

UNITED STATES PATENT OFFICE.

FRANK WORDSWORTH DONISTHORPE, OF BATH, ENGLAND.

PHOTOGRAPHY.

No. 923,030.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, FRANK WORDSWORTH DONISTHORPE, gentleman, a subject of the King of Great Britain, residing at Hohenfels, Combe Down, Bath, England, have invented new and useful Improvements in Photography, of which the following is a specification.

The object of this invention is by an improved method of rendering portions of a photographic negative unsaturable by aqueous dyes, to provide a plate which shall be capable of being used as a hydrotype printing plate for color photography or as a colored transparency.

According to this invention I load or charge with mineral or pigmentary matter the more opaque parts of an ordinary gelatin emulsion negative or other similar negative having a gelatin basis, whether on glass, celluloid or other support, and thus render these parts unsaturable by aqueous dyes or fluids, this resistance to the entry of aqueous fluids being proportionate to the amount of light that has acted on the different parts, and after this treatment the negative is soaked in the aqueous dye or solution.

Provided that the solution or solutions used to transform the negative into a hydrotype printing surface, can fulfil the essential condition of so reacting with the silver of the negative as to cause the deposition of a pigmentary material, there may be a wide choice in the matter of solutions or baths, so it is impossible to specify every individual solution that can be used, but I will particularize the following not only as examples but also as affording specific instructions for the practical working of the process. The proportions of the ingredients here given must be considered as approximate, as they may be varied considerably without materially affecting the result.

Example 1.

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|----|----------------------------|-----------|
| 45 | A. Uranium nitrate..... | 1 part. |
| | Potassium ferricyanid..... | 1 part. |
| | Water..... | 45 parts. |
| | B. Iron perchlorid..... | 1 part. |
| 50 | Glycerin..... | 1 part. |
| | Water..... | 50 parts. |

Immerse the negative in A for ten minutes, and follow with B for the same period. In bath A a deposit of uranium is made on the negative. By depositing the negative in bath B, a deposit of iron is obtained.

Example 2.

- | | |
|----------------------------|------------|
| A. Lead nitrate..... | 4 parts. |
| Potassium ferricyanid..... | 6 parts. |
| Acetic acid..... | 2 parts. |
| Glycerin..... | 1 part. |
| Water..... | 100 parts. |
| B. Sodium sulfid..... | 1 part. |
| Water..... | 40 parts. |

Immerse in A for ten minutes and follow with B for same period. In bath A the image is bleached, while in bath B the image is blackened.

Example 3.

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|--|------------|
| Vanadium chlorid..... | 2 parts. |
| Potassium ferricyanid..... | 2 parts. |
| Ferric chlorid..... | 1 part. |
| Glycerin..... | 1 part. |
| Ferric oxalate..... | 1 part. |
| Saturated solution of oxalic acid..... | 100 parts. |
| Water..... | 900 parts. |

So far as my present experience takes me, I prefer the bath last mentioned.

The negative is allowed to remain in the bath until the action is fully completed; in most cases this should be in something over ten minutes, but prolonged action, as for example all night, usually does no harm. The negative is then washed in cold water for a few minutes, and transferred into the dye bath or printing solution. If the printing is not to be performed at once the negative may be dried and stored away after washing, and at any subsequent period it may be charged with dye and used as a hydrotype printing plate.

The prepared or treated negatives should be kept in the dye bath or printing solution for about ten minutes, and then rinsed for about a minute in cold water. In order to print from a negative thus saturated with the dye or the printing solution, it is brought into contact with gelatin coated paper, which has been previously soaked in cold water for about a minute. The negative and paper may be brought into contact under water, or immediately after they have been taken out of the water. They are now squeezed together and left in contact for about ten minutes. It is convenient to cover the negative and paper with a damp cloth at this stage and lay a plate of glass over, so as to keep all compact and moist. The ten minutes having elapsed the gelatin paper is stripped from the negative,

and the paper now bears a positive impression in dye from the negative. The negative may then be redyed and used over and over again, the redyeing only taking about
 5 three minutes. This latter part of the process, from the time the negative has been removed from the dye or printing solution is exactly the same as in the case of other
 10 hydrotype printing methods, as for example printing from the positive transparencies in working the pinatype process.

One important use of my invention will be for three color work, by bringing the gelatinized paper into contact with the three
 15 stained negatives in turn, the whole making the complete color picture, just as the effect is obtained in the pinatype process from three positive bichromated gelatin plates.

In order to make a colored transparency
 20 by this method I prepare and dye the negative as described above, but instead of printing on gelatinized paper, I immerse in an ordinary reducing solution so as to bleach or dissolve out the original silver image and the
 25 pigmentary deposit, and leave the dyed or stained portions in the form of a positive. As suitable reducing solutions for this purpose I may mention the well-known hyposulfite and ferricyanid reducer, which is generally
 30 spoken of as Howard Farmer's reducer, and a reducer compounded of potassium ferricyanid one part, carbonate of soda crystals six parts and water forty parts.

In order to make a three color transparency by this method, one of the negatives
 35 should be taken reversed in the camera

through the back of the plate and the second should be taken direct or unreversed, while the third should be on film. The two pictures taken on the plates are now mounted
 40 face to face, with the picture on film between them.

What I claim is:—

1. The method herein described which consists in rendering portions of a photographic
 45 negative unsaturable by aqueous dyes by loading the more opaque parts of the negative with pigmentary matter and then soaking the negative in an aqueous dye.

2. The method herein described which consists in rendering portions of a photographic
 50 negative unsaturable by aqueous dyes by loading the more opaque parts of the negative with pigmentary matter, washing in cold water and then soaking the negative in an
 55 aqueous dye.

3. The method herein described which consists in rendering portions of a photographic
 negative unsaturable by aqueous dyes by loading the more opaque parts of the negative
 60 with pigmentary matter, soaking the negative in an aqueous dye and then bringing the negative into contact with a gelatin surface.

4. A printing plate having its more opaque
 65 parts loaded with pigmentary matter and which has then been soaked in an aqueous dye.

FRANK WORDSWORTH DONISTHORPE.

Witnesses:

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B. WILLIAMS.