

Oct. 28, 1930.

L. G. LANGE

1,779,884

COMPOSITE MATERIAL FOR CONTAINERS

Filed Feb. 3, 1930

Fig. 1.

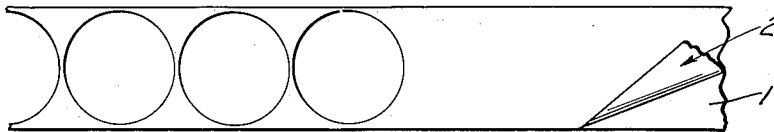


Fig. 2.

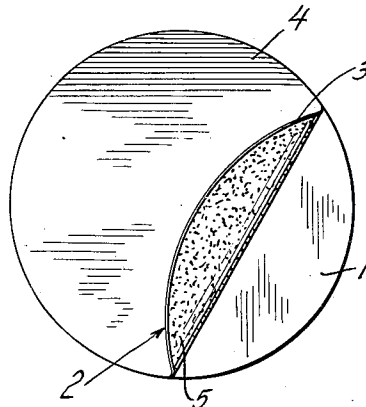


Fig. 3.

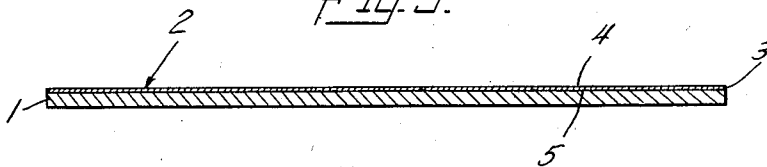
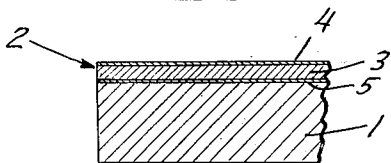


Fig. 4.



INVENTOR

Louise G. Lange

BY

Vernis Davis Martin & Edmonds

ATTORNEYS

UNITED STATES PATENT OFFICE

LOUVVERN G. LANGE, OF PASSAIC, NEW JERSEY

COMPOSITE MATERIAL FOR CONTAINERS

Application filed February 3, 1930. Serial No. 425,600.

This invention relates to composite material for use in the manufacture of containers and more particularly to a composite material especially adapted to the purpose of providing a liner for bottle caps and the covers of containers in general.

This application may be considered a continuation in part of my application, Serial Number 375,882 and Patent No. 1,758,610, both filed July 3, 1929.

In order that my invention may be clearly understood I will explain its application to the problem of providing an improved liner for bottle caps, jar covers and the like, although it will be understood that my invention is not limited to such applications thereof.

It has been common practice in the past to provide metal bottle caps, jar covers and the like with cork inserts which come directly in contact with the top of the bottle, or other receptacle. These cork inserts or discs are clamped in position by any suitable means, such as the crimped edge of the ordinary bottle cap, and the insert is supposed to form a seal for the contents of the container. The use of natural cork for this purpose is not very satisfactory because the natural cork contains imperfections which may render an insert made from this material incapable of forming a complete seal for the container. Composition cork inserts have been employed, such inserts comprising comminuted cork and a suitable binder. Such composition inserts, or liners, are more dense and uniform than such liners made from the natural product but they are still unsatisfactory for many purposes because of the fact that the binder of the composition is attacked by many solvents and this results in disintegration of the material which is supposed to form the seal for the container.

In the production of inserts, or liners, for bottle caps, jar covers and the like it is desirable to use some material such as cork, or composition cork, which is resilient and thus capable of conforming to the configuration of the top of the container. At the same time the materials just mentioned are objectionable for the reasons pointed out above

and it is an object of the present invention to provide a composite material suitable for use as liner, or insert material, as well as for other purposes and which is not open to the objections pointed out in connection with the materials discussed above. Natural cork, composition cork and other fibrous resilient materials may be used in accomplishing the objects of my invention but these materials are not used alone, or merely protected by a single coating of material which is supposed to improve their characteristics as has been suggested heretofore.

According to my invention as applied to the making of bottle cap liners and the like I provide some preferably resilient fibrous material, such as cork, composition cork, pulp board, news board, or gray felt and to this material I apply protective layers of a waterproof adhesive and an insoluble varnish. The adhesive and varnish may be carried by a suitable medium, such as cellulose material in sheet form, for example, paper, or the like. I have found that paper is quite satisfactory as a carrying medium and I prefer to employ thoroughly sized paper which has been thoroughly calendered to provide hard surfaces. To one surface of the paper, or other carrying medium, I apply in any suitable manner a film of what I call insoluble varnish. In general it may be stated that by insoluble varnish is meant a varnish which is insoluble, or inert to such solvents as alcohol, acetic acid, citric acid and carbonic acid. Such varnish, although insoluble in and impervious to alcohol and acids of the character described, nevertheless absorbs some moisture and permits some moisture to pass through a film of this varnish. Accordingly, I employ a film of waterproof adhesive and this is employed in such a manner that it is protected from the action of alcohol and other solvents of the character indicated above which would otherwise destroy the adhesive. As indicated above I may apply to one surface of the sheet of paper, or the like, a film of insoluble varnish. To the other surface I apply a film of waterproof adhesive, such as gutta-percha, or similar rubber-like material. This adhesive may be used as a means

for bonding the sheet of paper, or the like, to a base material, preferably resilient in character, such as cork, pulp board or felt. This composite material may be cut into suitable form for application to bottle caps, jar covers and the like, or, if desired, the material may in a sense be assembled within the container cover. For example, the paper may be coated, or otherwise provided with films of varnish and adhesive. The resilient material may be inserted in the container cover and thereafter the varnished and adhesive coated paper may be applied to the fibrous material within the container cover or cap.

I prefer to employ a varnish which comprises a resin which is resistant to alcohol, acetic acid, carbonic acid and the like and an oil which is resistant to these materials. It will be understood that the varnished surface of the paper, or other carrying medium, is exposed to the contents of the bottle, or other container. The films of varnish and adhesive cover the underlying resilient material and together form a complete seal for the container, which is impervious to moisture and inert to the action of such ingredients as may constitute the contents of the container. The adhesive is protected by the varnish and, while the varnish alone is incapable of preventing the escape of moisture, yet this function is performed in a satisfactory manner by the adhesive which remains intact because of the presence of the protective film of varnish.

It will be understood that my invention is particularly suitable for use in the manufacture of containers for beverages, food products and pharmaceutical preparations, many of which contain alcohol, or acids of the character indicated above, which would attack and destroy the ordinary varnish films heretofore proposed as a means for sealing the surface of cork, or other inserts used in container covers.

The various objects and advantages of my invention will be more apparent upon considering the following detailed description which is to be considered in conjunction with the accompanying drawings wherein:

Fig. 1 is a plan view of a strip of composite material embodying my invention;

Fig. 2 is an enlarged plan view of a disc cut from the strip illustrated in Fig. 1;

Fig. 3 is an enlarged elevation of the disc shown in Fig. 2 and

Fig. 4 is a greatly enlarged fragmentary section view of a portion of the disc illustrated in Figs. 2 and 3.

In the accompanying drawings I have illustrated one embodiment of my invention as applied to the production of liners or inserts for bottle caps, jar covers and the like. It will be understood that my invention may be applied to other purposes however.

Referring to Fig. 1 of the accompanying

drawing I have shown a strip of composite material embodying my invention, this strip comprising a base layer of material 1 preferably resilient in character and a superimposed composite layer 2 adhering to the base layer. In Fig. 1 the composite material is shown in strip form from which blanks may be cut in any desired shape to fit bottle caps, jar covers and the like, or for other purposes.

Fig. 2 shows in enlarged form a circular disc cut from the strip illustrated in Fig. 1. From this enlarged view it appears that the composite layer 2 supported by the base 1 comprises a carrying medium 3 in the form of a sheet of paper having on its upper surface a film 4 of insoluble varnish and on its lower surface a film of waterproof adhesive 5.

It will be understood that when the improved composite material is used as an insert or liner for bottle caps, jar covers and the like the base material 1 comes in contact with the inside of the cap or cover and the varnished film is exposed to the contents of the container. The film of varnish is highly resistant to and impervious to solvents, such as alcohol, acetic acid, citric acid and carbonic acid, or in other words the varnished film may be said to be insoluble. The adhesive 5, while not necessarily insoluble in alcohol and acids of the character described, is nevertheless impervious to moisture and effectively prevents any moisture which may pass through the film of varnish from entering the underlying base material 1. The layer of paper, or the like, disposed between the films of varnish and adhesive serves, not only as a carrier for these films, but also as a means for strengthening and reinforcing the composite material to prevent accidental injury to the underlying adhesive film. The combination of varnish and adhesive films according to this invention entirely prevents the escape of moisture through the material, which would have a tendency to cause the underlying base material to decompose or mold and this result is accomplished by employing a varnish which is impervious to solvents of the character indicated for protecting a layer or film of adhesive which is effective in preventing the escape of moisture from the container.

The layer of paper, or other cellulose material, illustrated at 3 in the figures of the accompanying drawing is preferably hard surfaced. Where I employ paper I prefer to use paper which has been heavily sized and well calendered to provide glossy surfaces. My reason for preferring this material is that by its use the penetration of the varnish and adhesive into the paper is largely prevented and the varnish and adhesive remain on the surface forming substantially continuous films.

The adhesive material 5 is preferably a

gutta-percha, or other rubberlike composition. I prefer to employ a composition comprising gutta-percha, for this material can be softened by heat and by heating the paper carrying the film of adhesive and by heating the underlying material, the layers of material may be effectively united by pressure. Gutta-percha is ordinarily combined with other gums or substances in order to impart to the gutta-percha desirable properties. Balata gums and various other resins are frequently used for this purpose. It will be understood that the term gutta-percha as used herein is intended to describe an adhesive material composed entirely, or only in part, of gutta-percha for various ingredients may be combined with the gutta-percha to improve its characteristics for certain purposes. Gutta-percha in strip form may be applied to the paper 3 in any suitable manner, or the gutta-percha adhesive may be dissolved in a suitable solvent and applied to the paper 3 in liquid form. Where the product is to be used under conditions such that relatively high atmospheric temperatures prevail it is desirable to incorporate with the gutta-percha materials which have a tendency to harden the same and prevent it from melting or softening at elevated atmospheric temperatures. On the other hand where the material is to be used under conditions where low temperatures prevail the gutta-percha composition may be altered accordingly to provide an adhesive which is not unduly brittle at the prevailing low temperatures.

Gutta-percha is especially suitable for accomplishing the objects of my invention for it is waterproof and when combined with a film of varnish as contemplated by my invention a composite material impervious to moisture is formed.

Where the gutta-percha is applied to the paper in liquid form the gutta-percha adhesive may be first dissolved in an appropriate volatile solvent, such as highly refined gasoline, naphtha, toluene, benzene or xylene. The solution may be heated until the mass thickens and it may be applied in the thickened state to the back of paper previously varnished and the remaining volatile solvent permitted to evaporate.

The varnished film 4 covering one surface of the paper, or other cellulose material 3, is preferably the dried residue of a varnish containing a resin which is resistant to alcohol and the acids above indicated and an oil the dried film of which is resistant to these solvents. Various gums or resins are available for this purpose including certain natural gums and at least one synthetic gum. Of the natural gums Zanzibar, Madagascar, and esterized manila gums give the best results. All of these natural gums which are insoluble in alcohol, and black damar, elastica (dry rubber resin) and certain grades of

copal, fuse with difficulty in the oils. Esterized manila however fuses more readily than the others. None of these gums however fuse with the oils as readily as the synthetic cumar gum, nor are the finished films as resistant to the action of solvents as is the cumar gum. Cumar gum (manufactured by the Barrett Company) is soluble in the hot oils of the varnish without any preparatory treatment. Cumar gum may be compounded largely with certain of the oils which are resistant to alcohol, such for example as China wood oil, and it has been found that with such a combination it is possible to add small amounts of oil, such as linseed oil, which is soluble in alcohol, and this without destroying the alcohol resisting properties of the varnish. In making the varnish one or more of the usual driers may be added in appropriate amounts to give a coating of the desired consistency and any volatile thinner in which the constituents of the varnish are soluble may be employed. For this purpose a hydrocarbon thinner, such as high test kerosene, is suitable.

Various oils may be used to dissolve the cumar gum. The following example is given as a representative varnish composition which may be regarded as insoluble in alcohol and in acids of the character indicated above:—150 pounds cumar gum, 50 gallons China wood oil, 5 gallons linseed oil, 5 gallons perilla oil, 18 pounds precipitated manganese resinate, 10 pounds cobalt linolate, 5 pounds full bleached paraffin.

This varnish may be thinned down hot with high test kerosene, or any other appropriate volatile solvent. This example is used merely as an illustration of one type of varnish which is suitable for carrying out my invention. Such a varnish successfully withstands the corrosive or solvent action of chemicals such as alcohol, acetic acid and citric acid or the like customarily encountered in beverages, food products, pharmaceutical preparations and cosmetics.

A departure from the formula given above may be made without sacrificing all of the advantages of my invention. The quantity of linseed oil may be further reduced, or the paraffin may be reduced or eliminated where special conditions of use indicate this to be desirable. Any of the ingredients may be used, in different amounts, or eliminated without departing from the spirit of the invention wherever conditions of use require such modification of a combination of ingredients. I prefer to employ a gum or resin which is insoluble in alcohol but soluble in hot oil in the nature of China wood oil.

After the varnish is applied to the paper it is preferably baked to harden the varnish film and increase its resistance to the action of chemicals. It is quite satisfactory to bake the varnished paper at a temperature of ap-

proximately 300° F. for about an hour. The adhesive coating may be applied to the paper after the baking operation has been completed.

5 It is to be understood that my invention is not limited to the particular embodiments illustrated and described but includes such modifications thereof as fall within the scope of the appended claims.

10 I claim:

1. A composite material of the character described comprising a layer of sheet material, an insoluble film of varnish adhering to one surface of said layer of sheet material, a layer of resilient material, and a waterproof adhesive bonding said resilient material to the other surface of said layer of sheet material, whereby the adhesive is protected from the action of solvents by the film of varnish and a composite material impervious to moisture is formed.

2. A composite material of the character described comprising a layer of sheet material, an alcohol resistant film of varnish adhering to one surface of said layer of sheet material, a layer of resilient material and a waterproof adhesive bonding said resilient material to the other surface of said layer of sheet material.

3. A composite material of the character described comprising a layer of sized paper, an insoluble film of varnish adhering to one surface of the paper, a layer of resilient material, and a film of waterproof adhesive bonding said resilient material to the other surface of the paper, whereby the adhesive is protected from the action of solvents by the film of varnish and a composite material impervious to moisture is formed.

4. A composite material of the character described comprising a layer of sheet material, an insoluble film of varnish adhering to one surface of said layer of sheet material, a layer of resilient material and a waterproof adhesive bonding said resilient material to the other surface of said layer of sheet material, said insoluble film of varnish consisting of the dried residue of a varnish comprising a gum insoluble in alcohol and an oil the dried film of which is resistant to alcohol.

5. A composite material of the character described comprising a layer of sheet material, an insoluble film of varnish adhering to one surface of said layer of sheet material, a layer of resilient material and a waterproof adhesive bonding said resilient material to the other surface of said layer of sheet material, said insoluble film of varnish consisting of the dried residue of a varnish comprising cumar gum and an oil the dried film of which is resistant to alcohol.

6. A composite material of the character described comprising a layer of sheet material, an insoluble film of varnish adhering

to one surface of said layer of sheet material, a layer of resilient material and a waterproof adhesive bonding said resilient material to the other surface of said layer of sheet material, said insoluble film of varnish consisting of the dried residue of a varnish comprising cumar gum and China wood oil.

7. A composite material of the character described comprising a layer of sheet material, an insoluble film of varnish adhering to one surface of said layer of sheet material, a layer of resilient material, and a waterproof adhesive bonding said resilient material to the other surface of said layer of sheet material, said insoluble film of varnish consisting of the dried residue of a varnish comprising cumar gum, China wood oil and linseed oil in the approximate proportions of 150 pounds of cumar gum to 50 gallons of China wood oil and approximately 5 gallons of linseed oil.

8. A composite material of the character described, comprising a layer of sheet material, an insoluble film of varnish adhering to one surface of said layer of sheet material, a layer of resilient material and a waterproof adhesive comprising gutta-percha bonding said layer of resilient material to the other surface of said sheet material, whereby the adhesive is protected from the action of solvents by the film of varnish and a composite material impervious to moisture is formed.

9. A composite material of the character described comprising a layer of sheet material, an insoluble film of varnish adhering to one surface of said layer of sheet material, a layer of fibrous material, and a waterproof adhesive bonding said fibrous material to the other surface of said layer of sheet material, whereby the adhesive is protected from the action of solvents by the film of varnish and a composite material impervious to moisture is formed.

In testimony whereof I affix my signature.
LOUVERN G. LANGE.

70
75
80
85
90
95
100
105
110
115
120
125
130