sixth embodiment in the first and/or second locked state operational locking and preferably also rotational locking are envisaged.

For optional rotational locking in the example shown the counter device 23 or its second counter 32 operates the blocking element 50 which in particular takes the form of a retaining spring.

The threaded spindle 48 of the counter device 23 or of the second counter 32 in the example shown is provided with an in particular toothed wheel- or pinion-like engagement section 75, which can be driven by assigned projections, cams, noses or similar (not shown), which are formed on the inside of the housing upper part 16, and which accordingly can be moved relative to the inner part 17 along a circumference or in an axial plane 76, for turning the threaded spindle 48. The rotation of the inner part 17 relative to the housing upper part, which in particular for tensioning the atomiser 1 or pressuriser 5 – in the example shown preferably

in 180° steps – always takes place in the same direction of rotation and therefore leads to a corresponding rotation of the threaded spindle 48 and thus to a corresponding axial movement of the rider 49.

In particular, when a corresponding number of permitted operations and/or containers 3 has been reached, the rider 49 – for example by means of a finger 77 or similar – can displace the blocking element 50 from the position shown in Figure 31 upwards so that a radial rebound of a leg of the blocking element 50 takes place. The leg can then engage in a correspond recess, groove or similar of the housing upper part 16 and thereby block any (further) rotation of the inner part 17 relative to the atomiser 1, and thus to the housing upper part 16. In this way rotational or atomiser locking is achieved, as has already been explained using Figures 15 to 17. Other designs are, however, also possible.

In the sixth embodiment the atomiser 1 has a locking device 78 for operational locking which with particular preference is designed as a forcibly controlled sliding mechanism, as explained in more detail further on. In particular the locking device 78 in the first and/or in the second locked state locks the locking element 8 of the atomiser 1 which must be operated to trigger delivery and/or atomisation of fluid 2.

In the example shown the locking device 78 has the lock part 41, the axis of which can in particular can be moved in parallel to the longitudinal, rotational or movement axis of the atomiser 1, and the assigned control part 45, the axis of which can in particular be moved peripherally in relation to the longitudinal, rotational or movement axis of the atomiser 1. The lock part 41 has cranked or forcible movement, here by the control part 45, as indicated in Figure 32. In the locked state the lock part 41 engages in particular between the locking element 8 and the housing upper part 16, as indicated in the schematic section according to Figure 33. The in particular circular shaped locking element 8 is in this locked state displaced radially relative to the holder 6, as a result of which the holder 6 is locked against an outwardly directed movement in Figure 33 for delivering the fluid 2 and pressurisation or atomisation. The locking element 8, which is preferably provided with a release key on the

opposite side to the locking or the lock part 41, is unable in this locked stated to be displaced radially to trigger the pressurisation or atomisation and is therefore blocked.

Figure 33 shows further the cranked or forcible guidance by the control part 45, which preferably engages diagonally to the direction of displacement or movement of the lock part 41 in a recess 79 of the lock part 41.

Figure 32 shows a schematic representation of the locking device 78 in the locked state. The lock part 41 is preferably guided in a displaceable manner in a recess or groove 80 formed in the inner part 17 and running parallel to the axis or longitudinally. The in particular arch-shaped control part 45 is for its part guided in a peripherally running recess or groove 81, preferably also formed on the inner part 17, so that it is essentially peripherally moveable or displaceable, more details of which are provided in the following.

The control part 45 has an arm 82 which extends into the area of movement of the rider 49, as shown in Figures 31 and 32. The control part 45 also has a radial stop or projection 83. In the unlocked state shown in Figures 31 and 32, the control part 45 with its arm 82 is in particular in its lower position so that the projection 83 is positioned outside of the movement path or plane 76.

Shortly before arriving at its upper end position shown in the illustrations the rider 49 engages with the arm 82 and displaces the control element 45 in particular diagonally to its preferably peripheral direction of operation, in the example shown essentially in the axial direction or upwards. This pushes the projection 83 into the running path or plane 76, so that with the further or next rotation of the inner part 17 relative to the housing upper part 16 the projections, cams, noses or similar (not shown) on the housing upper part engage with the projection 83 and are able to displace these together with the control part 45 – in the example shown essentially in the circumferential direction – in Figures 31 and 32 to the right – relative to the inner part 17 in the assigned recess or groove 81. This preferably peripheral movement or displacement leads via an inclined plane 84 formed on the control part 45 or another suitable geared connection to the desired locking movement of the lock part 41, here therefore to a displacement of the lock part 41 that is at least essentially parallel to the axis (in Figure 32

upwards). This sequence of movements is coupled with the in particular radial disengagement of the lock element 8 for blocking the holder 6 in the tensioned state in such a way that the lock part 41 engages in this radially disengaged state in particular between the lock element 8 and the housing upper part 16 or another suitable part, in order to achieve the desired locking of operation or triggering.

The control part 45, in its lower axial position as shown in Figures 31 and 32, is preferably pre-tensioned in an elastic manner and for this purpose has, for example, the spring arm 85 shown in Figure 31. The rider 49 can then displace the control part 45 with the radial projection 83, axially, in Figure 31 upwards, against the force of this spring arm 85.

The pre-tensioning of the control part 45 in the lower axial position serves in particular to prevent an undesired axial and/or peripheral displacement of the control part 45, before the predefined number of containers or operations has been reached.

In order to secure the control part 45 in the lower axial position a shoulder 86 can be provided which can only be overcome in the upper axial position. Only then can the peripheral movement or displacement of the control part 45 take place.

With the peripheral movement of the control part 45 the recess or groove 80 along with the recess 79 in the lock part 41 in particular form guides such that the lock part 41 is forcibly and in a defined manner – in particular in a cranked manner – moved – here axially upwards – into the lock position.

The operational lock, like the optional rotational lock, preferably can no longer be reversed and thus leads to an irreversible locking of the atomiser. In order to guarantee this, in the example shown the lock part 41 can be blocked in the lock position. This takes place in particular by blocking the control part 45 in the position in which it retains the lock part 41 in the lock position, in particular by engagement of the spring arm 85 in a corresponding recess 87 or similar.

The first and/or second lock state, depending on the design of the atomiser 1, cannot be reversed.

It should generally be mentioned that with the proposed atomiser 1 the container 3 is preferably insertable, and thus can be incorporated into the atomiser 1. Accordingly the container 3 is

preferably a separate component. However, the container 3 can basically also be formed directly by the atomiser 1 or a component of the atomiser 1 or be otherwise integrated into the atomiser 1.

As already mentioned individual features, aspects and/or principles of the embodiment described can also be combined with each other as desired and in particular can be used with the known atomiser according to Figures 1 and 2, but also with similar or other atomisers, dispenses or the like.

Unlike foot-mounted devices or similar the proposed atomiser 1 is preferably designed to be transportable, in particular it is a mobile manual device.

The proposed solution can not only be used in the atomiser 1 described here in detail but also in other atomisers or inhalers, such as powder inhalers or so-called metered dose inhalers.

The fluid 2 is preferably a liquid, as already mentioned, in particular an aqueous drug formulation. However, another drug formulation such as a suspension or similar may also be involved.

According to a design variant the fluid 2 can also comprise particles or powder. In this case, in place of the discharge nozzle 12 another delivery device, in particular a discharge opening (nor shown) or a feed channel (not shown), for delivering the fluid 2 or powder or similar into the mouthpiece 13 can be provided. The optional air vent 15 is then used for the preferably parallel feeding of ambient air, in order to generate or allow an air flow of sufficient volume for breathing in or inhalation in the mouthpiece 13.

If necessary the fluid 2 can also be atomised by means of a propellant gas.

In the following, preferred components and/or formulations of the preferably medicinal fluid 2 are listed. As already mentioned these may be aqueous, or non-aqueous solutions, mixtures, ethanol-containing or solvent-free formulations or similar. Preferably the fluid 2 may contain or comprise or consist of:

As pharmaceutically active substances, substance formulations or substance mixtures inhalable compounds are used, such as inhalable macromolecules, as disclosed in EP 1 003 478. Preferably substances, substance formulations or substances mixtures for the treatment of respiratory tract diseases are used which have applications in the inhalational field.

Particularly preferred in this context are pharmaceutical compositions selected from among the anticholinergics, betamimetics, steroids, phosphodiesterase IV inhibitors, LTD4 antagonists and EGFR-kinase inhibitors, antiallergics, ergot alkaloid derivatives, triptanes, CGRP antagonists, phosphodiesterase-V inhibitors, and combinations of active substances of this kind, e.g. betamimetics plus anticholinergics or betamimetics plus antiallergics. In the case of combinations at least one of the active substances preferably contains chemically bound water. Anticholinergic-containing active substances are preferably used, as monopreparations or in the form of combined preparations.

The fluid or formulation according to the invention might contain (additional) pharmacologically active substances or mixtures of substances, preferably selected from those groups:

Anticholinergica:

Anticholinergica preferably selected from the group consisting of tiotropium, tiotropiumbromide, oxitropiumbromide, flutropiumbromide, ipratropiumbromide, glycopyrroniumsalts, trospiumchloride, tolterodin, 2,2-diphenylpropionacidtropenolester-methobromide, 2,2-diphenylpropionacidscopinester-methobromide, 2-fluoro-2,2-diphenylacidicacidscopinester-methobromide, 2-fluoro-2,2-diphenylacidicacidtropenolester-methobromide, 3,3',4,4'-tetrafluorbenzi-lacidtropenolester-methobromide, 3,3',4,4'-tetrafluorbenzilacidscopinester-methobromide, 4,4'-difluorbenzilacidtropenolester-methobromide, 4,4'-difluorbenzilacidscopinester-methobromide, 3,3' difluorobenzilacidtropenolester-methobromide, 3,3'-difluorobenzilacidscopinester-methobromide, 9-hydroxy-fluoren-9-carbonacidtropenolester-methobromide, 9-fluoro-fluoren-9-carbonacidtropenolester-methobromide, 9-hydroxy-fluoren-9-carbonacidscopinester-methobromide, 9-fluoro-fluoren-9-carbonacidscopinester-methobromide, 9-methyl-fluoren-9-carbonacidtropenolester-methobromide, 9-methyl-fluoren-9-carbonacidscopinester-methobromide, benzilacidcyclopropyltropinester-methobromide, 2,2-diphenylpropion-acidcyclopropyltropinester-methobromide, 9-hydroxy-xanthen-9-carbonacidcyclopropyltropinester-methobromide, 9-methyl-fluoren-9-carbonacidcyclopropyltropinester-methobromide, 9-methyl-xanthen-9-carbonacidcyclopropyltropinester-methobromide, 9-hydroxy-fluoren-9-carbonacidcyclopropyltropinester-methobromide, 4,4'-difluorbenzilacidmethylestercyclopropyltropinester-methobromide, 9-hydroxy-xanthen-9-

carbonacidtropenolester-methobromide, 9-hydroxy-xanthen-9-carbonacidscopinestermethobromide, 9-methyl-xanthen-9-carbonacidtropenolester-methobromide, 9-methyl-xanthen-9-carbonacidscopinester-methobromide, 9-ethyl-xanthen-9-carbonacidtropenolester methobromide, 9-difluormethyl-xanthen-9-carbonacidtropenolester-methobromide, 9-hydroxymethyl-xanthen-9-carbonacidscopinester-methobromide, optionally in the form of the racemates, the enantiomers, the diastereomers and optionally the pharmacologically acceptable acid addition salts, solvates and/or the hydrates thereof.

Beta-sympathomimetica:

Beta-sympathomimetica preferably selected from the group consisting of albuterol, bambuterol, bitolterol, broxaterol, carbuterol, clenbuterol, fenoterol, formoterol, hexoprenaline, ibuterol, indacaterol, isoetharine, isoprenaline, levosalbutamol, mabuterol, meluadrine, metaproterenol, orciprenaline, pirbuterol, procaterol, reproterol, rimiterol, ritodrine, salmeterol, salmefamol, soterenot, sulphonterol, tiaramide, terbutaline, tolubuterol, CHF-1035, HOKU-81, KUL-1248, 3 (4-{6-[2-hydroxy-2-(4-hydroxy-3-hydroxymethyl-phenyl)-ethylamino]-hexyloxy}-butyl)-benzenesulfoneamide, 5-[2-(5,6-Diethyl-indan-2-ylamino)-1-hydroxy-ethyl]-8-hydroxy-1H-quinolin-2-one, 4-hydroxy-7-[2-{[2-{[3-(2-phenylethoxy)propyl]sulphonyl}ethyl]-amino}ethyl]-2(3H)-benzothiazolone, 1-(2-fluoro-4-hydroxyphenyl)-2-[4-(1-benzimidazolyl)-2-methyl-2-butylamino]ethanol, 1-[3-(4-methoxybenzyl-amino)-4-hydroxyphenyl]-2-[4-(1-benzimidazolyl)-2-methyl-2-butylamino]ethanol, 1-[2H-5-hydroxy-3-oxo-4H-1,4-benzoxazin-8-yl]-2-[3-(4-N,N-dimethylaminophenyl)-2-methyl-2-propylamino]ethanol, 1-[2H-5-hydroxy-3-oxo-4H-1,4-benzoxazin-8-yl]-2-[3-(4-methoxyphenyl)-2-methyl-2-propylamino]ethanol, 1-[2H-5-hydroxy-3-oxo-4H-1,4-benzoxazin-8-yl]-2-[3-(4-n-butyloxyphenyl)-2-methyl-2-propylamino]ethanol, 1-[2H-5-hydroxy-3-oxo-4H-1,4-benzoxazin-8-yl]-2-{4-[3-(4-methoxyphenyl)-1,2,4-triazol-3-yl]-2-methyl-2-butylamino}ethanol, 5-hydroxy-8-(1-hydroxy-2-isopropylaminobutyl)-2H-1,4-benzoxazin-3-(4H)-one, 1-(4-amino-3-chloro-5-trifluormethylphenyl)-2-tert.-butylamino)ethanol and 1-(4-ethoxycarbonylamino-3-cyano-5-fluorophenyl)-2-(tert.-butylamino)ethanol, optionally in the form of the racemates, the enantiomers, the diastereomers and optionally the pharmacologically acceptable acid addition salts, solvates and/or the hydrates thereof.

Steroids:

Steroids preferably selected from the group consisting of prednisolone, prednisone, butixocortpropionate, RPR-106541, flunisolide, beclomethasone, triamcinolone, budesonide, fluticasone, mometasone, ciclesonide, rofleponide, ST-126, dexamethasone, 6α,9α-difluoro-17α-[(2-furanylcarbonyl)oxy]-11β-hydroxy-16α-methyl-3-oxo-androsta-1,4-dien-17β-carbothionacid (S)-fluoromethylester, 6α,9α-difluoro-11β-hydroxy-16α-methyl-3-oxo-17α-propionyloxy-androsta-1,4-dien-17β-carbothionacid (S)-(2-oxo-tetrahydro-furan-3S-yl)ester and etiprednol-dichloroacetat (BNP-166), optionally in the form of the racemates, the enantiomers, the diastereomers and optionally the pharmacologically acceptable acid addition salts, solvates and/or the hydrates thereof.

PDEIV-inhibitors:

PDE IV-inhibitor preferably selected from the group consisting of enprofyllin, theophyllin, roflumilast, ariflo (cilomilast), CP-325,366, BY343, D-4396 (Sch-351591), AWD-12-281 (GW-842470), N-(3,5-Dichloro-1-oxo-pyridin-4-yl)-4-difluoromethoxy-3-cyclopropylmethoxybenzamide, NCS-613, pumafentine, (-)p-[(4aR*,10bS*)-9-ethoxy-1,2,3,4,4a,10b-hexahydro-8-methoxy-2-methyl-benzo[s][1,6]naphthyridin-6-yl]-N,N-diisopropylbenzamide, (R)-(+)-1-(4-bromobenzyl)-4-[(3-cyclopentyloxy)-4-methoxyphenyl]-2-pyrrolidone, 3-(cyclopentyloxy-4-methoxyphenyl)-1-(4-N'-[N-2-cyano-S-methyl-isothioureido]benzyl)-2-pyrrolidone, cis[4-cyano-4-(3-cyclopentyloxy-4-methoxyphenyl)cyclohexan-1-carbonacid], 2-carbomethoxy-4-cyano-4-(3-cyclopropylmethoxy-4-difluoromethoxyphenyl)cyclohexane-1-on, cis[4-cyano-4-(3-cyclopropylmethoxy-4-difluoromethoxyphenyl)cyclohexane-1-ol], (R)-(+)-ethyl[4-(3-cyclopentyloxy-4-methoxyphenyl)pyrrolidin-2-yliden]acetate, (S)-(-)-ethyl[4-(3-cyclopentyloxy-4-methoxyphenyl)pyrrolidin-2-yliden]acetate, CDP840, Bay-198004, D-4418, PD-168787, T-440, T-2585, arofyllin, atizoram, V-11294A, Cl-1018, CDC-801, CDC-3052, D-22888, YM-58997, Z-15370, 9-cyclopentyl-5,6-dihydro-7-ethyl-3-(2-thienyl)-9H-pyrazolo[3,4-c]-1,2,4-triazolo[4,3-a]pyridin and 9-cyclopentyl-5,6-dihydro-7-ethyl-3-(tert butyl)-9H-pyrazolo[3,4-c]-1,2,4-triazolo[4,3-a]pyridine, optionally in the form of the racemates, the enantiomers, the diastereomers and optionally the pharmacologically acceptable acid addition salts, solvates and/or the hydrates thereof.

LTD4-Antagonists:

LTD4-antagonist preferably selected from the group consisting of montelukast, 1 (((R)-(3-(2-(6,7-difluoro-2-quinolinyl)ethenyl)phenyl)-3-(2-(2-hydroxy-2-propyl)phenyl)thio)methylcyclopropan-acidicacid, 1-(((1(R)-3(3-(2-(2,3-dichlorothieno[3,2-b]pyridin-5-yl)-(E)-ethenyl)phenyl)-3-(2-(1-hydroxy-1-methylethyl)phenyl)propyl)thio)methyl)cyclopropanacidicacid, pranlukast, zafirlukast, [2 [[2-(4-tert-butyl-2-thiazolyl)-5-benzofuranyl]oxymethyl]phenyl]acidicacid, MCC-847 (ZD 3523), MN-001, MEN-91507 (LM-1507), VUF-5078, VUF-K-8707 and L-7 33321, optionally in the form of the racemates, the enantiomers, the diastereomers and optionally the pharmacologically acceptable acid addition salts, solvates and/or the hydrates thereof.

EGFR-Kinase-Inhibitors:

cetuximab, trastuzumab, ABX-EGF, Mab ICR-62, 4-[(3-Chlor-4-fluorophenyl)amino]-6-{[4-(morpholin-4-yl)-1-oxo-2-buten-1-yl]amino}-7-cyclopropyl-methoxy-chinazolin, 4-[(R)-(1-phenyl-ethyl)amino]-6-{[4-(morpholin-4-yl)-1-oxo-2-buten-1-yl]amino}-7-cyclopentyloxy-chinazolin, 4-[(3-chloro-4-fluoro-phenyl)amino]-6-{[4-((R)-6-methyl-2-oxo-morpholin-4-yl)-1-oxo-2-buten-1-yl]amino}-7-[(S)-(tetrahydrofurane-3-yl)oxy]-chinazoline, 4-[(3-chloro-4-fluoro-phenyl)amino]-6-[2-((S)-6-methyl-2-oxo-morpholine-4-yl)-ethoxy]-7-methoxy-chinazolin, 4-[(3-chloro-4-fluorophenyl)amino]-6-({4-[N-(2-methoxy-ethyl)-N-methyl-amino]-1-oxo-2-buten-1-yl}amino)-7-cyclopropylmethoxy-chinazoline, 4-[(R)-(1-Phenyl-ethyl)amino]-6-({4-[N-(tetrahydropyrane-4-yl)-N-methyl-amino]-1-oxo-2-buten-1-yl}amino)-7-cyclopropylmethoxy-chinazoline, 4-[(3-chloro-4-fluorophenyl)amino]-6-({4-[N-(2-methoxy-ethyl)-N-methyl-amino]-1-oxo-2-buten-1-yl}amino)-7-cyclopentyloxy-chinazoline, 4-[(3-chloro-4-fluorophenyl)amino]-6-{[4-(N,N-dimethylamino)-1-oxo-2-buten-1-yl]amino}-7-[(R)-(tetrahydrofuran-2-yl)methoxy]-chinazolin, 4-[(3-Ethinyl-phenyl)amino]-6,7-bis-(2-methoxy-ethoxy)-chinazoline, 4-[(R)-(1-phenyl-ethyl)amino]-6-(4-hydroxy-phenyl)-7H-pyrrolo[2,3-d]pyrimidine, 3-cyano-4-[(3-chloro-4-fluorophenyl)amino]-6-{[4-(N,N-dimethylamino)-1-oxo-2-buten-1-yl]amino}-7-ethoxy-chinoline, 4-[(R)-(1-phenyl-ethyl)amino]-6-{[4-((R)-6-methyl-2-oxo-morpholin-4-yl)-1-oxo-2-buten-1-yl]amino}-7-methoxy-chinazoline, 4-[(3-chloro-4-fluorophenyl)amino]-6-{[4-(morpholine-4-yl)-1-oxo-2-buten-1-yl]amino}-7-[(tetrahydrofurane-2-yl)methoxy]-chinazoline, 4-[(3-ethinyl-phenyl)amino]-6-{[4-(5,5-dimethyl-2-oxo-morpholin-4-yl)-1-oxo-2-buten-1-

yl]amino}-chinazoline, 4-[(3-chloro-4-fluoro-phenyl)amino]-6-{2-[4-(2-oxo-morpholine-4-yl)-piperidine-1-yl]-ethoxy}-7-methoxy-chinazoline, 4-[(3-chloro-4-fluoro-phenyl)amino]-6-(trans-4-amino-cyclohexan-1-yloxy)-7-methoxy-chinazoline, 4-[(3-chloro-4-fluoro-phenyl)amino]-6-(trans-4-methansulfonylamino-cyclohexan-1-yloxy)-7-methoxy-chinazoline, 4-[(3-chloro-4-fluorc-phenyl)amino]-6-(tetrahydropyrane-3-yloxy)-7-methoxy-chinazoline, 4-[(3-chloro-4-fluoro-phenyl)amino]-6-{1-[(morpholine-4-yl)carbonyl]-piperidin-4-yloxy}-7-methoxy-chinazoline, 4-[(3-chloro-4-fluoro-phenyl)amino]-6-(piperidine-3-yloxy)-7-methoxy-chinazoline, 4-[(3-chloro-4-fluoro-phenyl)amino]-6-[1-(2-acetylamino-ethyl)-piperidin-4-yloxy]-7-methoxy-chinazoline, 4-[(3-chloro-4-fluoro-phenyl)amino]-6-(tetrahydropyran-4-yloxy)-7-ethoxy-chinazoline, 4-[(3-chloro-4-fluoro-phenyl)amino]-6-{trans-4-[(morpholin-4-yl)carbonylamino]-cyclohexan-1-yloxy}-7-methoxy-chinazoline, 4-[(3-chloro-4-fluoro-phenyl)-amino]-6-{1-[(piperidin-1-yl)carbonyl]-piperidin-4-yloxy}-7-methoxy-chinazoline, 4-[(3-chloro-4-fluoro-phenyl)amino]-6-(cis-4-{N-[(morpholin-4-yl)carbonyl]-N-methyl-amino}-cyclohexan-1-yloxy)-7-methoxy-chinazoline, 4-[(3-chloro-4-fluoro-phenyl)amino]-6-(trans-4-ethansulfonylamino-cyclohexan-1-yloxy)-7-methoxy-chinazoline, 4-[(3-chloro-4-fluoro-phenyl)amino]-6-(1-methansulfonyl-piperidin-4-yloxy)-7-(2-methoxy-ethoxy)-chinazoline, 4-[(3-chloro-4-fluoro-phenyl)amino]-6-[1-(2-methoxy-acetyl)-piperidin-4-yloxy]-7-(2-methoxy-ethoxy)-chinazoline, 4-[(3-ethinyl-phenyl)amino]-6-(tetrahydropyran-4-yloxy]-7-methoxy-chinazoline, 4-[(3-chloro-4-fluoro-phenyl)amino]-6-(cis-4-{N-[(piperidin-1-yl)carbonyl]-N-methyl-amino}-cyclohexan-1-yloxy)-7-methoxy-chinazoline, 4-[(3-chloro-4-fluoro-phenyl)amino]-6-{cis-4-[(morpholin-4-yl)carbonylamino]-cyclohexan-1-yloxy}-7-methoxy-chinazoline, 4-[(3-chloro-4-fluoro-phenyl)amino]-6-{1-[2-(2-oxopyrrolidin-1-yl)ethyl]-piperidin-4-yloxy}-7-methoxy-chinazoline, 4-[(3-ethinyl-phenyl)amino]-6-(1-acetyl-piperidin-4-yloxy)-7-methoxy-chinazoline, 4-[(3-ethinyl-phenyl)amino]-6-(1-methyl-piperidin-4-yloxy)-7-methoxy-chinazoline, 4-[(3-ethinyl-phenyl)amino]-6-(1-methansulfonyl-piperidin-4-yloxy)-7-methoxy-chinazolin, 4-[(3-chloro-4-fluoro-phenyl)amino]-6-(1-methyl-piperidin-4-yloxy)-7(2-methoxy-ethoxy)-chinazoline, 4-[(3-ethinyl-phenyl)amino]-6-{1-[(morpholin-4-yl)carbonyl]-piperidin-4-yloxy}-7-methoxy-chinazoline, 4-[(3-chloro-4-fluoro-phenyl)amino]-6-{1-[(N-methyl-N-2-methoxyethyl-amino)carbonyl]-piperidin-4-yloxy}-7-methoxy-chinazoline, 4-[(3-chloro-4-fluoro-phenyl)amino]-6-(1-ethyl-piperidin-4-yloxy)-7-methoxy-chinazoline, 4-[(3-chloro-4-fluoro-phenyl)amino]-6-[cis-4-(N-methansulfonyl-N-

methyl-amino)-cyclohexan-1-yloxy]-7-methoxy-chinazoline, 4-[(3-chloro-4-fluoro-phenyl)amino]-6-[cis-4-(N-acetyl-N-methyl-amino)-cyclohexan-1-yloxy]-7-methoxy-chinazoline, 4-[(3-chloro-4-fluoro-phenyl)amino]-6-(trans-4-methylamino-cyclohexan-1-yloxy)-7-methoxy-chinazoline, 4-[(3-chloro-4-fluoro-phenyl)amino]-6-[trans-4-(N-methansulfonyl-N-methyl-amino)-cyclohexan-1-yloxy]-7-methoxy-chinazoline, 4-[(3-chloro-4-fluoro-phenyl)amino]-6-(trans-4-dimethylamino-cyclohexan-1-yloxy)-7-methoxy-chinazoline, 4-[(3-chloro-4-fluoro-phenyl)amino]-6-(trans-4-{N-[(morpholin-4-yl)carbonyl]-N-methyl-amino}-cyclohexan-1-yloxy)-7-methoxy-chinazoline, 4-[(3-chloro-4-fluoro-phenyl)amino]-6-[2-(2,2-dimethyl-6-oxo-morpholin-4-yl)-ethoxy]-7-[(S)-(tetrahydrofuran-2-yl)methoxy]-chinazoline, 4-[(3-chloro-4-fluoro-phenyl)amino]-6-(1-methansulfonyl-piperidin-4-yloxy)-7-methoxy-chinazoline, 4-[(3-chlor-4-fluoro-phenyl)amino]-6-(1-cyano-piperidin-4-yloxy)-7-methoxy-chinazoline, and 4-[(3-chloro-4-fluoro-phenyl)amino]-6-{1-[(2-methoxyethyl)carbonyl]-piperidin-4-yloxy}-7-methoxy-chinazoline, optionally in the form of the racemates, the enantiomers, the diastereomers and optionally the pharmacologically acceptable acid addition salts, solvates and/or the hydrates thereof.

The pharmacologically acceptable acid addition salts could be from the group of hydrochloride, hydrobromide, hydroiodide, hydrosulfate, hydrophosphate, hydromethansulfonate, hydronitrate, hydromaleate, hydroacetate, hydrobenzoate, hydrocitrate, hydrofumarate, hydrotartrate, hydrooxalate, hydrosuccinate, hydrobenzoate und hydro-

p-toluolsulfonate, preferably hydrochloride, hydrobromide, hydrosulfate, hydrophosphate, hydrofumarate and hydromethansulfonate.

Moreover, the compound could be from the group of antiallergika, derivates of ergotalcaloids, triptane, CGRP-antagonists, phosphodiesterase-V-inhibitores, optionally in the form of the racemates, the enantiomers, the diastereomers and optionally the pharmacologically acceptable acid addition salts and the hydrates thereof.

As antiallergika: disodiumcromoglicate, nedocromil.

As derivates of alkaloides: dihydroergotamine, ergotamine.

Moreover, inhalable macromolecules can be used as pharmacologically active substances, as disclosed in EP 1 003 478.

For inhalation purposes pharmaceuticals, formulations and mixtures of pharmaceuticals with the above named pharmacologically active substances can be used, as well as their pharmacologically active salts, esters and combinations of the pharmacologically active substances, salts and esters.

Legend

1	Atomiser	46	Section
2	Fluid	47	Recess
3	Container	48	Threaded spindle
4	Bag	49	Rider
5	Pressuriser	50	Blocking element
6	Holder	51	Actuator
7	Drive spring	52	Sliding surface
8	Locking element	53	Sliding surface
9	Delivery tube	54	Adapter
10	Non-return valve		
11	Pressure chamber		
12	Discharge nozzle	57	Unlocking element
13	Mouthpiece	58	Retaining arm
14	Aerosol	59	Safety bolts
15	Air vent	60	Opening
16	Housing upper part	61	Coupling element
17	Inner part	62	Ring section
17a	Upper part of the inner part	63	Gap
17b	Lower part of the inner part	64	Counter element
18	Housing part (lower part)	65	Pin
19	Holding element	66	Window
20	Spring (in housing lower part)	67	Ring
21	Container floor	68	Ramp
22	Piercing element	69	Coupling
23	Counter device	70	Shaft
24	Protective cap	71	Ring section
25	First coding element	72	Spring
26	Second coding element	73	Upper shaft
27	Seal	74	Drive ring
28	Septum	75	Engagement section
29	Connection element	76	Circumference / axial plane
30	Adapter	77	Finger
31	First counter	78	Locking device
32	Second counter	79	Recess

33 Operating element
34 First counting ring
35 Second counting ring
36 Guide surface
37 Transport arm
38 Ramp
39 Operating nose
40 Display device
41 Lock part
42 Projection
43 Recess
44 Spring
45 Control part
80 Groove
81 Recess
82 Arm
83 Projection
84 Inclined plane
85 Spring arm
86 Shoulder
87 Recess

CLAIMS:

1. Atomiser for a fluid, comprising:

a container with the fluid,

at least one counter device for counting a number of operations of the atomiser, and

a housing part formed of a plurality of housing parts, a first one of which is detachable from the atomiser for at least one of inserting and exchanging the container,

a pressure generator for pressurising the fluid from the container which is separate from the container and is mounted in a second one of the housing parts,

wherein the at least one counter device comprises a counter for counting the number of operations of the atomiser, the counter being adapted to lock the atomiser against further operation of the container if a predetermined number of operations of the atomiser is reached or exceeded in a locked state, and

wherein the counter is only exchangeable or replaceable with the container.

2. Atomiser for a fluid, comprising:

a container with the fluid,

a pressuriser for pressurising of the fluid that is separate from the container,

a counter device for counting a number of operations of the atomiser, and

a housing part detachable from the atomiser for at least one of inserting and exchanging the container,

wherein the counter device comprises a counter for counting the number of operations of the atomiser, the counter being adapted to lock the atomiser against further

operation of the container if a predetermined number of operations of the atomiser is reached or exceeded in a first locked state, and

wherein the counter device is adapted to lock the atomiser against further operation if a predetermined number of containers are used or a predetermined number of total operations of the atomiser with the container is reached or exceeded in a second locked state,

wherein the counter device is mechanically driven by tensioning of the pressuriser, and

wherein the counter is only exchangeable or replaceable with the container.

3. Atomiser according to claim 2, wherein a locking element of the atomiser necessary for at least one of delivery and atomisation of the fluid is locked in one of the first and the second locked states.

4. Atomiser according to claim 2, wherein the counter device is adapted to register each tensioning of the pressuriser and to count the tensioning as one of the operations of the atomiser.

5. Atomiser according to claim 2, wherein tensioning of at least one of the pressuriser and a drive spring for the pressuriser is blocked in one of the first and second locked states.

6. Atomiser according to claim 2, wherein the housing part is rotatable for at least one of extraction, fluid delivery, pressurisation and atomisation of the fluid, and wherein the housing part is locked against rotation in one of the first and second locked states.

7. Atomiser according to claim 2, wherein the first locked state is resettable by detaching the housing part and changing the container.

8. Atomiser according to claim 2, wherein the housing part is secured against detachment from the atomiser in the second locked state.

9. Atomiser according to claim 2, wherein the counter device is a mechanical operating device.

10. Atomiser according to claim 2, wherein the counter device has a display device for displaying at least one of a number of operations already performed or still possible by the atomiser and a number of containers inserted or insertable in the atomiser.

11. Atomiser according to claim 2, wherein the housing part is rotatable in one direction of rotation for at least one of tensioning of a pressurising drive spring and delivering the fluid.

12. Atomiser according to claim 2, wherein the pressuriser is provided with a drive spring, the drive spring being operable for producing a force for causing atomisation of the fluid.

13. Atomiser for a fluid, comprising:

a container with the fluid,

at least one counter device for counting at least one of a number of operations of the atomiser and a number of containers inserted, and

a housing part detachable from the atomiser for at least one of inserting and exchanging the container,

wherein the at least one counter device comprises a first counter for counting the number of operations of the atomiser arranged on the housing part, the first counter being adapted to lock the atomiser against at least one of further operation and removal of the container or insertion of a new container if a predetermined number of operations of the atomiser is reached or exceeded in a first locked state,

wherein the at least one counter device comprises a second counter adapted to lock the atomiser against further operation in a second locked state if a predetermined number of containers are used,

wherein the first and second counters are drivingly coupled, and

wherein the first counter is only exchangeable or replaceable with the container.

14. Atomiser according to claim 13, further comprising a pressure generator for pressurising the fluid in the container which is separate from the container.

15. Atomiser according to claim 13, wherein the atomiser is for atomising the fluid when the fluid is a liquid in an unpressurised state.

16. Atomiser according to claim 13, wherein in one of the first and the second locked states, a locking element of the atomiser necessary for at least one of delivery and atomisation of the fluid is locked.

17. Atomiser according to claim 13, further comprising at least one of a pressuriser and a drive spring, wherein tensioning of the at least one of the pressuriser and the drive spring is locked in one of the first and second locked states.

18. Atomiser according to claim 13 wherein the housing part is rotatable for at least one of extraction, fluid delivery, pressurisation and atomisation of the fluid, and wherein the housing part is locked against rotation in one of the first and second locked states.

19. Atomiser according to claim 13, wherein the first locked state is resettable by detaching the housing part and changing the container.

20. Atomiser according to claim 13, wherein the housing part is secured against detachment from the atomiser in the second locked state.

21. Atomiser according to claim 13, wherein the container is adapted to perform an axial movement during at least one of fluid extraction, fluid delivery, pressurisation and atomisation of the fluid, and wherein the at least one counter device registers said axial movement of the container or an end position of said axial movement and counts the registering thereof as one of the operations of the atomiser.

22. Atomiser according to claim 21, wherein an operating element for the first counter is provided on the container, the at least one counter device registering the axial movement or a position of the container by interaction with the operating element.

23. Atomiser according to claim 22, wherein the operating element is rotatably mounted on the container.

24. Atomiser according to claim 22, wherein the operating element has an arm shaped section which interacts with one or more counting rings of the at least one counter device so that, when the container moves, one of the one or more counting rings is rotated by an increment or counter step.

25. Atomiser according to claim 22, wherein the at least one counter device is operable to cause the atomiser to be locked against at least one of further operation and removal of the container and insertion of a new container, when at least one of the predetermined number of operations of the atomiser are performed and the predetermined number of containers are inserted.

26. Atomiser according to claim 21, wherein the at least one counter device registers the reaching or passing of the end position of the container, an end position of a tensioned pressuriser, or a movement of the container when tensioning or releasing the atomiser or a drive spring and counts the registering thereof as one of the operations of the atomiser.

27. Atomiser according to claim 21, wherein the at least one counter device is adapted to register the movement of the container in a contact-free manner.

28. Atomiser according to claim 13, wherein the at least one counter device is a mechanical operating device.

29. Atomiser according to claim 13, wherein the at least one counter device is adapted to register an action from among each extraction of the fluid from the container, each

tensioning of a drive spring of a pressuriser of the atomiser and each atomisation and to count the registering thereof as one of the operations of the atomiser.

30. Atomiser according to claim 13, wherein the at least one counter device is adapted to count the number of the operations performed by the atomiser or that are performable with the container.

31. Atomiser according to claim 30, wherein the first counter is resettable when the container is changed, and wherein the resetting is locked in an assembled state of the atomiser.

32. Atomiser according to claim 13, wherein the at least one counter device is adapted to count and display the total number of all operations of the atomiser that are performed or are still possible with more than one container.

33. Atomiser according to claim 13, wherein the at least one counter device has a display device for displaying at least one of a number of operations already performed or still possible by the atomiser and a number of containers inserted or instertable in the atomiser.

34. Atomiser according to claim 13, wherein the housing part is rotatable in one direction of rotation for at least one of tensioning of a pressurising drive spring and delivering the fluid.

35. Atomiser according to claim 13, further comprising a pressuriser with a drive spring, the drive spring being operable for producing a force for causing atomisation of the fluid.

36. Atomiser according to claim 13, wherein the first and second counters are separable from each other for changing of the container.

37. Atomiser according to claim 36, wherein the first counter is exchangeable when changing the container.

38. Atomiser according to claim 13, wherein at least the first counter is connected in a non-detachable manner to the housing part.

39. Atomiser according to claim 38, wherein the first counter is arranged in an axial front end area of the housing part.

40. Atomiser according to claim 38, wherein the first counter surrounds the container in a circular fashion.

41. Atomiser according to claim 13, wherein the housing part along with the container and the first counter form an exchangeable unit.

42. Atomiser according to claim 13, further comprising a housing upper part to which said housing part is detachably connectable and wherein the second counter is rotatably connected with the housing upper part in an undetachable manner.

43. Atomiser according to claim 35, further comprising a movable or rotatable inner part for tensioning said drive spring.

44. Atomiser according to claim 43, wherein the second counter is arranged on said inner part.

45. Atomiser according to claim 43, wherein the at least one counter device comprises a threaded spindle with a rider, the threaded spindle being rotated by a rotation of said inner part.

46. Atomiser according to claim 45, wherein the rider is operable as a blocking element in one of the first and second locked states, so that rotation of the inner part is blocked.

47. Atomiser according to claim 35, further comprising a locking device for locking a locking element, the locking device being operable for releasing the locking element to trigger delivery of the fluid.

48. Atomiser according to claim 47, further comprising a movable or rotatable inner part for tensioning said drive spring and wherein the locking device is arranged on said inner part.

49. Atomiser according to claim 48, wherein, in at least one of the first and second locked states, at least one of rotation of the inner part and operation of the locking element is blocked.

50. Atomiser according to claim 47, wherein the locking device has a lock part which is movable parallel to a longitudinal axis of the atomiser, said lock part, in at least one of the first and second locked states, blocking operation of the atomiser.

51. Atomiser according to claim 50, further comprising a housing upper part to which said housing part is detachably connectable, wherein the lock part, in at least one of the first and second locked states, engages between the locking element and the housing upper part.

52. Atomiser according to claim 50, wherein the locking device has a control part that is peripherally movable in relation to the longitudinal axis of the atomiser for operation of the lock part.

53. Atomiser according to claim 45, further comprising a locking device for locking a locking element, the locking device being operable for releasing the locking element to trigger delivery of the fluid; wherein the locking device has a lock part which is movable parallel to a longitudinal axis of the atomiser, said lock part, in at least one of the first and second locked states, blocking operation of the atomiser, wherein the locking device has a control part that is peripherally movable in relation to the longitudinal axis of the atomiser for operation of the lock part, and wherein the control part is operably moved by the rider to block operation of the atomiser.

54. Atomiser according to claim 53, wherein the control part, during operation of the atomiser, is peripherally movable for operation of the lock part.

55. Atomiser according to claim 13, wherein at least one of the first and second locked states is irreversible.

56. Atomiser according to claim 13, further comprising a mechanical means for atomisation of the fluid.

57. Atomiser according to claim 13, wherein the atomiser is a portable inhaler for medicinal aerosol therapy.

58. Atomiser for a fluid,

with a container with the fluid,

with a counter device for counting the operations of the atomiser and/or the number of containers inserted,

with a housing part that is mountable on or is detachable from the atomiser for inserting and/or exchanging the container,

wherein the counter device or at least one counter of the counter device for counting the operations of the atomiser is arranged on the housing part and is for locking the atomiser against further operation and/or against removal of the current container or insertion of a new container, if a predetermined number of operations of the atomiser is reached or exceeded, also referred to as a first locked state,

wherein the counter device is for locking the atomiser against removal of the current container, if at least one of a predetermined number of inserted containers and a predetermined number of operations of the atomiser with the current container is reached or exceeded, also referred to as a second locked state.

59. Atomiser according to claim 58, wherein the counter device is for locking the atomiser against further operation and/or insertion of the new container in the second locked state.

60. Atomiser according to claim 58 or 59, wherein the housing part for fluid extraction, fluid delivery, pressurisation and/or atomisation is rotated in one direction of rotation, wherein the housing part in the first or second locked stated is locked against rotation in the direction of rotation, and/or wherein the first locked state is reset by detaching the housing part and changing the container, and/or wherein the housing part in the first or second locked state is no longer detachable from the atomiser.

61. Atomiser according to any one of claims 58 to 60, wherein the counter device has a first counter for counting the operations of the atomiser and a second counter for counting the number of containers inserted.

62. Atomiser according to claim 61, wherein the first and second counters are separable from each other.

63. Atomiser according to claim 62, wherein the first and second counters are separable from each other during or for the purpose of changing the container.

64. Atomiser according to any one of claims 61 to 63, wherein the second counter is connected in a non-detachable manner with, or is integrated into, the atomiser.

65. Atomiser according to claim 64, wherein the second counter is connected in the non-detachable manner with, or is integrated into, a housing upper part of the atomiser.

66. Atomiser according to claim 64, wherein the second counter is connected in the non-detachable manner with, or is integrated into, an inner part of the atomiser.

67. Atomiser according to claim 66, wherein the inner part is rotatable.

68. Atomiser according to any one of claims 58 to 65, wherein the atomiser has a movable or rotatable inner part for tensioning the atomiser.

69. Atomiser according to any one of claims 61 to 65, wherein the atomiser has a movable or rotatable inner part for tensioning the atomiser and wherein the counter device or the second counter is arranged on the inner part.

70. Atomiser according to claim 66 or 67, wherein the inner part is for tensioning the atomiser and wherein the counter device or the second counter is arranged on the inner part.

71. Atomiser according to any one of claims 61 to 65, wherein the counter device or the second counter has a threaded spindle with a rider, wherein the threaded spindle is rotated by a rotation of an inner part relative to the atomiser, wherein the rider operates a blocking element in the first or second locked state, so that rotation of the inner part relative to the atomiser is blocked.

72. Atomiser according to any one of claims 66, 67, 69 and 70, wherein the counter device or the second counter has a threaded spindle with a rider, wherein the threaded spindle is rotated by a rotation of the inner part relative to the atomiser, and wherein the rider operates a blocking element in the first or second locked state, so that rotation of the inner part relative to the atomiser is blocked.

73. Atomiser according to any one of claims 58 to 60, wherein the counter device has a first counter for counting the operations of the atomiser and a second counter for counting the number of containers inserted, wherein the atomiser has a movable or rotatable inner part for tensioning the atomiser, wherein the counter device or the second counter has a threaded spindle with a rider, wherein the threaded spindle is rotated by a rotation of the inner part relative to the atomiser, and wherein the rider operates a blocking element in the first or second locked state, so that rotation of the inner part relative to the atomiser is blocked.

74. Atomiser according to any one of claims 58 to 73, wherein the atomiser has a locking device for locking a locking element of the atomiser, wherein the locking element in order to trigger delivery and/or atomisation of fluid is operated, in the first and/or second locked state.

75. Atomiser according to claim 68, wherein the atomiser has a locking device for locking a locking element of the atomiser, wherein the locking element in order to trigger delivery and/or atomisation of fluid is operated, in the first and/or second locked state and

wherein the locking device is arranged on the inner part or wherein in the first and/or second locked state rotation of the inner part relative to the atomiser and/or operation of the locking element are blocked.

76. Atomiser according to claim 61, wherein the atomiser has a locking device for locking a locking element of the atomiser, wherein the locking element in order to trigger delivery and/or atomisation of fluid is operated, in the first and/or second locked state, wherein the atomiser has a movable or rotatable inner part for tensioning the atomiser, wherein the counter device or the second counter is arranged on the inner part and wherein the locking device is arranged on the inner part or wherein in the first and/or second locked state rotation of the inner part relative to the atomiser and/or operation of the locking element are blocked.

77. Atomiser according to any one of claims 74 to 76, wherein the locking device has a lock part which is movable in parallel to a longitudinal, rotational or movement axis of the atomiser, which in the locked state blocks the atomiser against operation.

78. Atomiser according to claim 77, wherein the lock part in the locked state blocks the locking element.

79. Atomiser according to claim 77 or 78, wherein the lock part in the locked state engages between the locking element and a portion of the atomiser.

80. Atomiser according to any one of claims 77 to 79, wherein the lock part is moved in a cranked and/or forcible manner.

81. Atomiser according to any one of claims 77 to 80, wherein the locking device has a control part, which is movable peripherally in relation to the longitudinal, rotational or movement axis of the atomiser, for operation or movement of the lock part.

82. Atomiser according to claim 71, wherein the atomiser has a locking device for locking a locking element of the atomiser, wherein the locking element in order to trigger delivery and/or atomisation of fluid is operated, in the first and/or second locked state,

wherein the locking device has a lock part which is movable in parallel to a longitudinal, rotational or movement axis of the atomiser, which in the locked state blocks the atomiser against operation, wherein the locking device has a control part, which is movable peripherally in relation to the longitudinal, rotational or movement axis of the atomiser, for operation or movement of the lock part, and wherein the control part is operated or moved by the rider in order to achieve a blocking of the atomiser or the locked state.

83. Atomiser according to claim 82, wherein the control part is operated or moved by the rider parallel to the longitudinal, rotational or movement axis.

84. Atomiser according to claim 82 or 83, wherein the control part, during operation of the atomiser for operation of the lock part is movable only after a previous displacement parallel to the longitudinal, rotational or movement axis.

85. Atomiser according to claim 84, wherein the control part, during tensioning of the atomiser, for operation of the lock part is movable only after a previous displacement parallel to the longitudinal, rotational or movement axis.

86. Atomiser according to claim 84 or 85, wherein the control part is displaced peripherally only after a previous displacement parallel to the longitudinal, rotational or movement axis.

87. Atomiser according to any one of claims 58 to 73, wherein in the first or second locked state a locking element of the atomiser, which is operated to trigger delivery and/or atomisation of the fluid, is locked, and/or wherein the atomiser has a pressuriser and/or a drive spring, wherein tensioning of the pressuriser or the drive spring in the first or second locked state is locked.

88. Atomiser according to claim 87, wherein the locking element is a key.

89. Atomiser according to any one of claims 58 to 88, wherein the first and/or second locked state is irreversible, and/or wherein the pressurisation or atomisation takes

place in a purely mechanical fashion and/or wherein the atomiser is designed as a portable inhaler.

90. Atomiser according to claim 89, wherein the pressurisation takes place without propellant gas.

91. Atomiser according to claim 90, wherein the pressurisation takes place by spring power.

92. Atomiser according to claim 89, wherein the portable inhaler is for medicinal aerosol therapy.

93. Atomiser according to claim 1, wherein the counter is arranged on the first one of the housing parts.

94. Atomiser according to claim 1, wherein a locking element of the atomiser necessary for at least one of delivery and atomisation of the fluid is locked in the locked state.

95. Atomiser according to claim 1, wherein the at least one counter device is adapted to register tensioning of the pressure generator and to count each tensioning as one of the operations of the atomiser.

96. Atomiser according to claim 1, wherein tensioning of at least one of the pressure generator and a drive spring for the pressure generator is blocked in the locked state.

97. Atomiser according to claim 1, wherein the first one of the housing parts is rotatable for at least one of extraction, fluid delivery, pressurisation and atomisation of the fluid, and wherein the first one of the housing parts is locked against rotation in the locked state.

98. Atomiser according to claim 1, wherein the locked state is resettable by detaching the first one of the housing parts and changing the container.

99. Atomiser according to claim 1, wherein the first one of the housing parts is secured against detachment from the atomiser in the locked state.

100. Atomiser according to claim 1, wherein the at least one counter device is a mechanical operating device.

101. Atomiser according to claim 1, wherein the at least one counter device has a display device for displaying at least one of a number of operations already performed or still possible by the atomiser and a number of containers inserted or insertable in the atomiser.

102. Atomiser according to claim 1, wherein the first one of the housing parts is rotatable in one direction of rotation for at least one of tensioning of a pressurising drive spring and delivering the fluid.

103. Atomiser according to claim 1, wherein the pressure generator is provided with a drive spring, the drive spring being operable for producing a force for causing atomisation of the fluid.

104. Atomiser according to claim 1, wherein pressurising the fluid takes place without propellant gas.

105. Atomiser according to claim 104, wherein pressurising the fluid takes place by spring power.

106. Atomiser according to claim 1, wherein the atomizer is designed as a portable inhaler and wherein the potable inhaler is for medicinal aerosol therapy.

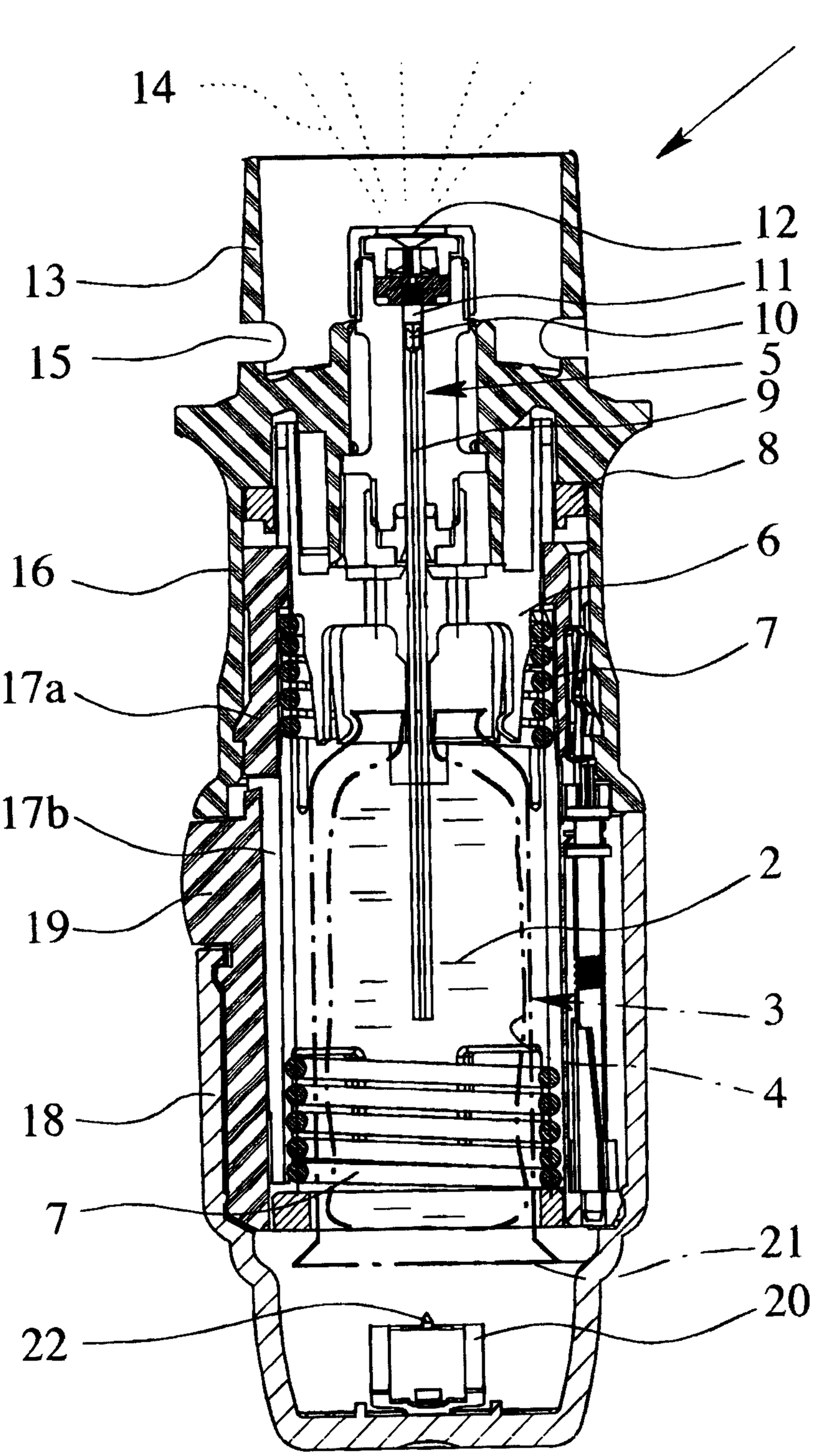


Fig. 1
(Prior Art)

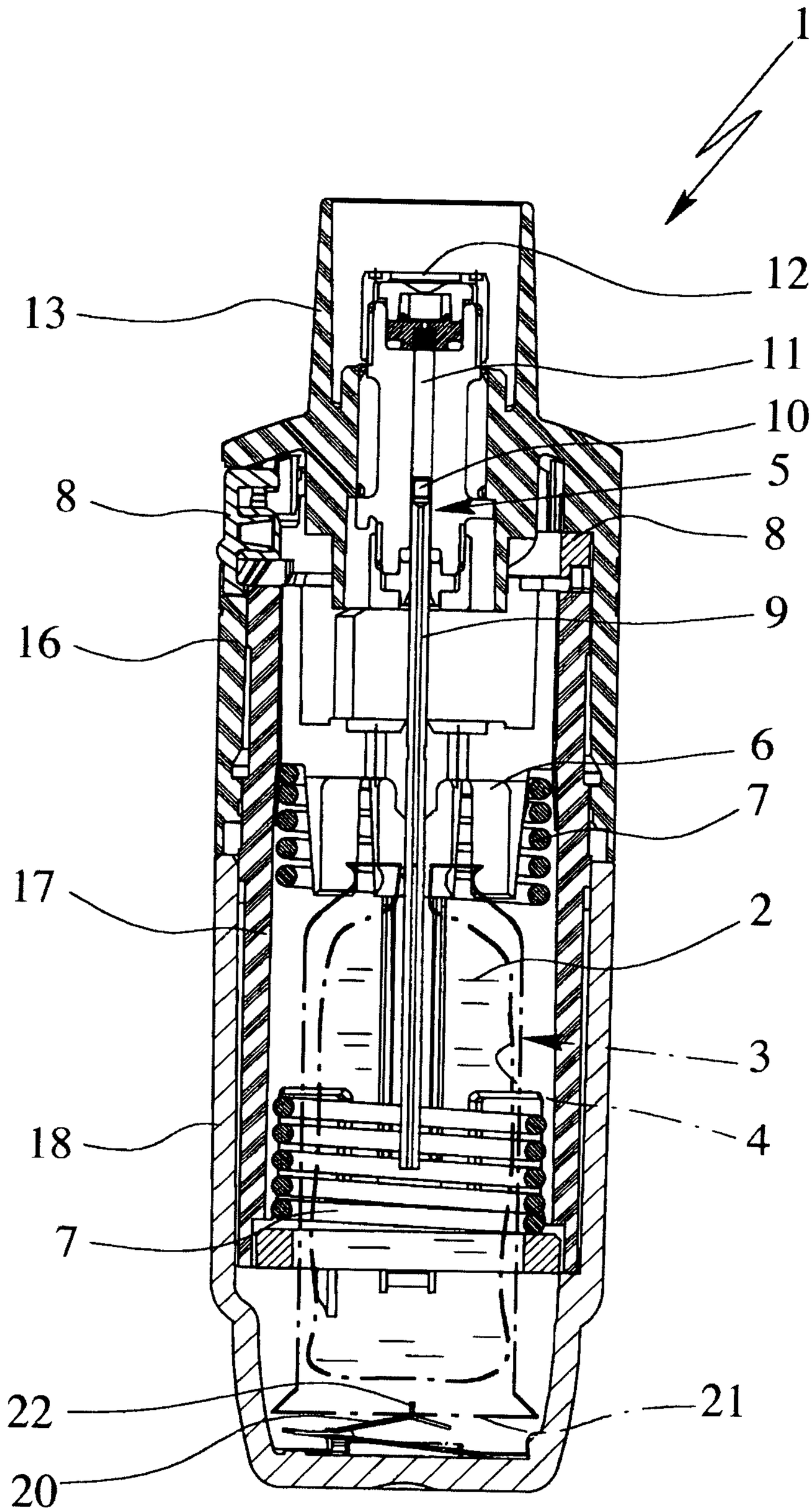


Fig. 2
(Prior Art)

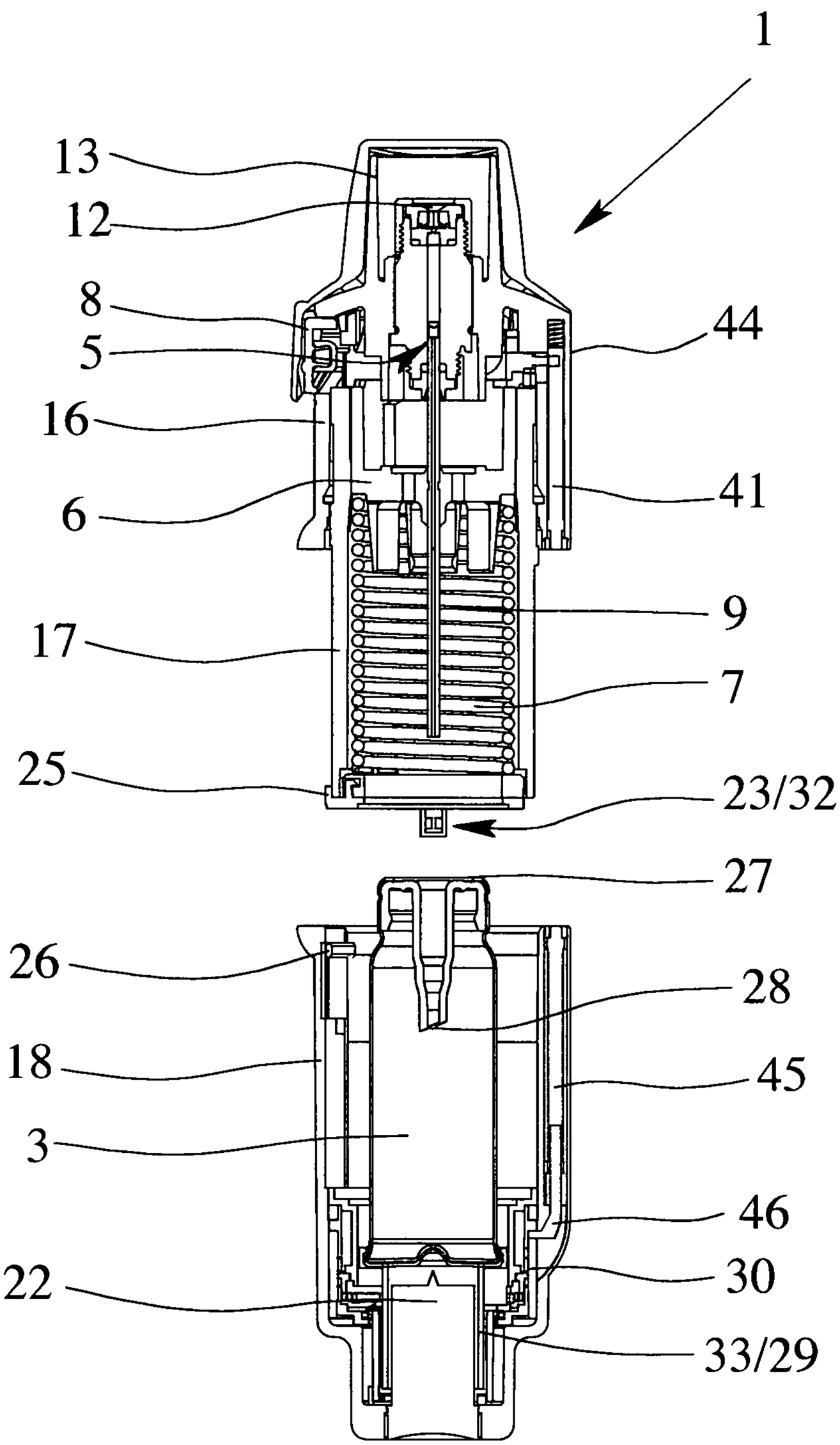


Fig. 3

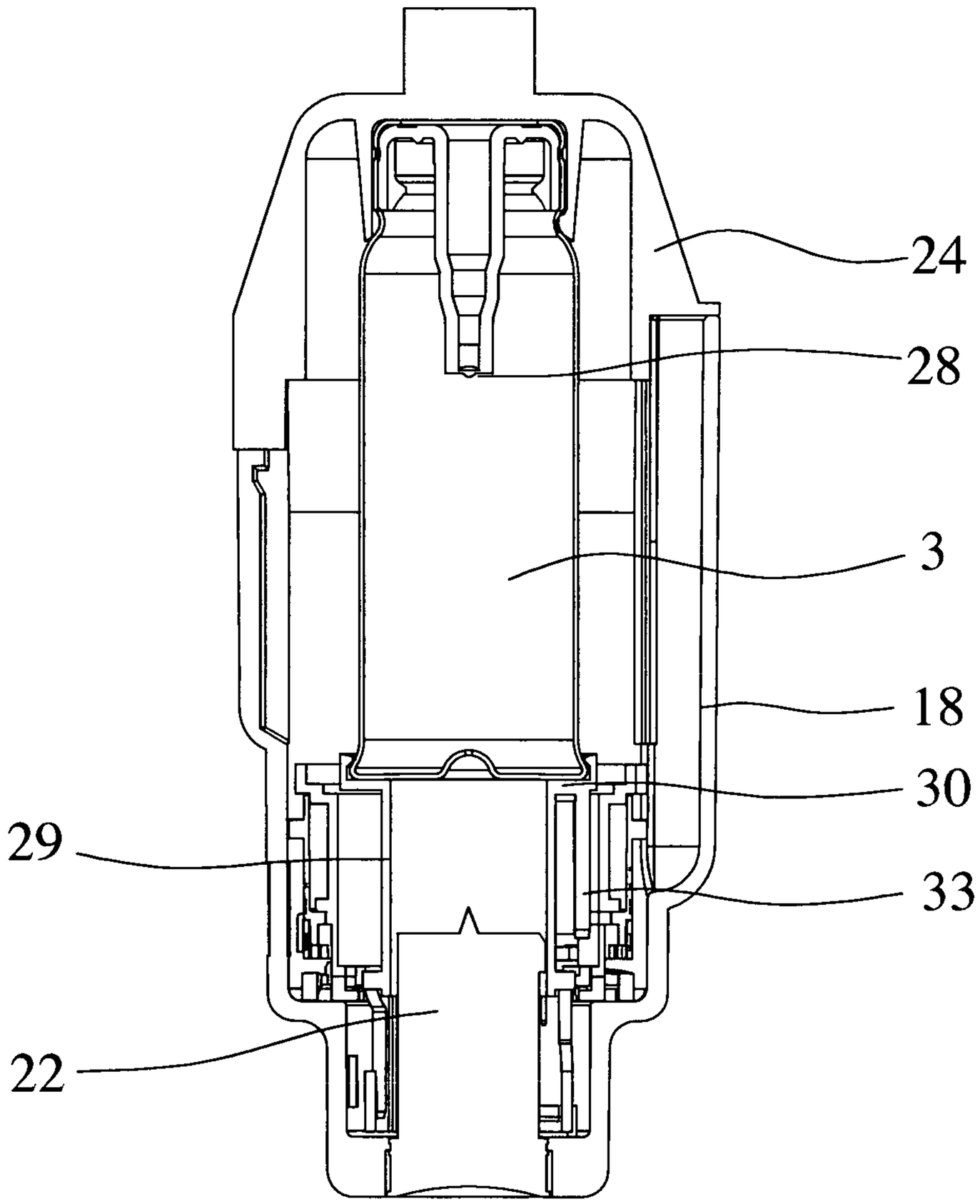


Fig. 4

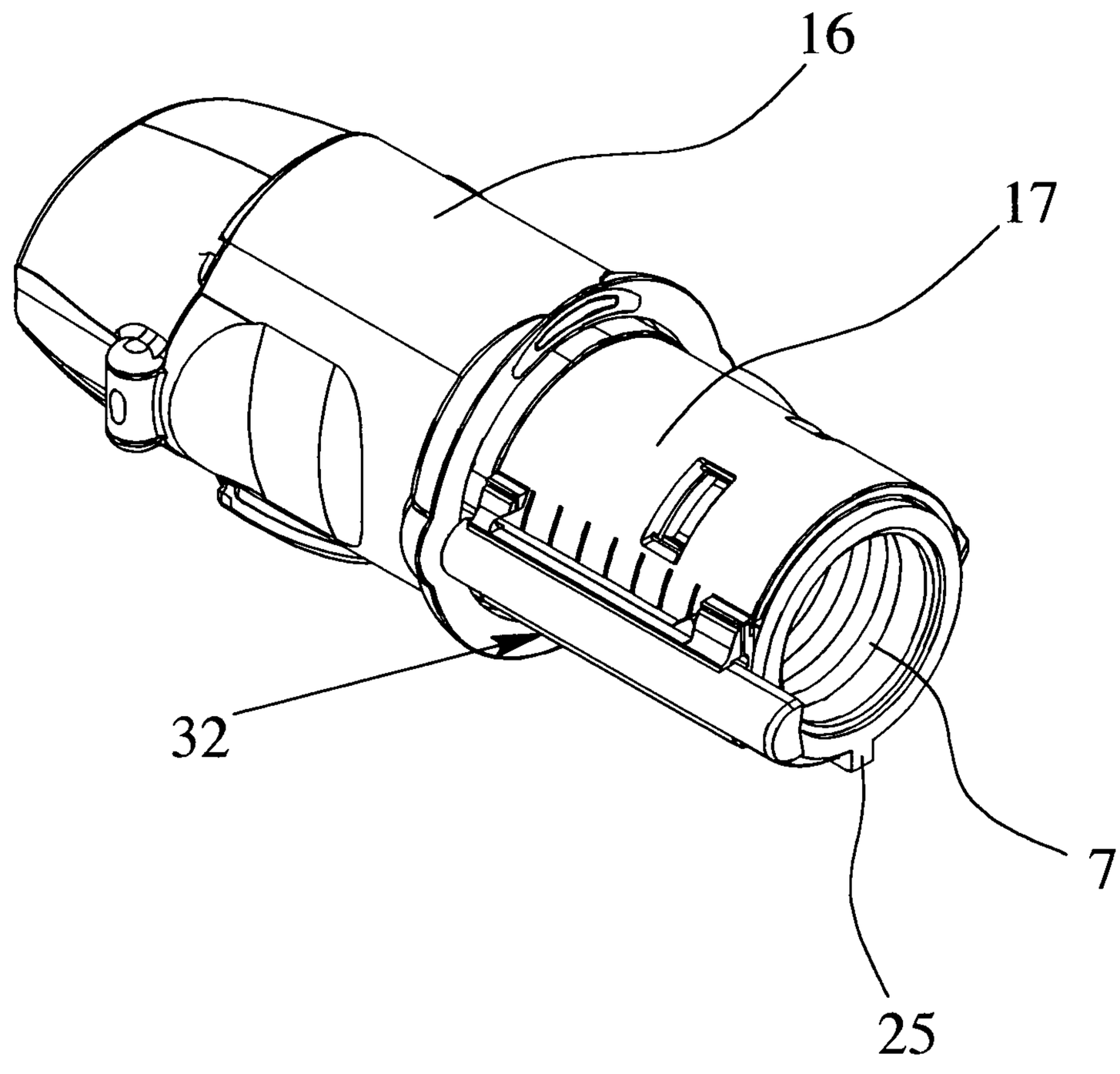


Fig. 5

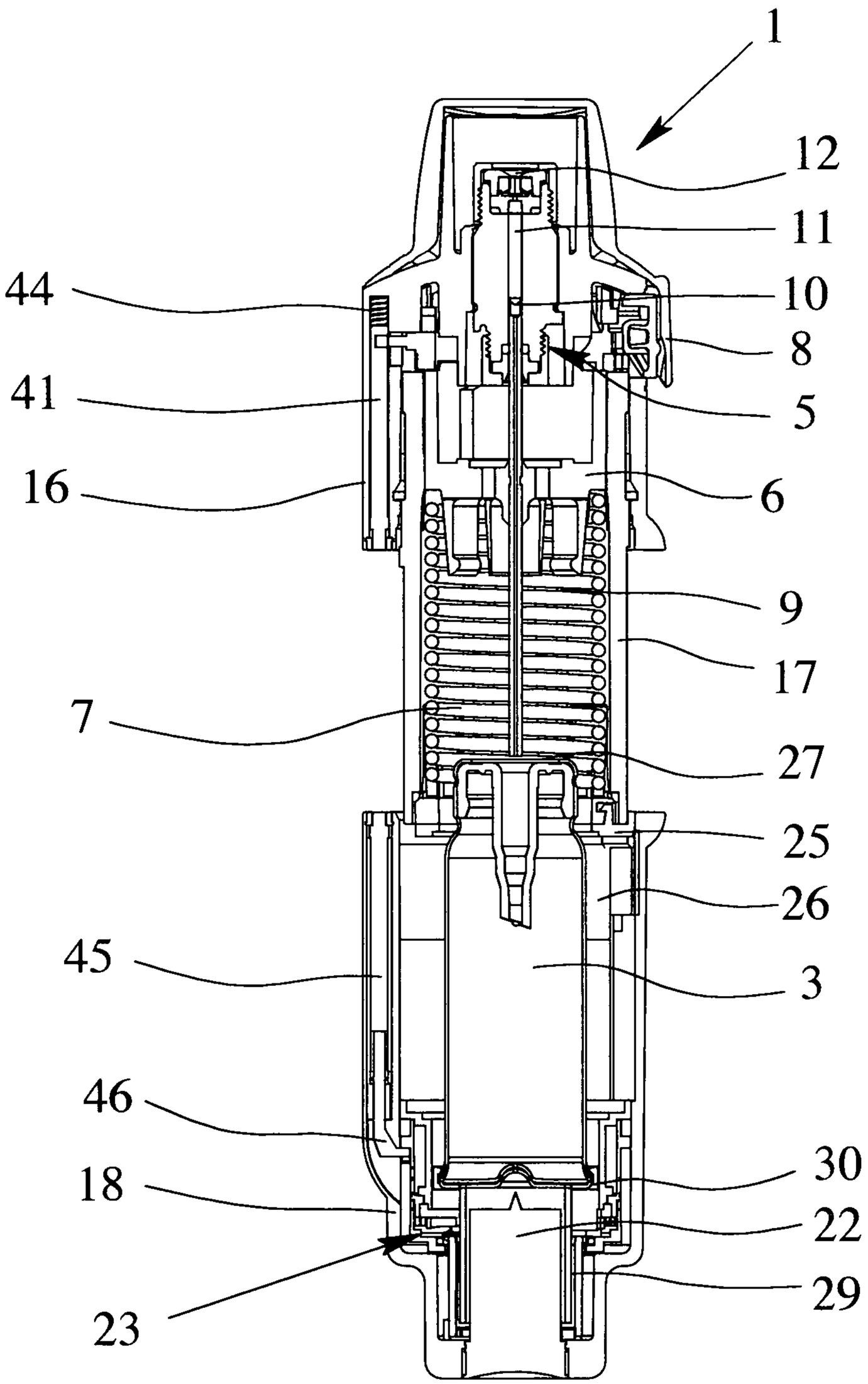


Fig. 6

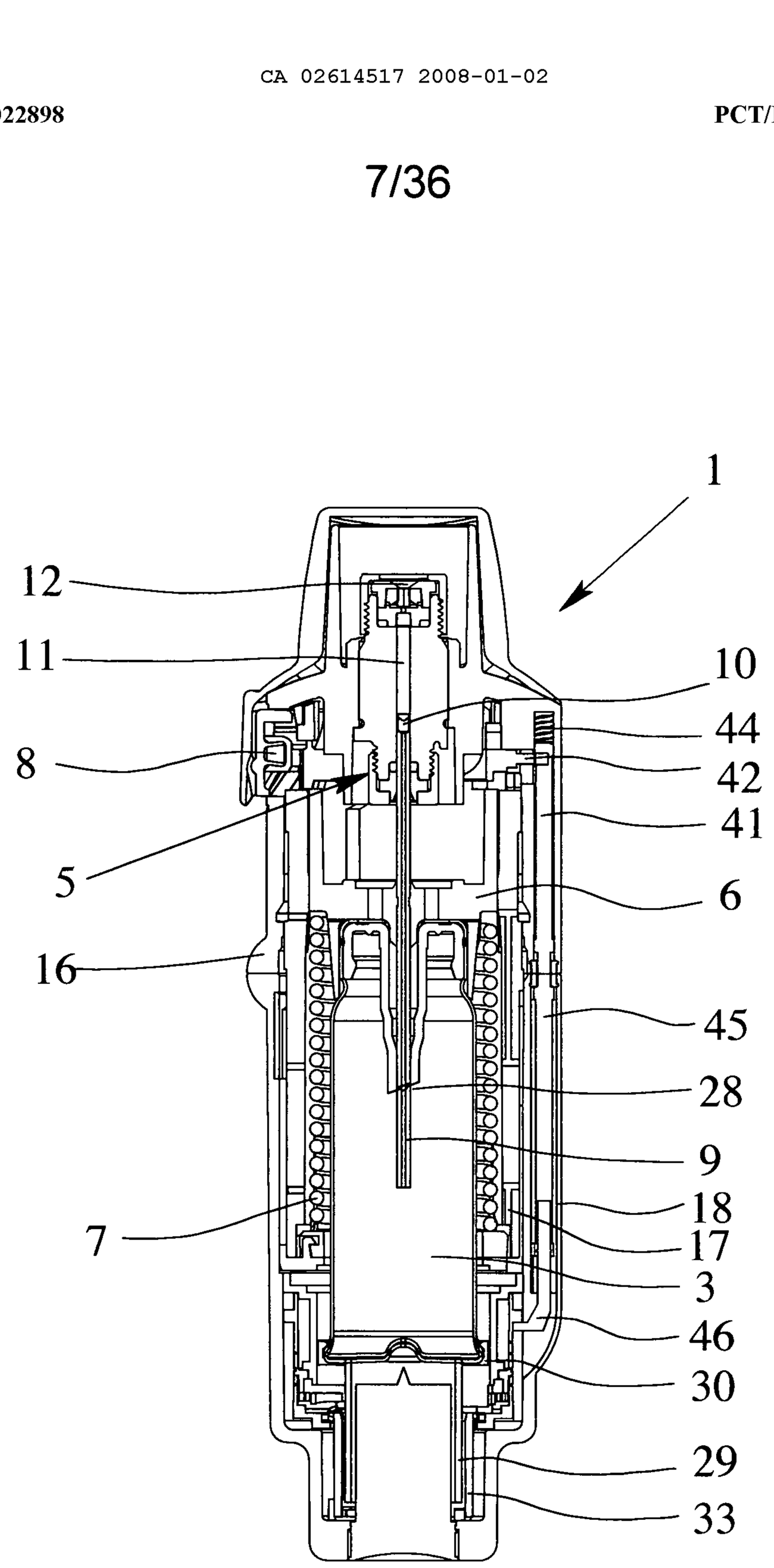


Fig. 7

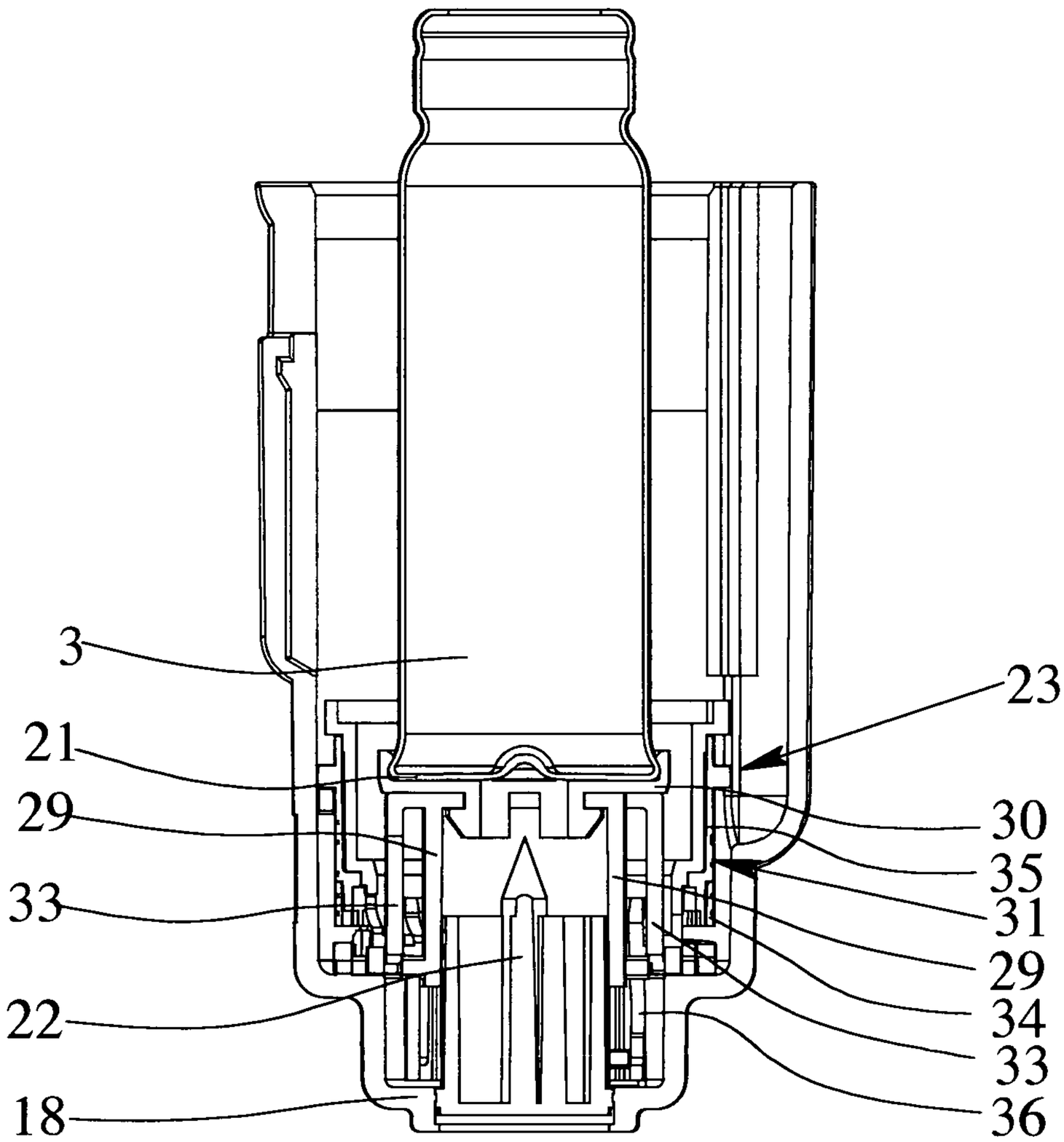


Fig. 8

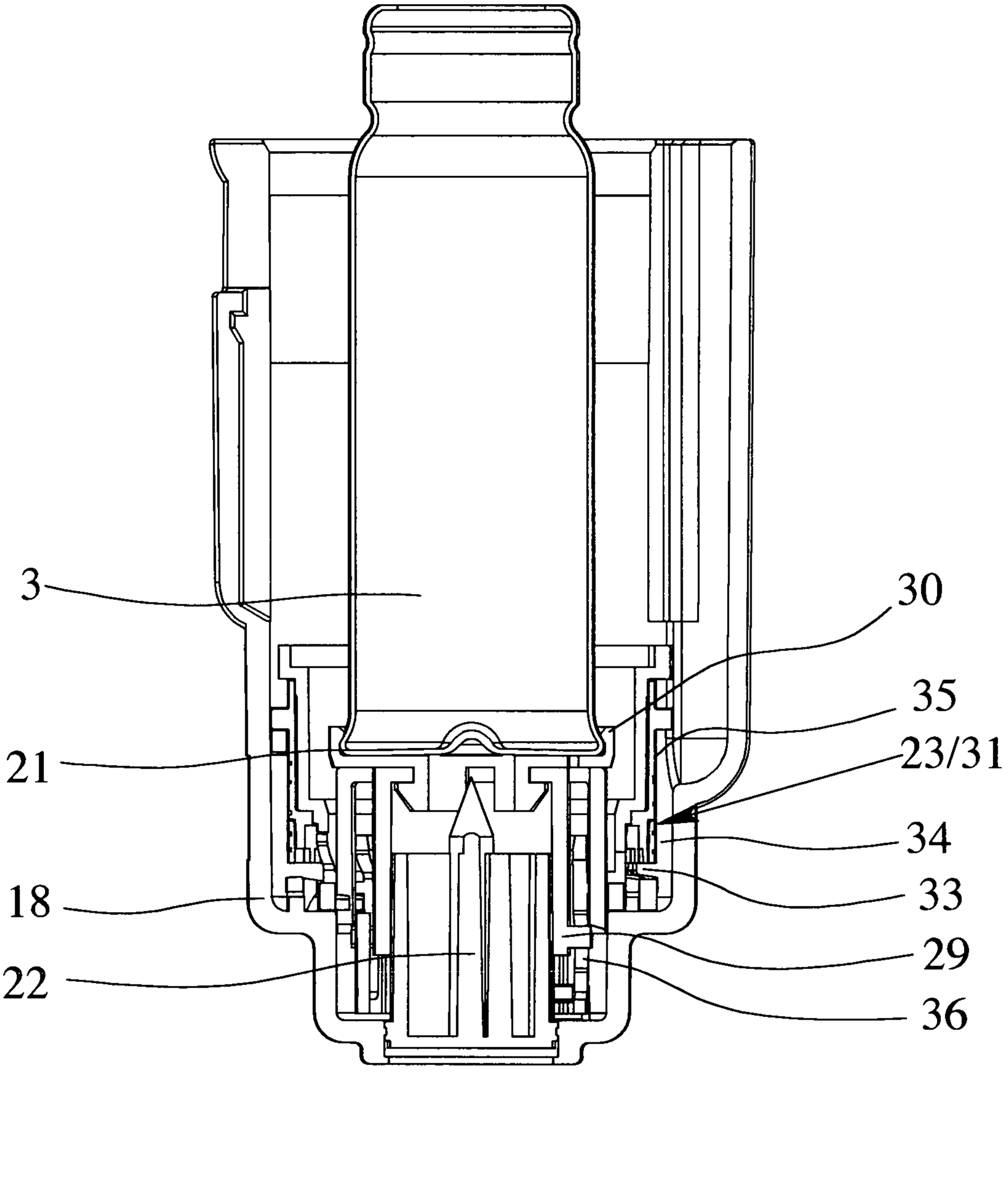


Fig. 9

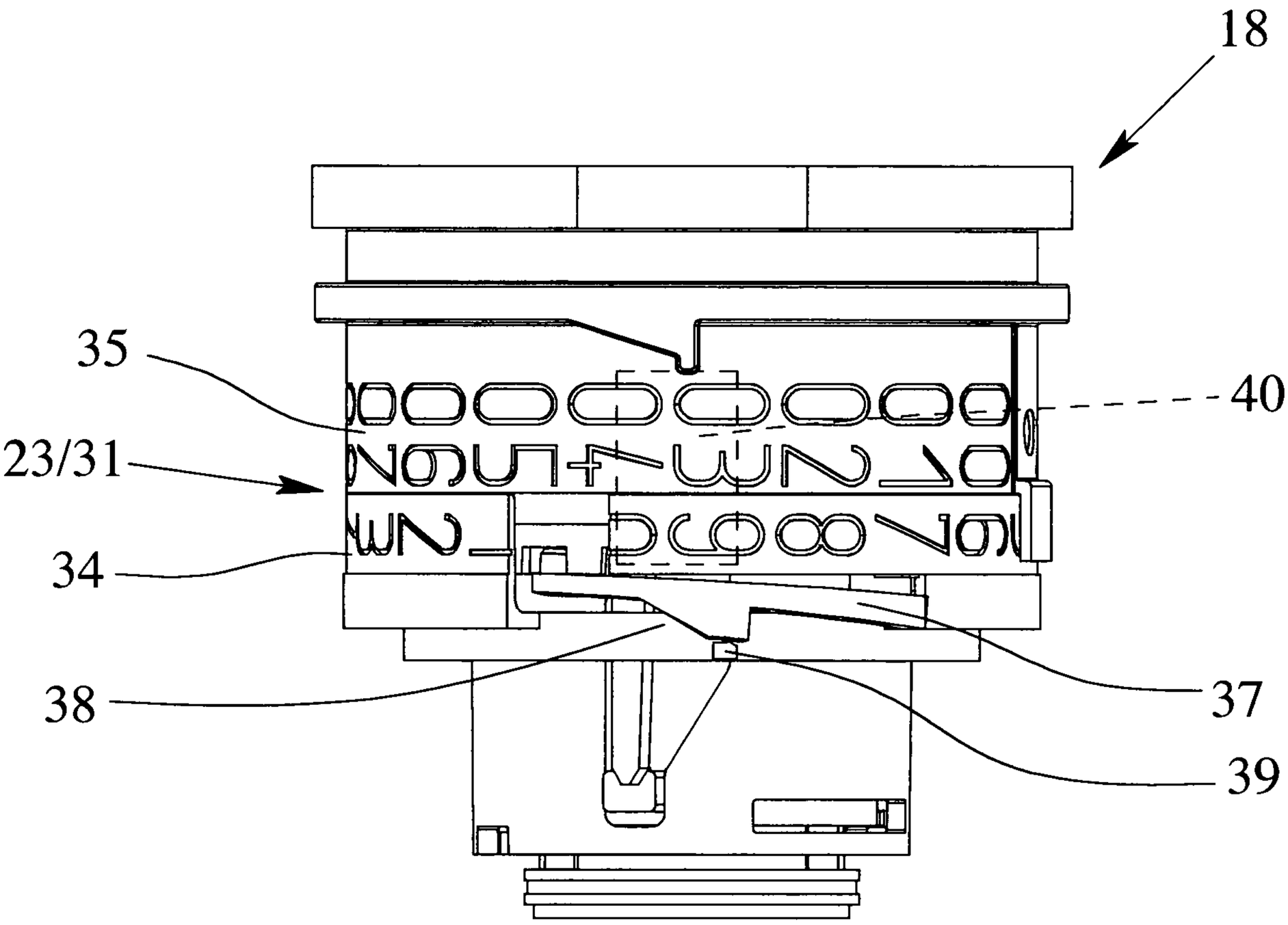


Fig. 10

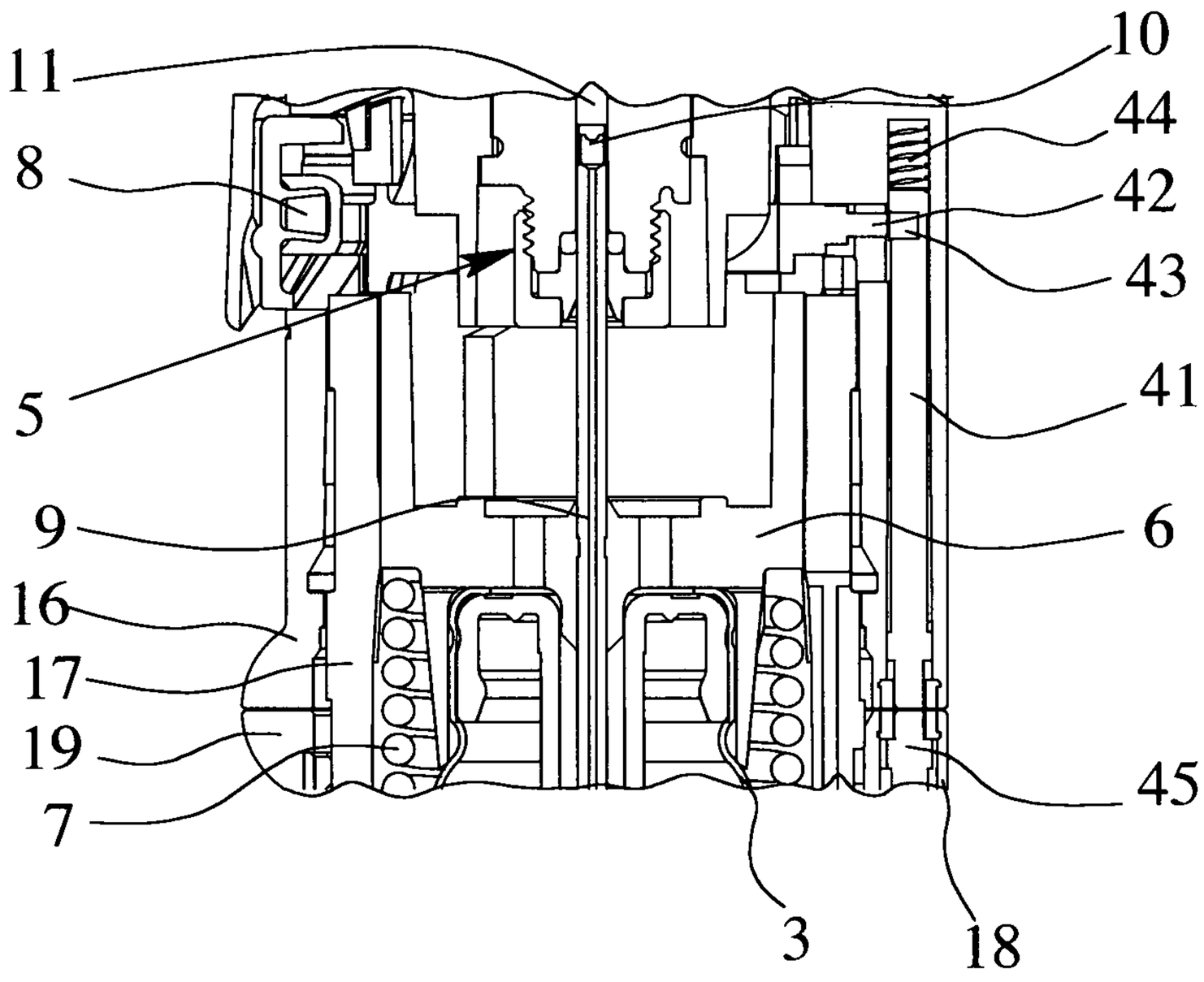


Fig. 11

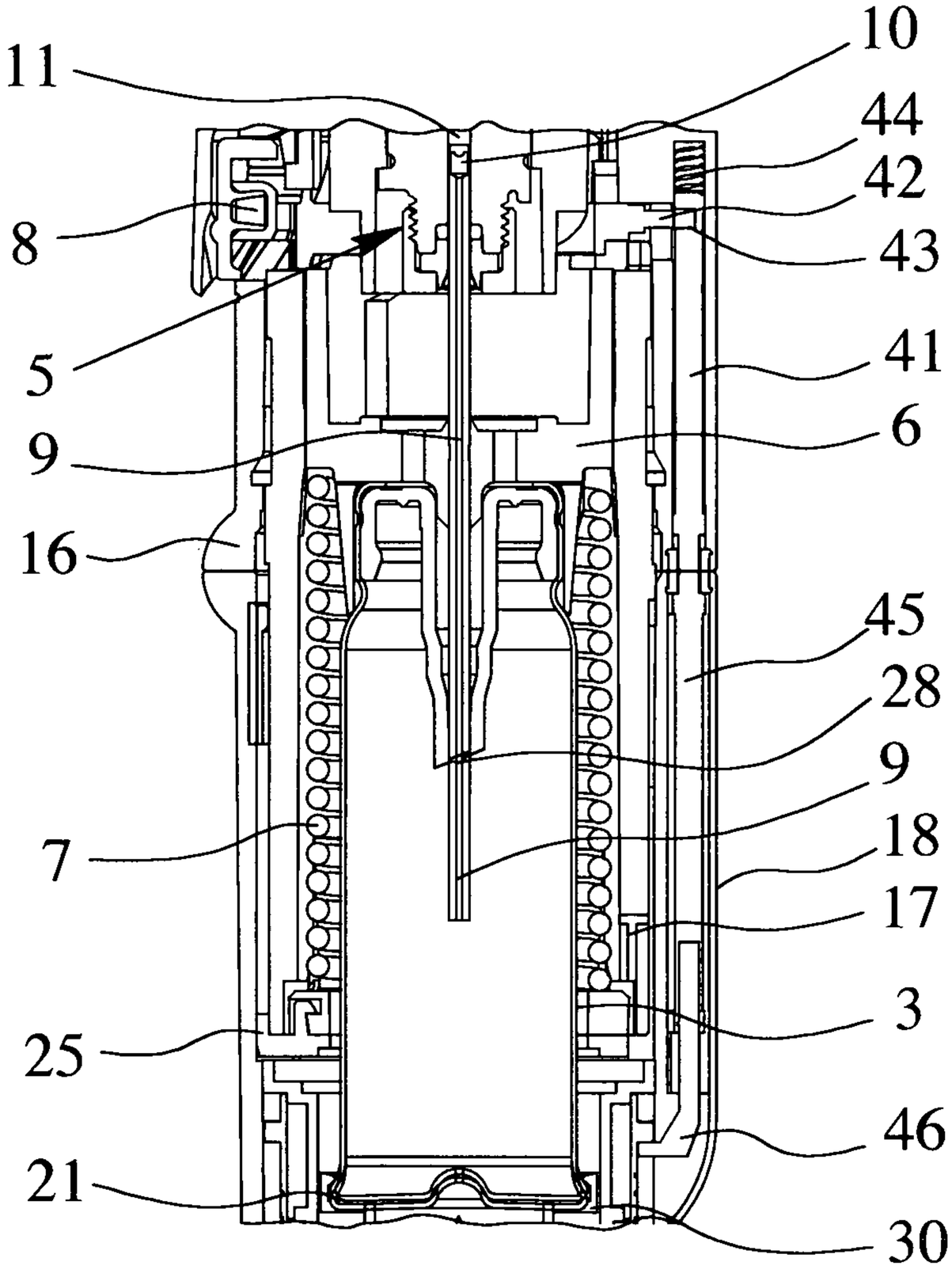


Fig. 12

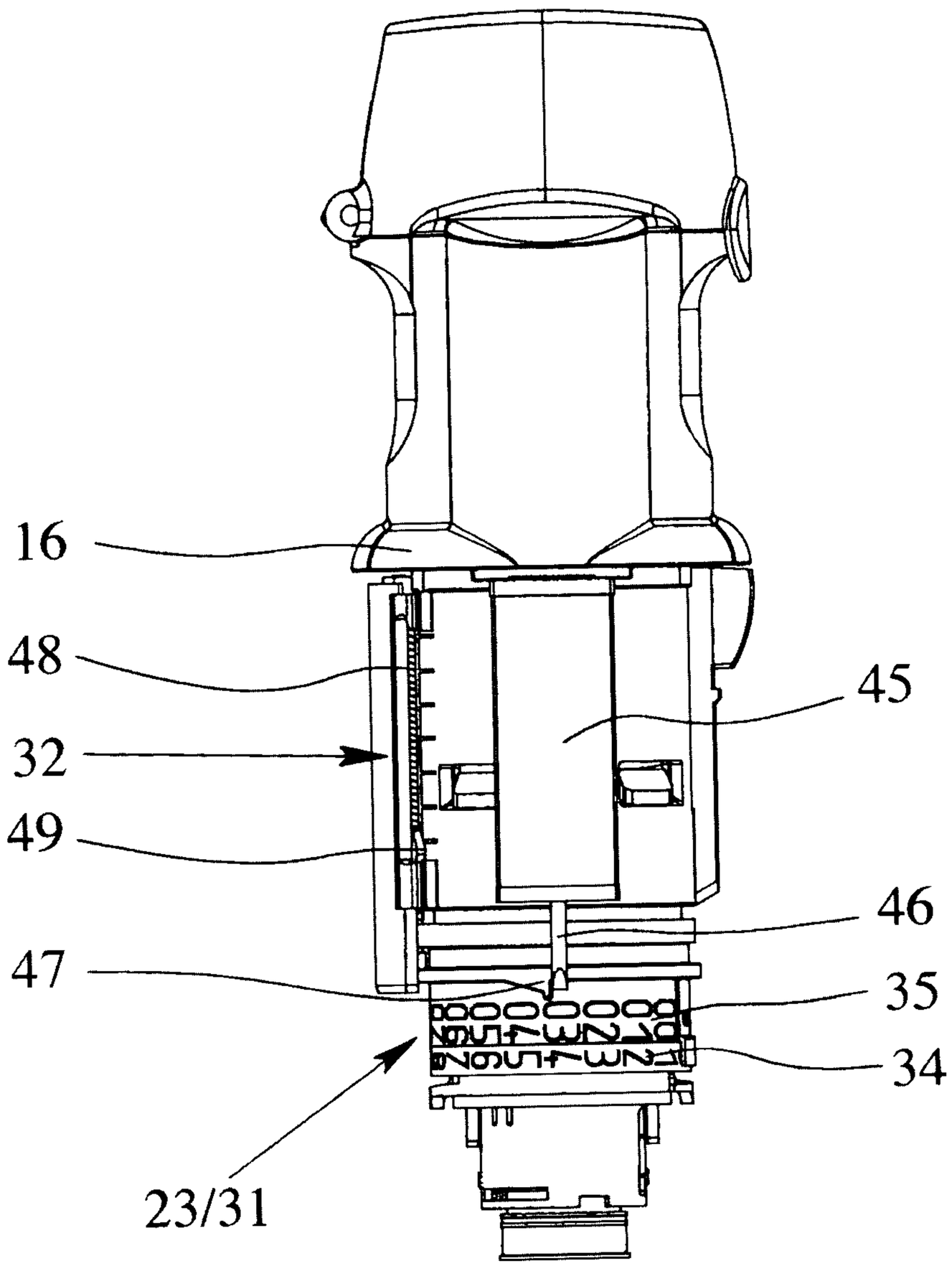


Fig. 13

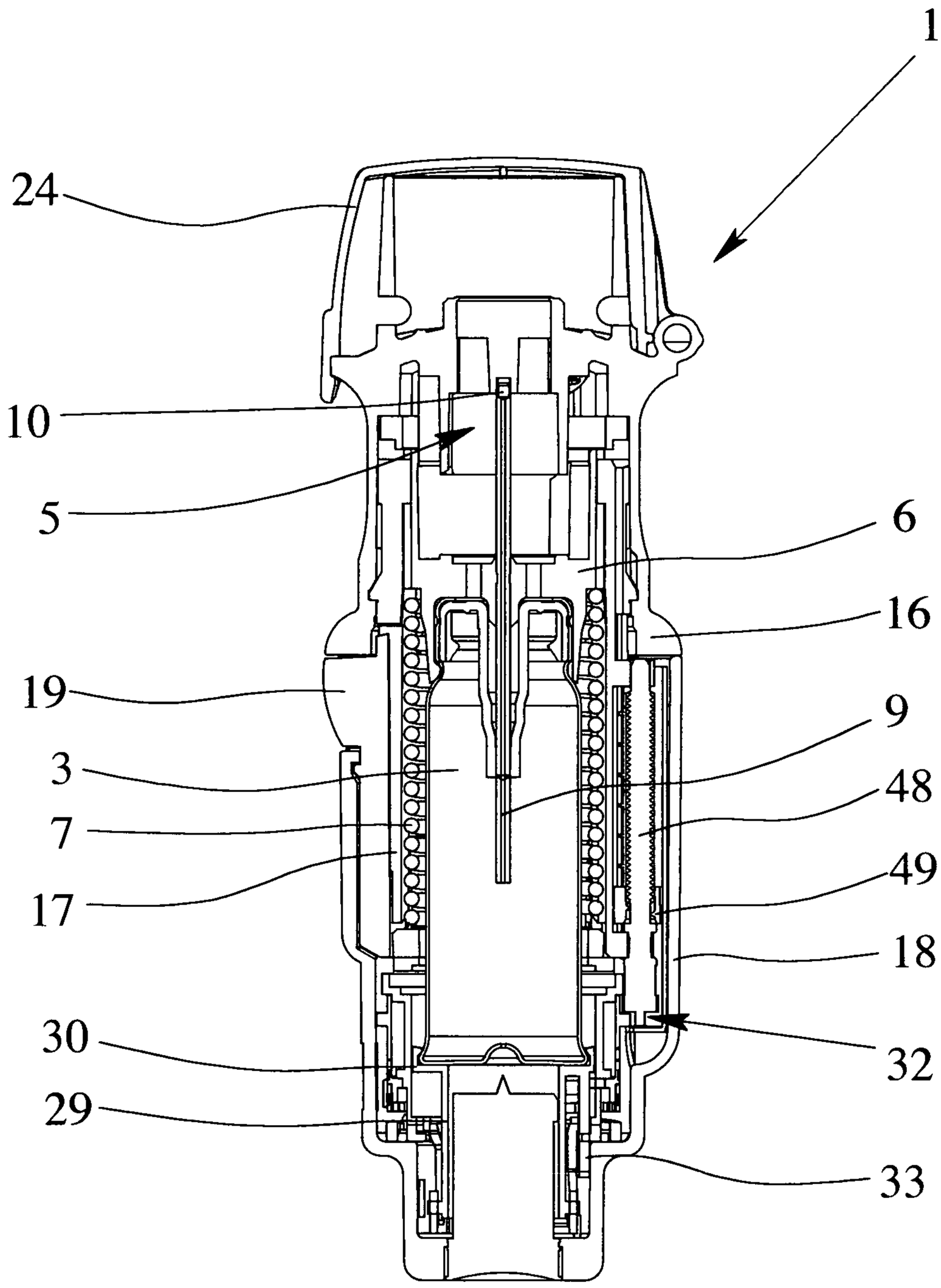


Fig. 14

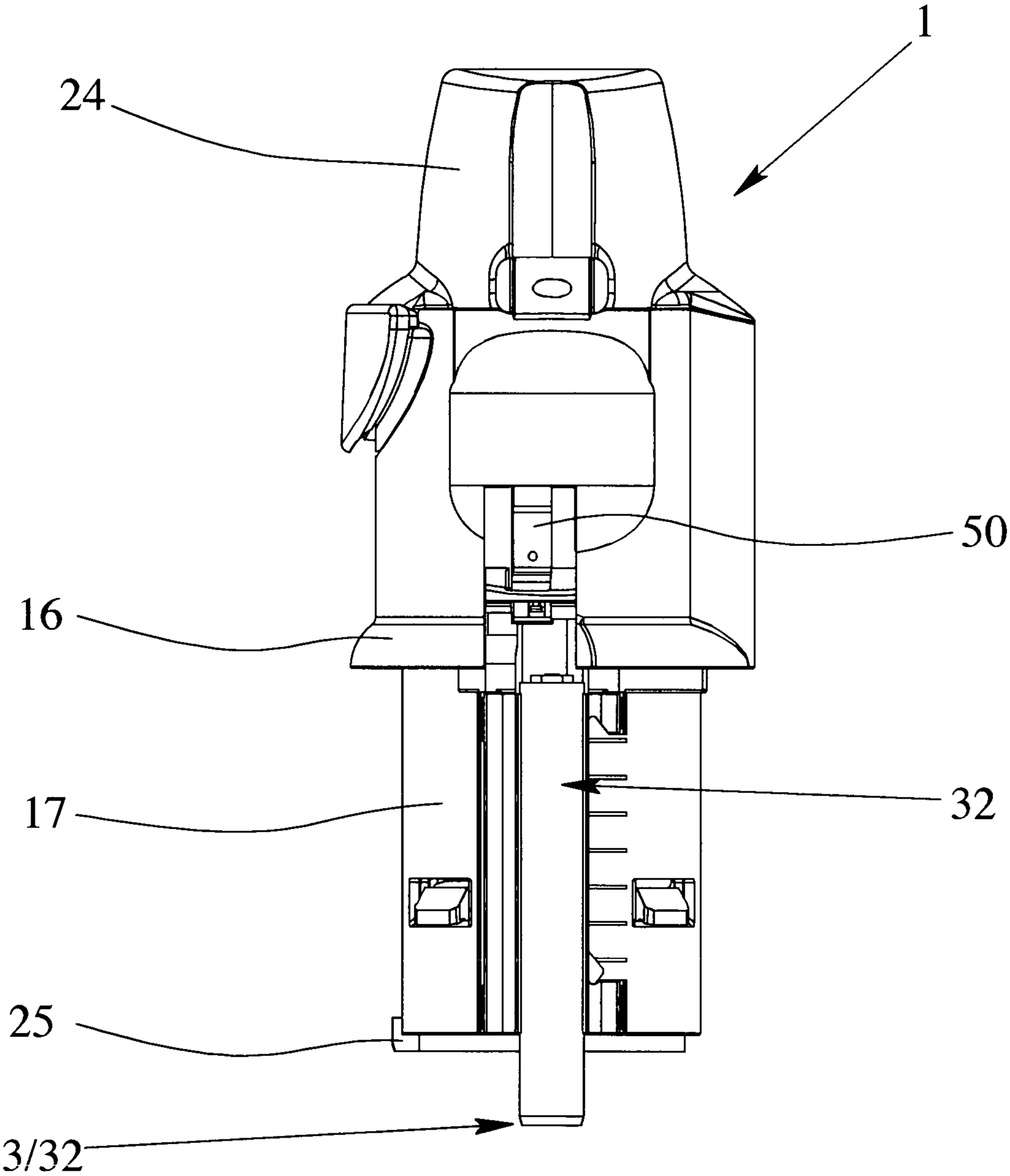


Fig. 15

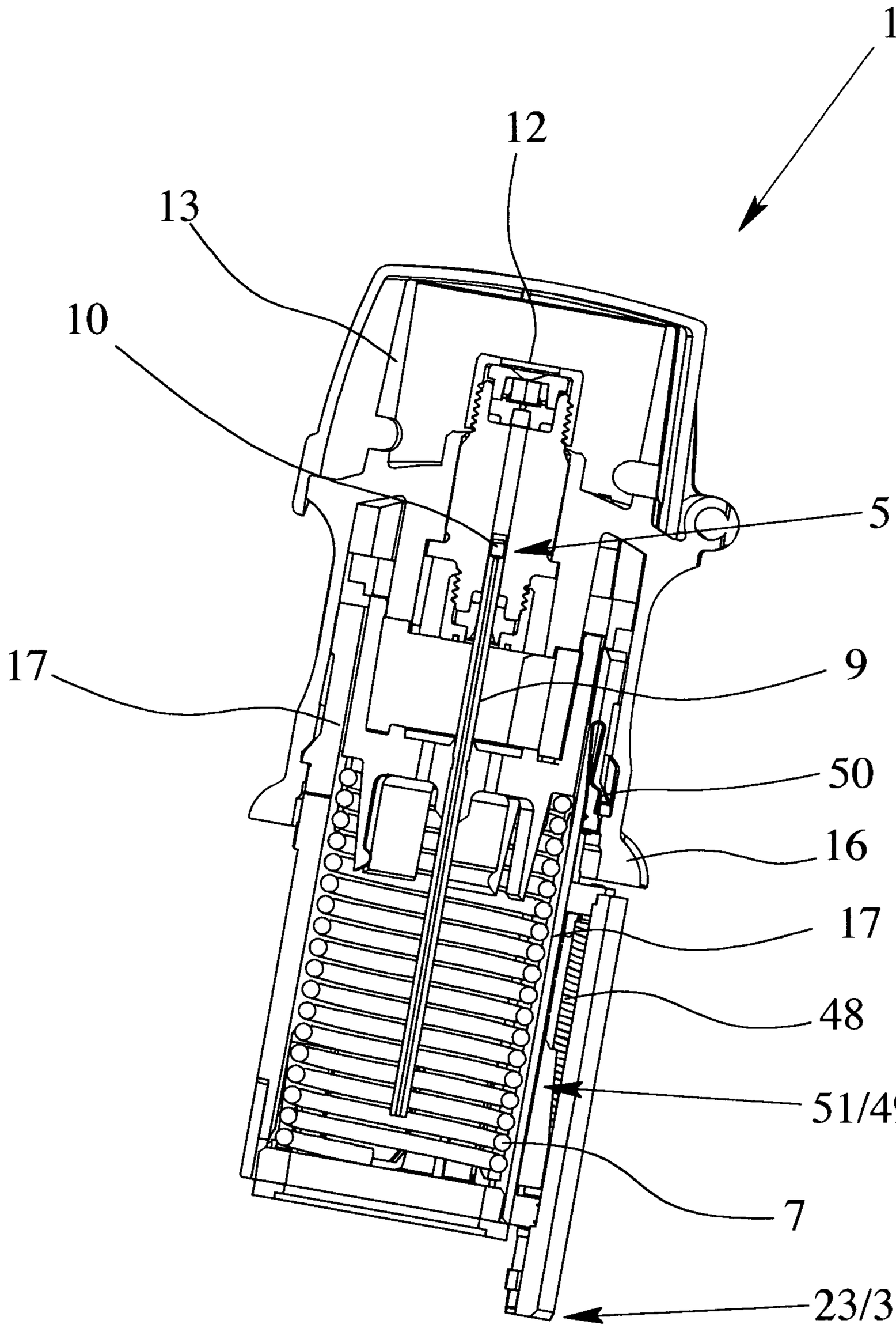


Fig. 16

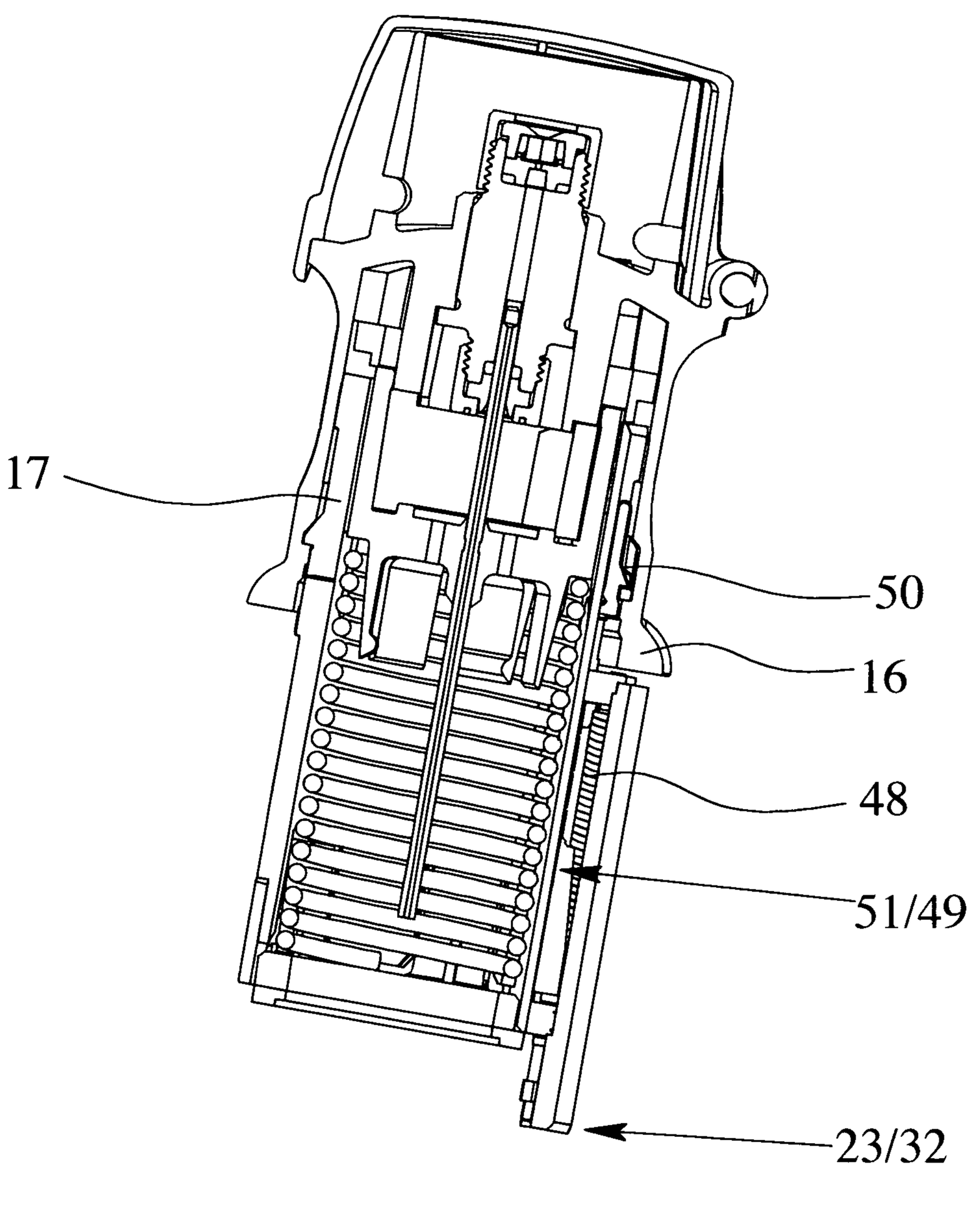


Fig. 17

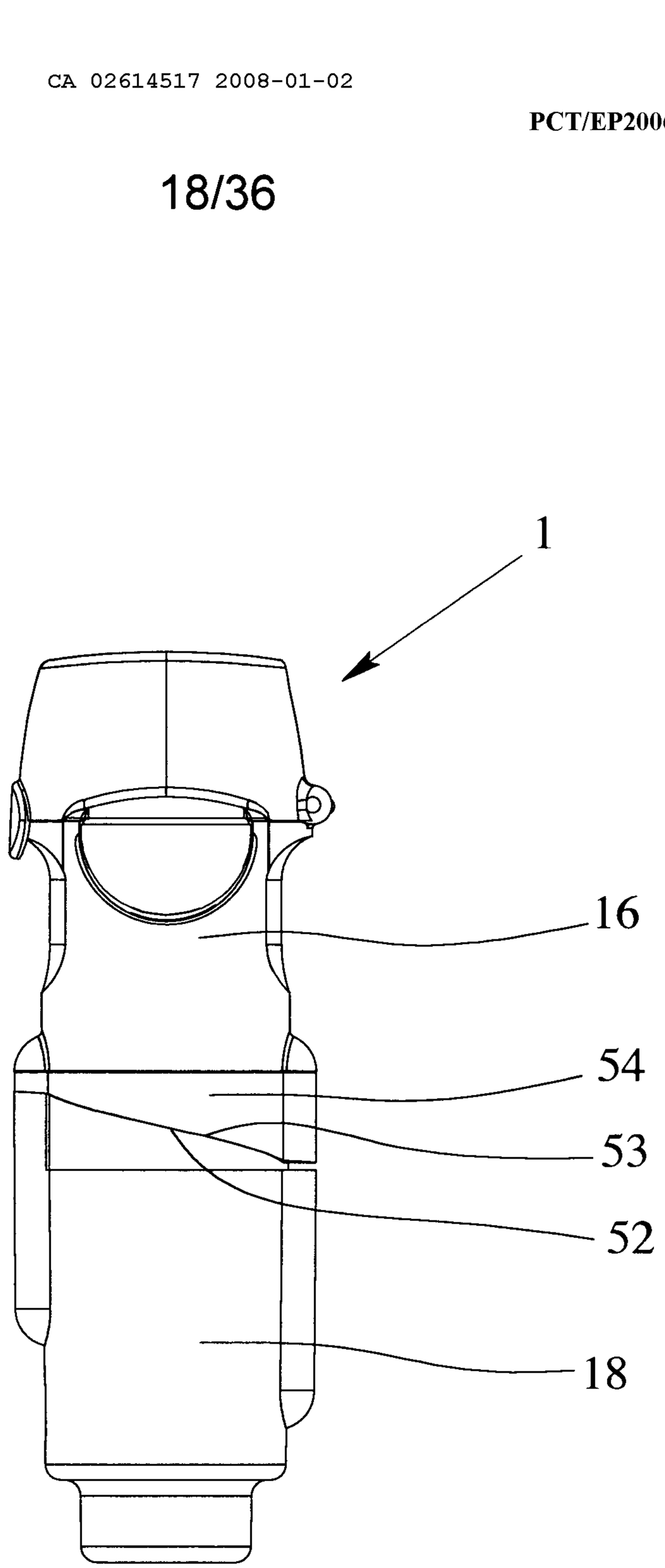


Fig. 18

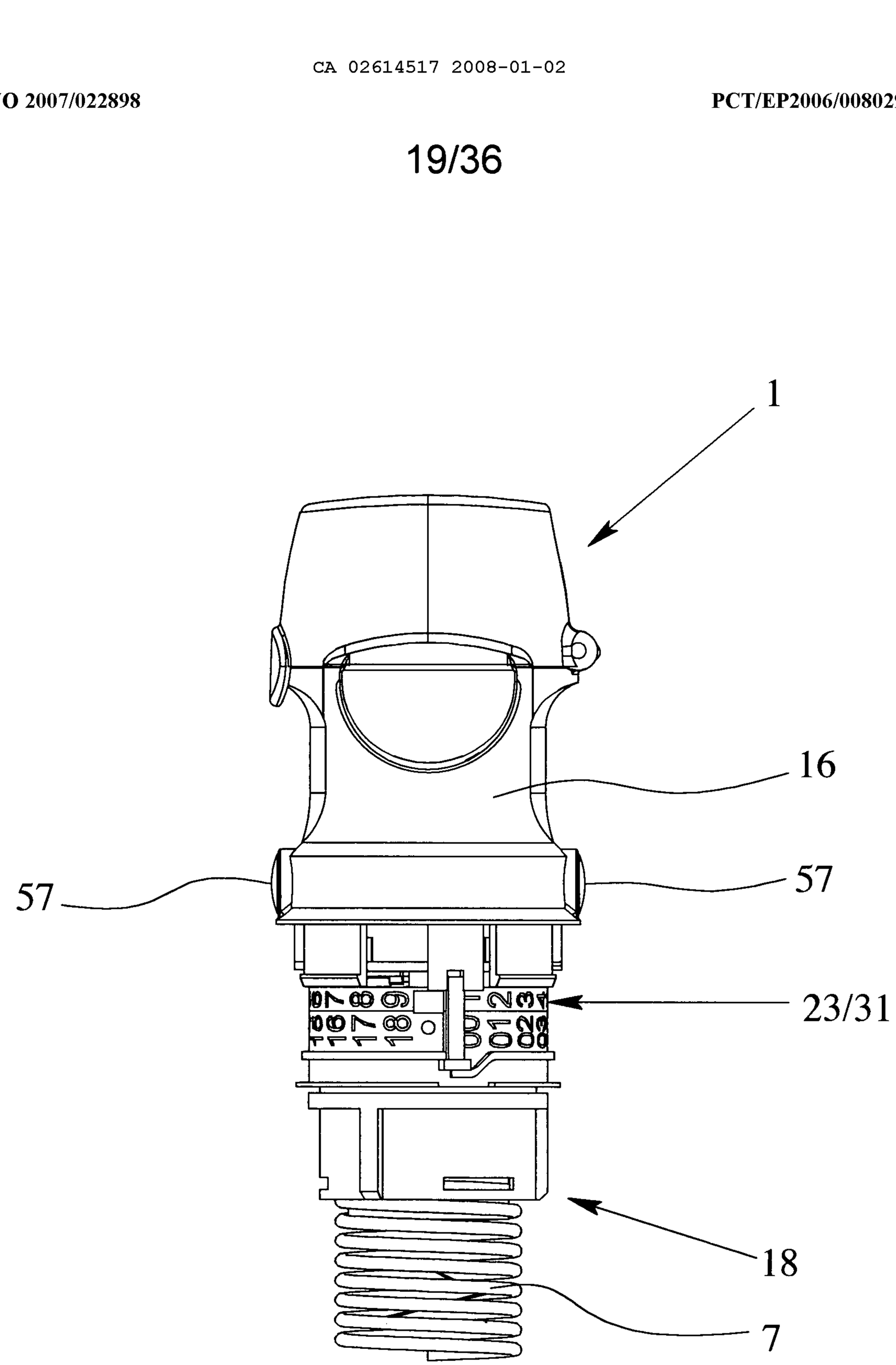


Fig. 19

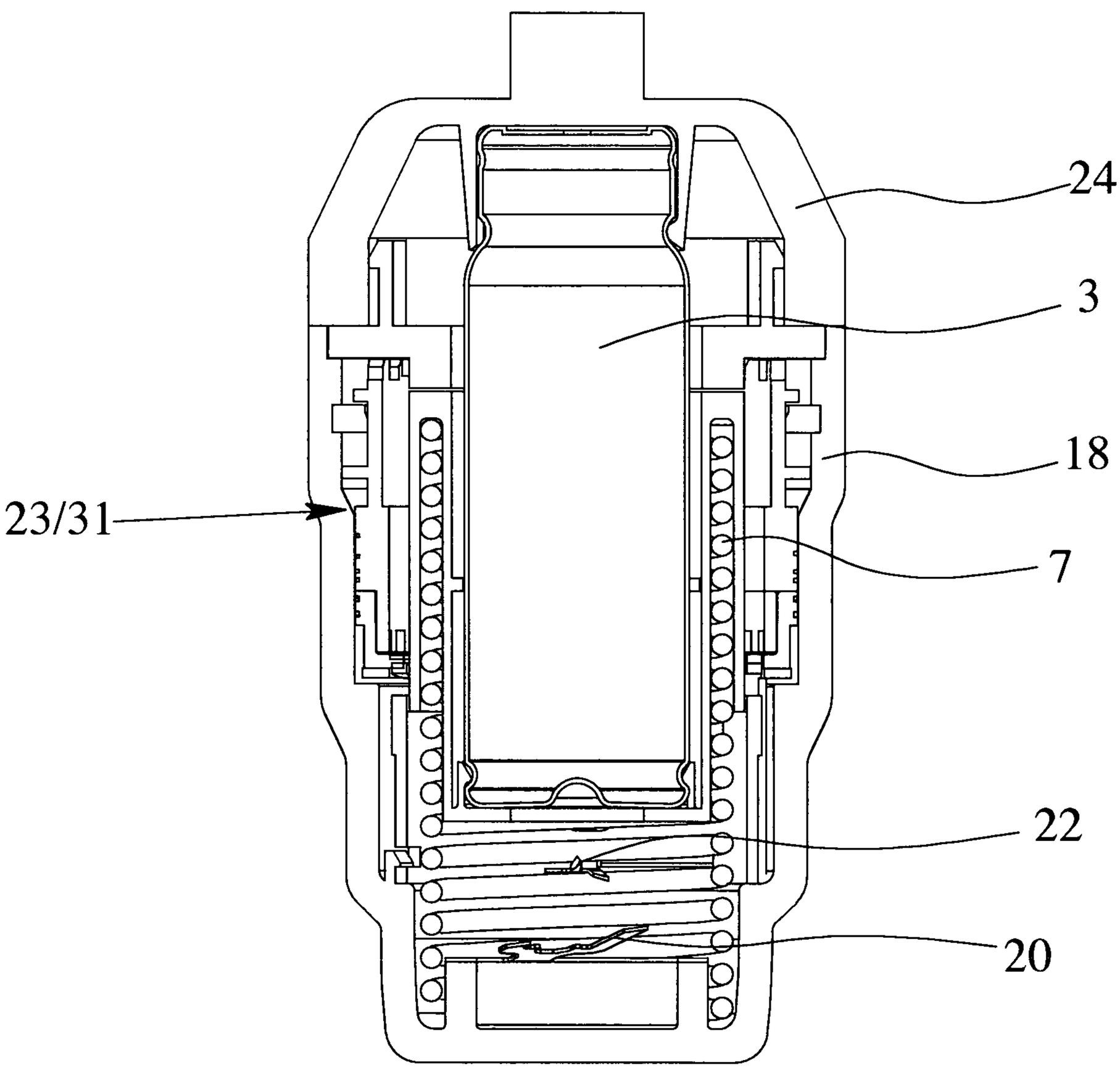


Fig. 20

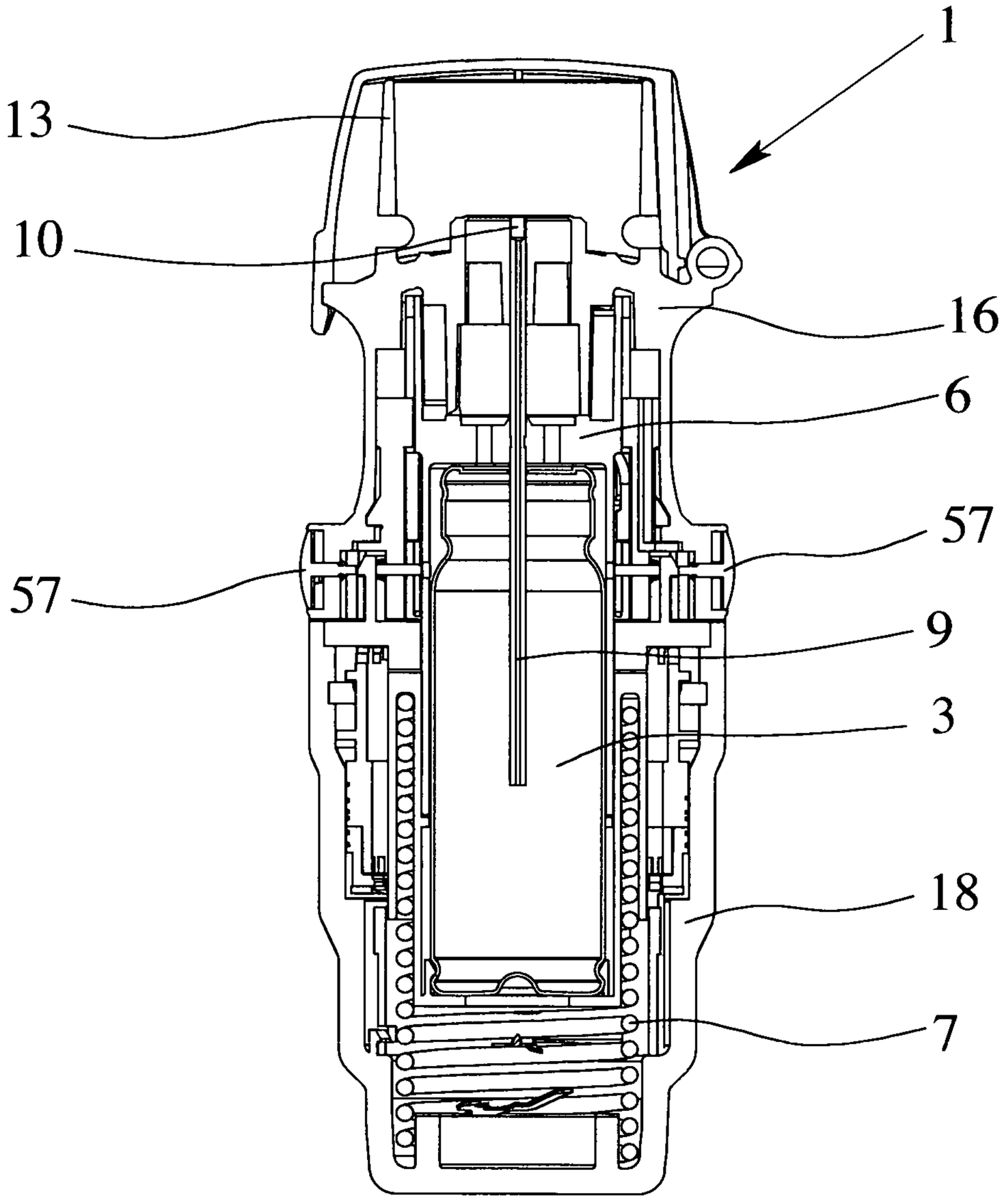


Fig. 21

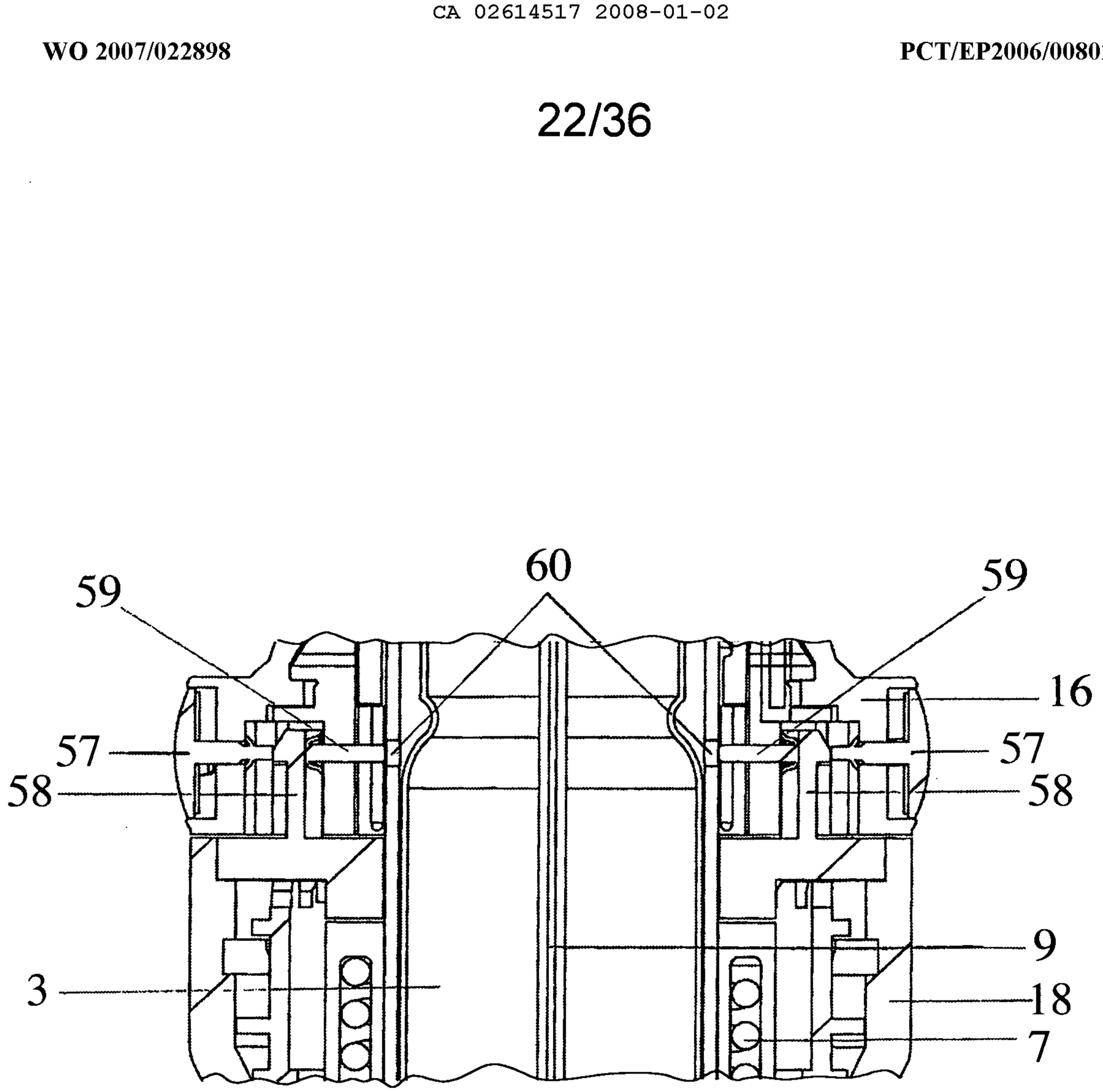


Fig. 22

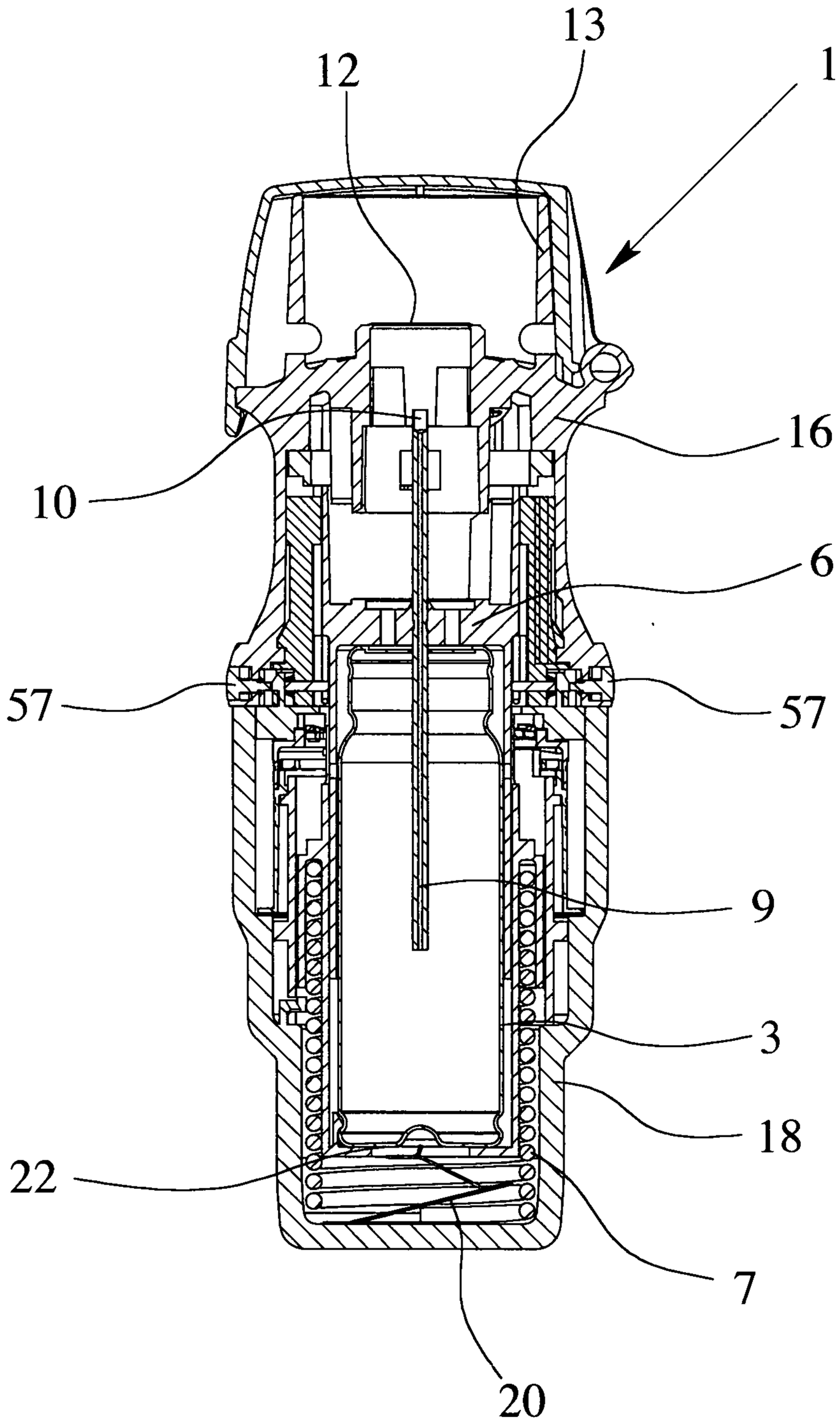


Fig. 23

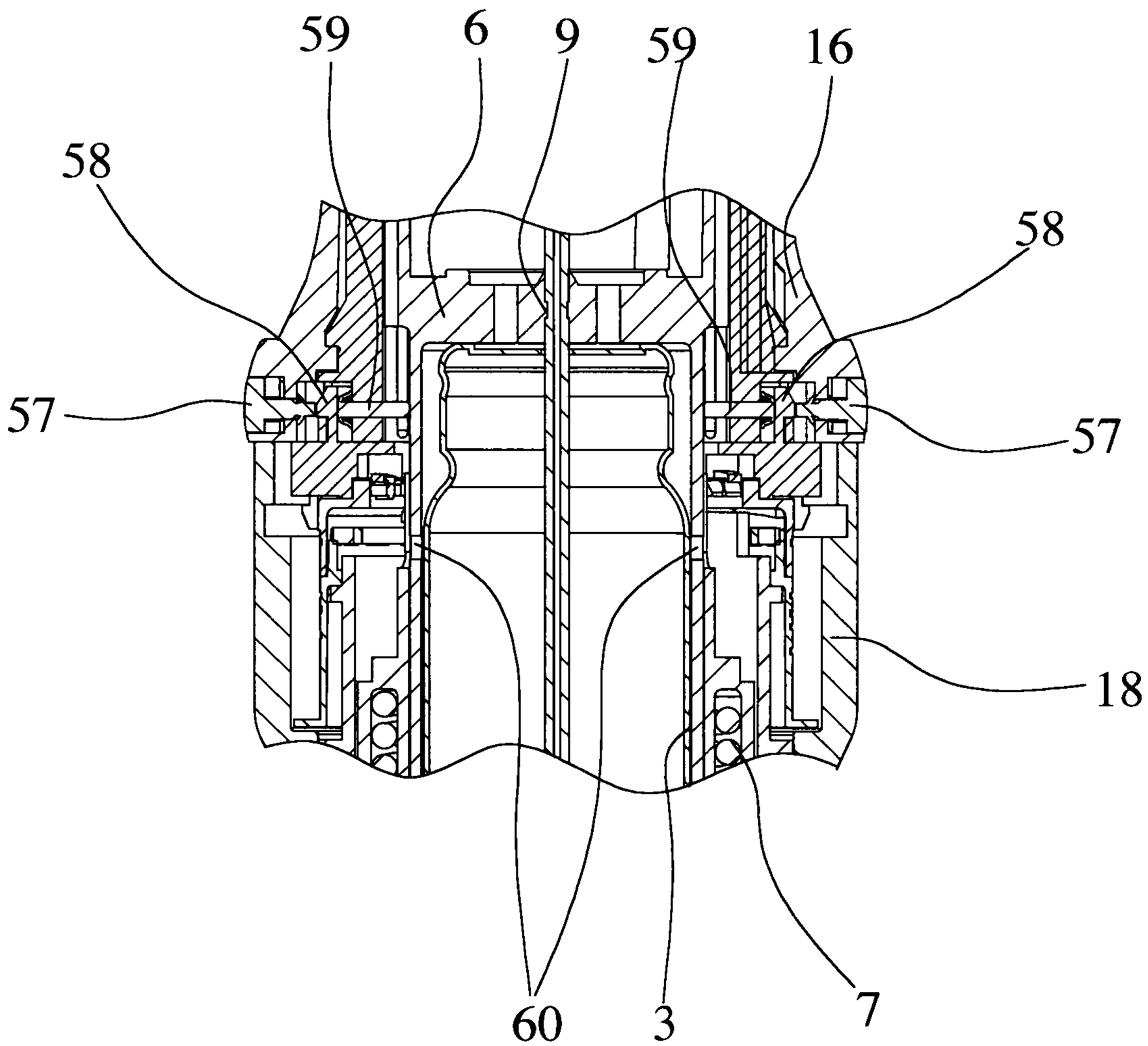


Fig. 24

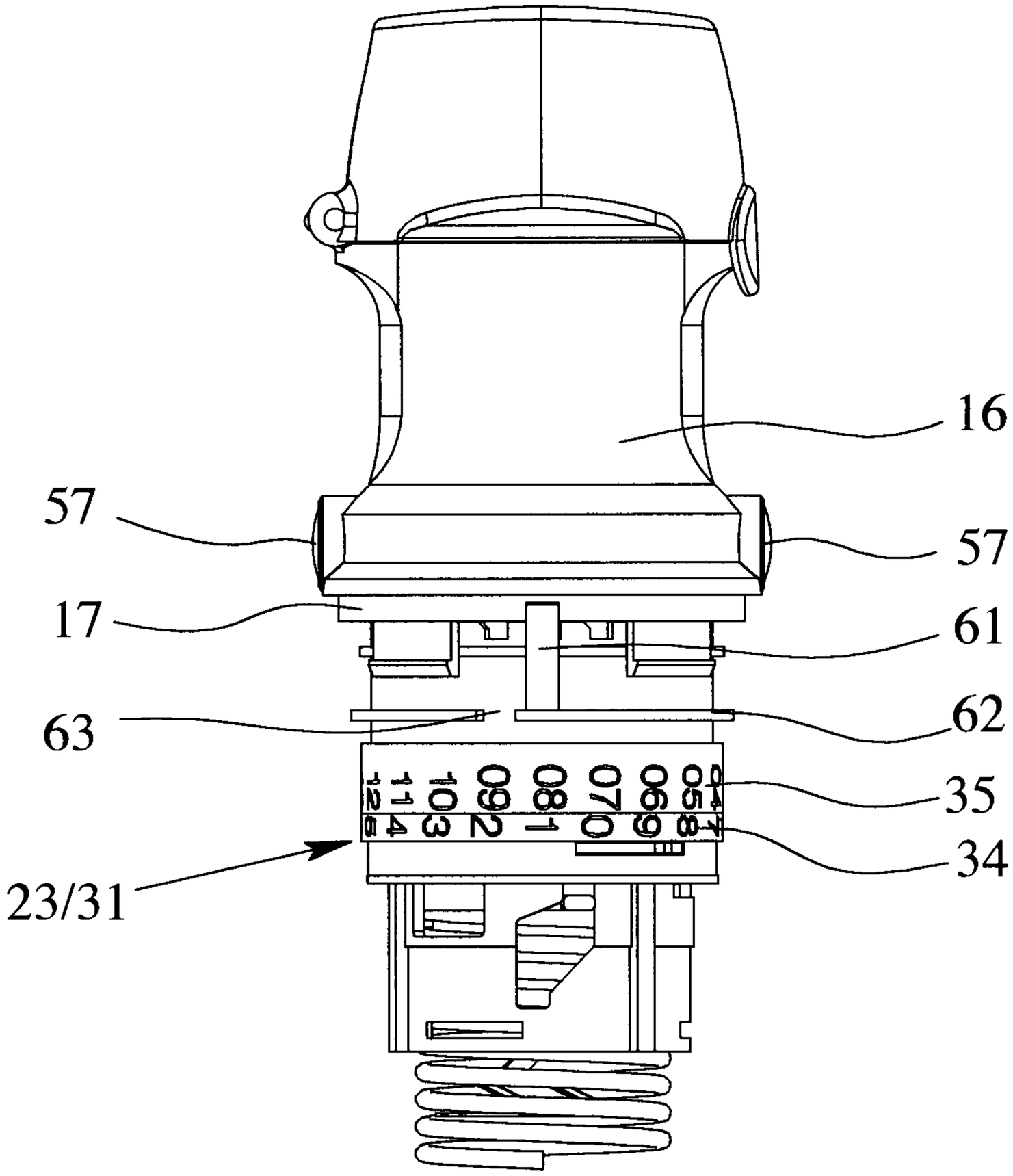


Fig. 25

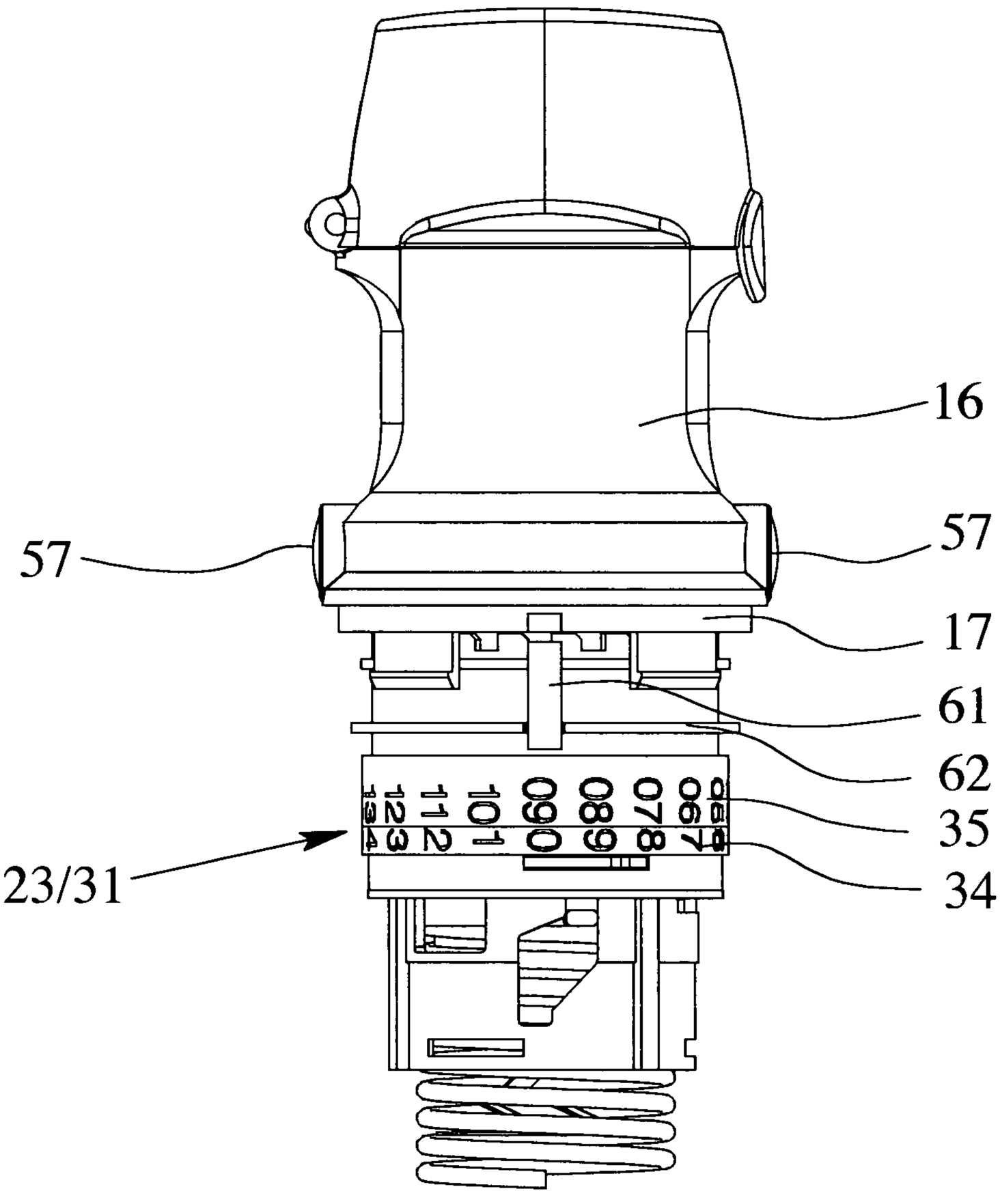


Fig. 26

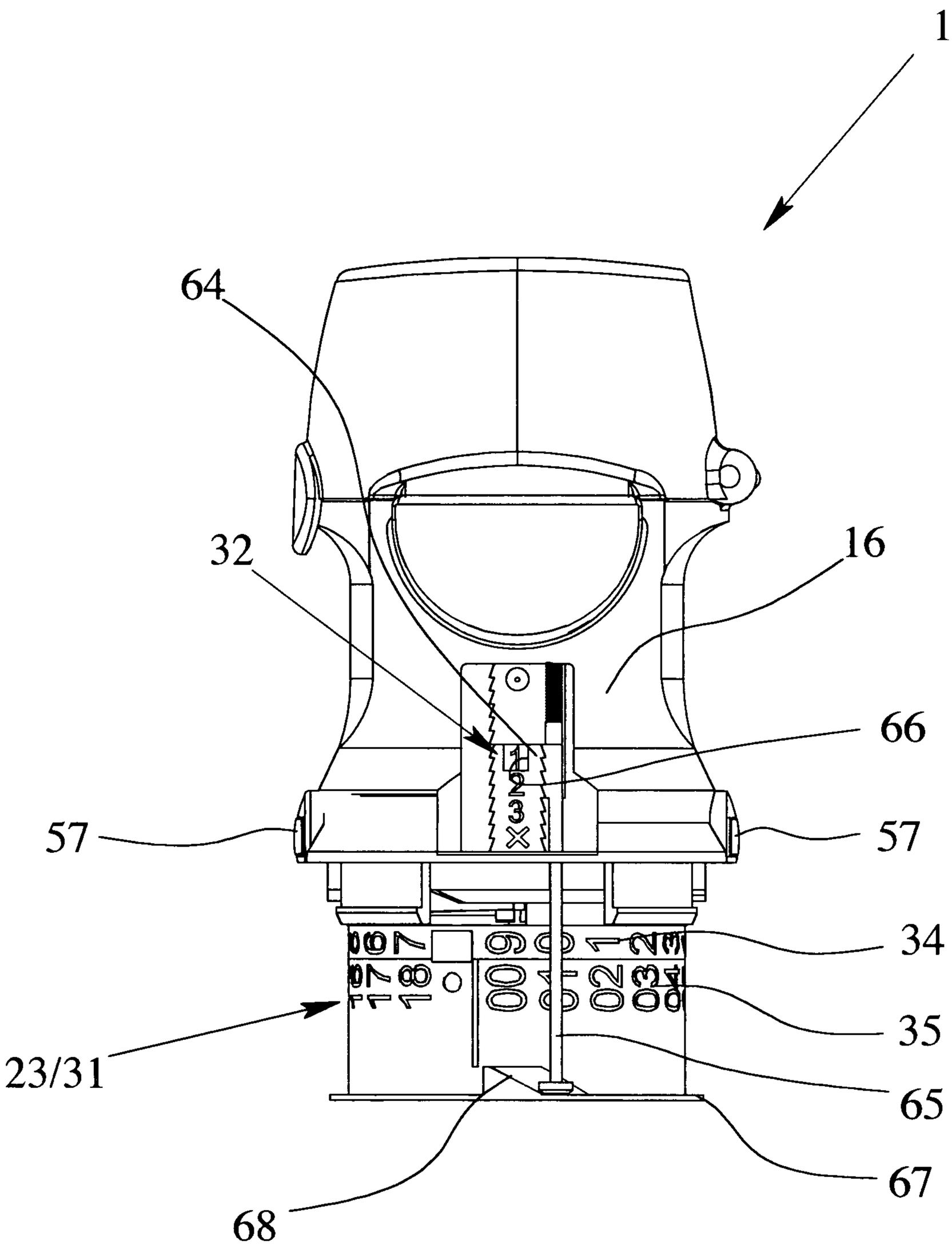


Fig. 27a

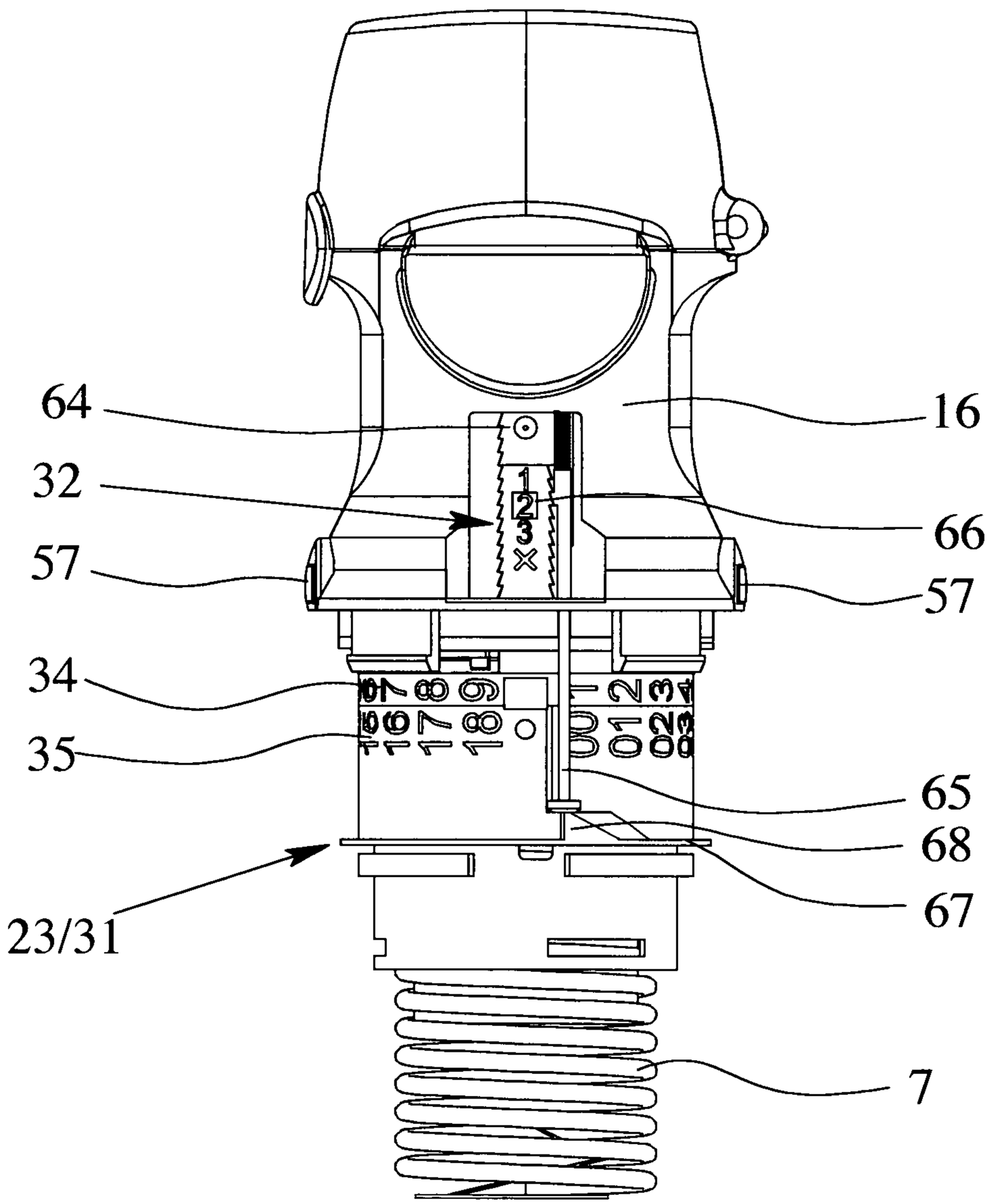


Fig. 27b

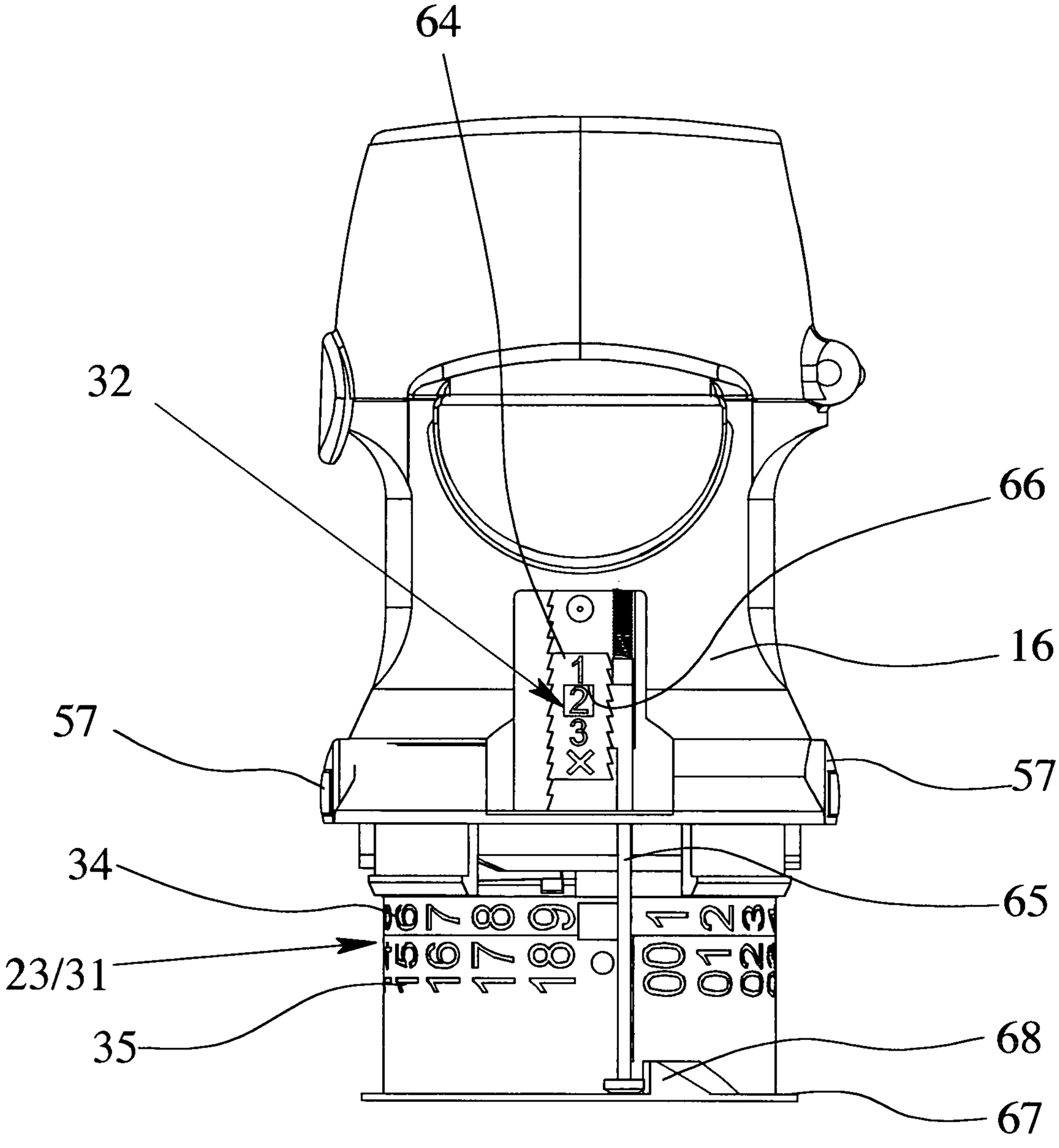


Fig. 27c

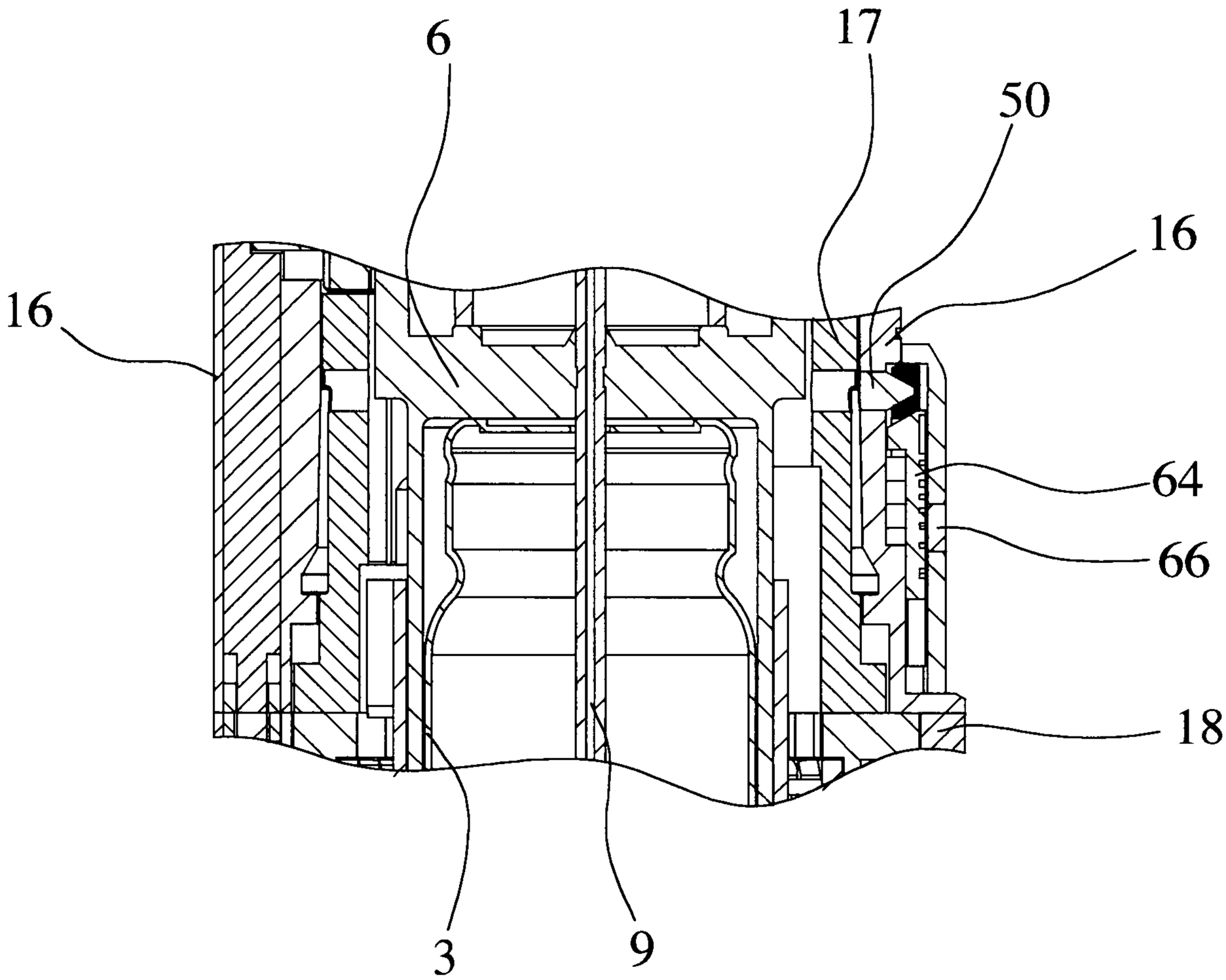


Fig. 28a

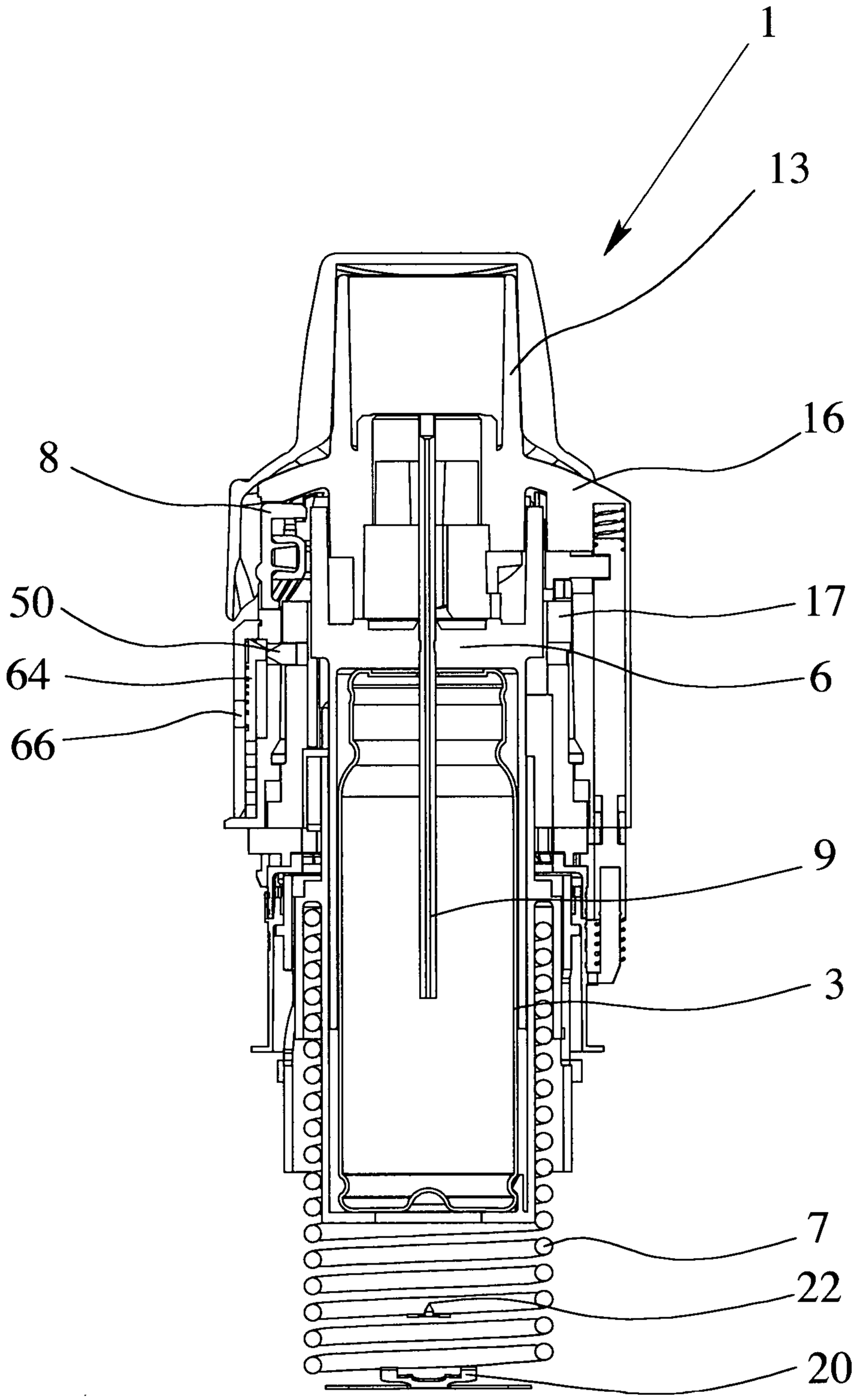


Fig. 28b

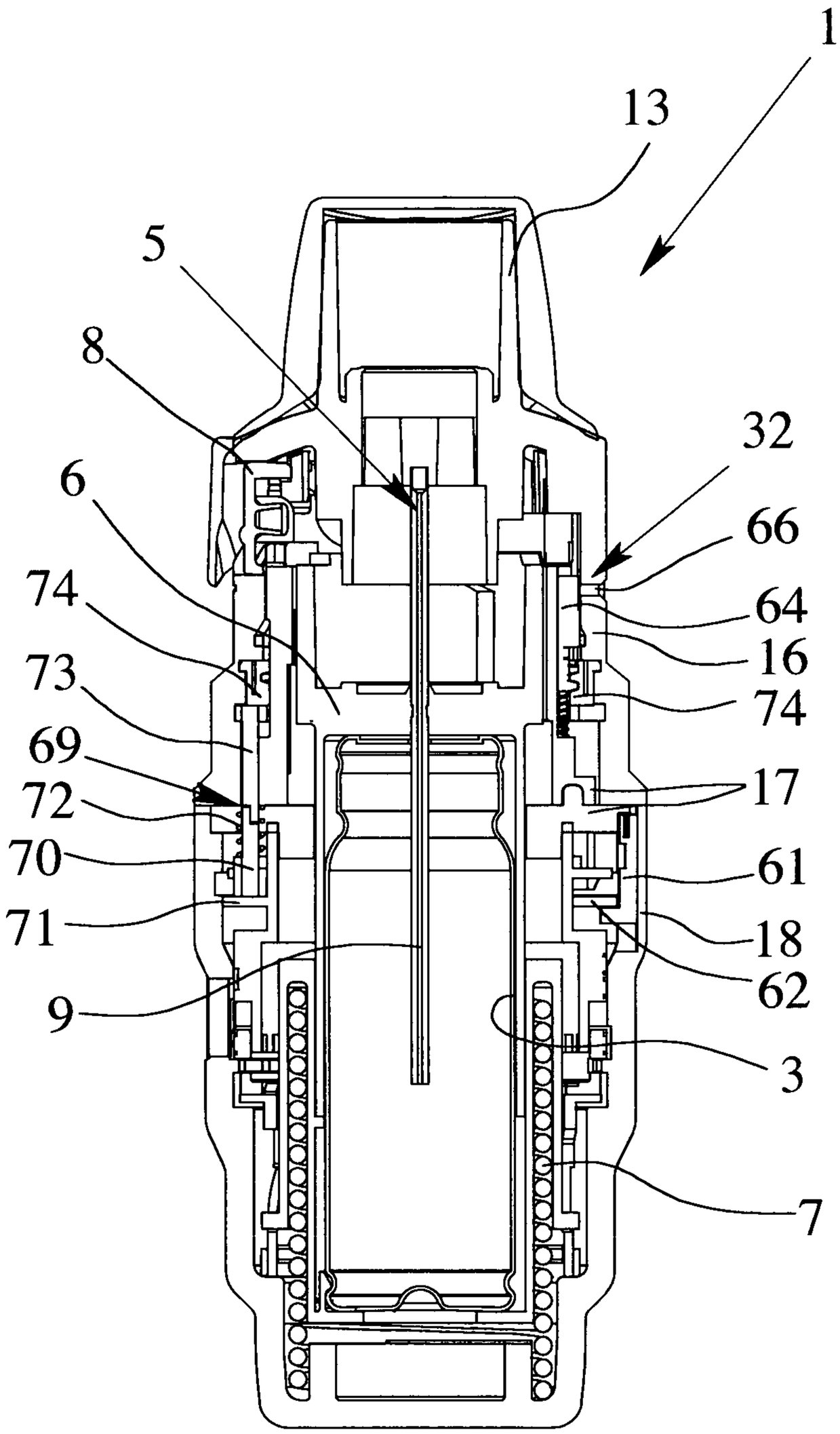


Fig. 29

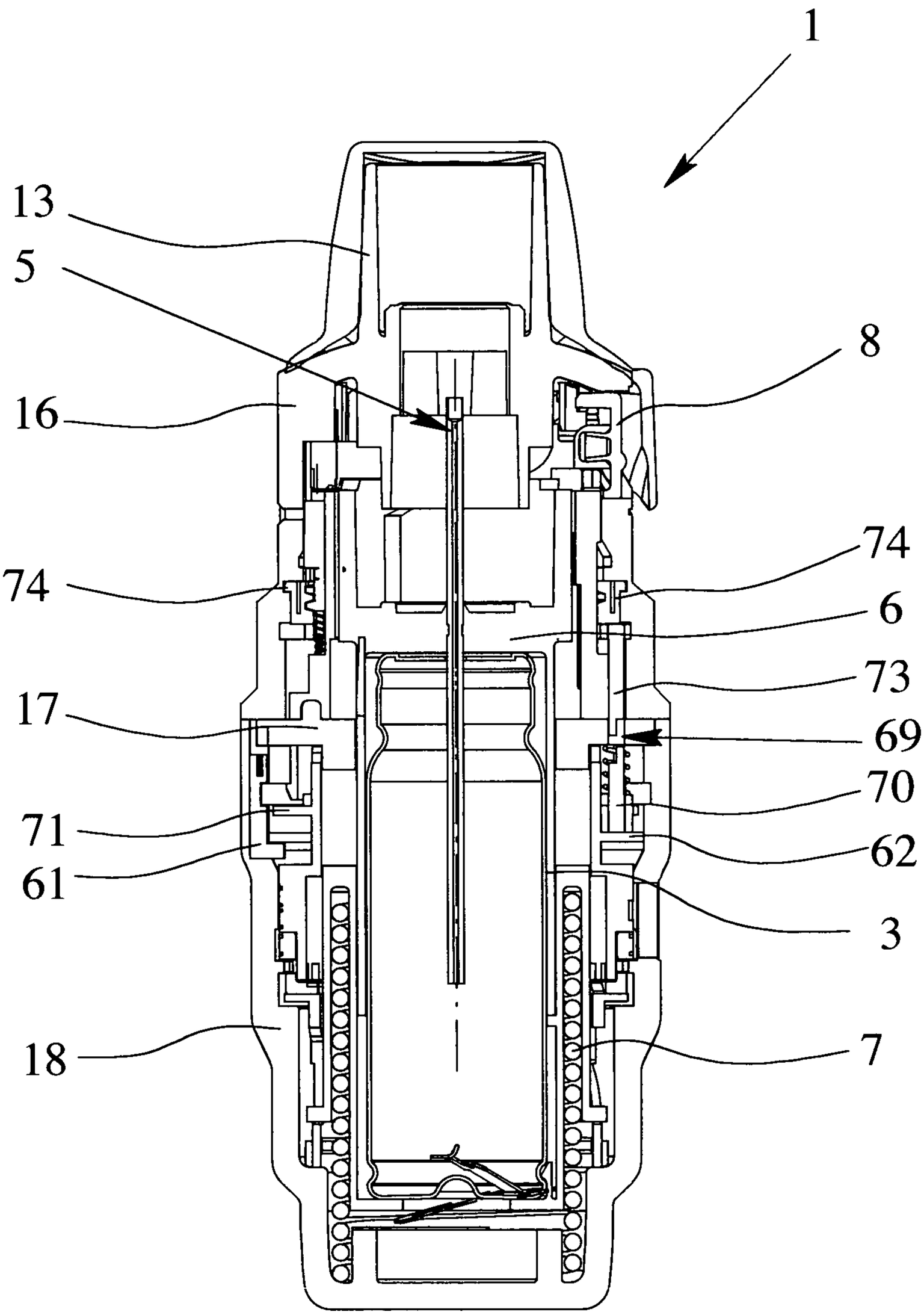


Fig. 30

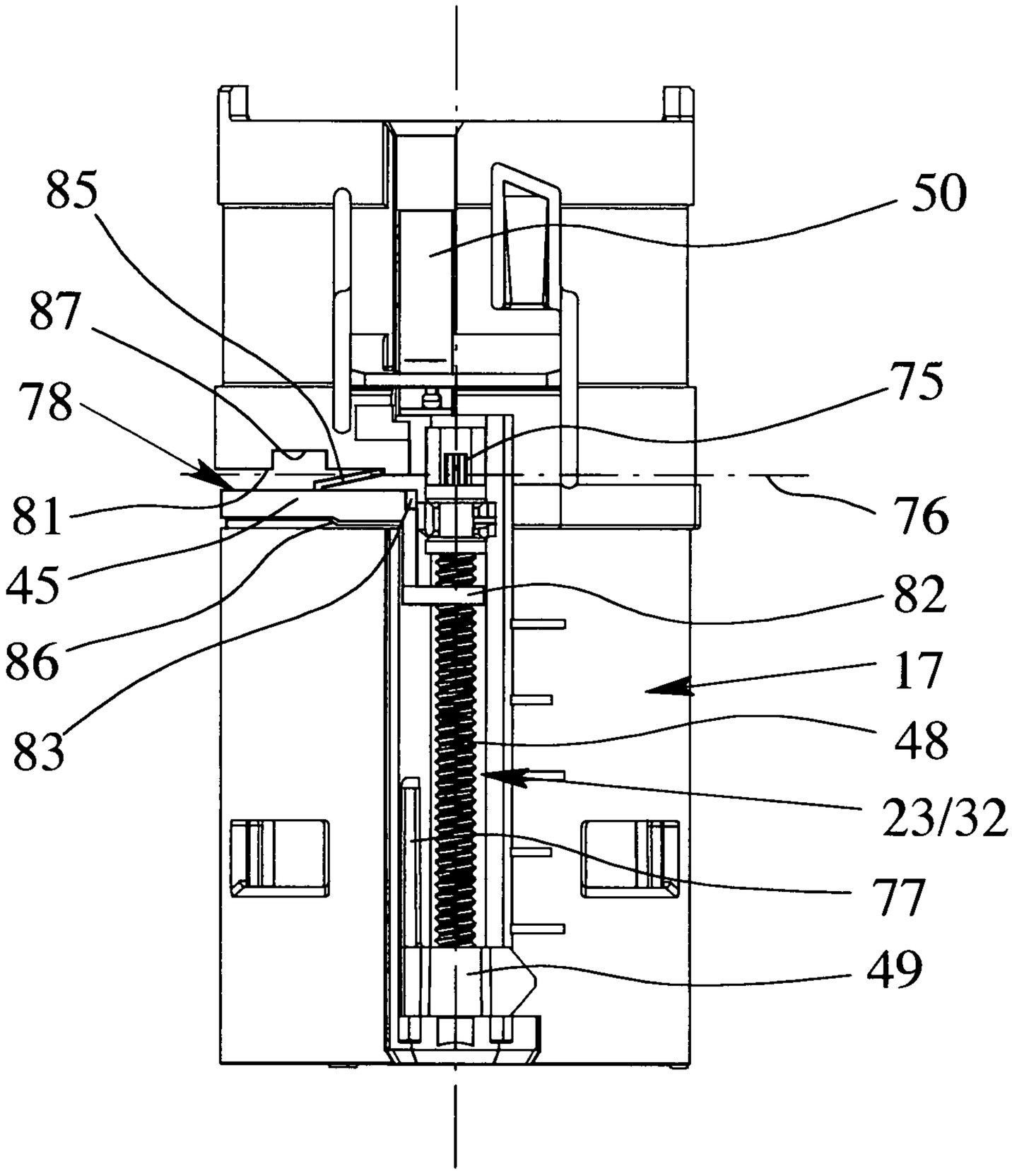


Fig. 31

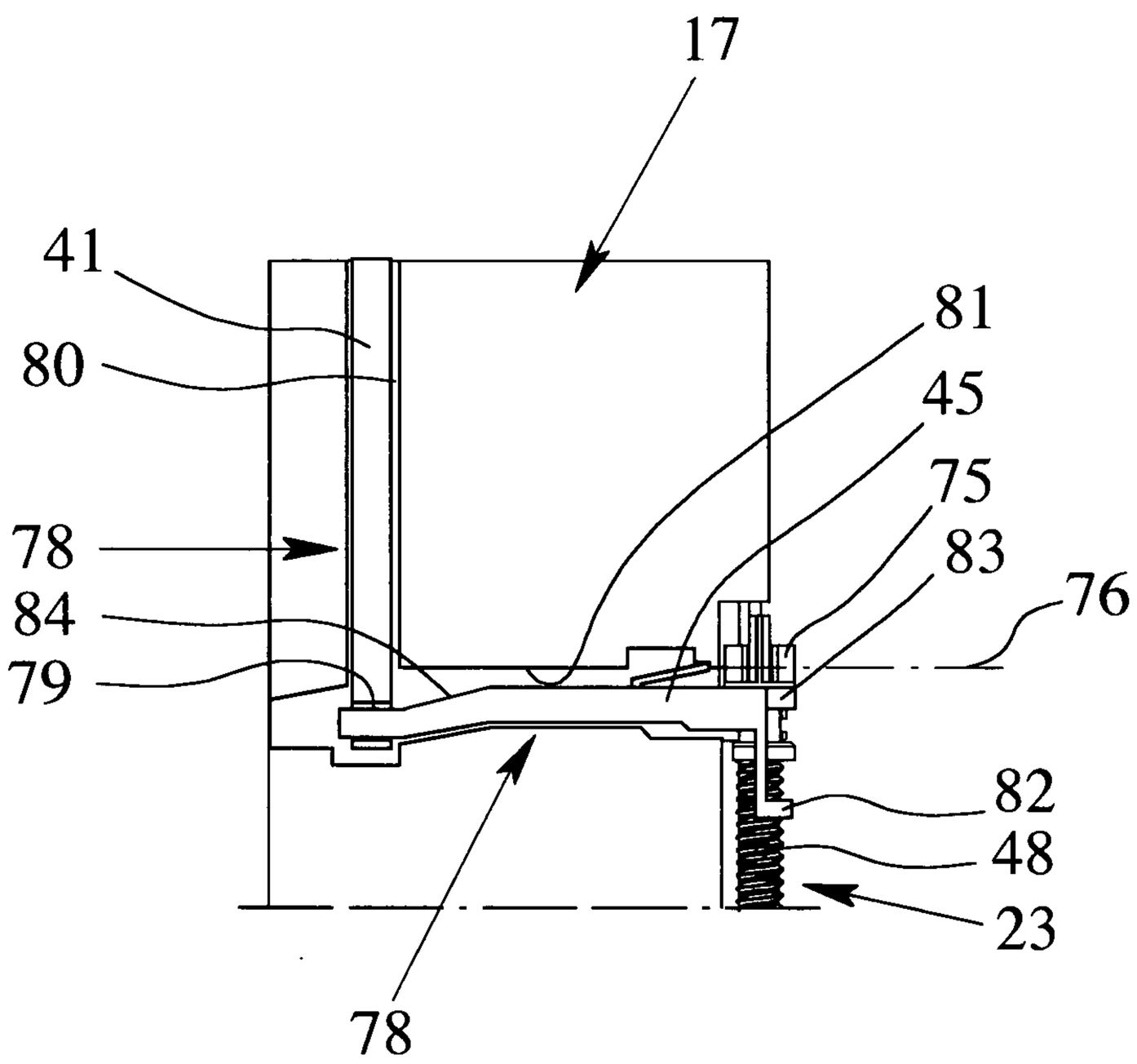


Fig. 32

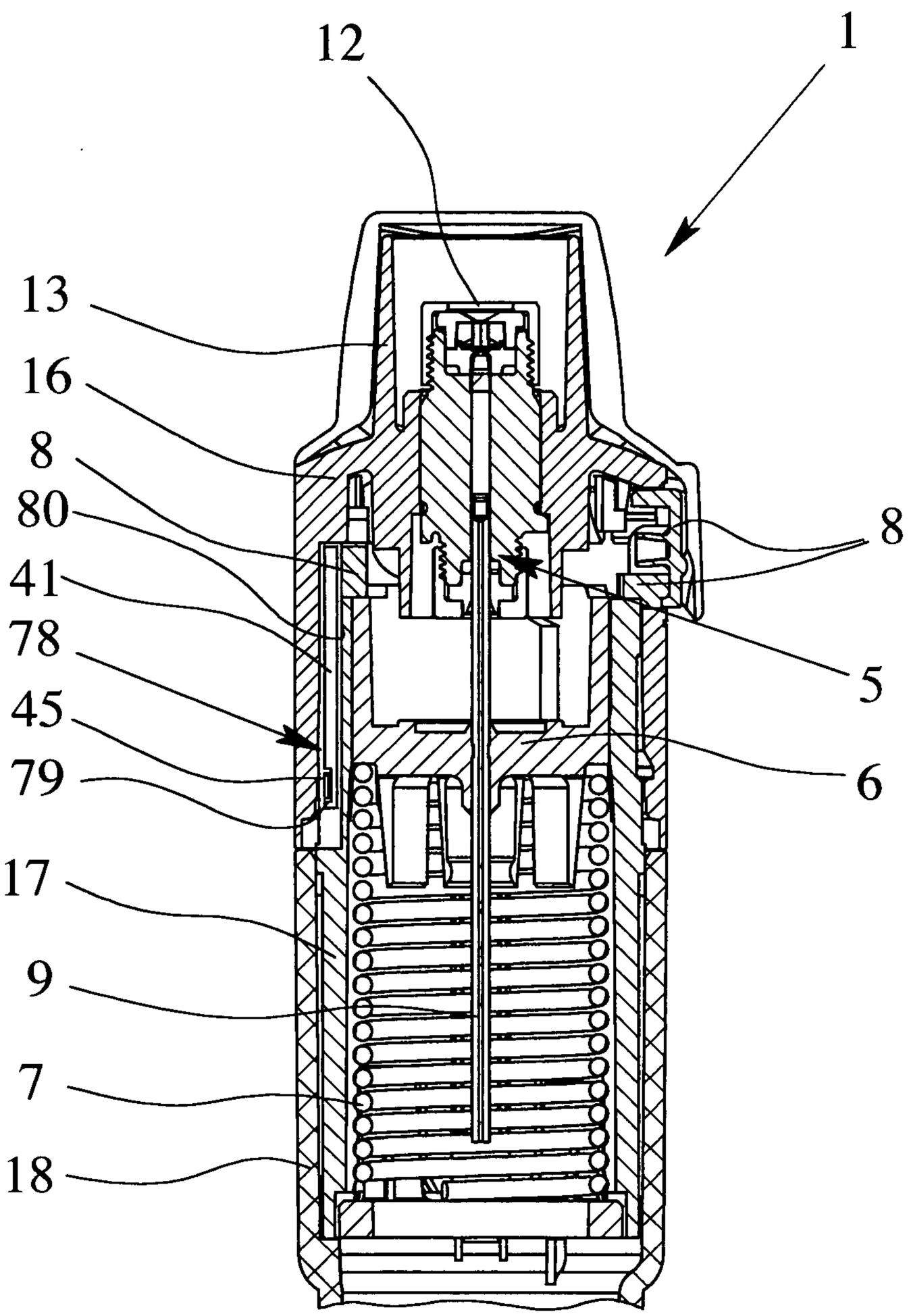
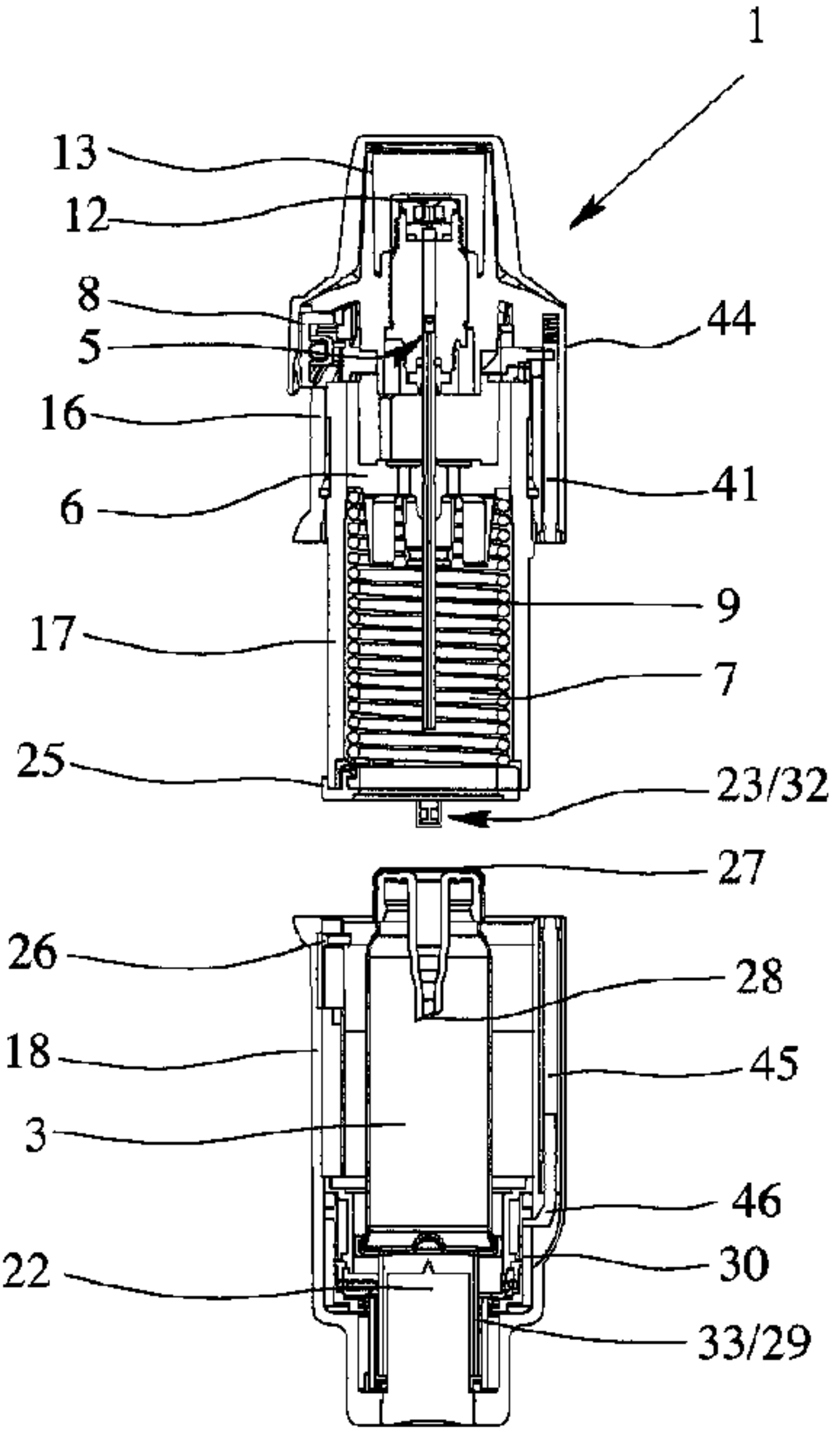


Fig. 33


1
13
12
8
5
16
6
44
41
9
17
7
25
23/32
27
26
28
18
45
3
46
22
30
33/29