

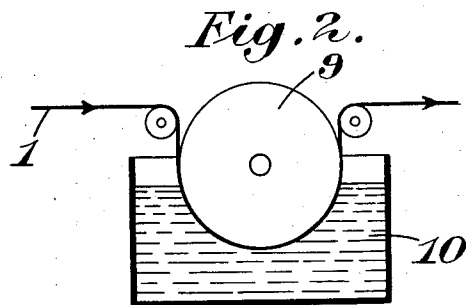
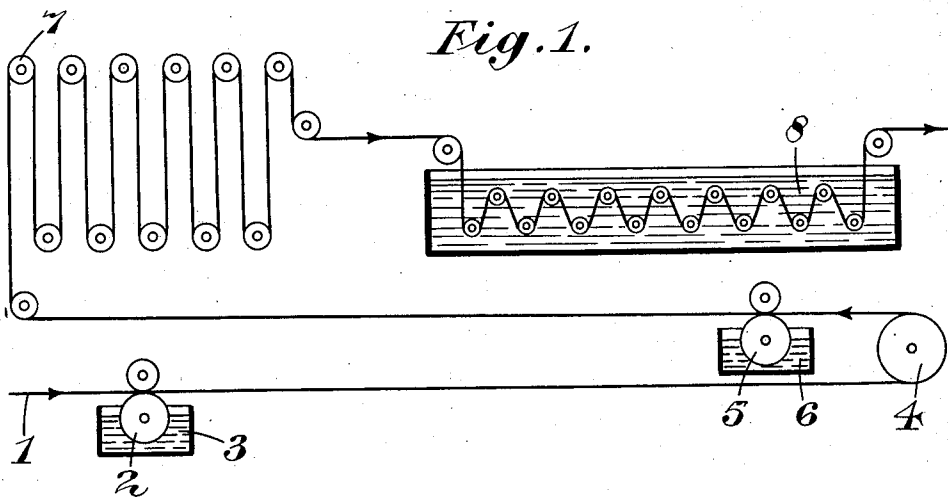
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H. D. MURRAY ET AL

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CHEMICAL TREATMENT OF PHOTOGRAPHIC IMAGES

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Inventors:
Humphrey Deane Murray &
Douglas Arthur Spencer,
By Stebbins, Blenko & Parnelles,
Attys

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CHEMICAL TREATMENT OF PHOTOGRAPHIC IMAGES

Humphrey Desmond Murray and Douglas Arthur Spencer, London, England, assignors to The Veracol Film Syndicate Limited, London, England, a British company

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2 Claims. (Cl. 95—88)

This invention consists in improvements in or relating to the chemical treatment of photographic images. It is sometimes desired when developing, fixing or otherwise treating photographic images with chemical solutions to apply the solution to only one side of the support carrying the image. This is particularly so when the support carries two images one on each side thereof and it is desired to treat the two images independently.

One known method of applying a solution to only one side of the support is to float the support with one side on the surface of one solution and then, if it is desired also to treat the other side, to reverse the support and float it with the other side on the surface of a second solution.

This method, however, suffers from the disadvantage that the solution is apt to wet the upper surface. This is particularly the case when the method is applied to the treatment of cinematograph films because the solutions are apt, by running up through the sprocket holes in the film, to wet the upper surface. Further some solutions used in treating photographic images are subject to surface oxidation which causes difficulties when they are used for treatment of an image by contact with the surface of the solution. This difficulty is of especial importance when the solutions are developers containing a low concentration of sodium sulphite relative to normal developing solutions, such as are used in the production of photographic images in colour by the process known as colour development. In this process a solution containing a selected photographic developing agent is allowed to act upon an emulsion containing a silver salt which has been wholly or partly exposed to light. There is simultaneously present either in the emulsion or in the solution of the developing agent a second substance known as a colour former which enters into the reaction to produce the coloured image.

It is an object of the present invention to provide a method of treating a photographic image with a chemical solution in which the above disadvantages are reduced or overcome.

The invention consists in the method of treating a photographic image with a chemical solution which comprises incorporating a thickening agent in the treating solution and then applying the thickened solution as a coating, leaving the coating in position for sufficient time for it to act on the image and then removing the coating. Suitable thickening agents for incorporation in a developing solution are gums, boiled starch, gela-

tine or glue and the coating may then be removed by washing off with cold or hot water.

Of the thickening agents mentioned, gelatine is to be preferred, as a sufficient concentration may be used to effect the setting of the applied developing or other coating on a cinematograph film and the film may subsequently be made to travel vertically, without the applied layer running down, until development is complete, when the applied layer may be removed by washing in warm water. Gelatine is a typical gel-forming colloid which can be used in such concentration that it is fluid when warm and will set when cool.

One specific example of a method according to the invention is as follows. A cinematograph film bearing on both sides a silver image produced by exposure, development, fixing, washing and drying, is bleached in any suitable known bleaching bath to produce corresponding images formed substantially of silver chloride. One side of the film, the image of which is to be coloured yellow, preferably after exposure to strong light has applied to it a mixture of the follow solutions by any suitable means such as coating from rollers or from weirs or by dipping:

A

Diethyl - paraphenylenediamine hydrochloride	grams	1.6
Sodium sulphite (crystals)	do.	3.0
Diethanolamine	cubic centimeters	30
Water	do.	70

B

Alpha-chlor-aceto-acet-para-toluidide	grams	1.2
Ethylglycol	cubic centimeters	15
Acetone	do.	5

C

50% gelatine (warm) cubic centimeters 100

C is added to A with stirring, then B to the mixture.

One method of applying the coating is illustrated diagrammatically in Figure 1. The film 1 is passed over a roller 2 dipping into a trough 3 containing warm developing solution. The film is then moved horizontally to allow the coating layer to set and it may, if desired, be chilled to accelerate the setting. The film is then reversed about a roller 4 and a coating layer containing in place of solution B a different colour former is applied to the other side by a roller 5 dipping into a trough 6. The horizontal movement of the film is continued while the second coating is

setting and the film is then festooned over a series of rollers 7 until development is complete when the applied layers are removed by washing the film in warm water in a tank 8. The developed silver is then removed (e. g., in Farmer's reducer) and the film washed and dried. The product bears a coloured image on each side of the film.

An alternative method of applying the coating layers is illustrated in Figure 2 in which the film 1 is carried by a roller 9 into the solution 10, the contact between the upper face of the film and the roller preventing the application of the thickened developer to that face.

Different colour formers which may be employed are for example:

Blue, 0.25% alphanaphthol in methyl alcohol.
Magenta, 0.50% p-nitro phenyl-aceto-nitrile in acetone.

Equal volumes of the solutions of these colour formers may be used in place of the solution B in the above example.

In another specific example of the method according to the invention a coating of thickened developing solution is applied to a film which has simply been exposed without development. The emulsion is first hardened to render it insoluble in water and then has applied to it a coating of a warm mixture of the following three solutions:

A		
Diethyl - paraphenylenediamine hydrochloride	grams	1.6
Sodium sulphite (crystals)	do.	3.0
Sodium carbonate (crystals)	do.	20
Potassium bromide	do.	.005
Water	cubic centimeters	100

B		
p-nitro-phenyl-aceto-nitrile	grams	1.2
Ethylglycol	cubic centimeters	20

C		
50% gelatine (warm)	cubic centimeters	100

C is added to A with stirring, then B to the mixture. The image produced is magenta.

The coated gelatine-developing solution may be warmed before the film passes into warm water and the coating carefully removed by means of a scraper or rotating wheel so positioned as just to clear the surface of the photographic emulsion. The gelatine-developer so recovered may be mixed with fresh developer and used a second time.

When the image is bleached before development it may, if desired, be converted to silver bromide instead of, as in the first example above, to silver chloride.

When suitable colour developing solutions are chosen the process may be applied to the production of the colours of a two-colour film or to the production of two of the colours of a three-colour film.

We claim:

1. In the art of color photography, the method of developing a photographic image which comprises incorporating in a color developing solution sufficient gelatine to set the solution when cool, applying the solution while warm as a coating on the image, immediately cooling the coating to set it, leaving the coating in position for sufficient time for it to act on the image and then removing the coating by washing in warm water.

2. That improvement in methods of developing a photographic image in color which comprises incorporating in a solution containing an appropriate color developer for the image a gel-forming colloid of such character and in such concentration that it is fluid when warm and will set when cool, applying said solution while warm as a coating on the image, immediately chilling said coating to form a set layer of the color developer, leaving the coating in position for sufficient time for it to develop the color image, and thereafter removing said coating by treatment with warm water.

HUMPHREY DESMOND MURRAY.
DOUGLAS ARTHUR SPENCER.