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(54) CAPPED AEROSOL CONTAINER

(57) There is provided an aerosol container for automatic gas release by an easy action at the time of disposal. The aerosol container having a container body and a cap; said container body comprising an upstanding discharge head;

said cap comprising a peripheral wall and a top wall and being adapted to fit on an upper part of the container body, a portion of the peripheral wall or the top wall defining a folding plate surrounded by a breaking line and a bendable line such that the folding plate may be bent inwardly about the bendable line after breakage of the breaking line, the cap also comprising a stopper for fixing the folding plate into an inwardly bent position such that when the discharge head is depressed for gas release, the folding plate fixed in the inwardly bent position contacts with a top of the discharge head for maintaining a depressed position thereof,

wherein the cap is so configured that an aperture (15) formed by bending the folding plate (17) inwardly acts as a gas release hole and also a finger receiving hole, a size of which is sufficiently great to receive a finger of an user, such that the folding plate (17) is capable of being fixed to the stopper (21) by pushing with the finger for breakage of breaking line (19), and then inserting the same finger further into the aperture (15).

Fig. 1

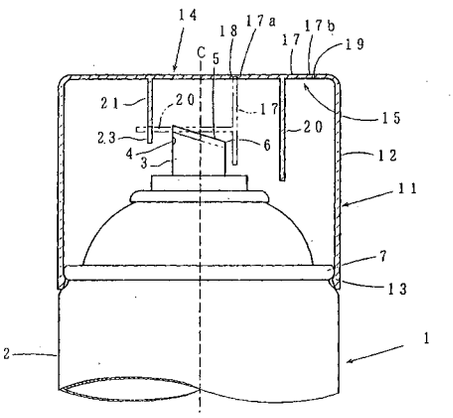
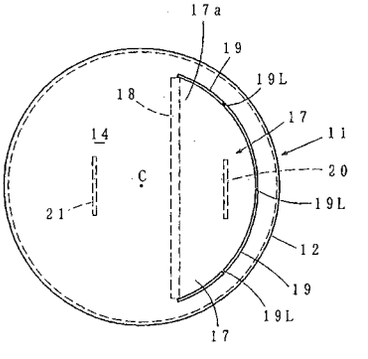


Fig. 2



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Description

Technical Fields

[0001] The present invention relates to an aerosol container with a cap or cover, particularly a container for facilitating safe and easy release of a pressurized gas contained in such an aerosol container for discharging the same.

Background

[0002] In a prior art, an aerosol container is widely used for discharging various kind of agent such as a paint, a cleaner, a hair-conditioner, an aromatic, and an insecticide. Such a container is used for not only an effective ingredient of the paint etc., but also a pressurized gas or an evaporable solvent for discharging the ingredient as a mist out of the container. These pressurized gas and the evaporated solvent may still remain in the container after the container is discarded as an out-of-use or unnecessary article. The container with its content remaining therein should not be burned to discard, since it may be exploded. Moreover, the above-mentioned ingredient may be harmful to human body. Accordingly, it is desirable that the contents such as the gas are released before the container is discarded.

[0003] When the used out or unnecessary container is discarded, several methods are taken for releasing the gas or effective ingredient in the prior art. One of the method is to bore a hole on a body of the container by using a nail, drill, etc., by hand. The other one is to use a special boring device for making a perforation from which the gas or the ingredient is discharged. However, the former method may cause a problem in view of safety or sanitation, since the discharged content such as the gas may fall on a person who execute the boring operation. It may also causes an another problem that contents such paint may be discharged together with the gas and soil the person or the place therearound. On the other hand, the latter method is not suitable for a personal or a home use, since it needs a place or cost for installing the device.

[0004] In view of the above problem, the following aerosol containers and cap assembly having gas release means are proposed.

[0005] Japanese Patent Application Laid Open 10 (1998)-53289 (which is referred to as document 1) discloses an aerosol container shown in Fig. 18(A) comprising a container body 103 with a mounting cup 104 from which a rod-shaped discharge head 102 is standing upwardly, and a cap 101 with a top wall having a fitting recess 105 which is contoured to be generally complementary to the container body's profile from the mounting cup to the rod-shaped discharge head, such that the cap is reversed to fit the periphery of the fitting recess 105 on the outer circumference of the mounting cup as shown in Fig. 18(B) such that the rod-shaped discharge head (102) is depressed by striking against the fitting recess so as to release gas outside through a gas release hole (106) formed at a portion of the fitting recess (105).

[0006] Japanese Utility Model Registration No. 3,056,237 (which is referred to as document 2) proposes an aerosol container shown in Fig. 19 comprising a cap with a slant top wall, a portion of the top wall is formed into a push button 110 by cutting its perimeter except for its lower side 110a such that the button is elastically bendable at the lower side so as to depress a discharge head 111 by its lower surface.

[0007] Japanese Patent Laid-Open No.11 (1999)-70986 (which is referred to as document 3) proposes a tilt-type aerosol container comprising a discharge head standing from the container body and being capable of tilting forward for discharging contents, and a cap for fitting on an upper portion of the container. Said cap has a rear wall, a portion of which is cut at its upper and lower margins to form an elastic band therebetween which is adapted to turnover inwardly against its elasticity so as to tilt the discharge head forwardly due to the turnover of the elastic band.

[0008] Japanese Patent Laid Open No. 2001-19067 (which is referred to as document 4) proposes an aerosol container comprising a cap with a top wall, a center portion of which is formed into a convex portion protruding upward, while a depression piece is protruding downwards from the convex portion, such that the discharge head is depressed by means of the depression piece by turning over the convex portion.

[0009] However, the container in document 1 is apt to be dirty since its fitting recess is easily soiled with dust. In the document 2, it is necessary to keep on depressing the push button for continuous discharge. And also the method according to the document 3 is only applied to the container with a tilt type discharge head. Furthermore, in the document 4, the gas release may start or stop unintentionally when the elastic band contacts with something else to elastically turn over from or to an inverted position in normal use or upon gas-releasing.

[0010] To solve these problem, the present applicant proposed an aerosol container with a cap, a portion of its top wall being formed into a folding plate which is capable of bending inwardly to open a gas-release aperture, such that the folding plate is fixed within the cap to maintain the depression state of the discharge head (Japanese Patent Laid Open 2000-191062).

[0011] The present invention proposes an improvement or alteration of the previous container for providing a comfortable use.

Summery of the Invention

[0012] Primary purpose of the present invention is to provide an useful aerosol container with cap allowing to perform two operations continuously with the same finger. One of the operations is to open an aperture by fold-

ing a portion of the top wall or peripheral wall of the cap, and the other operation is to engage the folding plate defined by the portion with a stopper provided within the cap.

[0013] To achieve this purpose, the present invention provides an aerosol container having a cap;

said aerosol container comprising an upstanding discharge head;

said cap comprising a peripheral wall and a top wall and being adapted to fit on an upper part of the aerosol container, a portion of the peripheral wall or the top wall defining a folding plate surounded by a breaking line and a bendable line such that the folding plate may be bent inwardly about the bendable line after breakage of the breaking line, the cap also comprising a stopper for fixing the folding plate into an inwardly bent position such that when the discharge head is depressed for gas release, the folding plate fixed in the inwardly bent position contacts with a top of the discharge head for maintaining a depressed position thereof,

wherein the cap is so configured that an aperture formed by bending the folding plate inwardly acts as a gas release hole and also a finger receiving hole, a size of which is sufficiently great to receive a finger of an user, such that the folding plate is capable of being fixed to the stopper by pushing with the finger for breakage of breaking line, and then inserting the same finger further into the aperture.

[0014] Secondary purpose of the present invention is to prevent unintentional gas release and the interruption of the same by engaging the folding plate with the stopper to lock within the cap by an action of the finger inserted through the aperture.

[0015] To achieve this purpose, the present invention proposes to provide the above-mentioned aerosol container with a stopper depending from the inner side of the top wall of the cap for engaging with the folding plate, which is formed on the top wall or peripheral wall of the cap, or a depression plate protruding perpendicularly from the folding plate.

[0016] As another structure for locking the folding plate in a prescribed position, there is proposed an aerosol container having a pair of folding plates at the top wall of the cap, which are adapted to face each other. Said folding plates are provided at their respective undersides with first and second fitting means for providing mutual engagement when the folding plates are faced each other.

[0017] Third purpose of the present invention is to permit three operations, i.e. opening aperture by the bend of folding plate, depression of the discharge head, and locking the folding plates in a depressed state of the discharge head, as a continuous action. This purpose is achieved by bending folding plate from the top wall of the cap, letting the folding plate to ride over the corner of the discharge head, and keeping the depressed state of the discharge head.

[0018] Fourth purpose of the present invention is to provide a chamfer for facilitating the folding plate to ride over the corner of the discharge head on either of the comer or the free end of the folding plate.

[0019] The other purpose of the present invention will be apparent from the detail description of the invention.

Brief Explanation of the Drawings

[0020]

Fig. 1 is a vertical section of an aerosol container according to the first embodiment of the present invention.

Fig. 2 is a top plan view of the cap of the container shown in Fig. 1.

Fig. 3 is a perspective view of the cap of the container shown in Fig. 1.

Fig. 4 is an explanation view for a state gas releasing of the cap for the container shown in Fig. 1 is completed.

Fig. 5 is a vertical section of an aerosol container according to the second embodiment of the present invention.

Fig. 6 is a front view of the container shown in Fig. 5.

Fig. 7 is a horizontal section of the cap of the container shown in Fig. 5 for explaining a state of the use.

Fig. 8 is an enlarged view of the essential portion of the cap shown in Fig. 5.

Fig. 9 is a vertical section of the aerosol container according to the third embodiment of the present invention.

Fig. 10 is an enlarged view of the essential part of the cap of the container shown in Fig. 9.

Fig. 11 is a front view of the cap of the container shown in Fig. 9

Fig. 12 is a vertical section of the aerosol container according to the fourth embodiment of the present invention.

Fig. 13 is a top plane view of the cap of the container shown in Fig. 12.

Fig. 14 is a perspective view of the cap of the container shown in Fig. 12.

Fig. 15 is an explanation view for a state upon gas releasing of the cap for the container shown in Fig. 12.

Fig. 16 is an explanation view for a state gas releasing of the cap for the container shown in Fig. 12 is completed.

Fig. 17 is a modified embodiment of the container shown in Fig.12.

Fig. 18 shows a conventional aerosol container with a cap, wherein Fig. 18(A) is a vertical section thereof, and Fig. 18(B) is an explanation view of its state of use.

Fig. 19 shows another conventional aerosol container with a cap.

Mode of Carrying Out the Invention

[0021] Figs. 1 to 4 shown a first embodiment of the present invention. The aerosol container 1 according to the present invention consists of a container body 2 and a cap 11. Hereinafter the words "front and rear" and "left and right" are used only for describing mutual relations of the components of the container.

[0022] The container body 2 comprises a discharge head 3 with a nozzle 4 opened forward, which is provided at the top of a stem (not shown) extending from an upper wall of the container body 2 in an upwardly biased manner. The discharge head 3 is-adapted to discharge contents of the container by depressing it down against the upwardly biasing force. The top wall of the container body is connected to an outer circumferential wall at its perimeter formed as a winding end 7.

[0023] The cap 11 has a top wall 14 and a peripheral wall 12 depending from a perimeter of the top wall. Numeral 13 designates an engagement device such as an engagement rib provided at the lower edge of the peripheral wall 12, its engagement strength is sufficiently great to withstand against upwardly biasing force of the discharge head upon the depression thereof as described later. The cap may preferably be made of flexible material, especially flexible synthetic resin.

[0024] A portion of the top wall 14 is formed into a folding plate (or lid) 17 which is enclosed by a bendable line 18 such as thin-hinge and a breaking line (or a fragile line). After breakage of the breaking line, the folding plate 17 is adapted to bend at the bendable line 18 inwardly, so as to open an aperture 15 within the breaking line 19 and the bendable line 18. The aperture is so sized to serve not only as gas releasing hole but also finger receiving hole into which a finger of a user may be inserted. The shape of the aperture may vary to any preferable shape. In a preferable shown embodiment, the bendable line 18 is formed into a straight line and the breaking line 19 is shaped into an arc spaced away from the perimeter of the top wall 14 with a constant interval. The breaking line may be a slit in which a plurality of severable pieces 19L are provided at intervals. The breaking line may also be a thin-walled portion shaping into a line.

[0025] In this embodiment, the aperture 15 is located eccentrically deviating from a longitudinal axis (c) of the discharge head 3, rearward of the axis in the shown embodiment. as shown in Fig. 2. The bendable line 18 is formed between the front perimeter of the aperture closer to the longitudinal axis (c) and the front margin of the folding plate defining its fixed end 17a adjacent to the front perimeter. The folding plate 17 has a depression plate 20 which is depending from its under surface and broad in its width in sideways (left-and-right direction). Also, from an front half of the top wall 14 of the cap, there is depending a plate-like stopper (or an engagement plate) 21, which faces against the depression plate with the bendable line 18 and the longitudinal axis 20 of the discharge head interposing therebetween. As shown in the Fig. 3, an engagement projection 22 is provided at either one of the lower ends of the depression plate 20 and the stopper 21, while an engagement recess 23 is notched at the other, such that when the folding plate 17 is bent towards the interior of the cap, the engagement projection 22 is unremovably fixed at the engagement recess 23 fixing and thus locking the depression plate 20 to the stopper 21.

[0026] In the above-mentioned structure, the outside of the folding plate 17 is generally flush with that of the top wall 14 in an initial state shown in Figs. 1 and 3, such that the folding plates serves like a part of the top wall to close the aperture 15. Upon discarding the container, the user should remove the cap from the upper part of the container body 2, and depress the upper surface of the folding plate 17 from a state shown in Fig. 1. Then, the breaking line 19 is broken and the folding plate 17 turns about the bendable lien 18 to a second position where it depends inward of the cap, such that the folding plate 17 is fixed to the stopper 21 by cooperation of the engagement projection 22 and engagement recess 23. Upon recapping the cap to the container body 2, the depression plate 20 depresses the upper side 5 of the discharge head 3 and maintains the depression state, allowing gas-release. During gas-releasing, the folding plate 17 is located within the top wall 14 and peripheral wall 12 which retard an unfavorable contact of the folding plate with something else. Accordingly, unintentional interruption of the gas-release due to the contact is prevented, even though the user discards the aerosol container into the dust box in the middle of gas-releasing operation.

[0027] Hereinafter, other embodiments of the present invention are explained. For ease of description, the explanation on the component of the structure which is generally equal to that of the previous embodiment is omitted, using the same numeral instead.

[0028] Figs 5 to 8 shows a second embodiment of the present invention. In this embodiment, the aperture 15 and folding plate 17 for closing it are provided in the peripheral wall 12 of the cap.

[0029] The aperture 15 has left and right margins either one of which is connected to adjacent end, i.e. fixed end 17a of the folding plate 17 via a bendable line 18, as shown in Fig. 6, such that the folding plate may turn about the bendable line 18 along a horizontal plane. In a preferred shown embodiment, the folding plate is configured to a band elongated in left-and-right sideways, and the breaking line is formed along the perimeter of the folding plate except for its right margin formed into vertical bendable line. The lower margin of the folding plate 17 is at a level generally corresponding to that of the top of the discharge head 3 in its lowermost position as depicted with an imaginary line in Fig. 5.

[0030] The plate-shaped stopper 21 is depending from the lower surface of the top wall 14 of the cap. The stopper is located anywhere on a diameter D of the cap's

peripheral wall extending from the bendable line towards the center of the peripheral wall. In the shown embodiment, the stopper is provided between the bendable line 18 and the discharge head depicted in a broken line in Fig. 7. The stopper may preferable be broad in its width in a direction perpendicular to the diameter D. A notch 24 is provided at a side edge of the stopper as shown in Fig. 8 at a level equal to that of the folding plate 17 such that a portion of the folding member 17 is fitted into the notch, while another portion of the folding plate contacts with the top of the discharge head to maintain the depressed state thereof. In the shown embodiment, lengthwise middle portion 25 of the folding plate 17 is adapted to be fitted into the notch, while the leading end portion of the same may contact with the upper end of the discharge head 3 in its lowermost position. The location and the length of the folding plate 17 may vary in the scope of the nature of the present invention.

[0031] In this embodiment, the outer surface of the folding plate 17 is generally flush with the outer surface of the peripheral wall of the cap in its initial state. Upon discarding the container, the user should remove the cap from the aerosol container, and push the folding plate 17 inwardly with a finger to break the breaking line 19. By inserting the finger further into the aperture 15, the portion of the folding plate 17 is fitted into the notch 24. so as to engage the folding plate with the stopper to lock thereat. The depressed state of the discharge head is maintained by contacting the folding plate with the top of the discharge head 3.

[0032] Figs 9 to 11 shows the third embodiment of the present invention. In this embodiment, the folding plate rotatable along a vertical plane is proposed in stead of the one rotatable along the horizontal plane in the second embodiment.

[0033] In this embodiment, the aperture 15 having a vertically elongated rectangular shape is provided in the peripheral wall 12 of the cap from its lower end to an upper portion of the same. The horizontal upper margin of the aperture 15 is connected to the adjacent end 17a of the folding plate 17 through the bendable line 18, while the breaking line 19 is defined between the folding plate and the vertical side margins of the aperture 15, such that the folding plate 17 may turn about the bendable line 18 after breakage of the breaking line from a first upstanding position to a second position protruding horizontally and inwardly. Also the stopper 21 is depending from the top wall 14 of the cap and facing with the front wall portion of the cap's peripheral wall 12, such that the discharge head 3 is interposed between the bendable line 18 and the stopper 21. At the lower end of the stopper 21, there is provided engagement recess 23 for engaging with the free end 17b of the folding pate 17, such that the folding plate 17 contacts with the upper surface of the discharge head 3 in the engaged state to maintain the depressed state of the discharge head 3. It is more preferable that a pair of hooks 26,26 are provided at both sides of the lower end of the stopper 21 to form the fitting recess 23 therebetween, such that the pair of hooks catches the an engagement projection defined by the free end 17b of the folding plate.

[0034] Figs 12 to 17 show the fourth embodiment of the present invention. In this embodiment, the pair of apertures with folding plates are provided in the top wall of the cap.

[0035] These apertures are front and rear symmetrical apertures of the same size and the same shape, and are separated by a rectangular partition plate 31. The both sides of the partition plate are connected to adjacent ends, i.e. fixed ends 17a of the respective folding plates 17 via bendable line 18, while the remainder of aperture's perimeter having a U-shape is connected to corresponding edge of the folding plate 17 via the breaking line 19. Each said aperture serves as a gas release hole and a finger receiving hole of a size which is sufficiently great to receive the finger of the user. More over, it is preferable that the partition plate 31 is traversing right above the discharge head 3, and the width of the partition plate is smaller than the diameter of the discharge head 3.

[0036] Under the lower sides of the folding plates 17, 17, there are provided first and second fitting means 32,33 for providing mutual fitting. These folding plates are adapted to turn from a first position where the folding plate is flush with the peripheral wall of the cap to a second position where the folding plates are depending toward the inside of the cap to fit the first and second fitting means to fit each other, such that the folding plates are mutually integrated in a vertical posture by means of the fitting of the first and second fitting means. Preferably, the first fitting means 32 may be a fitting cylinder, and the second fitting means 33 may be a protrusion which is able to press-fit into the fitting cylinder.

[0037] The folding plates 17,17 are formed by flexible plates. Moreover, it is necessary that the rotation radius of the folding plate, i.e. the length from the fixed end 17a to the free end 17b thereof is long enough that the free end of the folding plate contact to the corner 6 of the outer periphery of the discharge head 3 when the folding plates rotating from the first position to the second position as shown in Fig. 15. It is also necessary that the rotation radius is short enough that the free end 17b may forcibly ride over the corner 6 due to flexion of the folding plate when nipping the folding plates with fingers as shown in Fig. 15.

[0038] Furthermore, as shown in Fig. 12, 15, 16, the free end 17b of the folding plate 17 is provided with a chamfer portion 35 at a location where the free end contacts with the corner for facilitating the free end to ride over the corner. The chamfer portion may be provided at the corner of the discharge head as shown in Fig. 17 which is a modified embodiment.

[0039] In the construction above, the folding plate 17is generally flush with the top wall 14 of the cap in its initial state shown in Fig. 12. Upon discarding the aerosol container, the user should push the upper side of the folding

plates with fingers to break the breaking lines 19, such that the folding plates 17,17 are pressed into the cap, with each free ends coming to contact with the corner of the discharge head. The discharge head 3 is depressed when the free ends ride over the corner. And then the first and second fitting means 32,33 are fitted each other, and the folding plates 17, 17 achieve to the second position. In this position, the first and second fitting means 32,33 connect the folding plates to be integrated each other, and each one of the folding plates acts as a stopper for fixing the other in a perpendicular posture.

Claims

1. An aerosol container having a container body and a cap;

said container body comprising an upstanding discharge head;

said cap comprising a peripheral wall and a top wall and being adapted to fit on an upper part of the container body, a portion of the peripheral wall or the top wall defining a folding plate surrounded by a breaking line and a bendable line such that the folding plate may be bent inwardly about the bendable line after breakage of the breaking line, the cap also comprising a stopper for fixing the folding plate into an inwardly bent position such that when the discharge head is depressed for gas release, the folding plate fixed in the inwardly bent position contacts with a top of the discharge head for maintaining a depressed position thereof,

wherein the cap is so configured that an aperture (15) formed by bending the folding plate (17) inwardly acts as a gas release hole and also a finger receiving hole, a size of which is sufficiently great to receive a finger of an user, such that the folding plate (17) is capable of being fixed to the stopper (21) by pushing with the finger for breakage of breaking line (19), and then inserting the same finger further into the aperture (15).

2. An aerosol container according to claim 1

characterized in that the folding plate (17) and the aperture (15) are formed at the top wall (14) of the cap and located eccentrically deviating from a longitudinal central axis (c) of the discharge head (3), while the bendable line (18) is formed on a portion of the aperture edge closer to the longitudinal central axis (c);

and **in that** a depression plate (20) is depending from the folding plate (17), while the stopper (21) is depending from the top wall (14) of the cap and arranged such that the bendable line (18) and the longitudinal axis (c) are located between the stopper and the depression plate (20);

and **in that** the folding plate (17) is movable between a first position where the folding plate (17) is generally flush with the top wall (14) of the cap and a second position where the folding plate (17) is extending towards an interior of the cap from the top wall, such that when the folding plate turns to the second position the stopper (21) locks the depression plate (20) in a place where the depression plate (20) contacts an upper surface of the discharge head (3) for maintaining a depressed state of the discharge head.

3. An aerosol container according to claim 1.

characterized in that the folding plate (17) and the aperture (15) are formed at the peripheral wall (12) of the cap, while the stopper (21) is depending from the top wall (14);

and **in that** the folding plate (17) is movable between a first position where the folding plate (17) is generally flush with the peripheral wall (12) and a second position where the folding plate (17) is protruding to an interior of the cap, such that when the folding plate turns to the second position, the stopper (21) locks the folding plate (17) in a place where the folding plate (17) contacts an upper surface of the discharge head (3) for maintaining a depressed state of the discharge head.

4. An aerosol container according to claim 3,

characterized in that the bendable line (18) is formed between either of left and right margins of the aperture (15) and a end of the folding plate (17) adjacent thereto such that the folding plate (17) may turn about the bendable line (18) from the first position to the second position along a horizontal plane.

5. An aerosol container according to claim 3,

characterized in that the bendable line (18) is formed between either of upper and lower margins of the aperture (15) and a end of the folding plate (17) adjacent thereto such that the folding plate (17) may turn about the bendable line (18) from the first position to the second position along a vertical plane.

6. An aerosol container according to claim 1,

characterized in that the top wall (14) of the cap is provided with a pair of front and rear symmetric apertures (15),(15) separated by a partition plate (31) and a pair of folding plates (17), (17) which are connected at respective margins thereof to both sides of the partition plate (31) via the bendable line (18),

and **in that** the folding plates (17),(17) are provided at their respective lower surfaces with first and second fitting means (32), (33)

such that when upper surfaces of the folding plates (17),(17) are depressed by two fingers of the

user to break the breaking lines (19), (19), the folding plates (17) (17) turn from a first position where the folding plates (17).(17) are flush with the top wall (14) to a second position where the folding plates are extending downward, and that the first and second fitting means (32),(33) are engaged each other by inserting the two fingers into the apertures respectively to nip the folding plates therebetween;

and **in that** each of the folding plates (17),(17) serves as a stopper to fix the other of the folding plates in a vertical posture by engagement of the first and second fitting means (32),(33) so that lower ends of the mutually integrated folding plates in a fixed posture may contact the upper surface of the discharge head (3) to maintain the depressed state of the discharge head (3).

7. An aerosol container according to claim 6,

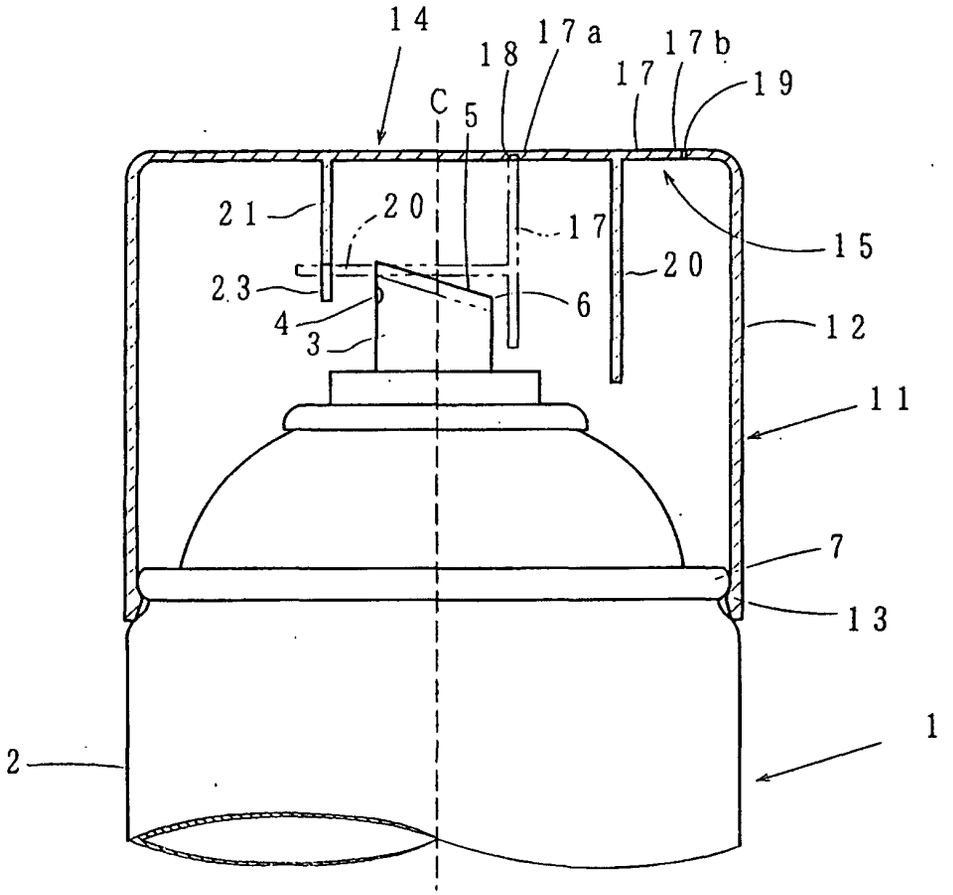
characterized in that each said folding plate (17) is flexible and has a fixed end (17a) and a free end (17b) between which a rotation radius is defined, said rotation radius is sufficiently great such that when the folding plates are pressed towards an interior of the cap fitted on the aerosol container, the free end (17b) contacts with a corner (6) at a sidewall surface of the discharge head (3),

and **in that** the free end (17b) may forcibly ride over the corner (6) due to flexion of the folding plate (17) by nipping the folding plates in contact with the corners (6),(6) inserted trough the apertures for depressing the discharge head (3).

8. An aerosol container according to claim 7,

characterized in that a chamfer portion (35) for facilitating the free end (17b) of the folding plate (17) to ride over the corner (6) of the discharge head (3) is formed at least either one of the corner (6) and the free end (17b) at a location where the free end and the corner come into contact with each other.

Fig. 1


14
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17a
17b
17
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Fig. 2

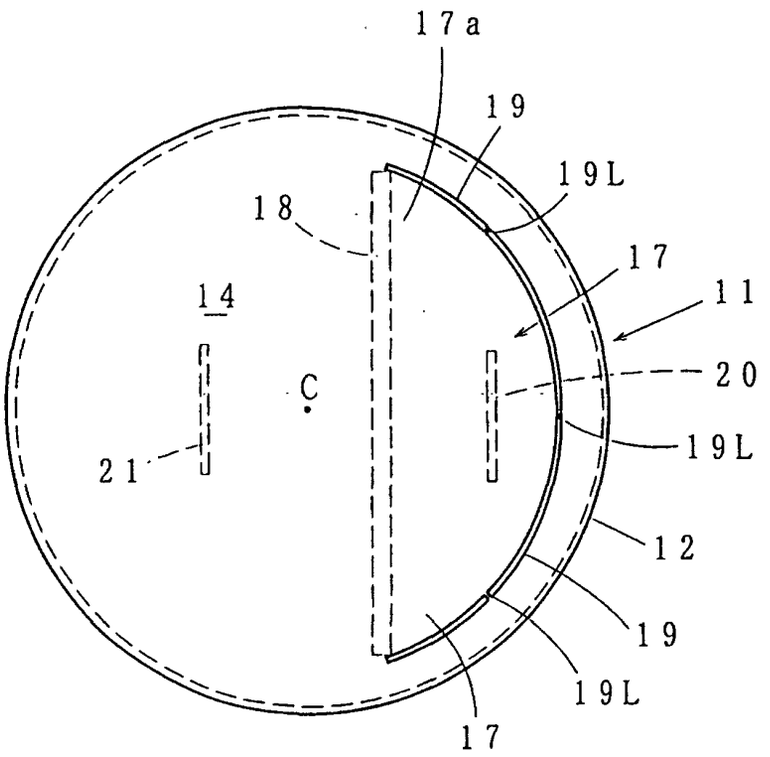
17a
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Fig. 3

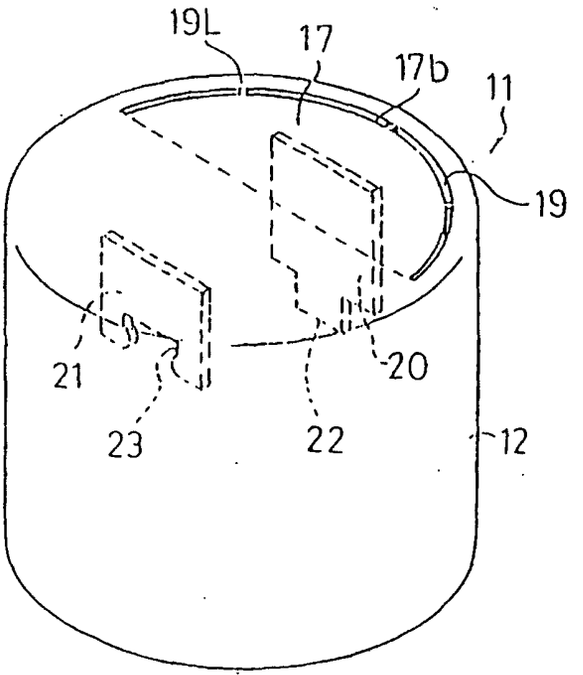
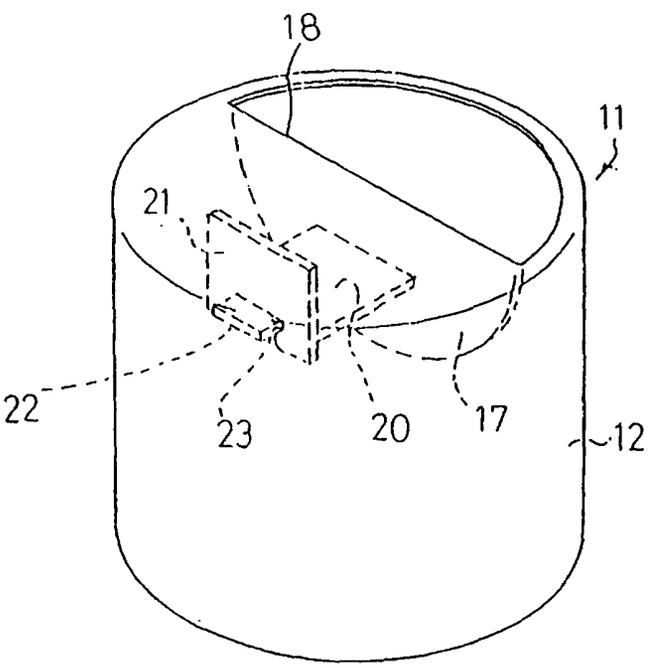


Fig. 4



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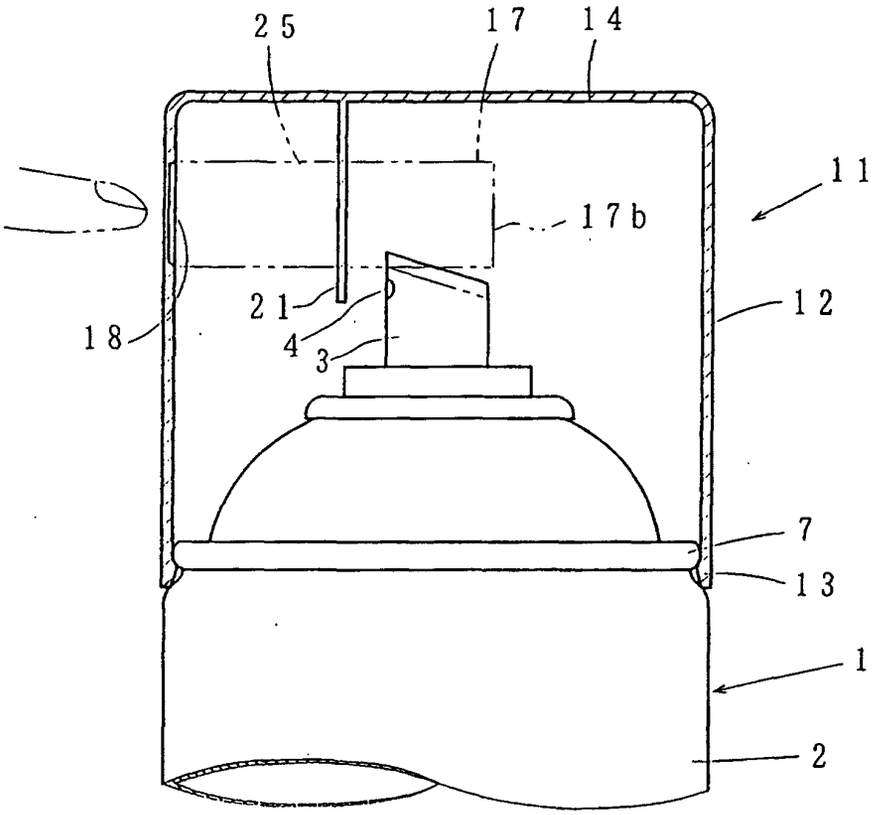
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Fig. 6

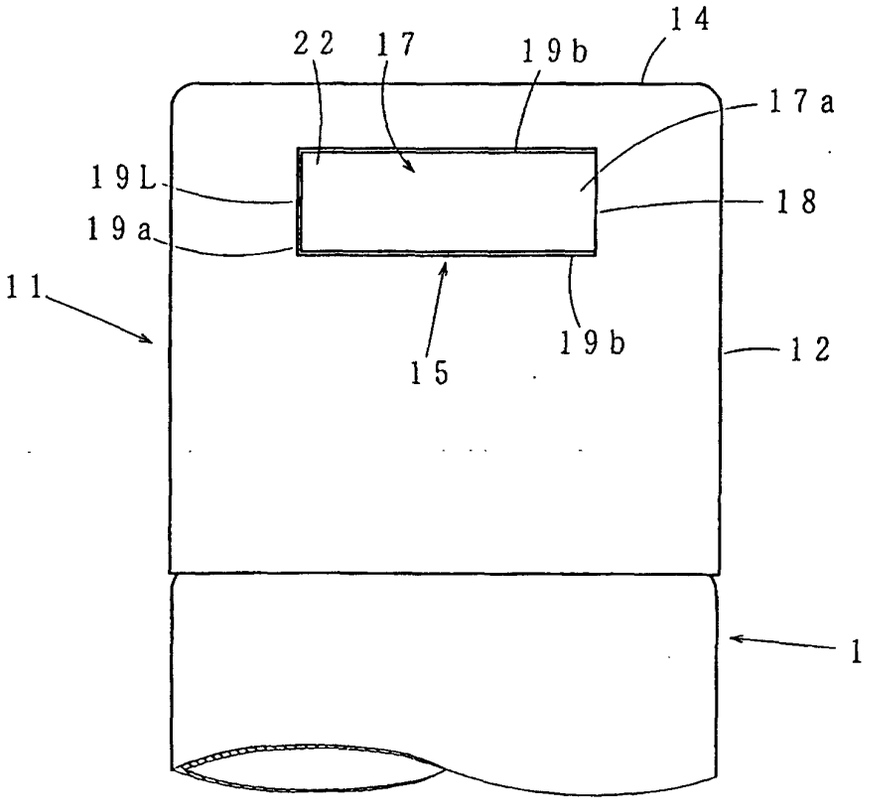
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Fig. 7

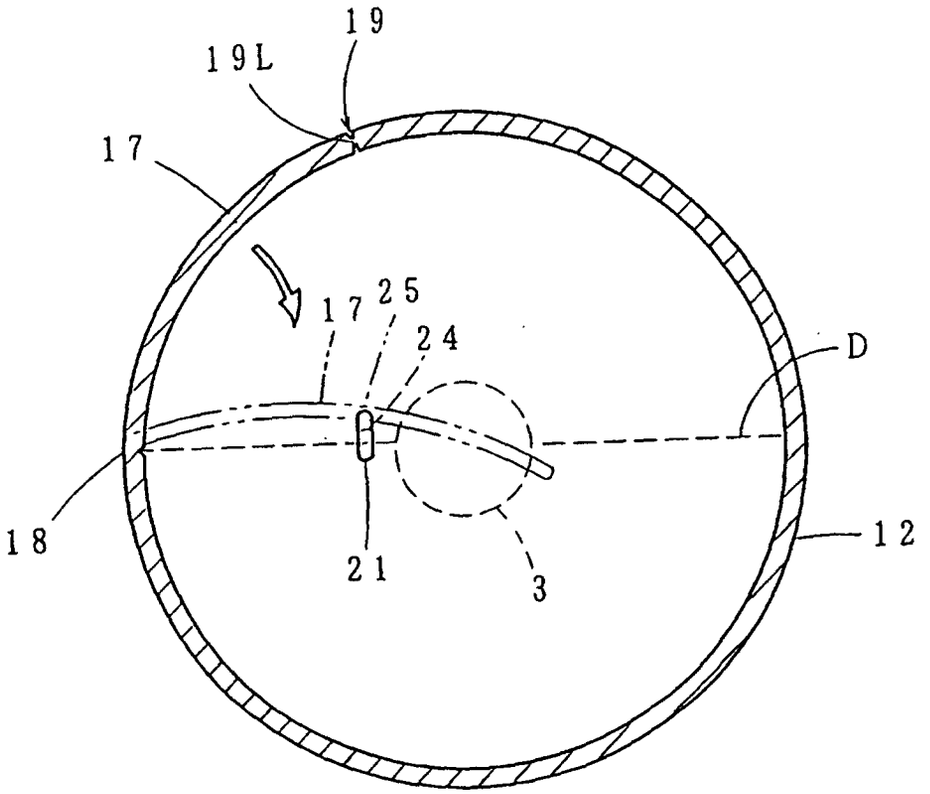
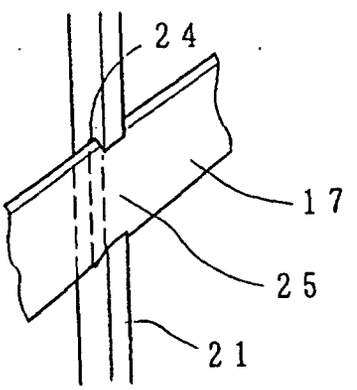


Fig. 8



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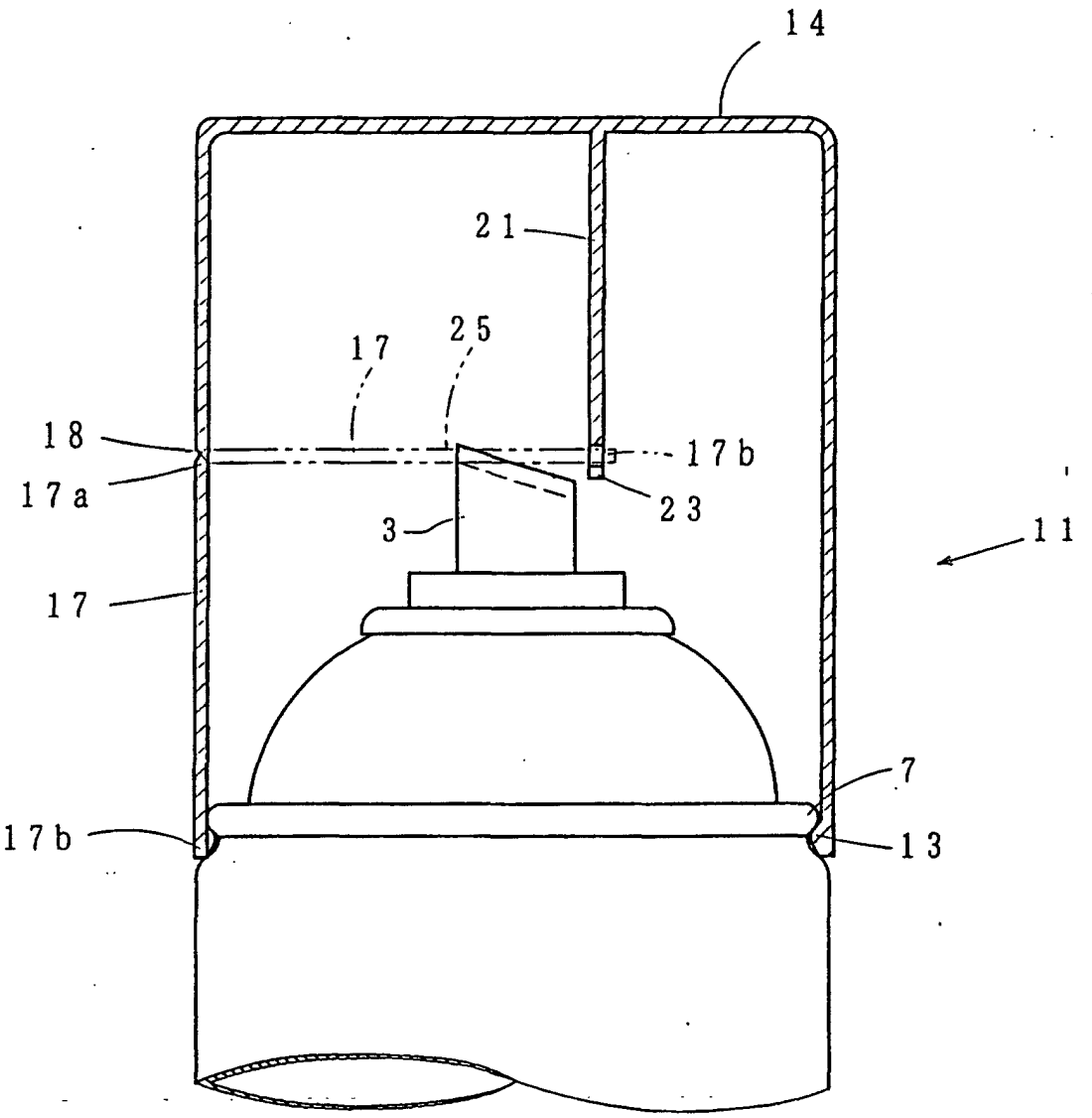

Fig. 10

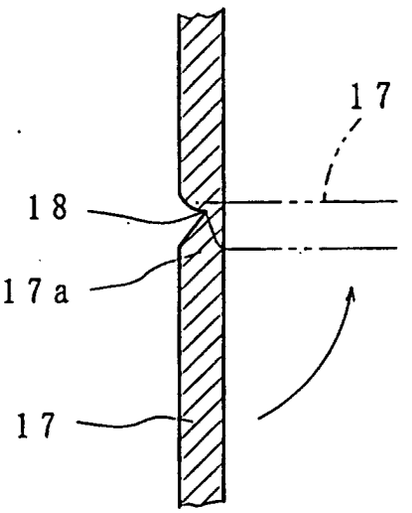

Fig. 11

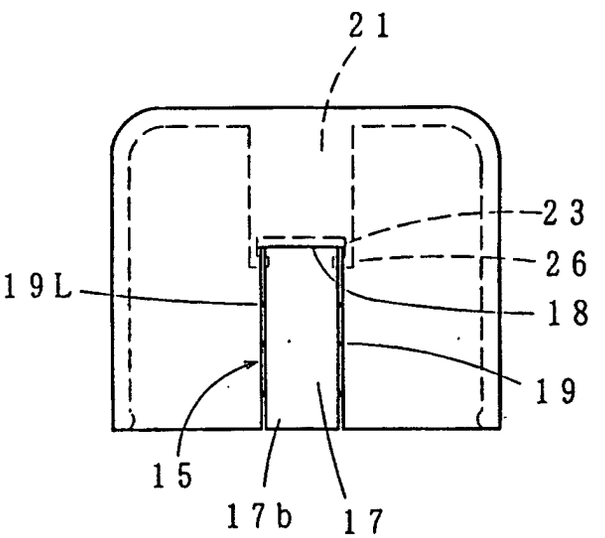

Fig. 12

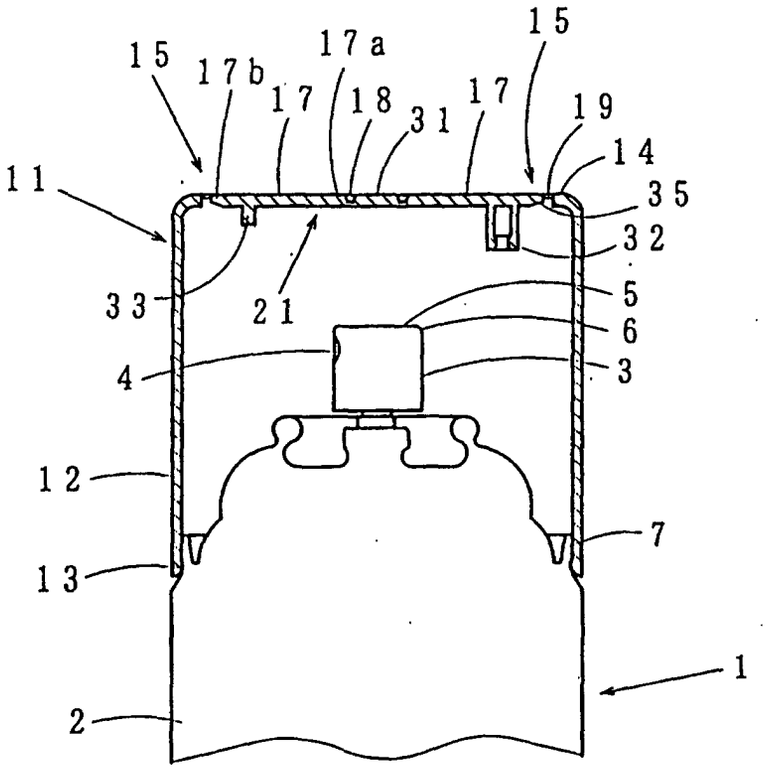
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Fig. 13

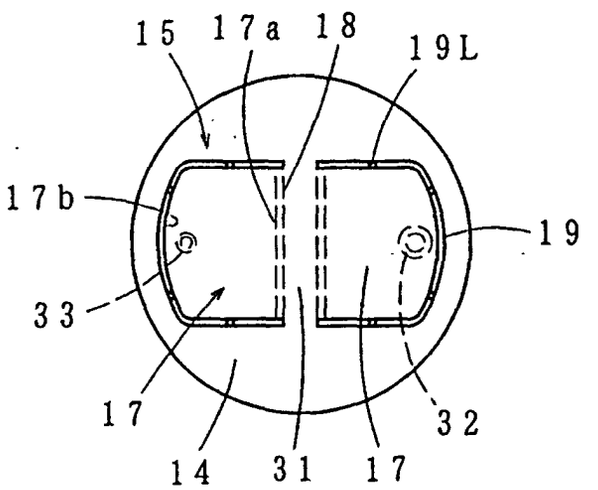
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Fig. 14

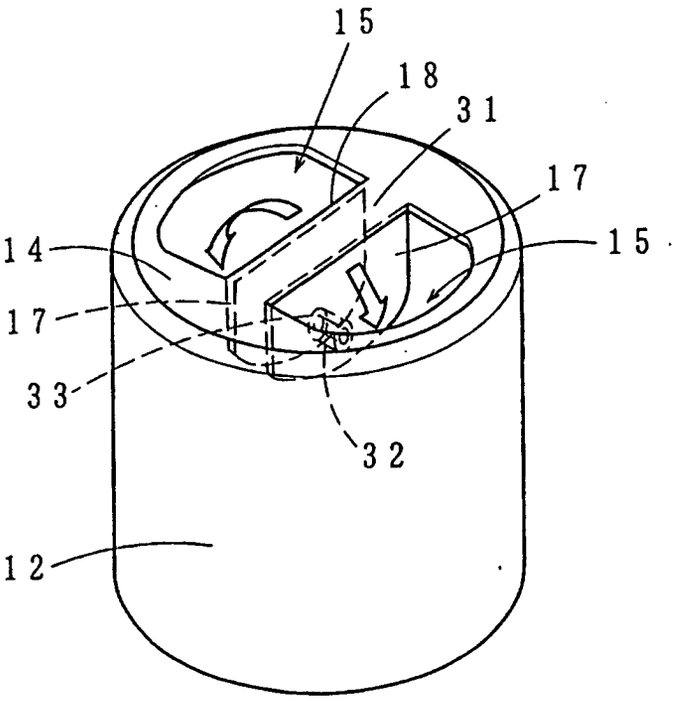


Fig. 15

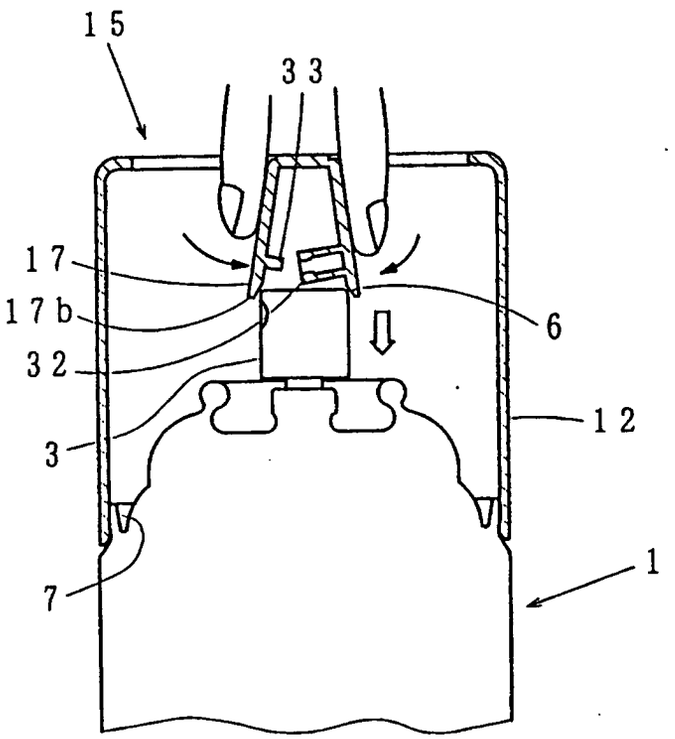


Fig. 16

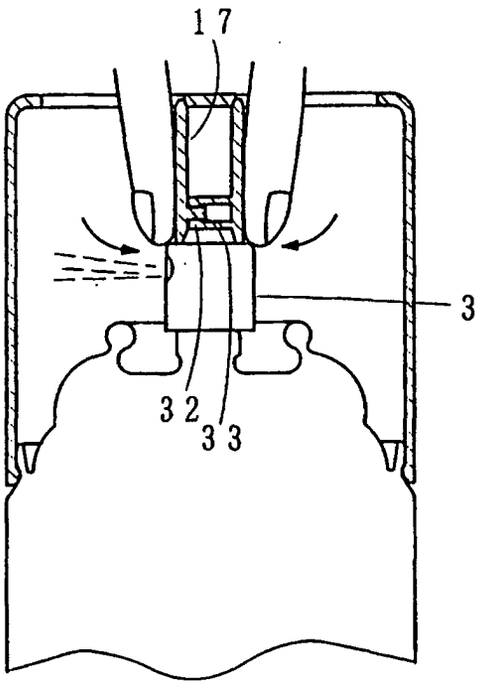


Fig. 17

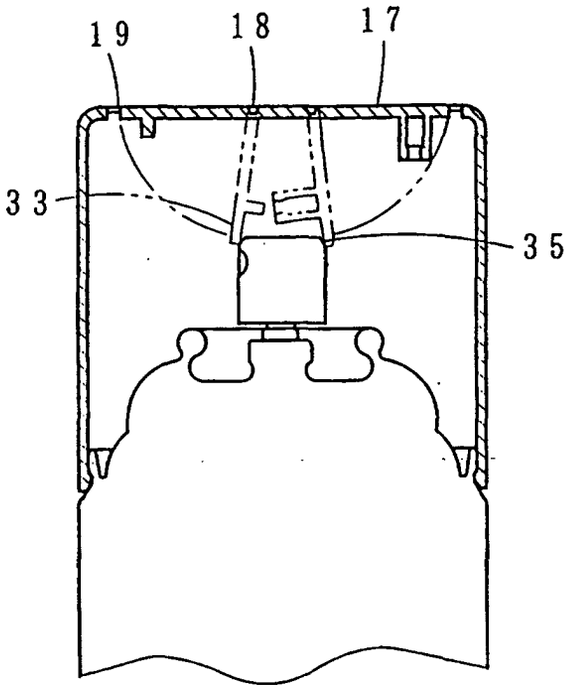


Fig. 18

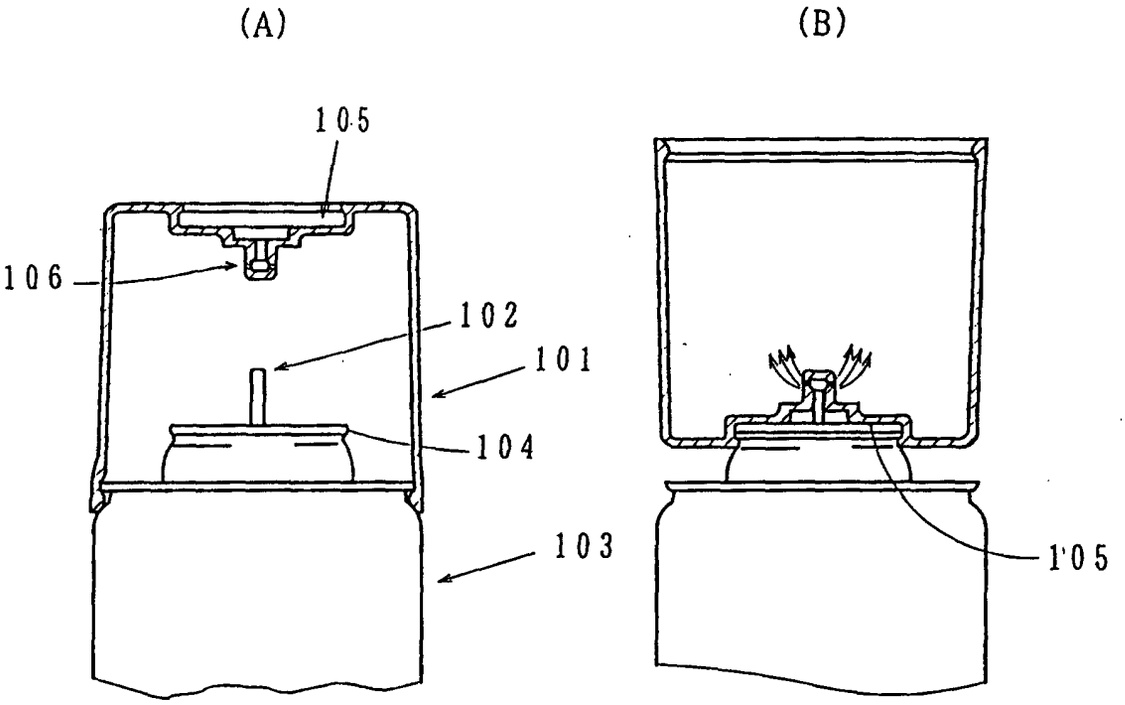
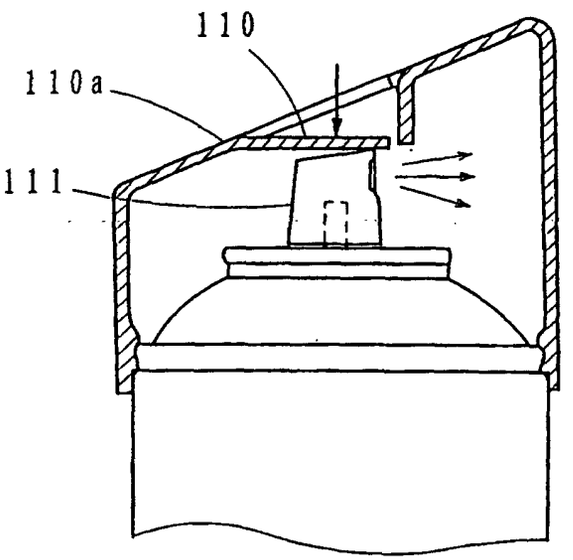


Fig. 19



INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP02/05385

A. CLASSIFICATION OF SUBJECT MATTER
Int.Cl[7] B65D83/40

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
Int.Cl[7] B65D83/40

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Jitsuyo Shinan Koho 1926-1996 Toroku Jitsuyo Shinan Koho 1994-2002
Kokai Jitsuyo Shinan Koho 1971-2002 Jitsuyo Shinan Toroku Koho 1996-2002

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	JP 2001-97466 A (Yoshino Kogyosho Co., Ltd.), 10 April, 2001 (10.04.01), Par. Nos. [0016] to [0024]; Figs. 1 to 5 (Family: none)	1 2-5
Y	JP 2-8564 U (Takashi IWAMA), 19 January, 1990 (19.01.90), Claims; Figs. 1 to 5 (Family: none)	3-5
X Y	JP 2000-191062 A (Yoshino Kogyosho Co., Ltd.), 11 July, 2000 (11.07.00), Full text; Figs. 1 to 4 (Family: none)	1,6-8 2

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
03 September, 2002 (03.09.02)	08 October, 2002 (08.10.02)
Name and mailing address of the ISA/ Japanese Patent Office Facsimile No.	Authorized officer Telephone No.

Form PCT/ISA/210 (second sheet) (July 1998)