



(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 158(3) EPC

(43) Date of publication:
03.09.2003 Bulletin 2003/36

(51) Int Cl.7: **B65D 35/14, B65D 35/24**

(21) Application number: **01996494.9**

(86) International application number:
PCT/JP01/09998

(22) Date of filing: **15.11.2001**

(87) International publication number:
WO 02/040364 (23.05.2002 Gazette 2002/21)

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE TR
Designated Extension States:
AL LT LV MK RO SI

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(30) Priority: **16.11.2000 JP 2000349047**
29.06.2001 JP 2001197866

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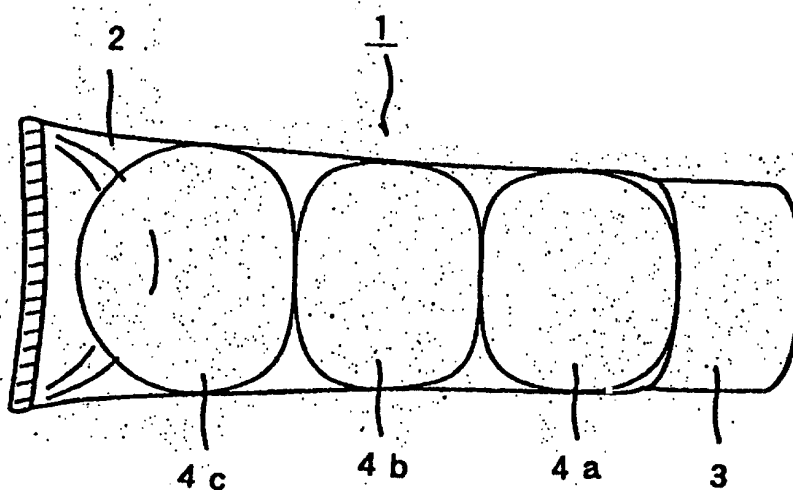
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(54) **FOAM DELIVERING CONTAINER AND METHOD FOR CHARGING CONTENTS INTO THE SAME**

(57) A foam discharge container 1 including: a flexible body portion 2 to be filled with contents having foaming properties; an ejection port 2a formed in the body portion 2 for discharging the contents therefrom when

the body portion 2 is gripped; foaming elements 4a to 4c housed in the body portion 2 and having elasticities. This foam discharge container 1 can suppress the container cost at a low level, can be simply finished and can have an excellent portability.

Fig. 1



Description

TECHNICAL FIELD

5 **[0001]** The present invention relates to a foam discharge container for foaming the contents and discharging them in the foamed state, and a method of filling the foam discharge container with the contents.

BACKGROUND ART

10 **[0002]** As the container (or the foam discharge container) for foaming and discharging a foaming liquid containing a surface active agent, there has been widely spread the aerosol container for foaming and injecting a liquid with the injection force of a gas. There are also known a method of foaming with a mesh mounted in the exit portion of the so-called "pump foamer" using a dispenser, or a method of foaming with a mesh mounted in the discharge portion of a squeeze bottle by squeezing the bottle.

15 **[0003]** However, any of the foam discharge containers of the related art has a large number of parts and also does not have a simple mechanism, so that it has high costs for the container and for finishing it.

[0004] Therefore, an object of the invention is to provide a foam discharge container, which has a novel construction for foaming and discharging contents.

20 **[0005]** Another object of the invention is to provide a foam discharge container, which can suppress the container cost at a low level, can be simply finished and can have an excellent portability.

DISCLOSURE OF THE INVENTION

25 **[0006]** A first aspect of the invention for achieving the above-specified objects relates to a foam discharge container for foaming and discharging contents in a liquid state. The foam discharge container comprises: contents containing a surface active agent and water and having foaming properties; a soft and tubular body portion filled with the contents; an ejection port formed in the body portion for discharging the contents therethrough when the body portion is gripped; and at least one foaming element housed in the body portion and having an elasticity.

30 **[0007]** Here in the first aspect, it is preferable that the ejection port is protruded in a cylinder shape from the body portion, and that the foaming element is absent from the inside of cylindrical portion of the ejection port. As a result, the introduction of the ambient air from the ejection port into the body portion can be facilitated to retain the restoration of the foaming element and to foam the contents continuously.

35 **[0008]** It is also preferable that the foaming element is present at least near the ejection port. Moreover, it is desired that the foaming density of the foaming element is higher at a portion near the ejection port than at the portion other than the near portion. In case three foaming elements are housed in the body portion, it is desired that the adjoining foaming elements have different densities. Moreover, there may be comprised a cylindrical portion, which is protruded to the bottom of the body portion from the portion where the ejection port and the body portion are connected to each other, for providing a discharge passage. Moreover, a design effect can be achieved by making the body portion transparent or semitransparent and the color of the foaming element different from that of the contents filled into the body portion.

40 **[0009]** A second aspect of the invention relates to a method of filling a foam discharge container with contents. This filling method comprises: the step of inserting at least one foaming element having an elasticity, from an opening formed in the bottom portion of a soft and tubular body portion; the step of filling the contents containing a surface active agent and water and having foaming properties, from the opening; and the step of closing the opening.

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BRIEF DESCRIPTION OF THE DRAWINGS

50 **[0010]** Fig. 1 is a top plan view of a preferred foam discharge container according to the present invention, and Fig. 2 is a side elevation of the foam discharge container with its cap being removed. Fig. 3 is an explanatory view of filling the foam discharge container with contents.

[0011] Fig. 4 is a top plan view of a foam discharge container having a round cap; Fig. 5 is an explanatory diagram of an essential portion of a foam discharge container according to a second embodiment; and Fig. 6 is an explanatory diagram of an essential portion of a foam discharge container having a cylindrical portion attached separately thereto.

55 BEST MODE FOR CARRYING OUT THE INVENTION

[0012] The invention will be described in more detail with reference to the accompanying drawings.

[0013] Fig. 1 is a top plan view of a tubular foam discharge container according to a preferred embodiment of the

invention, and Fig. 2 is a side elevation with a cap being removed.

[0014] This foam discharge container 1 is constructed to include a body portion 2, a cap 3 and foaming elements 4a to 4c. Moreover, this foam discharge container 1 is filled with contents having foaming properties, such as a liquid detergent or a shaving foam.

[0015] These contents are made of a foaming liquid containing a surface active agent and water and are preferred to have such a viscosity as it can soak into and can be reserved by the foaming elements 4a to 4c (especially the foaming element 4c functioning as a tank portion, as will be described hereinafter) and as it hardly drips in a liquid phase or in foams. The viscosity of the contents satisfying these demands and capable of forming sense foams is preferred to fall within a range from 50 cps to 6,000 cps, as metered at 25°C by the B-type rotary viscosimeter. The surface active agent is blended not only to establish the foaming properties but also to enhance the detergency and solubilize the various components thereby to make the contents transparent. On the other hand, the contents can contain not only the blend of the surface active agent and the water but also a blend of various components such as polyhydric alcohols, oils, salts, solvents, antioxidants, chelates, neutralizers or PH adjustors. Here, the contents may be exemplified not only by the above-specified ones but also by household articles such as various cosmetics, bath

detergents or toilet detergents.

[0016] The surface active agent are exemplified by anionic surfactants, cationic surfactants, nonionic surfactant or amphoteric surfactants. The blending amount of surface active agents are preferred to fall within a range from 3 wt. % to 30 wt. %, for which satisfactory detergencies can be obtained with homogeneous foams.

[0017] The anionic surfactants are exemplified by fatty acid soaps, α -acylsulfonates, alkylsulfonates, alkylarylsulfonates, alkylnaphthalenesulfonates, alkylsulfates, alkylethersulfates, alkylamidossulfates, alkylphosphates, alkylamidophosphates, alkylol-alkylaurinates, N-acylamines, sulfo-succinates or perfluoro alkyl phosphoric esters.

[0018] The cationic surfactants are exemplified by alkyltrimethyl ammonium chlorides, stearyl-trimethyl ammonium chlorides, stearyl-trimethyl ammonium bromides, cetostearyl-trimethyl ammonium chlorides, distearyl-dimethyl ammonium chlorides, stearyl-dimethyl benzyl ammonium chlorides or behenyl-trimethyl ammonium bromides.

[0019] The nonionic surfactants are exemplified by alkanolamide laurates, POE sorbitan fatty acid esters, POE glycerin fatty acid esters, POE fatty acid esters or polyether-modified silicones.

[0020] The amphoteric surfactants are exemplified by carboxybetaine types, amidobetaine types, sulfobetaine types, hydroxysulfobetaine types, amidosulfobetaine types, phosphobetaine types, amidocarbonate types, imidazoline derivative types or amido-amine types.

[0021] Here, the above-enumerated ones may be replaced by natural surfactants such as saponin or saccharic surfactants.

[0022] The blending amount of the contents with the surface active agent are preferred to fall within a range from 1 wt. % to 50 wt. % of the nonionic surfactants or the anion surfactants, in the case of detergents such as makeup removing cleanser, body shampoo, hair shampoo or shaving foam. In the case of cosmetics such as body lotion, sunscreen, face lotion, foundation, hand/leg lotion or shaving lotion, on the other hand, the contents are preferably blended with the surface active agent mainly of the nonionic surfactant within a range from 0.1 wt. % to 5 wt. %. In the case of hair cosmetics such as hair rinse, rinse tonic, hair tonic or hair liquid, moreover, it is preferred to blend the surface active agent mainly of the nonionic surfactant within a range of 0.1 wt. % to 5 wt. %.

[0023] The body portion 2 is formed by an extrusion-molding method into a soft tube shape of either a single layer of polyethylene or a lamination of polyethylene and a kind of nylon or polyethylene/polyvinyl alcohol copolymer. Moreover, this body portion 2 is made so transparent or semitransparent that the inside state can be visually confirmed from the outside. With the head portion of the body portion 2, moreover, there is integrally formed a cylindrical ejection port 2a, which has such a small diameter as it prevents the later-described leading end foaming element 4a from invading thereinto. This ejection port 2a is so externally threaded in its outer circumference that the cap 3 can be fastened thereon. Therefore, the cap 3 can be mounted on and demounted from the body portion 2.

[0024] Inside of the body portion 2 (excepting the ejection port 2a), there are housed the three generally spherical foaming elements 4a to 4c for foaming the contents filled therein. These foaming elements 4a to 4c are made of porous members having proper elasticities and a number of fine pores existing continuously in the surfaces and in the insides. The foaming elements 4a to 4c can be made of foaming materials such as urethane, NBR, NR or silicone, or natural sponge.

[0025] For the later-described reasons, the foaming densities (i.e., the porosities per unit area) of the foaming elements 4a to 4c are not so identical that the foaming density of the foaming element 4a located near the ejection port 2a is higher than that of the remaining foaming element 4b (or 4c). Moreover, the foaming elements 4a to 4c have such proper colors different from that of the contents as are exemplified by blue, yellow and red.

[0026] With the transparent contents being filled, more specifically, the differently colored foaming elements 4a to 4c can be observed from the outer side of the transparent or semitransparent body portion 2 so that a design effect can be obtained.

[0027] Of the foaming elements 4a to 4c, the foaming element 4a on the leading end side is required to have a

restoration property. This is because the leading end side of foaming element 4a is extruded, when continuously used, to clog the ejection port 2a or the discharge port for the contents if it does not have a sufficient restoring force.

[0028] In the structure, moreover, the foaming element 4a is not present inside the cylindrical portion of the cylindrically protruding ejection port 2a. This is because the ambient air hardly comes into the body portion 2 from the ejection port 2a if the foaming element 4a exists in the inside space of the ejection port 2a, so that the restoration property of the foaming element 4a is not obtained and make the foaming imperfect. In other words, the foaming of the contents can be continuously done by the absence of the foaming element 4a inside the cylindrical portion of the ejection port 2a.

[0029] In case polyurethane sponge is thus used to make the foaming element 4a on the leading end side from the viewpoint of facilitating introduction of the ambient air, the use of urethane sponge of the ester group, in which polyol for a di-isocyanate reaction is ester-linked, is preferred to the use of urethane sponge of the ether group having an ether-linkage. The use of the urethane sponge of the ester group is also preferred from the homogeneity of the pores (or cells) of the foaming elements 4a to 4c and from their size variability.

[0030] It is also preferable that the foaming element 4b has a strong restoring force and a high restoration rate.

[0031] Here, the shapes of the foaming elements 4a to 4c need not always be restricted to the generally spherical shape but can be exemplified by the shapes of circular cylinder, elliptical cylinder or square cylinder, or by a combination of those various shapes.

[0032] When the contents are to be discharged from the foam discharge container 1 thus constructed, the user crumples and squeezes the body portion 2 sufficiently with the cap 3 being mounted on the body portion 2. By this squeezing action, the contents are mixed and foamed with the air which is contained in the numerous pores in the foaming elements 4a to 4c. When the body portion 2 is gripped by the hand of the user with the cap 3 being removed to expose the ejection port 2a to the outside, moreover, the foamed contents are discharged from the leading end of the ejection port 2a. After this, the body portion 2 is allowed, when released, to restore its initial shape by the its own elasticity. At this time, the air is inhaled from the ejection port 2a so that it is contained again in the fine pores of the foaming elements 4a to 4c.

[0033] The foamed states of the contents discharged from the foam discharge container 1 thus constructed were examined by varying the foaming densities of the individual foaming elements 4a to 4c. It has been found that excellent foamed states were obtained in the cases having the following foaming densities:

(Foaming Densities)			
	Forming Element 4a	Forming Element 4b	Forming Element 4c
Case 1	High	Medium	High
Case 2	High	Low	Medium
Case 3	High	Low	High

[0034] The common points among all the cases are that the adjoining foaming elements had the different densities and that the foaming element 4a near the ejection port 2a had a higher density than that of the remaining foaming element 4b (or 4c). In view of the actions of the individual foaming elements 4a to 4c: the foaming element 4c farthest from the ejection port 2a has an action as a tank portion for reserving the contents; the central foaming element 4b has an action to extrude the air; and the foaming element 4a near the ejection port 2a has an action as a foam generating portion. Therefore, the fineness of the foams discharged depends highly on the foaming density of the foaming element 4a having a dominant action as the foam generating portion, so that the finer creamy foams can be generated for the higher foaming density.

[0035] As the foaming densities of the foaming elements 4a to 4c are the higher, however, the inhaling resistances become higher to invite a deterioration of the sense of use of the foam discharge container 1. It is, therefore, preferable that the foaming densities of the individual foaming elements 4a to 4c are determined considering both the fineness of the foams desired and the sense of use.

[0036] With reference to Fig. 3, here will be described a method for filling the aforementioned foam discharge container 1 with the contents. First of all, the body portion 2 having the cap 3 mounted thereon is arranged to have its bottom portion confronting the (not-shown) nozzle for filling the contents.

[0037] Then, the foaming elements 4a to 4c are sequentially inserted into the body portion 2 from an opening 5 formed in that bottom portion. And, the contents are inserted in a specified quantity from the opening 5, and this opening 5 is closed by a heat-sealing treatment or the like.

[0038] In the present embodiment, the body portion 2 is squeezed so sufficiently as to foam the contents having the foaming properties by mixing the contents and the air contained in the numerous fine pores in the foaming elements 4a to 4c. Then, the cap 3 is removed, and the well foamed contents can be discharged by squeezing the body portion 2. The foam discharge container 1 has less number of parts and simpler mechanism than those of the foam discharge

container of the related art such as an aerosol container or a pump foamer so that its cost is inexpensive.

[0039] Moreover, the body portion 2 can be filled with the foaming elements 4a to 4c and the contents merely by heat-sealing its bottom portion so that it is simply finished. Therefore, it is possible to reduce the total cost for manufacturing the foam discharge container according to the present embodiment. Moreover, this foam discharge container is so light and small that it is excellent in portability.

[0040] Moreover, the fineness of the foams to be discharged can be adjusted by varying the foaming densities of the foaming elements 4a to 4c to use the low-density foaming element having the tank function and the high-density foaming element having the function to foam the contents, separately.

[0041] Moreover, the existences of the foaming elements 4a to 4c can be visually confirmed from their appearances by making the body portion 2 transparent or semitransparent and by giving the foaming elements 4a to 4c different colors to that of the contents. As a result, the appeal as commodities can be improved by giving the novelty to the purchaser.

[0042] Here, the foregoing embodiment has been described on the case in which the three foaming elements 4a to 4c are housed in the body portion 2. However, the invention should not be restricted to the case, but can be satisfied if at least one foaming element is housed. From the viewpoint of the state of the foams discharged, however, it is preferred that the foaming element is disposed at least near the ejection port 2a, where its action as the foam generating portion dominates. Moreover, only one foaming element is easily displaced (or released) when the body portion 2 is gripped, but this displacement can be prevented by providing a plurality of foaming elements.

[0043] Moreover, the method of using plurality of foaming elements having the different foaming densities is the most inexpensive and simplest one, but similar effects could also be attained even by using the single foaming element which has different foaming densities at its portions.

[0044] Here, the present embodiment uses the cap 3 of the circular cylinder shape. As shown in Fig. 4, however, there may be used a cap 3' having a spherical crest portion. In this cap shape, the foam discharge container 1 cannot be supported by itself with the cap 3' being directed downward. It is, therefore, possible to prevent the tubular body portion 2 from being stored to leave the contents reserved in the inside of the shoulder of the body portion 2. As a result, it is possible to effectively prevent the contents left insufficiently foamed from being discharged in the liquid state.

(Second Embodiment)

[0045] In the first embodiment thus far described, the unfoamed contents may accumulate inside of the shoulder of the tubular body portion 2 and can be discharged, as the case may be, in the liquid state from the ejection port 2a but not through the foaming element 4a at the leading end. Therefore, the present embodiment relates to a structure of the foam discharge container 1 having worked out the countermeasure against the foaming insufficiency. Fig. 5 is an explanatory diagram of an essential portion of the foam discharge container according to the present embodiment. Here, the same members as those described in connection with the first embodiment will be designated by the common reference numerals, and their description will be omitted (as in the later description of Fig. 6).

[0046] With the body portion 2, there is integrally formed a cylindrical portion 2b, which has a generally cylindrical shape for regulating the discharge passage of the filled contents. This cylindrical portion 2b is protruded into the bottom of the body portion 2 from the portion where the ejection port 2a and the body portion 2 are connected to each other, to form a part of the discharge passage. The cylindrical portion 2b is given such a small diameter (typically, substantially equal to that of the ejection port 2a) that the foaming element 4a at the leading end may not invade therein. Moreover, the cylindrical portion 2b contacts at its leading end with the foaming element 4a. Thus, the foaming element 4a at the leading end takes the state, in which it is not present in the side portion of the cylindrical portion 2b (i.e., inside of the shoulder of the body portion 2) but pushed to the bottom side of the body portion 2.

[0047] When the foam discharge container is used, the contents A having accumulated inside the shoulder of the body portion 2 once return to the foaming element 4a, as indicated by solid arrows in the same Figure, and are mixed with the air and discharged from the ejection port 2a through the cylindrical portion 2b. In short, the cylindrical portion 2b functions as a guide member for preventing the contents A inside the shoulder of the body portion 2 from being discharged not through the foaming element 4a. As a result, the contents are sufficiently foamed when they are discharged, even if they accumulate in the liquid state inside the shoulder of the body portion 2.

[0048] Moreover, a mesh structure may be disposed midway (e.g., at the leading end of the ejection port 2a) of the discharge passage formed of the ejection port 2a and the cylindrical portion 2b. In this case, the contents A inside of the shoulder of the body portion 2 once return to the foaming element 4a, in which they are mixed with the air, and are discharged from the leading end of the ejection port 2a via the aforementioned discharge passage. At this time, the contents are foamed again through a mesh 7 at the leading end of the ejection port 2a, so that the density of the discharged foams can be improved.

[0049] Here, we have conducted many experiments and examinations and have found that satisfactory foams can be discharged if the mesh 7 is set to have a size within a range from 70 meshes to 400 meshes, preferably from 150

meshes to 350 meshes.

[0050] Moreover, the cylindrical portion 2b may be formed integrally with the body portion 2 but may be formed into an inside plug separately of the body portion 2 and fitted in the ejection port 2a. Fig. 6 is an explanatory diagram of an essential portion of the foam discharge container, to which the cylindrical portion is separately attached. The cylindrical portion 6 of the inside plug type may be provided with the aforementioned mesh 7 or 7' either at the leading end portion of the ejection port 2a or at the end portion of the cylindrical portion 6 on the side of the foaming element. Particularly, it is more convenient for the manufacture of the body portion 2 and more advantageous for the cost to attach the cylindrical portion 2b integrally to the body portion 2. Here, the mesh 7 or 7' is made of a net of nylon, polyolefin or polyester and is attached to the leading end of the cylindrical portion 6 or to the leading end of the ejection port 2a by a thermal adhesion or the like.

INDUSTRIAL APPLICABILITY

[0051] According to the foam discharge container of the present invention, as has been described hereinbefore, the air and the contents are mixed in the foaming elements housed in the tubular container by the squeezing action of the user. Therefore, the contents can be efficiently foamed and discharged. Moreover, this tubular foam discharge container can suppress the container cost at a lower level than that of the container of the related art, can be simply finished and can have an excellent portability.

Claims

1. A foam discharge container for foaming and discharging contents in a liquid state, **characterized by** comprising: contents containing a surface active agent and water and having foaming properties; a soft and tubular body portion filled with said contents; an ejection port formed in said body portion for discharging the contents therethrough when said body portion is gripped; and at least one foaming element housed in said body portion and having an elasticity.
2. A foam discharge container as set forth in Claim 1, wherein said ejection port is protruded in a cylindrical shape from the body portion, and wherein the foaming element is absent from the inside of cylindrical portion of said ejection port.
3. A foam discharge container as set forth in Claim 1 or 2, wherein the foaming element is present at least near the ejection port.
4. A foam discharge container as set forth in Claim 1 or 2, wherein the foaming density of the foaming element is higher at a portion near the ejection port than at the portion other than the near portion.
5. A foam discharge container as set forth in Claim 3, wherein the foaming density of the foaming element is higher at a portion near the ejection port than at the portion other than the near portion.
6. A foam discharge container as set forth in Claim 4, wherein three foaming elements are housed in the body portion, and wherein the adjoining foaming elements have different densities.
7. A foam discharge container as set forth in Claim 5, wherein three foaming elements are housed in the body portion, and wherein the adjoining foaming elements have different densities.
8. A foam discharge container as set forth in Claim 1 or 2, further comprising a cylindrical portion protruded to the bottom of the body portion from the portion where the ejection port and the body portion are connected to each other, for providing a discharge passage.
9. A foam discharge container as set forth in Claim 3, further comprising a cylindrical portion protruded to the bottom of the body portion from the portion where the ejection port and the body portion are connected to each other, for providing a discharge passage.
10. A foam discharge container as set forth in Claim 4, further comprising a cylindrical portion protruded to the bottom of the body portion from the portion where the ejection port and the body portion are connected to each other, for providing a discharge passage.

11. A foam discharge container as set forth in any of Claims 5 to 7, further comprising a cylindrical portion protruded to the bottom of the body portion from the portion where the ejection port and the body portion are connected to each other, for providing a discharge passage.

12. A foam discharge container as set forth in Claim 1 or 2, wherein the body portion is transparent or semitransparent, and wherein the color of the foaming element is different from that of the contents filled into the body portion.

13. A foam discharge container as set forth in Claim 3, wherein the body portion is transparent or semitransparent, and wherein the color of the foaming element is different from that of the contents filled into the body portion.

14. A foam discharge container as set forth in Claim 4, wherein the body portion is transparent or semitransparent, and wherein the color of the foaming element is different from that of the contents filled into the body portion.

15. A foam discharge container as set forth in any of Claims 5 to 7, wherein the body portion is transparent or semitransparent, and wherein the color of the foaming element is different from that of the contents filled into the body portion.

16. A foam discharge container as set forth in Claim 8, wherein the body portion is transparent or semitransparent, and wherein the color of the foaming element is different from that of the contents filled into the body portion.

17. A foam discharge container as set forth in Claim 9 or 10, wherein the body portion is transparent or semitransparent, and wherein the color of the foaming element is different from that of the contents filled into the body portion.

18. A foam discharge container as set forth in Claim 11, wherein the body portion is transparent or semitransparent, and wherein the color of the foaming element is different from that of the contents filled into the body portion.

19. A method of filling a foam discharge container with contents, **characterized by** comprising: the step of inserting at least one foaming element having an elasticity, from an opening formed in the bottom portion of a soft and tubular body portion; the step of filling the contents containing a surface active agent and water and having foaming properties, from said opening; and the step of closing said opening.

Fig. 1

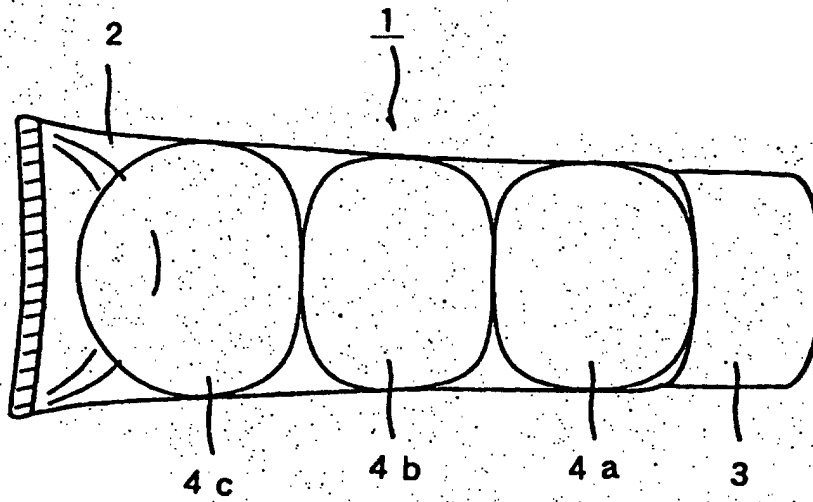


Fig. 2

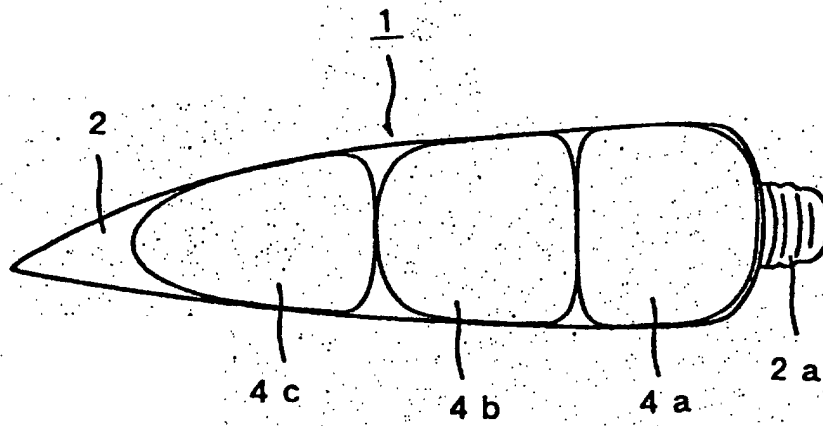


Fig. 3

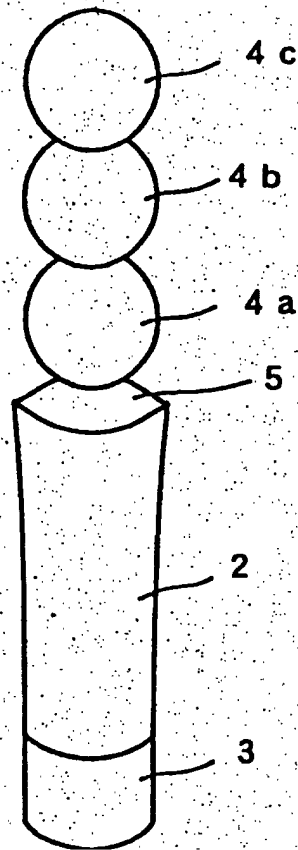


Fig. 4

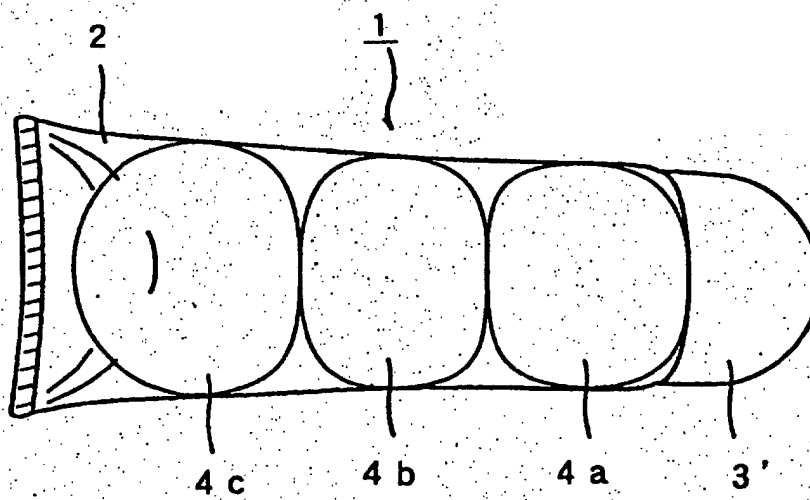


Fig. 5

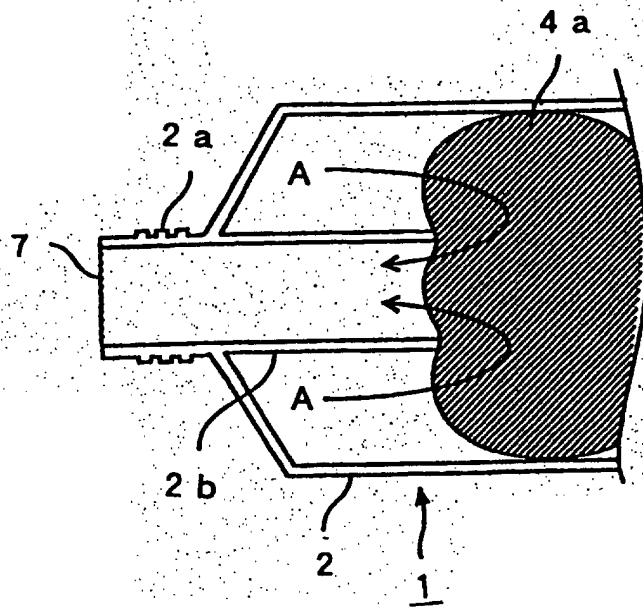
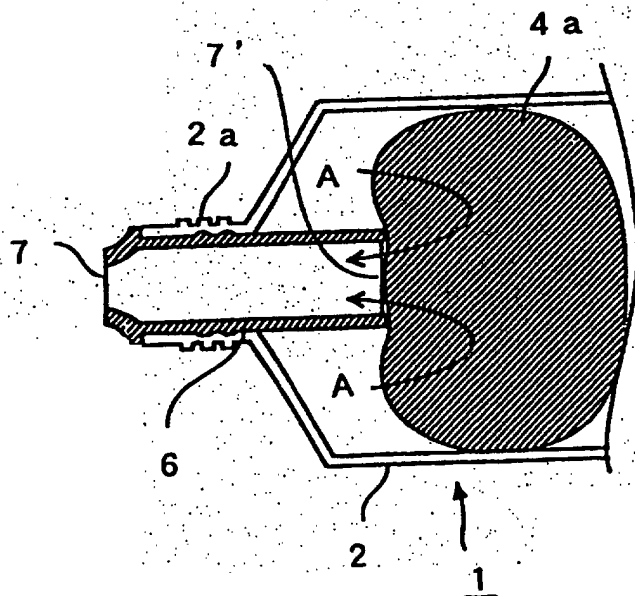


Fig. 6



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP01/09998

A. CLASSIFICATION OF SUBJECT MATTER Int.Cl. ⁷ B65D35/14, B65D35/24														
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 B65D35/00-35/42														
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 A	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 103387/1971 (Laid-open No. 057440/1973), (Sakura Color Prod. Corporation), 21 July, 1973 (21.07.1973), Full text; all drawings (Family: none)	1, 2 3, 8-9, 12-13, 16-17, 19 4-7, 10-11, 14-15, 18												
X Y A	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 130789/1983 (Laid-open No. 038238/1985), (Takeuchi Press Kogyo K.K.), 16 March, 1985 (16.03.1985), Full text; Figs. 1 to 3 (Family: none)	1, 3 2, 8-9, 12-13, 16-17, 19 4-7, 10-11, 14-15, 18												
☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.														
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Date of the actual completion of the international search 01 February, 2002 (01.02.02)		Date of mailing of the international search report 19 February, 2002 (19.02.02)												
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INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP01/09998

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 175154/1982 (Laid-open No. 084926/1983), (Yoshino Kogyosho Co., Ltd.),	8-9, 16-17
A	09 June, 1983 (09.06.1983), page 1, lines 5 to 16; drawings (Family: none)	10-11, 18
Y	JP 09-301388 A (Takara Co., Ltd.), 25 November, 1997 (25.11.1997), page 2, column 1, lines 2 to 23; Figs. 1 to 4	12-13, 16-17
A	(Family: none)	14-15, 18
Y	JP 10-249921 A (Nakayama Kogyo K.K.), 22 September, 1998 (22.09.1998), page 3, column 3, lines 15 to 21; Fig. 8 & AU 2365897 A & CN 1185373 A	19

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