

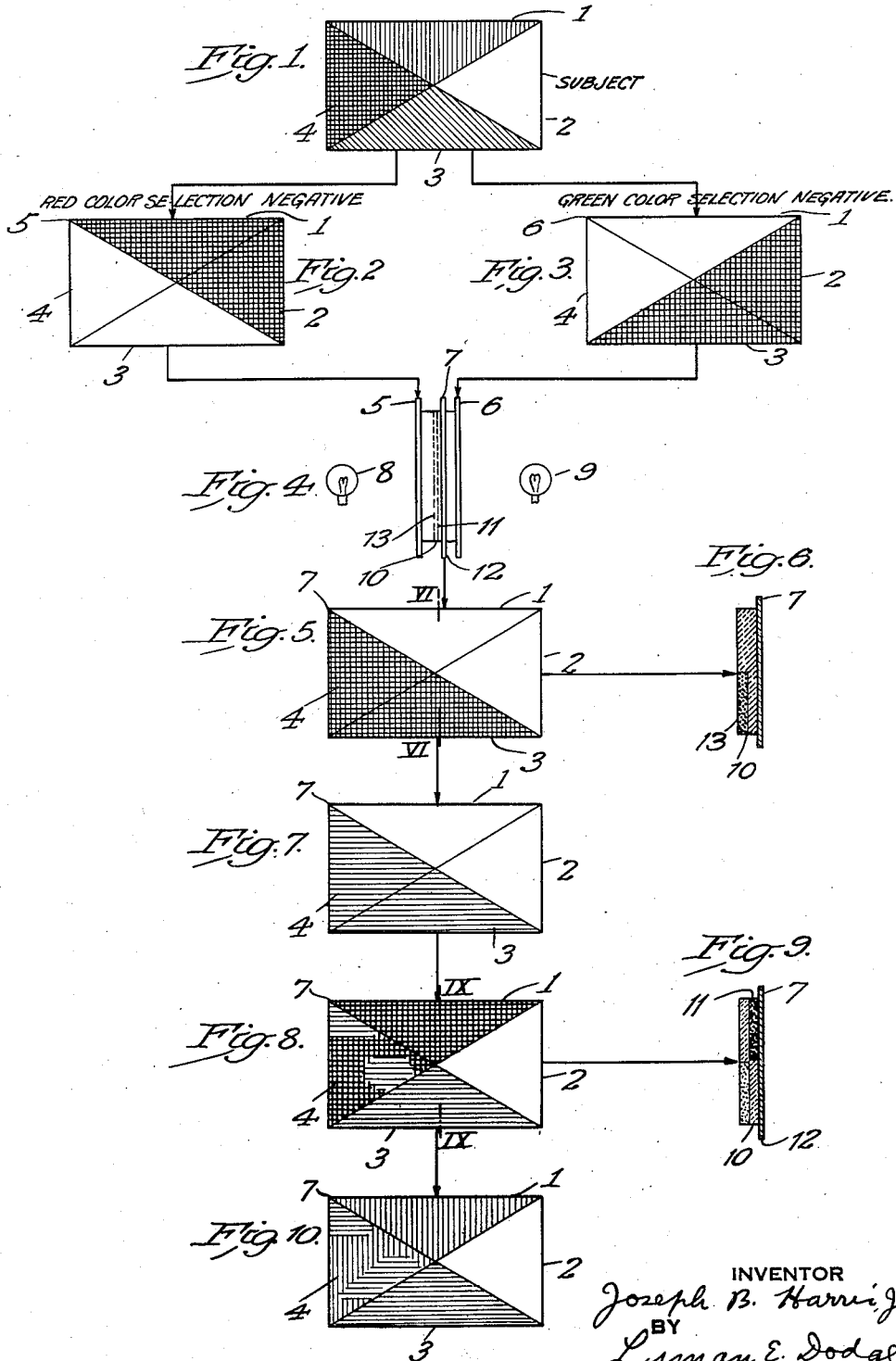
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COLOR PHOTOGRAPHY

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## COLOR PHOTOGRAPHY

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This invention relates to color photography and particularly has reference to the production of a plurality of colored registered images.

Quite a few processes have been proposed for forming a color-photograph, that is, a photograph which exhibits an image of a subject colored corresponding to the coloring of the subject. This photograph has usually comprised two registered super-imposed images in the same picture space, one of one color and the other of a substantially complementary color. These images have been secured, usually, by printing, developing, and toning one image and then printing, developing, and toning the other images.

A principal object of applicant's invention is to provide a process whereby at least two substantially complementary colored super-imposed images, in the same space, may be obtained by a method which provides for the formation of the necessary latent images in the positive emulsion before any other treatment thereof.

In describing the invention in detail and the particular physical product, resulting from the application of the process, selected to illustrate the invention reference is had to the accompanying drawings wherein has been illustrated a particular physical product resulting from the practice and application of the invention and wherein like characters of reference designate corresponding parts throughout the several views, and in which:

Figure 1 is a schematic representation of a subject; Fig. 2 is a schematic representation of a red color selection negative representative of the reds of the subject, Fig. 1; Fig. 3 is a green color selection negative representation of the greens in the subject, Fig. 1; Fig. 4 is a schematic illustration showing the position of the positive print stock and the negatives during the printing; Fig. 5 is a schematic representation of the print after the development of one of the images there-

of; Fig. 6 is a cross-sectional view, of the line VI—VI of Fig. 5, illustrating the position in the emulsion of the first developed image; Fig. 7, is a schematic view illustrating the print, Fig. 5, after being toned; Fig. 8 is a schematic view illustrating the print, Fig. 7, after the second development; Fig. 9 is a cross-sectional view on the line IX—IX of Fig. 8 illustrating the position in the emulsion of the second developed image; Fig. 10, is a schematic representation of Fig. 8 after being toned.

Applicant has selected a multi-colored rectangle as a subject by which to illustrate the application of this process. This multi-colored rectangle is illustrated by Fig. 1. It is divided by two diagonal lines forming four triangles. One triangle 1, is colored red; another 2, is white; another 3 is colored green; and the fourth, 4, is black.

The first step in carrying out applicant's process is to secure two color selection negatives of the subject, Fig. 1. This is done in the usual and well known manner. The finished red color selection negative designated as a whole by 5, is illustrated by Fig. 2. As the red color selection negative, Fig. 2, is a negative made from the subject 1 and in accordance with the usual methods the triangle 1 will be black; the triangle 2 will be black; the triangle 3 will be white; and the triangle 4 will be white. The finished green color selection negative, designated as a whole by 6, is illustrated by Fig. 2. In this negative, the triangle 1 will be white; the triangle 2 will be black; the triangle 3 will be black; and the triangle 4 white.

In order to avoid the effect of alteration in shape or size and especially that alteration known as shrinkage in the positive stock upon which the photograph is to be made, applicant prefers to form two latent images in the same image space at one and the same time. In order to do this, applicant posi-

tions the positive stock, designated as a whole by 7 and shown in Fig. 4, between the red negative 5 and the green negative 6 and uses two printing lights 8 and 9, one positioned on one side of the positive stock and the other positioned of the other side. By such means applicant secures both latent images at one and the same time so that if the negatives 5 and 6 are positioned in registry and the positive stock 7 is held from movement during the printing the latent images formed must be in registry.

Although applicant prefers to form both latent images simultaneously, it is of course to be understood that such simultaneous printing is not of the essence of this invention because the same result may be secured by successive printings in case they are close together in time and the positive print stock has not been subjected to any operation which tends in any wise to cause it to alter its shape or size.

In case either simultaneous or successive printing is employed applicant prefers to use a print stock having a substantially slow emulsion thereof and prefers to have that emulsion and the colloid bearing the same dyed with a light retarding dye. Such film stock is an article of commerce and is well known. This stock is generally of a yellowish hue and is generally colored with tartrazin. By using said positive film stock and properly regulating the printing lights 8 and 9, two registered independent images may be simultaneously formed in the emulsion 10, as shown in Fig. 4, of the positive print stock 7. One image, that formed from negative 6 would as indicated in dotted lines in Fig. 4 and designated 11 lie substantially adjacent the transparent, generally celluloid, carrier 12; the other image indicated by dotted lines and designated 13 would lie substantially adjacent the face or outside surface of the emulsion 10. These substantially separated positions of the two images can of course be obtained as well by successive printing.

When the latent images have been formed in the positive 7 it will then be developed. This development will be so arranged that the face or surface image will be first developed without action on the interior image. In order to so do applicant prefers to use a developer as follows:

18 grams-----hydroquinone  
100 grams-----sodium sulphite  
4½ grams-----potassium bromide  
18 grams-----sodium hydrate  
1000 ccs-----water

This developer will give rapidly a satisfactory black and white image from the face or outside latent image, so that the print, Fig. 5, after development will appear white in triangle 1; white in triangle 2; black in

triangle 3; and black in triangle 4 and the developed image giving the blacks will be substantially at the face of the emulsion, as shown at 13 in Fig. 6.

The positive stock is next washed and then toned. A suitable toning solution would be as follows:

3 grams-----ferric ammonium oxalate  
3 grams-----potassium ferricyanide  
3 grams-----citric acid  
500 ccs-----water

The toning bath would be allowed to act for such a time as would give a desired density of color. The print would then appear as shown in Fig. 7. Too great acidity in this bath is to be avoided.

After a thorough wash the film is placed in a bath as follows:

10 grams-----potassium bichromate  
10 grams-----ammonium bromide  
1000 ccs-----water

The bichromate clearing bath would be allowed to act for about 10 minutes and then the print would be thoroughly washed. This clearing bath tends to restore the sensitivity to developer of undeveloped exposed silver salts which may have been rendered undevelopable by previous treatments.

After washing the print would be subjected to a second development. The developer used would be a slow working developer. One designed to bring out the interior image to the fullest extent. A suitable developer would be as follows:

5 grams-----diamidophenol  
60 grams-----sodium sulphite  
5 ccs-----lactic acid  
1000 ccs-----water

After the developer is allowed to act the proper time to fully develop the latent image formed adjacent the carrier, that is, in the interior of the emulsion, the film is thoroughly washed and fixed in a thiosulfate bath and then washed. The print will then appear as shown in Fig. 8 in which: triangle 1 will be black; triangle 2 will be white; triangle 3 will be blue; and triangle 4 will contain both blue and black. The position of the black image of Fig. 8 is shown by Fig. 9 in which 11 indicates the image developed by the second development. This image is adjacent the carrier 12.

The print will then be toned by the use of any suitable toning solution such as:

50 grams-----sodium citrate  
10 grams-----cupric sulphate  
5 grams-----potassium ferricyanide  
1000 ccs-----water

After the print is washed and dried it will then appear as shown in Fig. 10 in which: triangle 1 will be red, triangle 2 white; tri-

angle 3, blue; and triangle 4, blue and red which by transmitted light would be black.

Although applicant has illustrated the principle of his invention by describing the 5 steps of a novel process which result in a novel product, nevertheless, it is to be understood that the particular manipulation described and the product formed does not exhaust the possible manipulations and products 10 lying within the domain of the invention.

What I claim as new and desire to secure by Letters Patent of the United States, is:

1. The method of producing a color photo- 15 graph from suitable color selection negatives which consists in first forming latent images therefrom within the body of a layer of material containing a light sensitive substance on a transparent carrier, one adjacent outside 20 face of the material, the other adjacent the carrier, then developing and toning with ferric salts the outside image and then resensitizing to development, developing and toning the other image.
2. The method of producing a color photo- 25 graph from suitable color selection negatives which consists in first forming substantial displaced latent images therefrom within the body of a layer of material containing a light 30 sensitive substance on a transparent carrier, then developing and toning the first developed image and then resensitizing to development and developing and toning the second image.
3. The method of producing a color photo- 35 graph from suitable color selection negatives which consists in first forming latent images therefrom within the body of a layer of material containing a light sensitive substance 40 on a transparent carrier, one adjacent the outside face of the material, the other adjacent the carrier, then developing the image adjacent the outside face with a quick acting developer and then toning with ferric salts 45 and then resensitizing to development, and then developing the image adjacent the carrier with a slow working developer and then toning the last developed image.

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