

RESERVE COPY
PATENT SPECIFICATION

Application Date: Aug. 8, 1928. No. 22,906 / 28. 324,043

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PROVISIONAL SPECIFICATION.



Improvements in or relating to Colour Photography.

I, THOMAS THORNE BAKER, a British Subject, of "Tadcaster", 9, Uxbridge Road, Hatch End, Middlesex, do hereby declare the nature of this invention to be as follows:—

This invention consists of improvements in or relating to colour photography and particularly to the reproduction of transparencies in natural colours from master pictures. The invention is applicable to the production of positive photographic images in natural colours and especially to the production of cinematograph pictures in natural colours.

It is well known that various processes exist by which photographic sensitive surfaces can be exposed in a camera through a coloured screen or reseau made up of tiny coloured elements (generally in two, three, or four colours) distributed in predetermined proportions. The production of such multi-colour screens is typified by the process described in British Patent No. 217,557. In the production of films for photography in natural colours, the film bearing the multi-colour screen is coated with a panchromatic emulsion. Such film is exposed through the colour screen, in the well known manner, and if, after exposure, the emulsion is developed and the negative image is converted into a positive transparency, the picture, when viewed by transmitted light, appears in the natural colours. Alternatively, the transparent picture so produced may be left in the negative condition, when the colours of the original subject will appear as complementaries.

This invention particularly relates to the production or duplication of positive images by photographic printing. This may be done in two ways. Thus, a positive in natural colours may be employed as a master copy and from it may be printed by contact, or by projection, further similar positives, the sensitive film (always exposed through the multi-coloured screen or reseau) being developed and reversed in each case, making a positive from a positive; or a negative in complementary colours may be employed, and from it may be printed by contact or by projection positive copies, the sensitive

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film being merely developed and fixed in the well-known manner.

It is found in practice exceedingly difficult to obtain good results by either of such processes, and I have now discovered means by which the difficulties may be overcome.

From spectroscopic examination of the multi-colour screen, or reseau, I find that the spectrum-band of colour is in most cases wider than it should be theoretically, i.e. in accordance with the accepted theories of two-colour or three-colour photography. The result is that although the colours in the original transparency may appear good, they are largely vitiated by a white hue due to the overlap between the spectral transmissions of the reseau. When a print is made, this fault is again produced and the effect is magnified, with a result that the colours may be very feeble and may, indeed, not appear at all in the print.

I have found that by employing elements in the multi-colour screen or reseau of the master film which give a narrower spectral transmission, or, alternatively, by intensifying the master copy so that by the increase in the neutral grey reduced silver deposit the transmission spectrum-bands are effectively narrowed, brilliant and greatly superior and more faithful colours can be produced whether the copies are made by either of the processes above described.

The method may consist in increasing the contrast of the master image beyond that which would be normal for correct reproduction of colour.

A great drawback to the coloured copies, especially in small sizes such as are used for cinematography, is the lack of sharp definition caused by the separation of the two photo-sensitive layers by the reseau and its support. I have overcome this by illuminating the printing frame with parallel rays of light so that the image does not spread during the passage of the rays through the reseau support. This may be done, for example, by using a lamp with a point-source of light placed at the focal distance from a condensing lens so that the emitted rays

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are parallel to the axis of the lens and the two films are placed at right-angles to the parallel rays.

5 It is advantageous to employ this invention in conjunction with that described in my concurrent Application No. 22,905/28 (322,231) of even date herewith.

Dated this 8th day of August, 1928.

BOULT, WADE & TENNANT,
111 & 112, Hatton Garden, London,
E.C. 1,
Chartered Patent Agents.

COMPLETE SPECIFICATION.

Improvements in or relating to Colour Photography.

10 I, THOMAS THORNE BAKER, a British Subject, of "Tadcaster", 9, Uxbridge Road, Hatch End, Middlesex, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

15 This invention consists of improvements in or relating to colour photography and particularly to the reproduction of transparencies in natural colours from master pictures. The invention is applicable to the production of positive photographic images in natural colours and especially to the production of cinematograph pictures in natural colours.

20 It is well known that various processes exist by which photographic sensitive surfaces can be exposed in a camera through a coloured screen or reseau made up of tiny coloured elements (generally in two, three, or four colours) distributed in predetermined proportions. The production of such multicolour screens is typified by the process described in British Patent No. 217,557, or by that described in British Patent Specification No. 22,607 of 1928 (322,432). In the production of films for photography in natural colours, the film bearing the multicolour screen is coated with a pneumatic emulsion. Such film is exposed through the colour screen, in the well known manner, and if, after exposure, the emulsion is developed and the negative image is converted into a positive transparency, the picture, when viewed by transmitted light, appears in the natural colours. Alternatively, the transparent picture so produced may be left in the negative condition, when the colours of the original subject will appear as complementaries.

50 This invention particularly relates to the production or duplication of positive images by photographic printing. This may be done in two ways. Thus, a positive in natural colours may be employed as a master copy and from it may be printed by contact, or by projection, further similar positives, the sensitive film

(always exposed through the multicoloured screen or reseau) being developed and reversed in each case, making a positive from a positive; or a negative in complementary colours may be employed, and from it may be printed by contact or by projection positive copies, the sensitive film being merely developed and fixed in the well-known manner.

60 In order to obtain the original transparency it is desirable to use as short an exposure as possible, and in the case when the invention is applied to colour cinematography it is essential that the exposure used in taking the original or master film should be as short as possible. It is therefore necessary to employ dye-stuffs in the reseau of the master transparency which transmit as high a proportion of light as possible. This has, however, the serious disadvantage that the spectral bands transmitted by the dye-stuffs constituting the elements of the master reseau are so broad that they include more of the spectrum than the theoretical primaries, and hence considerable over-lapping is obtained, and therefore a certain amount of white light produced by the overlaps is transmitted by the reseau, which has the effect of diluting the colours so that they appear very feeble. When a copying film is made by printing from the master film this fault is again produced and the effect magnified, with the result that the colours of the copying film appear very feeble indeed, and in some cases may not appear at all. It is to be understood that the words "copying film" in this specification refer to the film on which an image is formed by printing from the master film; this image being a positive image in the case where the master film has simply been developed and fixed in the ordinary manner, and a negative image in the case where the master film has been reversed.

105 This invention provides a method for the reproduction of transparencies in natural colours from master transparencies of the type in which a dye reseau is associated with the transparency, where-

in the dilution of the colours in the copying transparency by white light due to the overlap of the spectral bands of colour transmitted by the elements of the master reseau is reduced by increasing the intensity of the silver deposit in the master transparency. For example, in the case of a green object which has been photographed on the master transparency, a certain amount of silver will have been exposed behind the red and violet elements of the reseau as well as behind the green elements. When, therefore, the transparency is reversed, the colour of the green object will be diluted by a certain amount of white light due to the additive effect of the light transmitted by the red and violet elements of the reseau, which should theoretically be perfectly opaque. If now such a transparency is treated before reversal with a reducer such as ferricyanide, which preferentially removes silver from the low densities, and is then intensified again, the result will be that on reversal the red and violet elements of the reseau will be perfectly opaque and no undesirable dilution of the green colour with white light will be obtained.

According to a further feature of the invention the dilution of the colours of the copying transparency may be reduced, by so selecting and concentrating the dyestuffs constituting the elements of the copying reseau that the spectral bands of colour transmitted by the said elements are narrowed to such an extent that they do not overlap.

When printing from a master cinematograph film on to a copying film it is not so essential to have a short exposure as is the case during the actual exposure of the master film, and it is therefore possible according to this feature of the invention to employ a reseau for the copying film whose elements transmit spectral bands which are actually narrower than the theoretical primaries. The undesirable dilution of the colours in the master film are thus avoided, as if the spectral transmission of the elements of the copying

reseau are chosen sufficiently narrow, the overlaps will not be copied when printing, and there will be no undesirable dilution of the colours in the copying film. The colours in the copying film will therefore be purer and more saturated than those in the master film.

It is advantageous to employ this invention in conjunction with that described in British Specification No: 322,231.

I am aware of Patent No: 4932 of 1907, and I make no claim to anything disclosed therein.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A method for the production of transparencies in natural colours from master transparencies of the type in which a dye reseau is associated with the transparency, wherein the dilution of the colours in the copying transparency by white light due to the overlap of the spectral bands of colour transmitted by the elements of the master reseau is reduced by increasing the intensity of the silver deposit in the master transparency.

2. A method according to Claim 1 wherein the dilution of the colours of the copying transparency is reduced, by so selecting and concentrating the dyestuffs constituting the elements of the copying reseau that the spectral bands of colour transmitted by the said elements are narrowed to such an extent that they do not overlap.

3. A copying transparency, wherein the dilution of the colours by white light has been reduced by any of the special methods described or claimed herein.

4. The method for the reproduction of transparencies from master films substantially as described herein.

Dated this 17th day of October, 1928.

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