

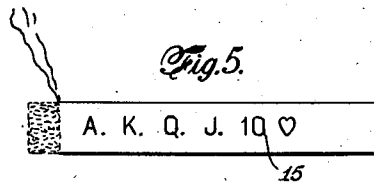
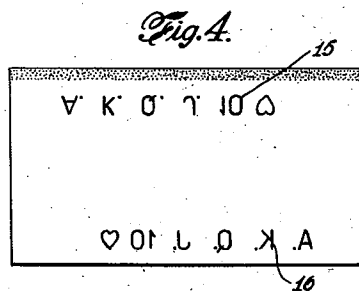
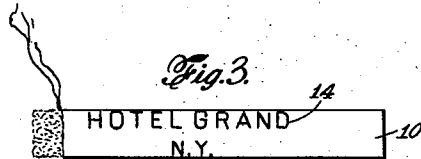
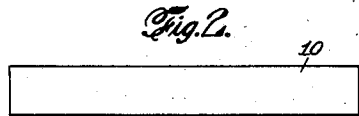
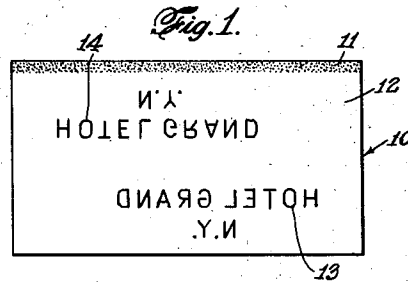
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H. S. VAN DOREN

2,193,439

WRAPPER WITH HEAT-RESPONSIVE MARKING

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INVENTOR.  
HAROLD S. VAN DOREN

BY *Richard S. Roberts*  
ATTORNEY.

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## WRAPPER WITH HEAT-RESPONSIVE MARKING

Harold S. van Doren, Hempstead, N. Y.

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7 Claims. (Cl. 131-15)

The invention relates to a wrapper of porous, opaque material bearing matter which is normally concealed but which may be rendered visible upon the application of heat as when the wrapper is subjected to a suitable temperature. For example, the wrapper may constitute the enclosing medium for a cylinder of tobacco as in the usual paper-wrapped cigarette; or, it may be associated as an indicator with various goods subject to deterioration at more or less elevated temperature.

The invention has for an object to provide a simple and effective composition for association with a wrapper of the aforesaid nature in the manner hereinafter set forth whereby to render visible upon the outer surface of the wrapper any desired design, symbol, legend, or indicia of various sorts upon exposure to a predetermined temperature of the composition as imprinted on said wrapper. For example, in the case of a cigarette, the matter to be rendered visible may be of an advertising nature, or the arrangement may be such that suitable games may be worked out therewith, appropriate symbols, legends, etc., being then substituted for the advertising matter. In the case of its use as a protective wrapper, the indicia displayed may be of a warning nature or indicator.

The invention has for a further object to provide a simple and effective means for securing upon the wrapper the desired matter to be displayed and in any desired variety of color; also, to bring out rapidly and effectively the concealed matter.

Still another object of the invention is to make use of a composition for printing the desired matter which is non-toxic and non-irritating and which has no effect on the odor or flavor, for example, of a cigarette whose wrapper is thus imprinted.

In carrying out the invention, there is printed on or otherwise applied to the undersurface of the wrapper, which is to be of paper or similar more or less porous and more or less opaque material, the desired design in a composition of an oleaginous vehicle of relatively low melting point and an oil-soluble pigment retained therein and of the desired color. The melting point of the vehicle is such that it will liquefy under relatively low temperatures, for example, the temperature of the smoke as drawn through a cigarette, and will, under capillary action, then travel through the wrapper to its outer surface and carry with it the pigment so that the design becomes visible.

The nature of the invention, however, will best be understood when described in connection with the accompanying drawing, in which:

Fig. 1 is a plan view of the undersurface of a wrapper of a cigarette, as one embodiment of the invention, designed for enclosing a cylinder of tobacco, and shows also the imprinted matter on said surface.

Fig. 2 is an elevation of the cigarette made therefrom, while Fig. 3 is a similar view illustrating said cigarette as burning and displaying on the outer surface the normally concealed matter.

Figs. 4 and 5 are views similar to those shown in Figs. 1 and 3, and illustrate a modification.

Referring to the drawing, 10 designates a wrapper of more or less porous and more or less opaque material such as paper and permeable to oleaginous matter, for example and as indicated in the drawing, a paper cigarette wrapper, one of whose edges 11 is gummed. In accordance with the invention, there is printed or otherwise suitably applied upon the undersurface 12 upon which the gummed edge 11 is provided the matter which it is desired to have rendered visible when the wrapper is exposed to the predetermined temperature as when the cigarette is ignited.

This matter may consist of an advertising marking 13 and 14, as indicated in Figs. 1 and 3, or as symbols 15 and 16 and as indicated in Figs. 4 and 5, or both types of markings may be displayed together if desired. Of course, the marking may be for purposes other than those disclosed in the drawing, the invention being concerned with the manner of rendering the markings visible rather than with the particular significance of the markings. Thus, the wrapper may be applied to goods susceptible to damage through overheating by affording an indicator to warn a prospective purchaser of the fact, no legend or other communication appearing until the goods have actually been subjected to such objectionable temperature.

In the particular application of the invention shown, namely: to cigarettes, the application of the legend is effected by printing both the literal and numerical characters preferably in two or more sets which are reversed and inverted so that at least one group will appear in normal reading order from any angle. Thus, as shown in Fig. 1, the two groups 13 and 14 are provided, and a novel composition for this purpose is utilized in the printing of the particular legend. This composition comprises an oleaginous vehicle of relatively low melting or solidifying point,

for example, a wax, a fat, or a mixture of oily, fatty, or waxy substances of either animal, vegetable, or mineral origin and having either a solidifying point or a melting point above the temperature of the human body and preferably in the neighborhood of 45° C. This vehicle, also, should be of non-toxic and non-irritating characteristics having no effect on the odor or flavor of the cigarette either before or during its combustion.

As a suitable material, use may be made of a substance known as spermaceti which is essentially the ester  $C_{16}H_{33}O.CO.C_{15}H_{31}$  and having a solidifying point ranging between 42° C. and 47° C. In addition to the wax spermaceti as a vehicle, a number of oils, fats, and waxes are suitable when mixed in proper proportion. For example, esters of the higher alcohols and fatty acids, as well as more or less complex mixtures of fatty substances, may be utilized. Thus, stearic acid  $C_{17}H_{35}COOH$  melting at 69.3° C. may be mixed with cocoa butter, Theobroma Cacao having a solidifying point varying between 21° C. and 27° C., in the proportions by weight of 4 parts of the former to 1 part of the latter. This mixture has a solidifying point of approximately 53° C.

In place of stearic acid, white beeswax, known as *Apis mellifera*, principally mellissic palmitate,  $C_{30}H_{61}O.CO.C_{15}H_{31}$  when mixed and melted with a calculated amount of cocoa butter, yields a mixture suitable as a vehicle. A composition consisting of 5 parts by weight of stearic acid and 1 part by weight of oleic acid, an unsaturated compound of the formula  $C_{17}H_{33}COOH$  whose melting point is 14° C., provides a mixture whose solidifying point begins at approximately 51° C. and is a satisfactory vehicle for 20% of its weight of oil-soluble nigrosine. As an example of a multiple mixture, 1 part by weight of each of the following substances, viz: paraffin wax, a hydrocarbon of complex nature consisting of the compounds  $C_{22}H_{46}$ ,  $C_{24}H_{50}$ , and  $C_{28}H_{58}$  among others, and whose melting point is approximately 55° C.; cocoa butter white beeswax, and stearic acid provide a suitable vehicle for an oil-soluble pigment within the range of the desired temperature.

There is an infinite number of combinations and mixtures of oils, fats, and waxes possible, but in the main, the principle is to incorporate a given weight of wax, fat, or similar substance at a melting or solidifying point greater than 45° C. with a calculated amount of a wax, fat, or oil of melting point or solidifying point less than 45° C. I do not wish, moreover, to restrict combinations of such substances to merely binary mixtures, but mixtures of three, four, or more substances may be employed. Furthermore, a single oleaginous substance whose melting point is simply in the immediate neighborhood of 45° C. may be most satisfactory.

With this vehicle is to be incorporated an oil-soluble pigment, for example, oil-soluble "nigrosine," or a dyestuff, and in a quantity sufficient to effect distinct legibility when paper is marked with the mixture—approximately 20% by weight of the vehicle. Other pigments are "oil yellow" which is the product obtained by diazotizing aniline and coupling this with dimethyl aniline; also, "oil scarlet" which is the product obtained by diazotizing ortho-amido-azotoluene and coupling this with b-naphthol; and "oil-soluble orange" obtained by diazotizing ortho-toluidine and coupling the same with b-naphthol.

In the incorporation of the dye with the vehicle, the amount of the former is governed according to the intensity of the color desired as well as its solubility in the particular vehicle employed, in the case of dark pigment less dye being generally required than in the case of the lighter colors. In preparing the composition, the wax or like substance may be melted and the pigment in the amount required added thereto with stirring until a homogeneous liquid mixture results, the mass then being allowed to cool when it is ready for application.

The mixture or wax-pigment composition may be applied in any suitable manner to the surface of the paper which is eventually to be the under-surface of the wrapper, for example, it may be printed thereon by type, dies, stencils, or other suitable means; or, the vehicle may first be applied and finely pulverized pigment dusted thereover, the pigment adhering to the wax printings and remaining until it is subsequently dissolved or dispersed therein when combustion or excessive heating occurs, the pigment in the meantime being invisible when the wrapper is wrapped around material or an object.

Thus, in either case when, for example, the cigarette is ignited, the warm air and products of combustion drawn through the paper cylinder or wrapper for the tobacco, being of a temperature above the melting point of the wax, cause the latter to melt or liquefy and to serve as a vehicle to convey under capillary action the pigment to the outer surface of the wrapper. The pigment is in a state more or less of solution or colloidal suspension which penetrates the pores of the paper wrapper, and as said pigment meets with the outer surface of the latter, conforms to the previous imprint on the inner surface.

Contrary to the usual forms of sympathetic inks and oxidation processes, the present invention comprises purely a series of physical phenomena beginning with the change of state of the wax from a solid to a semi-solid or liquid as the temperature is elevated, the passage of the liquid through the pores of the paper wrapper due to capillary action, and the transportation of the pigment in dispersion or solution in the vehicle. None of the substances employed is toxic or irritating nor are strange or disagreeable odors or flavors imparted to the tobacco either before or during its combustion, while the products of combustion of the substances are principally carbon dioxide and water vapor. The materials, moreover, are inexpensive and readily obtainable and applied, and the pigments may be had in a wide variety of colors either as individuals or by mixing pigments, which is not the case in the use of sympathetic inks or substances which undergo chemical changes or oxidation on heating.

I claim:

1. A porous, opaque wrapper for the purpose set forth and having normally concealed matter applied to its undersurface, and comprising an oleaginous vehicle of relatively low melting point and a retained pigment, whereby when the melting point of said vehicle is exceeded the latter will transport the pigment to the exposed surface of the wrapper to render the applied matter visible.

2. A porous, opaque wrapper for the purpose set forth and having normally concealed matter applied to its undersurface, and comprising a wax of relatively low melting point and a retained oil-soluble pigment, whereby when the

melting point of said wax is exceeded the latter will transport the pigment to the exposed surface of the wrapper to render the applied matter visible.

3. A porous, opaque wrapper for the purpose set forth and having normally concealed matter applied to its undersurface, and comprising a wax of a melting point of approximately 45° C. and about 20% by weight of a retained oil-soluble pigment, whereby when the melting point of said wax is exceeded the latter will transport the pigment to the exposed surface of the wrapper to render the applied matter visible.

4. A porous, opaque wrapper for the purpose set forth and having normally concealed matter applied to its undersurface, and comprising spermaceti and a retained pigment, whereby when the melting point of said spermaceti is exceeded the latter will transport the pigment to the exposed surface of the wrapper to render the applied matter visible.

5. A porous, opaque wrapper for the purpose set forth and having normally concealed matter applied to its undersurface, and comprising spermaceti and a retained oil-soluble pigment, where-

by when the melting point of said spermaceti is exceeded the latter will transport the pigment to the exposed surface of the wrapper to render the applied matter visible.

6. A porous, opaque wrapper for the purpose set forth and having normally concealed matter applied to its undersurface, and comprising spermaceti and retained nigrosine, whereby when the melting point of said spermaceti is exceeded the latter will transport the pigment to the exposed surface of the wrapper to render the applied matter visible.

7. A paper-wrapped cigarette having matter normally invisible on the exposed surface of the wrapper and applied on its undersurface in reverse and inverted order, said wrapper being constituted of opaque and porous material and the matter comprising an oleaginous vehicle of relatively low melting point and a retained pigment, whereby when the cigarette is ignited the vehicle will melt and transport the pigment to the exposed surface of the paper wrapper to render the applied matter visible on the said exposed surface of the wrapper and directly readable.

HAROLD S. VAN DOREN.