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CONTAINER CAP, CAP LINER, AND METHOD OF APPLYING LINERS TO CONTAINER CAPS

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Fig. 1.

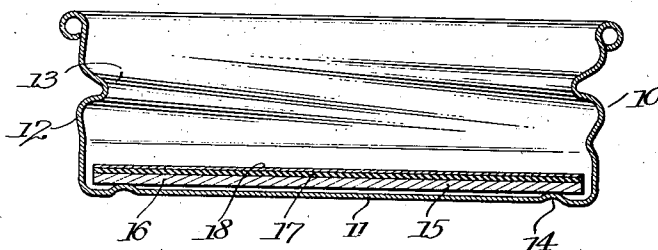


Fig. 2.

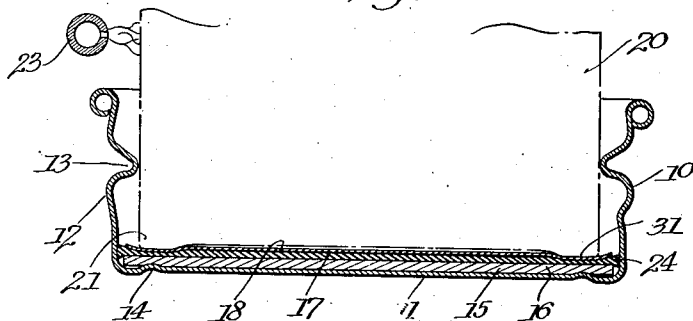


Fig. 3.

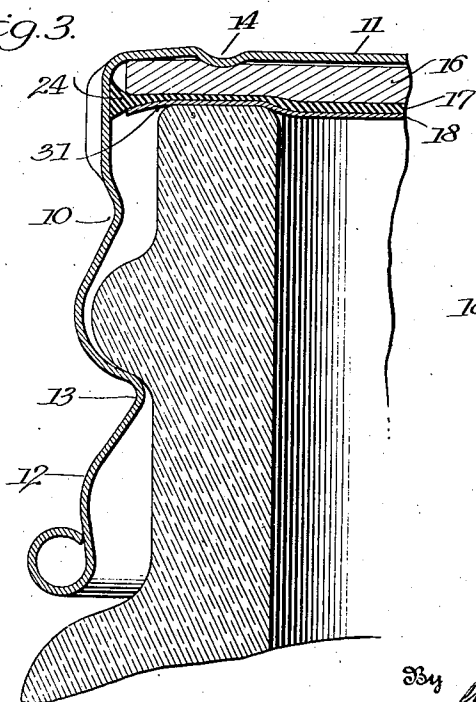
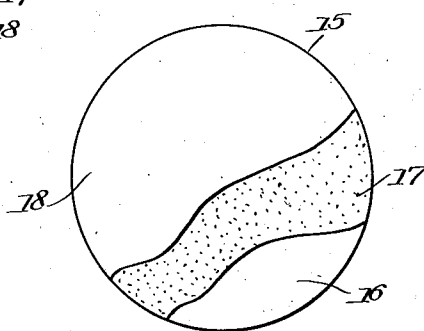


Fig. 4.



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## UNITED STATES PATENT OFFICE

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CONTAINER CAP, CAP LINER, AND METHOD  
OF APPLYING LINERS TO CONTAINER  
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2 Claims. (Cl. 215-37)

The present invention relates to a container cap, cap liner, and a method of applying liners to container caps.

In order to prevent the substance with which a container is filled from coming into contact with the container cap, and also to insure a proper seal between the mouth of the container and the undersurface of the top of the cap, container caps are usually provided with a liner. The liner ordinarily includes an impervious facing member which bears directly upon the container mouth and which is of such material that it will not affect or be affected by the substance placed in the container. The facing member is usually bonded to a backing member, the latter being of resilient material, so that when the cap is positioned upon the container, any depressions or protuberances upon the surface of the mouth or lip of the container will be compensated for and a proper seal maintained. The bonding between the facing and the backing is usually obtained by application of an adhesive of suitable nature, but, in many instances, the adhesive penetrates the backing member, decreasing the resiliency of the latter and thereby reducing its effectiveness.

An important object of the present invention is to provide a liner for container caps which will be completely resilient and in which the facing and backing members are secured together by a bonding material which is extremely effective for bonding purposes and which also increases the resiliency and sealing effectiveness of the liner.

It is highly desirable to have the liner so arranged with respect to the cap that it cannot fall from the latter, either before the cap has been placed upon a container or after it has been removed from the container by the consumer. If caps are of a type provided with an unsecured liner, each cap must be inspected before it is placed upon the container, to make certain that the liner is in position. Also, if the liner is not secured in the cap and falls from the latter when the container is opened by the consumer, the container will not be properly re-sealed and the contents of the container may be affected.

When the skirt of the cap is provided with inwardly projecting threads, lugs, or other retaining means to hold it upon a container, it is not practicable to have the liner of a diameter sufficiently large to contact with the largest inner diameter of the cap skirt, because the liner must be inserted in the cap past the inwardly projecting retaining means. Also, since caps pro-

vided with such retaining means are usually rotated with respect to the container mouth to secure them upon the container, it is not feasible to endeavor to retain the liner in the cap by adhesive applied between the liner backing and the undersurface of the cap top because rotation of the cap relative to the container mouth may break the adhesive bond between the liner and cap, permitting the liner to fall from the cap when the latter is removed from the container. For this reason, in order to prevent the liner from falling from the cap, it is ordinarily necessary to design liners for such caps in some special form whereby the liner will be held within the cap and prevented from moving past the threads, lugs or other retaining means and falling from the cap. The provision of means to hold the liner within the cap ordinarily increases the cost of manufacture of the liner.

Another important object of the present invention is to provide a lined container cap and a method of applying a liner thereto, whereby the latter will be securely held within the cap and the sealing qualities of the cap improved, the arrangement of the cap and the method by which it is lined being such that the cost of the cap will not be increased.

The cap of the present invention may be broadly described as provided with a liner having a body of less diameter than the greatest diameter of the cap skirt, and which liner, after insertion in the cap, is subjected to either pressure or heat, or both, over a predetermined area thereof to cause a portion of the liner, preferably the bonding material, to contact with the cap skirt to retain the liner in the cap.

In the manufacture of crown caps, it is quite usual to position a liner within a cap, and to then subject the liner to heat and pressure. However, the purpose of applying heat and pressure to the liner of such a cap is to cause adhesive arranged between the liner and the top of the cap to be so affected as to securely hold the liner in the cap. Furthermore, the liners used in crown caps, even as originally inserted in the cap, may be, and ordinarily are, of the same diameter as the inner diameter of the skirt, because the skirts of such caps are not provided with any inwardly projecting retaining means. For this reason, although the liner may be slightly increased in diameter by the pressure applied thereto, the pressure is not applied for the purpose of causing the liner to contact with the skirt of the cap but, as stated above, merely to insure that

the adhesive will properly hold the liner to the cap.

Other objects and advantages of the invention will be apparent from the following drawing, wherein:

Figure 1 is a central vertical sectional view through a cap, showing the form of the liner when initially positioned in the cap.

Figure 2 is a central vertical sectional view of the cap of the present invention, illustrating the method whereby the liner is secured in the cap.

Figure 3 is a vertical sectional view showing the mouth of a container having the cap of the present invention applied thereto, and

Figure 4 is a view of the liner device of the present invention, with portions broken away.

The numeral 10 designates a cap including a top 11 and a skirt 12. The skirt is provided with threads 13 but it will be understood that, instead, lugs or any other retaining means may be provided upon the skirt, the nature of the retaining means forming no part of the present invention. The top 11 of the cap may be provided with an annular groove adjacent its peripheral edge which forms a downwardly projecting shoulder 14 upon the top of the cap.

In the construction of the cap of the present invention, a liner 15 such as is shown in Figure 4 is positioned in the cap 10. The liner preferably comprises a backing 16 formed of material having resilient qualities, a layer 17 of a bonding material and a sheet or disc 18 of a facing material. As shown in Figure 4, the liner 15 is in the form of a disc.

The liner backing 16 is preferably formed of pulp board, heavy paper stock or any fairly stiff material which is sufficiently resilient to assist in the provision of a proper seal between the container and the cap. The facing 18 may be formed of various materials, according to the nature of the substance to be placed in the container. For example, it may be of metal foil or may have its lower surface coated with metal foil or it may be of paper stock having a varnish or other protective coating applied thereto.

The plastic material forming the layer 17 is preferably material of such nature that it will flow upon the application of heat or pressure thereto and is more resilient than the backing 16. The material 17 should also have some adhesive qualities in order to hold together the backing 16 and the facing 18. It is further desirable that the material 17 have some frictional qualities, the latter for a purpose to be hereinafter set forth. I find that gutta percha or india rubber, meets all of these requirements; such material being sufficiently tacky to hold together the backing and facing, being readily molded by heat or pressure or both, and being highly resilient. However, it will be understood that any gutta percha or india rubber compositions or any other mucilaginous or gum-like material having the qualities named above, may be used instead of gutta percha or india rubber.

In the formation of the lined cap of the present invention, the liner 15 is inserted in the cap as shown in Figure 1, the diameter of the liner being less than the greatest diameter of the cap skirt so that it may be freely sprung or moved past the threads, lugs or other retaining means 13 provided upon the skirt of the cap, as is the usual practice.

As shown in Figure 2, pressure is then applied to the faced surface of the liner by means of a die such as 20. The die 20 includes an annular

shoulder or ridge 21 adjacent the edge thereof, the inner edge of the shoulder preferably being inclined and its outer edge being slightly rounded, all so that the shoulder will generally conform to the outline of the mouth of the container upon which the cap is to be used. If desired, the die may be heated by a burner such as 23, which, when the die is raised, will direct a flame against the side of the die at the lower portion thereof. However, the die may be heated in any other well known manner.

The die 20 is applied to the liner with such force that the pressure of the die or, if the die is heated, the pressure and heat of the die, will cause the portion of the bonding material 17 adjacent the outer edge of the liner to flow outwardly from between the backing 16 and facing 18 to form a projecting edge 24 which will contact with the inner wall of the skirt 12 of the cap. It will be noted that because the central portion of the die 20 is recessed, little if any pressure will be applied to the central portion of the liner, the pressure and heat, or whichever is depended upon to cause the material 17 to flow, being sufficiently localized that the only portion of the bonding layer which will be extruded or forced outwardly past the body of the liner is that which would ordinarily be substantially beneath the cap shoulder 14, and hence comprise the annular area against which the mouth of the container would subsequently bear. In other words, the application of the die 20 to the liner 15 will result in a groove 31 about the undersurface of the liner into which the mouth of the container may project, and, as shown in Figure 3, the side walls of this groove will naturally contact with the edges of the container mouth to form a more secure seal between the container mouth and liner.

The outward extrusion or projection of a portion of the bonding material into contact with the skirt 12 of the cap will prevent the liner 15 from falling from the cap, since the bonding material has sufficiently high frictional or adhesive qualities to firmly grip the skirt. It will be understood that the original thickness of the layer of bonding material 17 is such that sufficient material may move outwardly into contact with the cap skirt, preferably without entirely removing all of the bonding material against which the die shoulder 21 applies pressure.

It will be understood that the invention is not limited to the details and use shown in the drawing and that the phraseology employed in the specification is for the purpose of description and not of limitation.

I claim:

1. In combination, a container cap and a liner, said cap including a top and a skirt provided with inwardly projecting retaining means by which the cap may be secured upon a container, and said liner including a flat backing layer having a body diameter greater than the inner diameter of the retaining means and which is formed of relatively stiff but resilient material so that it may be inserted in the cap past the retaining means without distortion from its normal form, said liner further including a portion having substantial adhesive qualities and adapted to be forced past the edge of said stiff layer of the liner upon the application of pressure thereto so as to engage the cap skirt and hold the liner against movement relative to the cap.

2. In combination, a container cap and a liner, said cap including a top and a skirt provided with inwardly projecting retaining means by

which the cap may be secured upon a container, and said liner including a backing layer having a body diameter greater than the inner diameter of the retaining means and formed of a relatively thick and stiff but resilient material so that it may be inserted in the cap past the retaining means without distortion from its normal form, and a layer of plastic material having substantial adhesive qualities positioned on the outer

face of said backing layer, said last-named layer having only sufficient thickness so that when pressure is applied to the portion thereof adapted to be opposite the edge of a container, the material extruded from that portion will be sufficient to firmly engage the cap skirt to hold the liner against movement relative to the cap.

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