Sept. 3, 1935. A. SCHOEN 2,013,010

METHOD OF PREPARING OUTLINES OF DESIGNS

Filed July 11, 1931

Fig. 1.

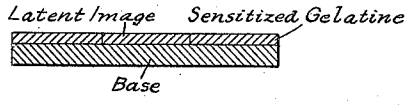


Fig. 2.

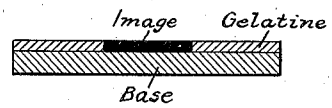


Fig. 3.

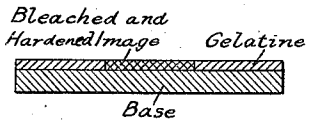


Fig. 4.

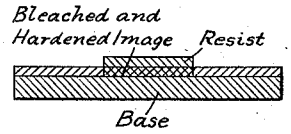


Fig. 5.

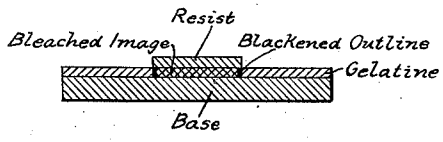


Fig. 6.

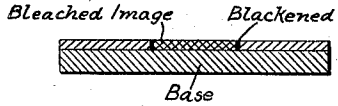


Fig. 7.

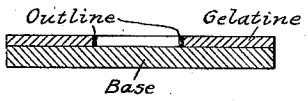


Fig. 8.

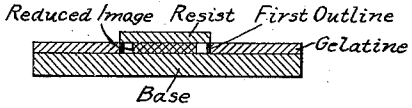


Fig. 9.

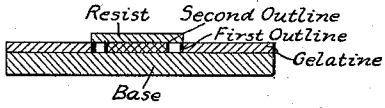


Fig. 10.

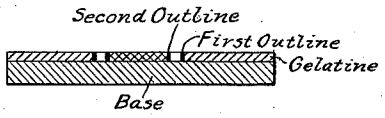
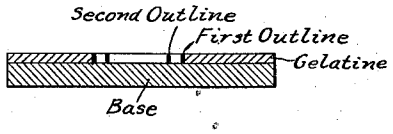


Fig. 11.



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METHOD OF PREPARING OUTLINES OF DESIGNS

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Application July 11, 1931, Serial No. 550,291

6 Claims. (Cl. 95—5)

This invention relates to a process of preparing sharp outlines of designs to be used or employed in the preparation of printing or transfer surfaces.

According to the present invention, an image of the selected design is formed and set on a sensitized medium, after which it is treated so that only an outline thereof is developed. Subsequently, the undeveloped portion of the image is removed. By varying and slightly modifying the sequence of steps, an allowance and/or a double outline may be prepared.

The development of the outline of the image is achieved by applying a resist over the surface of the image, formed in the well known way, and then subjecting the resist-coated image to the action of a suitable developer, such as, for example, a developing solution. Inasmuch as the upper surface of the image is protected by the resist, any developing effected must take place at, and progressively advance from, the edge of the image. In actual practice, when a developing solution is employed, it penetrates the uncoated gelatin and slowly diffuses thereinto. As it diffuses in the gelatin, it contacts with the edges of the image and progressively advances with the result that an outline thereof is developed. The width of the outline depends on the period of time during which the developing solution is permitted to act. Thus, by regulating the time, an appropriate width of the outline may be secured.

A double outline may be produced by the present invention. According to this modification, the image is formed, set and coated with the resist as above explained. The resist-coated image is then subjected to the treatment wherein only a marginal portion of the image is developed as described above. After this operation, the resist-coated design is submerged in a solution having a solvent action on the image with the result that the image adjacent the developed portion is dissolved and removed. The amount removed depends on the time during which the plate is immersed in the solvent. After the desired portion of the image has been removed adjacent the previously developed outline, the plate is then again subjected to the developing solution to develop the edge of the reduced image which has been produced by the solvent action. Finally, the resist and the undeveloped portions of the image are removed.

In order to more fully explain the present invention, reference hereafter will be made to several of the specific modifications of the process. It is, however, to be understood that the invention is not restricted to the specific details set forth, since the specific procedures described are intended merely to be illustrative and not limitative.

Figs. 1 to 11 of the drawing are diagrammatic illustrations of the steps of my invention, Figs. 1 to 7 illustrating one method and Figs. 1 to 5 and 8 to 11 illustrating an alternative method.

A latent image, such as a positive of the subject, diagrammatically illustrated in Figure 1 is formed, washed, fixed and washed on a sensitized medium, such as a photographic dry plate and preferably the well known process plate or other thinly coated plates, in the usual way as shown diagrammatically in Figure 2. The image is then bleached by subjecting the plate to the joint action of compositions containing Cr_2O_3 and a copper halide. This is shown diagrammatically in Figure 3. For example, the image may be bleached in a Bromoil bleacher with a composition comprising, for instance, the following ingredients in approximately the proportions set forth:

Copper-sulphate	80.0 grams
Alkali halide	80.0 grams
Potassium bichromate	4.2 grams
Sulphuric acid	3.3 grams
Water	1.0 liter

During this operation, the gelatin of the black parts of the plate is hardened and the silver component of the black image converted into a creamy silver halide. The hardened parts of the image have now lost the capacity to absorb water, while the other parts are still able to swell in water. Subsequently, the plate is washed for about one-half an hour and the excess water removed in any suitable manner such as with blotting paper.

For reasons which will become apparent, a resist or masking composition is applied to only the hardened portions of the image as diagrammatically shown in Figure 4. This is accomplished by applying the composition, such as a greasy ink, a Bromoil pigment or an offset ink, to the plate in any convenient manner. For example, it may be printed, applied with a leather, rubber or other composition roller or otherwise fixed on the hardened gelatin. Due to the nature of the resist, it is repelled by those portions of the plate which are coated with swollen gelatin, while it adheres to the hardened portions.

After the resist has been applied as just described, the plate is immersed in a developing or blackening solution, such as, for example, the

usual photographic developer, a hydrosulphite, a sulphide, an alkaline stannite or the like. Because of the resist, which is inert to the developer, the upper surface of the silver halide image is protected and restrained from reacting with the developer. However, the developer penetrates and diffuses in the gelatin, whereby the developer contacts with the edge of the image and gradually advances therein with the result that an outline is developed as diagrammatically shown in Figure 5. The width of the resultant outline is a function of the time during which the plate is immersed in the developer, and therefore it can very easily be controlled.

When the desired width of the outline is produced, the plate is treated with water for a short time to wash out the developer, and the resist is removed with a suitable solvent, such as kerosene, gasoline and the like. The result of this operation is diagrammatically shown in Figure 6. After the excess solvent has been removed as by evaporation, the plate is treated as by immersing in hypo whereby the undeveloped portion of the silver halide image is removed. The result of this operation is diagrammatically shown in Figure 7. The plate is finally washed and dried.

As an alternative procedure, after an image has been developed, washed, fixed, washed, bleached and hardened as above described, the surface moisture is then removed as with blotting paper and a resist is applied. As in the former case, the resist adheres only to the hardened portions of the image. The plate is then immersed in a solution having an acidic reaction, for example, an aqueous solution of sulphuric acid, alum, aluminum sulphate or the like for a short time. The excess of the acidic solution is removed with water and the outline produced as previously described.

The product resulting from the method just described comprises a plate having an outline of the subject which is to be reproduced on various materials. In other words, the plate is employed in the preparation of printing or transfer surfaces. Inasmuch as the specific mode of producing the printing or transfer elements forms no essential part of this invention and is well known, it is not described herein.

The present invention also contemplates the production of a double or spaced outline. With this in view an outline is prepared as described above and which is diagrammatically illustrated in Figures 1 to 5 inclusive. Prior to the removal of the resist and the undeveloped portions of the image, the plate is immersed in hypo which serves to remove or dissolve the undeveloped portions of the image adjacent the developed outline as diagrammatically shown in Figure 8. The plate is maintained in contact with the hypo until the desired amount of the image has been removed to give the spacing desired. The plate is then washed and again subjected to the developing or blackening composition, whereby an outline of the reduced image is formed. This is diagrammatically shown in Figure 9. Thus, a second outline is produced. The remaining steps, namely, the removal of the resist, as diagrammatically shown in Figure 10, and the removal of the undeveloped portions of the image, as diagrammatically shown in Figure 11, are performed in the same manner as previously explained.

In the preceding method, the outlines were formed in black. The invention is not restricted thereto, since the outline may be made transparent and the background black. One specific process illustrating this method is hereafter set forth.

An image, such as a negative of the subject, is formed on a sensitized plate in any well known manner and developed in the usual way. After the plate is washed free from the developer, it is subjected to a Bromoil bleaching whereby the developed portion, i. e. the image, is hardened and bleached. A resist or masking composition of the type above described is then applied as previously explained to only the hardened portions of the plate which is then subjected to a treatment with a blackening solution, whereby the undeveloped portion of the plate is blackened. In this condition the plate is treated with a solution of hypo or any other salt solution which dissolves silver bromide but is indifferent to silver with the result that the solvent solution penetrates into the unprotected portion of the plate, wherein it diffuses and contacts with the edges of the image protected on its upper surface by the resist. When this occurs, the portion of the image contacting with the solvent is dissolved. This action is permitted to take place until the desired amount of the image has been removed. Subsequently, the plate is washed free from hypo and then the resist is removed. The plate is then again introduced into a blackening solution, whereby the entire plate except those portions removed by the hypo are blackened.

The method described next preceding may also be employed to make double outlines.

It is to be understood that the formation of the image is not restricted to any specific procedure. For example, it may be prepared by either the direct or indirect bichromate gelatin processes.

Hereinbefore the various processes have been described in connection with the production of outlines of images. It is apparent that the image may be either a positive or negative as desired.

Since it is obvious that various changes may be made in the specific details hereinbefore set forth, the invention is not restricted thereto except as defined in the appended claims.

I claim

1. A method of forming an outline of a design which comprises forming a bleached and hardened image of the subject, on a sensitized medium comprising a silver halide emulsion, applying a resist which adheres only to the hardened portions of the image, immersing the resist-covered image in a developing solution, which penetrates and diffuses in those portions of the gelatin which were not exposed during the production of the image, contacts with the edges of said image and diffuses in said image, whereby the image is developed at those portions contacting with the developer, and removing the resist and undeveloped portions of the image.

2. A method of forming an outline of a design which comprises forming a fixed, bleached and hardened image of the subject on a suitable support comprising a silver halide emulsion, applying a resist which adheres only to the hardened portions of the image, immersing the support in a solution having an acid reaction, washing to remove the excess solution and then applying a developing solution which penetrates and diffuses in those portions of the gelatin which were not exposed during the production of the image, contacts with the edges of said image and diffuses in said image, whereby the image is developed at those portions contacting with the developer, and

removing the resist and undeveloped portions of the image.

3. A method of forming an outline of a design which comprises developing, bleaching and hardening an image of the subject on a sensitized medium comprising a silver halide emulsion, applying a resist to the hardened portions of the image, blackening the undeveloped portions of the medium, subjecting the medium to a composition which penetrates and diffuses in those portions which were not exposed during the production of the image, contacts with the edges of said image and diffuses in said image to form the outline, removing the resist, and subjecting the medium to a blackening solution.

4. A method of forming an outline of a design which comprises developing, bleaching and hardening an image of the subject on a sensitized medium comprising a silver halide emulsion, applying a resist to the hardened portions of the image, blackening the undeveloped portions of the medium, subjecting the medium to a composition which has a dissolving action on the material constituting the image, which penetrates and diffuses in those portions which were not exposed during the production of the image, contacts with the edges of said image and diffuses in said image to form the outline, removing the resist, and subjecting the medium to a blackening solution.

5. A method of forming an outline of a design which comprises forming an image of the subject on a sensitized medium comprising a silver halide emulsion, applying a resist to the surface of the image, developing only an outline of the image, then removing a portion of the undeveloped image adjacent the developed outline to form a reduced image, developing only an outline of the reduced image, and removing the resist and undeveloped portions of the image.

6. A method of forming an outline of a design which comprises forming a bleached image on a sensitized medium comprising a silver halide emulsion, applying a resist to the surface of the image, immersing the resist-covered image in a developing solution, which penetrates and diffuses in those portions of the gelatin which were not exposed during the production of the image, contacts with the edges of said image and diffuses in said image, whereby the image is developed at those portions contacting with the developer, dissolving a portion of the image adjacent the developed outline to form a reduced image, immersing the resist-covered reduced image in a developing solution functioning similarly to the first-mentioned developing solution to form an outline of said reduced image, and removing the resist and undeveloped portions of the image.

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