

UNITED STATES PATENT OFFICE

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GELATINO SILVER HALIDE EMULSION

No Drawing.

Application filed February 23, 1929. Serial No. 342,320.

This invention relates to gelatino silver halide emulsions.

Light-sensitive emulsions employed as coatings for photographic films and plates have generally a low electrical conductivity and tend therefore to accumulate static charges. This is true particularly of films which are subjected during the coating operation to mechanical transfer through apparatus. The static charges accumulating on the film tend to break down with the accompanying formation of sparks. The film is thus exposed and is sometimes partially spoiled so that sections must be removed therefrom.

It is the object of the present invention to provide a light-sensitive emulsion having a component which increases the electrical conductivity of the coating and thus prevents the accumulation of static charges on the film. Film coated with such compositions is free from exposed areas, resulting from the discharge of the accumulated static charges.

I have discovered that gelatino silver halide emulsions may be improved by the inclusion therein of a proportion of ethylene glycol, and that emulsions including this material are relatively conductive to electricity so that static charges cannot accumulate on the film which supports the emulsion. Ethylene glycol can be used in substantially all gelatino or collodio silver halide emulsions and is applicable to such emulsions for the purpose of the invention regardless of the particular composition thereof.

As will be understood, such emulsions vary widely in ingredients, proportions, and the treatment to which they have been subjected in preparation. Typical emulsions are described in the British patent to Newton, No. 23,722 of Nov. 2, 1903; British patent to Swan, No. 2,968 of July 22, 1879; United States patents to Cobenzl, No. 718,312 of January 13, 1903; and to Gaedicke, No. 779,777, January 10, 1905; and under the heading, "Emulsions" in Cassell's Cyclopædia of Photography, published by Cassell and Company, Ltd. in 1910. The examples given are merely illustrative, and changes in the composition of the emulsions do not affect the invention.

In such compositions or in any other gelatino silver halide emulsion, I include a proportion of ethylene glycol. The proportion which may be added varies widely, for example, from .5 to 1 parts of ethylene glycol to 100 parts of the emulsion. To obtain the most satisfactory results I prefer to use approximately .5 parts of ethylene glycol per 100 parts of the emulsion, and I have found that this proportion prevents substantially the accumulation of electrostatic charges and overcomes the difficulty experienced heretofore in the manufacture of films resulting from the exposure of the film as it passes through the machine.

Ethylene glycol of ordinary composition and of technical quality may be used for the purpose of the invention. I can use likewise the poly ethylene glycols including diethylene glycol and triethylene glycol. These poly glycols may be employed in substantially the proportions hereinbefore mentioned, and, when used in gelatino silver halide emulsion, they increase the electrical conductivity and prevent the accumulation of electrostatic charges.

I am aware that glycerine has been added heretofore to gelatino silver halide emulsions. Glycerine has, however, a relatively high viscosity and tends to develop undesirable stickiness in emulsions. Emulsions containing any considerable proportion of glycerine are viscous and do not flow freely. It is relatively difficult therefore to coat the film evenly with such emulsions. Ethylene glycol and ethylene poly glycols have, on the other hand, a viscosity substantially identical with that of water, so that these materials may be added to the emulsions without substantially modifying the viscosity thereof. The glycols have therefore the added advantage that they facilitate rather than hinder the coating of the film with the emulsion.

Emulsions, including glycol or poly glycols or mixtures thereof, can be prepared readily in the simple apparatus which is employed in the normal preparation of emulsion. The ingredients of the emulsion are mingled in the usual manner, and the glycol or poly glycols or mixtures thereof, in the proportions here-

inbefore mentioned, are added to and mixed thoroughly with the emulsion which is thereafter coated on the film in accordance with the customary procedure.

5 Various changes may be made in the constituents and proportions thereof in the composition and particularly in the proportion of glycol added thereto without departing from the invention or sacrificing any of its advantages.

10 Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A gelatino silver halide emulsion containing ethylene glycol.

15 2. A gelatino silver halide emulsion containing a poly glycol:

3. A gelatino silver halide emulsion containing a poly ethylene glycol.

20 4. A gelatino silver halide emulsion of high electrical conductivity, containing a glycol derivative, having substantially the viscosity of water.

5. A photographically sensitive emulsion including a colloid, sensitive silver halide salts and a poly glycol.

6. A photographically sensitive emulsion including a colloid, sensitive silver halide salts and ethylene glycol.

30 Signed at Rochester, New York, this 16th day of Feb., 1929.

PAUL C. SEEL.

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