

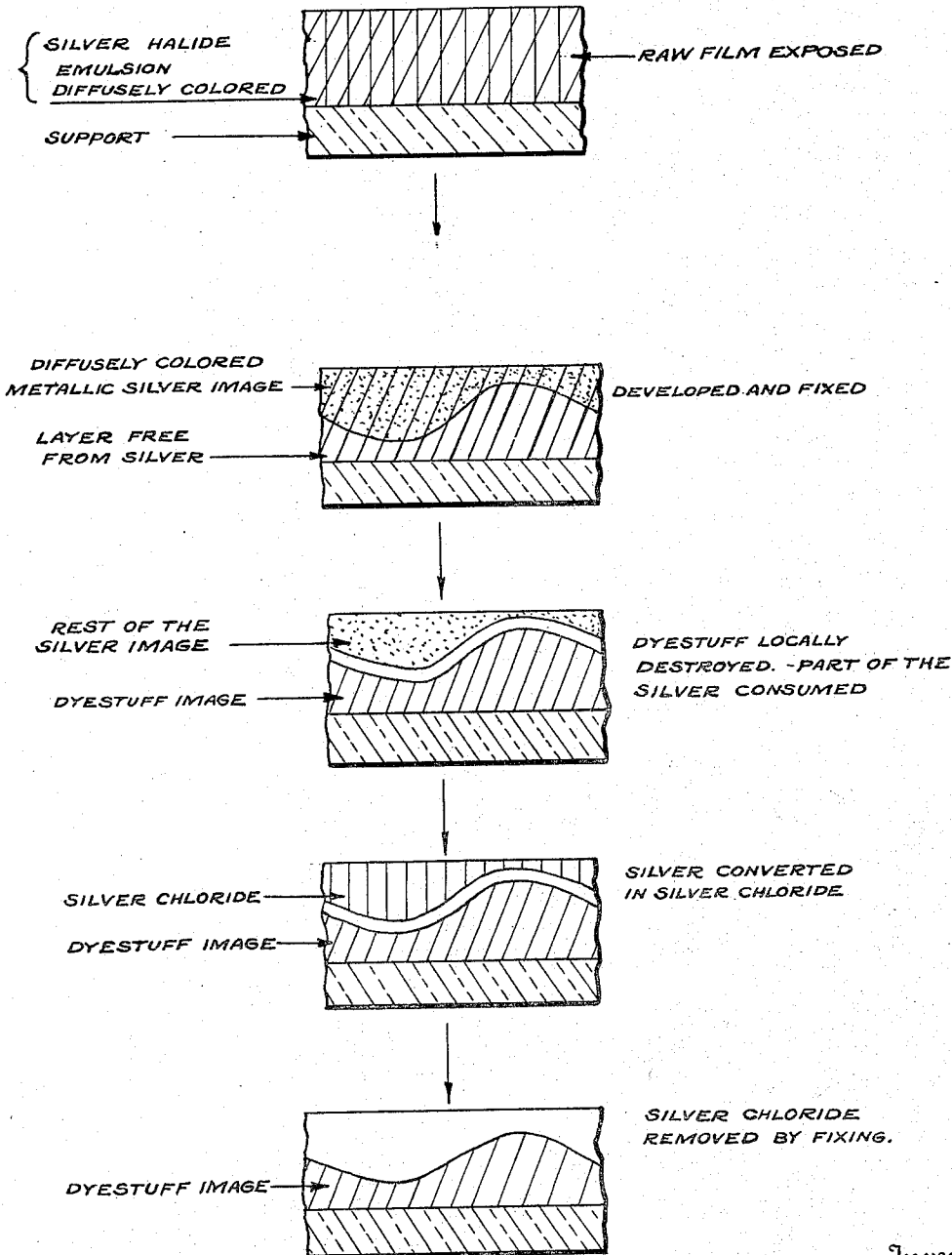
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METHOD OF PRODUCING PHOTOGRAPHIC DYESTUFF IMAGES

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METHOD OF PRODUCING PHOTOGRAPHIC
DYESTUFF IMAGES

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4 Claims. (Cl. 95—2)

This invention relates to a method of producing photographic dyestuff images.

The figure is a flow sheet setting forth the steps of the method.

5 Heretofore I have used methods according to which a diffusely colored metallic silver image is treated in an agent which destroys the dyestuff at the points of the silver image in proportion to the amount of silver present. The quantity of
10 silver is a governing factor as regards the destruction of the dyestuff. In this connection, an agent is employed which simultaneously dissolves away the amount of silver present, and any residual quantities remaining are dissolved out
15 in the subsequent reducing bath. The greater part of the silver, however, is discharged simultaneously in the dyestuff-destroying bath.

Now it has been found that as regards brilliance and graduation of the dyestuff images considerably better results may be obtained if initially there is employed a much more powerful silver image, i. e., if a relatively large deposit of silver is present right from the start in the photographic emulsion, as compared with the amount which is
25 necessary to participate in the destruction of the dyestuff. The reason for this behaviour resides partly in the fact that in this manner it is possible by reason of these amounts of silver to perform operations which conform with the
30 straight portion of the characteristic curve of the photographic emulsion. It is also possible by this process to obtain clear and distinct images in a considerably shorter time than if a silver image is employed which contains merely the exact
35 amount of silver necessary for destruction of the dyestuff or merely a slight quantity in excess thereof. In following this course, there will be consumed at practically all points of the image merely a small quantity of the silver present for
40 assisting in the local destruction of the dyestuff simultaneously present in the layer. There is, however, also obtained the additional advantage that very good dyestuff or reversed images may be obtained, as in this connection the duration
45 of treatment in the bath may be maintained constant to a very large extent. This period of treatment may be determined very readily in one single preliminary test, if the color of the layers (as is always the case particularly in connection
50 with sensitized materials coloured in the emulsion) is approximately the same. In the case of multi-layer images it is particularly important in accordance with the invention to employ a relatively large proportion of silver for performing
55 the method according to the invention, as

the effectiveness of the bath decreases with increasing depth of layer, so that the period of treatment of the dyestuff-destroying agents would in the case of a plurality of silver halide layers poured one on to the other be relatively
5 long, when using a normal quantity of silver. The increased quantity of silver is obtained by known means by corresponding exposure and development.

The constant and brief period of treatment in
10 the dyestuff-destroying bath is of particular importance in connection with mechanical treatment of cinematograph films, in order to always arrive at equal results. In connection with films sensitized on both sides, it is also important to
15 employ a surplus quantity of silver, as by reason of the effect above referred to the same quantities of dyestuff are, with excess of silver, destroyed on both sides in the same time, so that it is unnecessary to extend the period of treatment of
20 the dyestuff-destroying agent and simultaneously the silver-dissolving agent for such time until the silver has also been dissolved away, and, as may readily be determined by a preliminary test,
25 a constant period of treatment on the part of the dyestuff-destroying agent is to be expected. The use of this method also offers particular advantage in connection with layers, which contain a plurality of differently colored particles in adjacent or superimposed disposal.
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It is possible to employ the dyestuff discharging bath, which destroys the dyestuff at the points of the silver deposit or at the points free of silver by oxidation or reduction.

This method may also be made use of in the
35 additional treatment of sensitized materials containing dyestuff-forming substances. The dissolution of the silver takes place in a desired reducing bath. For this purpose, there may be
40 employed, for example, Farmer's reducer, after the images have been well washed. It has been found, however, that merely neutral reducers, or reducers which do not exert a vigorous action may be employed, i. e., which do not act on the
45 dyestuff image in such manner as to vary the same.

It has been found that the majority of photographic reducing baths act only on the layer in a manner not adapted to vary the dyestuff if all traces of the dyestuff-destroying bath are removed as a result of very thorough rinsing.
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It has furthermore been observed that the extremely powerful sensitizing of the fast, direct or acid dyestuffs, and more particularly azo dyestuffs, is maintained even with traces of the dye-
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stuff-destroying agent containing thioureas or substituted thioureas. The fast nature of the dye-stuff may be very considerably increased in advantageous fashion without lengthy washing and without endangering the dyestuff image itself, if a reducing agent is employed containing copper. This bleaching bath is moreover particularly rapid, and very effective either in the case of photographic materials, which contain a plurality of differently colored layers, poured one upon the other, or a plurality of differently colored particles in superimposed or adjacent disposal in one layer, whereby the vigorous and rapid bleaching out action is not accompanied by a dyestuff discharging effect, as in the case of other reducing agents.

According to the invention a reducing agent is employed of the following composition.

20	Cupric sulfate	grammes	20
	Sodium chloride	grammes	20
	Nitric acid	ccm.	1
	Water	grammes	100

or

25		Grammes	
	Cupric chloride		30
	Nitric acid		1
	Water		100

30 The images proceeding from the dyestuff-destroying bath are rinsed briefly and additionally treated in one of the baths above referred to for the purpose of bleaching out the silver image, which operation is usually completed in 1 to 2 minutes, whereupon the images are immersed for 35 30 seconds in a 20% fixing sodium solution, whereby the silver chloride formed is dissolved away. Washing is thereupon again effected for a brief period. The images thus produced are of an excellent kind, fast in color, and also remarkably resistant to washing.

I claim:—

45 1. A method of producing photographic dyestuff images in photographic layers, which are colored with dyestuffs or contain dyestuff-forming substances in the emulsion, which consists in initially producing by exposure and develop-

ment an image having an amount of silver in excess of that normally required for the destruction of the dyestuff and subsequently subjecting the image to a dye-destroying bath wherein a part of the silver assists in the destruction of the dyestuff.

2. A method of producing photographic dyestuff images in photographic layers, which are colored with dyestuffs or contain dyestuff-forming substances in the emulsion, which consists in initially producing by exposure and development an image having an amount of silver in excess of that normally required for the destruction of the dyestuff, then subjecting the image to a dye-destroying bath wherein a part of the silver aids in the dyestuff destruction, and subsequently removing the surplus silver by subjecting the image to a bath containing weak reducer.

3. A method of producing photographic dyestuff images in photographic layers, which are colored with dyestuffs or contain dyestuff-forming substances in the emulsion, which consists in initially producing by exposure and development an image having an amount of silver in excess of that normally required for the destruction of the dyestuff, then subjecting the image to a dye-destroying bath wherein a part of the silver aids in the dyestuff destruction, and subsequently removing the surplus silver by subjecting the image to a bath containing a cupric salt to obtain a rapid bleaching out action without a dyestuff discharging effect.

4. A method of producing photographic dyestuff images in photographic layers, which are colored with dyestuffs, which consists in initially producing by exposure and development an image having an amount of silver in excess of that normally required for the destruction of the dyestuff, then subjecting the image to a dyestuff destroying bath, rinsing the image in a bath containing a cupric salt to form a silver halide, next immersing the image in a fixing solution to wash away the silver halide, and subsequently washing the image for a brief period to produce the final image.

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