

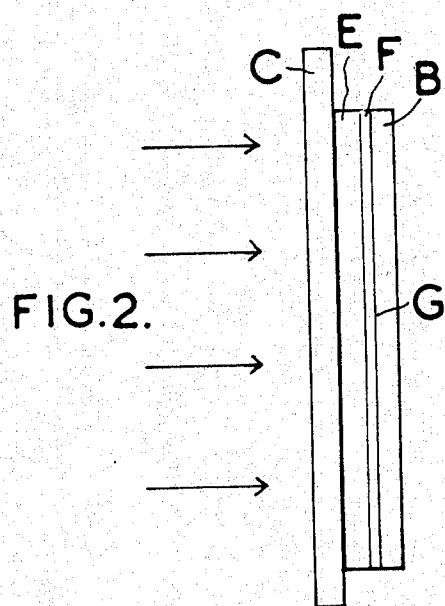
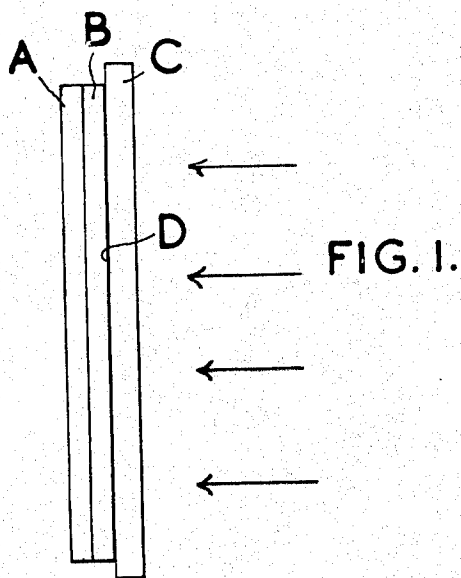
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MANUFACTURE AND PRODUCTION OF PHOTOGRAPHIC SENSITIVE MATERIAL

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INVENTORS
ERNEST ROBERT BOX
FRANK ENOCH KERRIDGE
BY THEIR ATTORNEYS

Howson and Howson

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MANUFACTURE AND PRODUCTION OF
PHOTOGRAPHIC SENSITIVE MATERIAL

Ernest Robert Box and Frank Enoch Kerridge,
London, England, assignors to Johnson,
Matthey & Company Limited, London, Eng-
land, a company of Great Britain

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This invention relates to the manufacture and production of a photographic sensitive material, and more particularly to the preparation of photographic stencils for using in silk screen and other printing processes.

It has hitherto been the practice to use for this purpose a pigmented gelatin-covered paper (commonly called pigment paper), consisting of a sheet of porous backing paper coated on one side with a layer of gelatin in which a suitable pigment, as for example carbon black, is uniformly dispersed. When the paper is required for making a stencil the gelatin layer is first sensitised by immersing the paper in a dilute solution of a soluble dichromate and then drying in the dark. This process renders the gelatin coating insoluble in warm water after exposure to light.

To prepare a stencil, a piece of the sensitised paper is exposed to light in contact with an ordinary photographic positive of the required design, so as to produce on the gelatin film an insoluble image of the design which can subsequently be developed by washing in warm water. Since only the outer layers of the gelatin are affected by the light and the image is also reversed, it is necessary to transfer the gelatin film to a specially prepared temporary support paper before development since otherwise the image would float away from the backing paper. This support paper consists of a sheet of white paper faced with a special glaze which is lightly coated with a film of paraffin wax.

To transfer the gelatin film to the temporary support paper, the pigment paper is immersed in cold water until saturated and then placed face down in contact with the wax surface of the temporary support paper, which has also been soaked in water. The two papers are squeezed firmly together, partially dried in blotting paper for a few minutes, and then immersed in water at approximately 105° F. until the soluble gelatin has dissolved sufficiently to allow the backing paper to be peeled off leaving the insoluble portion of the gelatin layer in contact with the surface of the temporary support paper. Washing with warm water is continued until the whole of the soluble gelatin has been removed. The paper is then immersed in cold water to harden the gelatin film, placed in position on the silk screen or other printing surface, pressed lightly, and allowed to dry. When quite dry, the temporary support paper can be pulled away leaving the image firmly adhering to the screen.

This process has been found to have several

serious disadvantages and requires a considerable degree of technical skill to produce a satisfactory result. Difficulties are frequently encountered in obtaining good adherence of the gelatin film to the temporary support paper in such a way as to prevent parts of the image floating away during the development. In addition, a certain amount of stretching takes place during the washing operations and frequently this stretching is greater in one direction than another, so that the final stencil obtained on the silk screen is slightly distorted as compared with the original design and its dimensions are different. This is of considerable importance when multi-coloured designs are to be printed as it renders it almost impossible to get a satisfactory registration of the various coloured portions of the design.

According to this invention all these difficulties may be overcome by the use for producing the stencil of photographic sensitive material comprising a thin sheet of water-insoluble transparent flexible backing material coated on one side with an intermediate film of heat-softening transparent or semi-transparent material on which is superposed an outer film of colloidal material capable of being rendered sensitive to light which may contain a pigment or dye. The said backing material may consist of a thin sheet (0.003 to 0.005 inch thick) of a plasticised cellulose ether or ester or a natural or synthetic resin or the like, such as is used for example in the preparation of films for the photographic industry. The intermediate film may consist of a transparent wax, a vinyl resin, shellac, or any heat-softening natural or synthetic resin. The outer film, which may be of gelatin or glue, may be plasticised by any known method and may contain a uniform dispersion of any suitable pigment, or it may be dyed with a transparent dye of any colour. Although not essential to the process, the pigment or dye is added to increase the visibility of the image during development and subsequent processing.

Photographic sensitive material prepared according to this invention may be sensitised by immersion in a dilute aqueous solution of a chromate or dichromate and dried in the dark in accordance with previous practice.

To prepare a stencil on a silk screen or other printing surface, a piece of the sensitised material prepared according to this invention is placed in contact with the photographic positive plate of the required design and exposed to a suitable source of light. In this case, however, the posi-

tive plate must be in contact, not with the outer film, but with the uncoated side of the transparent backing material so as to produce an insoluble design in the outer film in contact with the heat-softening transparent or semi-transparent material on the backing material and thus avoid inversion of the image. In this way the use of a temporary support is rendered unnecessary and the image may be developed on the transparent backing material by direct immersion in a bath of warm water at a temperature of approximately 105° F., so as to wash away the soluble part of the outer film leaving an insoluble image of the required design.

This image is free from distortion since the flexible backing material is inert to water and its dimensions do not change after immersion therein.

The developed outer film is transferred to the silk screen by removing the developed material from the warm water, cooling it with cold water, and pressing it in position in contact with the silk screen or other printing surface, and drying. The transparent backing material is then removed from the outer film stencil by warming the screen or by ironing the flexible transparent backing material with a domestic iron heated to a temperature above the softening point of the intermediate film. Alternatively, a liquid solvent for the heat-softening intermediate film may be applied to the stencil on the silk before the application of heat so as to facilitate the softening and subsequent removal of the flexible backing material. When the intermediate film melts, the backing material can be readily pulled off, leaving the image firmly fixed to the silk screen or other printing surface. Any trace of the intermediate film which remains on the screen can be removed by washing with a suitable solvent, which does not attack the silk screen or the stencil thereon.

In order that the differences between the known pigment paper and the photographic sensitive material in accordance with the present invention may be clearly understood, reference is made to the accompanying drawing in which Figure 1 is an end elevation of a piece of pigment paper being exposed to light through a photographic positive and Figure 2 is an end elevation of a piece of photographic sensitive material in accordance with this invention being similarly exposed. In both figures the relative dimensions of the various parts have been distorted for the sake of clearness.

Referring to Figure 1, the pigment paper consists of a porous backing paper A carrying a film of gelatin B. During exposure, the film B is in contact with the photographic positive C, the light being passed therethrough in the direction indicated by the arrows. Insolubilisation of the gelatin takes place at the surface D and does not extend to the junction of the paper A and the film B. It is therefore necessary, before development, to transfer the film B to a support paper so that the surface D is supported. If the pigment paper were to be developed without this step, the insoluble image formed in the film B would float away from the backing paper A since the whole of the gelatin in contact with the paper A remains soluble.

Referring now to Figure 2, E is the transparent

backing material, F the intermediate film of heat-softening material and B the outer film of colloidal material, such as gelatin. C is the photographic positive and light is passed therethrough in the direction of the arrows. The insoluble image is formed on the surface G, i. e. the surface in contact with the intermediate film F. Since the surface G is already supported, it is unnecessary to transfer the film B to a support paper, and the assembly E, F, B may be directly developed whereby the image remains adhering to the film F.

Where the word "chromate" is used in the claims, it is used in a collective sense including "dichromate."

We claim:

1. A process of producing a silk screen or the like stencil from a material comprising a thin sheet of water-insoluble flexible transparent backing material coated on one side with an intermediate film of heat softening material which is at least semi-transparent, said intermediate film having superposed thereon an outer film of gelatin or glue which comprises

- (a) rendering the outer film sensitive to light by immersion in a solution of a chromate and drying in the absence of light,
- (b) passing light through a photographic positive, then through the backing material and the intermediate film to act on the underside of the sensitized outer film,
- (c) immersing the whole in warm water whereby the unaffected part of the outer film is removed and the remainder assumes the shape of the desired design,
- (d) pressing the whole onto a screen with the outer film in contact with the latter,
- (e) allowing the whole to dry,
- (f) heating to soften the intermediate film, and
- (g) removing the backing material whereby the outer film having the shape of the desired design is left firmly adhering to the screen.

2. A process as claimed in claim 1 in which a solvent for the intermediate film is applied before the heating in step f.

3. A process as claimed in claim 1 in which any intermediate film adhering to the screen after step g is removed by treatment with a solvent for the intermediate film which is inert to the material of the screen and to the stencil thereon.

4. A process as claimed in claim 1 in which the backing material is selected from the group consisting of a plasticized cellulose ether, ester, a natural and synthetic resin.

5. A process as claimed in claim 1 in which the intermediate film is chosen from the group consisting of a transparent wax, vinyl resin, shellac, heat-softening natural and synthetic resin.

6. The use in the process as claimed in claim 1 of a material comprising a thin sheet of transparent cellulose nitrate backing material one side of which is coated with an intermediate film of a heat-softening polyvinyl resin, said intermediate film having superimposed thereon an outer film of pigmented or dyed gelatin.

ERNEST ROBERT BOX.
FRANK ENOCH KERRIDGE.