

# UNITED STATES PATENT OFFICE.

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## MANUFACTURE OF COLORED PHOTOGRAPHIC IMAGES.

No. 885,453.

Specification of Letters Patent.

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*To all whom it may concern:*

Be it known that I, LÉON DIDIER, a subject of the French Republic, and residing at Höchst-on-the-Main, Germany, have invented certain new and useful Improvements in the Manufacture of Colored Photographic Images, of which the following is a specification.

According to French specification No. 337054 colored photographic images are obtained in the following manner:—A gelatin layer sensitized with bichromate is exposed to light under a diapositive, parts of the layer being thus rendered hard. Excess of bichromate having been washed away with water, the gelatin layer is dyed by immersion in a dyestuff solution; excess of dyestuff is removed by rinsing and a moist paper coated with gelatin is brought into close contact with the dyed layer. In this manner the dyestuff is said to be transferred only from the unexposed parts to the gelatin paper so that a colored positive image is produced. It appears from experiments that dyestuffs generally do not behave towards hardened or unhardened gelatin in the manner requisite for the success of the said process. If, for instance, in order to obtain a blue color, methylene blue, patent blue or crystal violet is used, for a red color, magenta, safranin, or rhodamin; and for a yellow color, picric acid, tartrazin or auramin, either the exposed and unexposed parts of the gelatin layer are dyed alike, yielding their color uniformly to the gelatin paper, so that no image is obtained, or the dyestuff is not sufficiently retained by the gelatin and may for the greater part be readily removed by washing with water, thus producing a feeble hazy image. Some dyestuffs have the peculiar property of producing a reversed image. Similar results have been obtained with most of the other colors, even with those of different shades. Here, too, no image or only an indistinct one is obtained. Again with some dyestuffs at first an apparently good image is obtained but this subsequently proves useless, as it becomes indistinct owing to the dyestuff not having been sufficiently fixed by the gelatin.

According to the present invention excellent results may be obtained if certain dyestuffs are used. For instance, the mikado-dyestuffs obtained from para-nitro-toluene-

sulfonic acid, the soluble azo-dyestuffs derived from dehydro-thiotoluidin, primulin or their homologues and substitution products, natural carmin, the sulfonic acids of indulin and nigrosin, naphthazin blue and some of the diamine colors, like diamine pure blue, dianil blue, dianil yellow, dianil garnet and others. Of the anthraquinone dye-stuffs may be used the arylidoanthraquinone sulfonic acids and their derivatives.

For example, to produce a blue image, a gelatin layer sensitized by immersion in a 4 per cent. solution of bichromate may be exposed to light under a diapositive and excess of bichromate removed by washing with water. The layer may then be immersed in an aqueous solution of fast blue (indulin-sulfonic acid) of say 4 per cent. strength, rinsed with water after 15 minutes and then brought into intimate contact with a moist gelatin paper. After about 10 minutes the paper may be removed from the layer, when it will be found to exhibit the image in blue. The original layer, without being re-dyed, may serve several times for reproducing the image or may be colored again by immersion in a dye-bath.

This process is of special importance in the manufacture of three color photographs. The operation may be conducted, for instance, as follows:—From the 3 negatives are made 3 diapositives under which are exposed the bichromate gelatin plates as described above. The gelatin plate which corresponds with the red screen negative may be then dyed by immersion in a solution of about 4 per cent. strength of, for instance, diamine pure blue, and the image may be transferred to the gelatin paper as hereinbefore described.

The gelatin plate which corresponds with the green negative may be dyed by immersion in a solution of about 4 per cent. strength of carmin or of the azo-dyestuff from primulin-sulfonic acid and 1:4:7-alpha-naphtholdisulfonic acid and afterwards washed. The previously obtained blue, still moist or re-moistened image may then be placed on the red plate in such a manner that the outlines cover each other, and closely pressed; after about 10–15 minutes the image is removed.

The gelatin plate which corresponds with the blue screen negative may be dyed in a solution of about 4 per cent. strength of dianil



yellow R (azo-dyestuff from primulin-sulfonic acid and phenylmethylpyrazolone), excess of the dyestuff removed by rinsing with water and the blue and red image laid  
5 on so that the outlines cover each other. After about 15 minutes the finished image is removed from the plate.

Having now described my invention, what I claim is:—

10 The process herein described of producing colored photographic images on the three color-principle, which consists in dyeing a gelatin-layer sensitized with bichromate, exposed under a diapositive and washed, by  
15 immersing it in an aqueous solution of sulfonic acids of indulin, then removing the excess of dyestuff and bringing the dyed layer into close contact with moistened gelatin pa-

per, then superposing the blue image thus obtained on a gelatin-layer sensitized with 20 bichromate, exposed under a diapositive and washed, by immersing it into an aqueous solution of natural carmin, then superposing the blue and red images thus obtained on a gelatin-layer sensitized with bichromate, ex- 25 posed under a diapositive and washed, by immersing it into an aqueous solution of a primulin dye.

In testimony that I claim the foregoing as my invention, I have signed my name in 30 presence of two subscribing witnesses.

LÉON DIDIER.

Witnesses:

JEAN GRUND,  
CARL GRUND.