Nov. 29, 1938. F. J. GAVIN 2,138,419

CONTAINER CLOSURE AND FACING MATERIAL THEREFOR

Filed July 12, 1935

Fig. 1.

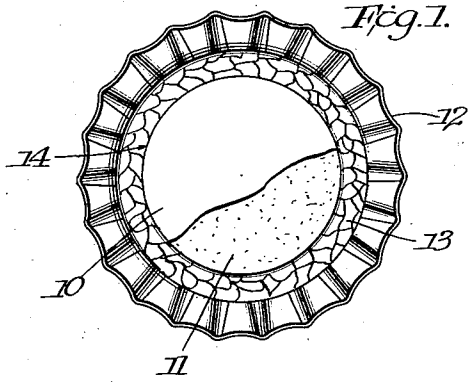


Fig. 2.

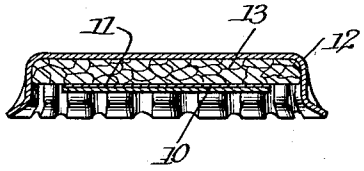


Fig. 3.

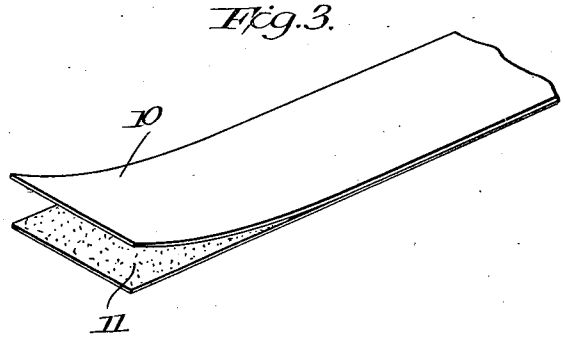
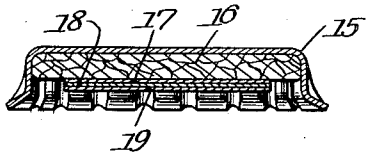


Fig. 4.



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2,138,419

CONTAINER CLOSURE AND FACING MATERIAL THEREFOR

Frank Joseph Gavin, Baltimore, Md., assignor to Crown Cork & Seal Company, Inc., Baltimore, Md., a corporation of New York

Application July 12, 1935, Serial No. 31,113

1 Claim. (Cl. 215—39)

The present invention contemplates facing material for closure caps constituted by a sheet of aluminum foil having predeveloped overall surface films of its own oxide with a layer of a thermoplastic adhesive applied to one of the surfaces of the foil. It relates also to container closures having sealing faces of the oxidized foil.

In the packaging of many products in sealed containers, great care must be taken to insure, as far as possible, that over a period of time the internal pressure, whether positive or negative, will be substantially maintained. To this end the closures of such containers have heretofore been provided on their undersides with sealing facings of an impermeable nature, such facings ordinarily being applied to a cushion liner and being either coextensive with the latter or of lesser diameter, the facings in the latter instances being known as spots.

While many materials have been proposed for such facings, metal foils, such as tin, aluminum, and so forth are naturally suited from a physical standpoint due to their impermeability, but are frequently objectionable due to their lack of resistance to chemical action. So far as its physical characteristics are concerned, aluminum foil makes an ideal facing material and is preferable to tin foil in view of its relative cheapness. From a chemical standpoint, however, plain aluminum foil is unsuited for many purposes due to its lack of acid and alkali resistance. To overcome this objection, the plain foil has been provided on its exposed face with a resistant coating of lacquer, this adding, however, materially to the cost and not being an absolute protection since upon damage to the lacquer the foil is exposed to possible destructive action.

I have found that a facing material of wide use is afforded by oxidized aluminum foil, that is, an aluminum foil having surface films of its own oxide. Extensive tests carried out with a variety of products, such as carbonated water and ginger ale, have shown such foil to have a remarkable resistance to deterioration.

In carrying out the tests I have made use of oxidized aluminum foil produced both by the anodic process and by the process of passing the plain foil through a hot solution of sodium carbonate and potassium dichromate. The former method results in a product whose color is metallic white, while in the latter case the color is darkish gray, and on this account not so desirable as the first. The anodic foil is produced by employing the plain foil as the anode in the electrolysis of a suitable electrolyte, which may be an aqueous solution containing sulphuric acid or chromic acid.

The anodic foil is resistant to acids that corrode aluminum foil and in alkali resistance is superior to the oxidized foil produced by the other method. While not so strong or ductile as the plain foil, its capacity in these respects is quite sufficient to enable its successful use as closure facings. Oxidized aluminum foils of both types take coatings extremely well, the adherence of thermoplastic coatings being greatly superior as contrasted to the plain foil.

The anodic foil is sensitive to discoloration and for this reason may desirably be dipped in a dye solution to give it a color which will not be visibly marked in handling. Both types of the oxidized foil may be subjected to a coloring treatment, in the one instance principally for the purpose of providing a non-discolorable surface, and in the other instance for the principal purpose of imparting a color more pleasing than its natural darkish gray.

The oxidized foils may be coated with a resistant varnish such as vinyl lacquer and in this case a double safeguard, as over the plain foil, is provided against deterioration. At the same time, the varnish may be given the desired color so as to have a double function.

Ordinarily in stamping metal foils a lubricant must be provided to prevent tearing by the punches. The oxide films of the oxidized aluminum foils serve to facilitate punching without the use of an extraneous lubricant so that the danger of discoloration from use of such latter is avoided.

In the accompanying drawing I have shown the facing material and closures,

Figure 1 being a bottom plan view of a crown cap provided with a spot of oxidized aluminum;

Figure 2 a diametric section of the cap of Figure 1;

Figure 3 a sheet or strip of the facing material, and

Figure 4 a view similar to Figure 2 with the spot provided with a protective coating.

In Figure 3, reference numeral 10 designates a sheet or strip of oxidized aluminum foil prepared in any suitable manner, for example by one of the processes above described, the treated foil having overall predeveloped surface films of its own oxide. Applied to one face of the foil is a layer 11 of thermo-plastic adhesive which may be the ordinary gutta percha or the cellulose derivative adhesive described in Patent No.

1,956,481, issued April 24, 1934, to Albin H. Warth. Any other suitable thermoplastic adhesive may, of course, be used. The adhesive is applied to the foil by any suitable method and bonds tenaciously therewith. In Figure 3 the foil and adhesive layer are shown as separated at one end of the strip, this being merely for the purpose of illustration. When properly applied, separation of the foil and adhesive layer is impossible. The described facing material may be packaged in stacks or in rolls, depending on the manner in which it is to be fed to the punches.

In Figures 1 and 2, reference numeral 12 designates the shell of a crown cap, such cap being shown merely as an example of a container closure to which the new facing material may be applied. Reference numeral 13 designates a cushion layer of cork, and reference numeral 14 a spot of the new facing material. In Figure 1 the foil 10 is broken away to show the adhesive 11. It will be understood that the facing material may cover the cork cushion entirely if desired instead of being merely a spot as shown. Furthermore, the cushion layer may be of any suitable material other than cork and in some instances might be omitted altogether. So far as the combination of a sealing facing of oxidized aluminum foil with a container closure is concerned, an adhesive other than a thermoplastic may be used.

In Figure 4 reference numeral 15 designates the metal shell of a crown cap, reference numeral 16 the cushion liner, reference numeral 17 an adhesive layer, reference numeral 18 a spot of oxidized aluminum foil, and reference numeral 19 a protective varnish coating. As above stated, this protective coating may also have a coloring function. Protective varnish coatings used with a plain aluminum foil may deteriorate or crack, thus exposing the foil to the destructive action of the packaged goods. When such a coating is used on oxidized foil, even if it becomes damaged, the protective effect of the oxidized film still remains so that a double safeguard is provided.

As above pointed out, the present invention is not limited to the exemplification shown in the drawing, its scope being determined in the following claim.

I claim:

A container closure having an adherent inner facing of aluminum foil treated to form on its exposed surface an overall artificial film of its own oxide, said film being substantially heavier than a naturally formed film and of uniform thickness and being acid and alkali resistant.

FRANK JOSEPH GAVIN.