UNITED STATES PATENT OFFICE.

FREDERIC EUGENE IVES, OF NEW YORK, N. Y.

COLOR-PHOTOGRAPHY PRINT.

1,160,288. Specification of Letters Patent. Patented Nov. 16, 1915.

No Drawing. Continuation in part of application Serial No. 682,774, filed March 9, 1912, and division of application Serial No. 709,034, filed July 12, 1912. This application filed July 3, 1914. Serial No. 849,007.

To all whom it may concern:

Be it known that I, FREDERIC EUGENE IVES, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Color-Photography Prints, of which the following is a specification.

This invention relates to a color-photography print, that is to say, a photograph or print made by the principles of color photography and showing the natural colors of the original subject.

The novel print forming the subject of this application may be prepared in various modes, for example, in accordance with the method which is set forth in detail in my Patents Numbers 1,106,816 issued August 11, 1914, and 1,121,187 issued December 15, 1914.

This application is a continuation in part of the application resulting in said Patent No. 1,106,816 and the division of the application resulting in said Patent No. 1,121,187.

The general object of the present invention is to afford a satisfactory color-photography print of a structure which may be readily duplicated or produced in quantities from a given set of color-selection photographic negatives, and more particularly upon an opaque back, typically represented by white paper; thus meeting a long existing demand for a color photograph upon paper which may be multiplied at will after securing the necessary negatives, and being flexible is comparable to an ordinary photograph in all the practical and convenient aspects of the latter. Another object is to afford such a color photograph which is capable of production by comparatively simple and therefore practical methods and which when completed will be permanent. Other objects hereof will be elucidated in the hereinafter following description.

To the attainment of such objects the present invention consists in the novel color-photography print devised by me, possessing the advantages in its physical form, its ease of production and its permanence, which have been referred to.

It will be understood that in the art of color photography, to which the present invention relates, it has been well known to first, by a suitable camera, secure a set of, for example three, color-selection negatives each representing one of the primary colors, for example red, green and blue in the original subject, from which negatives in one way or another suitable positive images in in the complementary colors were produced and combined.

The print of this invention is one prepared from such a set of color-selection photographic negatives, and the print may be described as follows. It consists of a suitable back or support coated with a layer of hardened colloid, usually gelatin, and it contains a plurality of accurately registered and unblurred images of different colors which have been successively applied and which are combined into a single multi-color picture, at least one of the images being an imbibed image contained in the body of the colloid layer. The gelatin coating of the print is preferably both hardened and mordanted. The back or support is preferably an opaque back, and is also preferably previous and flexible, and these three qualities are met by an ordinary paper back. The gelatin of the print contains preferably not merely one but a plurality of the differently colored images, and one or more or all of such images contained in the body of the gelatin are imbibed dye images.

The imbibed images contained in the body of the gelatin layer of the print should be located near the top or front surface thereof so that there is no danger of the dye spreading laterally in the paper back. This result is secured by reason of the already recited hardened and mordanted character of the gelatin. Each of the imbibed color images is likewise fixed and permanently held in the gelatin through the action of the mordant therein.

The advantageous print thus secured is one possessing brilliance of coloring without the flatness or cloudiness which would result from diffusion in soft gelatin or paper. It possesses permanence, as the color images are held as received. It possesses all the advantageous qualities of a paper photograph including flexibility, opacity, etc., and can be mounted in an album, rolled or otherwise handled without danger.

While the novel print above described

could be produced by different methods, it is, as already stated, conveniently produced by the method set forth in my aforesaid prior patents which method may be briefly reviewed as follows. From the three or other number of color-selection negatives representing, for example the blue, red and green elements of the subject, there will be made a set of vehicles or dye carriers, for example, in the form of gelatin reliefs, which can be used repeatedly in producing the finished prints. These dye carriers are adapted to selectively absorb color from aqueous dye baths, and each carrier will be dyed up previous to each operation with suitable precaution for insuring proper depth of color. Three color images are thus produced, and the subsequent operation is to successively transfer them by imbibition to the print. This transference according to said prior patents involves accurate registration of the carrier and print while preventing imbibition and then permitting imbibition while preventing relative movement. For example, the carrier and print may be brought into dry face contact and put under pressure followed by the application of moisture through the pervious or paper back of the print, the moisture penetrating to the colloid surfaces and starting the imbibition, which is continued under pressure for a considerable period. After each imbibition the print and carrier are separated and then dried, or dried and then separated. The steps of applying color images by imbibition to the print are repeated until all three colors are applied. These colors may, for example, be first yellow, then blue-green, and finally magenta.

In addition to the features above recited, I refer to the following further preferred characteristics of the color-photography print hereof. I prefer that the colors employed shall be water soluble dyes having little or no affinity for gelatin, but capable of being mordanted in the gelatin of the print by an insoluble mordant such as one of the alumina or chrome mordants. Further, I prefer to employ dyes and mordants of such character that the latter may convert the former into insoluble color lakes. Preferably certain alizarin dyes will be employed. For blue, Bayer's alizarin blue. For magenta, equal mixture of Bayer's alizarin rubinol R and rubinol 3 G. For yellow, Bayer's sulphon rubinol R. These colors have been converted into permanent and insoluble lakes in being imbibed in the gelatin.

Another preferable feature is in having the hardness of the gelatin of the print such as to withstand destruction under extremely high pressure. For this purpose the gelatin may be hardened by formalin. The formalin hardened gelatin permits the imbibition to be carried on under the advantageous condition of extreme pressure and intimacy of contact.

The print with the three colors imbibed therein may be rendered of greater permanence by being supplementally fixed, either in a fixing bath containing one or more and preferably all of the following ingredients, namely, tannic acid, acetate acid, acetate of calcium, or by varnishing with an amyl-acetate collodion varnish.

It will thus be seen that there has been described a color-photography print embodying the principles and attaining the objects and advantages before referred to, and other advantages will be apparent to those skilled in the art. Since certain details may be departed from without altering the principles of the improvement, no limitation to details is intended excepting as set forth in the appended claims.

What is claimed is:

1. A color-photography print prepared from a set of color-selection negatives, and consisting of an opaque back as paper coated with a hardened colloid as gelatin, and said coating containing a plurality of differently-colored, accurately-registered, unblurred, imbibed dye images.

2. A color-photography print prepared from a set of color-selection negatives, and consisting of an opaque pervious back as paper coated with a hardened and mordanted colloid as gelatin, and said coating containing a plurality of differently-colored, accurately-registered, unblurred, imbibed dye images mordanted within the colloid coating.

3. A color-photography print prepared from a set of color-selection negatives, and consisting of an opaque back as paper, coated with a hardened colloid as gelatin, and said coating containing a plurality of differently-colored, accurately-registered, unblurred, imbibed dye images confined in location near to the top surface of the colloid coating.

4. A color-photography print prepared from a set of color-selection negatives, and consisting of an opaque back as paper, coated with a hardened colloid as gelatin, and said coating containing a plurality of differently-colored, accurately-registered, unblurred, imbibed dye images, and an outer coating of transparent protecting material over the colloid coating.

5. A color-photography print prepared from a set of color-selection negatives, and consisting of an opaque back as paper, coated with a hardened colloid as gelatin, and said coating containing a plurality of differently-colored, accurately-registered, unblurred, imbibed dye images composed of dyes of a character having little or no affinity for gelatin.

6. A color-photography print prepared from a set of color-selection negatives, and consisting of an opaque pervious back as paper, coated with a hardened and mordanted colloid as gelatin, and said coating containing a plurality of differently-colored, accurately-registered, unblurred, imbibed dye images, mordanted within the colloid coating and composed of insoluble lakes.

7. A multi-colored print consisting of a pervious base, as paper, coated with a hardened and mordanted colloid, containing a plurality of registered, differently-colored, imbibed images.

In testimony whereof, I have affixed my signature in presence of two witnesses.

FREDERIC EUGENE IVES.

Witnesses:

DONALD CAMPBELL,

WM. J. DOLAN.