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G. WILMANN'S ET AL

2,168,183

STEREOPHOTOGRAPHY

Filed Oct. 20, 1936

Fig. 1

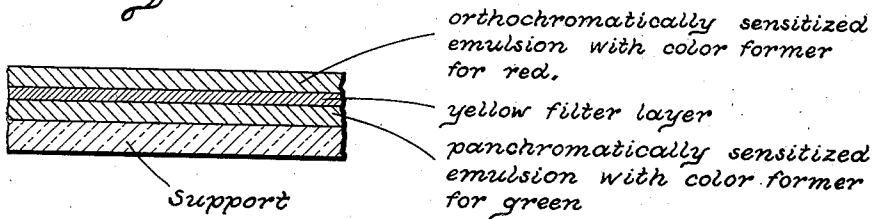
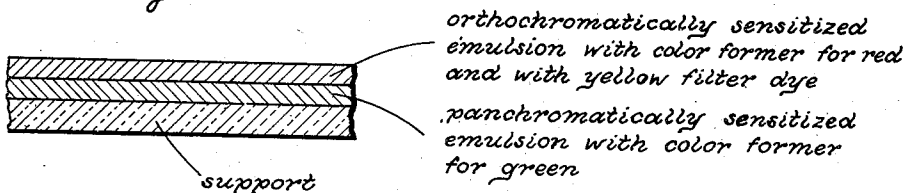


Fig. 2



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STEREOPHOTOGRAPHY

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In Germany October 30, 1935

10 Claims. (Cl. 95-5)

Our present invention relates to the manufacture of stereophotographic pictures and more particularly to the manufacture of stereoscopic pictures in the manner of anaglyphs.

Processes are known in which by simple manipulation anaglyphic stereoscopic pictures are produced which can be projected without the necessity of using special optical devices in consequence of the arrangement of the two component pictures. In one such process two component pictures are produced each through a complementary filter, for instance one through a red filter and the other through a green filter, the two exposure objectives being placed at such a distance apart that they produce stereoscopic component pictures. The optical arrangement is in this case such that the two component pictures are projected on to the exposure material not side by side, but superimposed. As an exposure material there is used a plate or film on one side of which there is an emulsion layer sensitized orthochromatically and on the other side a panchromatic layer. Between these two layers there is a color filter. After development of the two images in any manner the picture on one side is colored red and that on the other side complementary, that is to say, green. This process requires a whole series of troublesome individual baths and treatments.

This invention relates to the use of an exposure material having two layers directly superimposed which after exposure in the known manner through a green filter and through a red (minus green) filter contains on both layers stereoscopic component pictures superimposed in stereoscopic parallax. The two superimposed silver halide emulsion layers contain each one (or more) components which are substantive towards gelatin and are coupling components for red and green development spectrally or for the antidiazotate process as described in U. S. Patent 1,963,197. The two layers are either separated by a filter layer as shown in Fig. 1 of the accompanying drawing or the orthochromatically sensitized emulsion acting as the upper layer contains a corresponding filter dye-stuff with which it is diffusely colored as illustrated in Fig. 2. The lower emulsion layer is panchromatically sensitized.

The coupling components which produce the color on development are so distributed that the lower layer becomes the green component and the upper layer the red component.

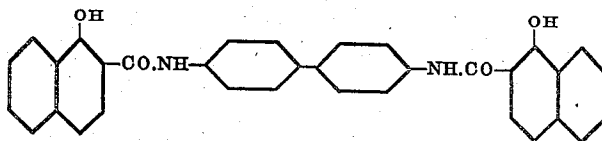
When such a material has been developed with a suitable color developer there is obtained a two-color negative the color values of which are complementary to those of the original. After removing the silver image from the color image, for instance, by the known use of Farmer's reducer, this negative may be copied by projection or by contact on a material of like composition and may be developed in the same manner whereby there is obtained a positive corresponding with the original in color values after the silver has again been dissolved on the color image.

It is possible, however, to arrive at a positive in correct color directly by reversal development. After exposure the image is developed by an ordinary developer in black and white and after known reversal at the second development to a color image by means of a color developer. In both ways there is obtained a two-color stereoscopic picture in which the stereoscopic effect is visible by inspection with anaglyphic spectacles. Since the two component pictures appear colored the film is a two-color film and shows as such in addition to the stereoscopic effect a colored reproduction of the photographed object.

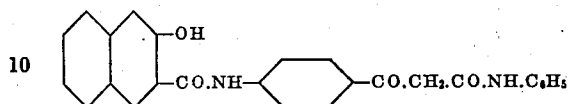
If the component pictures are to be produced by the antidiazotate method then after the development the unchanged silver bromide is converted into a silver antidiazotate and this is coupled with the component in the layer on acidification as described in U. S. Patent 1,963,197.

The following example illustrates the invention:

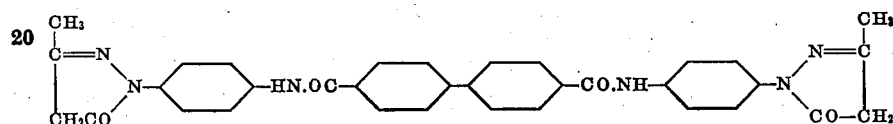
For exposure there is used any optical arrangement allowing the superimposition of two stereoscopic partial images on one exposure field, as for instance, described in German specification No. 611,229. The upper emulsion of the two directly superimposed layers is dyed diffusely with a yellow dyestuff; the lower layer serving as the panchromatically sensitized layer contains for producing the green image bis(1-hydroxy-2-naphthylamino) diphenyl corresponding with the following formula



(this compound may be produced as shown in Schultz, Farbstofftabellen, 7th ed., vol. 2, page 398 from bis(2-hydroxy-naphthoylamino) dimethoxy-diphenyl(=bis- β -hydroxynaphthoic acid-dianiside); and 2:3-hydroxynaphthoylamino benzoyl acetanilide corresponding with the following formula



to the amount of 4 grams each per litre of emulsion. The orthochromatically sensitized upper layer yielding the red image contains per kilo of emulsion 10 grams of 4:4'-diphenyldicarbonylamino-1-phenyl-3-methyl-5-pyrazolone corresponding with the following formula



and the aforesaid yellow filter color.

The development to a colored picture is by diethylaminoaniline hydrochloride. There is produced either a complementary colored negative or correct color positive accordingly as this color developer is used in a simple development process or as a second developer in a reversal process.

When producing the stereoscopic picture according to the antidiazotate method the exposed material is developed and the unchanged silver-bromide converted into silver antidiazotate, for instance, by means of α -naphthalene-sodium-antidiazotate which may be applied in a 1 per cent solution. The material is washed and then immersed in a solution of acetic acid of 2 per cent strength whereby the red and green partial stereoscopic pictures are produced. Then the material is again washed and the silver removed by Farmer's reducer.

What we claim is:

1. A process of producing stereoscopic pictures which comprises incorporating in the upper layer of two silver halide gelatin emulsion layers arranged in superimposition on a support a yellow filter dye and a coupling component having substantive character towards gelatin for the production of a red component picture, sensitizing this layer orthochromatically, incorporating in the lower layer a coupling component having substantive character towards gelatin for the production of a green component picture, sensitizing this layer panchromatically, exposing said material through a stereoscopic optical device adapted for the production of anaglyphs, and developing said material with a solution capable of forming complementary dyestuff pictures at the places of the silver picture by interaction with said coupling components.

2. A process of producing stereoscopic pictures which comprises incorporating in the upper layer of two silver halide gelatin emulsion layers arranged in superimposition on a support and separated by a yellow filter layer a coupling component having substantive character towards gelatin for the production of a red component picture, sensitizing this layer orthochromatically, incorporating in the lower layer a coupling component having substantive character towards gelatin for the production of a green component picture, sensitizing this layer panchromatically, exposing said material through a stereoscopic optical device adapted for the production of anaglyphs, and developing said material with a solution capable of forming complementary dyestuff pictures at the places of the silver picture by interaction with said coupling components.

cal device adapted for the production of anaglyphs, and developing said material with a solution capable of forming complementary dyestuff pictures at the places of the silver picture by interaction with said coupling components.

3. A process of producing stereoscopic pictures which comprises incorporating in the upper layer of two silver halide gelatin emulsion layers arranged in superimposition on a support a coupling component having substantive character towards gelatin for the production of the red component picture and a yellow filter dye, sensitizing this layer orthochromatically, incorporating in the lower layer a coupling component having substantive character towards gelatin for the production of a green component picture, sensitizing this layer panchromatically, exposing said material through a stereoscopic optical device adapted

for the production of anaglyphs, and developing said material with a solution capable of forming complementary dyestuff pictures at the places of the silver picture by interaction with said coupling components.

4. A process of producing stereoscopic pictures which comprises incorporating in the upper layer of two silver halide gelatin emulsion layers arranged in superimposition on a support and separated by a yellow filter layer a coupling component having substantive character towards gelatin for the production of a red component picture, sensitizing this layer orthochromatically, incorporating in the lower layer a coupling component having substantive character towards gelatin for the production of a green component picture, sensitizing this layer panchromatically, exposing said material through a stereoscopic optical device adapted for the production of anaglyphs, and developing said material by means of a color forming developer.

5. A process of producing stereoscopic pictures which comprises incorporating in the upper layer of two silver halide gelatin emulsion layers arranged in superimposition on a support and separated by a yellow filter layer a coupling component having substantive character towards gelatin for the production of a red component picture, sensitizing this layer orthochromatically, incorporating in the lower layer a coupling component having substantive character towards gelatin for the production of a green component picture, sensitizing this layer panchromatically, exposing said material through a stereoscopic optical device adapted for the production of anaglyphs, developing said material, treating said developed material with a solution of an antidiazotate, washing the material, treating the material with a slightly acid solution, and removing the silver.

6. A process of producing stereoscopic pictures which comprises incorporating in the upper layer of two silver halide gelatin emulsion layers arranged in superimposition on a support 4:4'-diphenyldicarbonylamino-1-phenyl-3-methyl-5-pyrazolone and a yellow filter dye, sensitizing this layer orthochromatically, incorporating in the lower layer bis-(1-hydroxy-2-naphthoylamino) diphenyl and 2:3-hydroxynaphthoylamino benzoyl acetanilide, sensitizing this layer panchromatically, exposing said material through a stereoscopic optical device adapted for the production of anaglyphs, and developing said material with a solution capable of forming complementary dyestuff pictures at the places of the silver picture by interaction with said coupling components.

optical device adapted for the production of anaglyphs, and developing said material by means of a solution of diethylaminoaniline-hydrochloride.

- 5 7. A photographic material for producing stereoscopic pictures comprising two silver halide gelatin emulsion layers arranged in superimposition on one side of a support, the upper emulsion layer having incorporated a coupling component having substantive character towards gelatin for the
10 production of a red picture and being orthochromatically sensitized, and the lower emulsion layer having incorporated a coupling component having substantive character towards gelatin for the
15 production of a green picture and being panchromatically sensitized, said lower emulsion layer being protected against the action of blue light by a yellow filter layer.

- 20 8. A photographic material for producing stereoscopic pictures comprising two silver halide gelatin emulsion layers arranged in superimposition on one side of a support, the upper emulsion layer having incorporated a coupling component having substantive character towards gelatin for the pro-
25 duction of a red picture and being orthochromatically sensitized, and the lower emulsion layer having incorporated a coupling component having substantive character towards gelatin for the pro-

duction of a green picture and being panchromatically sensitized, the two emulsion layers being separated by a yellow filter layer.

9. A photographic material for producing stereoscopic pictures comprising two silver halide gelatin emulsion layers arranged in superimposition on one side of a support, the upper emulsion layer having incorporated a yellow filter dyestuff and a coupling component having substantive character towards gelatin for the production of a red
10 picture and being orthochromatically sensitized, and the lower emulsion layer having incorporated a coupling component having substantive character towards gelatin for the production of a
15 green picture and being panchromatically sensitized.

10. A photographic material for producing stereoscopic pictures comprising two silver halide gelatin emulsion layers arranged in superimposition on one side of a support, the upper emulsion
20 layer having incorporated a yellow filter dyestuff and 4,4'-diphenyldicarbonylamino-1-phenyl-3-methyl-5-pyrazolone and being orthochromatically sensitized, and the lower emulsion layer bis(1-hydroxy-2-naphthoylamino)diphenyl and 2,3-
25 hydroxynaphthoylamino benzoyl acetanilide.

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