A safety closure for a container is provided with pivoted locking means rotatably mounted in and passing through the side wall of the closure to contact the neck of the container and having means slide through the neck threads in screwing on the closure. In fully tightening the closure on the neck, a portion of the locking means contacts abutment means on the neck of the container causing rotation of the locking means to fully locking position. After the closure is screwed on, in an attempted returning removal of the closure, an inward contacting portion of the locking means is placed in a position transverse of the neck threads, thereby preventing closure removal. The safety closure is thusly secured against opening by young children.
CONTAINER WITH SAFETY CLOSURE CAP THEREFORE

This invention relates to a safety closure. This invention relates to a safety closure screwed on to the neck of the container and provided with means whereby a child would be unable to effect removal therefrom, but a knowing adult could make the proper adjustment to permit removal.

It is an object of this invention to provide means to prevent accidental ingestion of toxic materials, whether medicinal or household by young children.

It is a further object of this invention to provide a safety closure in combination with a container so constructed as to prevent a child from effecting easy removal therefrom but permits a knowing adult to effect such removal.

Another object of this invention is to provide a safety closure and container combination that can be readily manufactured, inexpensively.

In the drawings:

FIG. 1 is a side elevational view of the closure being screwed on the container;

FIG. 2 is another side elevational view of the closure on the container as in FIG. 1 but after further screw tightening thereof;

FIG. 3 is a plan sectional view of the closure on the container taken along line 3-3 of FIG. 1;

FIG. 4 is a partial side sectional view of the closure and container taken along line 4-4 of FIG. 3;

FIGS. 5 and 6 are reversed side cut away sectional views of the closure assuming (FIG. 5) and residing (FIG. 6) in a locking position;

FIG. 7 is a plan sectional view of the pivot means housed the closure wall; as taken along line 7-7 of FIG. 8;

FIG. 8 is a side elevational view showing three positions of the pivoted locking means;

FIG. 9 is side sectional view of another embodiment of this invention;

FIG. 10 is a side sectional view as in FIG. 9, but further screw tightened to a locking position;

FIG. 11 is an opposing side sectional view showing the locking position of FIG. 9 in another locked position;

FIG. 12 is an enlarged sectional view of the engaged closure threads and container threads showing an unlocked position.

Heretofore it was generally required that a separate locking member be provided to ensure a safe and positive seal of a closure on a container. By this present invention there is now provided a closure and container combination wherein a positive locking member is integrally housed within the closure. After screw tightening the closure on the container in a usual manner, no further manipulation is required for positive locking of the closure on the container.

Referring now to FIGS. 1-8, there is shown the safety closure 10 screwed onto the neck portion 11 of container 12.

The neck 11 of container 12 has integrally formed thereon external threads 17, and at the base of the neck portion, actuating means 13a, and on the neck portion below the end 17a of the external threads 17 is stop means 13b. Spaced opposed surfaces of actuating means 13a and stop means 13b and 13a1 and 13b1, respectively.

The closure 10 comprises a horizontally disposed top wall 14, a vertically disposed cylindrical annular wall 15, internal side wall threads 16 (FIG. 4) for engaging external neck threads 17, and a transverse hole 25 in the annular wall. The closure 10 further comprises an outwardly protruding annular portion 24 on the outward surface of side wall 15, having central hole 25 therein and passing through the entire annular wall 15. On the surface that forms hole 25 is formed a radially extending slotted groove 23.

Pivoted locking means 18 is transversely disposed to closure annular wall 15 and rotatably housed within the central hole 25 of the closure annular wall 15. Pivoted locking means 18 comprises a cylindrical body portion 19, having an outward end 19a and an inward end 19b, and a extended wing portion 20 integrally formed with the outward end 19a and extending perpendicularly away from the axis of the cylindrical body portion 19.

On the inward end 19b, there is integrally formed therewith, an oblongated raised portion 21 having oblong sides 21c and adjacent shorter sides 21b and having a groove slot 21a transversely disposed through said oblongated sides 21c. The dimensions of the oblongated raised portion are such that the smaller sides 21b of the oblong are sufficiently small to permit the oblongated raised portion 21 to slideably fit between adjacent thread portions of the neck thread 17, when the pivoted locking member is in a first pivoted position (see A of FIG. 8). The dimensions of the groove slot 21a are sufficient to blockingly engage a thread portion of the neck thread 17, when the pivoted locking member 18 is in a locking pivoted position (not shown).

Radially extending on the cylindrical body portion 19, are formed two diagonally disposed lock buttons 22 (typical). The lock buttons 22 are slidably movable within internal groove 23 of protruding portion 24 (FIG. 7).

The protruding annular portion 24 may be of flexible resilient plastic to permit the lock buttons 22 (typical) to snap-lock the pivoted locking means 18 into the closure wall 15. At the upward portion of annular portion 24 is formed a stop member 23a (position C of FIG. 8).

To pivot the pivoted locking member 18, wing 20 is accurately moved to any desired position, the cylindrical body portion 19 being rotated within the hole 25 of closure wall 15 as the lock buttons slide within groove 23.

To screw closure 10 onto neck 11 of container 12, pivoted locking means 18 is firstly rotated to position A (FIG. 8). And the cap is then screwed down; the oblongated sides 21c of raised member 21 slidably engaging the sides of the neck threads 17. Prior to tightening down on the closure, the closure and pivoted locking means 18 are in a position as shown in FIG. 1 and FIG. 4. Further tightening of the closure causes wing portion 20 to contact actuating means 13a causing pivoted rotation of pivoted locking means 18 which in turn causes misalignment of oblongated raised portion 21 with the neck threads 17, as shown in FIG. 2, FIG. 5. Further continued screw tightening causes the rotation of wing portion 20 and oblongated raised portion 21 of pivoted locking means 18 to assume the position B as shown in FIG. 8. The closure is now in a securely locked position.

In the event a child would attempt to remove the closure 10 by returning the closure, the raised portion 21 blockingly contacts the end 17a of neck threads 17 thereby preventing removal (see FIG. 6).
To remove the closure, pivoted locking means 18, specifically wing 20 thereof, is vertically aligned between opposed surfaces 13a and 13b of actuating means 13a and stop means 13b respectively, as shown in FIG. 4. The oblongated member 21 is then slidably engageable between adjacent container neck threads.

To prevent alignment of oblongated member 21 between the neck threads, when the wing portion is turned 180° from said first position (A of FIG. 8), there is provided on protruding portion 24 a stop 23a. The stop 23a blockingly contacts wing 20 and thereby prevents further rotation of the pivoted locking means. As stated, blocking relationship is shown as position C in FIG. 8.

In FIGS. 9–12, there is shown another embodiment of this invention, as described hereinafter.

Referring now to FIGS. 9–12, there is shown a closure 101 comprising a horizontally disposed top wall 102, a vertically disposed cylindrical annular wall 103, having a transverse hole 104 therethrough, said transverse hole having a radially extending groove 104a. Further said closure 101 is formed with internal threads 105 on the inward surface of annular wall 103. In combination with the closure 101, is a container 110 (partially shown) being integrally formed with a neck portion 111, said neck portion being integrally formed with external threads 112 for engaging said closure threads 105. The lower portion of the neck, on the container, there is integrally formed therewith, actuating means 113, shown as an upwardly protruding member.

Rotatably housed within transverse hole 104 is pivoted locking means 120 comprising a cylindrical body or pin portion 120a, and outward end 120b and an inward end 120c. Inwardly extending from and raised up from and integrally formed with the inward end 120c is a semi-cylindrical portion 120d. Formed on said body portion 120 is a radially extending locking flange 120e for slidably engaging within groove 104a so as to rotatably support said pivoted locking means in said closure annular wall. The pivoted locking means further comprises a wing portion 120f integrally formed with the outward end 120b and extending radially away therefrom. The lower side portion 120f of the wing portion is of sufficient dimensions so as to contact at least one portion of actuating means 113 when the closure is screw-tightened on the neck of the container.

Referring now again to the neck threads 112, there is a lowest thread portion 112b formed with semi-cylindrical groove 112a therein, said semi-cylindrical groove slidably, rotatably receiving the semi-cylindrical raised portion 120d of the pivoted locking means. The actuating means 113 is located at a point below said semi-cylindrical groove and is generally arcuate disposed from said groove in the direction of the lower end of said neck thread. This spatial relationship between the semi-cylindrical groove is dependent upon the wing portion configuration. This is so because, as the closure 101 is screw-tightened on the container neck 111, the wing portion being vertically downward, the wing portion surface 120f contacts the actuating means 113 causing rotation of the pivoted locking means 120, thereby rotating the semi-cylindrical member 120d within the semi-cylindrical groove 112a, as shown in FIG. 10. The pivoted locking means 120 is thusly placed in a locking position. If desired, the wing portion may be manually aligned in a fully upright position as shown in FIG. 11, but this need not necessarily be done.

A child trying to remove the closure from the container would be unable to do so insofar as the semi-cylindrical portion 120d is blocked by the semi-cylindrical groove 112a. To remove the closure, the wing portion must be returned to the original vertically downward position as shown in FIGS. 9 and 12.

In still another aspect of this invention the actuating means of the container may be eliminated and the pivoted locking member is manually rotated to the locking position. It is of course preferred to provide the actuating means so as to eliminate the need for manual locking.

While the aforesaid wing portion is generally perpendicularly disposed to said pivoted locking means, it is to be understood that the term "perpendicularly," as used hereinafore, thereinafter and throughout the specification and claims is to mean "approximately as well as exactly perpendicular," as the case may be.

Although the description and drawings have primarily referred to container and cap, this is not meant to be construed or interpreted as limiting the invention or its application in any way. It can be used with any type of container or closure, and any material or method of construction; as well as any shape, and is so intended.

Many variations in design, material, shape, and so forth, are possible and the design and description here presented are merely illustrative, and not intended to be limiting in any way.

What is claimed is:

1. A container and safety closure combination, comprising: a closure comprising a vertically disposed side wall being formed with a transverse hole therethrough, and internal side wall threads and a top horizontally disposed to said side wall; a container integrally formed with a neck portion, said neck portion formed with external threads for engaging said closure wall threads; pivoted locking means comprising a cylindrical body and two ends thereof, transversely disposed to and extending through and rotatably housed within said hole of said side wall, said pivoted locking means having one end thereof inward of said side wall and the other end outward of said side wall, said locking means, said outward end thereof integrally formed with an extension thereon to rotate said locking means, said inward end thereof being integrally formed with means to slidably engage said neck threads when said locking means disposed in a first rotary position and means to blockingly engage at least a part of said neck threads when said extension rotates said locking means to rotate said locking means to a second rotary position other than said first rotary positions.

2. The combination of claim 1, said extension comprising a wing portion integrally formed with the outward end of said pivoted locking means, said wing portion perpendicularly disposed to said cylindrical body portion and extending radially away therefrom.

3. The combination of claim 1, said means to slidably engage said neck threads comprising an oblongated member integrally formed with the inward end of said cylindrical body of said pivoted locking means and raised up from said end and diamonally disposed on and to said cylindrical body, said oblongated member an oblongated surface thereof being slidably engageable with said neck threads.
4. The combination of claim 3, said oblongated member being formed with a groove transversely disposed thereto, whereby the lower end of said neck threads is blockingly engageable within said groove.

5. The combination of claim 2, said container further comprising means to actuate said wing portion so as to rotate said pivoted locking means from said first position to said second position as said closure is screw tightened on said container.

6. The combination of claim 5, said means to actuate said wing portion means comprising a raised member integrally formed with said container and said extension comprising a wing portion integrally formed with the outward end of said pivoted locking means, said wing portion perpendicularly disposed to said cylindrical body portion and extending radially away therefrom; whereby upon screw tightening said closure on said container said wing portion contacts said actuating means and is arcuately, upwardly displaced therefrom, in turn causing said pivoted locking means to rotate from said first position to said second position.

7. The combination of claim 4, said neck further comprising a member raised from the surface thereof and located below the end of the lowest neck thread, one surface of said member in a blocking relation with an opposed oblongated surface of said oblongated member of said pivot member when said pivoted locking means is in said second position.

8. The combination of claim 1, wherein said closure comprises and outwardly protruding annular portion surrounding and outwardly extending from said transverse hole.

9. The combination of claim 8, said transverse hole of said side wall, the transverse surface thereof having a radially extending groove therein and said cylindrical body portion of said pivoted locking means is formed with at least one radially extending lock button being slidably engageable within said groove.

10. The combination of claim 8, wherein said protruding annular portion is formed with a stop member thereon so as to blockingly engage said extension so as to limit the degree of rotational movement of said pivoted locking means.

11. The combination of claim 9, wherein said cylindrical body portion of said pivoted locking means is formed with two diagonally disposed, radially extending lock buttons.

12. The combination of claim 5, said inward end of said pivoted locking means being integrally formed with a semi-cylindrical member raised up inwardly from the cylindrical body portion of said pivoted locking means, said semi-cylindrical member being slidably engageable with said neck threads when said pivoted locking means is disposed in first rotary position.

13. The combination of claim 12, wherein a portion of the lowest neck thread is formed with a downwardly disposed semi-cylindrical groove therein, said semi-cylindrical raised portion of said pivoted locking means being slidably rotatably engageable within said semi-cylindrical groove of said neck thread.

14. In combination, a container having a neck formed with external threads, a closure cap having internal threads to screw onto said external threads, locking member rotatably mounted on said closure cap and having means passable between the threads of said neck when said cap is screwed onto said neck, and said locking member is in a predetermined angular position, said locking means being rotatable in one direction away from said predetermined position to another angular position and said locking member being provided with means to prevent unscrewing of said cap, when said locking member is in said another angular position thereof.

15. The combination of claim 1, and means on the neck container to cause further rotation of said locking means in said direction to a further angular position upon moving said cap in an unscrewing direction after the cap has been turned in a screwing direction to substantially fully screwed position.

16. The combination of claim 2, and means on said neck of said container to abut said locking means in said further angular position, to prevent further unscrewing of said cap.

17. In combination, a container having a neck formed with external threads, a closure cap having internal threads to screw into said external threads, a locking member rotatably mounted on said closure cap and having means passable between the threads of said neck when said cap is screwed onto said neck, and said locking member is in a predetermined angular position, means on said container to cause said locking member, said locking means being rotatable in one direction away from said predetermined position to another angular position upon substantially fully screwing said cap onto said neck, and said locking member being provided with means to prevent unscrewing of said cap, when said locking member is in said another angular position thereof.

18. The combination of claim 13, wherein said actuating means is integrally formed on said container at a point below said semi-cylindrical neck thread groove and arcuately displaced therefrom in the direction toward the lower end of said neck thread.