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SELF DEVELOPING PHOTOGRAPHIC SURFACE.

APPLICATION FILED APR. 23, 1906.

917,310. Patented Apr. 6, 1909.

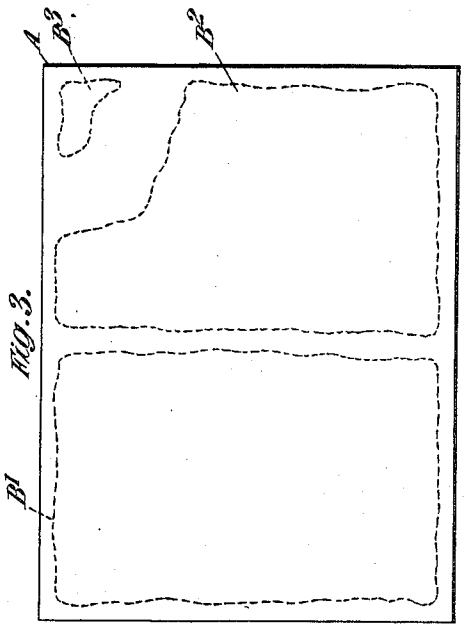


Fig. 3.

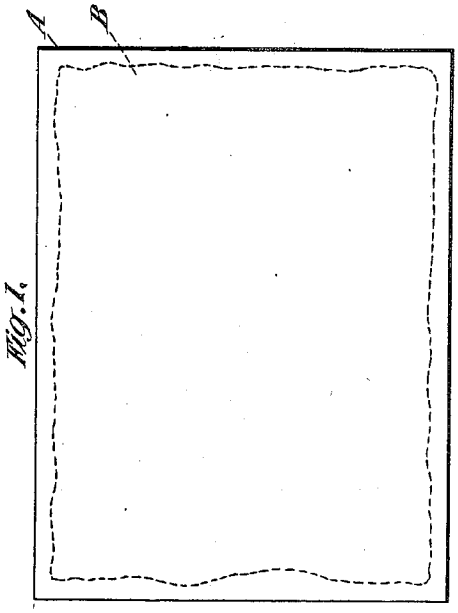


Fig. 1.



Fig. 2.

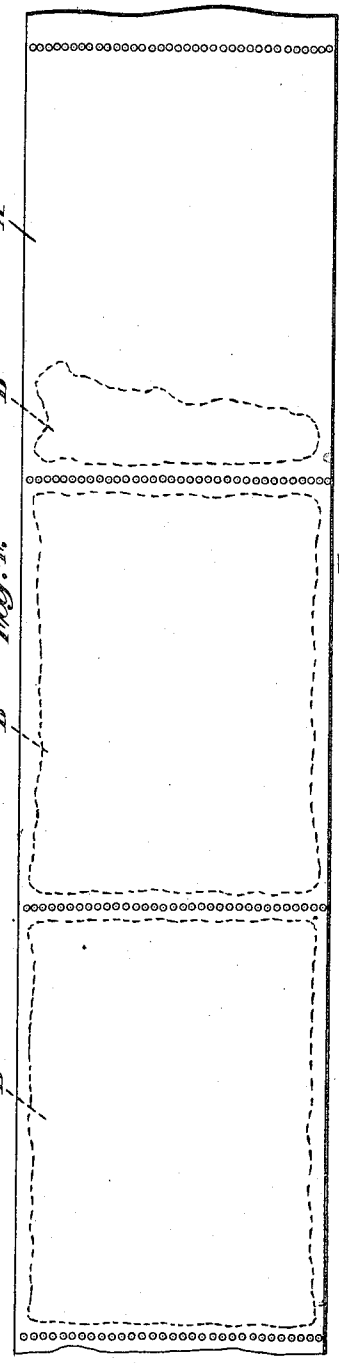


Fig. 4.



Fig. 5.

Witnesses
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UNITED STATES PATENT OFFICE.

WILLIAM FRASER CLAUGHTON KELLY AND JOHN ARTHUR BENTHAM, OF LONDON, ENGLAND.

SELF-DEVELOPING PHOTOGRAPHIC SURFACE.

No. 917,310. Specification of Letters Patent. Patented April 6, 1909.

Application filed April 28, 1906. Serial No. 313,315.

To all whom it may concern:

Be it known that we, WILLIAM FRASER CLAUGHTON KELLY, barrister-at-law, and JOHN ARTHUR BENTHAM, gentleman, subjects of the King of Great Britain, residing, respectively, at 8 Perham road, Kensington, and 36 Beaumont street, Portland Place, both in the county of London, England, have invented certain new and useful Improvements in Self-Developing Photographic Surfaces, of which the following is a specification.

Our invention relates to an improved method of developing photographic plates, films, bromid paper or the like, and the adaptation of the plates or films to this method of development.

Our plates or films are so prepared that mere immersion in water effects their development as they carry on the back the essential constituents of the developer in a dry state.

We are aware that photographic surfaces bearing their own developer in a dry state, have already been prepared, as inventions having this aim go back to 1887; and as an example of such an invention applied to dry plates we may refer to Backslandt's invention as disclosed in the specification of his British Letters Patent No. 1201 A. D. 1888 and we therefore make no claim for that special feature. We are also aware that Thornton and others in their specification No. 17292 A. D. 1899 made certain proposals, but these were impossible in practice as the developing composition could not keep.

According to the present invention, we prepare a concentrated developing mixture in a thick or semi-fluid condition, and containing as a preservative and alkaline constituent borax, boracic acid or a soluble borate, and this mixture we spread on the back of the plate, film or the like. We allow the developing composition to dry, and if, after such a plate or film has been exposed in the camera, it is immersed in water, the water will dissolve the backing and so become itself a developing fluid.

The following mixture for backing is convenient for use, but we do not bind ourselves to this special composition, as it is well known that developers must be varied to suit plates and conditions:—Metol 2 grains, hydroquinone 5 grains, metabisulfite of potassium ½–1 grain, bromid of potassium ⅛ grain, borax 10–20 grains, gum or other suitable colloid ¼ grain, water sufficient to make a thin paste. These materials are ground together, applied to the back of the plate, and allowed to dry. The quantity stated above is sufficient for a "quarter plate".

In the accompanying drawings:—Figures 1 to 5 show the manner of laying or arranging the developer on the back of the film or plate. Fig. 1 is a plan view of one embodiment of the invention; Fig. 2 is an edge view; Fig. 3 is a plan view of another embodiment of the invention; Fig. 4 is a plan view of a further embodiment; and Fig. 5 is a sectional view of a still further embodiment.

As shown in Figs. 1 and 2, A represents a glass or other plate and B the developing paste, spread on the back thereof. When the composition is to be applied to the back of a "roll film" it is necessary to so adjust the constituents as to secure flexibility. We quadruple the above quantities (except the gum) and mix the ingredients with fifty drops of gum arabic mucilage, four drops of glycerin or syrupy glucose and sufficient water. This quantity of mixture will serve for coating the back of an ordinary "six exposure" quarter-plate roll film. Instead of incorporating all the constituents of the mixture we sometimes keep separate the reducing and alkaline constituents, and spread these on adjacent areas on the back of the plate, film or the like.

Our composition as given above may be divided into two or more constituents as follows:—The two grains metol and the five grains hydroquinone and the metabisulfite of potassium may be mixed with a little gum, and spread on a portion of the plate as shown at B′ in Fig. 3. The borax, or accelerator, similarly treated and applied is shown by B^2, and the bromid, naturally occupying less space, may be placed as at B^3 from whence it can be removed by scraping or sponging before development, should this course be deemed desirable. Similarly, the other constituents may be adjusted or proportioned by the operator. A thin coating or wash of gum arabic or sugar in solution, or a mixture of both is a protection which we apply over the developing composition when exposure to trying atmospheric conditions is anticipated.

When we deal with "roll films" and divide the developer into constituent parts as above described, it is often convenient to ar-

range the constituents on sequent "exposure-sections" of the "roll film" as shown in Fig. 4. A being the film or support, B' B'' B''' the constituents of the developer.

In order to avoid excessive reflection of light from the back through the plate in the case of the single composition, and any unequal reflection in the case of the developer in separate constituents we interpose a "light absorptive" layer between the support and the developing materials; but in certain cases the "light-absorptive" layer may be between the sensitive film and the support, but we make no claim to the combination of sensitive film absorptive layer and support as same forms the subject of Oakley's British Patent No. 2986 of 1895. Fig. 5 shows the last mentioned arrangement. C being the plate or support. D the dry developing composition or a constituent of it. F the light absorptive layer, E the sensitive stratum. In the former case the "light-absorptive" material may be either a transparent color, a sheet of opaque substance or a pigment, in the second case a dye or stain that will wash out during development and fixation.

As an example of the light-absorptive medium which we interpose between the sensitive stratum and the support we give the following:—Gelatin 1 oz., water 16 oz. Dissolve by heat and add:—crocin scarlet, 3.B. 5 grains.

The solution is applied to the support and dried before coating with sensitive emulsion. Sometimes we prefer collodion or the like as a vehicle for the color. For coating the back of the plate we may use a similar composition or in place of the crocin scarlet or other dye we may use lampblack or other suitable pigment.

When our developing composition forms one unbroken covering over the back of the plate or film as shown by Fig. 1. B, it is convenient to incorporate the "light-absorptive" material with the developing constituents, in this case we may add 1/10 grain crocin or lamp-black or other suitable dye or pigment to the developing mixture described above.

In order to carry out our invention as applied to "roll film" with certainty of success under all climatic conditions it is necessary to interpose an impervious medium between the convolutions of the film, otherwise the developing composition might act on the sensitive stratum. The black "needle paper" ordinarily used to protect "roll film" from light is seldom or never sufficiently impervious to chemical action—but we render it sufficiently impervious by drawing it through a celluloid varnish or the like. On the other hand we sometimes use a protecting band of celluloid, waxed paper, Macintosh cloth, foil or the like.

What we claim and desire to secure by Letters Patent of the United States is:—

1. The combination with the support for the sensitive layer, of a developing composition applied to the back of the support and mixed with a light-obstructing material.

2. The combination with the support for the sensitive layer, of a developing composition applied to the back of the support and mixed with a material imparting flexibility to the composition.

3. The combination with the support for the sensitive layer, of a developing composition applied to the back of the support and mixed with a light-obstructing material and with a material imparting flexibility to the composition.

4. In self developing photographic plates or films the combination of a light-obstructing material with the developing and preserving constituents upon the back of the plate or film, substantially as described and for the purpose set forth.

5. In self developing roll films the combination with the developing compositions spread on the back of the film of a material imparting flexibility thereto.

In testimony whereof we have hereunto set our hands in presence of two subscribing witnesses this 11th day of April 1906.

WILLIAM FRASER CLAUGHTON KELLY.
JOHN ARTHUR BENTHAM.

Witnesses so far as regards W. F. C. Kelly:
H. D. JAMESON,
A. NUTTING.

Witnesses so far as regards J. A. Bentham:
WM. PIERCE,
H. WATSON.