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(54) LIQUID CONTAINER

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(57) **ABSTRACT**

A liquid container includes a receptacle for storing a liquid content such as mascara, a squeezer fitted in the mouth of the neck of the receptacle, and an applying shaft of a cap inserted into the receptacle through the squeezer. The squeezer is made of a material having flexibility and formed in such an approximate cylindrical shape that the diameter of the squeezer becomes gradually smaller from the top end toward the lower part and becomes gradually greater from that lower part to the bottommost part while a multiple number of vertical slits are cut out in the peripheral wall of the squeezer. The squeezer becomes gradually wider from the lower part to the bottommost part, so as to avoid collision with the applying part of the applying shaft that holds the liquid content.

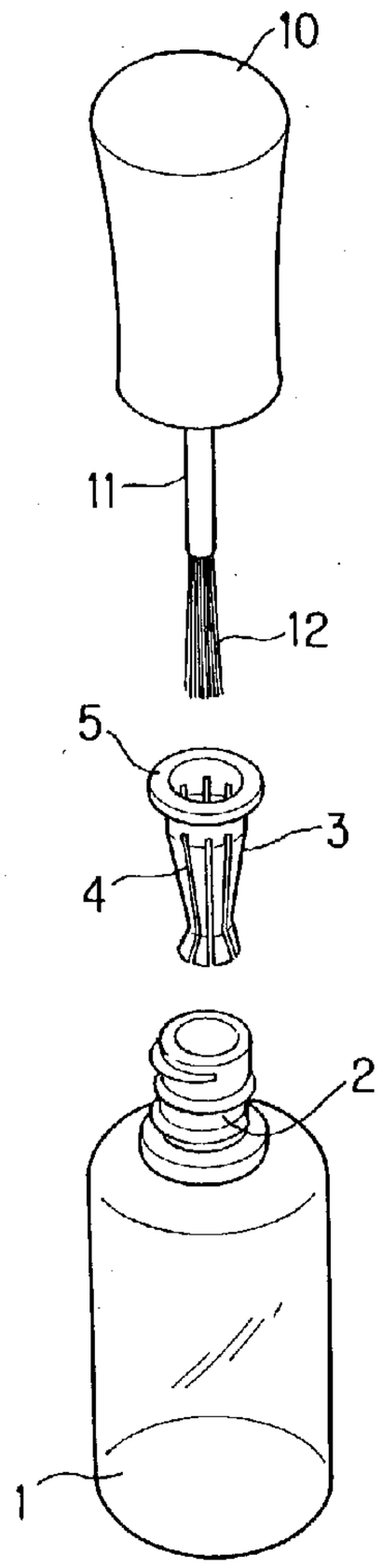


FIG.1

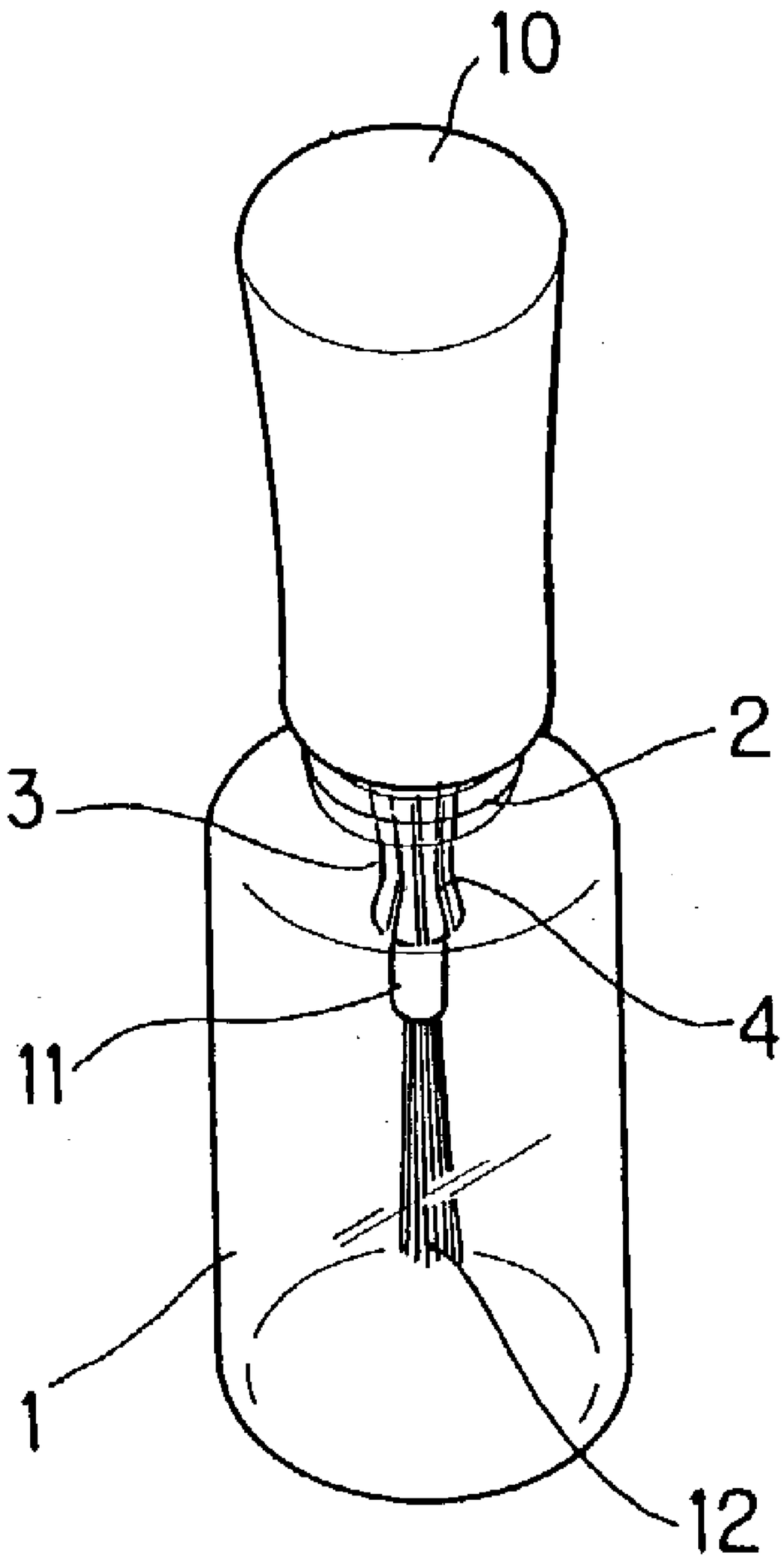


FIG.2

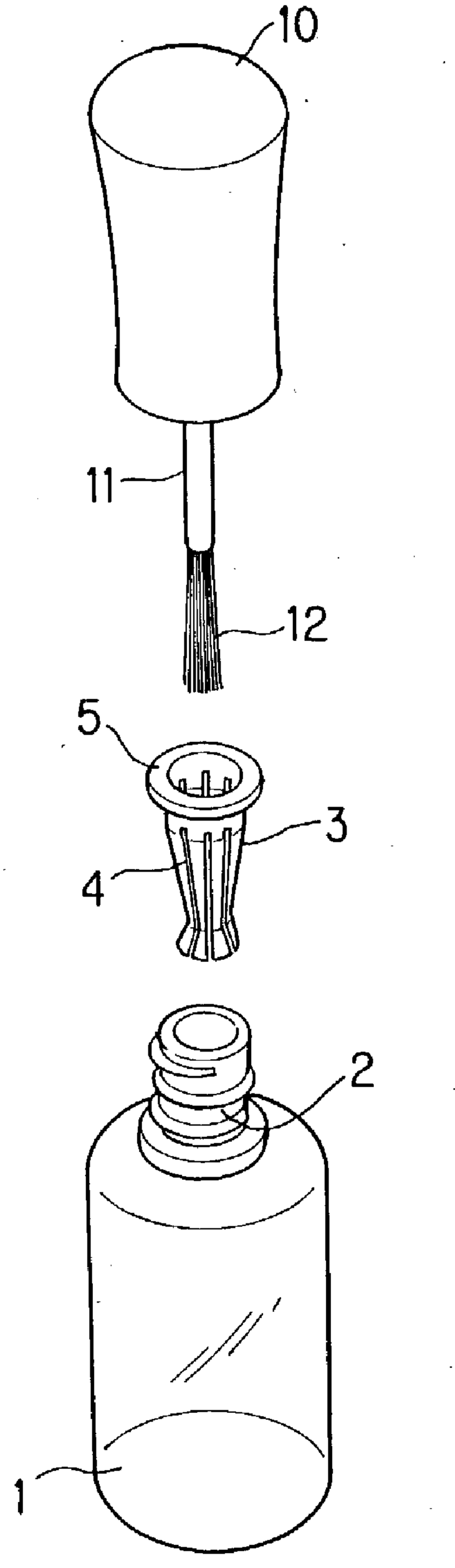


FIG.3

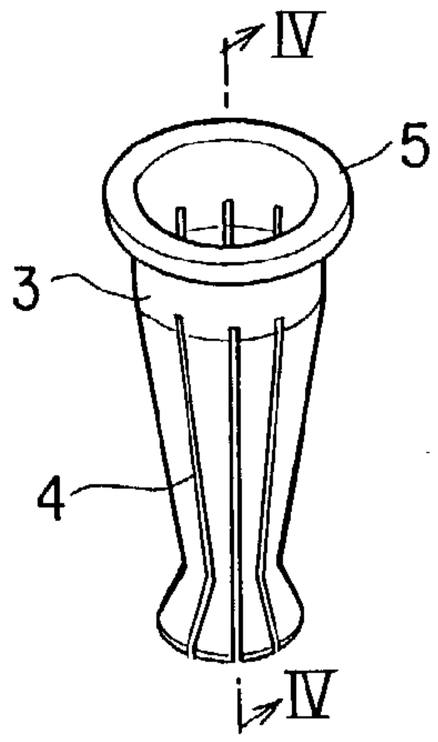


FIG.4

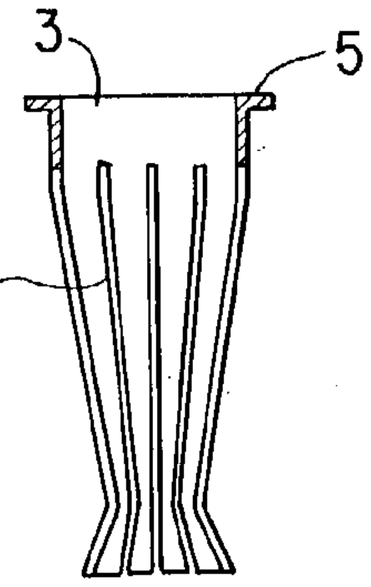
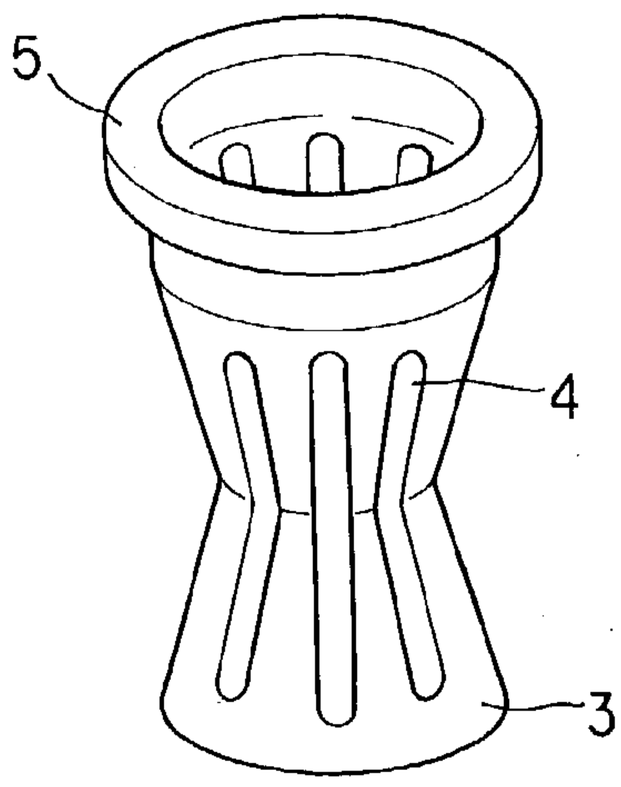


FIG.5



LIQUID CONTAINER

BACKGROUND OF THE INVENTION

[0001] (1) Field of the Invention

[0002] The present invention relates to a liquid container for storing fluid eyeliner, mascara, nail polish, rouge and the like.

[0003] (2) Description of the Prior Art

[0004] Conventional liquid containers have been disclosed by Japanese Utility Model Application Laid-open Sho 50 No. 154177, 55 No. 133906, 57 No. 86104, 60 No. 123110, Japanese Patent Application Laid-open Sho 58 No. 15810, Japanese Patent Application Disclosure Hei 11 No. 504555, Japanese Patent Application Disclosure No. 2000-513990, Japanese Patent Application Laid-open No. 2001-61547 and others.

[0005] Although not illustrated, a liquid container of this kind is comprised of a receptacle for storing a liquid content such as mascara and a cap which is removably screw fitted on the mouth of the neck of the receptacle. A cylindrical squeezer having flexibility and elasticity is fitted in the mouth of the neck of the receptacle. An applying shaft to be inserted into the receptacle through the squeezer is attached to the ceiling of the cap. Attached to the distal end of the applying shaft is an applying part that soaks up the liquid content. The applying shaft is formed so as to have a diameter approximately equal to, or marginally smaller than, the inside diameter of the squeezer, whereby the liquid content adhering to the applying portion is thinned out by the squeezer.

[0006] Incidentally, the squeezer used here should have the following functions: (1) an optimum dose adjusting function of thinning out the liquid content soaked up by the applying part of the-applying shaft when the cap is removed; (2) a mouth staining preventing function of returning the puddle of liquid content at the mouth into the receptacle when the applying shaft is inserted; (3) a mouth staining preventing function of inhibiting rise of the internal pressure of the receptacle when the applying shaft is inserted; (4) a performance maintaining function of preventing damage to the applying part of the applying shaft when the applying shaft is fitted in and taken out; and (5) a performance maintaining function of withstanding repeated attachment and removal of the applying shaft. In view of these demands, the squeezer is formed with slits, projections and the like, as appropriate.

[0007] In order to meet the above demands, the squeezers of the conventional liquid containers have been formed with slits, projections and other structure as appropriate. Although, these measures can meet the demands for the functions (1) to (3), it has not been possible to satisfy the demands for the functions (4) and (5).

[0008] That is, any of the conventional squeezers is arranged perpendicularly to the applying shaft or in such a position as to be acute angled in one direction with respect to the applying shaft. Hence, the squeezer would be easily turned up and deformed by its scraping on the step between the applying shaft and the applying part when the applying shaft is fitted in and removed, causing damage to the applying part and also being unable to withstand repeated attachment and removal of the applying shaft. Further, in the case of a perpendicular type squeezer, there is a relatively high risk of damage to the brush-like applying part taking place.

SUMMARY OF THE INVENTION

[0009] The present invention has been devised in view of the above discussion, and it is therefore an object of the present invention to provide a liquid container in which its squeezer is prevented from being turned up and deformed when the applying shaft is fitted and removed, hence the applying shaft and the like is prevented from being damaged and yet the squeezer can withstand repeated attachment and removal of the applying shaft.

[0010] In order to achieve the above object, the present invention is configured as follows:

[0011] In accordance with the present invention, a liquid container comprises: a receptacle for storing a liquid; a squeezer fitted in the mouth of the receptacle; and an applying shaft inserted into the receptacle through the squeezer, and is characterized in that the squeezer is made of a material having flexibility and formed in such an approximate cylindrical shape that the hollow size of the squeezer becomes gradually smaller from a first end to a position near the other end and becomes gradually greater from that position to the endmost part of the other end while slits extending in the axial direction are formed in the peripheral wall of the squeezer.

[0012] In connection with the above, it is possible that both ends of each slit are not extended to both ends of the squeezer.

[0013] It is also preferred that a flange is projected radially outwards at the first end of the squeezer so as to be engaged on the rim of the mouth of the receptacle.

[0014] Here, whether the viscosity of the liquid in the present invention is high or low is not important as long as it has fluidity. Specific examples of the liquid content include eyeliner, mascara, nail polish, rouge, correction fluid, various adhesives (e.g., dental cement, etc.) and paints. The receptacle may be transparent, translucent or opaque and may have a cylindrical, elliptic, polygonal shape or the like with a bottom. Further, the squeezer may be formed in a cylindrical form, cylindroid form, polygonal prism form, in conformity with the shape of the mouth of the receptacle. The first end of the squeezer may include the top end and upper part whereas the other end of the squeezer includes the middle part and the lower part. The applying shaft may be either solid or hollow.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] **FIG. 1** is a perspective view showing the overall configuration of the embodiment of a liquid container in accordance with the present invention;

[0016] **FIG. 2** is an exploded perspective view of **FIG. 1**;

[0017] **FIG. 3** is an illustrative perspective view showing a squeezer in the embodiment of a liquid container according to the present invention;

[0018] **FIG. 4** is a sectional view cut along a plane IV-IV in **FIG. 3**; and

[0019] **FIG. 5** is an illustrative perspective view showing a squeezer of another embodiment of a liquid container according to the present invention, wherein slits are cut out so that they do not reach the top and bottom ends thereof.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0020] The preferred embodiment of the present invention will hereinafter be described with reference to the accompanying drawings. As shown in FIGS. **1** to **5**, a liquid container in this embodiment includes a receptacle **1**, a squeezer **3** to be fitted in the mouth of a neck **2** of a receptacle **1**, and an applying shaft **11** fixed to a cap **10** and inserted into receptacle **1** through squeezer **3**. The squeezer **3** is formed to be similar to a hollow, waist-shaped drum.

[0021] Receptacle 1 is small-sized and transparent, for example, and holds a predetermined amount of an unillustrated fluidic liquid content such as mascara. This receptacle **1** has a narrow cylindrical neck **2** extending upwards, formed integrally at the upper part thereof. The outer peripheral side of the neck **2** is incised in the circumference direction with a thread for fixture. The thread of this neck **2** detachably mates the thread on the inner periphery of cap **10** having an approximate U-shaped section.

[0022] Squeezer **3** is made of a material having flexibility and elasticity and formed basically in an approximate cylindrical form with its diameter (hollow size) gradually reduced from its top (first end) or thereabout to the lower part (the other end) and gradually enlarged from the lower part to the bottom end (endmost part). Examples of the material for squeezer **3** include various types of rubbers and plastics. More specifically, silicone rubber, butadiene rubber, ABS, PP and PS resins are suitable. Squeezer **3** has a plurality of slits **4** arranged circumferentially and cut out in the vertical direction, so as to present a certain degree of flexibility and resiliency. It also has an annular flange **5** projected radially outwards from the top rim. This flange **5** is fitted so as to rest on the rim of the mouth of neck **2**. Slits **4** may be cut out so that their upper and lower ends extend to the top and bottom of squeezer **3** or may be cut out so that their upper or lower ends do not reach the top and bottom of squeezer **3**, as shown in **FIGS. 4 and 5**.

[0023] Applying shaft **11** is formed in a narrow cylindrical form and suspended from the center of the ceiling of cap **10** by means of a fixture. A brush-like applying part **12** for holding liquid content is fitted at the distal end of the applying shaft. This applying shaft **11** is formed so as to have a diameter approximately equal to, or marginally smaller than, the inside diameter of the lower portion of squeezer **3**, whereby the liquid content holding applying part **12** is thinned out by the lower part of squeezer **3**. Applying shaft **11** and cap **10** are molded of a material having impact resistance and dynamical, such as ABS, PP, PS, PE resins, recycled plastic, EVOH, PET, nylon, PBT, PA, POM resins and others.

[0024] When this liquid container is used for cosmetics, makeup can be applied by turning cap **10**, pulling it upwards to draw out applying shaft **11** from receptacle **1** and using the applying part **12** wetted with the mascara in receptacle **1**.

[0025] According to the above configuration, the lower part of squeezer **3** is more than a mere cylindrical configuration that linearly and vertically extends downwards rather it gradually enlarges radially outwardly as it goes downwards, forming an inverted funnel shape so as to avoid collision with applying part **12** of applying shaft **11** when the applying part holding the liquid content is used for application of mascara. Therefore, the squeezer will never oppose applying shaft **11** perpendicularly or in an acute-angled position with respect to one direction. As a result, it is possible to provide a markedly effective solution to the problem that the squeezer would be turned up and deformed by its scraping on the step between applying shaft **11** and applying part **12** when applying shaft **11** is fitted in and removed, causing damage to applying part **12** and also its being unable to withstand repeated attachment and removal of applying shaft **11**.

[0026] Of course, the configuration of the invention is able to meet the demands for (1) an optimum dose adjusting function of thinning out the liquid content soaked by applying part **12** of applying shaft **11** when cap **10** is removed; (2) a mouth staining preventing function of returning the puddle of liquid content at the mouth into the receptacle **1** when applying shaft **11** is inserted; and (3) a mouth staining preventing function of inhibiting rise of the internal pressure of receptacle **1** when applying shaft **11** is inserted. Further, slits **4** of squeezer **3** enhances the flexibility to some degree, so that the peripheral wall of squeezer **3** flexes inwards and outwards within limits, whereby no damage to applying part **12** occurs when it collides with squeezer **3**. Since flange **5** of squeezer **3** is fitted on the rim of the mouth of neck **2**, prevention against dislodging of squeezer **3** can be highly expected.

[0027] Squeezer **3** is effective enough if the lower ends of slits **4** reach the bottom of squeezer **3** forming open ends. However, when a very flexible material is used considering the solvent resistance against the liquid content and protection of the brush, the lower ends of slits **4** need not reach to the bottom of squeezer **3** so as to form open ends. This makes it possible to enhance the performance and function of (5). Needless to say, this makes it possible to improve only the function of (5) without compromising the functions of (1) to (4).

[0028] In the above embodiment, cap **10** is screw-fitted to neck **2** of receptacle **1**, but the invention should not be limited thereto. For example, cap **10** may be detachably and pressingly attached tightly on neck **2** of receptacle **1**. Further, in the above embodiment, the outer peripheral part of squeezer **3** near its lower end is formed angularly, but the invention should not be limited thereto. For example, the part near the lower end of squeezer **3** may be rounded. It is also possible to configure squeezer **3** so that its diameter becomes gradually smaller from the top end or the upper part towards the middle part and becomes gradually greater from the middle part towards the lower end. Flange **5** either may be, or need not be, formed in an annular shape. Applying part **12** may be a drawing brush or brush, or may be sponge, a twisted brush or others.

[0029] As has been described, according to the present invention, the squeezer is made of a material having flexibility and formed in such an approximate cylindrical shape that the hollow of the squeezer becomes gradually narrower from one end to a position near the other end and becomes gradually wider from that position to the endmost part of the

other end while slits extending in the axial direction are formed in the peripheral wall of the squeezer. Accordingly, it is possible to inhibit or prevent the squeezer from being turned up and deformed when the applying shaft is fitted in or removed, hence preventing damage to the applying shaft and other parts. Further, it is possible to provide a liquid container of which the squeezer is able to withstand repeated attachment and removal of the applying shaft.

What is claimed is:

1. A liquid container, comprising: a receptacle for storing a liquid; a squeezer fitted in the mouth of the receptacle; and an applying shaft inserted into the receptacle through the squeezer,

characterized in that the squeezer is made of a material having flexibility and formed in such an approximate cylindrical shape that the hollow size of the squeezer becomes gradually smaller from a first end to a position near the other end and becomes gradually greater from that position to the endmost part of the other end while slits extending in the axial direction are formed in the peripheral wall of the squeezer.

2. The liquid container according to claim 1, wherein both ends of each slit are not extended to both ends of the squeezer.

3. The liquid container according to claim 1, wherein a flange is projected radially outwards at the first end of the squeezer so as to be engaged on the rim of the mouth of the receptacle.

4. The liquid container according to claim 2, wherein a flange is projected radially outwards at the first end of the squeezer so as to be engaged on the rim of the mouth of the receptacle.

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