

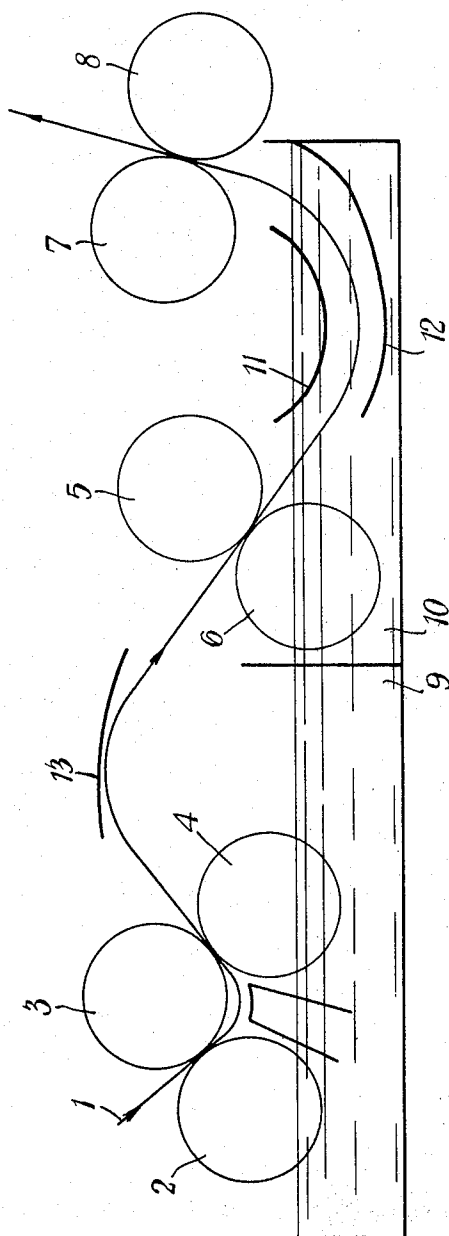
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PHOTOGRAPHIC PROCESSING APPARATUS

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PHOTOGRAPHIC PROCESSING APPARATUS

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This invention relates to photographic processing apparatus and in particular to apparatus for processing gelatino silver halide photographic sheet materials for use in offices or the like.

When exposed silver halide photographic material is processed, it is usually immersed in a developing solution to develop the latent image and then in a fixing bath to remove the unexposed silver halide. If the developing agent is included in the emulsion, the material can then be processed by merely wetting the emulsion with an activator solution, which is usually an alkaline solution of high pH and then passing the material into a stabilizer solution which does not remove the unexposed silver halide but converts it to a relatively light-insensitive complex. The latter type of material can be processed rapidly and conveniently and for this reason the material has been found to be of great value in the field of document copying for office use and also for the rapid production of positive prints from negatives.

In order to make use of the easy processing properties of developer-containing silver halide materials various machines have been designed. Generally the machines work on the principle of wetting the exposed material by passing it, emulsion face downwards, between a pair of rollers, the bottom one of which is partially immersed in activator solution. Sufficient activator is transferred from the rollers onto the emulsion surface to wet it and so cause development to take place. The material is then guided through a bath of stabilizer solution and is picked up by a pair of rollers just above the stabilizer solution. These rollers squeegee off the excess stabilizer and the resultant print is obtained practically dry.

In the past the difficulty with machines working as aforesaid has been to wet the emulsion sufficiently without immersing the material in the activator or without using a very complicated series of rollers. However, in co-pending application No. 313,024 a system of rollers for applying the activator solution is proposed which largely or wholly overcomes these difficulties. Whilst a sufficient degree of development of the image may be obtained with a very short period of contact with the activator solution, e.g. a contact period of say 3 seconds, full development of the image may take considerably longer, e.g. 12 seconds. It is accordingly usual to process the material in contact with the activator for less than the period required for full development and then pass it into the stabilizer solution. This means that, as development stops as soon as the material comes in contact with the stabilizer solution, due to the sudden drop in pH caused by the stabilizer solution, all the material must be arranged to come into contact with the stabilizer solution having received exactly the same development time since otherwise, marks, due either to over or under development, will appear on the processed material. In fact it has been found that most materials processed in this way do show such marks due to slight variations in development time. These variations are due to the fact that there is no precise control of the material from the time it leaves the activator applicator rollers until it is gripped by the squeegee rollers following immersion in the stabilizer solution.

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It has now been discovered that if the movement of the material from the activator rollers into the stabilizer is strictly controlled, the appearance of such marks on the processed material due to unequal development is avoided.

It is the object of the present invention therefore to provide improved apparatus for the application of stabilizer solution to a gelatino silver halide emulsion material containing a developer, in a process involving an activator-stabilizer sequence as described above.

According to the present invention there is provided an apparatus for contacting exposed developer containing gelatino silver halide photographic sheet material with activator solution followed by stabilizer solution which comprises a container for each said solution, at least one moistening roller mounted in the activator solution container and partially immersed in said activator solution whereby to moisten the sensitive layer of a photographic sheet passed over said moistening roller, guiding means for leading the photographic material thus moistened into the nip of two rollers, one mounted above the other, the top roller being driven and the lower roller being partially immersed in the stabilizer solution, the two said rollers being mounted in the stabilizer solution container, thereby ensuring that the said photographic sheet is uniformly wetted by the stabilizer solution, and guiding means mounted in the stabilizer solution container and adapted to receive and guide the photographic sheet into the stabilizer solution thereby to ensure that the sheet is totally immersed in the stabilizer solution.

In a further embodiment the rollers are composed substantially of rubber or synthetic rubber.

The method and apparatus of the invention is illustrated in the accompanying drawing which is a diagrammatic view of one form of the apparatus.

In the figure the path of the material through the apparatus 1 is shown. The material first of all passes through the activator applicator roller system 2, 3 and 4 (which is as described in copending application No. 313,024), which is mounted in a container of activator solution 9, and then is guided by a guide 13 into the nip of two rollers 5 and 6, the lower one of which is mounted in stabilizer solution 10. Thereafter it leaves the stabilizer applicator rollers in a downward direction and is immersed in the stabilizer solution. Its path through the stabilizer solution is controlled by guides 11 and 12 and it is directed by these guides into the nip of the squeegee rollers 7 and 8. The material is obtained from the squeegee rollers as a substantially dry photographic print.

The exposed material is therefore partially developed during its passage through the activator applicator system. This development is abruptly stopped as soon as the material enters the nip of the rollers 5 and 6 and thus comes in contact with the stabilizer solution. The material is then stabilized by total immersion in the stabilizer liquid 10 and is squeegeed substantially dry of liquid by rollers 7 and 8.

It is a further advantage of the invention that the material follows a rigidly controlled path from leaving the activator applicator rollers to entering the nip between the stabilizer applicator rollers when the material meets the stabilizer solution and development is rapidly stopped. This means that the whole sheet of material receives the same development time as compared to previously known apparatus. With these apparatus it was found that different levels of development were obtained on the same sheet of sensitive material due to differences in development time caused by changes in the level of the stabilizer solution. These changes in level of the stabilizer solution were caused by surges in the liquid as the leading edge of the material was immersed in the stabilizer solution

and also due to the trailing edge of the material abruptly changing path as it left the activator applicator rollers.

The invention includes the new apparatus hereinbefore described, and also the method of stabilizing photographic silver halide print products as hereinbefore described.

We claim as our invention:

1. A device for contacting exposed developer containing gelatino silver halide photographic sheet material with activator solution followed by stabilizer solution which comprises a container for each said solution, at least one moistening roller mounted in the activator solution container and partially immersed in said activator solution whereby to moisten the sensitive layer of a photographic sheet passed over said moistening roller, guiding means for leading the photographic sheet thus moistened into the nip of two rollers, one mounted above the other, the top roller being driven and the lower roller being partially immersed in the stabilizer solution, the two said rollers being mounted in the stabilizer solution container, thereby ensuring that the said photographic sheet is uniformly wetted by the stabilizer solution, and guiding means mounted in the stabilizer container and adapted to receive and guide the photographic sheet into the stabilizer solution thereby to ensure that the sheet is totally immersed in the stabilizer solution.

2. A device as in claim 1 wherein the rollers consist essentially of rubber.

3. A device as in claim 1 wherein the rollers consist essentially of synthetic rubber.

4. A method of processing exposed developer containing gelatino silver halide photographic sheet material which comprises partially developing the photographic sheet by passing the said sheet emulsion face downwards over at least one moistening roller partially immersed in activator solution whereby to initiate development of the exposed silver halide and thereafter leading the said photographic sheet material moistened with activator solution into the bead of stabilizer solution present in the nip formed between two rollers one mounted above the other the top roller being driven and the bottom roller being partially immersed in the said stabilizer solution thereby to stop development of the activator moistened photographic sheet material and thereafter to guide the thus partially stabilized photographic sheet into the stabilizer solution thereby immersing the said sheet in stabilizer solution and thus ensuring the said photographic sheet is completely stabilized.

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