

United States Patent

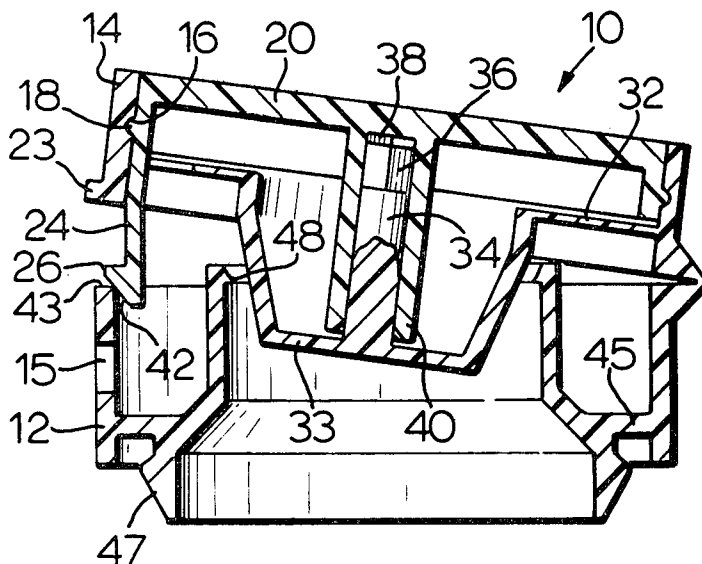
[11] 3,623,622

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 [21] Appl. No. **54,440**
 [22] Filed **July 13, 1970**
 [45] Patented **Nov. 30, 1971**
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Primary Examiner—George T. Hall
Attorney—Sim & McBurney

[54] **SAFETY LOCKING CLOSURE**
10 Claims, 10 Drawing Figs.
 [52] U.S. Cl. **215/9,**
 215/41, 222/543, 220/306, 220/315 R
 [51] Int. Cl. **A61j 1/00,**
 B65d 55/02
 [50] Field of Search **215/9, 41;**
 220/30.5, 60, 38.5, 30.6, 315 R, 33; 222/543, 542

ABSTRACT: A safety locking closure for a container, comprising a base portion and a cap hinged to the base. The base has an aperture giving access to the container, and the cap can swing to close or open the aperture. A pivotally mounted locking disc on the cap is torsion-biased into a given orientation, and when in this orientation a locking tooth carried on an arm secured to the disc engages a portion of the base portion and locks the cap in its closed position. The disc can be rotated away from the given orientation which withdraws the tooth from engagement with said portion, thus freeing the cap to be opened.



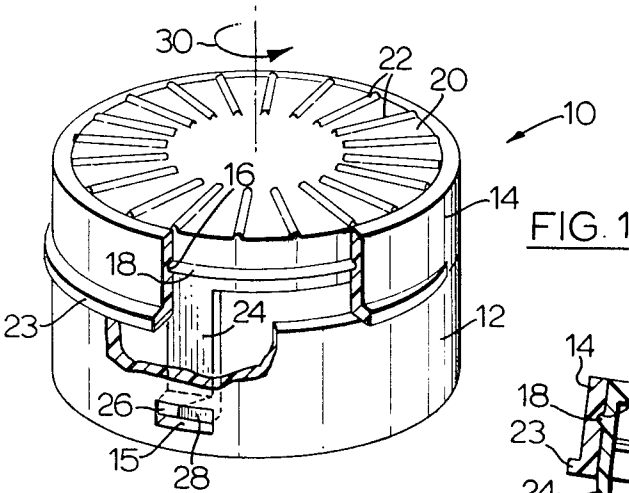


FIG. 1

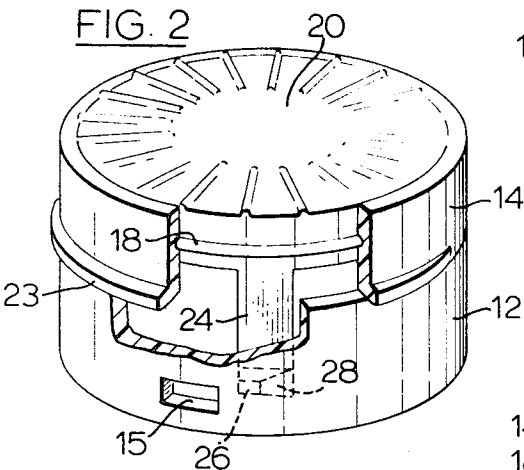


FIG. 2

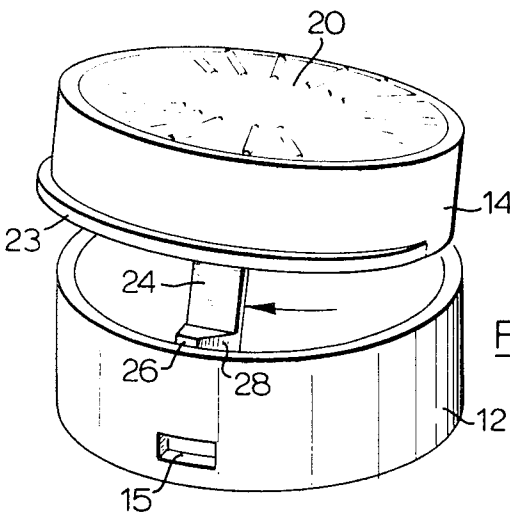


FIG. 3

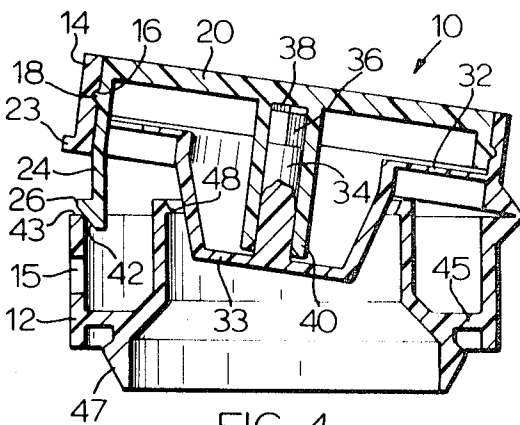


FIG. 4

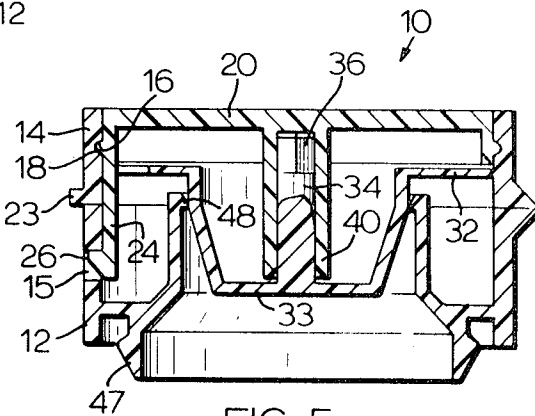


FIG. 5

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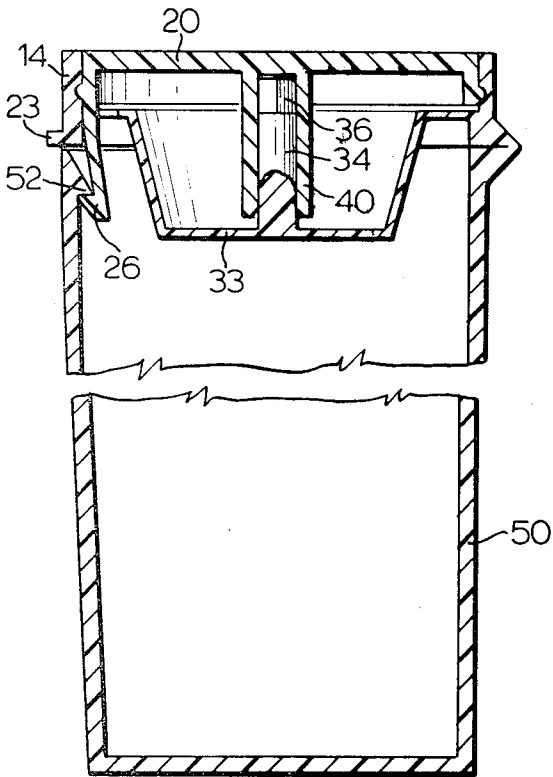


FIG. 6

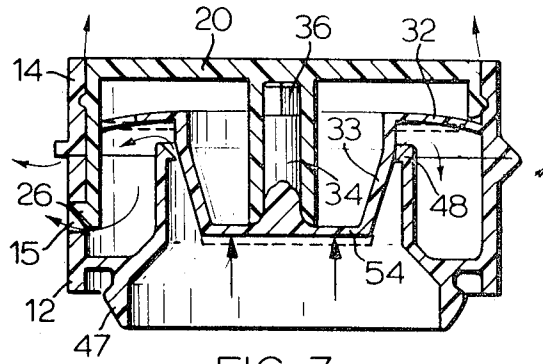


FIG. 7

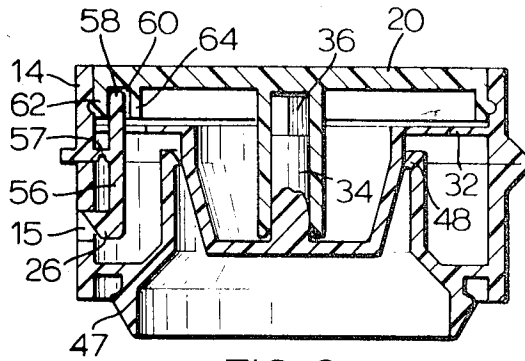


FIG. 8

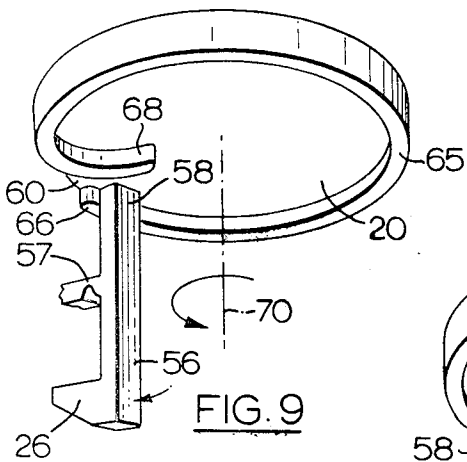


FIG. 9

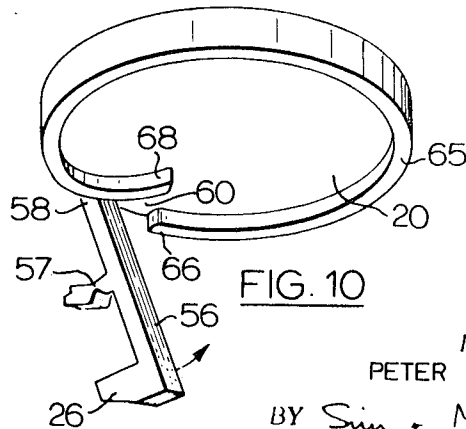


FIG. 10

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SAFETY LOCKING CLOSURE

This invention relates to safety locking closures for containers such as bottles. In particular, this invention relates to safety locking closures which cannot be opened by young children.

An object of this invention is to provide a safety locking closure which requires a two-step opening procedure requiring a level of digital coordination beyond the capability of young children.

Three embodiments of this invention are shown in the accompanying drawings, in which like numerals denote like parts throughout the several views, and in which:

FIGS. 1 and 2 are partly broken-away, perspective views of a closure constructed in accordance with the first embodiment of this invention, showing two sequential steps in the opening procedure;

FIG. 3 is a perspective view of the closure of FIGS. 1 and 2, although not broken-away in this view, showing the next step in opening the closure;

FIGS. 4 and 5 are axial sectional views of the closure of this invention, showing two sequential positions during closing of the opened safety locking closure;

FIG. 6 is an axial sectional view of the second embodiment of this invention, wherein the safety locking closure has been directly incorporated integrally with a container;

FIG. 7 is an axial sectional view of the first embodiment in the closed position, showing how the safety locking closure is self-venting to permit the release of excess pressure inside the container on which it is affixed;

FIG. 8 is an axial sectional view of the third embodiment of this invention; and

FIGS. 9 and 10 are perspective views of the functional portions of the third embodiment of this invention, showing two sequential steps encountered in the opening procedure.

Turning now to FIG. 1, the safety locking closure shown generally at 10 in FIG. 1 consists of a cap base 12 and a cap lid 14, the lid and the base being preferably hinged together at a location diametrically opposed to the aperture 15 in the cap base 12. The cap lid 14 is essentially cylindrical in shape, and has an annular, internal gallery 16 in which is lodged an outwardly protruding rib 18 on a lock disc 20 which is received within the upper opening of the cap lid 14.

The lock disc 20 has radial ridges 22 by which the fingers may get a grip on the lock disc 20 in order to rotate the same.

The cap lid 14 has, along its lower edge, an outwardly protruding lip 23 which only partially encircles the cap lid 14. Essentially, the lip 23 need only be present in the area of the aperture 15.

Extending downwardly from the lock disc 20, and integral therewith, is an arm 24 which has a bevelled tooth 26 at its lower end. When the cap lid 14 is closed down against the cap base 12, the tooth 26 lodges within the aperture 15. Because of its small radial dimension, the arm 24 is adapted to flex toward and away from the vertical axis of the safety locking closure 10, although it tends resiliently to maintain the tooth 26 outwardly locked in the aperture 15. As soon as the lock disc 20 is rotated within the cap lid 14, however, the tooth 26 is forced radially inwardly by virtue of its bevelled side 28 moving, in a cam-type of action, against the edge of the aperture 15. In the embodiment shown, the tooth 26 has only one bevelled edge 28, and because of this, the tooth 26 can be dislodged from the aperture 15 only by rotation of the lock disc 20 in the direction shown by the arrow 30; i.e., in the counterclockwise direction as seen from above looking downwardly.

When the tooth 26 is locked into the aperture 15 as shown in FIG. 1, it is impossible to hinge the cap lid 14 upwardly away from the cap base 12. However, once the lock disc 20 has been rotated into the FIG. 2 position, whereby the tooth 26 is withdrawn from the aperture 15, and in fact rests resiliently with its point bearing against the inside surface of the cap base 12, it is then possible to hook one's thumb under the lip 23, while holding the disc 20 in its FIG. 2 position, and

pry upwardly to open the cap lid 14 away from the cap base 12 into the position shown in FIG. 3.

Although not shown in FIGS. 1, 2 or 3, resilient means are provided for resiliently biasing the lock disc 20 into its FIG. 1 position, such that rotation of the lock disc 20 in the direction shown by the arrow 30 requires the application of sufficient force to overcome the resilience of the biasing means. Once the cap lid 14 has been opened as shown in FIG. 3, the force maintaining the lock disc 20 in its FIG. 2 orientation is released, and the resilient biasing means (not shown) will return the arm 24 to its FIG. 1 orientation, with the tooth 26 directly in line with, but not engaged in, the aperture 15.

Attention is now directed to FIGS. 4 and 5, in which the resilient biasing means is shown.

As shown in FIGS. 4 and 5, the cap lid 14 has an integral inward annular flange 32 which in turn is integral with a cup-shaped member 33, the latter having a central, upstanding torsion bar 34. The torsion bar 34 has a squared upper end 36 which is adapted to be received within a similarly shaped socket 38 defined within a tubular extension 40 extending integrally downwardly from the center of the lock disc 20. Thus, the major portion of the length of the torsion bar 34 acts as a torsion spring which resiliently tends to return the lock disc to an orientation, with respect to the cap lid, in which the stress in the torsion bar 34 is minimum, and this position is the one in which the tooth 26 is aligned with the aperture 15.

FIG. 4 shows the safety locking closure 10 just prior to being snapped shut, and it will be noticed that the tooth 26 also has a bevel 42 on its lower side, such that engagement between the bevel 42 and the upper edge 43 of the cap base 12 will urge the tooth 26 radially inwardly and permit it to slide down into its locking position within the aperture 15.

This locked position is shown in FIG. 5.

Attention is now directed to the design of the cap base 12 in FIGS. 4 and 5. It will be noted that, integral with the cap base 12, is an inwardly extending flange 45, which is integral in turn with a stepped cylindrical member 47, the upper edge of which has an integral, inwardly extending lip 48. The lip 48 has a knife-edge shape, and is so dimensioned as to rest resiliently against the cup-shaped member 33, when the cap lid 14 is in the closed position against the cap base 12. This situation is shown in FIG. 5, and the lip 48 provides a peripheral knife-edge seal for the contents of a container the interior of which communicates with the inside of the stepped cylindrical member 47.

It will be noticed, in FIGS. 4 and 5, that the hinge between the cap lid 14 and the cap base 12 is a "living hinge," a term which denotes an integral web hinge of very thin section capable of repeated flexing without rupture. As mentioned above, this particular kind of hinging provision is not essential to this invention and forms no part thereof. It will be appreciated that any of the conventional kinds of hinging means could be utilized in the present context.

Attention is now directed to FIG. 6, which shows the second embodiment of this invention, in which the cap base has been extended to form the entire container 50. The integral safety lock and the spring action discussed with reference to the previous Figures is still present in the embodiment shown in FIG. 6, the only significant changes being that the aperture 15 is replaced with an internal ledge 52 below which the tooth 26 is adapted to lock, and the removal of the stepped cylindrical member 47 with its knife-edge lip seal 48.

FIG. 7 shows the first embodiment (that of FIGS. 4 and 5), but it is shown in the position assumed when internal pressure within the container becomes so great as to require venting. The venting is automatic, and takes place when the upward pressure against the bottom 54 of the cup-shaped member 33 becomes great enough to force the cup-shaped member 33 upwardly, thereby straining the annular flange 32 upwardly away from its normal position. When the cup-shaped member 33 is thus raised by the internal pressure, the knife-edge seal at the lip 48 is broken, as shown in FIG. 7, and the excess pressure within the container is permitted to escape along the various

paths shown by the arrows. The broken lines in FIG. 7 show the normal, unstressed position of the cup-shaped member 33 and the annular flange 32, while the stressed, venting position is shown in solid lines.

FIGS. 8, 9 and 10 show the third embodiment of this invention, the primary modification being that the original arm 24 integral with the lock disc 20 is replaced, in FIG. 8, by a swivel lock arm 56 which is integral, through web 57, with the cap lid 14. The swivel lock arm 56 extends upwardly from the web 57, to terminate in an end 58 which is entrained in a groove or track 60 defined between an outer ridge 62 and an inner ridge 64. As the lock disc 20 is rotated, the track 60 moves radially outwardly, carrying the end 58 with it, and consequently withdrawing the tooth 26 from the aperture 15.

FIGS. 9 and 10 show one possible way of achieving this result. In FIGS. 9 and 10, the track 60 is defined between the opposite ends of a downwardly protruding ridge 65. As the lock disc 20 is rotated (this time in the clockwise direction as seen from above in FIGS. 9 and 10), the end 66 of the ridge 65, which had been maintaining the swivel lock arm 56 in the FIG. 9 position, with the tooth 26 locked in the aperture 15 (not shown in FIG. 9), moves to the right so that it no longer maintains the upper end 58 of the swivel lock arm 56 in its innermost position. Upon further clockwise motion (as seen from above in FIG. 9), the other end 68 of the ridge 65 comes into contact with the upper end 58 of the swivel lock arm 56, and because the end 68 is obliquely set, it urges the upper end 58 of the swivel lock arm 56 radially outwardly away from the axis 70, thereby withdrawing the tooth 26 from the aperture 15. The result is shown in FIG. 10, in which the swivel lock arm 56 is disengaged, permitting the cap lid to be hinged upwardly.

I claim:

1. A safety locking closure for a container, said closure comprising:

a base having an aperture through which the container contents can be removed from the container,

a cap hinged to said base for hinging movement between a first position in which it closes said aperture and a second position in which it is removed from said aperture, the cap including: (a) a lock member mounted on said cap for pivotal movement with respect thereto, and (b) engagement means adapted to engage a portion of said base when the lock member is in a first orientation with respect to said cap, the engagement of said engagement means with said portion restraining said cap in said first position, the lock member being pivotable to a second orientation with respect to said cap, said engagement means being disengaged from said portion of said base when the lock member is in said second orientation, thereby releasing said cap to be hinged to said second position,

and biasing means urging said lock member into said first orientation, the lock member having means by which it can be manually pivoted between said first and second orientations.

2. A safety locking closure as claimed in claim 1, in which said lock member is a disc centrally pivoted with respect to said cap, and in which the engagement means is a resilient arm secured to the disc and extending toward the base from the periphery of the disc in a direction normal to the plane of the disc, the resilient arm having at its extremity a tooth adapted to engage said portion of said base when the disc is in said first orientation.

3. A safety locking closure as claimed in claim 1, in which said biasing means is a torsion spring attached at one end to the cap and at the other to said lock member.

4. A safety locking closure as claimed in claim 1, in which the base is integral with the container.

5. A safety locking closure as claimed in claim 1, in which said lock member is a disc centrally pivoted with respect to said cap, and in which the engagement means is an arm hinged to the cap and extending toward the base in a direction sub-

stantially normal to the plane of the disc, the arm having remote from its own hinge a tooth adapted to engage said portion of said base, the disc having cam means for controlling said arm whereby when the disc is in said first orientation the tooth engages said portion and when the disc is in said second orientation the tooth is withdrawn from engagement with said portion.

6. A safety locking closure for a container, said closure comprising:

a substantially cylindrical base having an aperture through which the container contents can be removed from the container,

a substantially cylindrical cap hinged to said base for hinging movement between a first position in which it closes said aperture and a second position in which it is removed from said aperture, a torsion spring member attached at one end centrally to the cap and extending axially away from the container,

and a lock member comprising a disc element attached centrally to the other end of said torsion spring member and adapted to pivot with respect to said cap between a first orientation in which the torsion spring member is substantially unstressed and a second orientation in which the torsion spring member is stressed and tends to return the disc element to said first orientation,

the disc element having engagement means adapted to engage a portion of said base when the disc element is in said first orientation, thereby restraining said cap in the first position, the engagement means being disengaged from said portion of said base when the disc element is in said second orientation, thereby releasing said cap to be hinged to said second position,

the disc element having means by which it can be manually pivoted between said first and second orientations.

7. A safety locking closure as claimed in claim 6, in which said engagement means is a resilient arm secured to the disc at a location remote from its pivotal center and extending toward the base in a direction substantially normal to the plane of the disc, the resilient arm having at its extremity an outward protuberance adapted to enter an opening in the cap when the disc element is in said first orientation, the opening constituting the said portion, the protuberance being beveled such that rotation of the disc element from said first to said second orientation causes the protuberance to slide out of said opening and move inwardly against the resilience of said resilient arm.

8. A safety locking closure as claimed in claim 6, in which the base is integral with the container.

9. A safety locking closure for a container, said closure comprising:

a substantially cylindrical base having an aperture through which the container contents can be removed from the container,

a substantially cylindrical cap hinged to said base about a first hinge axis for hinging movement between a first position in which it closes said aperture and a second position in which it is removed from said aperture, a torsion spring member attached at one end centrally to the cap and extending axially away from the container,

and a lock member comprising a disc element attached centrally to the other end of said torsion spring member and adapted to pivot with respect to said cap between a first orientation in which the torsion spring member is substantially unstressed and a second orientation in which the torsion spring member is stressed and tends to return the disc element to said first orientation,

the cap having an arm hinged thereto about a second hinge axis substantially parallel with said first hinge axis, the arm having catch means remote from said second hinge axis, cam means between the arm and the disc element by which rotation of the disc from the second orientation to the first orientation urges the catch means into engagement with a portion of the base, thereby restraining the

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cap in said first position, and rotation of the disc from he first orientation to the second orientation withdraws said catch means from engagement with said portion, thereby releasing said cap to be hinged to said second position, the disc element having means by which it can be manually pivoted between said first and second orientations.

10. A safety locking closure as claimed in claim 9, in which said catch means is an outward protuberance adapted to enter

an opening in the cap when the disc element is in said first orientation, the opening constituting the said portion, in which the arm is hinged at a location intermediate its ends and has a first end carrying said protuberance and a second end extending to a location adjacent said disc element, the disc element having a cam track adapted to move said second end as the disc element is rotated.

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