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SELF-PROCESSING PHOTOSTAT PAPER

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Fig. 1.

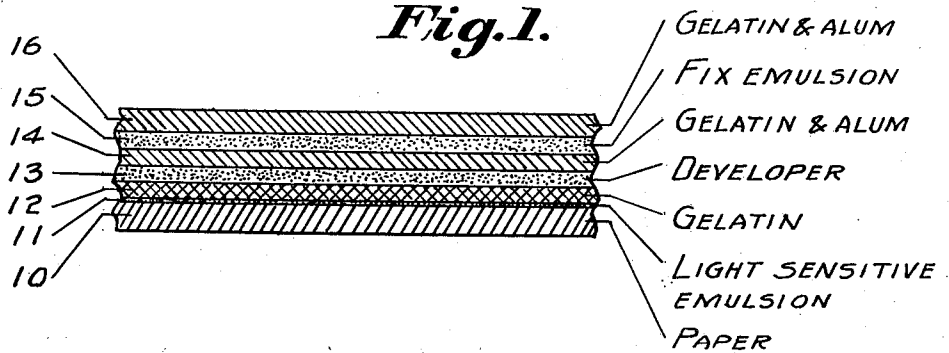
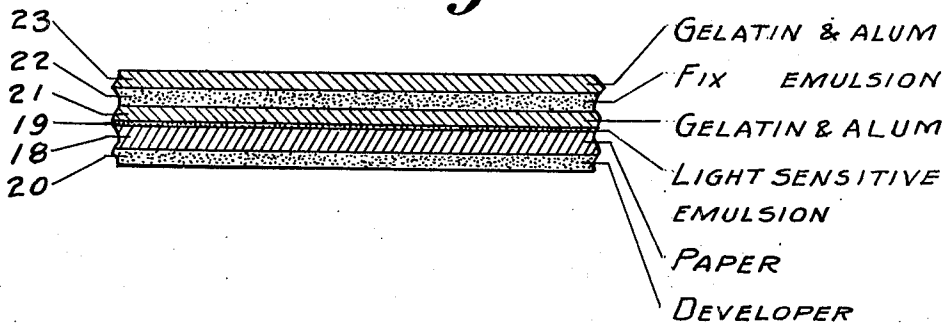


Fig. 2.



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SELF-PROCESSING PHOTOSTAT PAPER

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2 Claims. (Cl. 96—76)

(Granted under Title 35, U. S. Code (1952), sec. 266)

The invention described herein may be manufactured and used by or for the Government of the United States for governmental purposes without the payment to me of any royalty thereon in accordance with the provisions of the act of April 30, 1928 (Ch. 460, 45 Stat. L. 467).

This invention relates to photographic materials, and more particularly, to photosensitive sheet materials for forming fixed positive prints.

An object of this invention is to provide a self-processing photosensitive sheet material which after proper exposure may be rapidly developed and fixed in a simple operation.

Another object of this invention is to provide a photosensitive sheet material which after exposure to form a latent image may be developed and fixed to provide a fixed stable print by simply immersing it in water.

Another object of this invention is to provide a photosensitive sheet material which contains developing and fixing components which are sequentially effective when the photosensitive material is immersed in water.

Another object of this invention is to provide a photosensitive paper having separate layers of developing and fixing materials arranged to be sequentially permeated and dissolved upon immersion of the exposed photosensitive paper in water.

These and other objects and advantages of this invention will be apparent from the ensuing description taken in connection with the accompanying drawings, in which:

Fig. 1 is a diagrammatic, fragmentary, sectional view of sheet material comprising one embodiment of this invention.

Fig. 2 is a view similar to Fig. 1 of sheet material comprising another embodiment of the invention.

The photographic sheet material of this invention comprises a water permeable support coated with a photosensitive layer, and provided with separate layers containing developing and fixing components respectively. The layers of developing and fixing substances are separated from the light-sensitive layer in such a manner that the developing layer is more rapidly permeated by water than the fix layer, when the photosensitive sheet is immersed in water. This is accomplished by means of intermediate and covering layers or coatings of varying hardness or thickness, or of both varying hardness and thickness.

Referring to Fig. 1, a suitable water permeable material forms a support 10 which is provided with a light-sensitive layer 11. The support material may comprise paper, regenerated cellulose, or other water permeable substance, and the layer 11 may comprise a silver halide "emulsion" containing silver halides mixed in a suitable colloid or plastic carrier, such as gelatin, glue, albumin, collodion or the like.

Suitable manufactured materials providing a combination of the support and light-sensitive layer are the commercially available photographic films and papers. Any of these materials using a water permeable base or support may be used for the purposes of this invention.

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A layer 12 of gelatin or other water permeable organic colloid or plastic is superimposed upon the light-sensitive layer 11 and forms a subsurface and intermediate or separating layer for a coating 13 containing developing reagent in gelatin or similar carrier. Conventional developing reagents readily available on the market may be employed. A layer 14 of gelatin, or the like, separates the developing layer 13 from a layer 15 containing a fixing reagent. Suitable fixing reagents are readily available commercially. The fix layer 15 is finally covered with a protecting layer 16 of gelatin and alum or of other coating material which may be less rapidly permeated by water than the previous layers. The layer 16 may also be made thicker than the preceding layers. By controlling the composition or thickness of the coating materials, or by controlling both of these factors, the layers may be made to dissolve in stages from the paper up, so that when immersed in water, the developer will dissolve and become available for action upon the light-sensitive surface prior to dissolution of the fix. The image is thereby first developed and then fixed. For example, the intermediate layer 14 may comprise gelatin hardened with a suitable agent, such as, potassium alum, potassium chrome alum, or formaldehyde. The covering layer 16 may be gelatin hardened to a greater degree than the underlying layers by incorporating a greater quantity of the hardening agent. The layer 16 may also comprise a material similar in composition to that of layer 14 but of sufficiently greater thickness that the lower layers 12, 13, 14 and 15 are permeated by water absorbed upwardly through the support 10 before water acting upon the outside of layer 16 can completely permeate and dissolve this material.

In the embodiment of the invention shown in Fig. 2, the underside of a water permeable support 18, having sensitized surface 19, is coated with the developing composition to form a layer 20. The light-sensitive surface 19 is coated with a layer 21 of gelatin, or the like, which separates it from a superimposed layer 22 containing the fixing reagent. Coating 23 of hardened gelatin is provided over the fixing layer 22 to prevent dissolution from the top side until the developing reagent has had time to act upon the silvered surface. The top coating 23 may comprise gelatin incorporating a hardening agent such as alum, or may comprise other materials of a suitable comparatively slow rate of water permeability. It may also be of greater thickness than the preceding separating layers.

In the use of the material of Fig. 2, when the paper is immersed, the developer 20 on the back of the support 18 will dissolve first, go through support 18 and develop the silver salts in the light-sensitive layer 19. The gelatin layer 21 will then dissolve followed by the fix emulsion. The top layer of gelatin and alum 23 remains intact until both developer and fix have dissolved and acted upon the silver salts to form a stable fixed print.

Various changes can be made in the applications of the invention without departing from the spirit and scope thereof.

What is claimed is:

1. A laminated self-processing photoprint paper, comprising a paper base layer readily water absorptive and coated with a gelatin emulsion of silver halide, an outer layer of gelatin hardened with alum and substantially water impervious, a protective coating of gelatin hardened with a lesser amount of alum disposed upon the silver halide and being less water permeable than the paper base layer and more readily water permeable than the outer layer, a layer of dry water soluble developer for the silver halide carried by the paper base layer, and a layer of dry water soluble gelatin emulsion of fix for the silver halide disposed between the protective coating

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and the outer layer, whereby when the laminated sheet is immersed in water the water is absorbed inwardly from the paper side of the sheet only with a time delay for effecting solution of the fix layer with respect to the developer layer.

2. A laminated self-processing photoprint paper, comprising a paper base layer readily water absorptive and coated with a gelatin emulsion of silver halide, an outer layer of gelatin hardened by alum and substantially water impervious, a coating of water soluble gelatin disposed upon the silver halide, a layer of dry water soluble developer for the silver halide carried by the paper base layer, a protective coating of gelatin hardened by alum disposed upon the layer of developer and being less water permeable than the paper base layer and more readily

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water permeable than the outer layer, and a layer of dry water soluble gelatin emulsion of fix for the silver halide disposed between the protective coating and the outer layer whereby when the laminated sheet is immersed in water the water is absorbed inwardly from the paper side of the sheet only with a time delay for effecting solution of the fix layer with respect to the developer layer.

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