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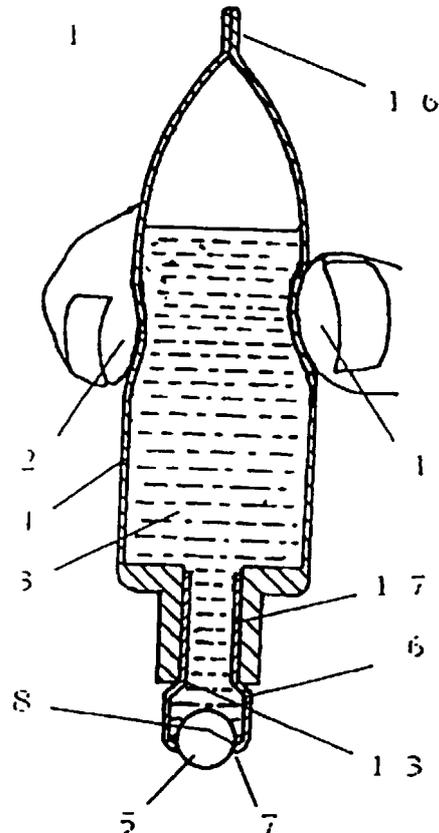
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(54) **EXTRUSION TYPE APPLICATOR**

(57) An applicator for performing coating, writing, and marking by pressing creamy liquid filled in an elastic container by fingers so as to force out the liquid from a nozzle, wherein valve seats opposed to each other are provided in the nozzle and a valve moving element is positioned between the valve seats so that a liquid dripping can be prevented and all the coating surfaces can be coated with the liquid satisfactorily, the valve moving element which closes the valve near a nozzle opening part when the liquid is pressed and is partly exposed rises freely from the coating surface when the liquid is applied so as to open the valve and force out the coating liquid, and the valve moving element is sucked in when the pressing is stopped after the application has been completed and the valve is closed at the bottom part of nozzle so as to prevent dirt from entering, whereby the applicator is used for marking, writing, and drawing with paint or outdoor paint, application of glue, chemicals, and cosmetics, and coating of waterproof sealing compound at specified positions.



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Description

BACKGROUND OF THE INVENTION

[0001] The invention relates to an extrusion type applicator using an elastic container and in particular, it concerns a flow controller or modulator inside of a nozzle part.

[0002] Various shapes for an opening part of nozzle have been devised hitherto in order to apply creamy liquid filled in an elastic container. But, it is very hard to perform a clear, fine coating, writing and marking at specified positions because of liquid dripping and string before or after application.

[0003] To solve above problems, mechanisms of ball point pen were applied as a nozzle part. One of such mechanisms had the spring which supported a ball to prevent a liquid dripping and string completely. If the surface, such as paper and skin, is to be applied, and if it has larger coefficient of friction between it and the ball than between metal supporter and the ball, the ball can roll easily. As the result of good rolling of the ball, the surface applied can be coated with the creamy liquid satisfactorily. But the ball can not roll smoothly on the surface coated with plastic resin, on the smooth surface such as glasses and tiles and on the surface using a large amount of creamy liquid, such as cutting surface of wood and concrete. In such cases, a clear and fine coating is not expected because the ball which can not roll scratches the new applied layer.

SUMMARY OF THE INVENTION

[0004] The invention is based on the prevention of liquid dripping and string before or after application, and of scratch of new applied layer.

[0005] An applicator using an elastic container to be pressed by fingers and a nozzle to force out the creamy liquid, wherein valve seats opposed to each other are provided in the nozzle, one is near the nozzle opening part, another is in the bottom part of nozzle. And the valve moving element is positioned between the valve seats and closes the valve near the nozzle opening part by pressure of the liquid when the elastic container is pressed by fingers is partly exposed out of the nozzle opening part.

[0006] In the beginning of application, the exposed part of the valve moving element comes to contact with the surface to be applied. And then the valve moving element rises freely from the surface, so that the valve is opened to force out the creamy liquid.

[0007] Tilting the applicator a little toward moving direction, the creamy liquid is applied clearly and finely on the surface. In this case, the force of the valve moving element to press the surface is composed of own weight and a difference of liquid pressure between outside and inside the nozzle, and so the force is only a little and does not scratch the new applied layer.

[0008] After application the applicator is held up from the surface, as its elastic container is pressed by fingers. The valve moving element is off from the surface and closes the valve near the nozzle opening part so as to prevent the liquid dripping and string. If the elastic container is being stopped pressing by fingers, the valve moving element is sucked together with the liquid by elasticity of the elastic container, and closes the valve at the bottom part of the nozzle so as to prevent dirt from entering. It is the same as general marking pen which covers a nozzle with a nozzle cap in order to prepare without dry for next application.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] Preferred examples of the invention will now be described in more details with reference to the drawing, wherein :

FIG. 1 is a front elevation view in longitudinal section of the applicator according to the invention, FIG. 2 shows a longitudinal part-section in applying the applicator according to the invention, FIG. 3 shows a longitudinal part-section in preparation for next application of the applicator according to the invention, FIG. 4 is an illustration including a longitudinal part-section of another example according to the invention, FIG. 5 illustrates to show composition of parts for another example according to the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0010] FIG. 1 illustrates the elastic container 4, holding the creamy liquid 3, is being pressed by finger 1 and 2. The ball 5 as the valve moving element, is pushed by creamy liquid 3 to the valve seat 8 near the nozzle opening part 7 in the nozzle 6. The ball 5 contacts with the valve seat 8, closes the valve and is partly exposed out of the nozzle opening part 7. Then the liquid dripping and string is prevented. It seems better for about 30% to 40% of diameter of the ball 5 is to be exposed.

[0011] In the beginning of application, the exposed part of the ball 5 comes to contact with the surface 9. And then the ball 5 rises freely from the surface 9, so that the valve is opened to force out the creamy liquid 3 on the surface 9.

[0012] Tilting the elastic container 4 a little toward moving direction, namely, "arrow A", the creamy liquid 3 is applied on the surface 9. Shown in FIG. 2, the ball 5 has no mechanical contact but the contact point 12 on the surface 9, has a little resistance of revolution and that enables the ball to roll smoothly on any kind of surface, because the ball 5 and the creamy liquid 3 are complete fluid bearing in the nozzle 6. That is explained

by Magnus effect based on the principle of Belnuli. As the ball 5 is rolling clockwise, the creamy liquid 3 is forced out from the clearance 10 between the nozzle opening part 7 and the surface 9 and becomes the new applied layer 11 without scratch by the ball 5.

[0013] After application, the elastic container 4 is held up from the surface 9, being pressed by finger 1 and 2, then returns to the state shown in FIG. 1, and has no drip or string of the creamy liquid 3 from the nozzle opening part 7. If the elastic container 4 is being stopped pressing by finger 1 and 2, the ball 5 is sucked together with the creamy liquid 3 by elasticity of the elastic container 4. The ball 5 comes to contact with the valve seat 13, which is in the bottom part of nozzle 6, closes the valve so as to prevent a liquid dripping, string and entering of dirt. And then the elastic container 4 is covered with the nozzle cap 14 near by the nozzle 6, becomes the state shown in FIG. 3. It is prepared for next application without dry up of the creamy liquid 3 in the nozzle 6.

[0014] Under condition that viscosity of the creamy liquid 3 was between 1500 cps and 2000 cps, good result came out as follows:

The diameter of the ball 5; 0.8 mm, the internal diameter of nozzle 6; 0.9 mm, the diameter of the ball 5; 2.4 mm, the internal diameter of nozzle 6; 2.6 mm,

[0015] The length of the room 15 between the nozzle opening part 7 and the ball 5 contacts with valve seat 13, is appropriate if it is about 1/4 diameter of the ball 5.

[0016] The elastic container 4 is made of linear polyethylene by injection molding, after being filled up with the creamy liquid 3, is ultrasonic-bonded at the upper end 16. The nozzle 6 is made of stainless steel pipe. After rolling process of the valve seat 13 and the insert part 17 is done, the stainless steel ball 5 is to be inserted in it. The valve seat 8 and the nozzle opening part 7 are processed by the rolling method.

[0017] FIG. 4 shows the example of the use of the roller 5a as the valve moving element, which is the elastic container 4 pressed by the finger 1 and 2. The nozzle 6a is made from polypropylene by the injection molding. It has the valve seat 13a and the insert part 17a. After the stainless steel roller 5a is being inserted, the valve seat 8a and the nozzle opening part 7a are to be processed by the heating method. The elastic container 4a is made of polypropylene by the injection molding, which is adhered to the tail parts 18. Then this example can apply to the rolling direction of the roller 5a. The width of layer is same as the roller's length. The function is the same as the example FIG. 1, FIG. 2, FIG. 3.

[0018] FIG. 5 shows another example that the elastic container 4b has the valve seat 13b and the male screw 19 in underside of itself. The half sphere 5b, a part of pyramid 5c and the exposed plate 5d are making

the valve moving element. The nozzle 6b has the square opening 7b and the valve seat 8b, and it fixes the female screw 20 to the male screw 19 of the elastic container 4b. This example is used same as the example FIG. 4. Uneven underside of the exposed plate 5d levels off the new layer. All parts in this example can be made of plastic resin by the injection molding. In this case, the valve moving element does not roll and does not have Magnus effect, but it is very light and rises freely on the new applied layer so as not to prevent application.

[0019] The valve moving element can rise freely without mechanical intervention on the surface to be applied, to be exactly, on the new applied layer. It does not scratch the new applied layer. Therefore, a clear and fine application can be made on any surface such as stones, tiles, leaves, metal, wood, and so on, when it is dried. This applicator is sure to be beneficial to agriculture, fishery, industry and so on.

20 Claims

1. Extrusion type applicator wherein the valve seats opposed to each other are provided near the opening and bottom parts of nozzle, and the valve moving element is positioned between the valve seats, when the elastic container is pressed and is partly exposed out of the nozzle opening part.
2. An extrusion type applicator according to claim 1, uses a ball as the valve moving element.
3. An extrusion type applicator according to claim 1, uses a roller as the valve moving element.
4. An extrusion type applicator according to claim 1, uses the valve moving element which requires spherical, conical, pyramidal parts, which contact with the valve seats, and a part to be exposed out of the nozzle opening part.

Amended claims under Art. 19.1 PCT

1. (amendment) Extrusion type applicator wherein the valve seats opposed to each other are provided near the opening and bottom parts of nozzle, and the valve moving element is positioned between the valve seats, when the elastic container is pressed is partly exposed out of the nozzle opening part, when an application is performing well and the valve moving element rises freely from a surface so as to control an application.

2. (amendment) An extrusion type applicator according to claim 1, uses a ball as the valve moving element, to roll and rise freely from the surface on the new layer without any mechanical intervention.

3. (amendment) An extrusion type applicator according to claim 1, uses a roller as the valve moving element, to roll and rise freely from the surface on the new layer without any mechanical intervention.

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4. An extrusion type applicator according to claim 1, uses the valve moving element which requires spherical, conical, pyramidal parts, which contact with the valve seats, and a part to be exposed out of the nozzle opening part.

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Statement under Art. 19.1 PCT

Claim 1 had explained the mechanism and position of the valve moving element before performing application. It assures the essence of the invention, to attach the statement explaining the state of performing application.

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The application according to the invention begins to force out a creamy liquid filled in an elastic container when the part of the valve moving element which is partly exposed from the nozzle and closes the valve, the valve moving element contacts with surface, rises freely and opens the valve. Tilting the applicator a little toward moving direction, the valve moving element rises freely from the surface on the new applied layer of the creamy liquid. The valve moving element which does not scratch the new applied layer to rise freely on the new applied layer without any mechanical intervention is the only factor of clear, fine, uniform width and thickness application. Then quantity of creamy liquid to force out is under the control of the pressure by fingers and of the clearance between the valve moving element and the nozzle.

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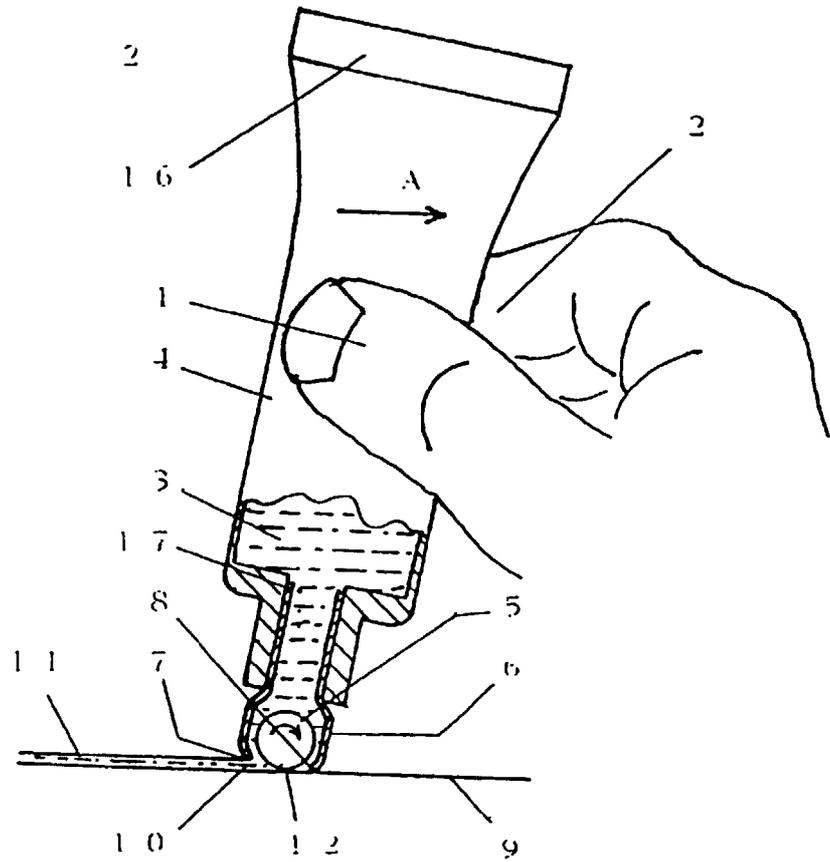
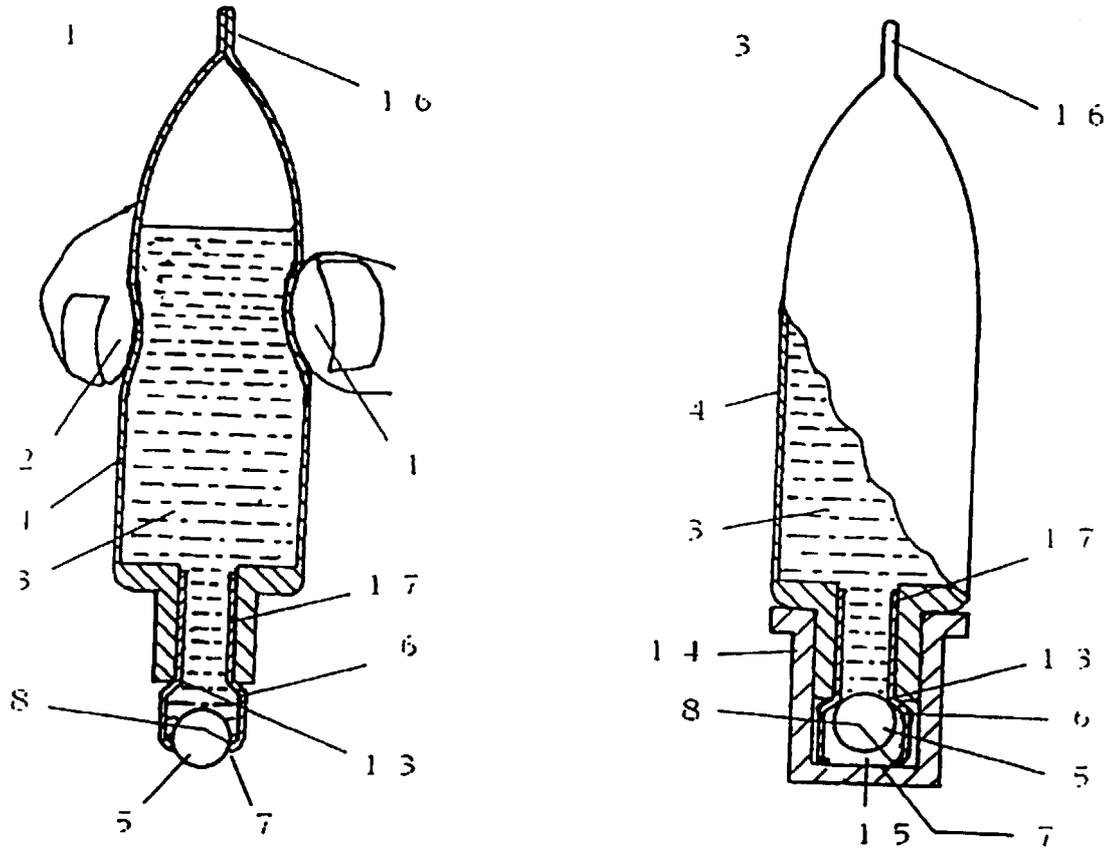
Claim 2, and claim 3 assure to improve the effect of rising and rolling of the ball and roller.

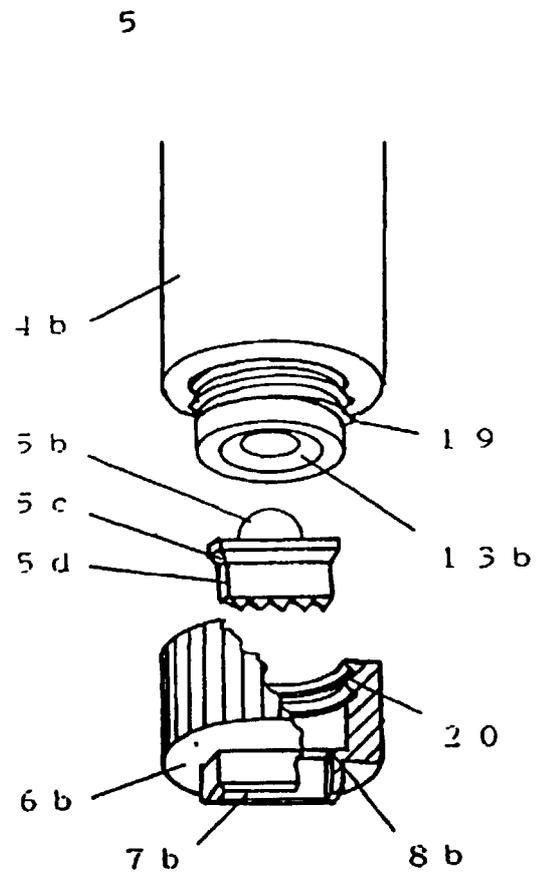
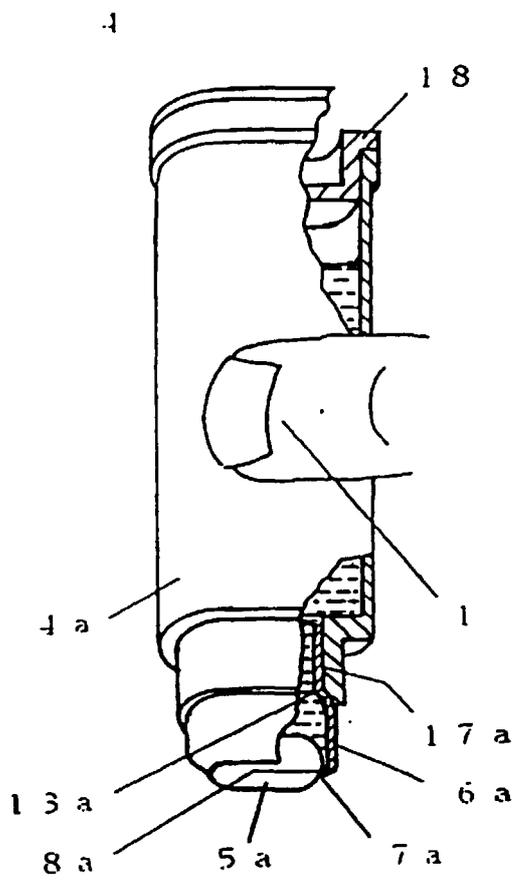
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INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP99/02349

A. CLASSIFICATION OF SUBJECT MATTER Int.Cl. ⁶ B65D35/50, B65D35/36		
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. ⁶ B65D35/00-47/42		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Jitsuyo Shinan Koho 1922-1996 Toroku Jitsuyo Shinan Koho 1994-1999 Kokai Jitsuyo Shinan Koho 1971-1999 Jitsuyo Shinan Toroku Koho 1996-1999		
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	Microfilm of the specification and drawings first annexed to the request of Japanese Utility Model Application No. 58-023025 (Laid-open No. 59-129744) (Yoshida Kogyo K.K.), 31 August, 1984 (31. 08. 84), Full text ; Figs. 1 to 6 (Family: none)	1-2
Y		3-4
X	Microfilm of the specification and drawings first annexed to the request of Japanese Utility Model Application No. 60-163456 (Laid-open No. 62-072949) (Pola Chemical Industries Inc.), 11 May, 1987 (11. 05. 87), Full text ; Figs. 1, 4, 5 (Family: none)	1-2
Y		3-4
Y	JP, 64-070366, A (L'Oreal), 15 March, 1989 (15. 03. 89), Full text ; Figs. 1 to 3 & FR, 2619689, A1 & DE, 3829395, A & NL, 8802099, A & GB, 2209138, A1 & US, 4909265, A & CH, 677865, A	3
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.		
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Date of the actual completion of the international search 13 August, 1999 (13. 08. 99)		Date of mailing of the international search report 31 August, 1999 (31. 08. 99)
Name and mailing address of the ISA/ Japanese Patent Office		Authorized officer
Facsimile No.		Telephone No.

Form PCT/ISA/210 (second sheet) (July 1992)