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FINE-GRAIN DEVELOPERS

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6 Claims. (Cl. 95—88)

This invention relates to photographic developers and more particularly to developers which produce a fine-grain image.

A large number of the cameras which have recently been placed on the market use a narrow film and the negative obtained is of such a size that the print must be made by projection rather than by contact printing. In order to produce a clear and continuous-tone print by projection, it is desirable to have a fine-grain image on the negative. Numerous methods have been suggested for obtaining these fine-grain images on development, such as diluting the developer or adding special agents which slow down the speed of development. Other developers have been suggested which employ developing agents which are poisonous and unpleasant to use or which are difficult to obtain. No one, as far as we are aware, has produced a successful fine-grain developer which makes use of the ordinary M—Q type of developer.

It is, therefore, the principal object of the present invention to provide a fine-grain photographic developer which contains an M—Q type of developing agent and which does not cause fog on the negative.

This object is accomplished by the present invention by adding the optimum amount of ammonium chloride to an M—Q type of developer.

In accordance with our invention, ammonium chloride is added in powder or in solution to the usual M—Q developer. By "M—Q developer", we mean a developer which contains p-methylaminophenol sulphate or similar aminophenol and hydroquinone in varying proportions. In addition to the developing agent which we have referred to as "M—Q", the developer includes sodium sulphite and an alkali and it may include a small amount of a soluble bromide such as potassium bromide. As the alkali of these developers, any of the well-known alkaline reacting agents may be used such as borax, sodium carbonate, sodium hydroxide, sodium metaborate, or triethanolamine. The following formulas have been found to give good results:

1.	p-methylaminophenol sulphate	g	2
	Hydroquinone	g	5
	Sodium sulphite	g	100
	Ammonium chloride	g	50
	Borax	g	2
	Water to	liter	1
2.	p-methylaminophenol sulphate	g	2
	Hydroquinone	g	5
	Sodium sulphite	g	100
	Ammonium chloride	g	50
	Sodium metaborate	g	5
	Water to	liter	1
3.	p-methylaminophenol sulphate	g	2
	Hydroquinone	g	5
	Sodium sulphite	g	35
	Ammonium chloride	g	45
	Borax	g	8
	Potassium bromide	g	0.5
	Water to	liter	1
4.	p-methylaminophenol sulphate	g	5
	Hydroquinone	g	2.5
	Sodium sulphite	g	35
	Ammonium chloride	g	45
	Borax	g	8
	Potassium bromide	g	0.5
	Water to	liter	1
5.	p-methylaminophenol sulphate	g	5
	Hydroquinone	g	2.5
	Sodium sulphite	g	60
	Ammonium chloride	g	40
	Sodium metaborate	g	6
	Potassium bromide	g	1
	Water to	liter	1
6.	p-methylaminophenol sulphate	g	5
	Hydroquinone	g	2.5
	Sodium sulphite	g	60
	Ammonium chloride	g	40
	Triethanolamine (commercial)	g	5
	Potassium bromide	g	1
	Water to	liter	1

We have found that the optimum amount of ammonium chloride to use in these developers is about 50 grams per liter of developing solution. With this amount of ammonium chloride, an image is produced which has about the same graininess as the image which is produced on development with p-phenylenediamine, which is a well-known fine-grain developer. The ammonium chloride may be used in amounts less than 50 grams per liter, but if the amount is materially decreased, graininess of the image increases. Increasing the ammonium chloride above 50 grams per liter does not appear to result in any further material decrease in graininess.

It is to be understood that our invention is not limited to the formulas and examples stated above, but includes all modifications coming within the terms of the appended claims.

What we claim is:

1. A fine-grain photographic developer comprising an M—Q developing agent and ammonium

chloride in amount sufficient to produce a fine grain image.

2. A fine-grain photographic developer comprising a solution of an M—Q developing agent and ammonium chloride in the amount of approximately 50 grams per liter of developing solution.

3. A fine-grain photographic developer comprising approximately 7 grams of an M—Q developing agent and approximately 50 grams of ammonium chloride.

4. A fine-grain photographic developer comprising a solution containing approximately 7 grams of an M—Q developing agent and approximately 50 grams of ammonium chloride in 1 liter of solution.

5. A fine-grain photographic developer comprising an M—Q developing agent, ammonium chloride in amount sufficient to produce a fine grain image, and triethanolamine.

6. A fine-grain photographic developer comprising approximately 7 grams of an M—Q developing agent, approximately 40 grams of ammonium chloride, and approximately 5 grams of triethanolamine.

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