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DECORATIVE FOIL

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This invention relates to the preparation of thin foils having a cellulosic base, and relates more particularly to foils having distinctive characteristics due to material contained within the body of the foil.

An object of my invention is to prepare thin foils which have therein distinctive decorative or characterizing markings within the body of such foils. Other objects of this invention will appear from the following detailed description.

Thin transparent foil made of regenerated cellulose is widely used for the wrapping of various articles to protect them, while still permitting an inspection of such articles.

I have found it very desirable to impart distinctive characteristics to such foil, so that such foil may be used for wrapping articles not only to protect them, but also to identify them to show that the wrapped articles are made by a given manufacturer. Merely printing, embossing, dyeing, or imparting any other surface ornamentation to such foil will not accomplish this purpose, as these operations can be easily carried out by an unfair trader who should desire to palm off his goods as that of the legitimate manufacturer who is using the distinctive foil to wrap and identify his goods.

I have found that if the distinctive characteristics are imparted to the thin foil by means of substances or articles which are embedded within the foil itself, such characteristic foil cannot be readily duplicated by counterfeiters, since it is necessary to impart these characteristics to the thin foil during the course of its manufacture, which manufacture requires expensive machinery which an illegitimate trader is not likely to be able to purchase and operate.

In accordance with my invention, I prepare thin foil of a cellulosic material base and having within the material of the foil itself another substance of characteristic appearance.

This invention is applicable to thin foil, however made, which foil usually has a thickness of from 0.0005 to 0.002", say 0.001". Such foil is preferably clear and colorless, except for the characteristic markings therein. However if desired the main portion of the foil may be colored.

The thin foil may be made by casting a solution of an organic derivative of cellulose, plasticizers and any other desired material, in a volatile solvent upon a smooth surface and causing the volatile solvent to evaporate. The organic derivative of cellulose may be an organic ester of cellulose or cellulose ether. The organic ester of cellulose is preferably cellulose acetate, but ex-

amples of other esters of cellulose are cellulose formate, cellulose propionate and cellulose butyrate, while examples of cellulose ethers are ethyl cellulose, methyl cellulose and benzyl cellulose. Examples of suitable plasticizers for cellulose acetate are diethyl tartrate, dibutyl tartrate, dimethyl phthalate, diethyl phthalate, triacetin, monomethyl xylene sulfonamid, etc. If desired the foil may be of regenerated cellulose made from viscose in the known manner.

The finished foil, whether of organic derivative of cellulose base or of regenerated cellulose base, may have a final coating thereon produced from a coating composition containing nitrocellulose, tricresyl phosphate, a resin and a wax, in order to impart greater imperviousness to moisture.

As stated, the essential feature of this invention is the imparting of a characteristic appearance to the thin foil by means of substances which are actually within the material of the foil itself, as against being merely on the surface of such foil. Any suitable material of characteristic appearance may be used, and this may be embedded within the foil to give any desired design. Thus dyes and/or pigments, artificial pearl essence or fish scale essence, or any other effect material may be incorporated in the foil in certain places, such as in strips or to produce flowed mottled effects. This may be done by introducing colored dopes at various points into various sections of the hopper from which the dopes are cast on smooth wheels or bands to form the foil.

Various other distinctive foreign materials not soluble in the solvents of the dope may be incorporated in the dope, either before it is cast on to the smooth surface, or after it is cast into the form of foil but before the foil is set. These distinctive foreign materials may be in the form of colored threads, yarns, alphabetic or numerical figures or they may have any desired characteristic design or shape.

By way of example of the use of this invention in connection with the making of thin foil made from a solution of cellulose acetate and plasticizers in acetone by the evaporative method, there may be incorporated in the dope, dyed or undyed threads, fibres, yarns or strands of cotton, flax, silk, wool or regenerated cellulose made by the viscose, cuprammonium or Chardonnet process. If desired these materials may be placed on the surface, such as that of film wheels or bands, upon which the solution of the cellulose acetate is cast; or again these materials may be placed on the wet surface of the cellulose acetate dope

after being deposited on the casting surface and prior to the stripping of such foil from such surface and before completion of the drying. This latter method lends itself particularly to a process wherein colored or uncolored letters, which may correspond to the initials of the manufacturer of the article to be wrapped, numerals or other comparatively large figures cut from sheets of regenerated cellulose foil are used as the identifying characteristics.

When it is desired to make decorative regenerated cellulose foil by the viscose method, the decorative or the distinguishing material may be made of any substance that is not attacked too severely by the alkali and the carbon bisulfite present in the viscose dope, examples of such substance being fine metallic strands, wires or foils.

Other variations of my invention may be made. Thus there may be introduced into the dope containing cellulose acetate from which the foils are made, substances such as salts or other chemical reagents which crystallize in the body of the foil when the solvent has sufficiently evaporated to produce crystalline effects, similar to those obtained by the so-called "crystalline lacquers".

Again a pebbly or wrinkled film or foil can be produced by adjustment of the solvent mixtures or by employing combinations of cellulose derivatives of different solvent characteristics, whereby by the selective or differential evaporation of the solvents, strains and stresses are set up in the foil, with the result that the foil strips off from the casting surface in a uniform pebbly or wrinkled effect. For example a mixture of a

chloroform soluble cellulose acetate and an acetone soluble cellulose acetate is dissolved in a mixture of chloroform and acetone and cast on to a smooth surface. As the solvents evaporate, the different cellulose acetates produce a distorted un-uniform effect.

It will be seen that by my invention there is produced a thin foil of characteristic appearance which would be difficult and expensive to duplicate, and which can be used for wrapping various articles such as tobacco products, foodstuffs, garments, electrical devices and indeed any article at all, not only to protect the same but to identify definitely such articles as being made or sold by a certain manufacturer or merchant.

It is to be understood that the foregoing description is given merely by way of illustration and that many variations may be made therein without departing from the spirit of my invention.

Having described my invention, what I desire to secure by Letters Patent is:

1. In the method of making characteristically marked thin foil from a cellulosic dope, the step of introducing differently colored dopes at various points into various sections of the hopper from which the dope is cast.

2. In the method of making characteristically marked thin foil from a cellulose acetate dope, the step of introducing differently colored dopes at various points into various sections of the hopper from which the dope is cast.

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