July 4, 1967 D. W. BAUMBACH 3,329,293

TAMPER-PROOF CONTAINER COVER

Filed May 31, 1966

Fig. 1

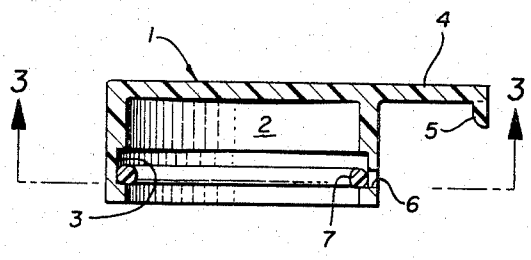
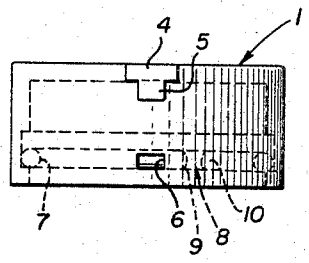


Fig. 2



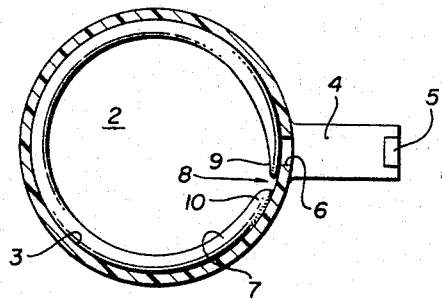


Fig. 3

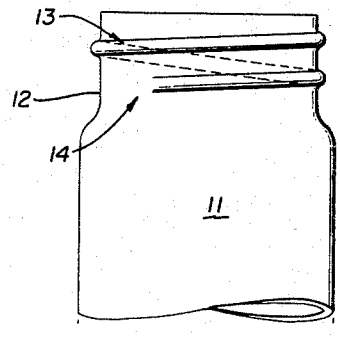


Fig. 4

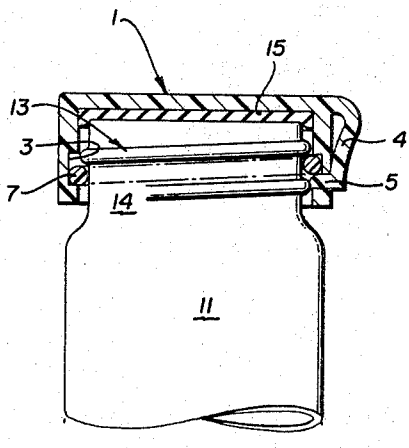


Fig. 5

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TAMPER-PROOF CONTAINER COVER

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My invention relates to an improved cover or cap for containers or bottles and especially for those which are frequently used in the pharmaceutical industry. More particularly my invention relates to a cover or cap which may be readily applied to a container, bottle, or other receptacle having a threaded connection but which is not so readily removable.

Various covers, caps, and closures have been devised for containers and receptacles containing ingredients which may be dangerous, or which it is desired to keep away from small children and others. A cover or closure which is not readily opened is also advantageous when carrying a container in a suitcase or grip while traveling to prevent its accidental opening due to vibration and handling, etc., and the consequent spilling of the contents. All existing devices intended for this purposes are rather cumbersome and complicated and very difficult to manufacture. They are therefore relatively expensive and have not attained wide usage. In addition to this, existing devices usually require a special type of container opening for their use which further adds to the expense and limits their application.

It is therefore a primary object of my invention to provide a cover for a container which would be easily applied to close the container, but not so readily removable.

It is another object of my invention to provide a tamper-proof container cover which while providing tamper proof protection would still be removable with a minimum amount of manipulation.

It is still another and very important object of my invention to provide a tamper-proof cover which would be readily adaptable to existing containers.

It is yet another object of my invention to provide a tamper-proof cover for containers which would be simple and economical to manufacture and at the same time be reasonably foolproof.

It is finally an object of my invention to provide a screw-on cover for a container which would be easily screwed on, but could not be removed accidentally or otherwise without special, although simple, manipulation.

I have discovered that by providing a hollow cap and inserting therein a flexible and movable circular ring, I am able to manipulate such ring inside my cap in such a manner as to have it act as a lock to prevent unscrewing of the cap accidentally or otherwise, and when so desired have it engage the screw threads on the containers to permit the cap to be readily unscrewed in the conventional manner. The unusual manner in which I insert my ring into my cap, combine it with a screwed enclosure opening, and then manipulate it to produce the novel results will be evident to those skilled in the art from the description which follows.

Reference should now be had to the drawings in which:

FIG. 1 represents a longitudinal cross-section of a preferred embodiment of my invention.

FIG. 2 represents a vertical elevation of the exterior of the cap of my invention.

FIG. 3 represents a plan view of the movable ring or spline of my invention.

FIG. 4 represents the top portion of a cylindrical container showing a typical opening which may be used with my invention.

FIG. 5 shows an elevation of the container of FIG. 4 together with a cross-section of my cap showing its method of operation.

Referring now more particularly to FIG. 1, there is seen the body portion 1 of my cap or cover having a hollow internal section 2. I prefer to fabricate my cap from a molded plastic material such as any one of those well known to those skilled in the art. I do not limit myself to this, however, but other suitable materials may be used also.

On the interior or hollow section 2, I provide a circular groove 3, the function and proportions of which will be evident from a description hereinbelow.

The tongue or ear section 4, together with wedge section 5, form an integral part of the body of my cap 1. Through the cylindrical portion of the body 1 I provide a slot or aperture 6 which is in alignment with the bottom of my groove 3.

Inside groove 3 I position my movable ring member which may also be described as a spline and may be better seen in FIG. 3. This spline member 7 has a slot 8 cut through it which gives it to the form of a segment of a circle and provides the needed flexibility. One end of spline 7 has a curved figuration as shown at 9, but the opposite end is tapered as shown at 10.

The body of the container to which my cap is applied 11, which may be seen on FIG. 4, is customarily provided with a reduced or necked section 12, although this is not essential to the successful operation of my invention. The threads 13 customarily form an integral part of the upper end of the container and in the case of plastic containers, they are usually molded together with the container proper. To facilitate the upward and downward movement of my spline or ring 7 and its springing over the threads 13 I may provide a section of reduced diameter 14 which is smaller in diameter than the root of the threads 13, thereby assisting the sliding up and down of ring 7. A gasket or seal 15 may be applied between the top of container 11 and the underside of cover 1 as is best seen on FIG. 5.

The relation of spline or ring 7 to the cap 1 may also be seen in FIG. 2. The slot 8 is shown slightly to the right of aperture 6 which is its proper position when my cover is applied to a right-hand thread. When applied to a left-hand thread the slot 8 would be on the opposite side of aperture 6 as seen in FIG. 3. Tapered section 10 is permanently secured or fastened to groove 3 by welding, heat sealing, adhesives, or other suitable means. The rounded end of ring 7, 9, which is opposite to the tapered end 10 is left free and permits the movement of the entire spline or ring 7 into a different angular plane. It will be evident that the width of groove 3 must be at least equal to the pitch of the screw threads 13 plus the thickness of spline 7. In fact, for best operation this width should be just about equal to the sum of the two above dimensions.

It should now be evident also that when spline 7 is in the bottom of groove 3 as shown in FIGS. 1 and 2, it will be impossible to remove cap 1 from container 11 by rotating it. Rotation may be effected, of course, but there being no threaded relationship between cover and container, no axial movement is achieved. To effect the latter it is first necessary to depress tongue member 4 through somewhat over ninety degrees, as best seen on FIG. 5. The tip or wedge member 5 is so positioned on tongue 4 that when the latter is depressed as shown, member 5 enters aperture 6. Since the tip of wedge member 5 is tapered, as shown, the effect of forcing it through aperture 6 is to raise the free end 8 of spline 7 and consequently the entire ring 7 up to an angle equal to the helix angle of thread 13, also best seen on FIG. 5. The reduced area 14 facilitates the operation of springing spline 7 over

threads **13**, as hereinabove described. When in this position it is now evident that cap **1** may be removed from container **11** by turning in the direction necessary for loosening a right-handed thread which is the case in the embodiment shown.

To replace the cover on the container the operations described above are merely performed again in reverse order and when completed the spline or ring **7** resumes its position in the bottom of groove **3** and continues to perform its function in providing the tamper proof and safety features described above.

While I have described a preferred embodiment of my invention herein, certain modifications and alterations will be evident to those skilled in the art which may be made without departing from the scope and spirit of my basic invention. I therefore do not limit myself to the embodiment shown herein except as I do so in the claims which follow.

I claim:

1. A tamper-proof cover for a cylindrical opening in a container having an externally threaded connection comprising:

a cylindrical hollow portion adapted to fit over said threaded connection;

a circumferential groove around the interior of said hollow portion at right angles to the longitudinal axis of said portion at the lower end thereof;

a circular ring member movably positioned within said groove and protruding radially into said hollow portion;

means for positioning said ring in said groove so that it would alternately lie at right angles to said axis and in a plane forming an angle with said axis equal to the helix angle of the threads of said threaded connection;

means for adapting said ring to said threads,

whereby said cover would be alternately held in in a fixed position relative to said container or be permitted to be unscrewed therefrom.

2. A tamper-proof cover for a cylindrical opening in a container having an externally threaded connection comprising:

a cylindrical hollow portion adapted to fit over said threaded connection;

a circumferential groove around the interior of said hollow portion at right angles to the longitudinal axis of said portion at the lower end thereof;

a circular ring member positioned within said groove at right angles to said axis and protruding radially into said hollow portion thereby preventing said cover from being unscrewed from said container;

said ring member being further characterized by a radial slot therethrough thereby defining a segment of a circle;

one end of said segment being fixedly positioned to the bottom of said groove;

means for raising the opposite end of said segment until said ring lies in a plane parallel to the helix angle of the threads of said threaded connection thereby permitting said cover to be unscrewed from said container.

3. The device of claim **2** in which said cover and said ring member are molded from a exible plastic material.

4. The device of claim **2** in which said means for raising said opposite end of said ring comprises the combination of an aperture through said cover positioned close to said opposite end and wedge means for insertion into said aperture and beneath said ring.

5. The device of claim **2** in which said means for raising said opposite end of said ring comprises the combination of an aperture through said cover positioned close to said opposite end and wedge means for insertion into said aperture and beneath said ring, said wedge means forming a part of a flexible tongue protruding from said cover, said wedge means and said tongue forming an integral part of said cover.

References Cited

UNITED STATES PATENTS

269,001	12/1882	Brunt	215—43
1,427,672	8/1922	Zehnbauer	215—44
1,606,804	11/1926	Podel	215—44

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