April 22, 1941. B. KLUTH 2,238,888

DISPENSING CLOSURE MEMBER

Filed April 17, 1939

Fig.1

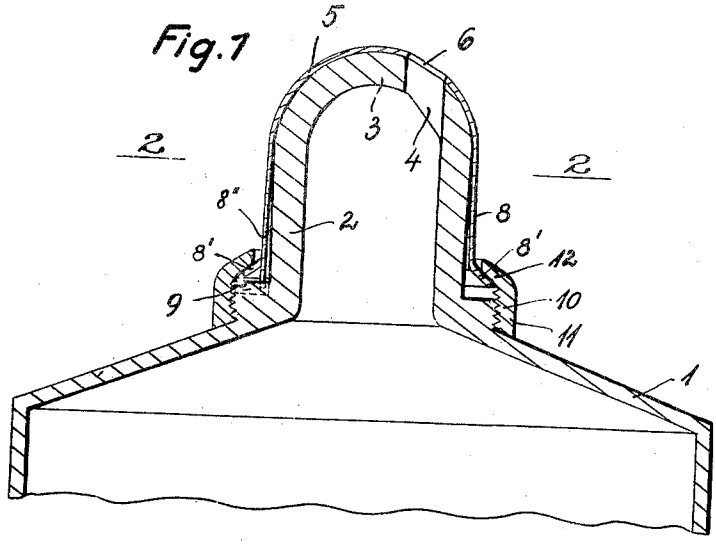
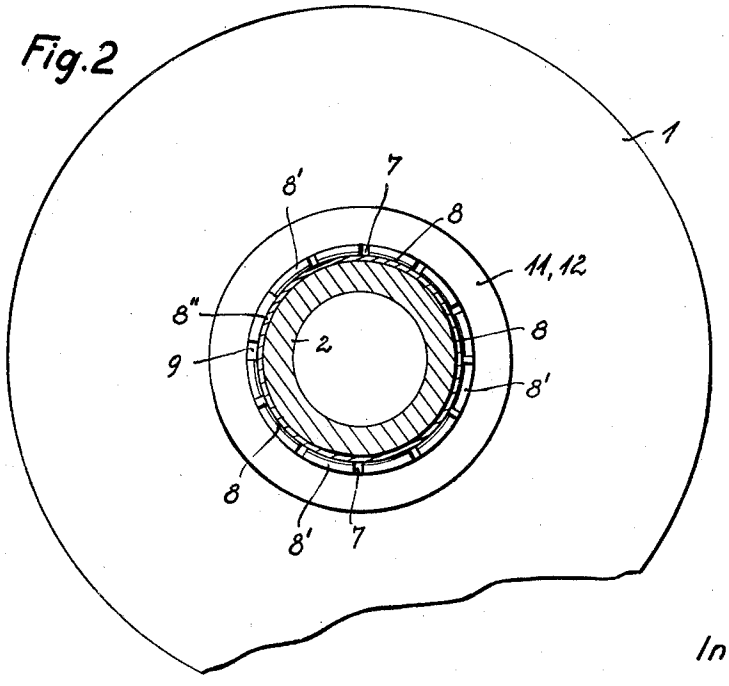


Fig.2



Inventor

By Bruno Kluth

Attorney

Patented Apr. 22, 1941

2,238,888

UNITED STATES PATENT OFFICE

2,238,888

DISPENSING CLOSURE MEMBER

Bruno Kluth, Berlin, Germany

Application April 17, 1939, Serial No. 268,317
In Germany April 14, 1938

5 Claims. (Cl. 221—60)

This invention relates to a dispensing closure member for tubes or other containers of the type comprising a closure cap arranged in rotative engagement with a correspondingly shaped neck portion of the tube or container. Both said cap and neck are provided with openings adapted to be moved into and out of register by rotation of the cap between its closed and open or dispensing positions, respectively.

According to the improved construction proposed by the present invention, the lower end of the cap is slotted at several points thereof to provide resilient tongues one of which serves as an abutment for limiting the rotary movement of the cap between the open and closed positions.

The resilient tongues with the exception of the one mentioned serving as an abutment, are bent outwardly at an angle to engage the inner surface of a tapering portion of a nut like member screwed on or otherwise secured to the tube. This nut by yieldingly engaging the resilient tongues of the closure cap causes the cap to closely engage the neck of the tube in such a manner that, due to the resiliency of the tongues, the cap, on the one hand, yieldingly engages the surface of the neck with a close and tight fit while, on the other hand, being allowed to rotate freely between its open and closed positions.

The invention will become more apparent from the following detailed description of a practical embodiment thereof taken with reference to the accompanying drawing forming part of this specification and wherein:

Figure 1 is a vertical cross-section through a dispensing closure member according to the invention, and

Figure 2 is a horizontal cross-sectional view taken on line 2—2 of Figure 1.

Like reference numerals identify like parts in both views of the drawing.

In the drawing, the tube or container 1 of which only the upper portion is shown and which may have any desired shape and configuration is formed with a neck comprising a lower cylindrical portion 2 and an upper closed hemispherical portion 3. The upper portion 3 is provided with a discharge opening 4 for dispensing a liquid, paste or other content of the container. Item 5 represents a rotary cap member or shell having the same shape as and closely fitting over the neck 2—3. This cap is also provided with an opening 6 corresponding to the opening 4 in the upper neck portion 3, both openings 4 and 6 being moved into and out of register in the open and closed position of the cap 5 as is readily understood.

The lower end of the cap 5 is formed with slots 7, thereby providing depending resilient tongues 8. The latter have their lower portions 8' bent outwardly at an angle with the exception of one of the tongues 8''. The latter serves as an abutment cooperating with a projection 9 at the base of the neck 2—3 forming a stop for limiting the rotary movement of the cap 5 and defining its open and closed positions, respectively.

The lower end of the neck portion 2 is enlarged or formed with a rim whose outer cylindrical surface is threaded as shown at 10 to receive a nut like member 11 having an inside thread engaging the thread 10. The nut 11 has its upper portion 12 bent inwardly at an angle to provide a tapering surface bearing against the bent portions 8' of the tongues 8 in such a manner as to effect a snug fit between the cap 5 and the neck portion 3. The height of the nut 11 is such that, when screwed tightly against the tube or container, the tongues are straightened only partly but sufficiently to insure a close but yielding engagement between the bent-out portions 8' of the tongues 8 and the inner surface of the bent-in upper portion 12 of the nut 11 by virtue of the resiliency of the tongues 8, while allowing easy rotation of the cap member 5. The outer surface of the neck portion 2 is advantageously shaped to taper slightly inwardly in the downward direction as shown in the drawing, thereby providing sufficient clearance for the tongues 8 to yield to the pressure exerted by the nut 11 when the latter is screwed onto the tube in the manner described hereinabove.

While only a single stop 9 is shown in the drawing, it is understood that the lower neck portion may also be provided with two projections serving as stops between which the abutment tongue 8'' can be moved. The distance between the two projections is chosen in such a manner that in one limit position of the cap 5 the openings in the cap and in the neck are in register, while in the other limit position the opening in the neck is covered or closed by the cap 5. The neck 2—3 of the tube, the nut 11 and, the cap member 5 may be made of artificial resin, such as a polymerisation product or similar material suited for moulding under pressure.

The inner conical surface 12 of the nut 11 which bears against the resilient tongues 8 of

the cap member 5 is preferably of spherical shape so as to insure a close engagement between the nut and the tongues under all conditions.

In order to facilitate the rotation of the cap 5, the latter is either roughened and/or the slots 7 are extended beyond the nut 11. If desired, ribs may be provided at the edges of the slots to afford a firm grip and facilitate rotation of the cap.

By inserting a washer between the cap and the tube the starting torque or the friction between the cap and the tube neck may be reduced while enabling the nut to be tightly screwed onto the tube.

When employing a dispensing closure member according to the invention, inaccuracies in the manufacture are easily compensated by an adjustment of the nut 11 and the tongues 8 engaging the same. If necessary, for large tolerances correspondingly thicker or thinner washers may be inserted between the nut 11 and the tube. Thus, if a reduced friction is desired between the bent tongue portions 8' and the engaging surface of the nut portion 12 to enable more easy rotation of the cap 5, it is not necessary to redesign the entire closure member or construct new tools and other accessory devices required for the manufacture and assembly.

The use of artificial resin, such as polymerisation and other artificial products capable of being moulded under pressure is not only desirable with a view to avoid the use of the more expensive metals, but also in order to reduce the cost of manufacture, while at the same time improving the appearance of the finished tube or other container. The materials for the cap member 5, the tube head 2—3, and, if desired, for the nut 11 may be selected so that either all have the same coefficient of thermal expansion, taking into consideration the various thicknesses of the materials. Alternatively the coefficients of expansion may differ from each other to provide, a more or less close engagement between the valve member and the tube neck in dependence upon the character of the contents of the container such as whether fluid or viscous etc. The materials employed may also be selected with regard to their friction coefficients from the same point of view.

I claim:

1. The combination of a container having a neck the outer end of which is provided with an opening therein, a cap rotatively fitting over said neck, said cap having an opening adapted to be moved into and out of register with the opening in said neck, and means for retaining said cap in engaging relation to said neck, said means comprising a plurality of elastic tongues extending from the lower edge of said cap and having lower portions bent outwardly at an angle, a tubular member secured to the container concentric to said neck and having an inner conical surface, the bent portions of said tongues yieldingly bearing against said conical surface, and stop means to define the dispensing and closed positions of said cap when said openings are in and out of register, respectively.

2. The combination of a container having a neck the outer end of which is provided with an opening therein, a cap rotatively fitting over said neck, said cap having an opening adapted to be moved into and out of register with the opening in said neck, and means for retaining said cap in engaging relation to said neck, said means comprising a plurality of elastic tongues extending from the lower edge of said cap and having lower portions bent outwardly at an angle, a tubular member secured to the container concentric to said neck and having an inner conical surface, the bent portions of said tongues yieldingly bearing against said conical surface, at least one of said tongues being unbent and extending in a straight direction from said cap, and stop means integral with said neck cooperating with said last mentioned tongue to define the dispensing and closed positions of said cap when said openings are in and out of register, respectively.

3. The combination of a container having a neck the outer end of which is provided with an opening therein, a cap rotatively fitting over said neck, said cap having an opening adapted to be moved into and out of register with the opening in said neck, and means for retaining said cap in engaging relation to said neck, said means comprising a plurality of elastic tongues extending from the lower edge of said cap and having lower portions bent outwardly at an angle, a nut screwed on to an enlarged threaded portion of said neck, said nut having an inner conical surface, the bent portions of said tongues yieldingly bearing against said conical surface, and stop means to define the dispensing and closed positions of said cap when said openings are in and out of register, respectively.

4. The combination of a container having a neck comprising a lower cylindrical portion and an outer hemispherical portion, the latter being provided with an opening therein, a cap rotatively fitting over said neck, said cap having an opening adapted to be moved into and out of register with the opening in said neck, the lower portion of said cap being slotted to provide a plurality of elastic tongues, the lower portions of said tongues being bent outwardly at an angle, a nut screwed on to the container having an inner conical surface bearing against the bent portions of said tongues, and stop means to define the dispensing and closed positions of said cap when said openings are in and out of register, respectively.

5. In an arrangement as claimed in claim 4, the outer surface of the cylindrical portion of said neck tapering inwardly in the direction towards said tongues to provide adequate clearance for said tongues to yieldingly engage the conical surface of said nut.

BRUNO KLUTH.