

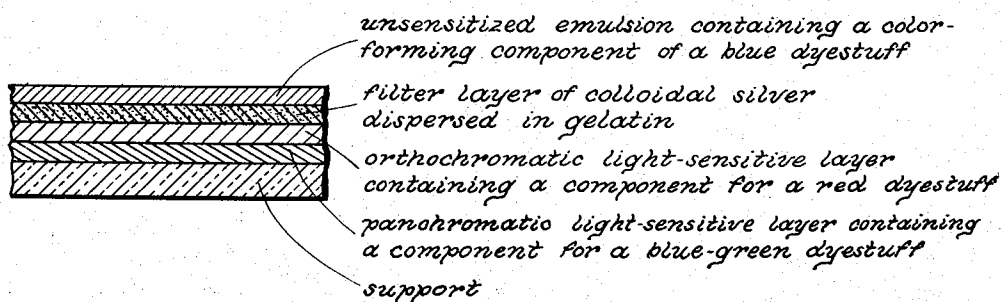
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FILTER LAYER FOR PHOTOGRAPHIC COLOR FILMS AND PLATES

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FILTER LAYER FOR PHOTOGRAPHIC COLOR FILMS AND PLATES

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2 Claims. (Cl. 95—2)

The present invention relates to the manufacture of photographic color films and plates containing an improved filter layer.

One of its objects is a photographic color film or plate containing a filter layer prepared from colloidal silver. Another object is a process of preparing such photographic color films and plates. Further objects will be seen from the detailed specification following hereafter.

It is known practice to insert intermediate filter layers colored with dyestuffs in photographic multiple-layer material for the purpose of color photography. For coloring these layers both organic dyestuffs and inorganic colored salts have been used.

The number of the latter which can be applied is limited; the organic dyestuffs on the other hand have in large part properties which make them unsuitable for use in special processes, namely their effect on the photographic emulsions, their tendency to bleed from one layer to another by diffusion and their incomplete destructibility. It may be said that there is scarcely one organic dyestuff or one inorganic pigment which is completely indifferent to the highly-sensitive layers in which they are embedded as intermediate layers.

If the material provided with the filter layers is to be subjected to reversal development, substantive dyestuffs, which are nullified by the reversal bath, may be used without special disadvantage. These dyestuffs are not applicable, however, if by color development before the use of the bleaching-bath a dyestuff picture is produced, because by the usual vigorous reducing baths, for example chromic acid or potassium permanganate, these dyestuff pictures are destroyed or at least seriously damaged.

This invention relates to a process, whereby filter layers are obtained which fulfill all requirements, that is to say which are in all cases in which they are contacted or connected with a silver halide emulsion layer fast to diffusion and photographically indifferent, by dispersing in gelatin colloidal silver in suitable degree of dispersing and using this gelatin as the filter layer. In this manner bright yellow to garnet-red filters are obtained by observing known conditions.

It has been proposed to use intermediate layers of silver or exposed silver halide emulsion layers in multi-layer films which are to be developed by the reversal method, but in this case the optical properties of a colloidal silver layer have not been utilized, but rather the catalytic

effect of the silver in destroying the dyestuffs with which it is in contact is applied. It has also been proposed to use colloidal silver of a color as dark as possible for making anti-halation layers in reversal films, but the production of light-filters which are introduced on, between or under the emulsion layers of a light-sensitive material for color photography purposes is new.

Such filter layers are absolutely free from diffusion and cannot in any case damage the emulsion which lies above or below them. Moreover, the silver is removed by any desired solvent for silver without damaging the dyestuff. The layers are made by producing a silversol of suitable color, for example by reducing silver nitrate in an alkaline medium by means of an organic reducing agent, such as dextrin, ferrous citrate or hydroquinone, and pouring this into the gelatin solution. The quantity of silver used is about 30 grams AgNO_3 per 1 kilogram of emulsion. The gelatin solution is then allowed to solidify, cut into strips and the inorganic or organic soluble compounds washed out of it. There remains in the gelatin only the pure colloidal silver. Such gelatin solutions can be applied to the support in the usual manner, which support may be cast or not cast.

The following examples when taken with the accompanying drawing disclosing in section a multi-layer film provided with a colloidal silver filter layer serve to illustrate the invention:

1. A light-sensitive color material carrying a filter layer according to the invention is composed for instance as shown in the drawing and comprises a support on which is poured a panchromatic light-sensitive layer containing a component for a blue-green dyestuff, on this is cast an orthochromatic light-sensitive layer containing a color-forming component of a red dyestuff. On the latter there is cast the filter layer described by the present invention containing colloidal silver, the grain size of which is suitably adjusted in such a way that only the blue part of the light is absorbed. On this filter layer is cast the last layer, an unsensitized emulsion containing a color-forming component of a blue dyestuff. Such a film after the exposure to light and after the reversal may either be developed by a color-forming developing process or may be transformed into colored pictures by a diazo-process.

2. Another material suitable for color photographic exposures consists of a film bearing a grain-screen, a line-screen or a lenticular screen in which between the screen and the emulsion

- layer or at another suitable place before the emulsion layer when looking in the direction of the impinging light rays the filter layer containing colloidal silver is poured, the grain size of the colloidal silver is chosen in such a way that the absorption of the filter is adjusted according to the sensitivity of the light-sensitive layer so that it is possible to adjust the exposure conditions as it is desired for instance for artificial or day-light.
- 10 As it has already been pointed out above, the different degrees of dispersion of the silver particles in the colloid layers are obtained according to known methods. Such methods are for instance described in "Kolloides Silber" by Carey
- 15 Lea 1908. It is also possible to influence the size of the silver particles and consequently the color of the filter layers to be prepared by the addition of electrolytes. Such processes are described for instance in "Encyklopädie der Photographie",
- 20 Heft 58, Photographische Probleme by Dr. Lüppo Cramer.

What we claim is:

1. A light-sensitive element for color photography comprising a base, a plurality of differently sensitized light-sensitive gelatino-silver halide emulsions on said base, a filter-layer interposed between two such layers, said filter layer comprising colloidal silver dispersed in a gelatine emulsion, the amount of silver to emulsion

being on the order of that represented by 30 gr. of silver nitrate to 1000 gr. of emulsion, said filter layer having a color ranging from bright yellow to garnet-red, the size of the colloidal silver particles in said layer being such that said filter layer absorbs light rays in the region to which the layer preceding it is sensitized and transmits light rays in the region to which the layer succeeding it is sensitized.

2. A light-sensitive element for color photography comprising a support and a plurality of differently sensitized silver halide emulsion layers, each of the layers containing a dyestuff component capable of being developed by a color forming developing process, two of said light-sensitive layers being separated by a filter layer comprising colloidal silver dispersed in a gelatine emulsion, the amount of silver to emulsion being on the order of that represented by 30 gr. of silver nitrate to 1000 gr. of emulsion, said layer having a color ranging from bright yellow to garnet-red, the size of the colloidal silver particles in said layer being such that said filter layer absorbs light rays in the region to which the layer preceding it is sensitized and transmits light rays in the region to which the layer succeeding it is sensitized.

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