July 5, 1966 P. JELLESEN 3,259,282

TUBE CLOSURE DEVICE

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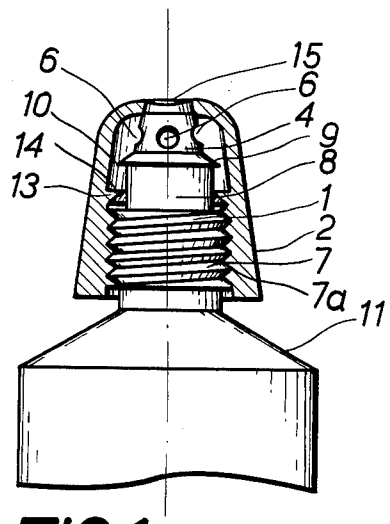


FIG.1

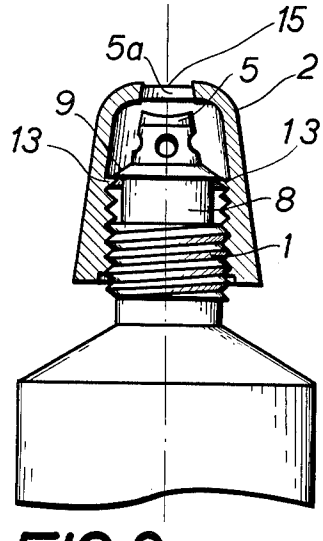


FIG.2

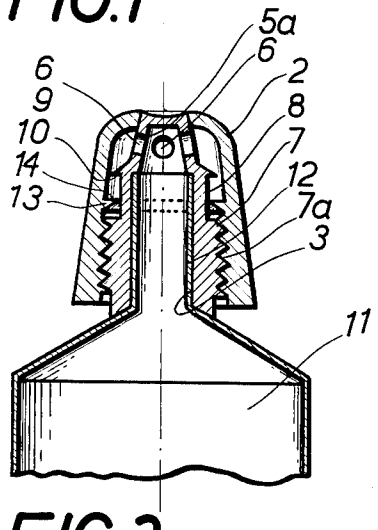


FIG.3

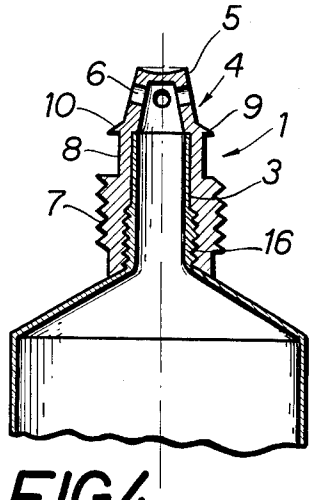


FIG.4

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TUBE CLOSURE DEVICE

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The present invention relates to a tube closure device of the type which, upon the turning of the tube cap is adapted to be screwed open for discharge of the tube's contents without the cap being completely displaced.

Several different types of such tube closures are known and used, where the actual tube cap is disposed so that it may not be completely displaced and lost. Amongst other ways this is attained by the tube cap and the cylindrical tube-shaped member, onto which the tube cap is screwed, being provided with oppositely facing conical rings whose embodiment and size are of such that permit the cap to be comparatively easily screwed on but which will form an effective stopper when it is screwed off, since the parallel right-angled surfaces of the rings meet and obstruct further displacement. Thus in this case these oppositely facing conical rings serve only to obstruct the complete displacement of the cap. A significant disadvantage of the previously known tube cap of this type is that on re-screwing the tube cap in order to close the tube, the upper volume in the upper portion of the tube closure is reduced so that in many cases the contents of the tube are pressed out through the discharge orifice until this is closed and further, will possibly be pressed down into the threaded portion of the tube cap and out at the lower edge of the tube cap.

The object of the invention is to eliminate this advantage in a simple and easy way and to retain the advantages of a cap that cannot be completely displaced and perhaps lost.

According to the invention this is obtained by disposing the previously known oppositely facing conical rings, adapted to prevent the complete displacement of the tube cap, so that besides acting as an obstruction they also effect a seal between the discharging substance in the upper cavity of the tube cap and the threaded portion in the lower part of the tube cap. This is attained thereby that the tube closure, comprising an inner tube shaped member and a tube cap adapted to be screwed down onto said tube shaped member, are provided with oppositely facing conical shaped rings where the ring located in the interior of the tube cap is disposed so that it bears against and seals a cylindrical portion on the tube-shaped member, and further that there is disposed above the cylindrical portion on the tube-shaped member a conical shaped ring which, when the tube cap is screwed outwardly on the tube shaped member, bears against the conical ring disposed in the tube cap and obstructs further displacement.

By disposing the combined sealing and stopping means consisting of the conical rings, together with the cylindrical shaped portion, above the threaded portion on the tube-shaped member on which the tube cap is screwed, the contents of the tube are prevented, by the conical ring which bears against and seals the cylindrical portion, from coming into contact with the threaded portion and thus involving such disadvantages as congealing of the substance, so that the tube cap cannot be screwed, or that the substance follows the threads downwards and escapes from the underside of the tube cap. A further effect obtained by the sealing conical ring being disposed on the interior of the tube cap, is that the upper volume in the tube cap is not reduced substantially during the closing operation and therefore does not cause the substance to be forced out through the discharge orifice or down through the fastening.

The invention thus comprises a tube closure of the type which, upon the turning of the tube cap is adapted to be screwed open for discharge of the tube's contents, without the cap being completely displaced, which tube closure comprises a tube cap having a central conical cavity where the surface of the inner walls is parallel with the surface of the outer walls and which terminates in a central aperture in the top of the tube cap, onto which tube cap is screwed a cylindrical tube-shaped member having a lower part adapted to be pushed over the neck of the tube and fastened to this, and whose upper part, shaped as a truncated cone, fits into the central aperture of the tube cap, and where the tube-shaped member's external surface and the tube cap's internal surface are formed with oppositely facing conical rings whose embodiment and size are of the type which permit the tube cap to be comparatively easily screwed on but which will form an effective stopper against complete displacement, since the rings' parallel surfaces meet, and where the tube-shaped member below its conical ring includes a portion having a cylindrical shape where the characterization is that the said cylindrical portion's external diameter is equal to or slightly larger than the smallest diameter in the conical ring in the tube cap and considerably smaller than the largest diameter on the conical ring on the tube-shaped body, and that the oppositely facing conical rings together with the cylindrical portion on the tube-shaped member are disposed above the threaded portion on the tube-shaped member. A further feature is that the internal cylinder of the tube-shaped body is provided with threads applied with glue for attachment to already existing tubes. A third feature is that the tube cap is made of a suitable pliable material while the tube body, on the other hand, is made of a strong hard material. The invention is further described in the following, with reference to the drawing, which shows a preferred embodiment and where

FIG. 1 shows a section through the tube cap when closed.

FIG. 2 shows a section through the tube cap when open.

FIG. 3 shows a section through the closure device, and

FIG. 4 shows a section through the tube-shaped member and the tube neck.

The tube-shaped member shown on the drawing, having external threads and one end shaped as a truncated cone, is designated as **1**, the tube closure as **2**, the cylindrical channel in the tube-shaped member as **3**.

The tube-shaped member **1** is preferably made of a hard plastic material in a continuous piece and with external threads **7** together with an internal cylindrical channel **3**. The tip portion of the member **1** in the form of a truncated conical plug **4** has a conical surface **5** engageable with the surfaces **5***a* of the central aperture of the tube cap **2**. The tip portion **4** is provided with apertures **6** for the discharge of the substance into the outer portion of the cap **2** and through the discharge aperture thereof. The tubular member **1** is provided with external threads **7** which extend to a cylindrical surface **8** thereof, which in turn terminates with a conical ring or flange **9** having an outer edge **10** located inwardly of the inside wall of the cap **2** and outwardly of the cylindrical portion **8**. The underside of the conically-shaped ring **9** is at a right angle to the surface of the cylindrical portion **8**.

The tube-shaped member **1** is fastened to the tube **11** in a suitable way, for instance by the tube neck **12** during the manufacture of the tubes, being pressed up into the cylindrical channel **3**, the internal walls of which are provided with grooves so that the tube-shaped member will not work itself loose and follow the tube cap **2** around when this is opened or closed. Further the tube-shaped

member 1, having a tube cap already screwed on, may be pressed down over the smooth finished tube neck and fastened to this.

In FIG. 4 is shown a modification where the cylinder 3 is provided with internal threads 16, at its lowest end, and accordingly may be screwed onto the tube neck and joined to this by means of glue or the like.

The tube cap 2 is preferably made of a soft plastic material. From the bottom and upwardly it is provided with internal threads 7*a* which co-operate with the threads 7 on the tube-shaped member 1. Above the threads 7*a* the internal walls of the tube cap 2 are formed as one with the conical ring 13 of the wall which on the upper side, forms a surface 14 right-angled to the surface of the cylindrical portion 8. The under side forms a sharp angle with the cylindrical surface 8, so that the tube cap 2 preferably glides easily over the conical ring 9 on the tube-shaped member 1, when screwing on, while it acts as an effective stopper when screwing off, since the underside of the ring 9 and the upper side of the ring 13 will bear against each other and act as a combined stopper and sealing device thus preventing the tube's substance from escaping down to the threads 7 and 7*a*.

The tube cap 2 is centrally provided with a slightly upwardly inclined aperture 15 having its largest area in towards the tube.

The aperture 15 corresponds to the truncated cone 4 which is formed as one with the tube-shaped member 1 and is a part of this.

The smallest internal diameter on the conical ring 13 shall have the same size as the external diameter on the cylindrical portion 8.

FIG. 1 shows the tube cap on the closed tube where the cone surface on the truncated cone 4 and the tube cap's aperture 15 are pressed against each other, and where the tube cap's internal ring 13 is pushed down a part of the way along the cylindrical portion 8.

In FIG. 2 is shown the tube cap on the open tube, here may be seen for example how the two rings 9 and 13 bear on and seal each other, simultaneously preventing the tube cap from being completely displaced.

FIG. 4 shows how the tube-shaped member 1 is pressed down over the tube neck, or conversely that the tube neck is pressed up into the internal cylindrical channel 3.

I claim:

1. A container tube closure device of the type including an externally threaded tubular member, the lower portion of which is adapted to be fastened to the outlet of the tube container and an internally-threaded cap cooperating with said tubular member and which is adapted to be screwed open for discharge of the contents of the tube container without the cap being completely removed, said cap having an internal cavity above its threads terminating

in a central aperture at the top, said tubular member having a plug at its upper end adapted to fit in and close said aperture when the cap is screwed down on the tubular member, the upper portion of said tubular member also including apertures opening out below the plug into the internal cavity in the cap, said tubular member being provided with a longitudinally-extending cylindrical outer surface between its external threads and the apertures in its upper portion, an integral ring on said tubular member below said apertures at the upper portion of said cylindrical surface projecting outwardly into the internal cavity in the cap and having a laterally-extending undersurface extending at right angles to said cylindrical surface, an integral inwardly-projecting ring in said cap above its threads having an upper surface parallel to the undersurface of the outwardly-projecting ring on the tubular member, said inwardly-projecting ring in the cap having an inner edge engaging and sealing against the cylindrical surface of the tubular member to prevent the contents of the container tube from entering the threads of the cap or those of the tubular member and being movable along said cylindrical surface when the cap is screwed up or down on the tubular member, the upper and under surfaces of said inwardly and said outwardly-projecting rings being adapted to snap over each other upon screwing the cap on the tubular member and to provide a stop preventing removal of the cap when screwed open for discharge of the contents of the tube container, the maximum diameter of said outwardly-projecting ring being substantially smaller than the diameter of the portion of the internal cavity of the cap into which it projects, the arrangement of the inwardly-projecting ring being such that the volume of said internal cavity thereabove in the cap is not substantially reduced during the closing of the cap when it is screwed down.

2. A closure device according to claim 1, characterized in that the cap is made of pliable material, while the tubular member on the other hand is made of a hard and strong material, whereby sealing and assembly of the tubular member and cap are facilitated.

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