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PHOTOGRAPHIC DEVELOPING AND FIXING SOLUTION

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10 Claims. (Cl. 95—6)

This invention relates to processing solutions for photographic layers of cellulose esters containing silver salts in the body of the layer.

In my prior application, Serial No. 74,815, filed April 16, 1936, I described photographic layers consisting of hydrolyzed cellulose monobasic organic acid esters, such as cellulose acetate, of 19 to 33% acyl content containing a sensitive silver salt. These layers are treated in the usual way to form an image by exposure, development, and fixing. I have found that while the hydrolyzed esters of from 19 to 26% acyl content are sufficiently water-permeable to enable the development and fixing actions to occur in about the same time required with gelatin emulsions, where an ester containing more than 26% acyl is used as the carrier for the sensitive silver salt, the processing solution, such as the developing and fixing solutions do not penetrate the cellulose ester layer as rapidly as is desired.

It is, therefore, an object of the present invention to provide a developing or fixing solution which permits the dissolved developing or fixing salts to readily penetrate a hydrolyzed cellulose ester layer having an acyl content of about 26 to 33%.

This object is accomplished by incorporating in the developing or fixing solution a swelling agent for the hydrolyzed cellulose ester.

Although the rate of penetration of the developing and fixing solutions may be increased by dilution with an equal or greater volume of water, a more satisfactory method is to dilute the developer with water and at the same time add to it a sufficient quantity of swelling agent to decrease the time of penetration of the solution. Among the swelling agents that I have found suitable for use in the developer are acetone, methyl Cellosolve (methoxy ethanol), ethyl lactate and ethyl carbamate. In the fixing bath potassium thiocyanate is satisfactory.

The following are specific examples of developing and fixing baths compounded according to my invention, it being understood that they are for the purposes of illustration only.

EXAMPLE I

Developing solution

Para-methyl-amino-phenol sulfate	grams	0.31
Sodium sulfite	do	4.5
Hydroquinone	do	1.2
Sodium carbamate	do	6.7
Potassium bromide	do	.2
Ethyl carbamate	do	20
Water to	ccs	200

EXAMPLE II

Fixing solution

Sodium thiosulfate	grams	10
Potassium thiocyanate	do	5
Water to	ccs	50

The solutions used according to my invention are of value in treating hydrolyzed cellulose ester layers of about 26% to about 33% acyl. Where the cellulose ester has been hydrolyzed to an acyl content of less than about 26%, the layer is sufficiently water-permeable to permit processing without the use of swelling agents in the processing baths. Where the cellulose ester has been hydrolyzed to a less degree and the acyl content is above about 33%, the ester is not permeable to water even in the presence of the swelling agents referred to and for that reason would not be satisfactory as a carrier for the sensitive silver salt. The limits of acyl contents stated are, however, approximate and not critical limits.

In processing a hydrolyzed cellulose monobasic acid ester, the photographic layer will contain originally a sensitive silver salt, such as silver halide which after exposure and development results in the reduction of the exposed silver halide to metallic silver, leaving silver halide in the layer at the points of unexposure. This silver halide is removed in the fixing solution in a manner well understood to those skilled in the art.

My invention may be used in other ways not herein specifically mentioned and it is to be understood that it is limited only by the scope of the appended claims.

What I claim is:

1. The method of treating an exposed photographic element which comprises immersing the element including a layer of hydrolyzed cellulose monobasic organic acid ester of about 26% to about 33% acyl content containing a silver salt, in a processing solution containing an organic swelling agent for the cellulose ester.

2. The method of treating an exposed photographic element which comprises immersing the element including a layer of hydrolyzed cellulose acetate of about 26% to about 33% acetyl content containing a silver salt, in a processing solution containing an organic swelling agent for the cellulose ester.

3. The method of developing an exposed photographic layer which conprises immersing a layer of hydrolyzed cellulose monobasic organic acid ester of about 26% to about 33% acyl content containing a sensitive silver salt, in a developing solution containing an organic swelling agent for the cellulose ester.

4. The method of developing an exposed photographic layer which comprises immersing a layer of hydrolyzed cellulose acetate of about 26% to about 33% acetyl content containing a sensitive silver salt, in a developing solution containing an organic swelling agent for the cellulose ester.

5. The method of fixing a photographic image which comprises immersing a layer of hydrolyzed cellulose monobasic organic acid ester of about 26% to about 33% acyl content containing a silver salt and a developed image, in a fixing solution containing an organic swelling agent for the cellulose ester.

6. The method of fixing a photographic image which comprises immersing a layer of hydrolyzed cellulose acetate of about 26% to about 33% acetyl content containing a silver salt and a developed image, in a fixing solution containing an organic swelling agent for the cellulose ester.

7. The method of developing an image in a photographic layer of hydrolyzed cellulose monobasic organic acid ester of about 26% to about 33% acyl content containing a silver salt, which comprises immersing said layer after exposure in a developer solution containing ethyl carbamate.

8. The method of developing an image in a photographic layer of hydrolyzed cellulose acetate of about 26% to about 33% acetyl content containing a silver salt, which comprises immersing said layer after exposure in a developer solution containing ethyl carbamate.

9. The method of fixing an image in a photographic layer of hydrolyzed cellulose monobasic organic acid ester of about 26% to about 33% acyl content containing a silver salt and a developed image, which comprises immersing said layer in a fixing solution containing potassium thiocyanate.

10. The method of fixing an image in a photographic layer of hydrolyzed cellulose acetate of about 26% to about 33% acetyl content containing a silver salt and a developed image, which comprises immersing said layer in a fixing solution containing potassium thiocyanate.

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