



(72) HENNEMANN, PASCAL, FR

(72) LEULIET, DAVID, FR

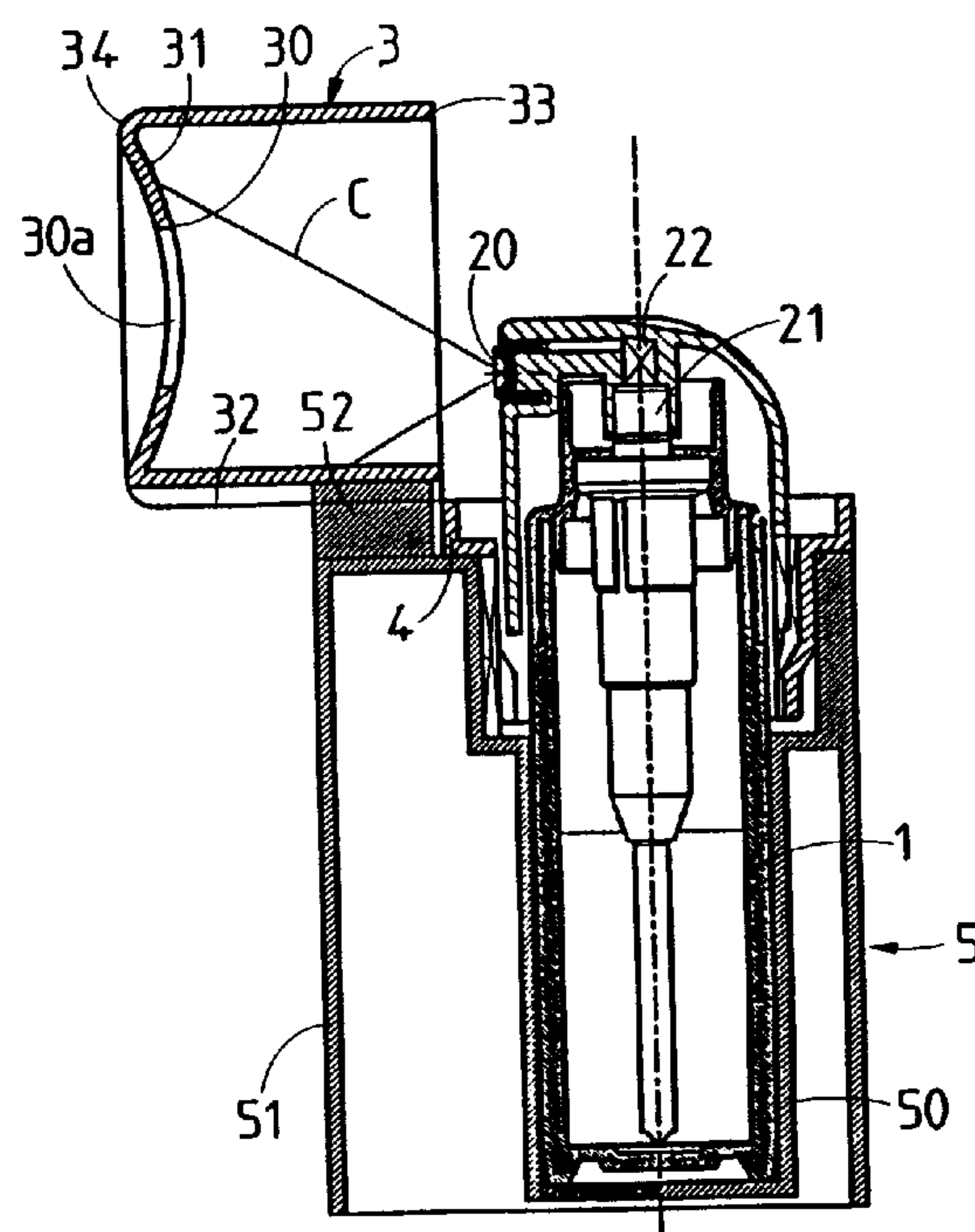
(71) REXAM SOFAB, FR

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(54) **DISPOSITIF POUR LE CONDITIONNEMENT ET LE DOSAGE
D'UN LIQUIDE DE TRAITEMENT OPHTALMIQUE**

(54) **DEVICE FOR PACKAGING AND DOSING A LIQUID FOR
OPHTHALMIC TREATMENT**



(57) L'invention concerne un dispositif pour le conditionnement et le dosage d'un liquide de traitement ophtalmique du type comprenant notamment un réservoir (1) équipé d'une pompe (2) et d'une buse (20) produisant un cône (C) de liquide pulvérisé, caractérisé en ce qu'il comprend en outre, une lunette (3) destinée à être appliquée sur l'oeil à traiter et qui est obturée partiellement par un diaphragme (30) susceptible d'être disposé en travers du cône (C) de liquide pulvérisé.

(57) The invention concerns a device for packaging and dosing a liquid for ophthalmic treatment comprising in particular a reservoir (1) equipped with a pump (2) and a nozzle (20) producing a cone (C) of liquid spray characterised in that it further comprises, an eye-piece (3) to be applied on the eye to be treated and which is partially shut by a diaphragm (30) capable of being arranged through the cone (C) of liquid spray.

DEVICE FOR PACKAGING AND DOSING A LIQUID FOR OPHTHALMIC TREATMENT

A B S T R A C T

The invention provides a device for packaging and measuring out ophthalmic treatment liquid, the device being of the type comprising a container (1) fitted with a pump (2) and a nozzle (20) to produce a cone (C) of sprayed liquid, and being characterized in that it further comprises an eyepiece (3) to be applied against the eye to be treated and which is partially closed by a diaphragm (30) suitable for being placed across the cone (C) of sprayed liquid.

Figure 4

DEVICE FOR PACKAGING AND DOSING A LIQUID FOR OPHTHALMIC TREATMENT.

The present invention relates to a device for packaging and measuring out a liquid for ophthalmic treatment.

5 The devices traditionally used for ophthalmic treatment are generally constituted by a container fitted with a simple pipette for extracting an eye lotion manually in the form of drops and applying them on the eye that is to be treated.

10 In use, such devices present technical problems, since it is difficult and uncomfortable for the patient to tilt back the head while simultaneously causing drops of lotion to flow onto the eye from the pipette.

15 In addition, the volume of a drop is determined by physical laws, and as a result it always lies in the range 25 microliters to 50 microliters (which corresponds to a diameter lying in the range 1.81 mm to 2.28 mm) and it is not possible to fraction such a drop for the purpose of delivering a smaller dose.

20 Devices such as the one described in FR-A-2 207 729 or US-A-4 052,985 exist which comprise a bottle joined in its upper part to a cupel designed to be applied against the eye to be treated so as to canalize the sprayed liquid and/or protect the eye by being provided with a translucent zone and/or a deflector arranged at a small distance from the internal partition of said cupel.

25 However, in US-A-4 052 985, the jet of sprayed ophthalmic solution is diverted and divided and does not reach the cornea directly whereas in FR-A-2 207 729, the ophthalmic solution is not measured out by the cupel.

An object of the present invention is to solve the technical problems associated with the prior art by using a spray for ophthalmic liquid.

30 According to the invention, this object is achieved by means of a device for packaging and measuring out ophthalmic treatment liquid, the device being of the type comprising a container fitted with a pump and a nozzle to produce a cone of sprayed liquid and an eyepiece to be applied against the eye to be treated, the device being characterized in that said

1a

Corrected Sheet

eyepiece may partially be closed by a diaphragm having a central opening of constant area suitable for being placed across the cone of sprayed liquid.

According to an advantageous characteristic, said eyepiece is
5 hinged by means of a hinge whose position is fixed relative to the nozzle.

Preferably, said hinge is organized in such a manner that the eyepiece can tilt between a rest position in which it covers the container to form a cap therefor, and a treatment position in which it extends laterally to form an aiming piece with the diaphragm extending across the
10 cone of sprayed liquid.

which it covers the container to form a cap therefor, and a treatment position in which it extends laterally to form an aiming piece with the diaphragm extending across the cone of sprayed liquid.

5 According to another characteristic, the outline of the opening in the diaphragm is elliptical and the dimensions of the opening are smaller than or equal to the dimensions of the eye to be treated.

10 Also, the diaphragm is formed in an internal partition of curvilinear profile forming part of the eyepiece.

In a particular embodiment, the container is removably received in a housing carrying the eyepiece.

15 Preferably, the cross-section of the eyepiece is identical to that of the housing, and the proximal edge of the eyepiece is of a profile that matches the top edge of the housing so as to make it possible for them to be joined together contiguously.

20 Still with this embodiment, the housing includes a holding element for securing the eyepiece to maintain the diaphragm across the cone of sprayed liquid, and where appropriate, it possesses a lateral column carrying the eyepiece.

25 According to yet another characteristic, the distal edge of the eyepiece includes a peripheral rib designed to bear against the periphery of the eye to be treated.

Also, said eyepiece includes locking means for locking it onto the container.

30 The device of the invention makes it possible to use finer doses of eye lotion since the dimensions of the droplets in a jet of sprayed liquid lie in the range 10 micrometers to 150 micrometers, i.e. 1/200th to 1/20th the dimensions of a drop.

35 In addition, the unit volume of liquid sprayed by a short press on the pump can be as little as 2 microliters, which corresponds to a dose whose volume is one-tenth of a drop.

The diaphragm also makes it possible to adjust dosage by allowing only a fraction of the sprayed volume to reach the eye.

5 The device of the invention also makes it possible for use to be comfortable since there is no longer any need to place the eye in a horizontal plane or to aim at the eye so as to allow drops to fall thereon.

The embodiment with the housing containing a removable container makes it possible, where appropriate,
10 to produce a rechargeable device.

Where appropriate, the device, and in particular the eyepiece, can be made using a plastics material that contains a bactericide.

The invention will be better understood on reading
15 the following description accompanied by the drawings, in which:

- Figure 1 is a perspective view of an embodiment of the device of the invention in its in-use position for performing treatment;

20

- Figure 2 is a perspective view of the Figure 1 embodiment with the eyepiece in its rest position;

- Figure 3 is a longitudinal section view of the embodiment of Figures 1 and 2 in the rest position;

25

- Figure 4 is a longitudinal section view of the embodiment of Figures 1 and 2 in its in-use position for performing treatment; and

- Figure 5 is a plan view of the device of the preceding figures in its rest position.

30 The device shown in Figures 1 and 2 is designed to package and measure out an eye lotion for performing ophthalmic treatment by applying the lotion to the surface of the eye.

The device comprises a sealed container 1 containing the eye lotion.

35 The container 1 is fitted with a pump 2, of which only the top portion is visible in Figure 1. The pump 2 is provided in particular with a spray nozzle 20

For treatment purposes, the eyepiece 3 together with its diaphragm 30 is placed to extend across the jet of eye lotion as defined by a cone C of sprayed liquid. The cone C produced by the nozzle 20 when the pump 2 is operated thus encounters the convex face of the partition 31.

5 Under such conditions, only a fraction of the jet of sprayed liquid passes through the opening 30a in the diaphragm 30 towards the eye, while the remaining fraction is stopped by the solid partition.

The distance between the nozzle 20 and the opening 30a and the area of said opening thus determine the amount or "dose" of eye lotion
10 that is actually applied to the eye.

The distance between the nozzle 20 and the diaphragm 30 depends on the position of the eyepiece 3.

To facilitate positioning and thus guarantee that the doses delivered are regular and accurate, the invention provides for the
15 eyepiece 3 to be hinged via a hinge 4 whose position is fixed relative to the nozzle 20.

By way of example, the hinge 4 may have a snap-action adapted and organized so that the eyepiece 3 can tilt between a rest position (Figures 2 and 3) where it covers the container 1 forming a lid or cap
20 therefor, and a treatment position (Figures 1 and 4) where it extends to one side and constitutes aiming means.

In this position, the diaphragm 30 extends across and preferably inside the spray cone C.

In the embodiment shown in the figures, the container 1 is housed,
25 optionally removably, in a compartment 50 formed inside a housing 5 carrying the hinge 4 and the eyepiece 3.

In this case the cross-section of the eyepiece 3 is identical to that of the housing 5 so that in the rest position (Figures 2 and 3) they co-operate to form an almost perfect cylinder. To this end, the proximal edge
30 33 of the eyepiece 3 situated on the same side as the nozzle 20 has its profile adapted to match the top edge of the housing 5, thereby providing a contiguous join with the housing.

The proximal edge 33 is also provided with means for locking the eyepiece 3 in its rest position. By way of example, these locking means
35 may be constituted by a tongue or a stud

By way of example, the hinge 4 may have a snap-action adapted and organized so that the eyepiece 3 can tilt between a rest position (Figures 2 and 3) where it covers the container 1 forming a lid or cap therefor, and
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15 position (Figures 2 and 3) they co-operate to form an almost perfect cylinder. To this end, the proximal edge 33 of the eyepiece 3 situated on the same side as the nozzle 20 has its profile adapted to match the top edge of the housing 5, thereby providing a contiguous join
20 with the housing.

The proximal edge 33 is also provided with means for locking the eyepiece 3 in its rest position. By way of example, these locking means may be constituted by a tongue or a stud 35 designed to snap reversibly into a
25 corresponding cavity formed in the top face of the housing 5.

The distal edge of the eyepiece 3 which is situated facing away from the nozzle 20 is provided with a projecting rib 34 designed to press around the eye or the
30 eye socket during treatment.

The housing 5 possesses an external lateral column 51 carrying firstly the hinge 4 and consequently the eyepiece 3, and secondly a holding element for holding the eyepiece 3 securely in its lateral, treatment
35 position.

This holding element is preferably implemented in the form of a rib 52 extending across the top face of the

column 51 parallel to the axis of the nozzle 20. The rib 52 is designed to engage in a groove 32 of complementary shape formed in the facing wall of the eyepiece 3 when said eyepiece is in the treatment position.

THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. A device for packaging and measuring out ophthalmic treatment liquid, the device comprising a container (1) fitted with a pump (2), a nozzle (20) to produce a cone (C) of sprayed liquid and an eyepiece (3) to be applied against the eye to be treated, the device being characterized in that said eyepiece may partially be closed by a diaphragm (30) having a central opening (30a) suitable for being placed across the cone (C) of sprayed liquid.
2. A device according to claim 1, characterized in that said eyepiece is hinged by means of a hinge (4) whose position is fixed relative to the nozzle (20).
3. A device according to claim 2, characterized in that said hinge (4) is organized in such a manner that the eyepiece (3) can tilt between a rest position in which it covers the container (1) to form a cap therefor, and a treatment position in which it extends laterally to form an aiming piece with the diaphragm (30) extending across the cone (C) of sprayed liquid.
4. A device according to one of the preceding claims, characterized in that the outline of the opening (30a) in the diaphragm (30) is elliptical and the dimensions of the opening are smaller than or equal to the dimensions of the eye to be treated.
5. A device according to one of the preceding claims, characterized in that the diaphragm (30) is formed in an internal partition (31) of curvilinear profile forming part of the eyepiece (3).
6. A device according to one of the preceding claims, characterized in that the container (1) is removably received in a housing (5) carrying the eyepiece (3).
7. A device according to claim 6, characterized in that the cross-section of the eyepiece (3) is identical to that of the housing (5).
8. A device according to claim 7, characterized in that the proximal edge (33) of the eyepiece (3) is of a profile that matches the top edge of the housing (5) so as to make it possible for them to be joined together contiguously.
9. A device according to one of claims 6 to 8, characterized in that the housing (5) includes a holding element (52) for securing the eyepiece

(3) to maintain the diaphragm (30) across the cone (C) of sprayed liquid.

10. A device according to one of claims 6 to 9, characterized in that the housing (5) possesses a lateral column (51) carrying the eyepiece (3).

5 11. A device according to one of the preceding claims, characterized in that the distal edge of the eyepiece (3) includes a peripheral rib (34) designed to bear against the periphery of the eye to be treated.

10 12. A device according to one of the preceding claims, characterized in that said eyepiece (3) includes locking means for locking it onto the container (1).

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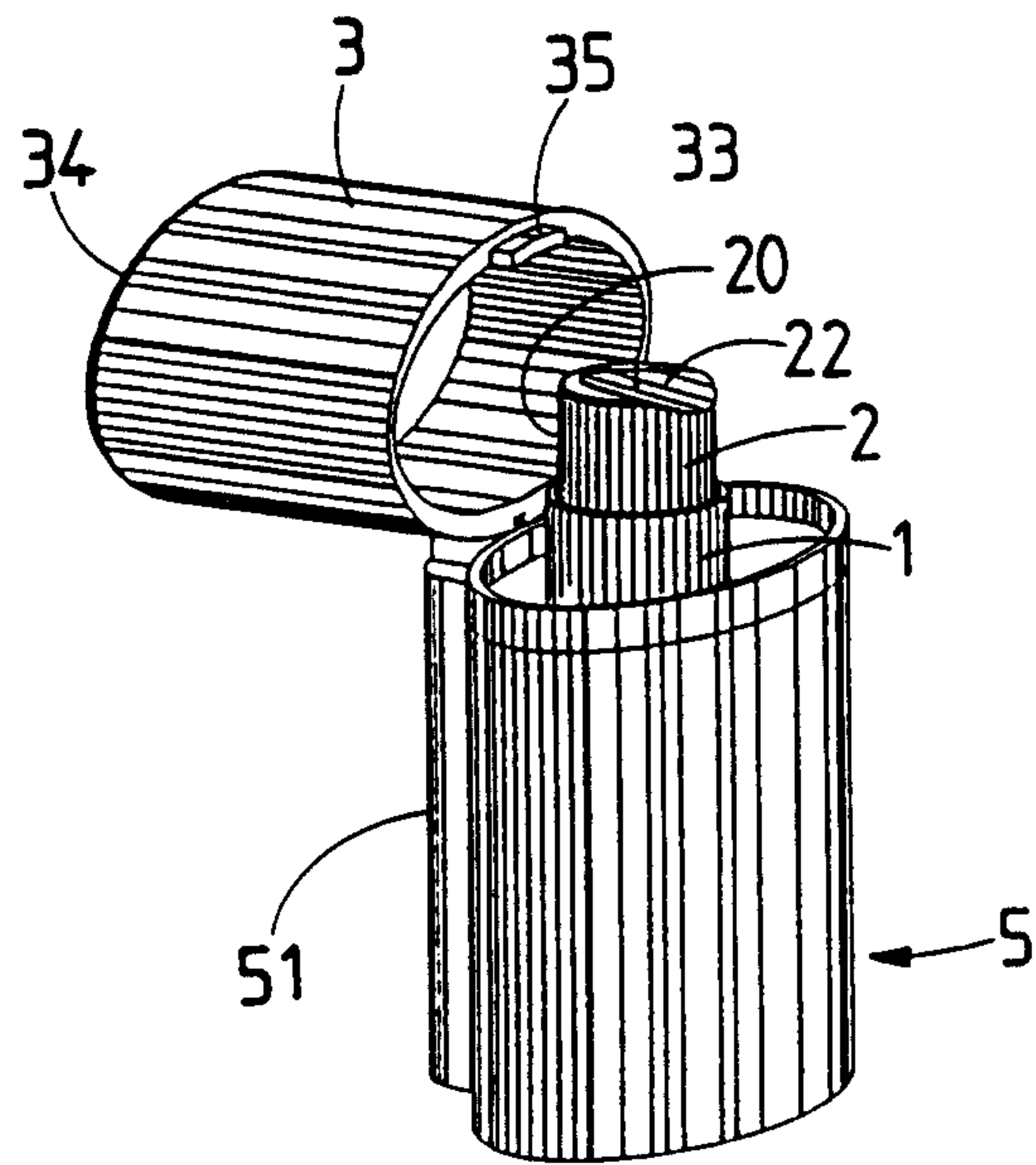


FIG.1

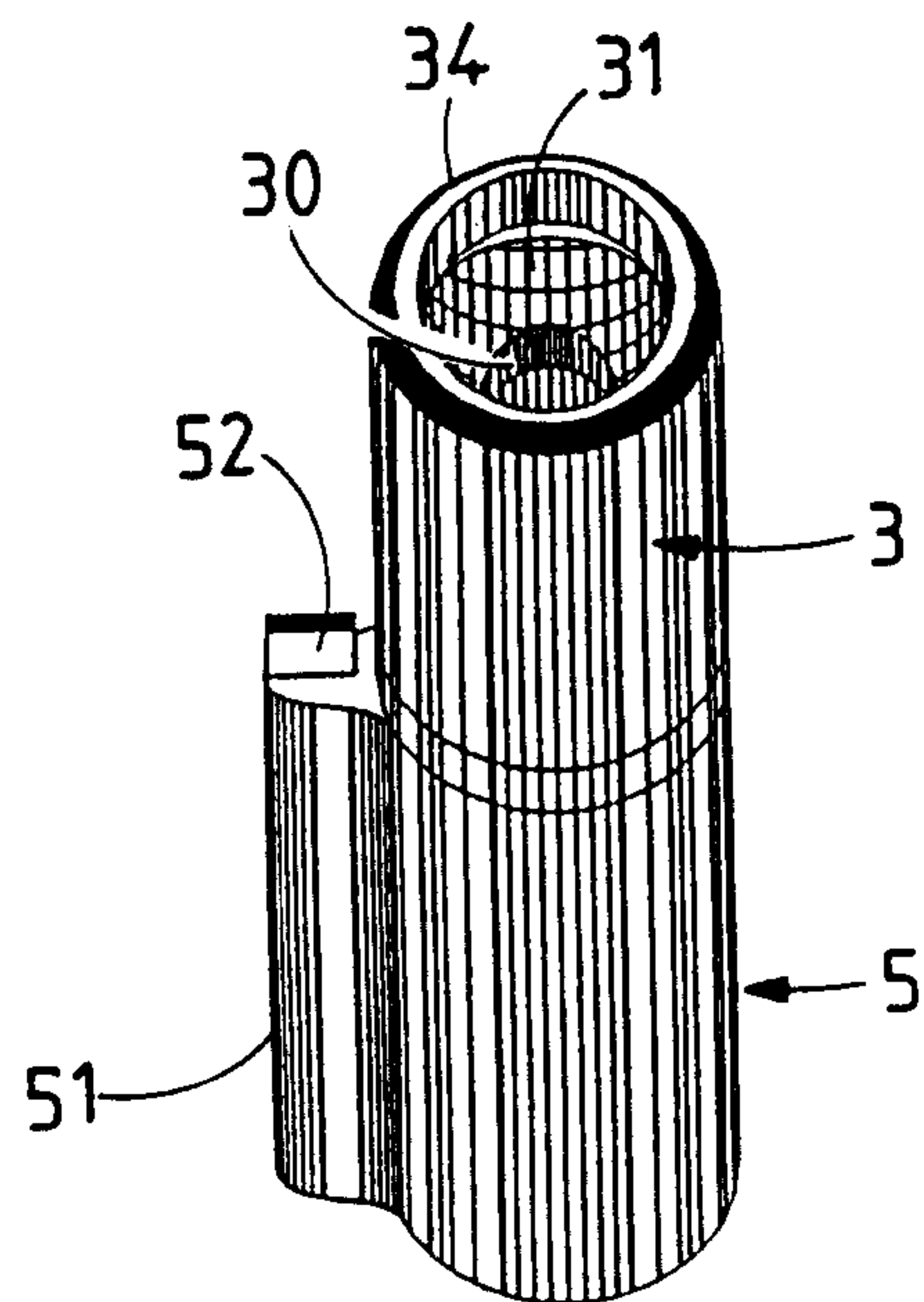


FIG.2

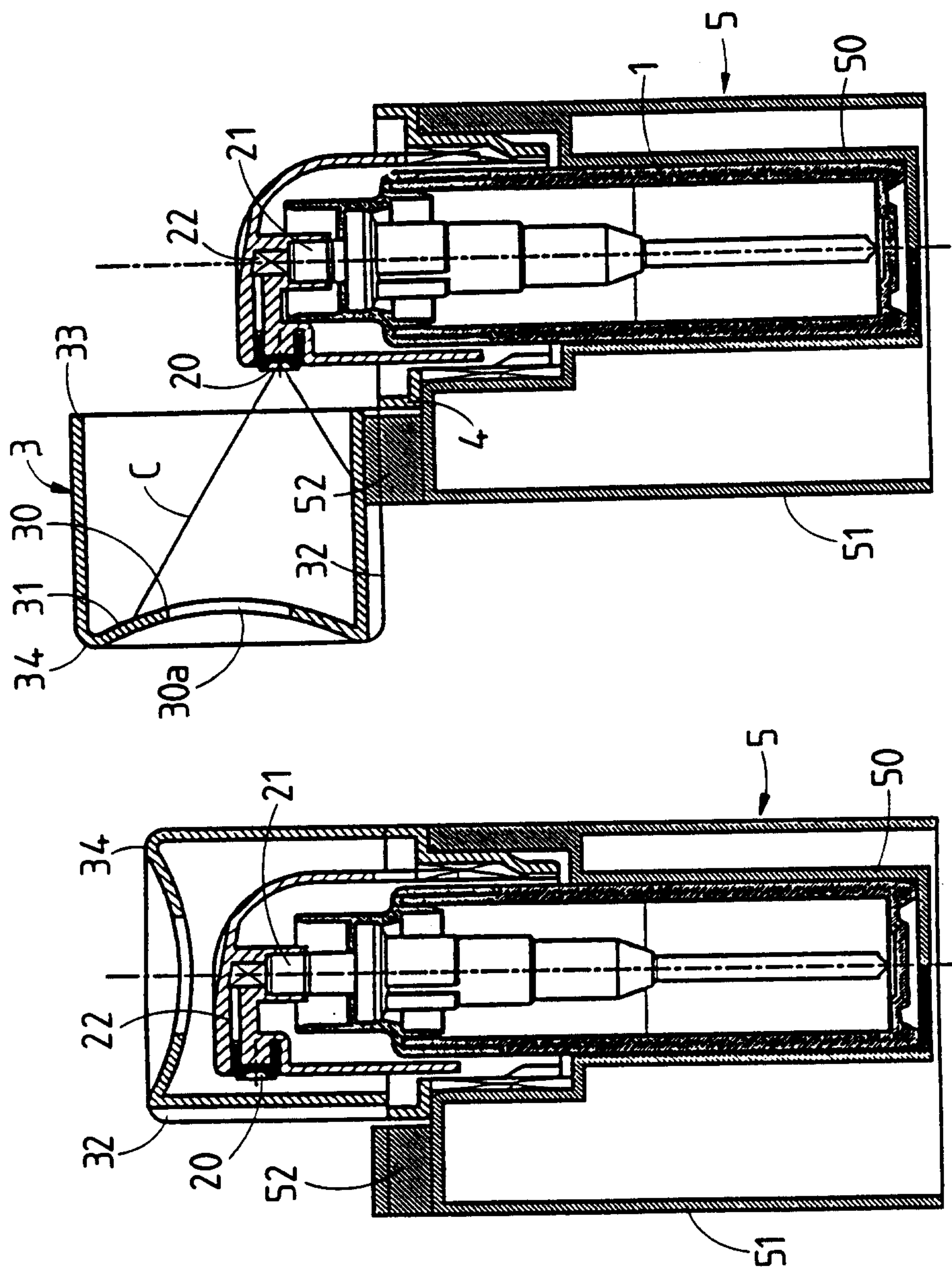


FIG. 3

FIG. 4

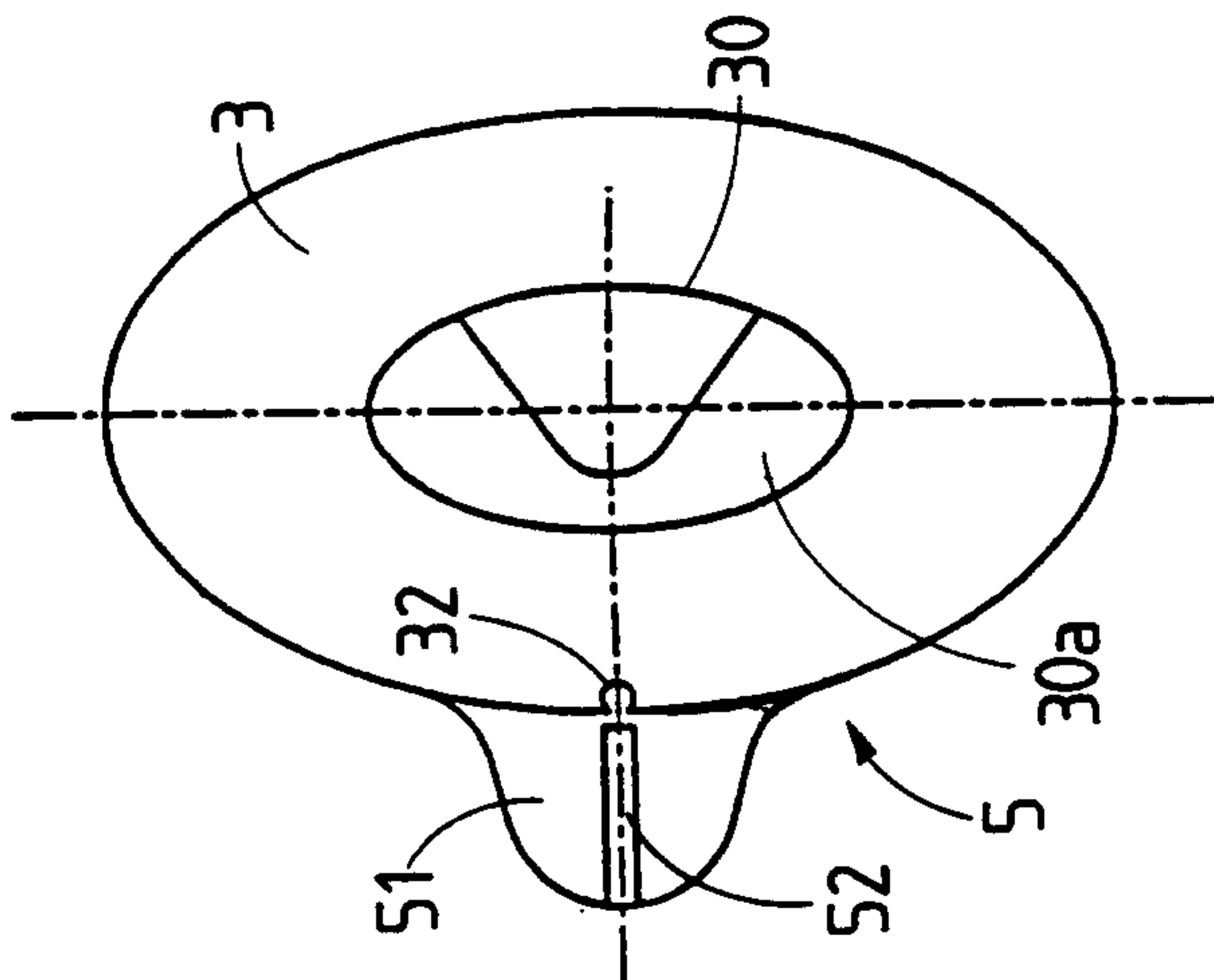


FIG. 5