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PRODUCTION OF PHOTOGRAPHIC MULTICOLOR PICTURES

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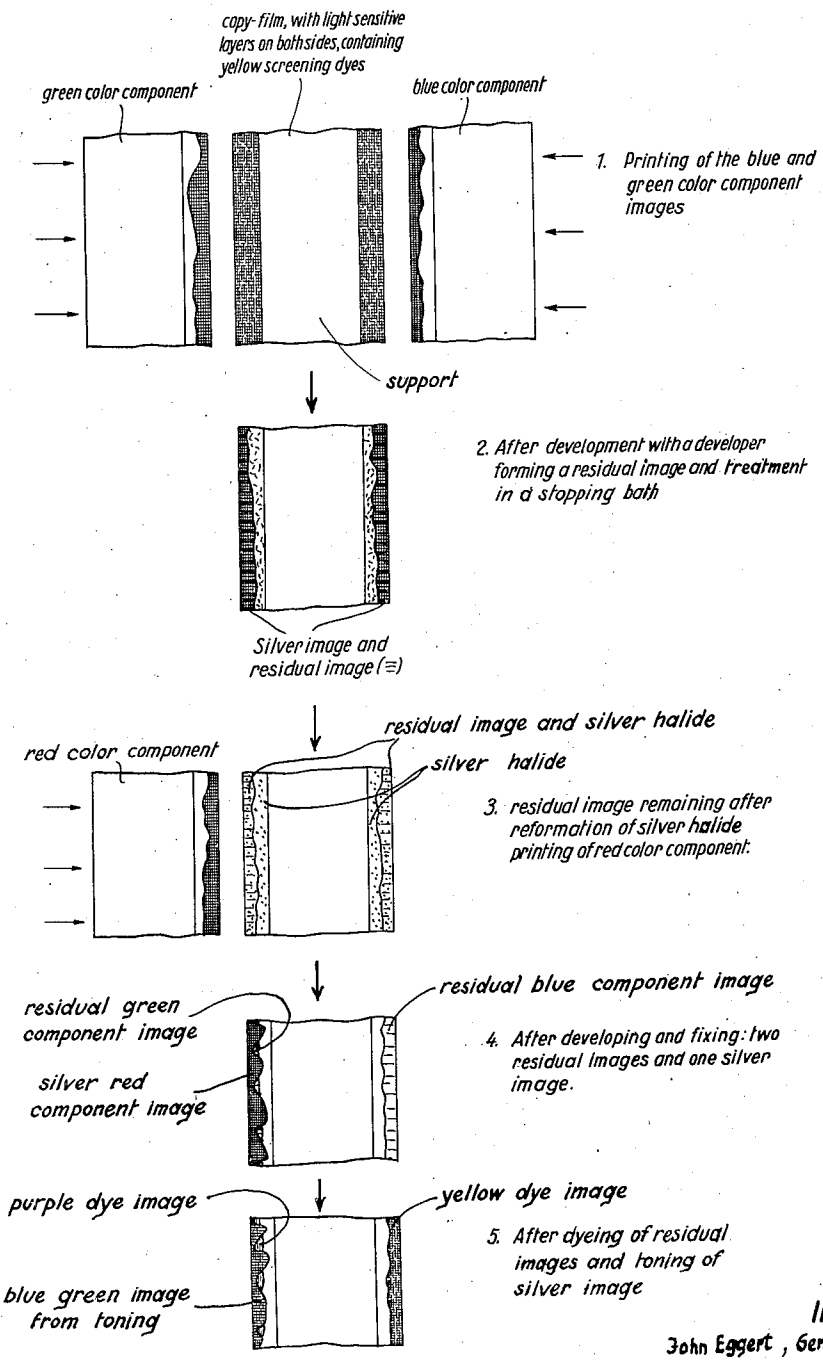

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PRODUCTION OF PHOTOGRAPHIC MULTICOLOR PICTURES

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4 Claims. (Cl. 95—2)

The present invention relates to the production of multicolor pictures.

One of its objects is an improved process for the production of multicolor pictures. Another object is a process for producing several color-component images in one silver halide emulsion layer. Further objects will be seen from the detailed specification following hereinafter.

A known method of producing a photographic color picture is to form on the photographic silver picture, preferably developed in a developer free from sulfite, a so-called residual image consisting of an organic oxidation product of the developer, which image can be colored by a basic dyestuff. Since the silver is no longer necessary after the residual image has been produced, this image being alone sufficient for producing the color picture, the silver can be restored for the production of a new silver image by conversion into silver halide. On this possibility is based the present invention.

On the two sides of a positive film carrying on each side a suitably sensitized light-sensitive emulsion there is produced by suitable exposure in known manner one of the three requisite component images, for example on one side the blue and on the other side the green component. These components are developed by a residual image developer, the composition of which is given by way of an example later in this specification. After the development the image is not fixed, but the silver image is reconverted into silver halide so that there is formed a silver halide uniform with the rest of the silver halide layer. This is not in all cases possible without difficulty if the sensitivity of those parts of the layer which have been reconverted from silver is different from that of the rest of the silver halide which has not been affected by light. In this case one proceeds in such a way that after the development of the first two component images the whole of the rest of the silver halide hitherto not affected by light is exposed to light and developed with a sulfite developer which yields no residual image so that now all the silver halide of the layer has been changed into silver. Then only is the whole of the silver contained in the layer reconverted into silver halide. This reconversion has been such that even the exposure nuclei are reconverted. After the conversion of the silver into silver halide the layers are dried and a third component image, preferably the red component, is copied. This image is developed by a developer which does not produce a residual image and is then fixed. After the three component images have been thus produced the two first corresponding with the residual images are dyed in this case yellow and purple and thereupon the silver of the third component image is converted into a blue image by toning in known manner. In general mordant dyeing can be combined with other processes, for instance toning, color development and the like.

If, for the dyeing of the residual images, basic dyestuffs are used which, for example, during the production of the third component image may be partially extracted from the residual images by the acid baths employed, it is necessary to fix the dyestuff before the acid blue toning bath is used, for instance by means of molybdic acid.

Instead of arranging on both sides residual images colored with basic dyestuffs a residual image may be produced in the manner described only on one side and this, after the conversion of the silver into silver halide, may be covered by a second, for example blue-toned, image, whereas on the other side of the film the third color component may be produced in any other known manner, for example by color development or by the silver bleaching-out process.

The following example illustrates the invention and reference is made to the accompanying drawing which indicates the course of our coloring process by a simple flow sheet.

Of the three components of a color exposure the blue component and the green component are copied on the two sides of a positive film having a suitably sensitized layer on each side. The exposure is developed by means of a developer which forms a residual image of the following composition:

Solution A:		
Water	cc.	500
Hydroquinone	grams	5
Solution B:		
Water	cc.	500
Calcined sodium carbonate	grams	30
Potassium bromide	do	1

The two solutions are mixed for use.

After the development the film is brought into a stopping bath, for example an acetic acid solution of 1 per cent strength. The whole film is now strongly exposed, for example to daylight, and developed with a usual developer until complete blackening is produced. The conver-

sion into silver bromide is produced by a bleaching bath of the following composition:

Water	cc.	1000
Ammonium bromide	grams	25
Bromine	cc.	1

After an intermediate washing there follows a treatment with sodium sulfite solution of 0.5% strength.

The film is now dried and the red component copied on the side which carries the green component. After development with an ordinary developer the film is fixed and washed in the usual manner.

The film now carries on one side a residual image as the copy of the blue component, on the other side a residual image as the copy of the green component and superimposed on the residual image a silver image as the copy of the red component. The residual image corresponding with the green component is now dyed with a basic purple dyestuff, for example Sapphranine, that corresponding with the blue component with a yellow dyestuff, for example Thioflavin T. A clarifying bath is used after the dyeing, that for Thioflavin T being preferably water and that for Sapphranine being acetic acid of 1 per cent strength. The object of the clarifying bath is to remove completely the dyestuff from the portions of the film which are free from the residual image while the dyestuff adsorbed by the residual image is not appreciably attacked if the action is not prolonged. There follows a treatment with an ammonium molybdate solution of 5 per cent strength, whereupon the blue-green toning is affected by changing the silver into a ferro-cyanide blue in known manner.

What we claim is:

1. A process for producing a photographic multicolor picture which comprises exposing a silver halide emulsion layer to a color component picture, developing the latent image by means of a developer forming a silver image and a secondary image consisting of the oxidation products of the developer, bleaching the silver image obtained in order to make it light-sensitive again, copying a second color-component on to said restored silver halide emulsion, developing said second latent image by means of an ordinary developer, fixing said emulsion, dyeing the residual secondary image of the first color component with a dyestuff and dyeing the silver image of the second color component by a known toning process.

2. A process for producing a photographic multicolor picture which comprises exposing a silver halide emulsion layer to a color component picture, developing the latent image by means of a developer forming a silver image and a secondary image consisting of the oxidation products of the developer, bleaching the silver image obtained in order to make it light-sensitive again, copying a second color-component on to said restored silver halide emulsion, developing said second latent image by means of an ordinary developer, fixing said emulsion, dyeing the residual secondary image of the first color-component with a basic dyestuff, fixing said dyestuff image by means of molybdic acid and dyeing the silver image of the second color component by a known toning process.

3. A process for producing a photographic multicolor picture which comprises exposing a silver halide emulsion layer to a color component picture, developing the latent image by means of a developer forming a silver image and a secondary image consisting of the oxidation products of the developer, exposing the layer to a strong light source, developing the layer with an ordinary developer, bleaching the silver in order to make it light-sensitive again, copying a second color component on to said restored silver halide emulsion, developing said latent image by means of an ordinary developer, fixing said emulsion, dyeing the residual secondary image of the first color-component with a basic dyestuff, fixing said dyestuff image by means of molybdic acid and dyeing the silver image of the second color component by a known toning process.

4. A process for producing a photographic multicolor picture on a photographic material being coated on both sides of the support with a silver halide emulsion layer which comprises exposing each emulsion to a color component picture, developing the latent images by means of a developer forming silver images and secondary images consisting of the oxidation products of the developer, exposing the images to a strong light source, developing the two layers with an ordinary developer, bleaching the silver in order to make it light-sensitive again, copying a third color component image on to one of said layers, developing with an ordinary developer, fixing the two layers, dyeing the two residual secondary images by means of a basic dyestuff and molybdic acid and dyeing the silver image by a known toning process.

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