Patented May 26, 1936

2,041,827

UNITED STATES PATENT OFFICE

2,041,827

COLORED LIGHT-SENSITIVE MATERIAL AND PROCESS OF PRODUCING COLOR PICTURES THEREWITH

Béla Gáspár, Brussels, Belgium

No Drawing. Application December 23, 1933, Serial No. 703,829. In Germany December 29, 1932

9 Claims. (Cl. 95—6)

This invention relates to a method of producing colored photographic materials, and more particularly to the use of a class of dyestuff-forming substances hitherto not employed for photographic purposes, viz., hydrazo substances and their derivatives. These substances, which are uncolored or are colored relatively weakly are added to materials capable of being employed for purposes of photography. Should the initial substance be intensely colored, the same may be employed only in certain instances, for example for producing insoluble dyestuffs in the layer or for producing layers thus colored which are re-colored by the subsequent chemical treatment.

It is known to employ osarones as filter dyestuffs. The invention, however, does not relate to the use of this substance but to hydrazo compounds of that kind which may be converted into azo dyestuffs.

The hydrazo compounds or compounds of equivalent effect may be employed in different manners.

It is possible, for example, to produce light filters by adding the hydrazo substances and subsequently converting these into azo substances.

If it is desired to produce photographic layers to support an image, a finished silver image may be impregnated with a hydrazo substance by immersion therein, and this hydrazo substance subsequently converted into an azo substance. At the point at which the dyestuff is to remain invisible, the azo dyestuff produced is destroyed locally, and this may take place at the points of the silver or the points free of silver, dependent on the particular circumstances. After the immersion in the hydrazo substance, the dyestuff may be produced locally, for example at the points of the silver image, by conversion of the silver image, say, by conversion over lead chromate into an oxidizing substance.

Alternately the hydrazo dyestuff-forming compounds may be incorporated in the emulsion prior to its application to the backing or support. It will be understood that in either case the hydrazo substance is uniformly dispersed throughout the emulsion layer during the immersion of the layer in the hydrazo substance.

For the production of colour-photographs, various methods may be adopted.

According to one method particles of emulsion of different subsequent color and different sensitization may be distributed in the layer in the manner of screen images, with or without filter dyestuffs, and the same then converted into the corresponding azo dyestuffs.

It is also possible to produce multi-layer color photographs having differently sensitized layers poured one upon the other. There may be produced in very simple fashion according to the invention films of the known kind sensitized on both sides for subtractive processes, in which one or more colored part-images are disposed on either side.

As an example of the dyestuff-forming substances employed according to the invention, reference may be made to benzol-hydrazo-α-naphthol, a colorless body which may be converted into a red-orange azo dyestuff by slight oxidation. A hydrazobiphenyl may be converted by oxidation into a purple-red dyestuff. These hydrazo substances are known in large numbers. It is also possible to employ their derivatives, products of substitution and esters, for example acetyl derivatives. Beyond this hydrazo compounds may be produced which contain an azo group in the molecule. From a hydrazo compound of this kind, a diazo dyestuff is obtained by subsequent oxidation. The hydrazo compounds may also be produced from azo dyestuffs by reduction. Examples of oxidizing agents are ferric-chloride or nitrous acid.

The advantage of this method consists on the one hand that colorless or relatively colorless dyestuff-forming substances may be admixed, for example, with a photographic emulsion, these substances having no disturbing effect on the exposure, and not until afterwards are the same converted in very simple manner into the dyestuff. An additional advantage resides in the fact that insoluble dyestuffs for example may be incorporated in colloid layers by means of soluble intermediate products. The layers may be employed for photographic purposes in any desired fashion.

It is also possible to incorporate insoluble salts, for example hydrazoaryl-sulfonic acid compounds with alkaline earth salts or nitrogenous organic bases with cinchonine or quinoline in the layer, or emulsion respectively.

It will be understood that no restriction is made to the substances specifically referred to, and that various modifications of this process are quite possible within the meaning of the above description and the annexed claims without departing from the spirit of the invention.

I claim:—

1. A photographic material for producing col-

ored images, comprising a light-sensitive silver halide gelatine emulsion and a hydrazo substance.

2. A photographic material for producing colored images, comprising a plurality of silver halide gelatine emulsions in combination with hydrazo substances, the said emulsions being disposed in desired order on a support.

3. A photographic material for producing colored images, comprising a light-sensitive silver halide gelatine emulsion and a hydrazo derivative.

4. A method of producing color images which comprises incorporating a hydrazo compound in a silver halide gelatine emulsion layer, producing a silver image in the said emulsion layer, and treating the layer with an oxydizing substance to transform the hydrazo compound into an azodyestuff.

5. A method of producing color images which comprises incorporating a hydrazo compound in a silver halide gelatine emulsion layer, producing a silver image in the said emulsion layer, treating the layer with an oxydizing substance to transform the hydrazo compound into an azodyestuff, and treating with a dyestuff-destroying agent which destroys the said azodyestuff by reaction with the silver particles in proportion to the silver image produced in the layer.

6. In a method of producing color images by selective dyestuff reaction with the silver image, the step which consists in treating a sliver image layer containing a hydrazo substance uniformly dispersed in said layer with an oxidizing substance to transform the hydrazo substance into an azodyestuff.

7. A method of producing color images which comprises treating a silver image layer containing a hydrazo substance uniformly dispersed in said layer with an oxidizing substance to transform the hydrazo substance into an azodyestuff, and treating with a dyestuff destroying agent which destroys the said azodyestuff by reaction with the silver particles in proportion to the silver image produced in the layer.

8. A method of producing color images which comprises treating a silver image layer containing a hydrazo substance uniformly dispersed in said layer with an oxidizing substance to transform the hydrazo substance into an azodyestuff, and treating with a dyestuff destroying agent which destroys the said azodyestuff by reaction with the silver image in inverse proportion to the silver image produced in the layer.

9. A method of producing color images which comprises treating a silver image layer containing a hydrazo substance uniformly dispersed in said layer with an agent which converts the silver particles of said image into an oxidizing substance, and utilizing the oxidizing agent thus formed to transform said hydrazo substance into an azodyestuff.

BÉLA GÁSPÁR.