July 19, 1932. A. H. WARTH 1,867,637

CLOSURE AND INTERIOR FACING THEREFOR

Filed Dec. 23, 1930

Fig. 1.

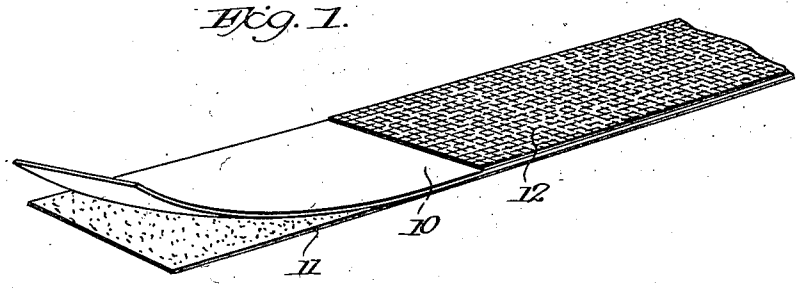


Fig. 4.

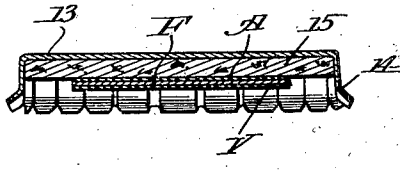


Fig. 3.

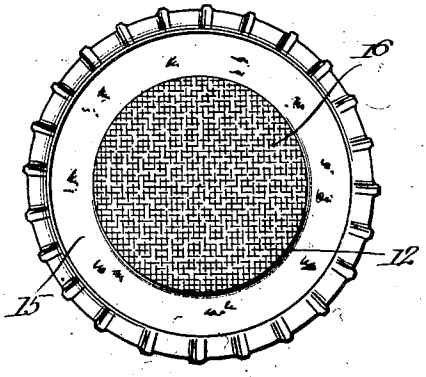


Fig 2.

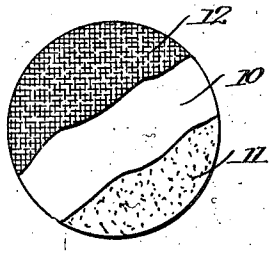
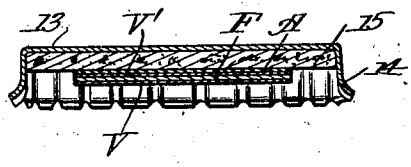


Fig. 5.



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Patented July 19, 1932 1,867,637

UNITED STATES PATENT OFFICE

ALBIN H. WARTH, OF BALTIMORE, MARYLAND, ASSIGNOR TO CROWN CORK & SEAL COMPANY, INC., OF BALTIMORE, MARYLAND, A CORPORATION OF NEW YORK

CLOSURE AND INTERIOR FACING THEREFOR

Application filed December 23, 1930. Serial No. 504,409.

The present invention relates to closures, and more particularly to an improved interior facing for closures and method of producing the same.

Although the invention is applicable to closures of any type in which an interior facing may be usable, from a more specific aspect it is particularly applicable to closures of the crown type and which have a center spot for facing and protecting from container contents the liner of cushion material.

For center spots, it has been customary to employ various materials, such as aluminum foil, tin foil, and paper or other fibrous material having a gas and liquid impervious coating.

The present invention has as an object the provision of an improved facing of the metal foil type. In crown caps, metal foil has been used as a spot in caps intended for the sealing of mineral waters, soda waters, beers, and other liquids. These metal spots are commonly made of tin foil, or aluminum foil. There are some liquids, however, with which it has not heretofore been practicable to utilize a foil facing, and the present invention seeks to provide an improved facing of metal foil which will effectively resist the action of liquids for which metal foil has been unsuitable as a cap spot or facing.

Moreover, the invention seeks to provide an improved facing which will permit the use of aluminum foil for the capping of liquids with which it has heretofore been practicable to use only tin foil. For certain highly carbonated alkaline and saline waters, the relatively more expensive tin foil spotted or faced caps have been used to the exclusion of other metal foil and of paper. Since closures, particularly those of the crown type, are sold for only a few cents a gross, a saving of only a fraction of a cent per crown or dozen crowns is of considerable importance.

Moreover, for certain liquids, for example those requiring high temperatures for sterilization, metal foil facings are unsatisfactory, particularly if the liquids contain acids such as citric acid, lactic acid, and acetic acid. When subjected to such acids, the foil becomes tarnished, corroded, or even dissolved if the acid is very strong. Aluminum foil tends to corrode or tarnish in the presence of fruit acids, and to be eaten away by minute amounts of alkalies, alkaline earths, and mineral salts, which are present in waters.

The present invention seeks to provide a facing of the foil type, and particularly a facing of aluminum foil, which will be resistant to such alkalies, alkaline earths, and mineral salts, and which will not be easily eaten away by fruit acids, such as are present in ginger ale and other acidulated beverages.

Another object of the invention is to provide a foil facing of distinctive appearance which will facilitate the distinguishing of aluminum and tin foil facings and of the materials when in strip form, and which will also permit the use of foil without the usual foil appearance, thereby enabling this material to be used in instances and where the employment of foil might be objectionable, for example because of the widely recognized non-resistant characteristics of foil. It will be understood that it is frequently very difficult to distinguish aluminum foil and tin foil from one another. Moreover, there is widespread objection to closures with foil facings because of the weakness of this material in the presence of acids and alkalies.

The invention will be described in connection with the manufacture of a closure of the crown type and provided with a center spot. Spot crowns are well known in the art, and are illustrated for example in the patent to McManus, No. 1,339,066, granted May 4, 1920. Although described as applied to crown caps, it will be understood that the invention is applicable to caps of other types, such as screw or lug caps, and is not limited to a cap-facing of smaller diameter than the cap.

Referring to the accompanying drawing, wherein there is shown one embodiment of the invention,

Figure 1 is a perspective view showing the laminated material used in the preferred method of manufacturing the cap.

Figure 2 is a plan view partly broken away

showing the disc formed from the material illustrated in Figure 1.

Figure 3 is an interior face view of a completed cap.

Figure 4 is a cross sectional view, and

Figure 5 is a cross sectional view of a modified form of cap.

In order to produce a cap having a facing of the desired character, it is preferred to utilize a laminated material which is made up in sheet or strip form, and from which the facing may be punched and applied to the cap for assembly in the manner illustrated and described in my Patent No. 1,788,260, granted January 6, 1931.

This material comprises an intermediate layer 10 (Fig. 1) of waterproof material, such as tin or aluminum foil. One surface of the material is coated with a layer of suitable adhesive 11. I prefer an adhesive which is waterproof and, to a certain extent, acid resistant, such as gutta percha or a mixture of gutta percha and other gum. Another adhesive which has been found satisfactory is a mixture of damar resin, turpentine rosin, bodied linseed oil, poppy-seed oil, the mixture being thinned with mineral spirits and permitted to dry after application to the foil. This adhesive, as well as one which includes gutta percha, is normally hard or firm at room temperature, and consequently the spot material can be conveniently handled in strip form, in which form it may be stored in rolls adapted to be used in the cap forming machines. Moreover, such an adhesive will become tacky upon the application of heat, and hence will unite the spot material to the cap upon the application of heat and pressure, which may be simultaneously applied, as by the punch which forms the facing discs or spots from the strip material. Since the adhesive is water-resistant and acid resistant it constitutes an additional layer which will protect the cushion material of the cap should the foil material become weakened or perforated by the alkalies, acids or alcohol in the capped liquids.

Still another adhesive which may be used is one one containing as its principal constituent pitch, preferably fused pitch of a moderately hard or hard consistency having a melting point of more than 140° F. By pitch is meant the residue from the distillate of coal-tar, shale oil, petroleum, or vegetable oil. For coating purposes the pitch may be dissolved in suitable solvents such as benzol or toluol, the solvent being evaporated off in the drying of the coating. The pitch may be also combined with ceresin wax, such as 4 parts pitch, and 1 part ceresin wax, and then thinned out with benzol or toluol. The wax has a tendency to prevent certain grades of pitch being too tacky at low temperatures.

The other surface of the material is provided with a coating 12 of varnish or lacquer, and both sides of the foil may be coated in this manner if the varnish coating is applied before the application of the adhesive. In some instances, the coating of both sides may be found to be desirable. For applying the varnish or lacquer coating the foil may be passed through a bath of the varnish or lacquer, or the coating may be applied by rollers, and thereafter it may be hardened, as by baking at a temperature of about 300° F.

Any suitable varnish may be used, but I prefer a varnish which is acid and alkali resistant. By "resistant" I mean a varnish which will resist the action of alcohol, alkalies and acids in the percentages usually present in beverages or liquids with which the caps are intended to be used. The precise acid and alkali resisting properties of the varnish or lacquer will depend, of course, upon the beverages with which the caps are intended for use, and it will be obvious, of course, to one skilled in the art of producing acid, alkali and alcohol resistant varnishes, that the characteristics of the preferred varnish indicated below may be varied to the extent desired in accordance with the particular purposes of the material.

I have found that for the capping of ordinary beverages containing alkalies and acids, and also alcohol, a varnish comprising a natural gum, such as Zanzibar, Madagascar, or esterized manila gum, together with a relatively large amount of China-wood oil will be very efficient. To make a long oil varnish of this character, I prefer to use thirty-five gallons of oil to one hundred pounds of resinous gum. In such a varnish, metallic driers and plasticizers are added in small amounts, such plasticizers as linseed oil, perilla oil, castor oil, tea seed oil, or lecithin being suitable.

In the manufacture of a foil spot, I have found it advantageous to color the varnish or lacquer, and the use of different and readily distinguishable colors, such as gold and red upon the different types of foil (tin and aluminum) will enable one to determine readily by the color the precise character of the foil. Furthermore, the provision of a colored varnish will conceal the characteristic foil appearance, and thus permit the use of foil in the manufacture of caps for which foil would not ordinarily be regarded as acceptable because of the general impression that a foil spot will not suitably resist acids and alkalies. In order to provide a golden color, for instance, a small amount of gilsonite asphaltum may be incorporated in a varnish of the character above described. The varnish may be brought to the desired consistency by the use of mineral spirits or turpentine substitute.

The foil may be coated either before or after the application of the adhesive, but necessarily preliminary to the application of the

adhesive coating when both sides of the foil are coated with varnish.

By the use of a varnish or lacquer which is resistant to acids (carbonic acid, acetic acid, tartaric acid, citric acid) and which is unaffected by alkalies, alkaline earths and mineral salts, such as sodium chloride, there is provided a foil facing which is suited to the sealing of acidulous beverages which are to be subjected to high temperatures and also to high pressures. A facing of this character is also particularly suited for the sealing of alkaline and saline waters. When coated in this manner, aluminum or other cheap foil can be substituted for tin foil, thereby effecting a substantial economy in the manufacture of the cap.

A cap provided with a spot of this character, namely in which metal foil has its exposed face coated with acid and alkali resistant varnish, is particularly useful in connection with liquids requiring high temperatures for sterilization. For such liquids, paper spot caps even though varnished are not satisfactory, for the reason that varnished paper is permeable, and, therefore, swells and causes the underlying disc or cork to become soggy. As a result, the present invention not only permits the use of cheaper foil, such as aluminum foil for the capping of liquids with which such foils could not heretofore be used, but also permits the use of metal foil spots where paper spots have not been satisfactory even though the paper spots are varnished. That is to say, the varnishing of the foil produces results and affords advantages not obtainable with varnished paper spots and not suggested therefore by the use of varnished paper.

If desired, the adhesive may be applied at the time the varnish coated foil is assembled with the cap, for example, as described in my copending application, Serial No. 360,895, filed May 6, 1929. In this process, the strips of varnish coated foil and adhesive tissue, such as gutta percha, are collated and fed into a punching machine so that superimposed or registering discs of adhesive tissue and spot material are punched from the strips and applied to the cap, heat and pressure being applied to fuse the gutta percha and simultaneously causing adhesion of the same to both the spot disc and the cushion liner in the cap.

In Figures 3 and 4, there is shown a cap made from such a material, whether of the preformed type, shown in Figures 1 and 2, or of the type built up during assembly with the cap. This cap comprises a metallic body or shell 13 of the usual type, having a corrugated skirt 14. Within the cap is a disc of cushion material, such as composition cork 15. This liner or disc is provided with a center spot 16, having its edge spaced from the skirt of the cap to provide a surrounding surface of cushion material, which may directly engage the lip of a bottle, as described in the patent to McManus, No. 1,339,066, granted May 4, 1920.

The disc 16 comprises an exposed layer V of insoluble varnish or lacquer, an intermediate layer F of foil, such as aluminum foil, and a bottom layer A of waterproof adhesive, such as gutta percha. These layers are coextensive in area and afford a laminated center spot.

In some instances, it may be preferable to provide two layers of varnish or lacquer disposed, respectively, at opposite sides of the foil, and a cap having a center spot of this character is shown at Figure 5. In this figure there will be noted, in addition to the layers described in the foregoing description of the cap shown in Figure 4, an additional intermediate layer V′ of varnish. A coating of this character may be conveniently applied by passing the foil through the varnish bath, regardless of whether only a single surface or both surfaces of the foil are to be coated.

Although the material has been described as applied to the cushion material within a cap, it will be understood, of course, that the varnished and adhesively coated foil, or the varnish foil and a separate adhesive strip, such as gutta percha tissue, may be associated with the cushion material before assembly of the latter with the cap, and whether the cushion material is in disc or strip form. Such cushion material may be a composition of cork, newsboard or fibrous material of any character suitable for use in the manufacture of closures.

I claim:

1. A cap having a sealing liner, an interior facing of metal foil on the liner, the facing leaving exposed the surface of the liner around the periphery of the facing, adhesive coextensive with the undersurface of the facing and uniting the same to the liner, and a coating of acid or alkali resistant varnish on the outer surface of the facing.

2. A cap having a sealing liner, an interior facing of metal foil on the liner, the facing leaving exposed the surface of the liner around the periphery of the facing, adhesive coextensive with the undersurface of the facing and uniting the same to the liner, and a coating of acid or alkali resistant varnish on the outer surface of the facing colored to conceal and contrast with the foil surface.

In testimony whereof I have hereunto set my hand.

ALBIN H. WARTH.