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PREVENTION OF FUNGUS GROWTH ON PHOTOGRAPHIC FILMS

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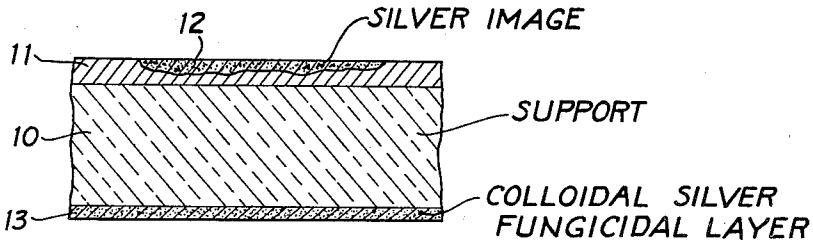

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PREVENTION OF FUNGUS GROWTH ON PHOTOGRAPHIC FILMS

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6 Claims. (Cl. 95—1)

This invention relates to photography and particularly to a method for preventing the growth of fungus and mold on photographic films, plates and papers.

One of the difficulties encountered in the storage of finished photographic elements such as photographic films or plates under conditions of high temperature and humidity, such as storage in the tropics, is the formation of fungus growth or mold on the backs of the films or plates. The appearance of these growths is not usually noticed on the emulsion side of the elements presumably because the silver salts present in the emulsions act as fungicides or insecticides to prevent the growths at that place, but may occur there if simple gelatin overcoatings are employed, e. g., for anti-abrasion purposes.

It is, therefore, the principal object of the present invention to provide a method for preventing the growth of fungus or mold on photographic elements when stored under tropical conditions.

This object is accomplished by incorporating in the coating on the side of the photographic film or plate, not carrying the emulsion layer, finely divided silver either in the form of a silver protein compound or as colloidal silver in amounts sufficient to prevent fungus growth but insufficient to absorb an appreciable amount of light, for any overcoating above the emulsion layer, e. g., anti-abrasion layer, also may contain such amounts of colloidal silver.

In the accompanying drawing the single figure is a sectional view of a photographic film made in accordance with our invention.

The solutions which we propose to use according to our invention consist of ordinary gelatin solutions with which the silver or silver compound is mixed or dispersed. The gelatin solution is preferably one which contains about 15% gelatin in water. The silver may be incorporated as silver protein powder (Merck) which is either a suspension of metallic silver in protein or a compound of silver with the protein, as silver nitrate solution, and which has undergone reduction to colloidal silver or as colloidal silver of other derivation.

The amount of silver which we prefer to use varies from about 0.005 gram to 0.08 gram per 100 cc. of 15% gelatin solution or 0.03 gram to .5 gram per 100 grams of gelatin. These concentrations have been found sufficient to prevent the growth of mold and fungus when the films on which they are coated are stored for periods up to one year under tropical conditions.

We are aware that colloidal silver has previously been used in film backings for the purpose of preventing halation. However, the amounts necessary for anti-halation purposes are much greater than those which we contemplate using and the silver is removed from the film during processing by a bleach and, therefore, is not present to prevent fungus growth when the films are stored after processing. The application of the colloidal silver material, where it is required to remain after process, is, therefore, restricted to such photographic materials as are not passed through an oxidizing bleach in the course of processing. The amount of colloidal silver which would be used to prevent halation would not be suitable for use according to our invention since we desire that no appreciable amount of light is absorbed by the colloidal silver backing. In the case of transparent materials, the photographic element must be in such condition that it can be printed. The following examples illustrate our invention:

To each four 100 cc. portions of gelatin solution containing 15% solution there were added 0.01, 0.02, 0.03 and 0.04 gram of silver protein powder (Merck). The powder was dispersed in the solution by heating for five minutes at 70° C. with constant stirring. A fifth sample of the gelatin solution was retained as a control. 5 x 7 glass plates were placed on a chilled block and 10 cc. of each solution were coated by means of a pipette. The plates were then removed to a cabinet and allowed to dry for 12 to 14 hours at 27° C.

The plates were processed by exposure and development for five minutes at 23° C. in a developer having the following composition:

Water	grams	250
Monomethyl - p - amino phenol sulfate	do	1.5
Sodium sulfite	do	45
Sodium bisulfite	do	1
Hydroquinone	do	3
Sodium carbonate	do	6
Potassium bromide	do	0.8
Water to	liter	1

They were fixed for ten minutes in acid hypo, washed twenty minutes and dried.

These plates were stored in a tropical climate for a period of about one year and were then examined for fungus growth. Upon examination it was found that only slight fungus growth or none at all had been formed on the plates. Our invention will now be described by reference to

the accompanying drawing. As shown in the single figure of the drawing, which is a sectional view of a photographic element according to our invention, 10 is a support of transparent material such as glass or cellulose ester or opaque material such as paper having thereon a gelatin layer 11 in which is a finished silver image 12. On the other side of the support 10 there is a layer 13 of gelatin containing colloidal silver which acts as a fungicidal layer.

Although we have referred to the use of our invention principally for preventing the growth of fungus on photographic films and plates, it will be understood that coatings according to our invention may also be made on photographic paper supports or supports of synthetic resins or other materials or that the coatings may be placed on photographic elements not containing photographic images. Our invention may be used with sensitive photographic films or plates but is intended chiefly for use on films or plates which have been processed subject to the limitations previously noted and which contain a photographic image on one side thereof or both.

We claim:

1. A photographic element which is substantially free of fungus and mold growth upon storage under tropical conditions, comprising a support having thereon a finished photographic image and a gelatin layer containing from .03 to .5 gram of colloidal silver per 100 grams of gelatin.

2. A photographic element which is substantially free of fungus and mold growth upon storage under tropical conditions, comprising a support having on one side thereof a finished photographic image and on the other side thereof a gelatin layer containing approximately .2 gram of colloidal silver per 100 grams of gelatin.

3. A photographic element which is substantially free of fungus and mold growth upon storage under tropical conditions, comprising a cellulosic support having on one side thereof a finished photographic image and on the other side thereof a gelatin layer containing from .03 to .5 gram of colloidal silver per 100 grams of gelatin.

4. The method of preventing growth of fungus and mold on finished photographic elements having a photographic image on one side thereof, which comprises coating the side of the element opposite to that having the photographic image, with a layer of gelatin containing from .03 to .5 gram of colloidal silver per 100 grams of gelatin.

5. A photographic element which is substantially free of fungus and mold growth upon storage under tropical conditions, comprising a support having on one side thereof a gelatin layer containing a finished photographic image and on the other side thereof a gelatin layer containing silver protein powder having a colloidal silver content of .03 to .5 gram per 100 grams of gelatin.

6. The method of preventing growth of fungus and mold on finished photographic elements having a photographic image on one side thereof which comprises coating the side of the element opposite to that having the photographic image, with a layer of gelatin containing silver protein powder having a colloidal silver content of from .03 to .5 gram of colloidal silver per 100 grams of gelatin.

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