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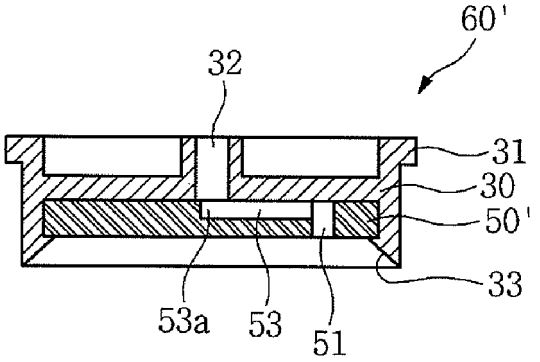
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(54) **CLOSURE DEVICE FOR A CONTAINER USING VISCOSITY**

(57) The present invention relates to a closure device for a container using viscosity. More specifically, the closure device dispenses only the amount desired for use and can prevent spillage even if a user accidentally turns the container over. The closure device according to the present invention comprises: a main body which is inserted in and combined with a neck portion of the container and includes a solution-discharge opening at a central portion of the container; and a disc-shaped fixed plate mounted on an inner side of the main body, which has at least one through-hole. A flow path with a certain depth from the through-hole to the central portion is formed on an upper side of the fixed plate. The closure device can reduce production costs by minimizing components and alleviate user anxiety about upsetting the container. Since the closure device discharges desired amounts of content, waste due to over-discharging can be reduced.

[Fig. 10]




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## Description

**[0001]** [Technical Field]

**[0002]** The present invention relates to a closure device for a container, in more detail, a closure device for a container using physical viscosity of liquid, which can prevent liquid from leaking out of a container, even if a user accidentally turns the container upside down in everyday life, and dispense the amount of liquid that the user wants, when the user wants to use the liquid in the container.

**[0003]** [Background Art]

**[0004]** Closures of containers used at the present time simply close (seal) the containers to prevent leakage, or adjust the shape and the dispensed amount of contents by changing the shape of the outlets of the containers into a circle or a rectangle, such as containers for food.

**[0005]** Improved from the above, spray-typed, pump-typed, and pipette-typed closures are used generally for medicine or cosmetic container, and usually made of plastic in large quantities by injection molding.

**[0006]** The closures of common containers having a simple shape of outlet has a problem in that the contents leaks by the shock, when the container is upside down, while when wanting to use the container, the users are anxious about that they have pay attention to using the containers, because too much contents may be dispensed.

**[0007]** The spray-typed and pump-typed closure that are widely used for good sealing, as compared with the simple shapes of closures, requires a large number of parts (seven to eleven) to satisfy the functions of desired sealing and adjusting the contents, such that the manufacturing cost is high. Further, when the contents solidify, the operational parts may be stuck and cause malfunction, or the contents in the containers are not completely discharged or remain between the parts, thereby wasting resources.

**[0008]** Further, it is difficult to dispense the amount of contents, which a user wants.

**[0009]** [Disclosure]

**[0010]** [Technical Problem]

**[0011]** The present invention has been made to overcome the problems of the related art and it is an object of the present invention to a closure device for a container using viscosity according to a new conception, which has a simple structure with a small amount of parts, prevents the contents from leaking, even if the container is upside down, makes it easy to adjust the dispensed amount, and makes it possible to dispense almost all the contents in the container without waste.

**[0012]** [Technical Solution]

**[0013]** In order to achieve the object of the present invention, a closure device for a container using viscosity includes: a main body that is inserted in and combined with a neck portion of a container and have a solution discharging opening at the center; and a fixed plate that is a circular plate disposed in the main body, has a through-hole at a predetermined position, and defines a fixed-plate flow path on the top, at a predetermined depth from the through-hole to the center.

**[0014]** The lower end of the discharging opening of the main body is connected with the fixed-plate flow path formed at the center on the fixed plate

**[0015]** It is preferable that the main body has a packing portion at the top and a locking step at the bottom to prevent the fixed plate from separating downward.

**[0016]** Further, the through-hole of the fixed plate is positioned at a predetermined distance from the center of the fixed plate, and the fixed-plate flow path connected to the through-hole is formed straight or in a curve to the center of the fixed plate.

**[0017]** Meanwhile, a separator is further disposed between the main body and the fixed plate, in which the separator is a circular plate and preferably has a center groove at a predetermined depth on the bottom, a plurality of under-separator flow paths formed from the center groove to the circumference, under-separator flow path holes at the ends of the under-separator flow paths, and protrusions at regular intervals on the top of the separator.

**[0018]** In this configuration, the center flow path formed on the top of the separator is connected with the lower end of the discharging opening of the main body above the flow path, and with the fixed-plate center flow path under the flow path.

**[0019]** Features and advantages of the present invention will be made clear from the following detailed description based on the accompanying drawings. Terms or words used in the specification and claims herein should be not construed as a general and lexical meaning and should be construed as the meaning and concept meeting the technical idea of the present invention based on a principle that the present inventors can properly define the concepts of terms in order to elucidate their own invention in the best method.

**[0020]** [Advantageous Effects]

**[0021]** A closure device for a container using viscosity according to the present invention uses a principle that liquid is stopped by viscous force that is generated when the fluid passes through a narrow channel, whereas the closure device adjusts the dispensed amount by making the viscous force smaller than the gravity of external force applied by hands, when using the liquid. Therefore, a structural sealing device is achieved by using the viscosity that is a physical

property of liquid, without using specific operational parts.

**[0022]** The closure device according to the present invention has the following effects.

**[0023]** First, it is possible to remove anxiety in use by preventing the contents from leaking, even if the container is turned upside down by a mistake of a user.

**[0024]** Second, it is possible to prevent a safety accident due to the anti-leaking function of the container.

**[0025]** Third, it is possible to reduce waster for excessive dispensing, because only the amount of contents that users want can be dispensed.

**[0026]** Fourth, it is possible to reduce waste of resources, because the contents do not substantially remain in the container.

**[0027]** Fifth, it is possible reduce factors for malfunction and correspondingly improve reliability, because operational parts having specific opening/closing functions are not used.

**[0028]** Sixth, it is possible to reduce the manufacturing cost by minimizing the number of parts and simplifying the parts.

**[0029]** Seventh, it is possible to improve reliability and increase the selling amount.

**[0030]** [Description of Drawings]

**[0031]** FIG. 1 is a perspective view showing when a lid and a closure device according to the present invention are separated from a container;

**[0032]** FIGS. 2 to 4 are a plan view, a bottom view, and a cross-sectional view of the closure device according to the present invention, respectively;

**[0033]** FIGS. 5 to 7 are a plan view, a bottom view, and a cross-sectional view of a separator according to the present invention, respectively;

**[0034]** FIGS. 8 and 9 are a cross-sectional view and a plan view showing the structure of a fixed plate according to the present invention;

**[0035]** FIG. 10 is a cross-sectional view showing another example of a closure device according to the present invention;

**[0036]** FIGS. 11 and 12 are cross-sectional views of an example of the fixed plate shown in FIG. 10, respectively;

**[0037]** FIG. 13 is a plan view of another example of the fixed plate shown in FIG. 10; and

**[0038]** FIG. 14 is a view showing when liquid is dispensed out of a container equipped with a closure device according to the present invention.

**[0039]** <Reference Numerals>

| | |
|---|---|
| 10: Lid | 30: Main body |
| 31: Packing portion opening | 32: Solution discharging |
| 33: Locking step | 40: Separator |
| 41: Protrusion | 42: Under-separator flow path |
| 43: Flow path end hole | 44: Center hole |
| 46: Over-separator flow path | |
| 50, 50', 50": Fixed plate | |
| 51, 55: Through-hole | 53, 57: Fixed-plate flow path |
| 60: Closure device | 70: Container |
| 71: Container neck portion | |

**[0040]** [Best Mode]

**[0041]** Exemplary embodiments of a closure device for a container using viscosity according to the present invention are described in detail with reference to the accompanying drawings.

**[0042]** FIG. 1 is a perspective view showing when a lid and a closure device according to the present invention are separated from a container, and FIGS, 2 and 4 are views showing the structure of the closure device according to the present invention, in which FIG. 2 is a plan view, FIG. 3 is a bottom view, and FIG. 4 is a cross-sectional view.

**[0043]** Further, FIGS. 5 to 7 are views showing the structure of a separator according to the present invention, in which FIG. 5 is a plan view, FIG. 6 is a bottom view, and FIG. 7 are cross-sectional view.

**[0044]** FIGS. 8 and 9 are a cross-sectional view and a plan view showing the structure of a fixed plate according to the present invention.

**[0045]** Referring to the figures, a closure device 60 for a container using viscosity according to the present invention is inserted in and combined with a neck 71 of a container 70 and a lid 10 is combined with the upper portion of the closure device 60.

**[0046]** The closure device 60 of the present invention, as shown in FIGS.2 to 4, is composed of a main body 30 having a solution discharging opening 32 at the center, a separator 40 disposed in the main body 30, and a fixed plate 50

disposed under the separator 40.

**[0047]** In this configuration, the separator 40 may be removed, which is described below (see FIG. 10).

**[0048]** The main body 30 has a solution discharging opening 32 at the center, a packing portion 31 at the top, and a locking step 33 preventing the fixed plate 50 from separating downward.

**[0049]** The separator 40 of the present invention is a circular plate and the configuration is shown in detailed in FIGS. 5 to 7. The separator 40 has a center groove 44 formed at a depth on the bottom of the circular plate, a plurality of separator flow paths 42 formed from the center groove 44 to the circumference, and separator flow path end holes 43 cut at a predetermined depth inside the circular plate at the ends of the separator flow paths 42.

**[0050]** Further, protrusions 41 are formed at regular intervals on the top of the separator 40 and a flow path (46 in FIGS. 4 and 7) along which solution flows is defined between the protrusions 41 and the bottom of the main body 30.

**[0051]** Solution flowing inside through the center groove 44 on the bottom of the separator flows to the over-separator flow path 46 through the under-separator flow path 42 and the separator flow path end holes 43.

**[0052]** The over-separator flow path 46 is connected with the solution discharging opening 32 of the main body 30 at the center of the separator 40, such that the solution flowing along the over-separator flow path 46 is discharged outside through the solution discharging opening 32.

**[0053]** The fixed plate 50 of the present invention is disposed under the separator 40 in close contact with the separator 40. A through-hole 51 is formed at the center of the fixed plate 50 to guide the solution flowing through the neck portion 71 to the under-separator flow path 42.

**[0054]** In this configuration, it is possible to prevent the contents from remaining in the container by making the bottom of the fixed plate 50 recessed.

**[0055]** Meanwhile, FIG. 10 is a cross-sectional view showing another example of a closure device according to the present invention, FIGS. 11 and 12 are cross-sectional view of an example of the fixed plate shown in FIG. 10, respectively, and FIG. 13 is a plan view of another example of the fixed plate shown in FIG. 10.

**[0056]** A closure device 50' shown in FIG. 10 is that shown in FIG. 4 with the separator 40 removed. That is, one fixed plate 50' is disposed in the main body 30.

**[0057]** The fixed plate 50' is a circular plate having a through-hole 51 at a predetermined position and a fixed-plate flow path 53 formed on the top at a predetermined depth from the through-hole 51 to the center.

**[0058]** In the fixed-plate flow path 53, the flow path 53a at the center of the fixed plate is connected with the bottom of the solution discharging opening 32 of the main body 30 to connect the flow of solution.

**[0059]** Further, the through-hole 51 of the fixed plate is spaced at a predetermined distance from the center of the fixed plate 50' and the fixed-plate flow path 53 connected with the through-hole 51 is formed straight to the center of the fixed plate 50' (see FIGS. 11 and 12).

**[0060]** Meanwhile, referring to FIG. 13, a flow path 57 is formed in a curve along the circumference of a fixed plate 50", extending from a through-hole 55 formed through the fixed plate 50", such that it is possible to make the fixed-plate flow path 57 long.

**[0061]** Therefore, according to the closure device 40 of the present invention, viscous force is generated by viscosity, which is a physical property of solution, due to the gaps of the flow paths 42, 46 defined between the main body 30 and the separator 40 or the main body 30 and the fixed plates 50, 50', 50", such that the viscous force prevents the solution from leaking, even if the container 70 is upside down.

**[0062]** FIG. 14 is a view showing when liquid is dispensed out of a container equipped with a closure device according to the present invention. When a user shakes the container 70 up and down or presses it with hands to user the liquid in the container 70, if needed, as shown in FIG. 14, the solution is dispensed, because the external force applied to the outer circumference is larger than the viscous force of the solution in the closure device 40.

**[0063]** In this position, the gap between the separator 40 and the main body 30 depends on the viscosity of the solution and the viscous force can be adjusted by forming flow paths in various ways on the bottom of the separator 40.

**[0064]** Therefore, even if the container 70 is upside down, the solution is first stopped by viscous force generated along the under-separator flow path 42 under the separator 40, and then viscous force is exerted by the gap between the bottom of the main body 30 and the top of the separator 40, such that double anti-leaking is implemented and reliability against the leakage is improved.

**[0065]** Most cosmetic containers 40 commonly used in everyday life are designed to be easily turned upside down and users would be anxious about that expensive cosmetics may be leaked and wasted for upside-down of the container, and would take pity when the too much cosmetics are dispensed.

**[0066]** Similarly, liquid-state source, such as soy source and vinegar, may pour down due to upside-down of the containers, and the users have to pay attention to pour the source with anxiety that too much source is dispensed and messes the taste of food.

**[0067]** Therefore, it is possible to provide convenience and satisfaction for the users by using the closure device for a container using viscosity of the present invention.

## Claims

1. A closure device for a container using viscosity, comprising:

   a main body that is inserted in and combined with a neck portion of a container and have a solution discharging opening at the center; and
   a fixed plate that is a circular plate disposed in the main body, has a through-hole at a predetermined position, and defines a fixed-plate flow path on the top, at a predetermined depth from the through-hole to the center.

2. The closure device for a container using viscosity according to claim 1, wherein the lower end of the discharging opening of the main body is connected with the fixed-plate flow path formed at the center on the fixed plate

3. The closure device for a container using viscosity according to claim 1, wherein the main body has a packing portion at the top and a locking step at the bottom to prevent the fixed plate from separating downward.

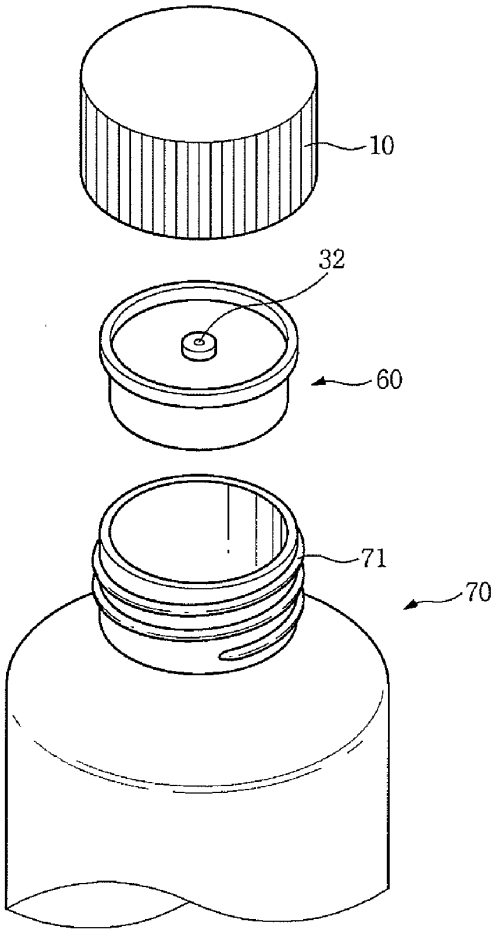
4. The closure device for a container using viscosity according to claim 1, wherein the through-hole of the fixed plate is positioned at a predetermined distance from the center of the fixed plate, and the fixed-plate flow path connected to the through-hole is formed straight or in a curve to the center of the fixed plate.

5. The closure device for a container using viscosity according to claim 1, wherein a separator is further disposed between the main body and the fixed plate.

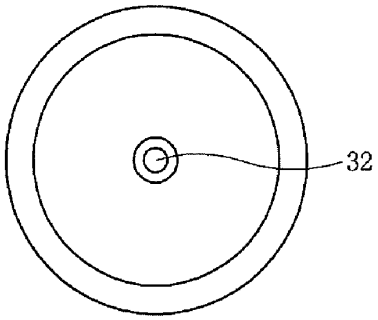
6. The closure device for a container using viscosity according to claim 5, wherein the separator is a circular plate and has a center groove formed at a predetermined depth on the bottom, a plurality of under-separator flow paths formed from the center groove to the circumference, under-separator flow path holes formed at the ends of the under-separator flow paths, and protrusions formed at regular intervals on the top of the separator.

7. The closure device for a container using viscosity according to claim 6, wherein the protrusions define a flow path on the separator by being in contact with the bottom of the main body, and the center of the over-separator path is connected with the lower end of the discharging opening of the main body.

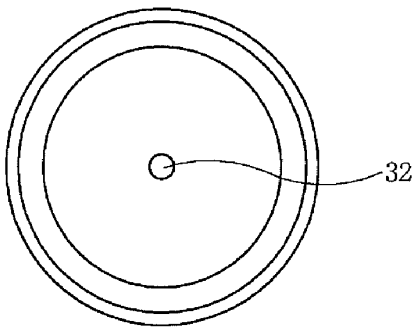
[Fig. 1]



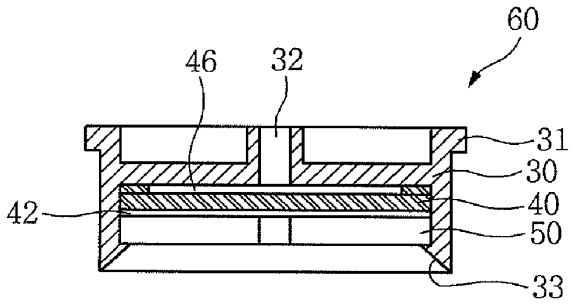

[Fig. 2]



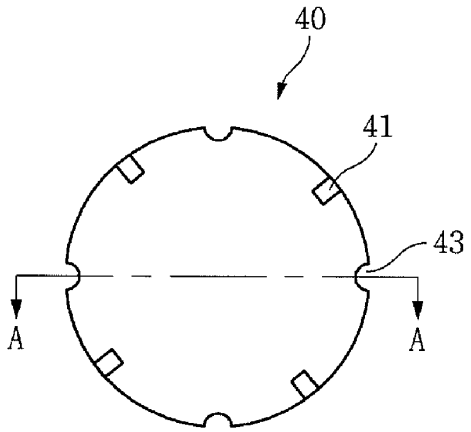

[Fig. 3]



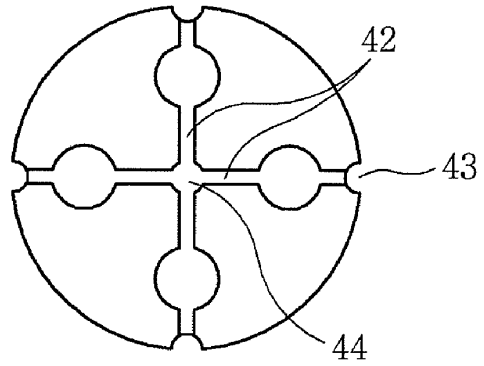
[Fig. 4]



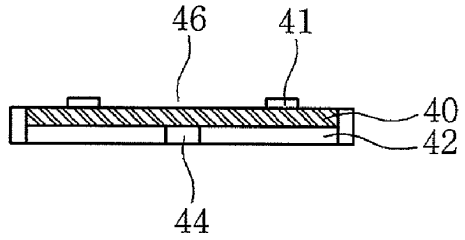

[Fig. 5]



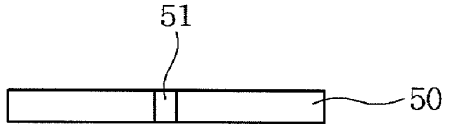

[Fig. 6]



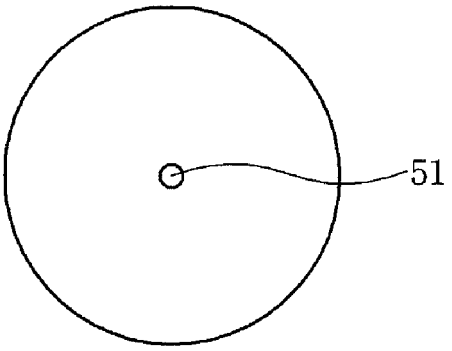

[Fig. 7]



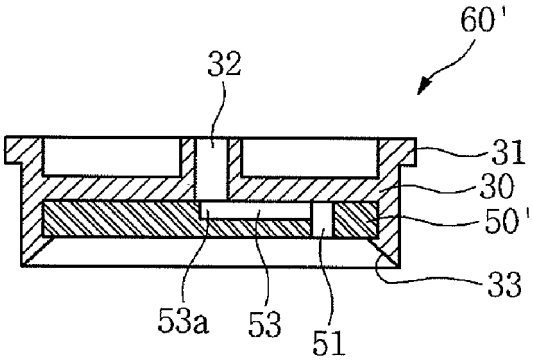

[Fig. 8]



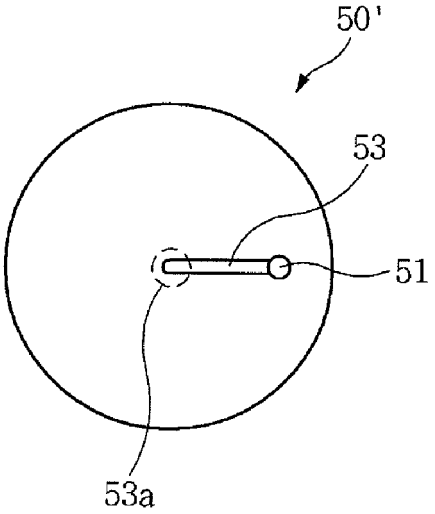
[Fig. 9]



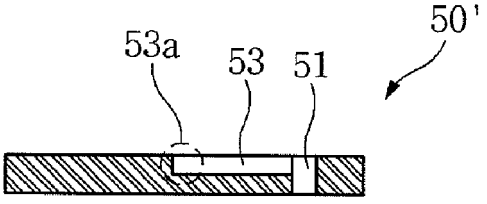

[Fig. 10]



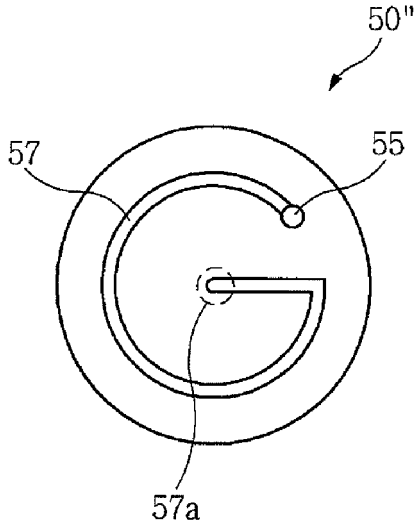

[Fig. 11]




[Fig. 12]



[Fig. 13]




[Fig. 14]

