

UNITED STATES PATENT OFFICE

2,307,162

PROCESS FOR THE PRODUCTION OF COLOR IMAGES

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No Drawing. Application October 11, 1940, Serial
No. 360,787. In Germany June 6, 1939

4 Claims. (Cl. 95-2)

This process relates to the production of color images.

It is already known to combine the silver-dye-bleaching-out-process with the method of the color forming development in such a way, that there is produced in a multilayer film part of the color separation images by means of the color forming development and part by means of the silver-dye-bleaching-out-process (French Patent 807,045). In this way it will be possible to select from the dyestuffs the most suitable ones which for both processes are at the disposal in limited number only. Besides the spectral properties the sensitivity, the keeping qualities and the gradation of the silver bromide emulsion must be taken into consideration thereby. According to the afore-mentioned process there was first carried out the color forming development and then the silver-dye-bleaching-out-process. The dyestuffs obtained by the color forming development, however, were found in most cases not to be fast to the acid baths necessary in the silver-dye-bleaching-out-process, so that the selection of the dyestuffs was again very much image.

It is an object of the present invention to produce color images on a multicolor material.

A further object is to avoid the disadvantages mentioned above.

Still another object is the production of a steep black image superimposed on the three color images.

These and other objects will become apparent from the detailed specification following hereinafter.

According to the present invention it is possible to remove these difficulties by changing the order of the two working processes, i. e. there are first produced the separation images according to the silver-dye-bleaching-out-process and then that or those according to the color forming development. The color formers are incorporated preferably right from the beginning into the layers destined for the color forming development as it is generally done with the dyestuffs for the silver-dye-bleaching-out-layers. These dyestuffs, however, can be incorporated into the outer layers also afterwards. After exposure and development in an ordinary developer the layers are then treated with a non-fixing silver-dye-bleaching-out-bath. Such a fixing bath consists most suitably of hydrochloric acid, potassium bromide and metol. After bleaching the film, the same is after-exposed in diffused light and color-developed in a suitable developer accord-

ing to known methods. Finally the silver is removed by a Farmer reducer or the like. When working in this way, good results are obtained, since the color formers are generally more stable against the bleaching bath than the dyestuffs formed therefrom.

In the following case the aforesaid process is preferably applied:

For the manufacture of color copies there is known as copying material a film which on both sides of the support carries three emulsion layers sensitized for different spectral regions. All three are either worked up according to the silver-dye-bleaching-out-process, i. e. they contain already the image dyestuff, or only two separation layers arranged on one side of the film are worked up according to the silver-dye-bleaching-out-process, whereas the third emulsion layer arranged as a single layer on the other side of the film is worked up according to the Prussian-blue-toning-process.

According to the present invention an improvement in picture quality is attained, if the three color images obtained on said copying material are superimposed by a black image steeper in gradation than the three color images, so that in the high lights the delicate and pure colors of the dyestuffs contained in the layers prevail, whereas the shadows become deeper by the superimposed black image. This effect is attained, if the aforementioned material is treated according to the silver-dye-bleaching-out-process and if this process is combined with the color forming development process in such a way, that the color separation images are obtained by the silver-dye-bleaching-out-process and the black image by color forming development. Components for black or nearly black dyestuffs formed by development are known (French Patent 829,781.)

For that purpose the different layers are arranged for example as follows:

On the one side of the emulsion carrier there is arranged a yellow colored, red sensitized layer, superimposed on it a purple colored, unsensitized layer and on top of that a thin layer with a steeply graduated emulsion containing the black component. On the other side of the carrier there is arranged a blue-green colored emulsion layer which is unsensitized. The red and green separation images are copied into the blue-green and purple layers by means of blue light in the usual way. Simultaneously the green separation image may be copied into the black layer. The blue separation image is then copied into the yellow layer by means of red light. In order to har-

monize the black and purple separation images with each other, it is advantageous to sensitize for green also the separation layer destined for the black image and when copying the green separation image into the purple layer by means of blue light to vary the density of both separation images by admixing variable portions of green light to the blue copying light.

The working up into the color image is accomplished in the manner described above.

What I claim is:

1. Process for the production of color images on multi-color material, comprising at least four emulsion layers which are sensitized for different spectral regions, the lowermost three layers of said four layers being dyed and being capable of being worked up by the silver bleaching-out process and the fourth uppermost layer being uncolored and containing a color former capable of producing a black dye by color development which comprises copying the different color separation images onto the single colored emulsion layers by means of colored light while simultaneously copying into the uncolored layer a color separation image copied into one of said colored layers, developing the film in a black and

white developer, bringing said film without fixing it into a silver-dye bleaching-out-bath to produce silver and dye images in the colored layers, color developing the upper layer to produce a black image dye in that layer and removing the silver from the various layers.

2. The process as defined in claim 1 wherein the green separation image is copied into a colored layer and simultaneously into the uncolored layer.

3. The process as defined in claim 1 wherein one layer is sensitive to blue and is colored blue green, another layer is sensitive to red and is colored yellow, and a third layer is sensitive to blue and is colored magenta.

4. Process as defined in claim 1 wherein one layer is sensitive to blue and is colored blue green, another is sensitive to red and is colored yellow and the third layer is sensitive to blue and is colored purple, and wherein the red separation image is copied into the blue green colored layer, the blue separation is copied into the yellow colored layer and the green separation image is copied into the magenta colored and the uncolored layers simultaneously.

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CERTIFICATE OF CORRECTION.

Patent No. 2,307,162.

January 5, 1943.

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It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 1, first column, line 25, for "image" read --limited--; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 23rd day of February, A. D. 1943.

Henry Van Arsdale,
Acting Commissioner of Patents.

(Seal)