

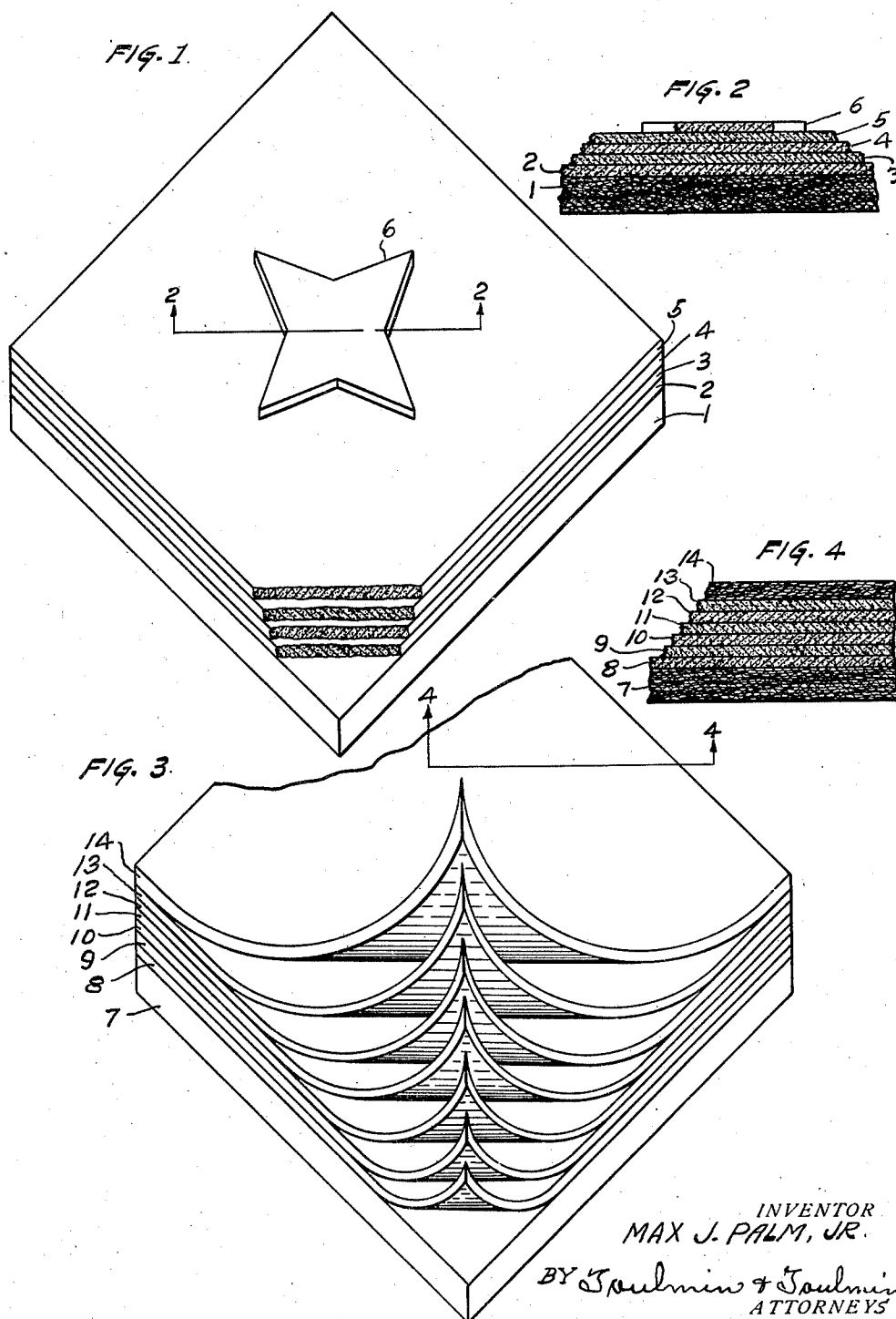
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CONVERTIBLE COLOR TRANSFER

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CONVERTIBLE COLOR TRANSFER

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This invention relates to decalcomanias and, in particular, to the use of materials in the decalcomanias which can be utilized, upon the application of a suitable temperature or moisture condition, to indicate whether the decalcomania is a genuine one or not.

It is the object of this invention to provide a stamp, label, wrapper or other form in a decalcomania or in any similar device which, when heat or moisture is applied, the device will change color and thereby indicate that it is of genuine manufacture. In the field of stamps and labels for Government tax purposes, it is difficult to detect counterfeits. The purpose of the use of a thermal color or a color which is changed upon the application of moisture permits of such an identification by the change of color upon such application.

It is a further object to provide a stamp, such as a stamp or label for cigarette packages and the like, in which the application of such heat as from a lighted cigarette, when brought close to the stamp or label will cause it to change color, as from yellow to red, or from red to brown, or any other color combination depending upon the chemicals employed.

This invention is broadly for incorporating a material in the glue, paper or printing of a stamp, label, or the like, so that, upon the application of the testing material, temperature or moisture, the article in question will change color to identify it as genuine.

Referring to the drawing:

Figure 1 is a perspective of a slide-off decalcomania, partially broken away, embodying the invention described herein;

Figure 2 is a section on the line 2—2 of Figure 1;

Figure 3 is a view similar to Figure 1 of a regular decalcomania turned back to show the arrangement of the layers; it will be understood that this view is greatly exaggerated and that no attempt to duplicate the exact thicknesses or relative proportions of the several layers has been made;

Figure 4 is a section on the line 4—4 of Figure 3.

Referring to the drawing in detail, and in particular to Figures 1 and 2 showing a slide-off decalcomania, 1 represents the paper base, 2 the soluble glue, 3 the white coats, 4 the color coats, 5 the varnish coat, and 6 the coat which changes upon the application of some predetermined external condition, such as heat. This coat 6 may be interposed at any place and between any

layers but, for the purpose of illustration, it has been shown on top of the face of the decalcomania. According to the usual practice, the layers 3, 4, 5 and 6, upon the bringing of the layer 2 into the solution, are slid off as a body on to some supporting surface, such as a cigarette package, bottle and the like.

Referring to Figures 3 and 4, particularly where there is shown the regular type decalcomania that is applied to the surface by varnish and then the paper backing is removed after being moistened, 7 indicates a surface to which the decalcomania is to be applied. This may be a paper container, such as a cigarette package cover. The next layer to the support 7 is the varnish layer 8. The decalcomania proper consists of the leaf or bronze or color layer 9, then the layer of white ink, or leaf or bronze 10 on which is printed the color layer 11 and on top of this is the layer 12 which changes color under heat, moisture and the like. On this is the glue layer that is solvent in water and which supports the paper cover. This glue layer is designated 13 and the paper cover 14.

In making the decalcomania transfer of the regular type, the so-called change color or thermal color can be printed in a design or complete layer and can be printed at any place between any of the layers constituting the decalcomania. The material should be susceptible of being printed as an ordinary printing coat like the ink coats are printed to form the decalcomania. It is, therefore, very thin but it is readily susceptible according to its chemical composition to heat or moisture, or it may be susceptible to some chemical test as by the application of sodium silicate.

As typical examples of the material to be used, without confining myself to particular materials, I have found that the following examples are satisfactory:

EXAMPLE 1

Silver mercuric iodide

I provide a mixture of mercury, silver and iodine with suitable re-agents in order to produce the double iodides of mercury and silver, giving a yellow color that turns to red upon the application of heat, such as the heat from a lighted cigarette, and will return to yellow upon cooling.

This compound is best prepared by precipitating from a solution of potassium mercuric iodide with silver nitrate. It is a yellow insoluble compound which changes to an orange-red color on gently heating and returns to its original color on cooling.

By using approximately the theoretical quantities of each chemical required the best yield is obtained. For example, 80 grams of mercuric chloride are dissolved in a suitable quantity of water, say one liter, and to this are added slowly, with stirring, 200 grams of potassium iodide dissolved in another liter of water. At first a bright red precipitate is formed which should be completely re-dissolved when all of the potassium iodide has been added. In a third liter of water are dissolved 100 grams of silver nitrate and this solution is added slowly and with stirring to the above solution. The yellow precipitate formed is silver mercuric iodide which is filtered off and washed with water thoroughly before drying.

EXAMPLE 2

Copper mercuric iodide

I provide a mixture of mercury, copper and iodine with suitable reagents to produce the double iodides of mercury and copper. When cooled this gives a red color that, upon being subjected to heat, turns to black-brown, and upon cooling, returns to red.

This is prepared in a similar manner to the silver mercuric iodide excepting copper sulphate is used in place of the silver nitrate.

To prepare it 110 grams of mercuric chloride are dissolved in one liter of water and to this are added 270 grams of potassium iodide dissolved in another liter of water. The red precipitate formed at first should be completely dissolved when all of the potassium iodide has been added. To this solution is added a solution of 100 grams of copper sulphate in one liter of water. The red precipitate formed is copper mercuric iodide. This should be filtered off and washed first with a dilute solution of sodium thiosulphate until all traces of iodine are removed and then washed with water. The precipitate when dried is ready for use.

Copper mercuric iodide is a bright red compound changing to a deep chocolate brown color on heating, and returning to its original color on cooling.

EXAMPLE 3

Mercuric iodide

A typical change of color that remains changed when heated is a mercuric iodide which becomes yellow when heated but does not return to its original color upon cooling. This material can be incorporated in the ink.

Mercuric iodide is prepared by precipitating from a solution of mercuric chloride with potassium iodide. It is a bright red compound changing to a lemon yellow on heating. Unlike the above compounds it does not readily return to its original color on cooling. However, if it is rubbed the red color is restored instantly.

To prepare it 100 grams of mercuric chloride dissolved in about one liter of water, and to this added a solution of 122 grams of potassium iodide also in one liter of water. The red precipitate is filtered off and washed thoroughly with water and then dried.

EXAMPLE 4

If desired, there can be incorporated in the printing ink the intermediates used for producing the resulting dye stuff, which when brought together in a suitable medium, form a dye. For instance, betanaphthol is placed in the ink and if it is tested with paranitraniline a red dye will be produced, which gives para red. No heat is necessary for this change.

EXAMPLE 5

Dry phenolphthalein and dry sodium carbonate can be placed in the ink and upon moisture being added a red color results from the reaction of the water on the phenolphthalein and the sodium carbonate. If desired, one of these elements can be mixed in the ink and then the printing treated with a solution of the other, in the presence of moisture, to get the same result.

EXAMPLE 6

There can be incorporated in the decalcomania litmus color or paper which will change color upon the application of moisture. For instance, calcium oxide when moistened turns pink litmus paper blue.

EXAMPLE 7

Cobalt chloride can be employed in the decalcomania and, upon the application of sodium silicate, it will change any color.

EXAMPLE 8

Calcium oxide when moistened will turn pink litmus paper blue; ferric ammonium sulphate solution when treated with sodium silicate turns red to brown. Manganese sulphate solution when treated with sodium silicate turns pink. Sodium carbonate when treated with water and nickel ammonium sulphate solution will turn a light green.

In preparing these compounds all equipment must be made of glass, porcelain, nickel, Monel metal, stainless steel, or chromium plated to prevent discoloration and decomposition of the compounds.

In the preparation of the copper mercuric iodide free iodine is produced as a by-product of the reaction. This is due to the reduction of the cupric salt to the cuprous state. It is possible that this may be avoided by reducing the cupric salt with some reducing agent before reacting with the iodide and thus increasing the yield of the color.

If these compounds are to be ground with oils or varnish it is possible that special vehicles will be required to prevent discoloration of the color. Also, some substitute may be required for the usual metallic driers as these may likewise cause discoloration. Vehicles of the synthetic lacquer type will prove satisfactory.

It will be understood that it is desired to comprehend within this invention such modifications as may be necessary to adapt it to varying conditions and uses.

By the use of the words "suitable reagent" in the following claims I intend to comprehend the application of heat, moisture or a suitable chemical to bring about the desired color change.

Having thus fully described this invention, what is claimed as new and is desired to secure by Letters Patent, is:

1. A new article of manufacture for use as a decalcomania comprising layers of printing ink to form the decalcomania, and an area of a thermal color which will change its color upon the application of heat.

2. A new article of manufacture for use as a decalcomania comprising a decalcomania body consisting of layers of printing ink, and a printed area of a thermal color that will change its color temporarily upon the application of heat.

3. A new article of manufacture for use as a decalcomania comprising a decalcomania body consisting of layers of printing ink, and a print-

ed area of a thermal color that will change its color temporarily upon the application of moisture.

4. A new article of manufacture for use as a decalcomania comprising a decalcomania body consisting of layers of printing ink, and a printed area of a thermal color that will change its color temporarily upon the application of a suitable reagent.
5. A new article of manufacture for use as a decalcomania comprising a printed decalcomania having printed therewith a temporarily changing thermal color, such as a mixture of mercury, silver and iodine constituting a mixture of the double iodides of mercury and silver.
6. A new article of manufacture for use as a decalcomania comprising a printed decalcomania having printed therewith a temporarily changing thermal color, such as a mixture of mercury, silver and iodine constituting a mixture of the double iodides of mercury and silver but with such reagents as will produce such change in color.
7. A new article of manufacture for use as a

decalcomania comprising a printed decalcomania having printed therewith a temporarily changing thermal color, such as a mixture of mercury, copper and iodine constituting a mixture of the double iodides of mercury and copper.

8. A new article of manufacture for use as a decalcomania label comprising a printed decalcomania having printed therewith a thermal color that, upon the application of heat, changes from yellow to red and, upon cooling, returns to yellow.

9. A new article of manufacture for use as a decalcomania comprising a decalcomania printed from ink, and a thermal color printed therewith adapted, upon the application of heat, to change permanently its color.

10. A new article of manufacture for use as a decalcomania comprising a decalcomania printed from ink, and a thermal color printed therewith adapted, upon the application of heat, to change permanently its color, such as from red to brown.

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