Feb. 18, 1930. H. B. WALLACE ET AL 1,747,917

BOTTLE CLOSURE

Filed May 21, 1928

Fig. 1.

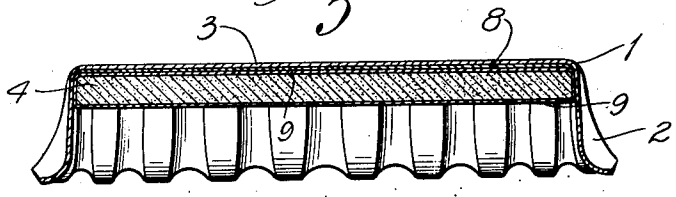


Fig. 2.

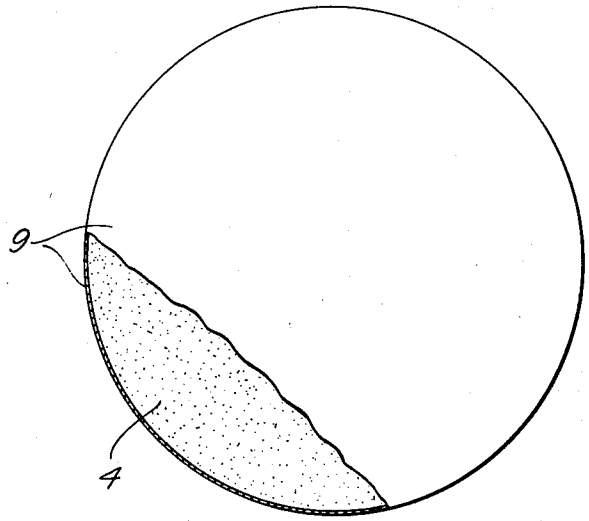
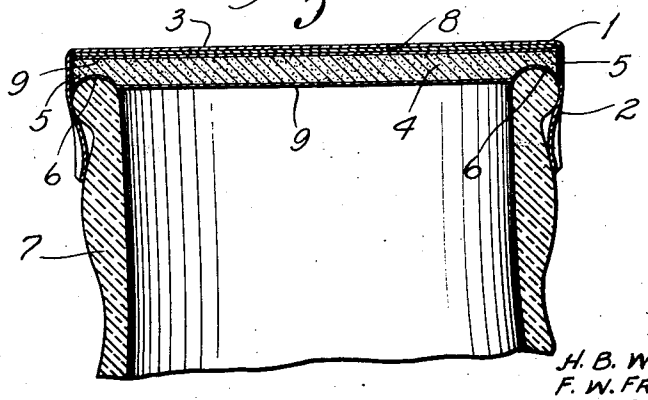


Fig. 3.



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UNITED STATES PATENT OFFICE

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BOTTLE CLOSURE

Application filed May 21, 1928. Serial No. 279,352.

This invention relates to bottle closures of the type known as crown caps, and more particularly to a closure of this kind having an elastic sealing member exposed to the contents of the bottle. The ordinary crown cap now in general use is provided with a cork disk intended to serve as a sealing member, and while cork has been adopted as the best, or most feasible, sealing element for caps of this type, the results of using cork in crown caps have not been entirely satisfactory.

Cork is comparatively inelastic, and the crown cap is merely crimped onto the bottle, so the cork does not provide the desired seal between the metal cap and the bottle. The cork is compressed in a circular line around the top of the bottle, but the compression is not very great, and the compressed portion soon loses its expansive force, thereby permitting leakage of gases between the cork and the bottle. Moreover, cork has very large pores which reduce the efficiency of the seal and allow the liquid and gases in the bottle to contact with the metal cap. This contact with the metal results in a chemical action which in some cases has an objectionable effect upon the contents of the bottle.

Nevertheless, cork has been accepted and generally recognized for many years as the most satisfactory sealing material for use with crown caps. In some instances waxed paper has been arranged between the cork and the metal cap to separate the contents of the bottle from the metal. In other cases, metal foil, or waxed paper, has been attached to the face of the cork disk, to exclude the contents of the bottle from the pores in the cork.

However, the use of such facing disks adds a substantial amount to the cost of the simple closures, and they do not overcome the danger of leakage between the top of the bottle and the compressed margin of the cork disk.

It thus appears that the old problem in this art may be overcome by a highly elastic sealing member adapted to produce and maintain the desired seal between the bottle and the metal cap, but to afford a complete solution of the problem, the sealing member should be so designed that no odor, taste or color will be imparted to the contents of the bottle. Of course, the complete device must be very inexpensive, and this point practically excludes the use of separate facing sheets to separate the contents of the bottle from the sealing member.

Heretofore, rubber has been recognized as a very desirable elastic sealing material for crown caps, but experience has shown that ordinary rubber or rubber compounds will impart objectionable odor, taste and color to beverages ordinarily contained in such bottles. It has been suggested that an ordinary rubber disk may be provided with a separate facing disk of paper, or the like, to separate the contents of the bottle from the rubber. However, this involves the trouble and expense of properly securing the facing disk to the rubber, and has not met with commercial success.

The object of our invention is to produce a crown cap having the important advantage of elastic rubber as a sealing member, and lacking the disadvantage of using a separate facing sheet to exclude the liquid and gases from the rubber. We will hereafter show how this can be accomplished without imparting the objectionable odor, taste and color to the contents of the bottle.

We have found that this odor, taste and color is due to resins which are contained in both crude and reclaimed rubber.

A study of this subject, and experiments resulting from such study, has shown that by removing the natural resins from the rubber, we eliminate the ingredients that have prevented successful use of rubber or reclaimed rubber in crown caps. The deresinated rubber has the natural elasticity required to produce and maintain a most effective seal, and it imparts no odor, taste or color to the contents of the bottle. Therefore, it is not necessary to cover he deresinated rubber with paper, metal, foil, or the like, and by eliminating the expense involved in using such additional material, we have overcome all of the disadvantages of the old crown caps, and at the same time obtained the highly important advantage of using elastic rubber to produce the seal.

In addition to deresinating the rubber, we have found it advantageous to incorporate into the rubber compound a quantity of wax sufficient to fill the pores in the rubber and to also form a film or thin coating of wax over the surface of the rubber disk. The object of this is to prevent leakage of gases through the pores in the rubber. The wax also prevents contact between any weak acids present in the contents of the bottle and exposed particles of fillers used in compounding the rubber.

Briefly stated, the crown cap hereafter described has the usual crimped flange to secure the cap to the bottle, and the face of the simple rubber disk is exposed to the contents of the bottle, but the natural resins are removed from the rubber.

With the foregoing and other objects in view, the invention comprises the novel construction, combination and arrangement of parts hereinafter more specifically described and illustrated in the accompanying drawings, wherein is shown the preferred embodiment of the invention. However, it is to be understood that the invention comprehends changes, variations and modifications which come within the scope of the claims hereunto appended.

Fig. 1 is an enlarged cross-sectional view of a crown cap embodying our invention.

Fig. 2 is a face view of the sealing disk shown in Fig. 1.

Fig. 3 is a cross-sectional view showing the cap applied to a bottle.

In the embodiment of our invention shown in the drawings, we employ a metallic shell 1 having the ordinary crimped or fluted flange 2 and a top 3. Within the shell 1 is a sealing member 4 comprising a disk made of deresinated rubber. The diameter of the sealing disk 4 is approximately equal to the inside diameter of the top 2, and the marginal portions 5 of this disk contact with the top 6 of the bottle 7 and top 3 of the shell 1 (Fig. 3). The sealing member may be cemented to the shell by any suitable adhesive 8.

The sealing member 4 is made of deresinated rubber, compounded with wax and other ingredients, as hereafter described, the amount of wax used being large enough to fill the pores in the rubber, and to produce a thin coating or film 9 of wax over the surface of the rubber. To show this wax film, its thickness is exaggerated in the drawing.

The rubber may be deresinated in any suitable manner. An inexpensive plan lies in the use of reclaimed rubber. Used rubber may be ground and placed in a caustic soda solution which is boiled to an extent sufficient to remove substantially all of the resins. These resins combine with the caustic soda solution to form a soap which is soluble in water, and the resin-free rubber is then washed with water to remove the soap and all traces of alkali.

Thereafter, the deresinated rubber may be compounded and treated in the usual manner to produce a plastic mass, but in doing this we preferably add a relatively large quantity of wax, such as paraffine wax. For our purpose it is desirable to obtain the proportions of more than 2 percent wax on the rubber content, for example, about 5 percent wax.

The plastic mass of wax-containing deresinated rubber may be forced through a mill to produce a long rod of rubber conforming in diameter to the diameter of the sealing disk. This rod may be sliced to form the disks.

After the compound has been sliced in this manner, some of the wax exudes from the pores and forms a thin protective film, or coating, over the surface of each disk, as suggested at 9 in the drawing. This coating would not exclude the resins from the contents of the bottle, but it forms a seal which prevents leakage of gases through the pores in the rubber, and also prevents contamination which might occur if the contents were allowed to contact with inorganic chemicals in the rubber, such chemicals including zinc oxide, china clay, calcium carbonate, magnesium oxide, iron oxide, and other similar fillers which are frequently used in rubber compounds.

The top of an ordinary crown cap is formed with a concave inner face, and in carrying out our invention we found an unexpected problem in trying to cement the rubber disk to the ordinary crown cap. It was necessary to carefully force the rubber disk onto the concave face while the adhesive material was in a wet, or substantially liquid condition, and owing to the elasticity of the rubber disk, it would tend to resume its flat condition, instead of adhering to the concave face. However, by flattening the top of the metal cap, as shown in the drawing, we found that the rubber disk could be readily secured to the flat inner face, and that this operation could be easily and quickly performed without using special appliances to change the shape of the disk, and without holding the disk under pressure during the drying operation. Lacquer, or other suitable cement, may be used to secure the disk to the flat face, and the desired attachment can be easily obtained by quickly inserting the disk into the cap.

We claim:

1. A bottle closure comprising a metal cap having a flange to secure the closure to the bottle, and a deresinated rubber sealing member located in said cap, said sealing member having its face exposed to contact with both the bottle and its contents.

2. A bottle closure comprising a metal cap having a crimped flange to secure the cap to the bottle, and a deresinated rubber sealing disk located in said metal cap, the back of said

deresinated rubber disk being fastened to said metal cap, and the face of said disk being exposed to contact with both the bottle and its contents.

3. A bottle closure comprising a metal cap having a flange to secure the closure to the bottle, and a deresinated rubber sealing member located in said cap, said deresinated rubber sealing member being impregnated with and coated with wax, said sealing member having its face exposed to contact with both the bottle and its contents.

4. A bottle closure comprising a metal cap having a crimped flange to secure the cap to the bottle, and a deresinated rubber sealing disk located in said metal cap, the back of said deresinated rubber disk being fastened to said metal cap, said deresinated rubber disk being impregnated with and coated with wax, the proportions of wax and deresinated rubber compound in said disk being more than 3 percent wax and less than 97 percent deresinated rubber compound, and the face of said disk being exposed to contact with both the bottle and its contents.

5. A bottle closure comprising a crown cap having a flat top and a crimped flange extending from said flat top, and a flat sealing disk cemented to the inner face of said flat top, said sealing disk being made of deresinated rubber impregnated and coated with wax, and the face of said disk being exposed to contact with both the bottle and its contents.

In testimony that we claim the foregoing we hereunto affix our signatures.

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