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CLOSURE FOR A CONTAINER

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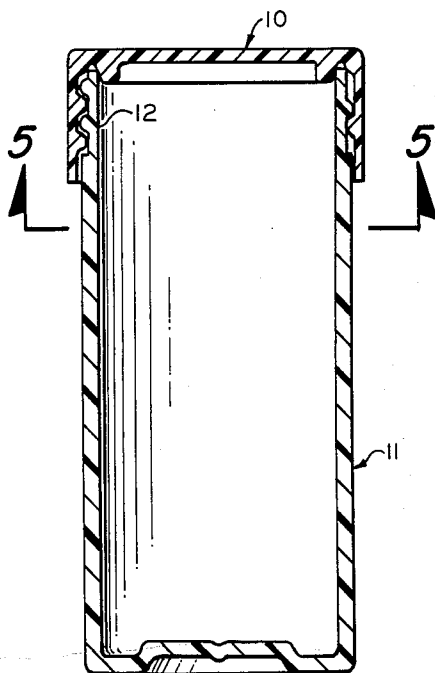


FIG. 1

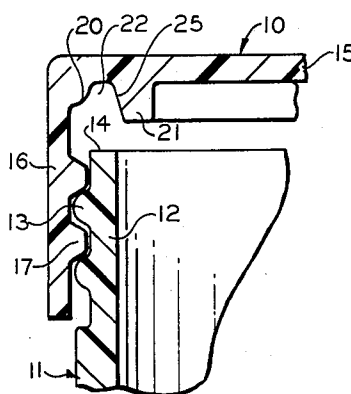


FIG. 2

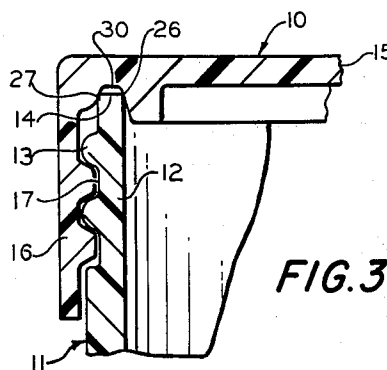


FIG. 3

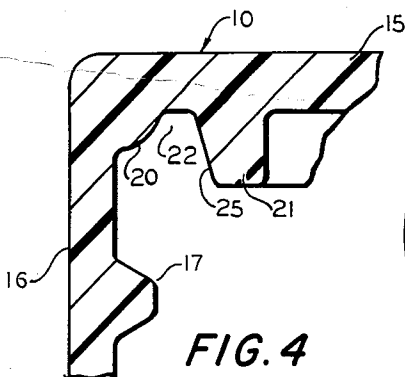


FIG. 4

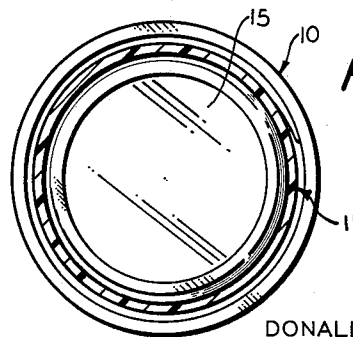


FIG. 5-5

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CLOSURE FOR A CONTAINER

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1 Claim. (Cl. 215—43)

My invention relates to a closure for a container. It has to do, more particularly, with a screw cap closure which is preferably of a resilient plastic that fits on a container which is also preferably of plastic of a more rigid nature. The main object of this invention is to provide a screw cap which, when tightened on the threaded neck of the container, will result in a leakproof closure of the container.

The accompanying drawing illustrates the preferred embodiment of my invention and in this drawing:

Figure 1 is a vertical sectional view through a container and cooperating closure in which my invention is embodied showing the closure in sealing position on the container.

Figure 2 is an enlarged vertical sectional view of the threaded upper portion or neck of the container showing the threads on the cap or closure being initially engaged with the complementary threads on the neck of the container.

Figure 3 is a view similar to Figure 2 but showing the cap or closure tightened to sealing position on the neck of the container.

Figure 4 is an enlarged vertical sectional view through a portion of the cap or closure.

Figure 5 is a horizontal sectional view taken along line 5—5 of Figure 1.

With reference to the drawing, I have illustrated a closure or cap 10 and a receptacle or container 11. The cap and container are both of annular cross-section and are both preferably formed of plastic. It is important that the cap 10 be of resilient plastic and that the container 11, or at least its neck, be of a more rigid plastic. Both members are preferably formed of thermoplastic resins and polyethylene has been used and found most suitable for the cap while polystyrene has been found most suitable and used for the container, although similar plastics may be used.

The container 11 is shown as being of cylindrical form but can take other forms as long as its neck 12 is of circular cross-section. The neck 12 on its outer surface is provided with deep angular threads 13 extending from the upper extremity or lip 14 thereof inwardly a suitable distance.

The cap 10 embodies a flat upper disk-like body 15 having a depending flange or skirt 16 of annular form completely around its circumference. On the inner surface of this skirt 16 there is formed a deep angular thread 17 which is complementary to the thread 13 on the neck of the container. This thread extends inwardly or upwardly from the lower extremity of the skirt to a point adjacent the disk-like body 15 of the cap.

In order to obtain a leakproof unit when the cap 10 is tightened on the neck 12 of the container 11, I provide a very effective sealing arrangement of novel form. This sealing arrangement includes a continuous annular convex sealing shoulder or surface 20 at the included angle or internal corner of the junction of the disk-like body 15 and skirt 16 of the cap 10 along with the

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annular angulated flange 21 spaced inwardly of the convex shoulder and providing an annular groove 22 therebetween for receiving the lip 14 on the upper extremity of the container 11. It will be noted that the sealing shoulder 20 or surface 20 is reversely curved so that it is convex rather than concave as is usually true of a radius in an included corner of molded plastic structures. Thus, it may be termed a reversed radius surface. This reversed radius surface 20 is very important in the effective sealing of the cap 10 on the container 11.

The flange 21 cooperates with the reversed radius surface 20 in the sealing operation. This flange is relatively heavy compared to its downward extent and is provided with the outer angled or wedging surface 25. The inner side of the flange may be vertical as indicated or angled if desired.

In the operation of this closure structure, the cap 10 is initially positioned on the neck 12 of the container 11 in the manner shown in Figure 2. In this position, the lip 14 of the container has not yet entered the downwardly opening annular groove 22 in the cap. It will be noted that because of the arrangement of the reversed radius surface 20 and the upwardly and outwardly angled surface 25 of the flange 21, the groove 22 has a diverging mouth and gradually narrows toward its top flat wall. It will also be noted that at its top flat wall the groove is of less width than the width of the lip 14 or upper extremity of the neck 12 of the container.

As indicated in Figure 3, as the cap 10 is tightened on the neck 12 of the container 11, the cooperating deep threads 17 and 13, respectively, thereof draw the cap firmly down on the container. As the lip 14 enters the groove 22, the inner sharp margin 26 of the lip 14 squeezes against the angled surface 25 of the flange 21 and the outer sharp margin 27 of the lip 14 pinches against the reversed radius surface 20. Thus, the annular flange 21 inwardly supports the container neck 12 while the reversed radius annular surface 20 pinches and pushes on the outer surface of the neck of the container. The supporting flange 21 and the reversed radius surface 20 cooperate to maintain roundness of the open neck 12 of the container 11 and at the same time form an effective seal which is an hermetic seal. Since the reversed radius surface 20 and the angled flange surface 25 converge upwardly the seal is made more effective as the cap is tightened. However, the lip 14 will not engage the flat top wall of the groove 22 even with the cap 10 in its tightened position, since, as previously indicated, the lip 14 or wall of the container is of greater width than the groove at its top flat wall. This will insure that the outer margin 27 of the lip 14 will always engage the sealing reversed radius surface 20 and there will always be a small space 30 between the lip 14 and the top wall of the groove 22, as shown in Figure 3.

An important feature of this sealing arrangement is the sealing by means of the outer margin 27 with the reversed radius or convex annular surface 20. When polystyrene plastic or similar material is molded, sometimes there is "flashing" of plastic on the inner top side of a container. This is due to the core clearance which is necessary for molding the part. Such "flashing" produces small particles of plastic on the inner or core side, then when a closure is placed, the flashing does not permit perfect contact with the top of the container and permits leakage. However, during molding the outer surface of such containers can be kept sharp and sufficiently free of plastic material that would interfere with efficient sealing. Therefore, this sharp harder outer edge of the container will seal efficiently against the softer closure. Even though there may be some "flashing" on the inner margin 26 of the top of the container 11, the closure described herein will seal the container. The space 30

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between the cap and container can be occupied by "flushed" plastic material on the inner margin 26 of the container yet leakage will not occur because the container is sealed by the reversed radius 20 against the sharp outer margin 27 of the container.

It will be apparent that I provide for an effective seal in a container and closure combination where the cap is of relatively resilient material and the container is of more rigid material so that its sharp upper edge will cut into the material of the cap. Although the container is made of harder material, the neck wall is flexible because it is made of minimum thickness for economy of material. However, the inner supporting flange will keep the container neck round during the sealing action as the outer margin of the top of the container bites into the reversed radius sealing surface.

According to the provisions of the patent statutes, the principles of this invention have been explained and have been illustrated and described in what is now considered to represent the best embodiment. However, it is to be understood that, within the scope of the appended claim, the invention may be practiced otherwise than as specifically illustrated and described.

Having thus described my invention, what I claim is:

In combination, a container of annular cross-section having an upper open end with an exposed lip having inner and outer margins, said outer margin being sharp and continuous, said upper end of the container on its outer surface being provided with threads, a cap cooperating with the container and comprising a disc-like

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body with a depending skirt of annular form, said skirt having threads on its inner surface which cooperate with the threads on the outer surface of the upper end of the container so that the cap can be screwed onto the container and tightened into sealing position, said cap having a continuous reversed radius convex surface which is spaced axially above the upper extremity of the threads on said skirt in the included angle at the junction of the body and the skirt in sealing engagement with the continuous outer sharp margin of the lip of the container when the cap is tightened thereon, said body of the cap also having a depending continuous annular supporting flange fitting within the upper end of the container for engaging the inner annular margin on said lip which is also continuous, said flange having an angled outer surface which cooperates with said reversed radius convex surface to form a groove with upwardly converging walls for receiving said lip of the container and a top wall formed at the inner surface of said body and which supports the upper end of the container to hold said outer sharp margin of the lip of the container in engagement with said reversed radius convex surface, said lip of the container being of greater width than the width of the groove at its top wall.

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