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PHOTOGRAPHIC DEVELOPER FOR USE AT HIGH TEMPERATURES

John I. Crabtree, Rochester, N. Y., and John F. Ross, Phillipsburg, N. J., assignors to Eastman Kodak Company, Rochester, N. Y., a corporation of New York

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This invention relates to a photographic developer, especially to one capable of use at relatively high temperatures, and more particularly to one which contains the well known hardening agent, namely, formalin, but which contains a developing agent such that the developer gives no appreciable fog at the temperatures used.

A specific application of our invention has been made and claimed by Muehler in his copending application Serial Number 427,944, filed February 12, 1930.

An object of the invention is to avoid extensive fog when formalin is used to harden the film.

The use of formalin as a hardening agent in developers or other photographic baths, especially for use in the tropics or at relatively high temperatures, has been known for many years, there being many references to its use in the literature and textbooks of photography. In the art of photographic developing, temperatures very much in excess of 70° Fahrenheit are usually termed high temperatures and the expression is so used here. When formalin is used in any of the ordinary developers for high temperature work, it usually produces a heavy fog or veiling of the image which is, of course, objectionable. This cannot be overcome by the use of any of the agents usually employed for reducing fog, such as potassium bromide, and the use of formalin for high temperature development has therefore been greatly restricted. This is particularly true of alkaline developing solutions.

We have found it possible to select a developing agent for use in a developer including formalin so that no appreciable fog is produced, even if the solution is alkaline. One of the best developing agents for this purpose is para-aminophenol. Pyrocatechol or monomethyl paraminophenol sulphate may also be used for this purpose. Other suitable developing agents are the halogen substituted hydroquinons as described by Muehler supra. It is only necessary to make up a suitable developer containing one of these substances, together with formalin, to prepare a developer giving the desired results. Development, of course, is carried out in the usual manner after which the plate or film is washed and fixed, preferably in a hardening-fixing bath of a well known type.

In carrying out our invention the formalin may be used in the form of the 40% solution sold on the market, or in the form of dry powdered trioxymethylene which with water under the conditions employed yields formalin. Three formula which are illustrative of a number which may be used are:

Formula Number 1

Para-aminophenol	7 grams
Sodium carbonate	50 grams
Sodium sulphite	50 grams
Trioxymethylene	2 to 10 grams
Water	to 1 liter

Formula Number 2

Monomethyl paraminophenol sulphate	5 grams
Sodium sulphite	75 grams
Sodium carbonate	25 grams
Potassium bromide	1.5 grams
40% formalin	5 to 25 cc.
Water	to 1 liter

Formula Number 3

Pyrocatechol	7 grams
Sodium carbonate	50 grams
Sodium sulphite	50 grams
40% formalin	5 to 25 cc.
Water	to 1 liter

All of the above developers are included in the class which normally give little aerial fog and may be considered as fog inhibiting developing agents. However, it has hitherto been known that even at high temperatures and when used with formalin they do not produce fog.

While particularly useful at higher temperatures, the advantages are also inherent whatever the temperature. Formalin is not, however, often used at lower temperatures. We consider as within our invention all equivalents and modifications coming within the scope of the appended claims.

What we claim is:

1. A photographic developer including formalin, an alkai and monomethyl paraminophenol sulphate and which, without other elements therein, is substantially free from fogging effects when used at high temperatures.

2. A photographic developer including formalin, an alkali and pyrocatechol and which, without other elements therein, is substantially free from fogging effects when used at high temperatures.

3. A photographic developer including a carbonate of an alkali, formalin and a developing agent selected from the group consisting of para-aminophenol, monomethyl-paraminophenol sulphate and pyrocatechol and which, without other elements therein, is substantially free from fogging effects when used at high temperatures.

4. A photographic developer including formalin, an alkali, and paraminophenol and which, without other elements therein, is substantially free from fogging effects when used at high temperatures.

5. A photographic developer including forma-

lin, sodium carbonate and paraminophenol and which, without other elements therein, is substantially free from fogging effects when used at high temperatures.

6. A photographic developer including formalin, sodium carbonate and monomethyl-paraminophenol-sulphate and which, without other elements therein, is substantially free from fogging effects when used at high temperatures.

7. A photographic developer including formalin, sodium carbonate and pyrocatechol and which, without other elements therein, is substantially free from fogging effects when used at high temperatures.

JOHN I. CRABTREE.
JOHN F. ROSS.