Sept. 26, 1961 H. T. HOLSAPPLE 3,001,311

FLUORESCENT ARTICLE FOR USE IN THE GRAPHIC ARTS AND METHOD OF MAKING SAME

Filed Aug. 27, 1957

FIG_1

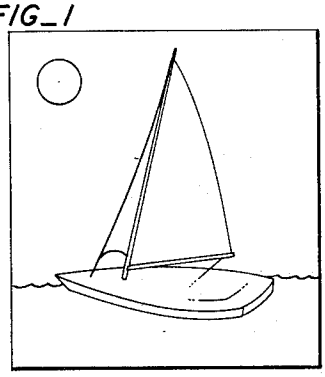


FIG_2

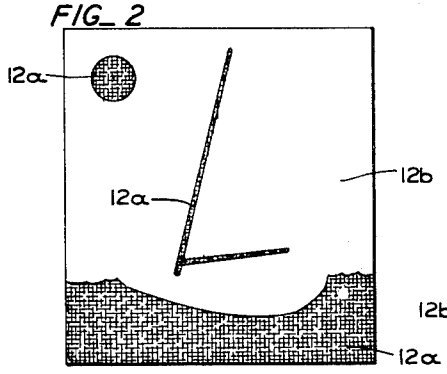



FIG_3

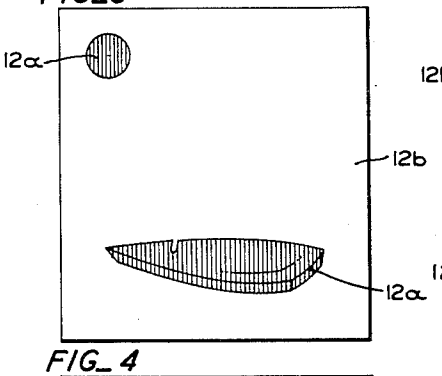



FIG_4

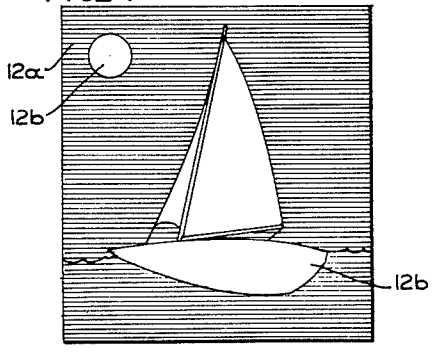



FIG_5

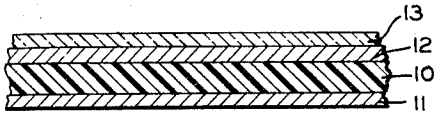



FIG_6

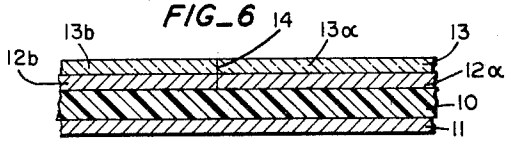



FIG_7

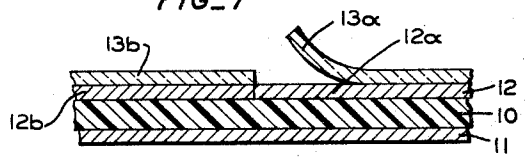



FIG_8

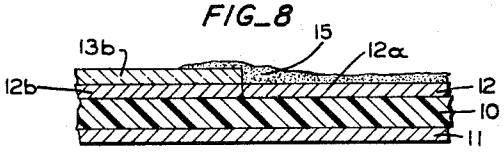



FIG_9

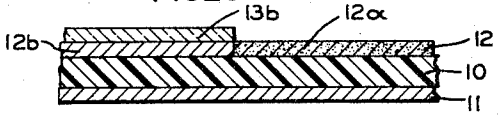
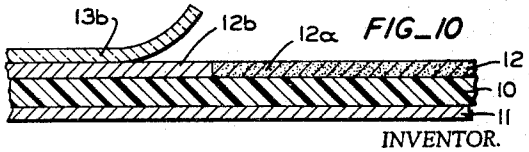



FIG_10




INVENTOR.

HARVEY T. HOLSAPPLE

BY Carl Hoppe

ATTORNEY

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3,001,311

# FLUORESCENT ARTICLE FOR USE IN THE GRAPHIC ARTS AND METHOD OF MAKING SAME

Harvey T. Holsapple, Minneapolis, Minn., assignor to Kemart Corporation, San Francisco, Calif., a corporation of California

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5 Claims. (Cl. 41—26)

This invention relates to improvements in the graphic arts, and more particularly to improvements in the art of preparing pre-separated color copy and to artist's materials useful in such art.

It is an object of this invention to provide simple means and easily used materials for adapting ordinary black and white copy to pre-separated color copy preparatory to making color separations.

It is a further object of this invention to provide pre-separated color copy which results in color separations having an unusual clarity of tone.

It is an additional object of this invention to provide improved means simplifying the work of the artist in making pre-separated color copy.

It is another object of this invention to provide color copy which the photoengraver can use more easily and more rapidly than he can use the known best prior art.

It is still another object of this invention to provide pre-separated color copy giving the artist a faithful visual impression of the final reproduction to be made from the color separations while he is preparing the copy and giving the observer of the completed color copy the same faithful visual impression.

The foregoing and other objects of applicant's invention will become clear upon an understanding of the following written description considered in connection with the appended claims.

Before discussing the instant disclosures, an understanding of pre-separated art techniques should be helpful in understanding the present status of the art and the problems inherent in existing techniques and materials.

A typical exemplification of the prior art is the so-called Bourges Color Copy, described in "Color by Overprinting," written by Donald E. Cooke, and published by The John C. Winston Company, copyright 1955; and as described in an article entitled "Pre-separated Art Techniques" by Herbert T. Paschel, and published in Modern Lithography for September, 1956, page 49. So far as applicant knows, this procedure represents the furthest prior advance in the pre-separated color art.

Under the prior art Bourges process, a black and white drawing, in line or tone, is made using conventional art techniques. This drawing is otherwise known as the "key" drawing. With the key drawing as a guide, the artist prepares a set of three overlay sheets, one in each of the process colors, yellow, red and blue. These overlay sheets are plastic sheets containing a layer of uniform ink color in tint in strengths from 10% to 100%. The artist removes the color layer from undesired spots by means of a stylus or liquid. Each of these overlay sheets is hinged to the drawing so that each or all can be superimposed over the drawing. The artist then proceeds to remove color from each overlay, one at a time, in all areas where that particular color is not needed.

The disadvantage of this procedure is that the artist must select the general color value which he desires from one of a plurality of different tint strength sheets and then must remove the undesired color. This means that the artist must have a large inventory of plastic



sheets and that, at least for the darker tones, the artist works blindly. In addition, the artist must add additional color with matching pencils and liquids in the event he desires to strengthen color over the starting sheet.

Another disadvantage is that a proper exposure of the colored portions of each finished overlay sheet does not result in a completed dot elimination in the non-colored portions of the overlay sheet. This results in halftone dots of the color in question to a slight degree in unwanted portions of the final reproduction, thereby distorting the true color values, unless special treatment or highlight masks are provided.

It will appear from a description of the within procedures that the applicant has developed a procedure and materials which enable the artist to use a minimum inventory of artist's supplies and to produce overlay sheets in complete view of the key drawing and which enable the photoengraver to produce faithfully color separations without the need for special treatment or highlight masks.

In the drawings:

FIG. 1 is a plan view of a black and white key drawing used in the preparation of the pre-separated color copy of this invention;

FIG. 2 is a plan view of a yellow color overlay made in accordance with this invention;

FIG. 3 is a plan view of a red color overlay made in accordance with this invention;

FIG. 4 is a plan view of a blue color overlay made in accordance with this invention;

FIG. 5 is a sectional view of the plastic sheeting used in accordance with this invention; and

FIGS. 6, 7, 8, 9 and 10 are sectional views of the plastic sheeting, as showing in FIG. 5, but showing the several steps in making the color separation overlays of this invention.

In the practice of this invention a black and white drawing, either in tone or in line, is made using conventional art techniques. As illustrated in FIG. 1, the illustrative black and white drawing comprises a line drawing of a sailboat upon a seascape. For the illustrative example, this drawing is made in accordance with the teachings of the Burtt L. Berry Patent 2,395,986, issued March 5, 1946, for Half-tone Drop-out Process. In the example, it is desired to have finished color copy in which the sky is blue, the sun is orange, the sea is green, the hull of the boat is red, the sails are white, and the mast and boom are yellow.

In order to accomplish this result, the color overlay sheet of FIG. 2 is affixed to one margin of the drawing of FIG. 1; the color overlay of FIG. 3 is affixed to a second margin of the drawing of FIG. 1; and the color overlay of FIG. 4 is affixed to a third margin of FIG. 1.

Color overlay sheet 2 is provided with yellow coloring as indicated in cross-hatching; the color overlay of FIG. 3 is provided with red coloring as shown in the cross-hatching; and the color overlay of FIG. 4 is provided with blue coloring as shown by the cross-hatching, all in accord with specific procedures set forth later in this application.

In general, the foregoing disclosure constitutes a part of the prior art and is used in prior art procedures, such as for examule the Bourges process referred to above. This invention refers to improved artist's materials and improved process steps for creating the color overlay sheets of FIGS. 2, 3 and 4.

In the applicant's procedure the color overlay sheets are made from transparent colored plastic sheeting shown in cross section in FIG. 5. This sheeting comprises a transparent colorless plastic film 10, a substantially colorless fluorescent layer 11 adhered to one surface of the

film **10**, a second substantially colorless fluorescent layer **12** adhered to the other surface of film **10**, and a transparent colored layer **13** strippably adhered to the layer **12**. The fluorescent layers **11** and **12** are adhesively adhered to the transparent plastic base sheet **10**, and the transparent colored layer **13** is adhesively adhered to the fluorescent layer **12**.

The layers **11** and **12** have the power of absorbing dyestuffs in solution, as appears later in this specification.

The coefficient of adhesion between the transparent fluorescent layer **12** and the transparent plastic film **10** is greater than the coefficient of adhesion between the transparent colored layer **13** and the fluorescent layer **12**, so that the transparent colored layer **13** may be stripped from the fluorescent layer **12**, without offsetting the fluorescent layer **12** from the transparent plastic film **10**.

In actual practice, applicant uses commercially obtainable transparent cellulose acetate sheeting coated on both sides with a gelatin film, such as for example the gelatin film obtainable from General Aniline and Film Company under its trade-mark "Ansco" and under its trade designation "Graphic Base Film."

This film is dipped into a substantially colorless ultraviolet-activatable fluorescent solution. By way of illustration, a suitable solution is made with 1 gallon of water; in which 38 grams of a colorless blancophor fluorescent dyesuff, as for example General Dyestuff's Blancophor HS76, is dissolved; to which 25 cubic centimeters of butyl alcohol is added as a wetting agent. The gelatin coating on the film absorbs the fluorescent solution, thereby providing a sandwich structure comprising the transparent plastic film **10**, the lower substantially colorless fluorescent layer **11** and the upper substantially colorless fluorescent layer **12**.

To complete the sandwich structure illustrated in FIG. 5, the transparent color layer **13** is applied over the upper fluorescent layer **12**. By way of illustration, the applicant uses a commercially available frisket lacquer tinted with a bright green dye. One commercially available frisket lacquer is that produced by the Glidden Paint Company under its trade designation "Strip Coat Lacquer." Generically, this product is known to the art as a lacquer made by dissolving a vinyl resin in methyl iso butyl ketone. It is colored in the specific example here given with an oil soluble green dyestuff.

The resulting structure is sufficiently transparent so that several sheets of the material may be superimposed over the drawing of FIG. 1 and still render the black and white portions of the drawing clearly perceptible to the artist. The gelatin layers **11** and **12** have the power to absorb dyestuffs in solution. The frisket lacquer is waterproof and has a lesser adhesion for the gelatin layer **12** than the gelatin layer **12** has for the cellulose acetate sheeting **10**, thereby enabling the artist, in a way to be disclosed later in this application, to strip the frisket lacquer from the sandwich structure without offsetting the gelatin layer.

The foregoing basic sheeting is used for each of the color overlays and the various colors and shadings are obtainable, not by the use of different colored transparent sheetings, but by the application of colored dyestuffs to the gelatin layer **12** of the sandwich structure in the manner later described in this specification.

The several liquid colors, yellow, red and blue, each comprises a transparent, substantially non-fluorescent, fluorescence-quenching, ultraviolet-absorbing colored dyestuff which is soluble in the gelatin layer and which has a color equivalent in shade and brightness to the color of the printing inks which are to be used to reproduce the finished copy. The vehicle for the liquid colors, moreover, should be incapable of dissolving the frisket layer **13**.

By way of example, applicant assumes that the final reproduction is to be printed with the standard process printing inks commonly used in the graphic arts industry.



In this case the formulae for the several colored materials are set forth below:

| | | |
|---|---|---|
| Yellow: | | |
| Napthol Yellow | gm | 10 |
| Water | oz | 8 |
| Nickel Chloride Solution | oz | 8 |
| Glycerine | oz | 2 |
| Red: | | |
| Phloxine RB | gm | 10 |
| Napthol Yellow | gm | ½ |
| Water | oz | 8 |
| Nickel Chloride Solution | oz | 8 |
| Glycerine | oz | 2 |
| Blue: | | |
| Neptune Blue BRA | gm | 10 |
| Water | oz | 8 |
| Nickel Chloride Solution | oz | 8 |
| Glycerine | oz | 2 |

The several dyestuffs, Napthol Yellow, Phloxine RB Red and Neptune Blue BRA are commercially obtainable dyestuffs, and applicant has purchased them under said designations from General Dyestuffs Corporation.

The nickel chloride solution referred to in the foregoing formulae is made by taking 100 grams of nickel chloride and adding enough water to make one gallon of solution.

The several colored solutions set forth above are applied to the sandwich structure of FIG. 5 in the manner disclosed in FIGS. 6 to 10, both inclusive.

First, the artist views the drawing and determines each section or portion of the drawing which is to have the particular color in question upon completion of the overlay sheet. With a sharp knife, the artist makes a cut **14** through the colored layer **13** and in vertical alignment with and outlining the margins of the area to be colored. The cut will ordinarily also go through the fluorescent layer **12**, but this is neither necessary nor harmful. Viewing FIG. 6, a marginal portion of the fluorescent layer **12** which is to be colored is designated **12*a***, and a marginal portion of the fluorescent layer **12** which is to remain uncolored is designated **12*b***. The marginal portions of the transparent colored layer **13** overlaying portions **12*a*** and **12*b*** of the fluorescent layer **12** are similarly lettered **13*a*** and **13*b***.

Next, the operator strips from each portion **12*a*** of the fluorescent layer the related overlay portion **13*a*** of the transparent colored frisket layer, as appears in FIG. 7. This procedure gives the artist access to the fluorescent layer overlying the desired portion of the key drawing and protects the balance of the fluorescent layer from being altered during the subsequent steps of the process.

Next, the artist with the use of an ordinary paint brush fully loaded with the desired liquid color flows the desired liquid color **15**, as shown in FIG. 8, onto the colored overlay sheet with a liberal wash. Because of the frisket layer, the artist need not exercise critical care in this operation.

The artist waits about a minute, during which the liquid dyestuff will go into solid solution into the portion **12*a*** of the transparent fluorescent layer (see FIG. 9). He then wipes the excess liquid color from the overlay sheet with a slightly damp sponge. In so doing, the dyestuff colors the transparent layer the desired color and also quenches or destroys the fluorescence of the area in question. In addition, the dyestuff absorbs ultraviolet which might otherwise excite fluorescence of the corresponding portion of underlying fluorescent layer **11**.

The final step in the preparation of the colored overlay sheeting consists in removing the balance of the transparent colored layer **13*b*** (see FIG. 10).

The colored overlay sheet thus made is shown in FIG. 2. It comprises a portion **12*a*** of the fluorescent layer **12** colored with the yellow dyestuff. This portion has a clear transparent yellow color and is substantially non-

fluorescent. The balance of the drawing in FIG. 2 comprises a colorless fluorescent portion 12*b*.

The same procedures are followed in producing the red and the blue overlay sheets illustrated in FIGS. 3 and 4, where similar reference numerals are used to indicate similar areas of the drawing.

After the foregoing copy has been made, color separations are produced, one a black and white separation in accordance with FIG. 1, and one for each of the colors, as in FIGS. 2, 3 and 4. In making the separation of FIG. 1, all of the color overlay sheets are laid back; and in exposing the color overlays of FIGS. 2, 3 and 4, only one color overlay sheet is used at a time with a piece of white paper behind it.

For complete drop-out of the non-colored areas and for complete drop-out of non-desired colors, it is recommended that two exposures be made for each separation, one a normal white light exposure with the halftone screen in place, and the other an exposure under ultraviolet illumination with the halftone screen removed or displaced. These procedures are not described here in detail, since they are well known to the art, being described for example in the Burtt L. Berry Patent 2,395,985, patented March 5, 1946, for Half-tone Highlight Process, and the Burtt L. Berry Patent 2,395,986, patented March 5, 1946, for Half-tone Drop-out Process.

In making the halftone color separations, it is unnecessary to use filters for color separation between the copy and the film. This is true because each of the color overlays is photographically effective with respect to the desired colors only. If orthochromatic film is used, a filter changing the color to black is necessary. For the red separation a light green filter is used; for the yellow separation a rose filter is used; and for the blue separation a yellow filter is used.

The foregoing procedure describes the operation of this method with uniform color shading, the materials described above having further utility in that lighter shadings of the color tone and variations in the color tone are obtainable without a large inventory of various artist's materials. The characteristics of the materials described are such that the colors may be diluted to any desired degree by the use of a simple thinner. The thinner to be used quenches fluorescence in the top layer **12** and absorbs ultraviolet which would otherwise be transmitted to the bottom layer **11** so that the fluorescence of both gelatin layers will be prevented, regardless of how thin the colored solution is made. A suitable solution is made by dissolving 80 grams of copper sulphate in 1 gallon of distilled water and adding 2 ounces of a 14° Baumé gum arabic solution. This solution is thoroughly mixed and filtered. 16 oz. of this base solution is then mixed with 2 oz. of glycerine. The resulting fluid is bottled and is used for thinning the respective colors set forth above.

The foregoing artist's materials and procedures offer the artist and platemaker benefits and advantages heretofore unobtainable in pre-separated color methods. They make it unnecessary for the artist to scrape away pre-applied colors. They reduce the expensive and confusing inventories. They enable the artist to develop his artwork on separate color overlays, one superimposed over another and to see the finished artwork in its true colors just as the printer or lithographer will reproduce them. They eliminate that color degradation present in even the best of the prior art. It has been found in actual practice that the time for making color separations is but a fraction of the best of the prior art and that the quality of the finished product surpasses the best of the prior art that has come to the applicant's attention.

It will become apparent to those skilled in the art that numerous advantages in addition to those specifically pointed out in the foregoing description are inherent in the artist's materials and in the procedures disclosed above.

For example, if the artist makes a mistake and colors a portion of the gelatin film which should have been uncovered, he need only take a scraper, scrape off the colored gelatin, and the fluorescence from the bottom layer will become photographically effective. In addition, in the event that the artist accidentally removes too much of the frisket lacquer, liquid frisket lacquer can be applied to repair the damage.

The color overlay sheets and the liquid colors of this invention and the procedures herein described may also be used in connection with an ordinary black and white photograph as the key copy. In this instance, the color overlay sheets are made in the manner described above. The black and white separation is made of the photograph itself in the usual halftone method. The color separations are made by placing a sheet of white paper underneath each color overlay sheet and taking a white light halftone exposure. With the white sheet still in place, a supplementary exposure is made with ultraviolet. The finished separations do not have the usual fault of the dark tones of the key drawing repeating themselves in each color separation.

Some of the advantages of this invention may be obtained even if the gelatin layers **11** and **12** are non-fluorescent. In this case, a plain fluorescent sheet, such as that disclosed in the Burtt L. Berry Patent 2,395,986, patented March 5, 1946, for Half-tone Drop-out Process, is placed behind the finished color overlay sheet and two exposures are made, as disclosed in the aforesaid Berry patent, for each color separation. Some of the results of this invention may also be obtained if a piece of ordinary reflective white paper is placed behind such a color overlay sheet and two exposures with ultraviolet light only are made in the manner disclosed in Walter S. Marx, Jr. Patent 2,191,939, issued on February 27, 1940, for Photoengraving.

Having thus described a selected embodiment of my invention, it will become apparent to those skilled in the art that other modifications may be practiced and that equivalent materials may be substituted for those described above, so long as the practitioner remains within the boundaries of the invention as defined within the appended claims. With this understanding, the invention is claimed as follows.

I claim:

1. An article of manufacture comprising a transparent, colorless, plastic film; a normally colorless, normally fluorescent, layer excitable in response to ultraviolet and overlying at least one surface of said plastic film; and a transparent, colored, ultraviolet-absorbing, fluorescence-quenching material disposed in preselected portions only of said fluorescent layer.

2. An article of manufacture comprising a transparent, colorless, plastic film; a normally colorless gelatinous layer overlying at least one surface of said plastic film; a normally colorless, normally fluorescent dyestuff excitable in response to ultraviolet in said gelatinous layer; and a transparent, colored, ultraviolet-absorbing, fluorescence-quenching material disposed in preselected portions only of said gelatinous layer.

3. An article of manufacture comprising a transparent, colorless, cellulose acetate film; a normally colorless, gelatinous layer overlying at least one surface of said acetate film; a substantially colorless, normally fluorescent dyestuff excitable in response to ultraviolet in said gelatinous layer; and a transparent, colored ultraviolet-absorbing, fluorescence-quenching material disposed in preselected portions only of said gelatinous layer.

4. The method of making pre-separated color copy from a colorless, transparent, plastic film having a normally colorless, transparent, dye dissolvent, fluorescent layer excitable in response to ultraviolet and adhered to at least one surface of said film and provided with a transparent, colored, strippable layer which comprises making a cut around the margin of a preselected portion

of said strippable layer; removing the portion of said strippable layer within said margin; dyeing said fluorescent layer with a transparent, non-fluorescent, fluorescence-quenching, ultraviolet-absorbing, colored dyestuff; waiting until said dyestuff has gone into solution in said fluorescent material; wiping off any excess dyestuff; and removing the balance of said strippable layer.

5. The method of making pre-separated color copy from a colorless, transparent, plastic film having a normally colorless, transparent, dye dissolvent, fluorescent layer excitable in response to ultraviolet and adhered to at least one surface of said film, which comprises dyeing preselected portions of said fluorescent layer with a transparent, non-fluorescent, fluorescence-quenching, ultraviolet-absorbing, colored dyestuff.

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