



(51) International Patent Classification:
B05B 9/04 (2006.01)

(21) International Application Number:
PCT/AU2012/000105

(22) International Filing Date:
6 February 2012 (06.02.2012)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
2011900617 22 February 2011 (22.02.2011) AU

(71) Applicant (for all designated States except US): **VEGA INNOVATIONS PTY LTD** [AU/AU]; Suites 9 & 10, 19 Lang Parade, Milton, Queensland 4064 (AU).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **GILLESPIE, Benjamin Cyril** [AU/AU]; Unit 46, 98 Thorn Street, Kangaroo Point, Queensland 4169 (AU). **GRIFFIN, David Eric** [AU/AU]; 24 Sandbek Street, Annandale, Queensland 4814 (AU).

(74) Agent: **FISHER ADAMS KELLY**; Level 29, 12 Creek Street, Brisbane, Queensland 4000 (AU).

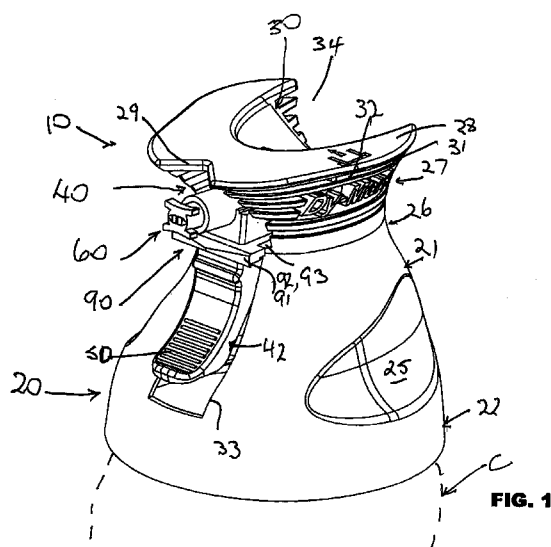
(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, 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, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report (Art. 21(3))

(54) Title: **SPRAY ACTUATOR**



(57) Abstract: A spray actuator for an aerosol container, having at least one liquid to be dispensed there-from, has a valve actuator hinged mounted in the actuator body about a hinge axis, preferably at, or above, an intersection of the valve stem of the container valve and the inlet of a product passageway in the valve actuator, the product passage being connected to a spray nozzle. The valve actuator has both a trigger and a button, which enables operation of the spray actuator in any disposition of the container. Optionally, the spray nozzle is rotatable in the valve actuator to enable the major-axis of the spray fan to be rotated; and an optional locking assembly may be provided to selectively lock the valve actuator against operation.



TITLE: SPRAY ACTUATOR**BACKGROUND OF THE INVENTION****5 1. Field of the Invention**

[0001] The present invention relates to a spray actuator.

[0002] The present invention particularly relates, but is not limited to, a spray actuator for a pressurised (aerosol) container.

10 [0003] The pressurised (aerosol) container may contain a wide range of liquids to be dispensed as an aerosol spray, including paints, coatings, inks, adhesives, insecticides, pesticides, herbicides, lubricants, anti-corrosion chemicals or the like. The contents of the container may be pressurised by suitable propellant gas (or gasses), including hydrocarbons, or gas (or gasses) inert to the liquids, dissolved therein.

15 2. Prior Art

[0004] Many spray actuators for pressurised aerosol containers have been proposed, or adopted, over the years.

20 [0005] In the simplest versions, a simple "valve actuator" is fitted to a valve stem in communication with the interior of the container, and is provided with a nozzle, arranged to produce a cone-like spray pattern. When the valve stem is operated e.g. depressed by the valve actuator, the stem causes the valve in the container to release a portion of the liquid contents (and propellant) from the container, to be released in the spray pattern from the nozzle.

25 [0006] Over the years, more complex spray actuators have been devised. In particular, the actuators may comprise a body (mountable on the container), a nozzle, and a trigger hingedly mounted on / on the body, and the nozzle communicates with the interior of the container via a product passageway connected to a valve in the container and an orifice in the
30 nozzle.

[0007] Examples of recent designs of such spray actuators are disclosed in WO 2007/021918 A1 (Summit Packaging Systems, Inc) (= US 7,204,393) (Strand)) and US 2010/0059551 A1 (Tomkins et al).

5 [0008] All of the known spray actuators have one, or more, limitations in their construction and/or their method of operation. For example, they can only be operated by either a finger-operated trigger or a finger- (or thumb-) operated "button". They are usually not capable of being easily operated when the container is in a number of different orientations, or where alternative spray patterns are to be applied. In addition, any locks
10 for the triggers can usually only be operational up to the first time the spray actuators are operated; and, if reusable, are easily misplaced / lost.
[0009] Spray actuators previously designed to overcome, or at least ameliorate, these known limitations, are typically complex, and thereby, expensive to manufacture.

15

SUMMARY OF THE PRESENT INVENTION

[0010] It is an object of the present invention to provide a spray actuator for pressurise aerosol containers while at least further ameliorates the limitations of the known spray actuators.

20 [0011] It is a preferred object to provide such a spray actuator which provides a valve actuator incorporating both a trigger and a depressible "button" to operate the spray actuator.

[0012] It is a further preferred object a valve actuator where the trigger and button are formed integrally and can be operated by a single finger
25 (e.g. the index finger) depending on the orientation of the spray actuator.

[0013] It is a still preferred object to provide releasable locking mechanism for the trigger, where the locking mechanism is reusable and is provided with a storage compartment when the spray actuator is in use.

30 [0014] It is a still preferred object to provide a rotatable nozzle enabling the spray pattern to be varied e.g. for spraying vertical strokes to spraying horizontal strokes.

[0015] Other preferred objects of the present invention will become from the following description.

[0016] In one aspect, the present invention resides in a spray actuator for attachment to an aerosol container containing at least one liquid to be
5 dispensed, the container having a valve and valve stem, the spray actuator including:

a body having a sidewall, to enclose and/or releasably engage an upper portion of a sidewall of the container;

a valve actuator, hingedly mounted to the body about a hinge axis, having
10 a product passageway therethrough, the product passageway having an inlet operably connectable to the valve stem and an outlet; and
a nozzle operably connectable to the outlet of the product passageway, wherein:

the valve actuator has a valve actuator body incorporating both a trigger
15 and a button operable to rotate the valve actuator relative to the body about the hinge axis, to thereby actuate the valve to enable dispensing of the at least one liquid from the aerosol container.

[0017] Preferably, the sidewall has a rim engaging portion for attachment to the container and/or a skirt depending from the sidewall of the body.

20 [0018] Preferably, the hinge axis is adjacent the sidewall of the body, spaced from the nozzle, and is provided at, or above, an intersection of the valve stem and the inlet of the product passageway.

[0019] Preferably, the trigger extends from the body, optionally extending (substantially radially) outwardly through a slot or recess in the sidewall of
25 the body, the trigger being provided on the valve actuator body at a position diametrically opposed from the hinged mounting of the valve actuator body to the sidewall about the hinge axis, and is arranged to be pulled downwardly (and optionally inwardly towards the body) to actuate the valve.

30 [0020] Preferably, the button is provided on an upper portion of the valve actuator body, intermediate the trigger and the hinge axis. Preferably, the button is located substantially coaxially with the valve stem. Preferably,

the button is provided within, or accessible via, a slot or recess in a top wall of the body, the slot preferably extending across the top wall from the button to the upper portion of the sidewall adjacent the hinge axis, and may further extend down the upper portion of sidewall to a location just above the hinge axis.

[0021] Preferably, both the trigger and the button are operable to enable the spray actuator to be operated in any disposition of the container, to which the spray actuator is attached in use, to enable 360° operation.

[0022] Preferably, the valve actuator body is integrally moulded of suitable plastics-material, and has an extension portion provide with a hinge pin at its distal end, the hinge pin being rotatably journalled on the hinge axis, in at least one support lug or flange on an inner face of the sidewall of the body,

[0023] Preferably, the product passageway is an (inverted) L-shaped bore (in side view) extending (centrally) through the interior of the valve actuator body; and the outlet of the product passageway is spaced above the trigger.

[0024] Preferably, the nozzle has a nozzle body with an inlet end releasably engageable in an enlarged bore at the outlet of the product passageway and an outlet end defining the spray pattern of the liquid being dispensed. Preferably, the spray pattern is in the form of a "fan", where rotation of the nozzle body relative to the valve actuator body enables the major-axis of the fan spray pattern to be changed from vertical to horizontal, or vice versa, or any inclined angle there-between.

[0025] Preferably, a locking member is releasably mountable on the body to prevent the valve actuator from being operated, and is storable on a storage compartment on the body when the spray actuator is in use.

[0026] Preferably, the locking member is of substantially U-shape in plan view, with a cross-bar engageable under the outlet of the product passageway and/or the nozzle body, the cross-bar interconnecting a pair of legs releasably engageable in locating slots or recesses in the adjacent sidewall of the body. When in the locking position, the locking member

prevents movement of the valve actuator body relative to the body which would enable the valve to be actuated.

[0027] In a second aspect, the present invention resides on a spray assembly for liquids including:

- 5 an aerosol container containing at least one liquid to be dispensed, the container having a valve and valve stem; and
a spray actuator as hereinbefore described.

[0028] Preferably, the aerosol container is pressurised by a propellant gas dissolved in the liquid to be dispensed, the valve and valve stem being
10 operable by the valve actuator to actuate the valve against bias of the valve stem urging the valve to a closed position.

BRIEF DESCRIPTION OF THE DRAWINGS

[0029] To enable the invention to be fully understood, preferred
15 embodiments will now be described with reference to the accompanying drawings, in which:

- FIG. 1 is a front isometric view, from above, of a first embodiment of the spray actuator in accordance with the present invention;
FIG. 2 is a similar view of the spray actuator, but from below;
20 FIG. 3 is a top plan view of the spray actuator;
FIG. 4 is a front elevational view of the spray actuator;
FIG. 5 is a rear elevational view of the spray actuator;
FIG. 6 is a side elevational view of the spray actuator;
FIG. 7 is a bottom plan view of the spray actuator; and
25 FIG. 8 is a sectional side view of the spray actuator, taken on line 8-8 in FIG. 4, fitted to an aerosol container.

[0030] NB: The "Dy-Mark" word, which appears in FIGS. 1, 2 and 6, does not form part of the invention; but is a Registered Trade Mark of Dy-Mark (Aust) Pty Ltd, Milton, Queensland, Australia, which has been optionally
30 moulded into the body of the spray actuator. That feature, and any other visual design aspects e.g. the "ribs" on the trigger, are not limiting to the

scope of the present invention; and are to be disregarded when considering the scope of the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

- 5 [0031] The spray actuator 10, as illustrated in FIGS. 1 to 8, is adapted to be secured to the rim and/or upper body portion of a conventional pressurised aerosol container C.
- [0032] The pressurised aerosol container C can be of any one of the types currently available. The container C typically has a peripheral rim R
10 (or flange) at the junction of the cylindrical sidewall W and of the (domed) top wall T; and the valve stem S extends upwardly (coaxially) from the top wall T. The valve stem S is connected to the valve V in the container C which permits the dispensing of the liquid(s) L and gas propellant G, the valve V being actuated when the valve stem S is depressed.
- 15 [0033] The container C does not require any modification to receive, and be operated by, the spray actuator 10.
- [0034] The spray actuator 10 has three primary components: the body 20, the valve actuator 40, and the nozzle 60, each to be individually hereinafter described.
- 20 [0035] The body 20 of the spray actuator is typically injection-moulded of a suitable plastics-material e.g. HDPE, where the plastics-material typically incorporates a dye or colour to provide an attractive, and attention-grabbing, appearance.
- [0036] The body 20 has a frusto-conical sidewall 21 with a skirt 22
25 arranged to enclose an upper portion of the container C to which the spray actuator is fitted. An inwardly-directed circumferential flange 23 is adapted to engage the underside of the rim portion of the container C, while an abutment member 24 is spaced above the flange 23 to locate the rim portion there-between.
- 30 [0037] A pair of finger-grips 25 provided on opposed sides of the body 20 to assist the user to securely hold the spray actuator 20 when in use.

[0038] The body 20 has a neck portion 26 which leads to a (frusto-conical) top portion 27, which has a top wall 28 with a V-shaped notch 29 which provides a "sight" for the spray pattern.

5 [0039] The sidewall 30 of the top portion 27 is provided with a plurality of vertically-spaced horizontal "ribs" 31 which assist in creating a storage compartment 32 for the locking member 90 to be hereinafter described.

[0040] A substantially-vertical slot 33 is provided at the front of the body 20, to receive the trigger 42 of the valve actuator 40.

10 [0041] A semi-elliptical recess 34 is provided in the top wall 28 and extends into the top portion 27. The recess 34 provides access to the button 43 of the valve actuator 40, to enable the button 43 to be depressed by a finger from above, or extending from the rear of the spray actuator 10.

15 [0042] As best illustrated in FIGS. 2 and 7, a pair of spaced lugs 35 is provided on the inner face of the rear portion of the sidewall 21 and the lugs 35 have aligned slots 36 to rotatably journal the hinge pin 43A of the valve actuator 40. The aligned slots 36 and hinge pin 43A define the hinge axis 44 for the valve actuator 40. (As is best illustrated in FIGS. 2 and 7, the hinge axis 44 is aligned with, or above, the intersection of the valve stem S and the inlet 47 of the product passageway, to be
20 hereinafter described. This provides an advantageous pivotal mounting of the valve actuator body 41 on the body 20 to enable efficient depression of the valve stem S by the valve actuator 40.)

25 [0043] As best illustrated in FIGS. 2 and 8, the valve actuator 40 has a valve actuator body 41, which is injection-moulded in suitable plastics material, e.g. HDPE, and where the valve actuator body 41 has the trigger 42 at the forward end; a circular button 43 on the upper surface intermediate the length of the valve actuator body; and a transverse hinge pin 43A at the rearward end of a support web 45.

30 [0044] An (inverted) L-shaped bore through the valve actuator body 41 forms the product passageway 46.

[0045] The inlet 47 of the product passageway 46 has an enlarged bore and is adapted to receive, and sealably engage, the distal end of the valve stem S of the container C. (The inlet 47 preferably has a "divergent" mouth 48 to assist in the entry of the valve stem S into the inlet 47.)

5 [0046] The outlet 48 of the product passageway 46 is provided in a tubular extension 49 spaced above the trigger 42, aligned with the V-shaped "sight" notch 29.

[0047] Both the trigger 42 and the button 43 are provided with formations 50, 51 to improve the grip, or contact, between the trigger 42 or button 43 and the user's (preferably, index) finger.

10 [0048] The nozzle 60 has a tubular body 61 with a central bore 62. The inlet end 63 of the tubular body 61 is dimensioned to be snugly, sealably, and rotatably, received in the outlet 48 of the product passageway 46. The outlet 64 of the tubular body 61 is configured to produce a "fan-like" spray pattern for the liquid being sprayed there-from. Wings 65 adjacent the outlet 64 enable the tubular body 61 to be rotated relative to the valve actuator 40 to enable the major-axis of the spray pattern to be rotated e.g. from vertical to horizontal, or any angle there-between.

15 [0049] A locking member 90 – see particularly FIGS. 1, 2, 3 and 6 – has a substantially U-shaped body comprising a cross-bar 91 interconnecting spaced legs 92, 93. In the locking position – see FIGS. 1, 2 and 6 – the cross-bar 91 engages the trigger 42 and the legs 92, 93 are received in the vertical slot 33 in the body 20. The locking member 90 prevents the valve actuator body 41 being depressed by either the trigger 42 or button 43 to actuate the valve V.

20 [0050] During operation of the spray actuator 10, the locking member 90 is released from both the slot 33 and trigger 42, and is received in the storage compartment – see FIG. 3.

25 [0051] The skilled addressee will appreciate that the valve actuator 40 can be operated by the user either pulling the trigger 42 downwardly (and optionally inwardly), or depressing the button 43, to cause the valve actuator body 41 to move downwardly about the hinge axis 44, thereby

30

depressing the valve stem S against its bias towards a valve-closed position, to actuate the valve V and allow the liquid (and propellant) to be dispensed from the nozzle 60 as an aerosol. Preferably, the user operates the trigger 42 and button 43 with their index finger, but the thumb and/or other fingers may be employed.

[0052] As the container C is preferably provided with a 360° valve V, the spray actuator 10 can be easily operated with the container C in any disposition.

[0053] In addition, the ability to rotate the nozzle 60 enables a liquid, such as paint, to be sprayed e.g. with a first- (or under-) coat applied in horizontal sweeps with the spray-pattern having a vertical major-axis and then a second coat applied in vertical sweeps with the spray-pattern having a horizontal axis.

[0054] It will be readily apparent to the skilled addressee that spray actuators manufactured and assembled in accordance with the various embodiments of the present invention have one or more of the following advantages:

- a) the spray actuator can be easily operated in any disposition of the container e.g. inverted and truly catering for 360° operation;
- b) the user can operate the spray actuator by either the trigger or button, whichever is more convenient / comfortable for use;
- c) the user can always operate the spray actuator by a single (preferred) finger;
- d) the operator can easily adjust the nozzle to provide the best spray-pattern for a particular application;
- e) alternative nozzles can be fitted to provide different spray-patterns and/or to suit different liquids (e.g. paints, or inks, or lubricants);
- f) a reusable locking member can be provided, with the additional advantage that a storage compartment is provided therefore while the spray applicator is in use;
- g) the spray actuator can be used with a wide range of conventional pressurised containers without modification(s) to the containers;

h) the spray actuator can be easily adapted to different size / shape containers;

i) the spray actuator is easy to use, providing a "sight" for the spray-pattern, and being relatively tough or robust;

5 j) the spray actuator is relatively easy to manufacture and assemble, reduce the manufacturing costs;

k) the spray actuator can be used with containers having a wide range of liquids (and propellants) to be dispensed as aerosols; and

10 l) trademarks and/or other decorative features can be applied to and/or incorporated in the body to increase user adoption and market share.

[0055] The skilled addressee will also appreciate that the selection of material(s) for the manufacture of the components of the spray actuator may be varied to suit the particular intended applications and/or liquids to be dispensed as aerosols.

15 [0056] The embodiments hereinbefore described and illustrated are by way of example only; and various changes and modifications may be made thereto without departing from the present invention.

CLAIMS

1. A spray actuator for attachment to an aerosol container containing at least one liquid to be dispensed, the container having a valve and valve stem, the spray actuator including:
- 5 a body having a sidewall to enclose and/or releasably engage an upper portion of a sidewall of the container;
- a valve actuator, hingedly mounted to the body about a hinge axis, having a product passageway therethrough, the product passageway having an
- 10 inlet operably connectable to the valve stem and an outlet; and
- a nozzle operably connectable to the outlet of the product passageway, wherein:
- the valve actuator has a valve actuator body incorporating both a trigger and a button operable to rotate the valve actuator relative to the body
- 15 about the hinge axis, to thereby actuate the valve to enable dispensing of the at least one liquid from the aerosol container.
2. A spray actuator as claimed in claim 1, wherein:
- the sidewall includes a rim engaging portion for attachment to the container and/or a skirt depending from the sidewall.
- 20 3. A spray actuator as claimed in claim 1 or claim 2, wherein:
- the hinge axis is adjacent the sidewall of the body, spaced from the nozzle, and is provided at, or above, an intersection of the valve stem and the inlet of the product passageway.
4. A spray actuator as claimed in any one of claims 1 to 3, wherein:
- 25 the trigger extends from the body, the trigger being provided on the valve actuator body at a position diametrically opposed from the hinged mounting of the valve actuator body to the sidewall about the hinge axis.
5. A spray actuator as claimed in claim 4, wherein:
- the trigger extends substantially radially outwardly through a slot or recess
- 30 in the sidewall of the body, and is arranged to be pulled downwardly and optionally inwardly towards the body to actuate the valve.
6. A spray actuator as claimed in any one of claims 1 to 5, wherein:

the button is provided on an upper portion of the valve actuator body, intermediate the trigger and the hinge axis; and
the button is located substantially coaxially with the valve stem.

7. The spray actuator as claimed in claim 6, wherein:

- 5 the button is provided within, or accessible via, a slot or recess in a top wall of the body;
the slot optionally extends across the top wall from the button to the upper portion of the sidewall adjacent the hinge axis; and
optionally further extends down the upper portion of sidewall to a location
10 just above the hinge axis.

8. A spray actuator as claimed in any one of claims 1 to 7, wherein:

- both the trigger and the button are operable to enable the spray actuator to be operated in any disposition of the container, having a 360° valve, to which the spray actuator is attached in use, to enable 360° dispensing
15 operation of the at least one liquid from the container.

9. A spray actuator as claimed in claim 1, wherein:

- the valve actuator body is integrally moulded of suitable plastics-material, and has an extension portion provide with a hinge pin at its distal end; and the hinge pin is rotatably journalled on the hinge axis, in at least one
20 support lug or flange on an inner face of the sidewall of the body,

10. A spray actuator as claimed in claim 9, wherein:

the product passageway is an inverted L-shaped bore in side view extending centrally through the interior of the valve actuator body; and the outlet of the product passageway is spaced above the trigger.

25 11. A spray actuator as claimed in any one of claims 1 to 10, wherein:

the nozzle has a nozzle body with an inlet end releasably engageable in an enlarged bore at the outlet of the product passageway and an outlet end defining the spray pattern of the liquid being dispensed.

12. A spray actuator as claimed in claim 11, wherein:

- 30 the spray pattern is in the form of a "fan", where rotation of the nozzle body relative to the valve actuator body enables the major-axis of the fan

spray pattern to be changed from vertical to horizontal, or vice versa, or to any inclined angle there-between.

13. A spray actuator as claimed in any one of claims 1 to 12, wherein:
a locking member is releasably mountable on the body to prevent the
5 valve actuator from being operated, and is storable on a storage
compartment on the body when the spray actuator is in use.

14. A spray actuator as claimed in claim 13, wherein:
the locking member is of substantially U-shape in plan view, with a cross-
bar engageable under the outlet of the product passageway and/or the
10 nozzle body;

the cross-bar interconnects a pair of legs releasably engageable in
locating slots or recesses in the adjacent sidewall of the body; and
when in the locking position, the locking member prevents movement of
the valve actuator body relative to the body which would enable the valve
15 to be actuated.

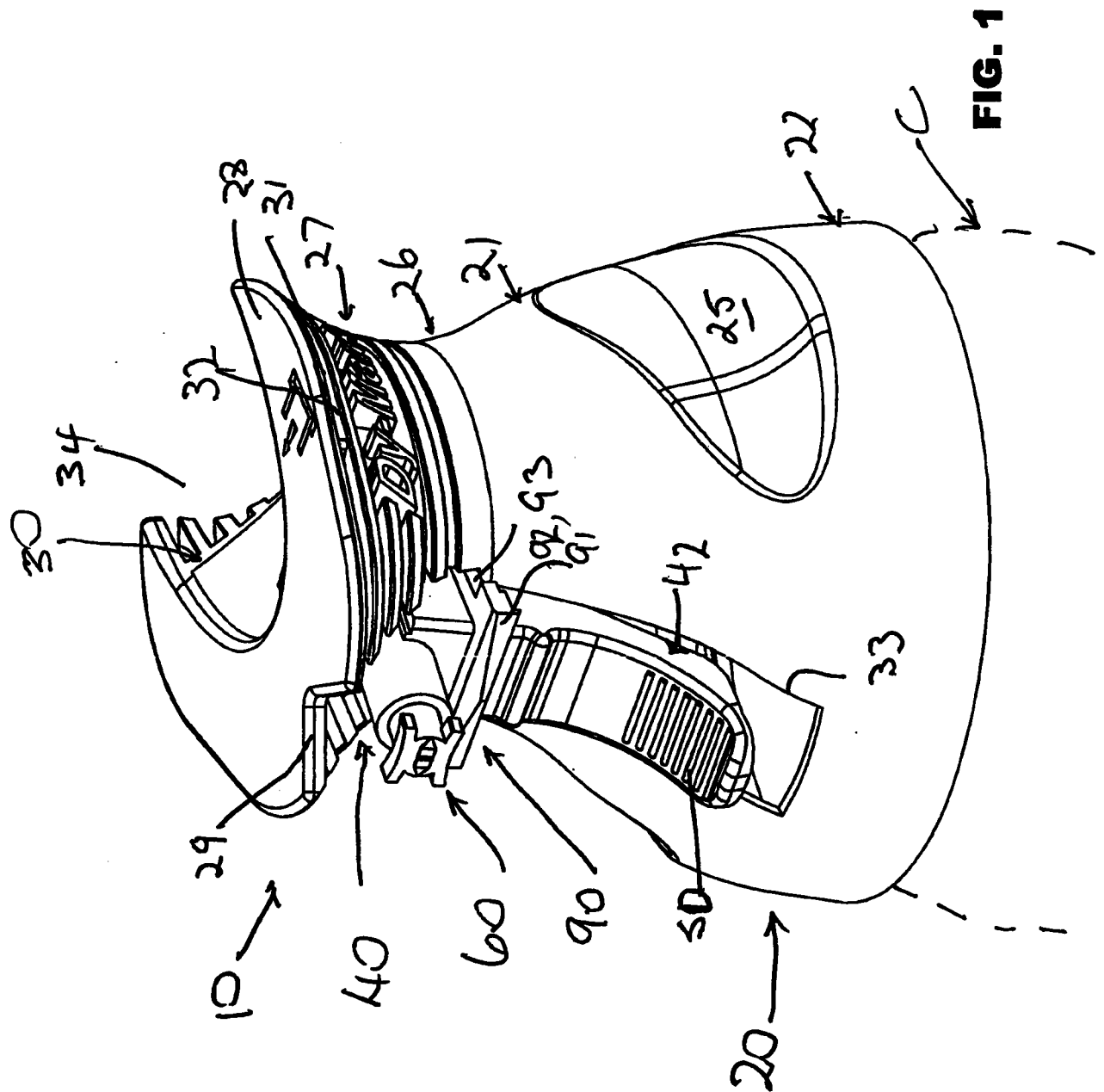
15. A spray assembly for liquids including:
an aerosol container containing at least one liquid to be dispensed, the
container having a valve and valve stem; and
a spray actuator as claimed in any one of claims 1 to 14.

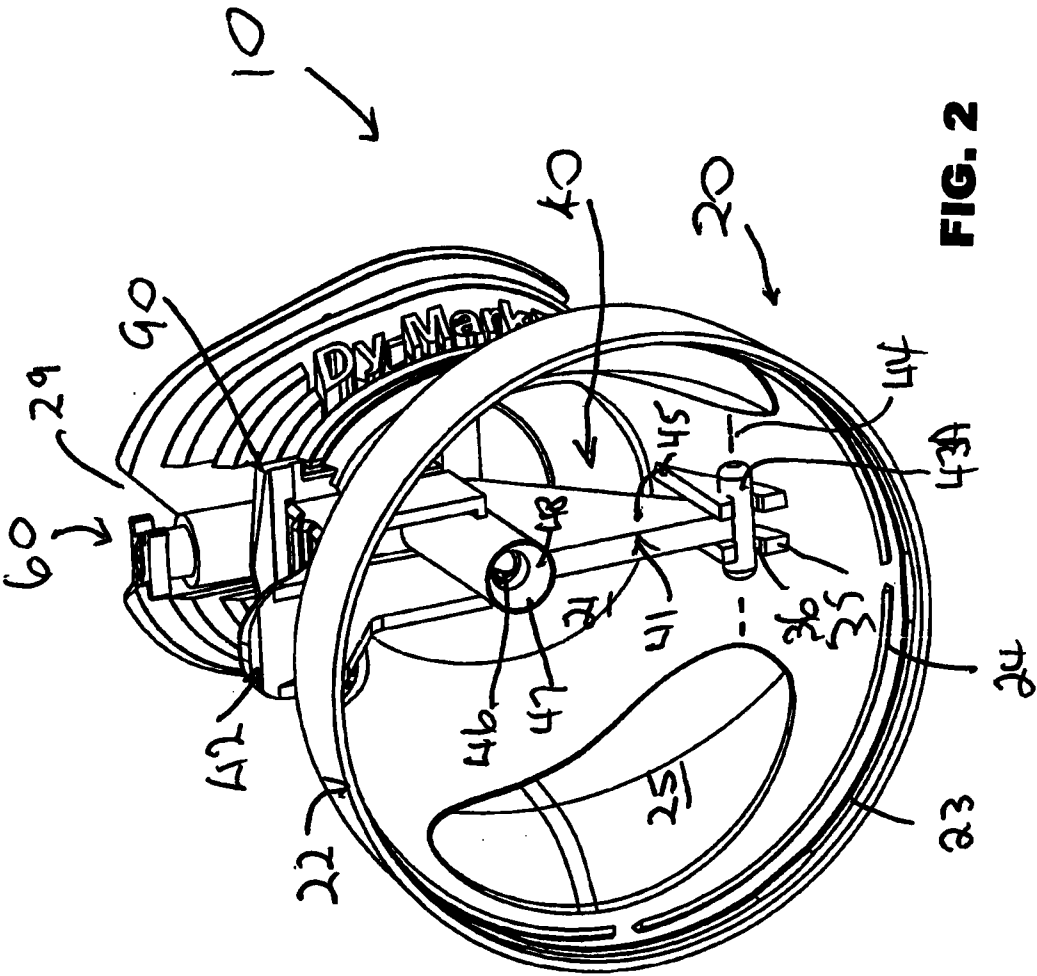
20 16. A spray assembly as claimed in claim 15, wherein:
the aerosol container is pressurised by a propellant gas dissolved in the
liquid to be dispensed, the valve and valve stem S being operable by the
valve actuator to actuate the valve against bias of the valve stem urging
the valve to a closed position.

25

30

1/8





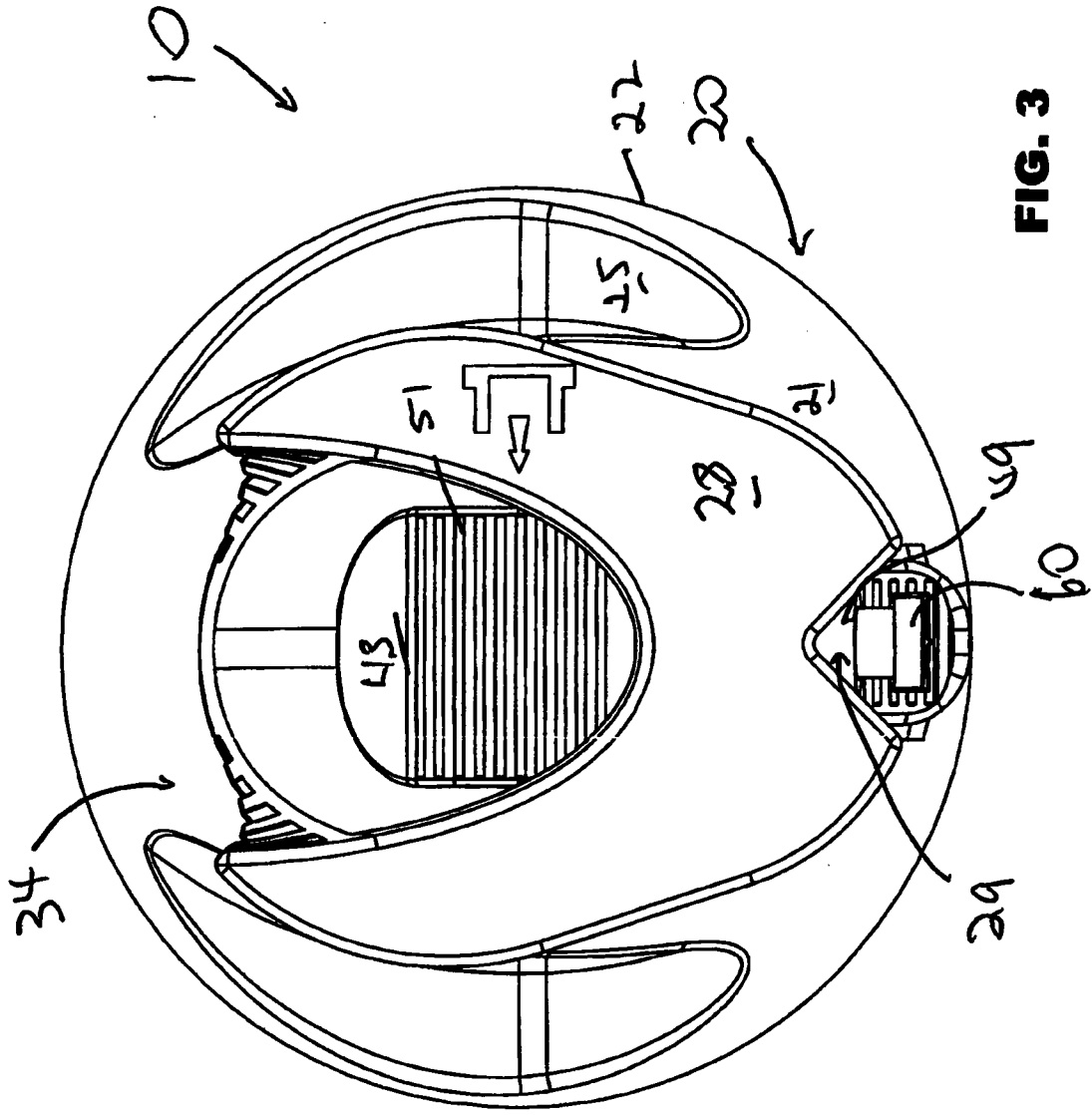


FIG. 3

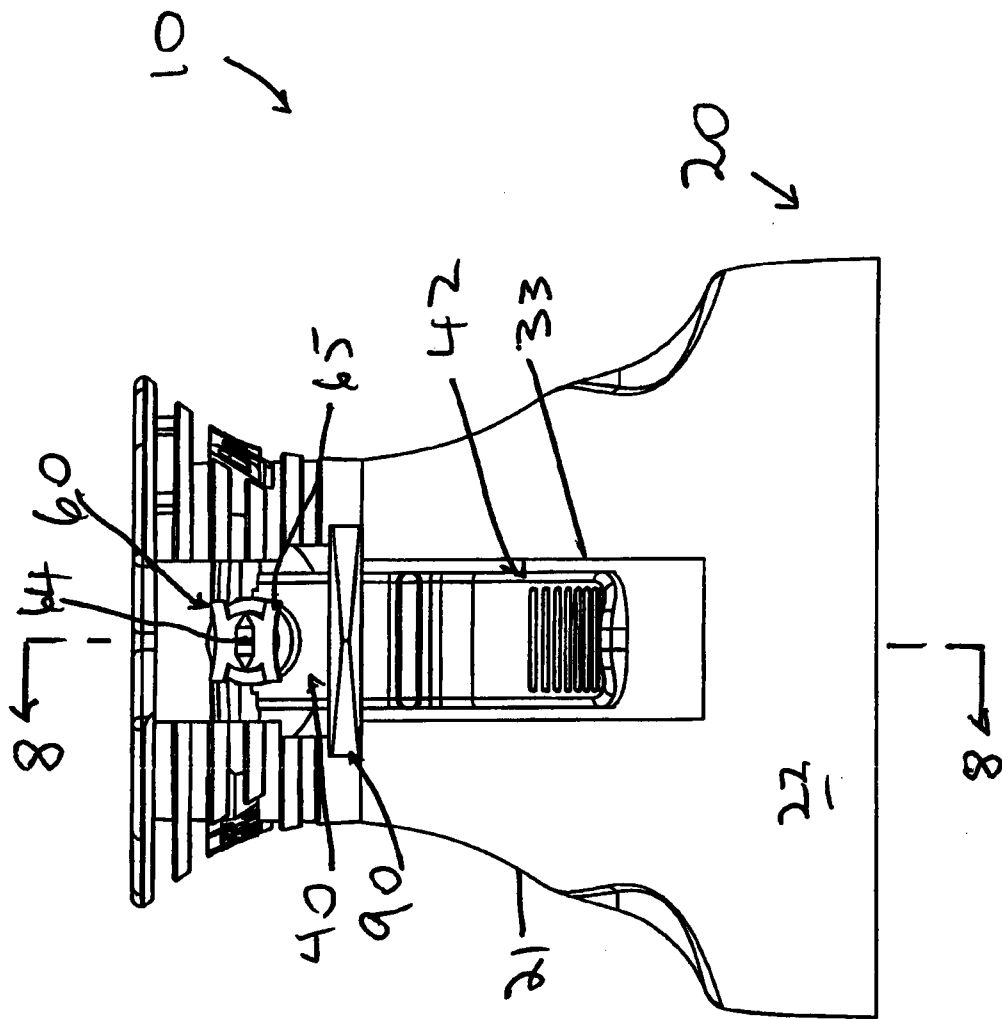


FIG. 4

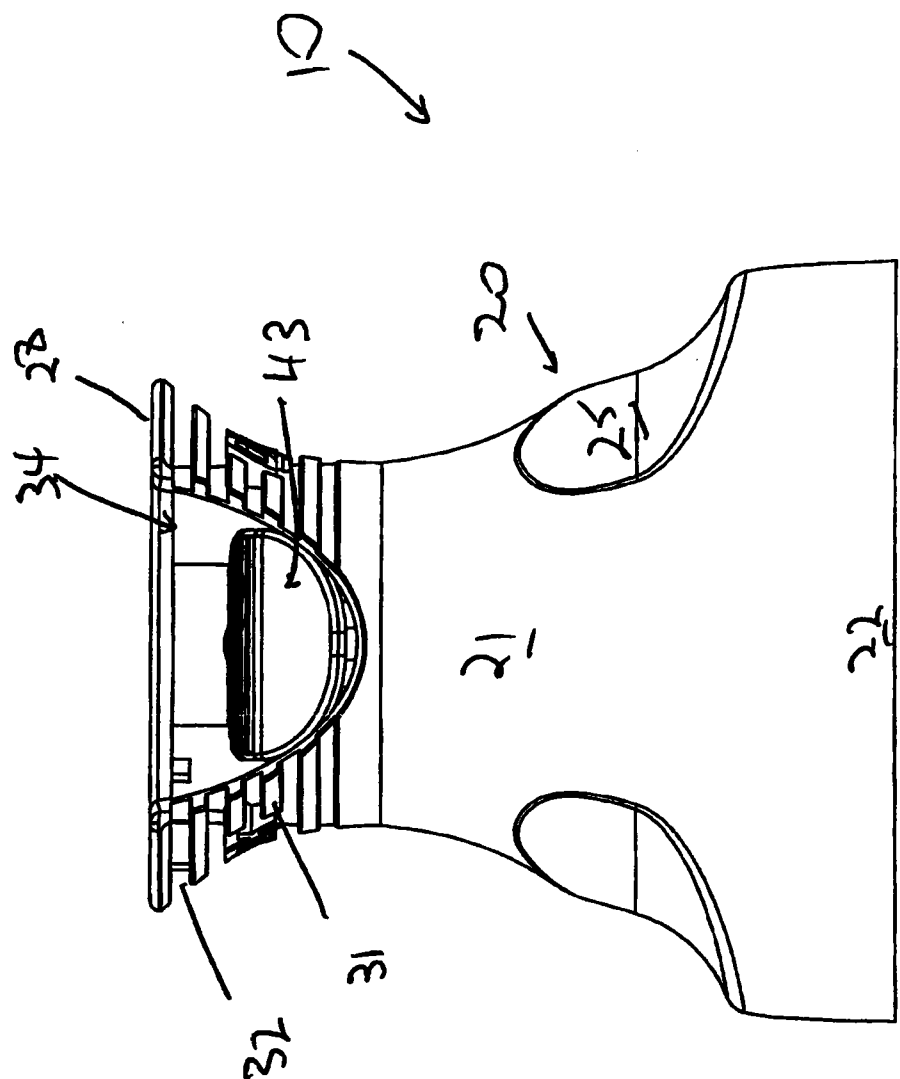


FIG. 5

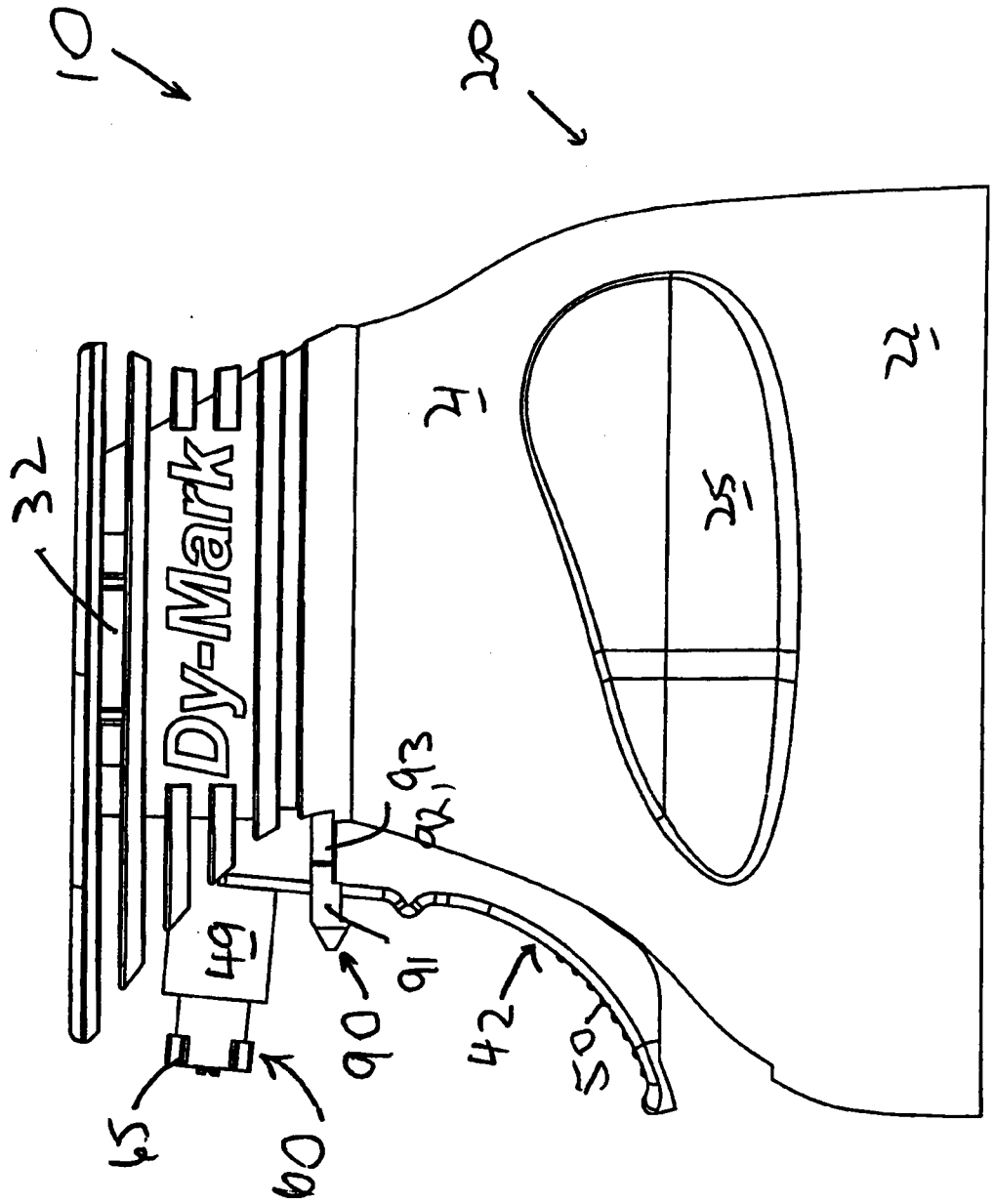


FIG. 6

7/8

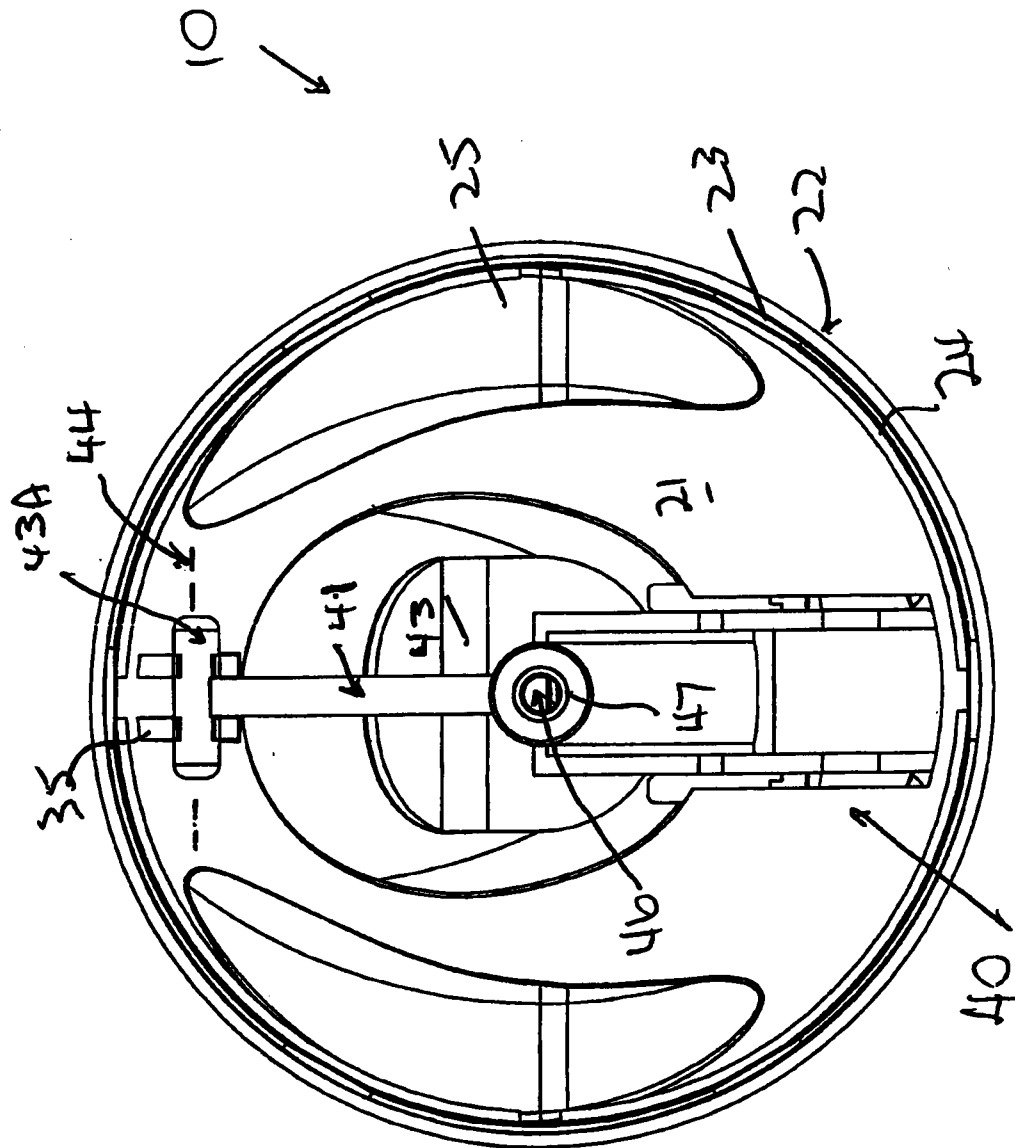
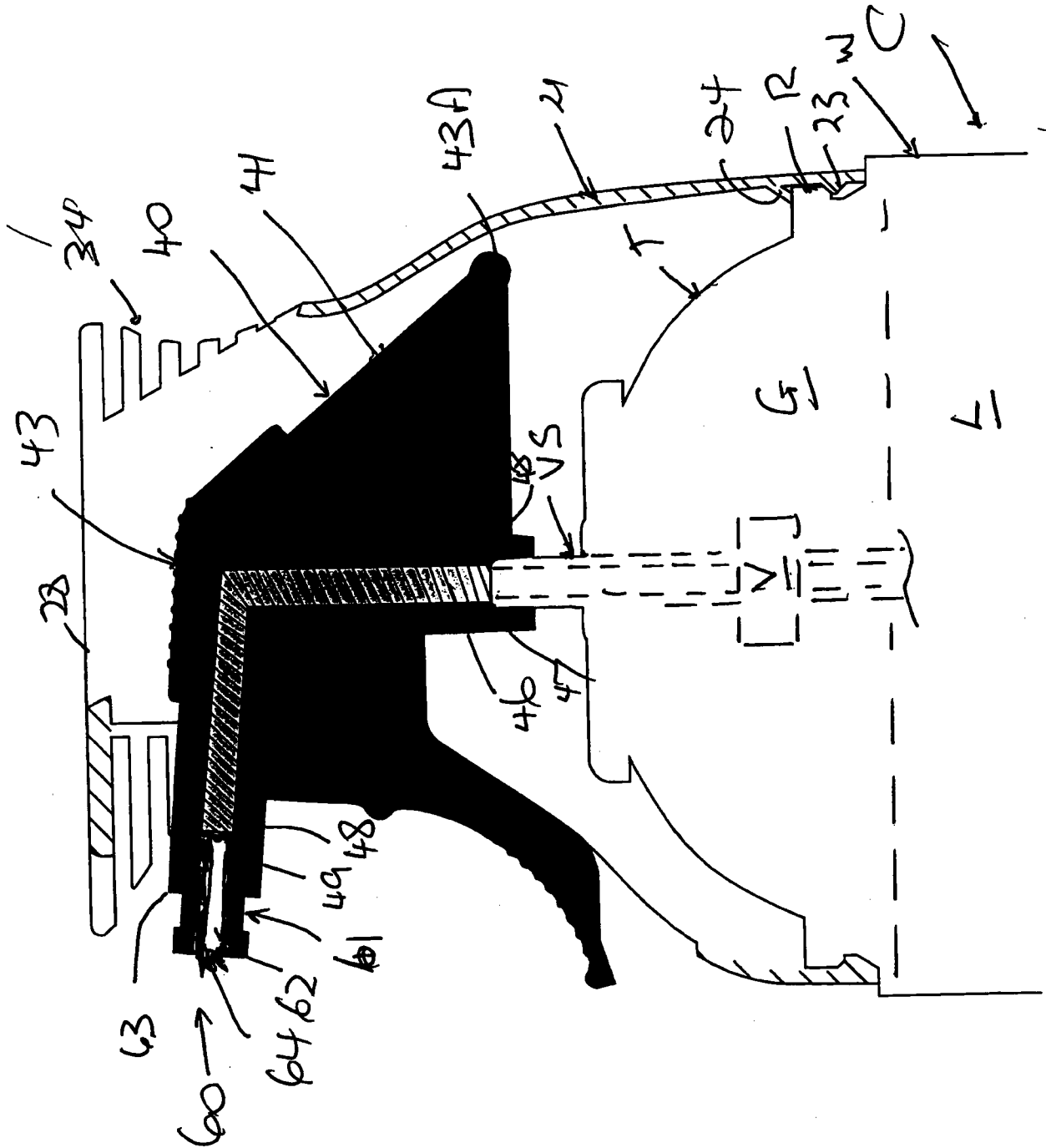


FIG. 7

8/8

FIG. 8



INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU2012/000105

A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl.

B05B 9/04 (2006.01)

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)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
WPI, EPODOC, Google Patents, Esp@cenet; IPC Marks - B05B17/04, B05B1/02/LOW, B05B11/00/LOW, B65D83/14/LOW, B05B9/03/LOW, B05B3/02/LOW; Key Words - ROTAT+, REVOLV+, CIRCULAR+, VALV+, ACTUAT+, OPERAT+, BUTTON?, TRIGGER+, SWITCH+, NOZZL+, OUTLET+, AEROSOL+, (PRESS+ 3D (OR CONTAIN+, BOTTL+, JAR?;

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2004/078635 A2 (SEAQUIST PERFECT DISPENSING FOREIGN, INC.) 16 September 2004 See whole document	
A	US 5667138 A (CRAMPTON) 16 September 1997 See whole document	
A	JP 2008 – 030798 A (MITANI VALVE CO LTD) 14 February 2008. English Abstract retrieved from WPI database See Abstract	
A	JP 2002 – 347862 A (TOYO AEROSOL KOGYO KK) 04 December 2002. English Abstract retrieved from WPI database See Abstract	

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

* Special categories of cited documents:	
"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"E" earlier application or patent but published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search
10 April 2012

Date of mailing of the international search report
12/04/2012

Name and mailing address of the ISA/AU
AUSTRALIAN PATENT OFFICE
PO BOX 200, WODEN ACT 2606, AUSTRALIA
E-mail address: pct@ipaustralia.gov.au
Facsimile No. +61 2 6283 7999

Authorized officer
PRAVEEN JAIN
AUSTRALIAN PATENT OFFICE
(ISO 9001 Quality Certified Service)
Telephone No : +61 2 6222 3653

INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU2012/000105

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 2002 - 166982 A (SHENGYI CAN MFR CO LTD) 11 June 2002. English Abstract retrieved from WPI database See Abstract	

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/AU2012/000105

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report			Patent Family Member				
WO	2004078635	BR	PI0407984	CN	1756715	CN	101575039
		EP	1599409	EP	2143661	JP	2006520306
		JP	2009173350	US	2005017027	US	7487891
		US	2008210710	US	8100298	US	2008179347
		US	8127968				
US	5667138	CA	2142503	CA	2163016	EP	0684081
		EP	0764057	JP	8173866	JP	H10503703
		US	5492275	US	5740964	WO	9531291
JP	2008030798	NONE					
JP	2002347862	NONE					
JP	2002166982	NONE					
Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.							
END OF ANNEX							