United States Patent [19]

Hazard

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[45] **Dec. 4, 1973**

[54] **SAFETY CLOSURE USEABLE ON THREADED CONTAINER NECK**

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[52] **U.S. Cl.** **222/153,** 222/534, 222/536

[51] **Int. Cl.** **B67d 5/32**

[58] **Field of Search** 222/153, 532, 536, 222/534, 538, 548, 402.11; 215/9

[56] **References Cited**

UNITED STATES PATENTS

3,677,445	7/1972	Linkletter	222/153
3,055,524	9/1962	Glasbrenner	215/9

Primary Examiner—Robert B. Reeves
Assistant Examiner—Larry Martin
Attorney—Edward D. O'Brian et al.

[57] **ABSTRACT**

A so-called safety closure having a closure body, a closure element mounted on the closure body so as to be movable between open and closed positions and a locking member mounted on the closure body so as to be capable of being moved so as to prohibit movement of the closure element from the closed position and so as to permit movement of the closure element to the open position from the closed position can be constructed utilizing an internally threaded skirt on the closure body and a sleeve on the locking member in such a manner that the closure can be utilized on a conventional threaded container neck without significant danger of the closure being removed from the neck by comparatively young children or others. Coacting ratchet means only permitting the entire closure to be screwed or torqued on a container neck are provided between the closure body and the locking member on the skirt and on the sleeve.

6 Claims, 4 Drawing Figures

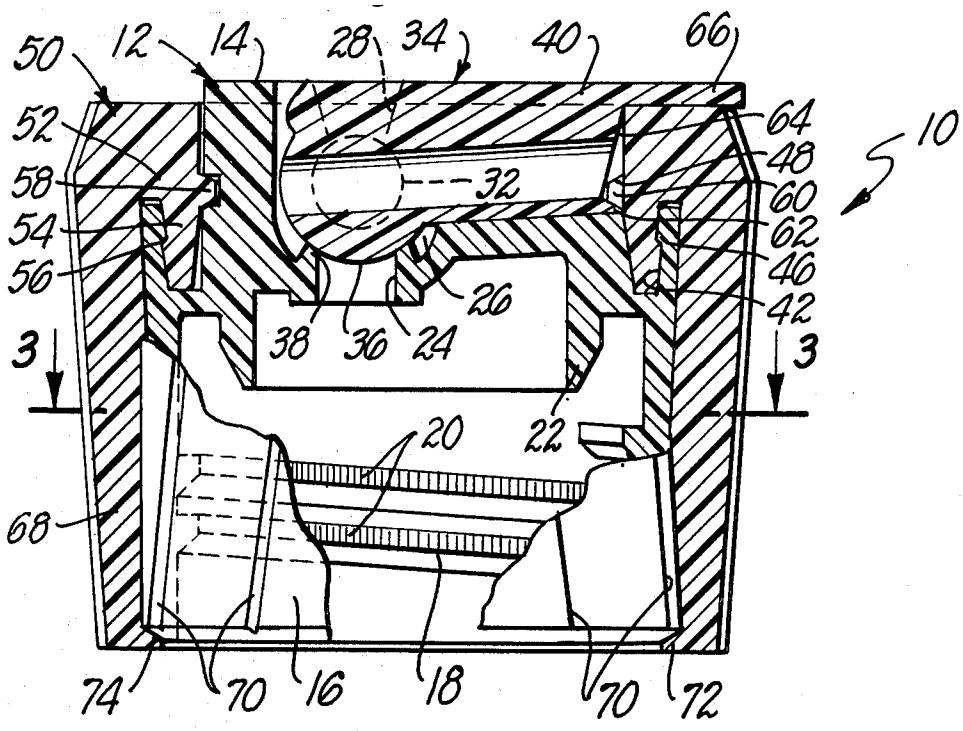


FIG. 1.

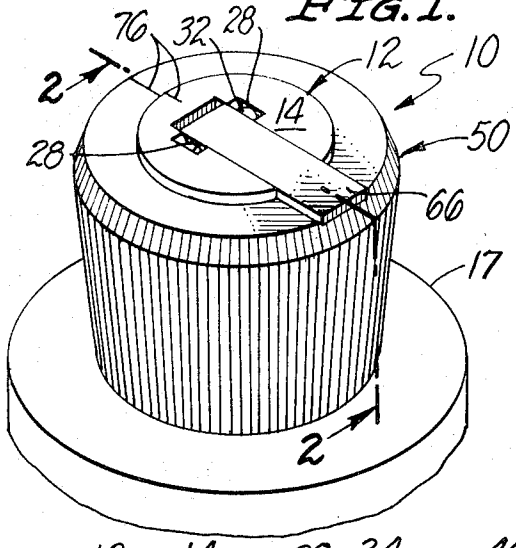
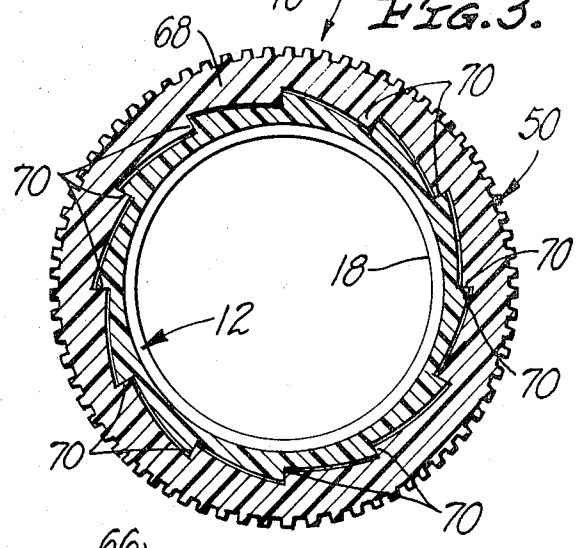


FIG. 3.



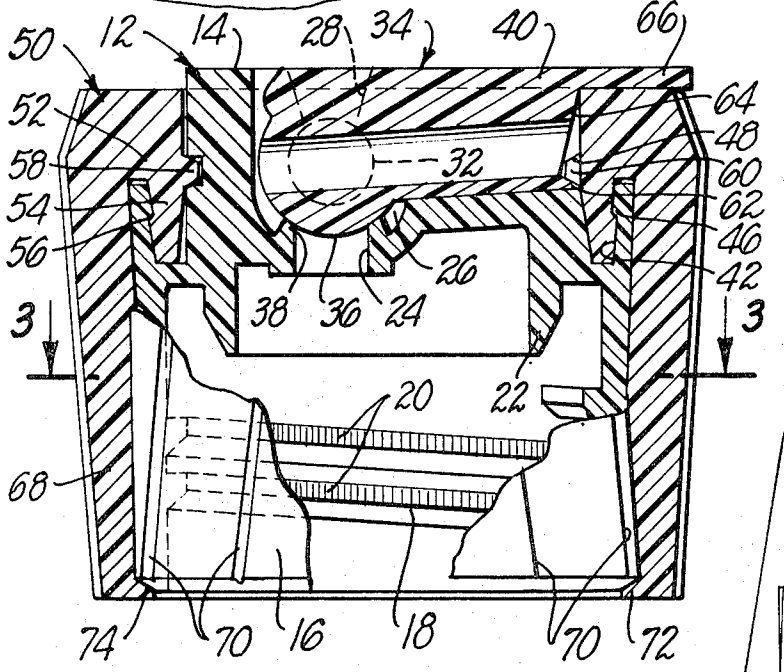
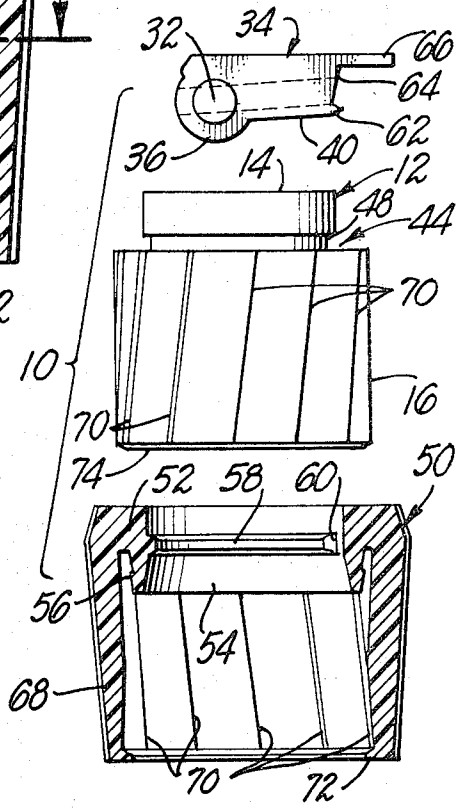


FIG. 2.

FIG. 4.



SAFETY CLOSURE USEABLE ON THREADED CONTAINER NECK

CROSS-REFERENCES TO RELATED APPLICATIONS

This application relates the co-pending application Ser. No. 235,970 filed Mar. 20, 1972, entitled "Safety Dispensing Closure With Movable Retainer." The entire disclosure of this co-pending application is incorporated herein by reference.

BACKGROUND OF THE INVENTION

Increased recognition of the hazards attending to the use of containers which may be readily opened has resulted in many manufacturers desiring to utilize so-called safety closures. Such closures can be loosely defined as closures which can be readily opend by individuals of a normal mental capacity, but which are relatively difficult for comparatively yound children and older individuals of decreased mental capacity to open. It is believed that the increased adoption and use of such safety closures will prevent a great deal of damage and injury.

A number of different problems have been encountered in the development and use of various different types of safety closures. One of these problems pertains to adapting closure structures of safety-type character so that they can be satisfactorily employed on existing container necks and more specifically on threaded container necks such as bottle necks.

Container manufacturers have significant sums tied up in appropriate machines, dies and the like for the production of containers having these threaded necks. Obviously it would be economically desirable to have safety closures capable of being utilized with them. In the past, however, such closures have not been available. In the past it has been considered that safety closures should not be utilized with containers having threaded necks because of the ease of removal.

SUMMARY OF THE INVENTION

A broad objective of the present invention is to fulfill the indicated existing need for safety closures which can be utilized satisfactorily with containers having threaded necks. A more specific objective of the present invention is to provide closures or safety closures which when utilized on such necks cannot be readily removed from them. Other objectives of the present invention are to provide closures as indicated which may be easily and conveniently manufactured and assembled at comparatively reasonable costs, which may be readily installed upon containers by manufacturers utilizing existing types of capping equipment and which when so installed can be easily and conveniently utilized by container users without there being significant danger of these closures being removed from the containers upon which they are installed.

In accordance with this invention these and various related objectives of the invention are achieved in a closure having a closure body, a closure element mounted on the closure body so as to be capable of being moved between open and closed positions and a locking member movably mounted relative to the closure body and the closure element so as to be capable of being moved between locked and unlocked positions, the improvement which comprises or includes the locking member being rotatably mounted upon the closure body, coacting ratchet means located upon the closure body and the locking member. The coacting ratchet means used permits the closure body to be torqued or screwed on a container neck when the locking member is turned in one manner or direction, the coacting ratchet means being capable of snapping over one another so that the closure body will not be turned upon a container neck when turned in another manner or direction.

BRIEF DESCRIPTION OF THE DRAWING

A summary of this type is inherently incapable of indicating many features and details of an invention. Such features and details as well as many advantages of the invention will be apparent from a careful consideration of the remainder of this specification, the appended claims and the accompanying drawing in which:

FIG. 1 is an isometric view of a presently preferred embodiment or form of a closure in accordance with this invention installed on a container neck;

FIG. 2 is a partially cross-sectional view taken at line 2—2 of FIG. 1 of only the closure shown in FIG. 1;

FIG. 3 is a cross-sectional view taken at line 3—3 of FIG. 2; and

FIG. 4 is an exploded view showing two of the three parts of the closure illustrated in side elevations and showing a third part in cross-section.

Since the invention set forth in this specification involves certain intangible concepts or features as expressed in the appended claims it will be realized that the illustrated closure is not the invention itself. The illustrated closure is simply a specific structure embodying these concepts or features. On the basis of the disclosure embodied within this specification those skilled in the art of closures will be able to utilize these concepts or features in other closures which differ from the illustrated closure in matters of routine engineering design.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

In the drawing there is shown a closure **10** of the present invention which includes an integrally formed closure body **12,** having a top **14** holding a dependent cylindrical skirt **16.** Conventional threads **18** are provided within the interior of this skirt **16.** Preferably these threads are formed so as to be slightly off of desired size for use on a threaded container neck **17** so that they cannot be readily turned on such a neck. If desired, they can be provided with internal nurling **20** intended to provide adequate friction between them and the container neck.

The body **12** preferably also includes an internal tapered conventional sealing plug **22** adapted to fit within a container neck so as to form a seal therewith or another similar conventional structure. An opening **24** leads through the body **12** into an internal cavity **26.** As described in the Wilson et al. U.S. Pat. No. 2,793,795 snap-in type bearing openings **28** lead from opposed sides of this cavity **26.** These bearing openings **28** are intended to engage and support aligned axles or trunnions **32** of a spout **34** serving as a closure element so that a cylindrical surface **36** of this spout **34** is held within the cavity **26** in sealed relationship with a known sealing ring **38** located within the cavity **26** around an opening **24.**

In a closed position of this spout 34 a nozzle portion 40 of it extends within the cavity 26 in such a manner that the surface 36 seals off the opening 24. In the closure 10 an annular groove 42 which is concentric with the skirt 16 is located in the base of a peripheral notch 44 in the top 14. This groove 42 is provided with an internal annular shoulder or lip 46. Another annular groove 48 extending at right angles to the groove 42 is also located so as to extend from the notch 44 generally adjacent to the top of the groove 42.

Within the closure 10 a locking member 50 is provided for the purpose of controlling or regulating the movement of the spout 34 between its closed position as illustrated in FIGS. 1 and 2 of the drawing in an open position in which the spout 34 extends vertically. With the described structure the spout 34 can be rotated between these two positions. This locking member 50 includes a top ring-like structure 52 fitting within the notch 44 and carrying a downwardly extending annular flange 54 fitting within the groove 42. This flange carries an annular lip 56 which is adapted to mate with the lip 46 so as to hold the locking member 50 against removal from the closure 10.

The structure 52 also is provided with an internally extending ring-like flange 58 which normally fits within the groove 48. This flange 58 is provided with an opening 60 of a width corresponding to the width of the cavity 26. It will be noted that the groove 48 and the flange 58 are both located a short distance above the bottom of the cavity 26 so that when the locking member 50 is turned in a position as shown in FIG. 2 the flange 58 will engage a lip 62 on the end 64 of the spout 34 in order to hold this spout 34 in a locked position. In this locked position a small tab 66 attached to the end 64 extends across and a short distance beyond the locking member 50.

This locking member 50 is also provided with a dependent peripheral sleeve 68 which is concentric with the exterior of the skirt 16. Coacting ratchet teeth 70 are provided on the adjacent surface of the sleeve 68 of the skirt 16 so that they are normally in engagement with one another. Preferably these teeth 70 are twisted slightly in the same manner in which the so-called "rifling" in a gun barrel is gradually curved around the axis of a barrel. This twisting is intended to facilitate manufacturing and to facilitate the locking member firmly engaging the skirt 16 during the application of the closure 10 to a container neck. The locking member 50 also preferably includes on the sleeve 68 a small internally extending flange 72 which fits underneath the skirt 16 against a sloping bottom 74 of this skirt 16.

Preferably all of the parts of the closure 10 described are manufactured by comparatively inexpensive injection molding techniques out of a resilient, somewhat pliable material such as polyethylene and more particularly out of grades of this polymer such as are commonly employed in the manufacture of dispensing closures. It will be realized that other materials having physical properties which are similar to those of polyethylene may be employed in the closure 10. Preferably the locking member 50 is formed of a material as indicated which is harder than or less pliable than the material utilized within the body 12. This variation in hardness or pliability can be achieved by an appropriate selection of different polyethylene polymers or by appropriate selections of other polymer materials.

When the various parts of the closure 10 are formed of such materials both the locking member 50 and the spout 34 may easily be "popped" into or "snapped" into operative positions on the body 12 as the result of temporary material deformation. When this is done, the locking member 50 will be rotatably mounted on the body 12 so it can be rotated to an unlocked position in which the spout 34 can be moved so that the lip 62 will pass through the opening 60 to a closed position. In such a closed position as illustrated in FIGS. 1 and 2 the locking member 50 may be rotated to a locked position in which the flange 58 physically engages the lip 62 in such a manner that the spout 34 cannot be rotated to an open position as described. However, upon further rotation of the locking member 50 it can be placed so that the spout 34 can be rotated in such an open position by manually lifting the tab 66. If desired indicia 76 can be added on the closure 10 indicating when the locking member 50 is in such an unlocked position in which the spout 34 can be rotated between open and closed positions.

The closure 10 is normally installed upon a container neck 17 in the same generalized manner in which any other closure of a conventional character is threaded down upon a threaded container neck. As the closure 10 is applied to such a neck 17, the exterior of the locking member 50 is engaged and twisted. By virtue of the engagement of the teeth 70 the torque or twisting applied to the locking member 50 will be conveyed to the body 12 causing the threads 18 on the skirt 16 to engage and move with respect to the corresponding threads on such a neck 17. Normally the locking member 50 will be twisted in this generalized manner utilizing a known type of capping equipment which will provide or apply such force as is necessary to tightly hold the closure 10 upon such a neck.

Thereafter, the locking member 50 may be rotated in the reverse of the direction necessary to locate the closure 10 in place upon a container neck 17 so as to move this locking member 50 between its unlocked position and various locked positions. During the rotation of this locking member 50 in such a reverse direction it will normally be engaged manually at its exterior. During the rotation of this locking member 50 in this reverse direction the sleeve 68 and/or the skirt 16 will temporarily deform to a sufficient extent to permit the teeth 70 to ride over one another without causing the body 12 to be unscrewed from such a container neck 17.

It is preferred that the sleeve 68 and the skirt 16 be formed of polymer compositions as indicated in the preceding so that the skirt 16 is more pliable and flexible than the sleeve 68 so that the principal flexure as these teeth 70 ride over one another will tend to force the skirt 16 inwardly. Such movement of this skirt 16 in this manner will tend to increase the friction between the skirt 16 and the container neck so as to minimize the possibility of the body 12 being "backed off of" such a container neck. During movement of the locking member 50 in a reverse direction as indicated, engagement between various parts of the unlocking member 50 and various parts of the body 12 will prevent the locking member 50 from being removed from the body 12.

I claim:

1. In the combination of a threaded container neck and a closure, said closure having a closure body, a clo-

sure element mounted on said closure body so as to be capable of being moved between opened and closed positions and a locking member movably mounted on said closure body and said closure element so as to be capable of being moved between a locked and unlocked position, said closure element being incapable of being moved between said opened and closed positions when said locking member is in said locked position and being capable of being moved between said opened and closed positions when said locking member is in said unlocked position, said closure body having an internally threaded skirt located thereon threaded into engagement with said container neck so as to mount said closure upon said container neck, the improvement which comprises:

said locking member being rotatably mounted on said closure body so as to be incapable of linear movement relative to said closure body and being capable of being rotated between said locked and unlocked positions,

said closure element being a spout which is rotatably mounted on said closure body,

said locking member having an opening formed therein,

said spout being capable of being moved through said opening when said locking member is rotated to said unlocked position, said opening is aligned with said spout when said locking member is in said unlocked position, said locking member overlying a part of said spout so that said opening is not aligned with said spout in said locked positions so as to preclude rotation of said spout between said open and said closed position,

said locking member including a sleeve concentric with and surrounding said skirt,

co-acting ratchet means located on the adjacent surfaces of said skirt and said sleeve, said ratchet means extending along the lengths of said skirt and said sleeve,

said co-acting ratchet means engaging one another so that rotation is transferred from said locking member to said closure body when said locking member is rotated in one direction relative to said closure body, such rotation in said one direction being related to the orientation of the threads on said container neck and threads on said threaded skirt so that during such rotation in said one direction said threaded skirt is tightened upon said container neck,

said closure body or said locking member or both said closure body and said locking member being formed of a deformable material capable of temporary deformation during the rotation of said locking member in a direction which is the reverse of said one direction to a sufficient extent so that said co-acting ratchet means will disengage one another without the rotation of said locking member in said reverse direction being transferred to said closure body,

such deformation permitting said locking member to be rotated in said reverse direction between said locked and said unlocked positions without said closure body being unthreaded from said container neck.

2. In the combination claimed in claim **1** wherein:

said closure body is formed out of a material which is more pliable than the material within said locking member.

3. In the combination claimed in claim **2** wherein:

said ratchet means are twisted around the exterior of said skirt and the interior of said sleeve so as to apply pressure to said closure body as said closure is twisted in order to thread said skirt on a container neck.

4. In the combination claimed in claim **1** including:

interengaging means on said locking member and said closure body for retaining said locking member on said closure body.

5. In the combination claimed in claim **1** wherein:

said co-acting ratchet means extend the entire lengths of said skirt and said sleeve.

6. In the combination claimed in claim **1** wherein:

said co-acting ratchet means extend the entire lengths of said skirt and said sleeve,

said closure body is formed out of a material which is more pliable than the material within said locking member,

said ratchet means are twisted around the exterior of said skirt and the interior of said sleeve so as to apply pressure to said closure body as said closure is twisted in order to thread said skirt on a container neck,

interengaging means on said locking member and said closure body for retaining said locking member on said closure body.

* * * * *

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,776,428 Dated December 4, 1973

Inventor(s) Robert E. Hazard

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 1, line 19, "yound" should read --young--.

Signed and sealed this 25th day of June 1974.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents

FORM PO-1050 (10-69)

USCOMM-DC 60376-P69
* U.S. GOVERNMENT PRINTING OFFICE : 1969 O—366-334.