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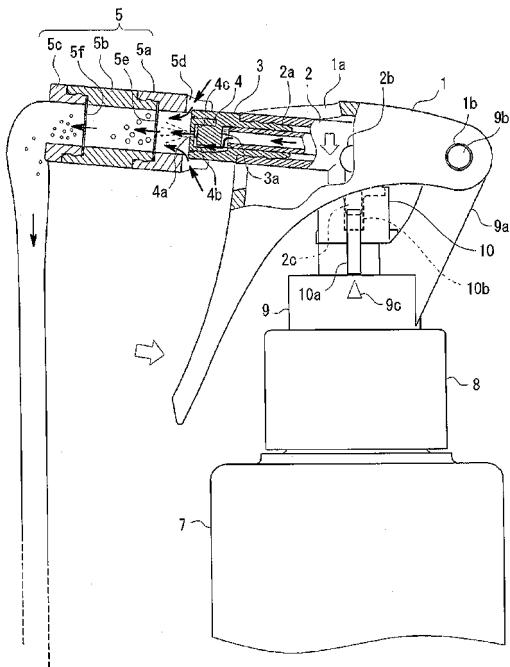
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### (54) ATTACHMENT FOR FOAMING CONTAINER CONTENTS, AND PUMP PRODUCT AND AEROSOL PRODUCT PROVIDED WITH AN ATTACHMENT FOR FOAMING CONTAINER CONTENTS

(57) Disclosed is a means to improve the foaming action or assembly efficiency of liquid content-dispensing mechanisms that are provided with a foaming function, and to allow foam dispensing from liquid content-dispensing mechanisms that are not provided with said foaming function. A foaming attachment (5) comprising cylindrical parts (5a, 5b, 5c) and mesh foam-forming members (5e, 5f) is externally attached to the liquid content-dispensing orifice (4a). The external attachment eliminates size restrictions on the cylindrical parts or meshes during fabrication of same. Contents of the container body (7) that are dispensed from the dispensing orifice (4a) by operation of the trigger lever (1) incorporate air from a slit (5d) while being made into a foam by stirring effects that result from passage through the meshes (5e, 5f) and are dispensed into an external space.

FIG. 2



**Description****TECHNICAL FIELD**

**[0001]** The present invention relates to foam generating attachments attached for use to outer surfaces of discharge holes of common pump containers, aerosol containers and the like that contain various liquid contents

**[0002]** In other words, the present invention relates to a cylindrical member attached eternally, in a sense, and having a function of foaming the liquid contents flowing in from the discharge hole of the pump container or the like to which the cylindrical member is attached by making the liquid contents pass through a mesh and the like inside the cylinder and discharging the contents to outer space

**[0003]** The applicable liquid contents include, for example, soaps, sanitizers, cosmetics, milky lotions, shaving foams, hair styling mousses, detergents, hair dyes, shampoos, conditioners, insecticides and various others as will be described later

**[0004]** It should be noted that the word "container" is used herein to indicate not only a container body containing the liquid contents, but also a general arrangement from the container body to a nozzle. Also, the side of the discharge hole of the foam generating attachment (the left side in Fig 1 and other drawings) is referred to as "front", and the side of the nozzle that is opposite thereto (the right side in Fig. 1 and other drawings) is referred to as "back",

**BACKGROUND ART**

**[0005]** A discharging mechanism having a foam generating function of liquid contents contained in a pump container and the like is disclosed, for example, in the following Patent document 1.

**[0006]** In the discharging mechanism according to the Patent document 1, a recess is provided at the tip (discharge hole) of a spraying nozzle for the container contents (nose drops), and a cylindrical nozzle tip for foam generation, together with a mesh member, is attached into the recess"

**[0007]** In the state where the nozzle tip is attached inside the recess at the tip of the spraying nozzle,

- (11) the mesh member is disposed at a contents inflow opening of the nozzle tip, and
- (12) an outside air flow passage to a passage area upstream from the mesh member is set between an outer periphery of the nozzle tip and an inner periphery of the recess at the tip of the spraying nozzle

**CITATION LIST****PATENT DOCUMENT**

5 **[0008]** Patent document 1: Japanese Unexamined Patent Application Publication No 2008-132406

**SUMMARY OF INVENTION****10 TECHNICAL PROBLEM**

**[0009]** With the conventional liquid contents discharging mechanism having the foam generating function as described above, the recess is termed at the discharge hole at the tip of the nozzle itself, and the mesh member for foam generation and the cylindrical nozzle tip corresponding to its downstream member are incorporate in the recess, in a sense,

**[0010]** Specifically, the cylindrical nozzle tip for foam generation is provided in an inner space area constituting a part of a nozzle tip portion as a discharging passage on the side of outputting the liquid contents

**[0011]** As a matter of course, this limits longitudinal and radial sizes of the nozzle tip to be within a size range 25 of the inner space area of the nozzle, which makes it difficult to use the nozzle tip having the size large enough to generate sufficient foam of the liquid contents.

**[0012]** Moreover, it is necessary to incorporate the small nozzle tip, mesh member and the like into the narrow inner space area at the tip of the nozzle, which makes it difficult to achieve improvement in efficiency of assembly work of the nozzle as a whole

**[0013]** It is therefore an object of the present invention to provide a foam generating attachment formed by a 35 cylindrical unit to be attached externally, in a sense, to a discharge hole for liquid contents in order to remove restrictions on the size of the foam generating member in manufacturing, and to facilitate attaching work of the foam generating member to the nozzle.

**[0014]** Further, it is another object of the present invention to allow various liquid contents discharging mechanisms including a pump container and an aerosol container that do not include a foam generating function to discharge the contents in foam.

**45 SOLUTION TO PROBLEM**

**[0015]** According to the present invention, the above problems are solved as follows

50 **(1)** A foam generating attachment for container contents is used, which includes:

55 a cylindrical unit (for example, a backside joint bushing 5a, a middle joint bushing 5b, a front side joint bushing 5c, an upstream molded member 6a and a downstream molded member 6b that will be described later) attached to an outer

surface of a discharge hole (for example, holes 4a that will be described later) of the container containing liquid contents to function as a contents passage area extending from the discharge hole to an exterior; an inside and outside communication unit (for example, slits 5d and holes 6b that will be described later) provided on a side of the discharge hole of the contents passage area in order to take in outside air; and a foam generating operation unit (for example, backside meshes 5e and 6c, front side meshes 5f and 6e, a lattice mesh 11, a honeycomb mesh 12, a circular mesh 13 and a target mesh 14 that will be described later) provided in the contents passage area on a side downstream from the inside and outside communication unit.

(2) In the above (1),  
the foam generating operation unit is in the form of a mesh set to cross an inner periphery of the cylindrical unit  
(3) In the above (1) and (2),  
the foam generating operation units are set at parts spaced apart from each other in a flow direction of the contents in the cylindrical unit  
(4) In the above (3),

the cylindrical unit consists of

an upstream member having a contents inflow side portion, a first foam generating operation unit and the inside and outside communication unit that are molded into a single unit, and a downstream member having a contents outflow side portion and a second foam generating operation unit that are molded into a single unit.

**[0016]** The present invention concerns the foam generating attachment for the container contents structured as above, and the pump product and the aerosol product including the foam generating attachment

#### ADVANTAGEOUS EFFECTS OF INVENTION

**[0017]** According to the present invention, the foam generating attachment formed by the cylindrical unit to be attached externally, in a sense, to the discharge hole for liquid contents is used as described above, which makes it possible to remove restrictions on the size of the foam generating member in manufacturing, and to further facilitate the attaching work itself of the foam generating member

**[0018]** Moreover, it is also possible to allow the various liquid contents discharging mechanisms including the pump container and the aerosol container that do not

include the foam generating function to discharge the contents in foam.

#### BRIEF DESCRIPTION OF DRAWINGS

##### [0019]

Fig. 1 is an explanatory view showing a rest mode of a discharging mechanism to which a foam generating attachment having two front and back meshes in total is attached;  
Fig 2 is an explanatory view showing a discharging mode of the discharging mechanism shown in Fig 1;  
Figs. 3 are explanatory views showing examples of shapes of the mesh for the foam generating attachment shown in Fig 1;  
Fig. 4 is an explanatory view of a foam generating attachment that consists of only two pieces of cylindrical molded member and is different from the one shown in Fig 1;  
Fig. 5 is an explanatory view showing a discharging state of the liquid contents in the discharging mode shown in Fig. 2;  
Fig. 6 is an explanatory view showing foamed contents obtained by the discharging operation shown in Fig 5;  
Fig. 7 is an explanatory view showing a part of the discharging mechanism in which a foam generating attachment having only one backside mesh is attached to an outer periphery of a nozzle;  
Fig. 8 is an explanatory view showing the discharging state of the liquid contents of the discharging mechanism shown in Fig. 7 in the discharging mode;  
Fig 9 is an explanatory view showing the foamed contents obtained by the discharging operation shown in Fig. 8;  
Fig 10 is an explanatory view showing a part of the discharging mechanism in which a foam generating attachment having only one front side mesh is attached to the outer periphery of the nozzle;  
Fig 11 is an explanatory view showing the discharging state of the liquid contents of the discharging mechanism shown in Fig 10 in the discharging mode;  
Fig. 12 is an explanatory view showing the foamed contents obtained by the discharging operation shown in Fig 11;  
Fig. 13 is an explanatory view showing the discharging state of the liquid contents of the discharging mechanism in the discharging mode, to which an attachment without a mesh is attached to the outer periphery of the nozzle; and  
Fig 14 is an explanatory view showing the foamed contents obtained by the discharging operation shown in Fig. 13.

#### DESCRIPTION OF EMBODIMENTS

**[0020]** Preferred embodiments of the present invention

(Fig. 1 to Fig. 12) and its comparative examples (Fig. 13 and Fig. 14) will be explained with reference to Fig. 1 to Fig. 14.

**[0021]** As explained above, a foam generating attachment of the present invention is applicable to both a pump container and an aerosol container, but a case of the pump container is illustrated in the drawings and explained in the following description only for the reason of simplifying explanation.

**[0022]** When a component in the drawings has a reference numeral added with an alphabet (for example, an opening 1a), it basically means that the component is a part of a component having the same reference numeral (for example, a trigger lever 1).

**[0023]** It should be noted that reference numerals 6 to 6e are used only in Fig. 4, a reference numeral 5' only in Fig. 7, a reference numeral 5" only in Fig. 10, and L1 to L5 only in Fig. 1, respectively

**[0024]** Fig 1, Fig. 2, Fig. 4, Fig 7 and Fig. 10 illustrate:

a rotatable trigger lever 1 for discharging mode setting operation;  
an opening 1a formed in an upper portion of a front side surface and a front portion of an upper surface extending therefrom of the trigger lever to allow vertical movement of a nozzle 3 (piston 2) that will be described later;  
a pair of holes 1b formed in both surfaces of the trigger lever, respectively, to serve as a center of rotation of the trigger lever by engaging with shafts 9b that will be described later;  
a cylindrical piston 2 in an L-shape that moves downward with rotating operation of the trigger lever 1 to move to a discharging mode position;  
an inner passage for contents 2a;  
a known column 2b (cam follower) formed on an outer periphery of the piston to convert the rotation of the trigger lever 1 to the downward movement of the piston;  
a vertical rib 2c formed on the outer periphery of the piston to serve as a member to prevent erroneous operation (to avoid the discharge mode setting) by cooperating with a vertical groove 10b of a member to prevent misoperation 10 that will be described later;  
a nozzle 3 fittingly attached at the tip of the piston 2; a first space area 3a formed on a contents inflow side of the nozzle for passage of the contents;  
a nozzle tip 4 having a known spiral groove for atomization at its bottom and fittingly attached to a recess at the tip of the nozzle 3;  
a hole 4a allowing the contents to flow out;  
a groove 4b formed on an inner periphery of the nozzle tip for the passage of the contents;  
a second space area 4c formed on the side of the bottom of the nozzle tip for the passage of the contents;  
a foam generating attachment 5 retrofitted on an out-

er periphery of the tip of the nozzle 3;  
a backside joint bushing 5a;  
a middle joint bushing 5b fittingly attached to the backside joint bushing;  
a front side joint bushing 5c fittingly attached to the middle joint bushing;  
slits, for example the two slits, 5d for air intake formed at a back end of the backside joint bushing 5a;  
a backside mesh 5e sandwiched between the backside joint bushing 5a and the middle joint bushing 5b;  
a front side mesh 5f sandwiched between the middle joint bushing 5b and the front side joint bushing 5c;  
a foam generating attachment 5' having the backside mesh 5e only with the omission of the front side mesh 5f (refer to Fig. 7);  
a foam generating attachment 5" having the front side mesh 5f only with the omission of the backside mesh 5e (refer to Fig 10);  
a foam generating attachment 6 with two molded members fittingly attached to each other (refer to Fig 4);  
a cylindrical upstream molded member 6a as one of the components of the foam generating attachment;  
holes, for example the two holes, 6b for air intake formed in the upstream molded member;  
a backside mesh 6c for foam generation as a part of the upstream molded member;  
a cylindrical downstream molded member 6d as the other component of the foam generating attachment;  
a front side mesh 6e for foam generation as a part of the downstream molded member;  
a container body 7 containing liquid contents;  
a screw cap 8 screwed to an opening in the container body 7;  
a cylindrical cover body 9 combined with a housing (illustration omitted) into a single unit to protect the piston 2 and a known pump mechanism provided herein;  
an arm 9a extending from a small-diameter portion on an upper side of the cover body;  
a pair of the shafts 9b that are formed on an outer surface of an upper end side of the arm and fitted into the pair of the holes 1b of the trigger lever 1 for use, to serve as a central shaft of the rotating operation of the trigger lever;  
a mark 9c attached to an outer periphery of a large-diameter portion on a lower side of the cover body to serve as an indicator of a position allowing the discharging mode setting of the member to prevent misoperation 9 that will be described later;  
the member to prevent misoperation 10 rotatably attached to the small-diameter portion on the upper side of the cover body 8 without vertical movement to avoid the downward movement of the piston 2, that is, to prevent the discharging mode setting operation, according to its position of rotation;  
a knob 10a for rotating operation of the member to

prevent misoperation;  
 a vertical groove 10b permitting ingress of the vertical rib 2c of the piston 2;  
 a lattice mesh 11;  
 a honeycomb mesh 12;  
 a circular mesh 13;  
 a target mesh 14;  
 a length L1 of the foam generating attachment;  
 a length L2 from the hole 4a of the nozzle tip 4 to the backside mesh;  
 a length L3 from the backside mesh 5e to the front side mesh 5f;  
 a length L4 from the front side mesh 5f to a discharge hole of the foam generating attachment; and  
 a length L5 in a longitudinal direction at a boundary between the passage for the contents and the slits 5d of the foam generating attachment

**[0025]** It should be noted that the trigger lever 1, the piston 2, the nozzle 3, the nozzle tip 4, the foam generating attachments 5, 5', 5" and 6, the container body 7, the screw cap 8, the cover body 9, the member to prevent misoperation 10, the lattice mesh 11, the honeycomb mesh 12, the circular mesh 13 and the target mesh 14 are respectively made of plastic including polypropylene, polyethylene, polyacetal, nylon, polybutylene terephthalate or the like

**[0026]** In the contents discharging mechanism as illustrated, the components peculiar to the present invention are the attachments 5, 5', 5" and 6 only, and the contents discharging mechanism (pump container) itself, without the attachment, is for general purpose use.

**[0027]** In the discharging mode as shown in Fig. 2, in which the trigger lever 1 in a rest mode as shown in Fig. 1 is being pulled and rotated counterclockwise in the drawing, a known pump mechanism (illustration omitted) that is provided inside the screw cap 8, the cover body 9 and the like operates to close its intake valve and open its discharge valve

**[0028]** By this action of the pump, the liquid contents contained in a storage space area between the intake valve and the discharge valve pass through "the passage for the contents 2a - the first space area 3a - the groove 4b - the second space area 4c - the hole 4a" to flow into the inner space area of the foam generating attachment 5 in mist.

**[0029]** The liquid contents flowed into the foam generating attachment 5 pass through the backside mesh 5e and also the front side mesh 5f to be discharged to outer space

**[0030]** When discharged to the outer space, the liquid contents hit against the backside mesh 5e, the front side mesh 5f and the inner periphery of the foam generating attachment 5 to be stirred and become a finer state, in a sense, so that the liquid contents change to foamed contents including air therein

**[0031]** Outside air is drawn in from the slits 5d and taken into the attachment corresponding to the amount of

air used for generating the foamed contents, or corresponding to the flow of the liquid contents flowing into the foam generating attachment 5.

**[0032]** The lattice mesh 11, the honeycomb mesh 12, the circular mesh 13 and the target mesh 14 as shown in Figs 3 and the like are used as the backside mesh 5e and the front side mesh 5f incorporated in the foam generating attachment 5. This also applies to the respective meshes in the foam generating attachments 5', 5" and 6

**[0033]** It should be noted that the lattice mesh 11 is used in verification of contents discharging states as shown in Fig. 5, Fig. 6, Fig. 8, Fig. 9, Fig. 11 and Fig. 12

**[0034]** Specifications of the foam generating attachments 5, 5' and 5" and the lattice mesh 11 used in the verification are as follows (refer to Fig. 1):

(21) the length L1 of the foam generating attachment: 24.9 mm, the outside diameter: 11.6 mm, the inside diameter: 7.1 mm;

(22) the length L2 from the hole 4a of the nozzle tip 4 to the back surface of the backside mesh 5e: 5.0 mm;

(23) the length L3 from the back surface of the backside mesh 5e to the back surface of the front side mesh 5f: 105 mm;

(24) the length L4 from the back surface of the front side mesh 5f to the discharge hole of the foam generating attachment: 6.1 mm;

(25) the length L5 in the longitudinal direction at the boundary between the passage for the contents and the slits 5d of the foam generating attachment: 1.5 mm, the width in the radial direction at the boundary: 0.8 mm; and

(26) the size of each hole in the lattice mesh 11: 1.3 mm x 1.3 mm, the interval between adjacent holes: 0.45 mm, the thickness of the mesh: 0.45 mm

**[0035]** The foam generating attachments with the lattice meshes that meet the above specifications are attached to the pump product shown in Fig 1, and the contents discharging states from the attachments are verified. It should be noted that a facial cleanser (Biore Marshmallow Whip manufactured by Kao Corporation) is used as the liquid contents A resin wire having a diameter of 0.45 mm is netted and used as the lattice mesh 11

**[0036]** Fig 5 and Fig. 6 are photographed pictures of the contents discharging state when the foam generating attachment 5 that has both of the front side mesh 5f and the backside mesh 5e is attached to the pump product shown in Fig 1 (refer to Fig. 2).

**[0037]** Fig. 8 and Fig 9 are photographed pictures of the contents discharging state when the foam generating attachment 5' that has the backside mesh 5e only is attached to the pump product shown in Fig. 1 (refer to Fig. 7)

**[0038]** Fig. 11 and Fig. 12 are photographed pictures of the contents discharging state when the foam generating attachment 5' that has the front side mesh 5f only is attached to the pump product shown in Fig. 1 (refer to

Fig. 10).

**[0039]** As is clear from the verification results, it is possible to obtain the smooth, continuous, and unified foamed contents with every foam generating attachment attached, that is, the foam generating attachment 5 having the front side and the backside meshes 5f and 5e, the foam generating attachment 5' having the backside mesh 5e only, and the foam generating attachment 5" having the front side mesh 5f only

**[0040]** If it is necessary to compare these by visual impression, the contents discharged from the foam generating attachment 5 are the most unified and creamy (refer to Fig. 5 and Fig. 6), followed by the contents discharged from the foam generating attachment 5" (Fig. 11 and Fig. 12). However, the contents discharged from the foam generating attachment 5' are sufficiently unified (refer to Fig 8 and Fig. 9).

**[0041]** Fig 13 and Fig 14 are photographed pictures of the contents discharging state when an attachment that does not include a mesh is attached to the pump product shown in Fig. 1,

**[0042]** Basic characteristics of the foam generating attachment according to the present invention are that the cylindrical member attached to the outside of the discharge hole of the pump product and the aerosol product is provided, and the mesh and the like for foam generating operation is provided in the passage for the contents that is provided inside the cylindrical member

**[0043]** It is therefore needless to say that the numerical values of the foam generating attachments 5, 5' and 5" and the lattice mesh 11 that are given above as the specifications are only one of the examples,

**[0044]** The foam generating attachment 6 shown in Fig. 4 consists of the two components only (the upstream molded member 6a and the downstream molded member 6d).

**[0045]** An inside diameter of the hole 6b for air intake formed in the upstream molded member 6a is 1.2 mm. The values of the parts corresponding to the above-described lengths L2 to L4 are the same as those of the foam generating attachments 5, 5' and 5"

**[0046]** When the rotating operation of the trigger lever 1 is stopped, the piston 2 moves upward by the action of a coil spring (illustration omitted) of the known pump mechanism. Then, the trigger lever 1 rotates clockwise in the drawing by a camming action with the column 2b by the movement of the piston 2 to return to the rest mode as shown in Fig. 1.

**[0047]** It is needless to say that the present invention is not limited to the above-described embodiments, and, for example, projections and depressions, ribs and the like formed on the inner periphery of the foam generating attachment may be used as the component to allow the liquid contents to be stirred and foamed, other than the above-described mesh.

**[0048]** Moreover, the number of the slits 5d for the air intake formed in the foam generating attachments 5, 5' and 5" and the number of the holes 6b for the air intake

formed in the foam generating attachment 6 are arbitrary.

**[0049]** The above-described foam generating attachments are applicable to the pump products and the aerosol products that use pressing down type, spout type, and other types of operation buttons, and that subject the liquid contents to direct injection or injection in foam

**[0050]** The pump products and the aerosol products, to which the present invention is applied, are for various uses including washing agents, cleaning agents, antiperspirants, coolants, anti-inflammatory agents for muscles, hair styling products, hair treatment products, hair dyes, hair tonics, cosmetics, shaving foams, foods, dietary supplements (vitamins and the like), drugs, quasi-drugs, paints, agents for gardening, repellents (insecticides), cleaners, deodorizing agents, ironing starches, polyurethane foams, fire-extinguishing agents, adhesives, lubricants and the like

**[0051]** The contents contained in the container body are mainly liquid, but creamy, gel-formed and other forms of the contents may be used as long as the contents can be sprayed and injected. The components included in the contents may include, for example, powder materials, oil constituents, alcohols, surface-active agents, high molecular compounds, active components for various uses, water and the like

**[0052]** As the powder materials, metal salt powder, inorganic material powder, resin powder and the like are used. For example, talc, kaoline, aluminum hydroxychloride (aluminum salt), calcium alginate, powdered gold, powdered silver, mica, carbonate, barium sulfate, cellulose, a mixture of the above and the like are used

**[0053]** As the oil constituents, silicone oil, palm oil, eucalyptus oil, camellia oil, olive oil, jojoba oil, paraffin oil, myristic acid, palmitic acid, stearic acid, linoleic acid, linolenic acid and the like are used

**[0054]** As the alcohols, monohydric lower alcohol such as ethanol, monohydric higher alcohol such as lauryl alcohol, polyhydric alcohol such as ethylene glycol, glycerin, 1, 3-butylene glycol and the like are used

**[0055]** As the surface-active agents, an anionic surface-active agent such as sodium lauryl sulfate, a nonionic surface-active agent such as polyoxyethylene oleyl ether, an amphoteric surface-active agent such as lauryl dimethyl aminoacetic acid betaine, a cationic surface-active agent such as alkyltrimethylammonium chloride and the like are used.

**[0056]** As the high molecular compounds, methylcellulose, gelatin, starch, casein, hydroxyethylcellulose, xanthan gum, carboxyvinyl polymer and the like are used.

**[0057]** As the active components for the various uses, anti-inflammatory analgesic such as methyl salicylate and indomethacin, antimicrobial products such as sodium benzoate and cresol, insect pest repellents such as pyrethroid and diethyltoluamide, antiperspirants such as zinc oxide, refrigerants such as camphor and menthol, antiasthmatic agents such as ephedrine and adrenaline, sweeteners such as sucralose and aspartame, adhesives and paints such as epoxy resin and urethane, dyes

such as paraphenylenediamine and aminophenol, fire-extinguishing agents such as ammonium dihydrogen phosphate, sodium/potassium hydrogen carbonate and the like are used

**[0058]** Furthermore, suspensions, ultraviolet absorbers, emulsifying agents, moisturizing agents, antioxidants, sequestering agents and the like may be used in addition to the above contents

**[0059]** As gases for discharging the contents in the aerosol products, compressed gases such as carbon dioxide gas, nitrogen gas, compressed air, oxygen gas, noble gas, mixed gas of the above and the like, and liquefied gases such as liquefied petroleum gas, dimethyl ether, fluorocarbon and the like are used

#### REFERENCE SIGNS LIST

#### [0060]

1	trigger level
1a	opening
1b	a pair of holes
2	piston
2a	passage for contents
2b	column (cam follower)
2c	vertical rib
3	nozzle
3a	first space area
4	nozzle tip
4a	hole
4b	groove
4c	second space area
5	foam generating attachment
5a	backside joint bushing
5b	middle joint bushing
5c	front side joint bushing
5d	a plurality of slits
5e	backside mesh
5f	front side mesh
5'	foam generating attachment (refer to Fig 7)
5"	foam generating attachment (refer to Fig 10)
6	foam generating attachment (refer to Fig. 4)
6a	upstream molded member
6b	a plurality of holes
6c	backside mesh
6d	downstream molded member
6e	front side mesh
7	container body
8	screw cap
9	cover body
9a	arm
9b	a pair of shafts
9c	mark
10	member to prevent misoperation
10a	knob
10b	vertical groove
11	lattice mesh
12	honeycomb mesh

13	circular mesh
14	target mesh
L1	length of foam generating attachment
L2	length from hole 4a of nozzle tip 4 to backside mesh
L3	length from backside mesh 5e to front side mesh 5f
L4	length from front side mesh 5f to discharge hole of foam generating attachment
10 L5	length in longitudinal direction at boundary between passage for contents and slit 5

#### Claims

15	1. A foam generating attachment for container contents, comprising:
20	a cylindrical unit attached to an outer surface of a discharge hole of the container containing liquid contents to function as a contents passage area extending from the discharge hole to an exterior;
25	an inside and outside communication unit provided on a side of the discharge hole of the contents passage area in order to take in outside air; and
30	a foam generating operation unit provided in the contents passage area on a side downstream from the inside and outside communication unit.
35	2. The foam generating attachment for the container contents according to claim 1, wherein the foam generating operation unit comprises a mesh set to cross an inner periphery of the cylindrical unit
40	3. The foam generating attachment for the container contents according to claim 1 or claim 2, wherein the foam generating operation units are set at parts spaced apart from each other in a flow direction of the contents in the cylindrical unit.
45	4. The foam generating attachment for the container contents according to claim 3, wherein the cylindrical unit comprises an upstream member having a contents inflow side portion, a first foam generating operation unit and the inside and outside communication unit that are molded into a single unit, and
50	a downstream member having a contents outflow side portion and a second foam generating operation unit that are molded into a single unit.
55	5. A pump product comprising a foam generating attachment for container contents according to any one of claim 1 to claim 4, wherein liquid contents are contained therein.

6. An aerosol product comprising  
a foam generating attachment for container contents  
according to any one of claim 1 to claim 4,  
wherein spraying gas and liquid contents are con-  
tained therein

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FIG. 1

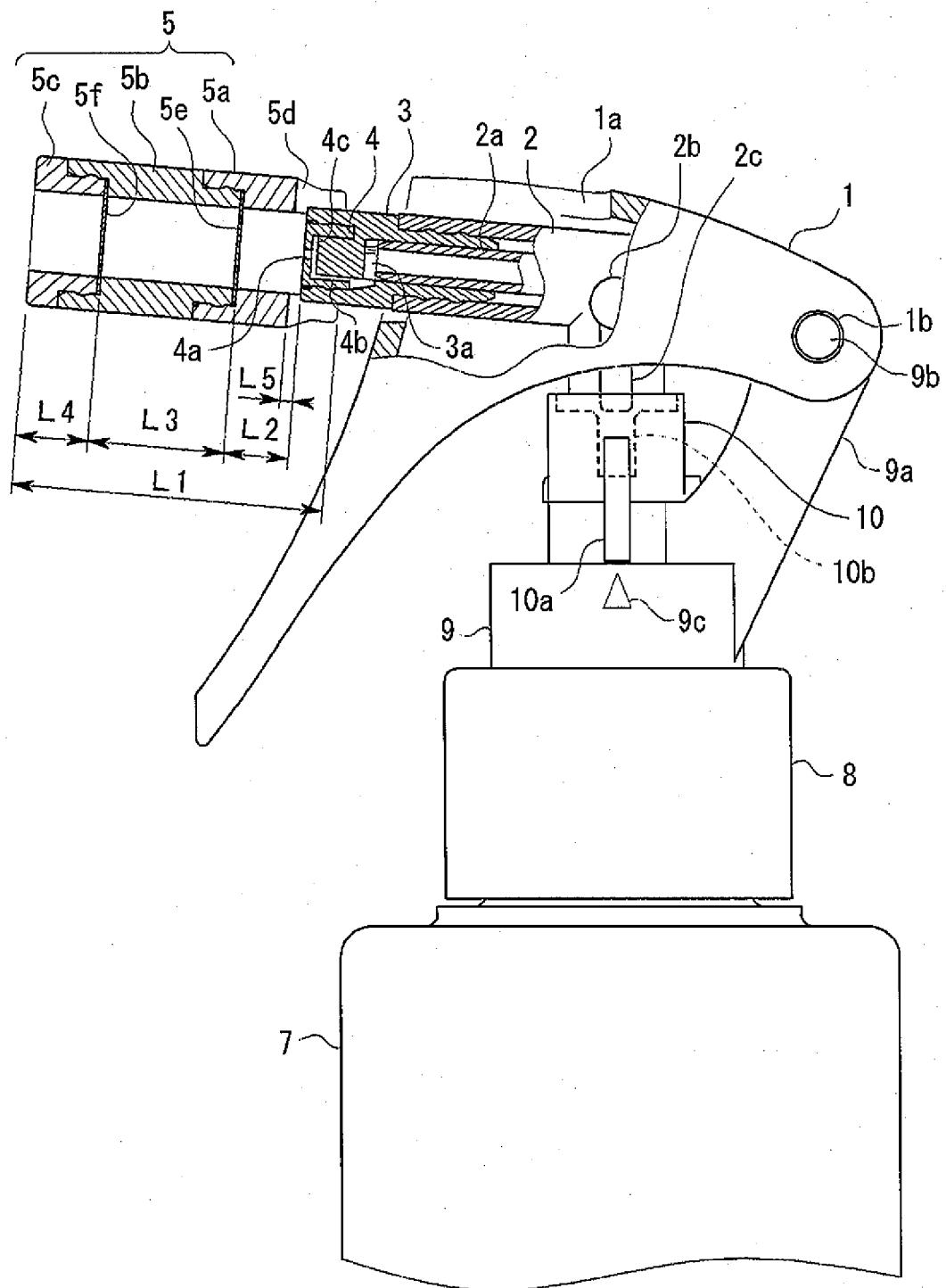


FIG. 2

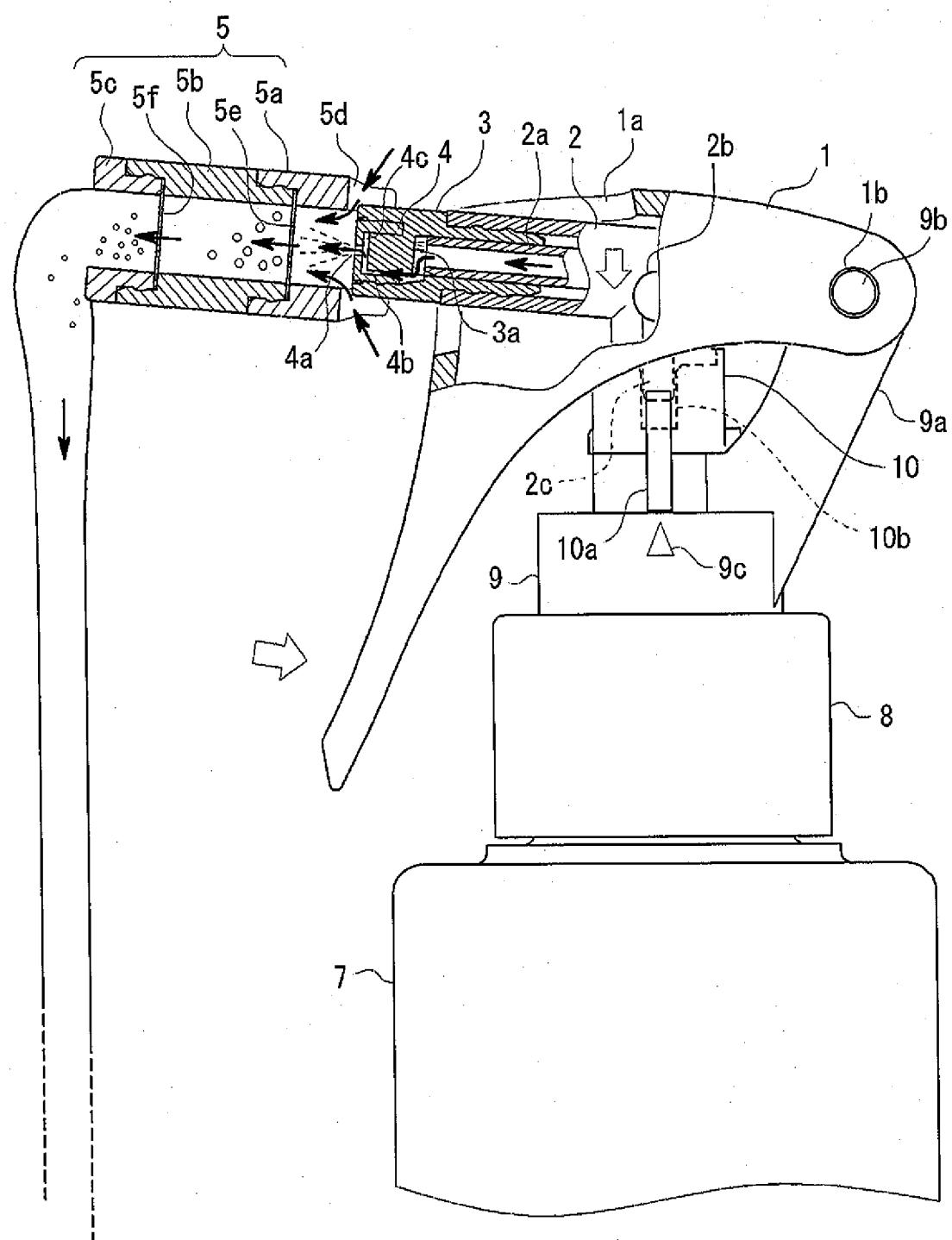
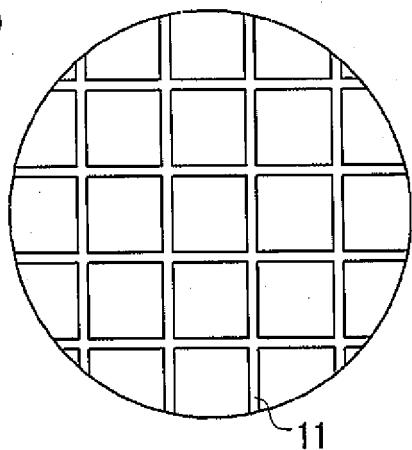
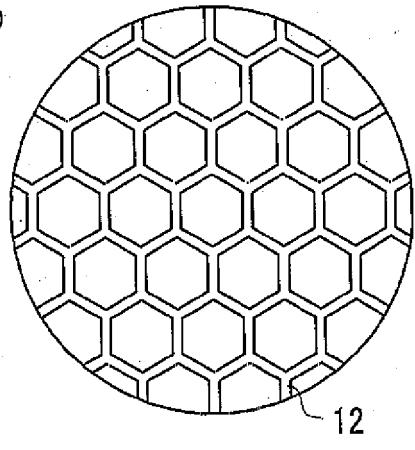


FIG. 3

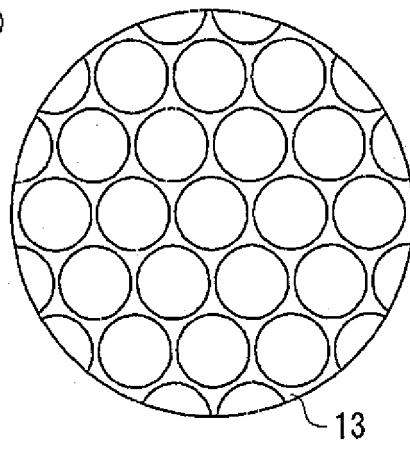
(a)



(b)



(c)



(d)

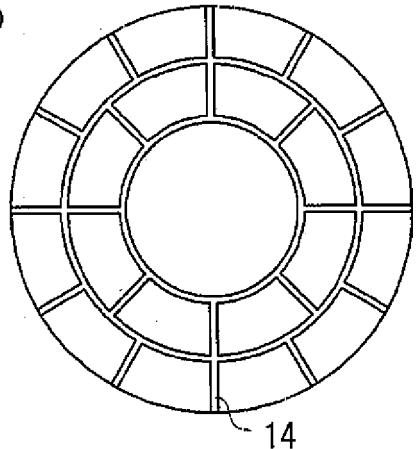


FIG. 4

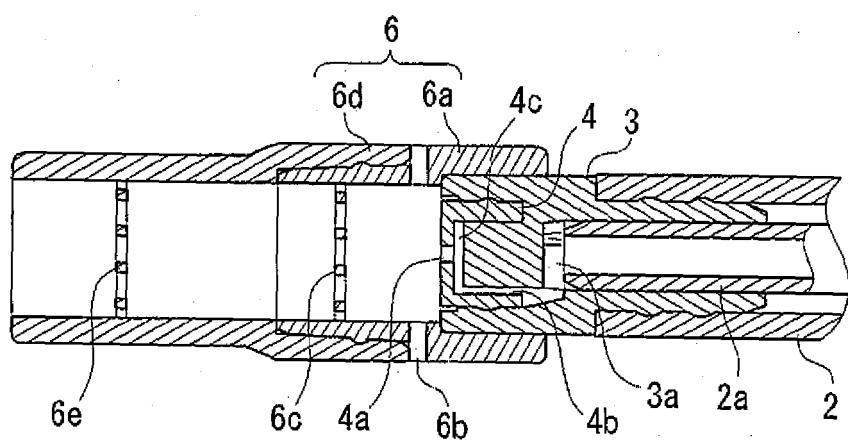


FIG. 5

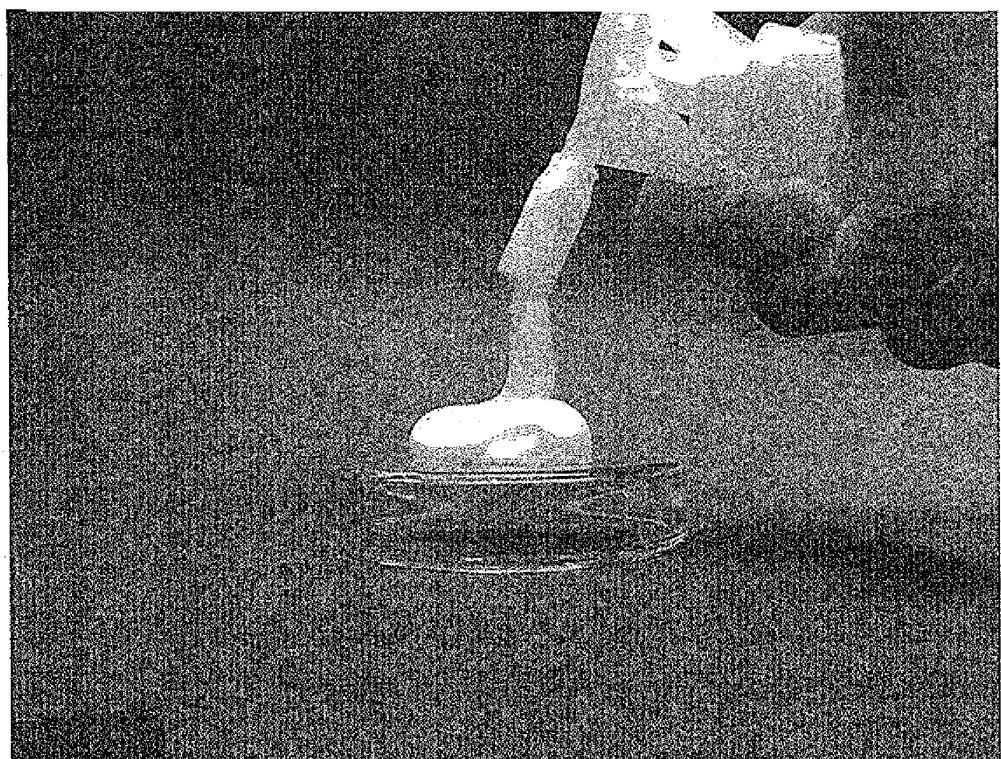


FIG. 6

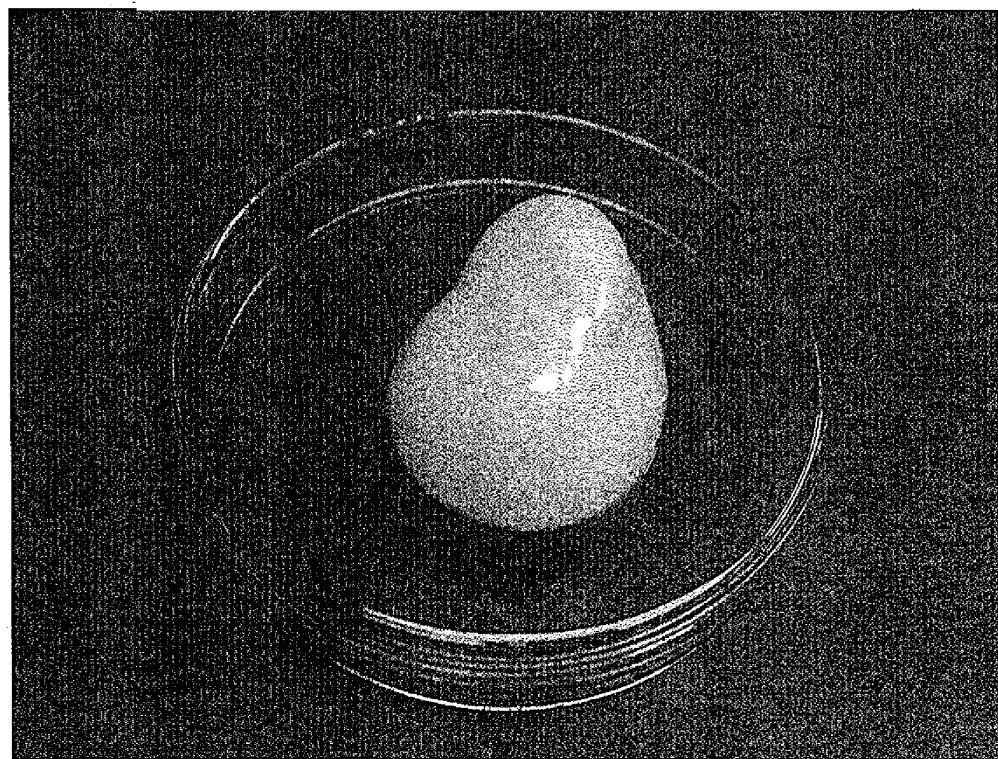


FIG. 7

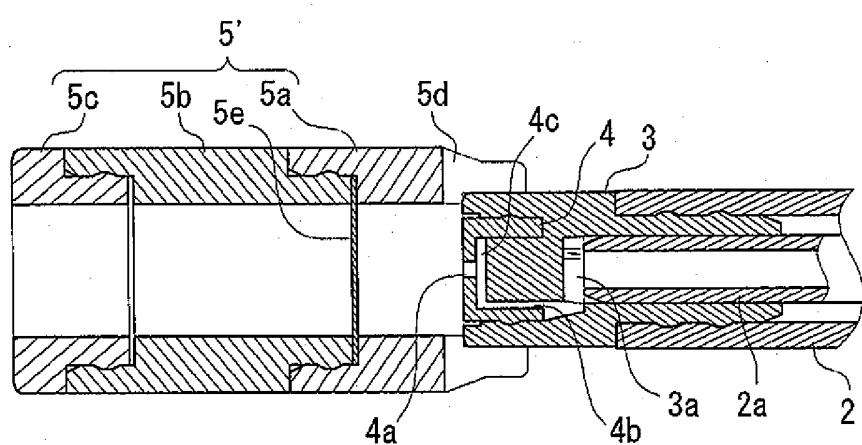


FIG. 8

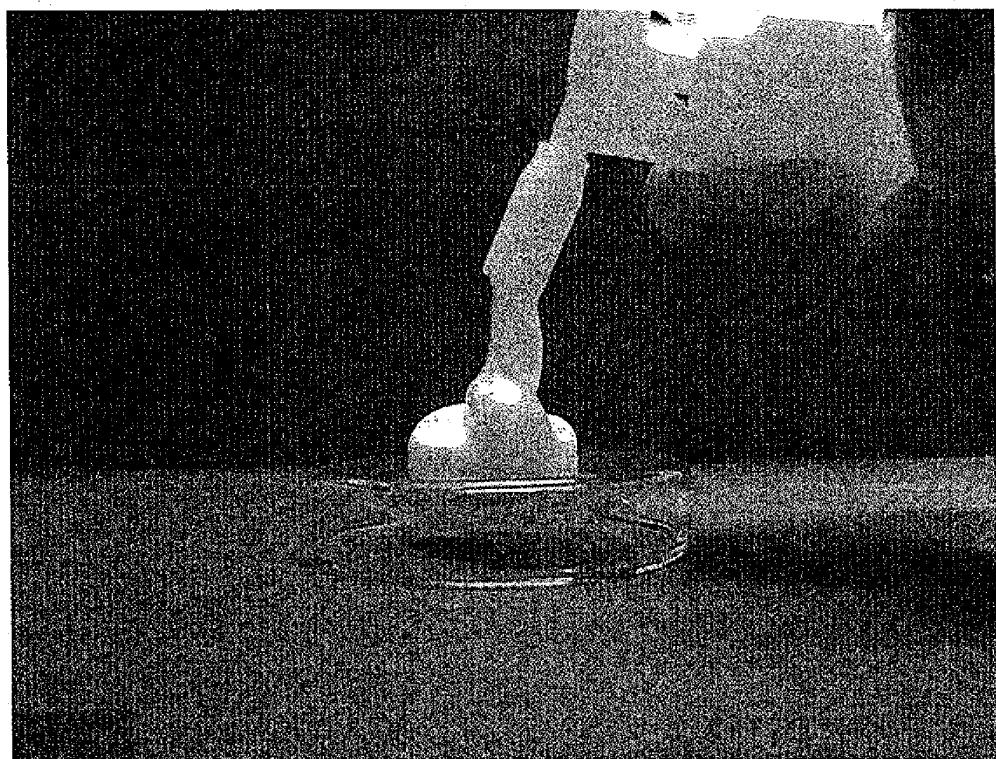


FIG. 9

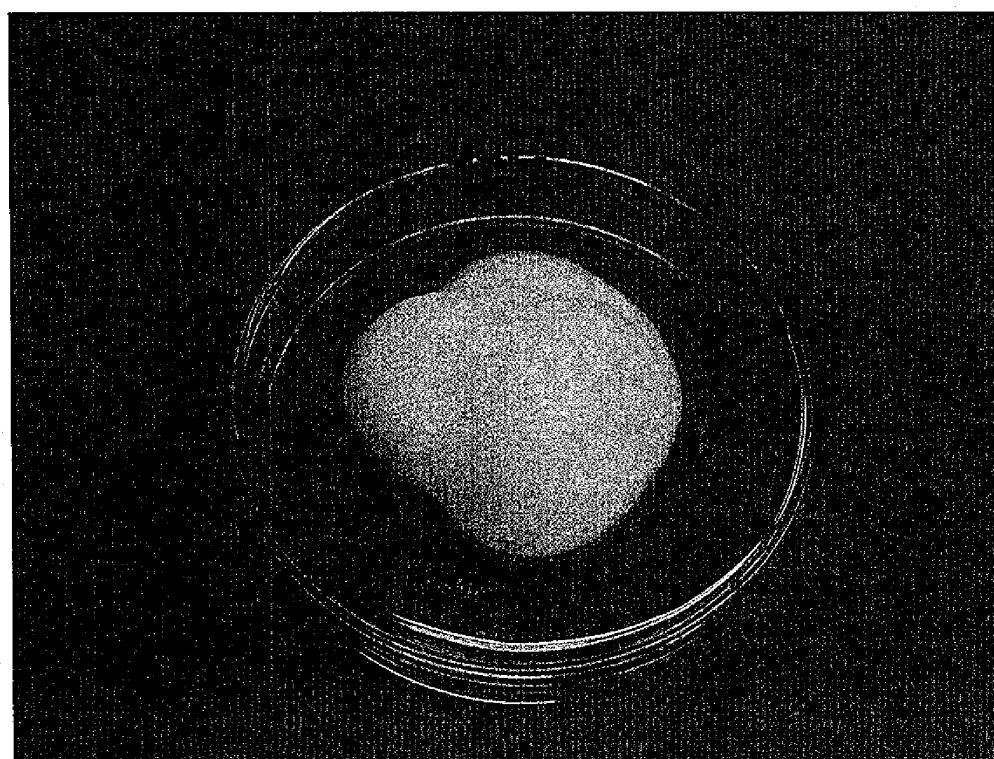


FIG. 10

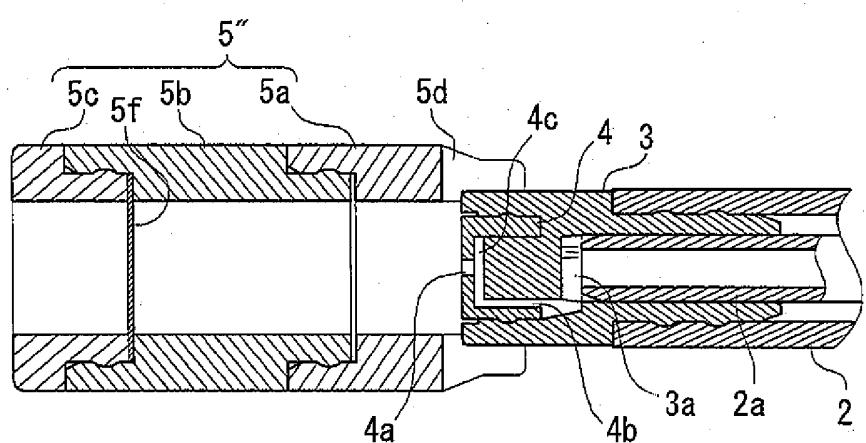


FIG. 11

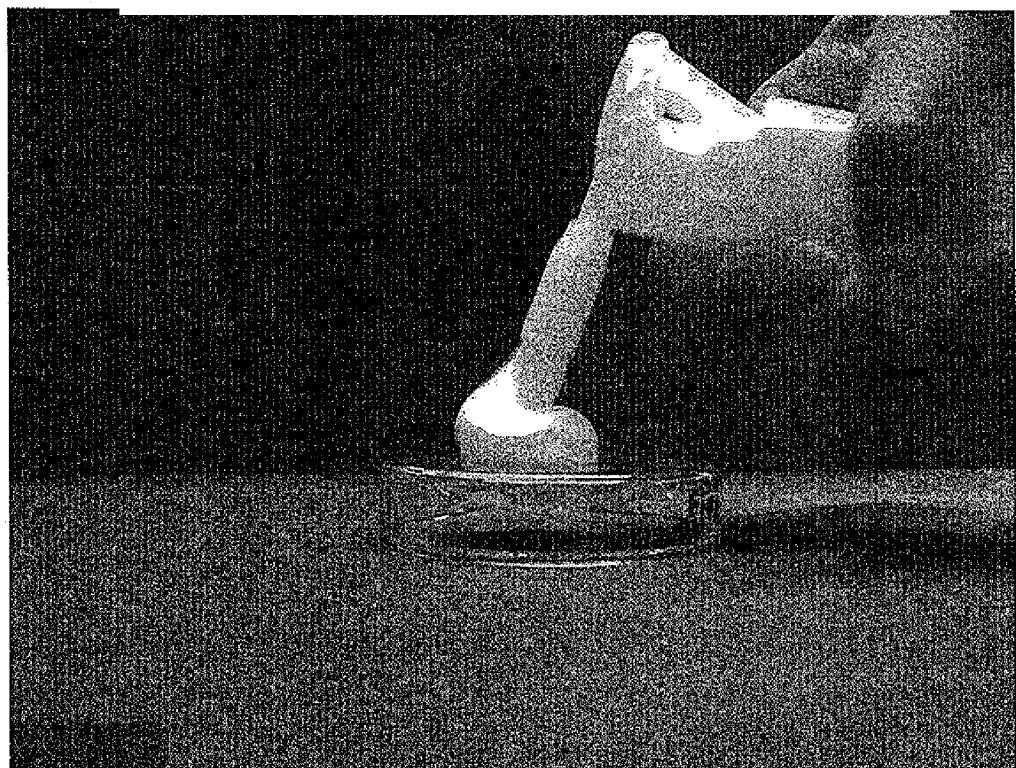


FIG. 12

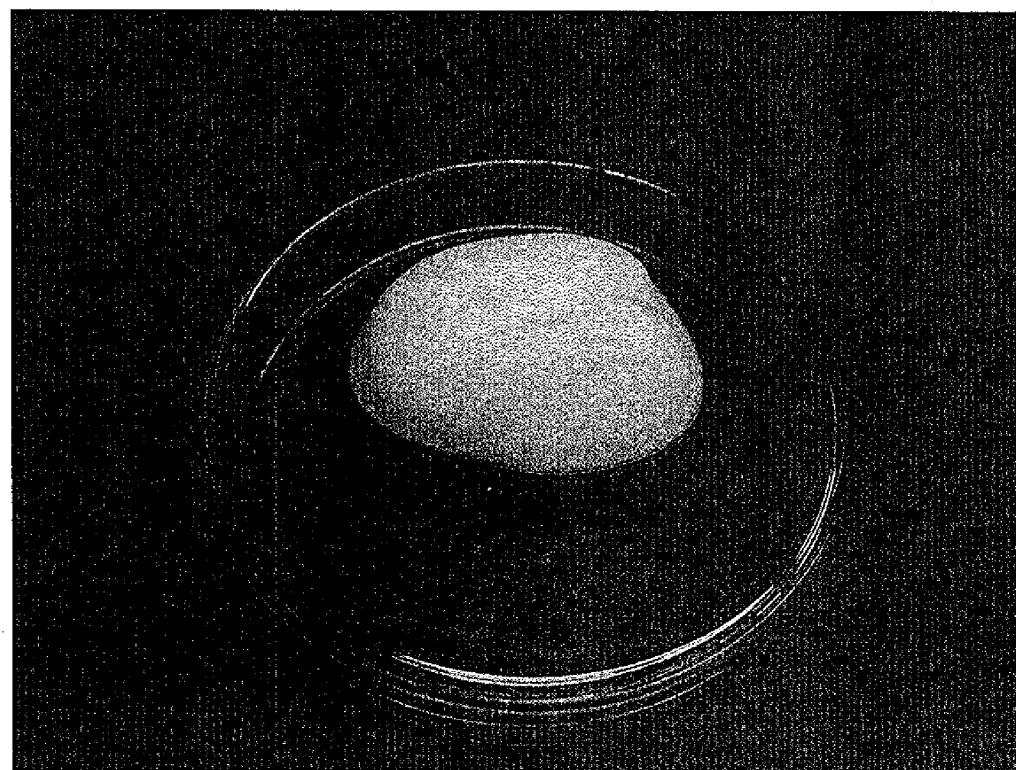
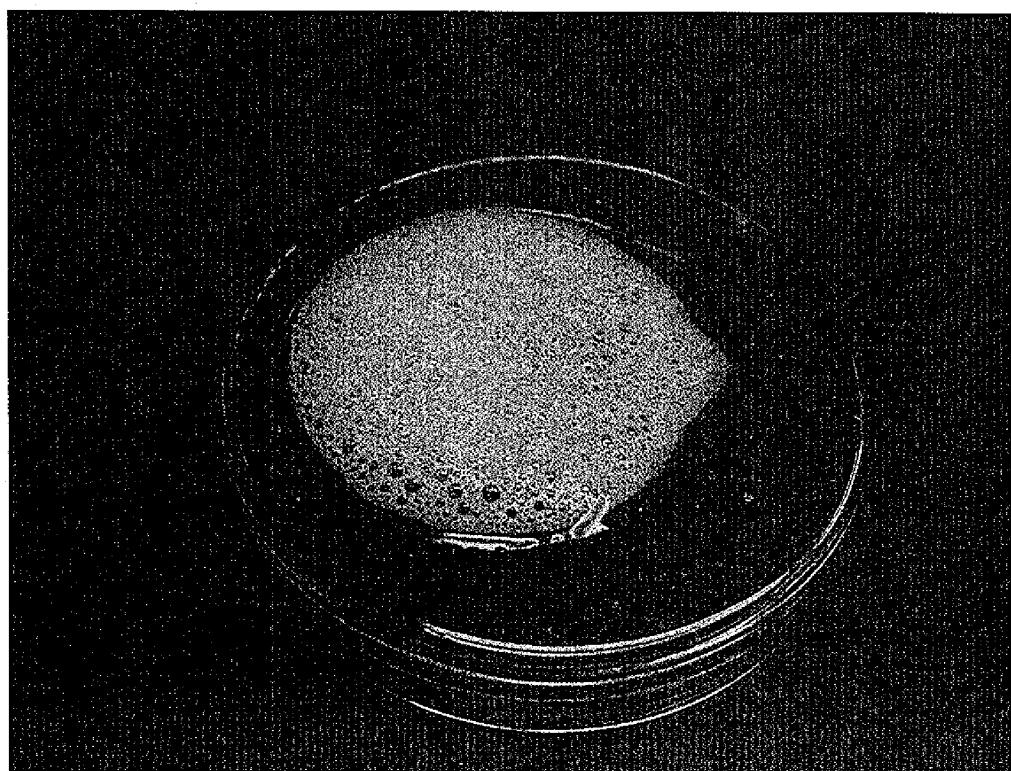


FIG. 13



FIG. 14



INTERNATIONAL SEARCH REPORT		International application No. PCT/JP2010/057769												
<b>A. CLASSIFICATION OF SUBJECT MATTER</b> <i>B05B1/02(2006.01)i, B05B7/02(2006.01)i, B05B9/04(2006.01)i, B05B11/00(2006.01)i, B65D47/34(2006.01)i, B65D83/44(2006.01)i, B65D83/76(2006.01)i</i>														
According to International Patent Classification (IPC) or to both national classification and IPC														
<b>B. FIELDS SEARCHED</b> Minimum documentation searched (classification system followed by classification symbols) <i>B05B1/02, B05B7/02, B05B9/04, B05B11/00, B65D47/34, B65D83/44, B65D83/76</i>														
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched <i>Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2011  Kokai Jitsuyo Shinan Koho 1971-2011 Toroku Jitsuyo Shinan Koho 1994-2011</i>														
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)														
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; padding: 2px;">Category*</th> <th style="text-align: left; padding: 2px;">Citation of document, with indication, where appropriate, of the relevant passages</th> <th style="text-align: left; padding: 2px;">Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td style="text-align: center; padding: 2px;">Y</td> <td style="padding: 2px;">Aerosol Industry Newspaper (Japan) Co., Ltd., Kan'i Mousse Pump, Aerosol &amp; Spray Sangyo Shinbun, 25 November 2008 (25.11.2008), no.1309, page 2</td> <td style="text-align: center; padding: 2px;">1-6</td> </tr> <tr> <td style="text-align: center; padding: 2px;">Y</td> <td style="padding: 2px;">JP 9-173922 A (Yoshino Kogyosho Co., Ltd.), 08 July 1997 (08.07.1997), paragraph [0011]; fig. 2 to 4 (Family: none)</td> <td style="text-align: center; padding: 2px;">1-6</td> </tr> <tr> <td style="text-align: center; padding: 2px;">Y</td> <td style="padding: 2px;">WO 2005/080003 A1 (Yoshino Kogyosho Co., Ltd.), 01 September 2005 (01.09.2005), paragraph [0017]; fig. 3 &amp; US 2006/0219738 A1 &amp; EP 1716933 A1</td> <td style="text-align: center; padding: 2px;">3-6</td> </tr> </tbody> </table>			Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	Y	Aerosol Industry Newspaper (Japan) Co., Ltd., Kan'i Mousse Pump, Aerosol & Spray Sangyo Shinbun, 25 November 2008 (25.11.2008), no.1309, page 2	1-6	Y	JP 9-173922 A (Yoshino Kogyosho Co., Ltd.), 08 July 1997 (08.07.1997), paragraph [0011]; fig. 2 to 4 (Family: none)	1-6	Y	WO 2005/080003 A1 (Yoshino Kogyosho Co., Ltd.), 01 September 2005 (01.09.2005), paragraph [0017]; fig. 3 & US 2006/0219738 A1 & EP 1716933 A1	3-6
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Y	WO 2005/080003 A1 (Yoshino Kogyosho Co., Ltd.), 01 September 2005 (01.09.2005), paragraph [0017]; fig. 3 & US 2006/0219738 A1 & EP 1716933 A1	3-6												
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Date of the actual completion of the international search 19 January, 2011 (19.01.11)		Date of mailing of the international search report 01 February, 2011 (01.02.11)												
Name and mailing address of the ISA/ Japanese Patent Office		Authorized officer												
Facsimile No.		Telephone No.												

INTERNATIONAL SEARCH REPORT		International application No. PCT/JP2010/057769
C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP 2003-117445 A (Ishihara Chemical Co., Ltd.), 22 April 2003 (22.04.2003), entire text; fig. 1 to 4 (Family: none)	4-6
E,X	JP 2010-142689 A (Mitani Valve Co., Ltd.), 01 July 2010 (01.07.2010), claims 1 to 6 (Family: none)	1-6

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**REFERENCES CITED IN THE DESCRIPTION**

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**Patent documents cited in the description**

- JP 2008132406 A [0008]