

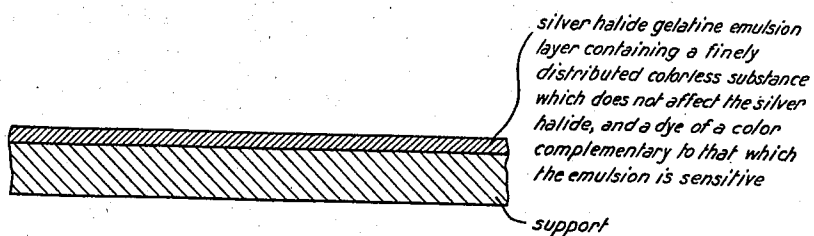
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MANUFACTURE OF GELATIN RELIEFS FOR PRINTING

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MANUFACTURE OF GELATIN RELIEFS
FOR PRINTING

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Our present invention relates to the manufacture of gelatin reliefs for printing.

One of its objects is an improved process of manufacturing gelatin etched reliefs, which are suitable for multiplication after the manner of the pinatype process which uses swollen reliefs, and are distinguished particularly by good reproduction of the half-tones. Further objects will be seen from the detailed specification following hereafter.

The reliefs are produced in a silver halide gelatin layer, which is dyed complementarily to its spectral sensitivity, and contains in uniform, fine dispersion a solid substance having no influence on the silver halide. For the support of the said layer there may be used any known and suitable water-resisting material, for example, celluloid, cellulose acetate, varnished cellophane, polyvinyl-chloride, polyacrylic acid ester, and the like.

In the silver halide gelatin layers constituted as above described there is produced in any convenient manner (by copying direct photography in the camera) a latent image; this is developed by the usual process without tanning, and then a positive relief is produced by etching with a solution of hydrogen peroxide, ammonium persulfate, or another peroxide.

Owing to the fact that the silver halide gelatin layers are dyed complementarily to their spectral sensitivity in each particular case, there is obtained a satisfactory gradation of the silver image and of the etched relief obtained therefrom. The various tonal values of the original copy or of the object photographed are well reproduced, whereas if the complementary coloring is not used the gradation obtained is much too steep.

The presence of the finely dispersed solid substance involves the advantage that the positive gelatin relief obtained by the etching process also reproduces the finest details of the developed silver image. Without the solid substance which serves as a filling in the layer, the parts of the picture of soft tone or slight area are often too extensively attacked.

The layers serving for the production of the etched relief may contain either white or colorless pigments as solid substances and also soluble dyestuffs for producing the desired coloration of the layer, or a suitable colored, very finely dispersed pigment can at the same time serve the purpose of a filling and also color the layer. In the first case, for example, blue-sensitive emulsion layers can be colored with naphthol yellow S (Schultz, Farbstofftabellen 7th edition No. 19),

acridine yellow G (Schultz, Farbstofftabellen 7th edition No. 901) or chrysophenine G (Schultz, Farbstofftabellen 7th edition No. 726), and green-sensitive emulsion layers can be colored with benzo-light red 8 BL (Schultz, Farbstofftabellen 7th edition No. 566), whereas barium sulfate, aluminium oxide, silica or other white or colorless pigments that do not influence the silver halide in very fine state of dispersion, can be used as solid substances. The additional substances may be prepared separately and incorporated subsequently in the emulsion when ready for casting or may be precipitated in the solution when it is prepared.

If it is desired to color and fill the layer by means of a single substance, pigments must be selected which are completely insoluble in water and insensitive to weak acids and alkalis that is to say they are insoluble in the photographic treating baths, because even the slightest traces of dissolved pigment would seriously endanger the sensitivity of the light sensitive layer. All pigments that fulfill these requirements and have the necessary optical properties are suitable for the present process. There may be named for example, sparingly soluble lakes of organic dyestuffs, complex salts from basic triphenyl methane dyestuffs or xanthene dyestuffs with phosphoric acid, molybdic acid or tungstic acid (familiar dyes of the I. G. Farbenindustrie Aktiengesellschaft, Frankfurt-on-the-Main).

A blue-sensitive silver halide emulsion layer can be colored, for example, with very finely dispersed Hansa-yellow 10 G (Schultz, Farbstofftabellen 7th edition No. 84) or farnal lake of citroflavin 8 G (Schultz, Farbstofftabellen 7th edition No. 934). Very finely dispersed indigo BASF/G (Schultz, Farbstofftabellen, 7th edition No. 1320), as colored dyestuff, is inter alia very suitable for red-sensitive emulsions. With panchromatic emulsion layers, suitable reliefs can be obtained by the addition of very finely dispersed lamp-black. Besides the colored pigments it is, of course, also possible if necessary, to incorporate colorless filling substances.

By mechanical comminution or by the addition of suitable wetting agents the pigments are dispersed until they consist mainly of particles having a diameter not exceeding 1μ , in which condition they produce a homogeneous or quasi homogeneous coloring of the emulsion layer which when fixed is clearly transparent and also, when magnified 400 to 500 times under the microscope, shows no grain. With this dispersion of the pig-

ment the greatest part of it consists of particles having a diameter of less than 1μ . A distribution curve of the number of particles of certain grain sizes contained in one of the pigments gave the following results: up to 0.3μ 40%, up to 0.5μ 67%, and up to 0.7μ 85%. The proportion of solid substance added may be varied within wide limits according to the kind of pigment selected. For example, additions of 5 to 20 per cent by weight of barium sulfate, calculated on the dry emulsion (corresponding with 0.5 to 2 per cent by weight calculated on the wet emulsion when ready for casting) yield good results.

The thickness of the emulsion layer, in consideration of the printing capacity, should not be too great. Layers of not more than 10μ thickness are particularly suitable.

The etching is carried out with solutions of hydrogen peroxide, ammonium persulfate or other peroxide. For the production of an optional number of pictures the etched reliefs produced in the described manner are caused to imbibe the color solutions and the reliefs thus colored are impressed on wet gelatin paper. For this purpose all aqueous dyestuff solutions are suitable which are accepted by the reliefs and can easily be transferred to the gelatin surfaces to be printed.

The single figure of the accompanying drawing shows a film consisting of a support to which there has been attached a silver halide gelatin emulsion layer containing a finely distributed colorless substance which does not affect the silver halide gelatin emulsion layer and a dye of a color complementary to that to which the silver halation layer is sensitive.

What we claim is:

1. A manufacture of gelatin reliefs for printing which comprises incorporating in a silver halide gelatin emulsion, a finely dispersed solid substance of which the main part has a particle diameter not exceeding 1μ which substance does not influence the silver halide and is insoluble in the photographic treating baths, sensitizing said silver halide emulsion, sensitizing said emulsion layer for a spectral region different from its initial sensitivity, dyeing said silver halide emulsion in a color complementary to that to which said emulsion has been sensitized casting said emulsion on a support to form a layer, producing a latent image in said emulsion, developing said image to a silver picture and etching said emulsion layer to form a relief.

2. A process of manufacturing a gelatin relief for printing which comprises incorporating in a silver halide gelatin emulsion a finely dispersed non-colored solid substance of which the main part has a particle diameter not exceeding 1μ which substance does not influence the silver halide and is insoluble in the photographic treating baths, sensitizing said silver halide emulsion for a spectral region different from its initial sensitivity, dyeing said silver halide emulsion with a soluble dye in a color complementary to that to which said emulsion has been sensitized, casting said emulsion on a support to form a layer, producing a latent image in said emulsion, developing said image to a silver pic-

ture and etching said emulsion layer to form a relief.

3. A process of manufacturing a gelatin relief for printing which comprises incorporating in said silver halide gelatin emulsion a finely dispersed solid substance of which the main part has a particle diameter not exceeding 1μ which substance does not influence the silver halide, has a color complementary to that for which said emulsion is sensitized and is insoluble in the photographic treating baths, sensitizing said silver halide emulsion to a color complementary to that of said solid substance, casting said emulsion on a support to form a layer, producing a latent image in said emulsion, developing said image to a silver picture and etching said emulsion layer to form a relief.

4. A photographic material which comprises a support and attached to said support a silver halide gelatin emulsion layer containing a finely dispersed solid substance having a particle diameter not exceeding 1μ which substance does not affect the silver halide and which is insoluble in photographic treating baths, said silver halide emulsion being sensitized for a spectral region different from that of its initial sensitiveness to blue, and containing a dye of a color complementary to that of the spectral sensitivity.

5. A photographic material which comprises a support and attached to said support a silver halide gelatin emulsion layer containing a finely dispersed solid substance having a particle diameter not exceeding 1μ which substance does not affect the silver halide and which is insoluble in photographic treating baths, said silver halide emulsion being sensitized for a spectral region different from that of its initial sensitiveness to blue, and containing a soluble dye of a color complementary to that of the spectral sensitivity.

6. A photographic material which comprises a support and attached to said support a silver halide gelatin emulsion layer sensitized for a spectral region different from its initial sensitivity to blue and containing a finely dispersed solid substance of a color complementary to that of the spectral sensitivity of said layer and having a particle diameter not exceeding 1μ which substance does not affect the silver halide and which is insoluble in the photographic treating baths.

7. A process of manufacturing a gelatin relief for printing which comprises incorporating in a silver halide gelatin emulsion a finely dispersed compound selected from the group consisting of barium sulfate, aluminium oxide and silica of which the main part has a particle diameter not exceeding 1μ , sensitizing said silver halide emulsion to a spectral region different from its initial sensitivity, dyeing said silver halide emulsion with a soluble dye in a color complementary to that to which said emulsion has been sensitized, casting said emulsion on a support to form a layer, producing a latent image in said emulsion, developing said image to a silver picture and etching said emulsion layer to form a relief.

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