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METHOD AND MEANS FOR MAKING CORRECTED COLOR SEPARATION IMAGES

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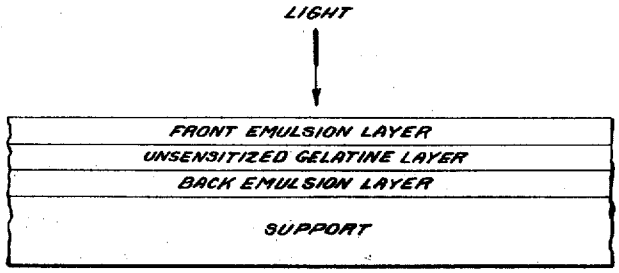
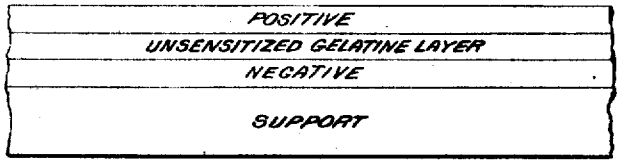


Fig. 1.

Fig. 2.



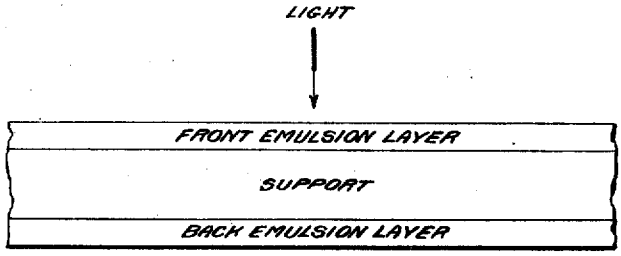


Fig. 3.

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METHOD AND MEANS FOR MAKING CORRECTED COLOR SEPARATION IMAGES

Arthur C. Hardy, Wellesley, Mass., assignor to Interchemical Corporation, a corporation of Ohio

Application January 21, 1937, Serial No. 121,467

7 Claims. (Cl. 95—2)

This invention relates to a method of making a corrected color separation image with a single exposure to the subject. The invention includes also a photographic film for use in the method.

In preparing color separation images for color reproduction, it has been suggested that a color separation negative made by photographing a subject through a color filter be corrected by means of a positive of another color separation image made by photographing the subject through a filter of a different color. The ordinary method of making such corrections is to mask the color separation negative to be corrected with a positive of the image which is to effect the correction, and then to expose a plate to light passed through the positive and negative. Corrections made by such masking do not produce theoretically correct color separation images, but the correction by such masking greatly improves color separation images.

My invention provides for making a corrected color separation image by a single exposure. It will be described in connection with the accompanying drawings which are diagrammatic sections of films embodying my invention, in which Fig. 1 shows the film before development, Fig. 2 the film after development, and Fig. 3 a modified film.

A photographic film according to my invention comprises a support carrying two different photographic emulsion layers. The back layer consists of an emulsion containing silver halide and a dye which sensitizes the emulsion to light in one spectral region; and the front layer consists of an emulsion containing silver halide and a dye which sensitizes the emulsion to light in another spectral region. The back emulsion layer, in finished form, is relatively fast, and the front emulsion layer, in finished form, is relatively slow. The sensitizing dye in the back layer absorbs light in a spectral region corresponding approximately to the primary which the color separation image made on the film is to control. The sensitizing dye in the front layer absorbs light in a different spectral region for correction of the image made on the back layer.

Thus, in a photographic film for making a corrected "red" color separation image to control a red light or a blue-green ink in the reproduction, the sensitizing dye used in the back emulsion layer is one which sensitizes the emulsion to light in the red region of the spectrum, while the sensitizing dye used in the front layer is one which sensitizes the emulsion in another, for example, the green region of the spectrum.

It is desirable but not necessary to place between the two emulsion layers a layer of gelatin containing no silver halide. It is in some cases also desirable to incorporate a dye in this intermediate gelatin layer, as for example one adapted to absorb light in the same spectral region as the sensitizing dye contained in the front layer so as to prevent light in this spectral region from reaching the back layer.

The film which has been described is shown diagrammatically in Fig. 1, where it will be seen that the back emulsion layer is placed directly over the support, an unsensitized gelatin layer is placed over the back emulsion layer, and the front emulsion layer is placed over the unsensitized gelatin layer. A possible and less desirable arrangement is shown in Fig. 3, in which the front and back emulsion layers are placed on opposite sides of the support. In this case, an additional layer of dyed gelatin may be placed next to the support, or the support itself may be dyed to constitute a filter.

The support shown in the figures is most desirably a flexible film. A rigid support, such as a plate of glass, may be used, and it should be understood that the use of the word "film" in the claims which follow is not intended to exclude the use of a rigid glass support.

In making a color separation negative by means of the film shown in Fig. 1, or the film shown in Fig. 3, a single exposure of the film to the subject is made, and the film is then developed in such a way as to make the back layer a negative and the front layer a positive.

In carrying out my invention, this result may be obtained in either one of the two following ways:

1. The two emulsion layers of the film may consist of ordinary "negative" emulsions, that is, of emulsions which, after exposure and normal development, produce negative images of the subject. In this case, it is necessary to use a method of development which reverses the image produced in the front or slow emulsion. A known method of this sort, which is applicable to the film shown in Fig. 1 when the two emulsion layers are both ordinary negative emulsions, consists in (1) developing both emulsion layers, (2) bleaching the front emulsion layer to make the silver into a soluble salt and washing out this salt, (3) flashing the film and redeveloping the front layer to convert the residual silver halide into silver, and (4) then fixing both emulsion layers. In this method, the presence of an intermediate unsensitized gelatin layer is of advantage in fa-

cilitating the bleaching and redevelopment of the front layer without penetration of the bleaching and developing solutions into the back layer. If an intermediate layer containing a dye is used, this dye is most desirably bleached out during the developing process.

2. The back or fast emulsion layer of the film may consist of an ordinary "negative" emulsion, while the front or slow emulsion layer may consist of a "direct positive" emulsion, that is, the type of emulsion which produces a positive image directly with ordinary development. This type of emulsion is described in an article entitled "A Film Emulsion for Making Direct Duplicates in a Single Step" by W. Barth in the October, 1936 number of Journal of the Society of Motion Picture Engineers. In this case, the double layer film is subjected to ordinary development, the developing and fixing solutions being allowed to penetrate both layers.

In either case, exposure of the double layer film and development thereof produces a developed film which consists of a support carrying two layers, one of which contains a positive image and the other a negative image, as shown in Fig. 2. As the two images have been produced by a single exposure of the two emulsion layers of the film to the same subject and as the emulsion which is developed as a negative is relatively fast while that developed as a positive is relatively show, the negative image in the developed film is stronger than the positive image. The developed film, therefore, provides a corrected color separation image.

What I claim is:

1. The method of making a corrected color-separation transparency, which comprises simultaneously exposing to light from a colored subject two superimposed emulsion layers of different speeds and different spectral sensitivities to produce strong and weak registering latent images of different color components and thereafter developing one of said images as a negative and the other as a positive without separation of the layers.

2. The method of making a corrected color separation transparency consisting of a main image and a correcting mask in register therewith, which comprises making a single exposure to light from a colored subject of a film having strata sensitized to light in different spectral regions, one of said strata being relatively fast and the other relatively slow so that the single exposure produces a strong latent image in one stratum and a weak latent image in the other, and without separation of said strata developing one of said images as a negative and the other of said images as a positive so that the stronger image may serve as the main image and the weaker image as a correcting mask therefor.

3. The method of producing a corrected color component image of a colored object by use of a photographic element having two sensitive layers permanently attached to a support, which comprises forming a negative image of one of the primary color components of the colored object in one of the sensitive layers, forming a positive image of another of the primary color components of the colored object in the other sensitive layer, the positive image being superposed and in register with the negative image, and printing both images simultaneously to form a corrected color component record of the colored object.

4. The method of making a corrected color separation transparency consisting of a main image and a correcting mask in register therewith, which comprises making a single exposure to light from a colored subject of a film having two emulsion layers sensitized to light in different spectral regions, one of said layers being relatively fast and the other relatively slow so that the single exposure produces a strong latent image in one layer and a weak latent image in the other, developing both layers without fixing them, removing the silver image from one layer and converting the remaining silver salts in this layer to metallic silver, and fixing both layers to provide a positive silver image in the one layer and a negative silver image in the other layer.

5. The method of making a corrected color separation negative consisting of a main image and a correcting mask in register therewith, which comprises making a single exposure to light from a colored subject of a film having a layer of a negative photographic emulsion sensitive to light in one spectral region and a layer of a direct positive photographic emulsion sensitive to light in another spectral region, and developing and fixing both layers at the same time to provide a negative image in the first layer and a positive image in the second layer.

6. A photographic film for making color separation negatives comprising two layers one of which is a relatively fast negative photographic emulsion sensitive to light in one spectral region, and the other of which is a relatively slow direct positive photographic emulsion sensitive to light in another spectral region.

7. A photographic film for making color separation negatives comprising a back layer of a relatively fast negative photographic emulsion containing a dye sensitizing the emulsion to light in one spectral region, and a front layer of a relatively slow direct positive photographic emulsion containing a dye sensitizing the emulsion to light in another spectral region.

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DISCLAIMER

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Hereby enters this disclaimer to claim 3 of said patent.

[*Official Gazette September 8, 1942.*]

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