

PATENT SPECIFICATION

451,243

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PROVISIONAL SPECIFICATION

Improvements in or relating to Colour Photography

We, DUFAYCOLOR LIMITED, a British Company, of 19, New Bridge Street, London, E.C.4, SYDNEY RENODEN WYCHERLEY, a British Subject, of Netherleigh, Keswick Road, Orpington, Kent, and THOMAS THORNE BAKER, a British Subject, of The Hut, Hatch End, Middlesex, do hereby declare the nature of this invention to be as follows:—

10 This invention consists in improvements in or relating to colour photography and has for an object to produce in an economical manner colour prints (i.e. photographic prints in approximately 15 natural colours to be viewed by reflected light) from photographic transparencies in colour of the kind in which a multi-colour screen of primary colours is associated with the emulsion and the picture is 20 taken and viewed through the colour screen.

The invention provides the method of producing a composite colour print from a master multi-colour screen record having 25 three-part images of the subject produced by the selective action of the screen colours which comprises the steps of preparing from that record three photographic positive prints corresponding to the said 30 images respectively and one being on a light reflecting base to constitute the base of the final print, toning the prints to colours complementary to the screen colour to which they are appropriate and superposing the prints in register on the print 35 on the permanent light reflecting base.

In the preferred form of the invention the master transparency is developed and reversed to form a positive, a single negative 40 on multi-colour screen material is produced from this positive by contact or projection printing and the photographic positive prints are produced from this negative. In this way a master positive 45 transparency is obtained and as many prints from this master as are required may also be obtained.

In view of the difficulties which occur during registration of the prints due to 50 stretching of the base material when wet, it is preferred to prepare all the photographic prints on similar light reflecting base material and to secure registration of

prints by mechanical means. The use of mechanical means in this case is of course 55 necessary because the light reflecting bases are opaque and the respective images cannot be seen during registration. One way of securing mechanical registration between a plurality of prints is described in 60 Specification No. 406,663 according to which the master transparency and the several prints are perforated and registration is secured by means of a registering board having pins arranged to engage with 65 the perforations.

One method of obtaining a composite colour print from a master positive transparency on multi-colour screen material of the kind described in Specification No. 70 322,432, will now be described by way of example. A negative transparency on similar multi-colour screen material is first produced by contact or projection printing from the positive, the positive 75 having been produced by reversal during the development process. From this negative transparency and without making separation negatives three bromide prints 80 are made:—

- (a) On ordinary bromide paper through a blue-violet filter,
- (b) On colour sensitised bromide paper through a green filter, and
- (c) On red sensitised bromide paper 85 through a red filter.

The print (a) is toned yellow, for example by bleaching it in a solution of lead acetate and potassium ferricyanide and then converting it with potassium bichromate or chromate to a yellow image of lead chromate. 90

The print (b) is toned magenta for example by first bleaching the image (e.g. by treatment with a suitable copper salt) 95 and then treating with a solution of *p* - dimethylaminobenzylidenerhodanine. Alternatively the image may first be converted into silver iodide or mercuric silver chloride before the treatment with 100 *p* - dimethylaminobenzylidenerhodanine.

The print (c) is toned blue, for example by bleaching with potassium ferricyanide and toning with iron alum.

The prints (b) and (c) which have a 105 paper backing similar to that used for

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print (a) but which may be stripped from their backings are then superimposed on print (a) and their backings removed. The registration of the prints is secured by perforating their bases and by the use of a registering board in a manner similar to that described in Specification No. 406,663.

It will be seen that by the method described in the above example it is possible to produce as many prints as may be

desired from a master transparency which has been developed to form a positive. If, however, a master positive is not required the master may be developed as a negative and the step of producing an intermediate negative may be omitted.

Dated this 2nd day of February, 1935.
BOULT, WADE & TENNANT,
111 & 112, Hatton Garden, London, E.C.1.
Chartered Patent Agents.

COMPLETE SPECIFICATION

Improvements in or relating to Colour Photography

We, DUFAYCOLOR LIMITED, a British Company, of 19, New Bridge Street, London, E.C.4, SYDNEY RENODEN WYCHERLEY, a British Subject, of Netherleigh, Keswick Road, Orpington, Kent, and THOMAS THORNE BAKER, a British Subject, of The Hut, 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:—

This invention consists in improvements in or relating to colour photography and has for an object to produce in an economical manner colour prints (i.e. photographic prints in approximately natural colours to be viewed by reflected light) from photographic transparencies in colour of the kind in which a multi-colour screen of primary colours is associated with the emulsion and the picture is taken and viewed through the colour screen.

The invention provides the method of producing a master positive photographic transparency in colours and one or more composite, coloured photographic prints from that positive transparency which consists in developing an exposed multi-colour screen photograph of the subject by the reversal process to form the master positive and copying this positive onto multi-colour screen sensitive material, developing the copy to form a single negative on the multi-colour screen material, the negative record consisting of a plurality of negative part images of the subject produced by the selective action of the colours of the screen, preparing from that negative, for each print, a set of photographic separate positive prints corresponding to the said part images respectively and one being on a light reflecting base to constitute the base of the final print, changing the prints (e.g. by toning the prints or by producing positive prints in colour from them) to colours comple-

mentary to the screen colours to which the respective prints are appropriate and superposing the coloured prints in register on the permanent light reflecting base. In this way a master positive transparency is obtained by the process which gives the best colour rendering i.e. by reversal of the original negative during the developing process, and as many prints from this master as may be required may also be obtained.

In view of the difficulties which occur during registration of the prints due to stretching of the base material when wet, it is preferred to prepare all the photographic prints on similar light reflecting base material and to secure registration of the prints by mechanical means. The use of mechanical means in this case is of course necessary because the light reflecting bases are opaque and the respective images cannot be seen during registration.

One method of obtaining a composite colour print from a master positive transparency on multi-colour screen material of the kind described in Specification No. 322,432, will now be described by way of example. A negative transparency on similar multi-colour screen material is first produced by contact or projection printing from the positive, the positive having been produced by reversal during the development process. From this negative transparency and without making separation negatives three bromide prints are made:—

(a) On ordinary bromide paper through a blue-violet filter,

(b) On green sensitised bromide paper through a green filter, and

(c) On red sensitised bromide paper through a red filter.

The print (a) is toned yellow, for example by bleaching it in a solution of lead acetate and potassium ferricyanide and then converting it with potassium bichromate or chromate to a yellow image of lead chromate.

The print (b) is toned magenta, for example by first bleaching the image (e.g. by treatment with a suitable copper salt) and then treating with a solution such as a solution of *p*-dimethylaminobenzylidenerhodanine as described in co-pending application No. 3461/35 (Serial No. 444,773). Alternatively the image may first be converted into silver iodide or mercuric silver chloride before the treatment with *p*-dimethylaminobenzylidenerhodanine. Other methods of producing a magenta image from the print (b) may be employed e.g. the print may be dyed-toned or a magenta print may be obtained from it by inhibition printing or by the method known under the Registered Trade name "Carbro."

The print (c) is toned blue, for example by bleaching with potassium ferricyanide and toning with iron alum (ferric ammonium sulphate).

The prints (b) and (c) which have a paper backing similar to that used for print (a) but which may be stripped from their backings are then superimposed on print (a) and their backings removed. The registration of the prints is secured by mechanical means as described in Specification No. 406,663 according to which the master transparency (in the present case the intermediate negative) and the several prints are perforated and registration is secured by means of a registering board having pins arranged to engage with the perforations.

It will be seen that since in the method described above the master photograph is obtained as a positive by the reversal process the invention is advantageously distinguished from methods (see Specification No. 406,663) in which positive coloured prints are produced direct from a multi-colour screen master photograph in the form of a negative, or from methods (see Specifications Nos. 8390/96 and 716/07) in which a single intermediate positive is produced from a master negative taken through a multi-colour screen. The method is also more economical than prior proposals (see specification No. 406,663) in which composite prints are produced indirectly from a positive master transparency by the use of a plurality of partial negatives produced from the master positive. Specification No. 8390/96 refers to the production of a single intermediate negative from a single positive subdivided into partial colour records by

means of a multi-colour screen or the like, and to the production from that negative of a plurality of separate positive prints which are to be used for the production of printing surfaces. This specification however does not refer to the use of the reversal process for the preparation of the master positive nor is it concerned with the production of composite photographic prints on a light reflecting base.

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

1. The method of producing a master positive photographic transparency in colours and one or more composite, coloured photographic prints from that positive transparency which consists in developing an exposed multi-colour screen photograph of the subject by the reversal process to form the master positive and copying this positive onto multi-colour screen sensitive material, developing the copy to form a single negative on the multi-colour screen material, the negative record consisting of a plurality of negative part images of the subject produced by the selective action of the colours of the screen, preparing from that negative, for each print, a set of photographic separate positive prints corresponding to the said part images respectively and one being on a light reflecting base to constitute the base of the final print, changing the prints (e.g. by toning the prints or by producing positive prints in colour from them) to colours complementary to the screen colours to which the respective prints are appropriate and superposing the coloured prints in register on the permanent light reflecting base.

2. The method according to Claim 1 in which the master colour screen consists of three colours, the single negative is prepared on material having a similar colour screen and three positive prints are prepared from that negative.

3. The method of producing a composite colour print from a master multi-colour screen positive record substantially as described.

Dated this 16th day of September, 1935.
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