

UNITED STATES PATENT OFFICE.

ARTHUR W. McCURDY, OF BADDECK, NOVA SCOTIA, CANADA.

PHOTOGRAPHIC NEGATIVE AND METHOD OF PRODUCING THE SAME.

1,014,970.

Specification of Letters Patent.

Patented Jan. 16, 1912.

No Drawing.

Application filed February 3, 1904. Serial No. 191,868.

To all whom it may concern:

Be it known that I, ARTHUR W. McCURDY, a subject of the King of Great Britain, residing at Baddeck, Nova Scotia, Canada, now temporarily sojourning in Washington, District of Columbia, have invented certain new and useful Improvements in Photographic Negatives and Methods of Producing the Same, of which the following is a specification.

This invention pertains to photography, and has for its object the production of what may be appropriately termed "positive-negatives" or combined positives and negatives. In other words, I aim to produce a plate or film which, when held up to the light, is transparent in the shadows and opaque or translucent in the high lights, but which, when its face or film side is viewed from the side upon which the light falls, is dark in the shadows and in the high lights reflects the light, thus producing a positive similar to the positive which would be produced from the plate or film in the usual method of printing by transmitted light.

The invention therefore consists both in the process of treating the negative, and in the article, that is, the positive-negative so produced.

A positive-negative or combined positive and negative possesses various advantages over the ordinary negative, among which may be mentioned the fact that it is a picture of what is actually seen by the observer, faithfully reproducing the lights and shadows as they appear in nature; that the photographer is enabled to see from inspection of the negative itself what a positive printed therefrom will be, except that the negative is peculiarly soft and beautiful in appearance; and that the positive produced by using the negative in its ordinary way and printing therefrom by transmitted light is softer and more artistic than that produced by an ordinary negative. For the purposes of mechanical or process printing the negative possesses other and marked advantages, which will be readily comprehended by those familiar with such matters.

My invention is susceptible of being car-

ried out in ways varying considerably in details, though embodying the same general principle or idea throughout.

Briefly stated, the essential feature of the invention resides in so treating or acting upon the darkened portions of an ordinary negative as to render said darkened portions white or capable of reflecting white light. The treatment whereby the high-light portions of the negative, that is, those portions which in the ordinary negative appear dark and which produce the high lights in a positive printed from such negative are rendered white or light-reflecting, may vary according to the character of the film with which the glass, celluloid, paper or other body is coated, the sensitizing preparation or emulsion used, and the developer employed to bring out the image upon the plate; but in all cases the treatment will begin with a developed and fixed negative, and will consist in so treating or acting upon said negative as to leave the shadow portions of the picture transparent and render the high-lights light-reflecting, and opaque or translucent. Having thus stated the general character and principle of the invention I will now state in detail a treatment which I have found to produce excellent results with a sensitized, gelatin-coated, dry-plate or film of commerce, this representing the bulk of photographic plates and films now generally used.

A plate or film being exposed in a camera in the ordinary way, so as to have thrown upon it by the lens the picture to be produced, and the latent image being thereby formed, the plate or film is developed in any usual way to bring out the latent image, for instance, by immersion and washing in a bath of pyrogallie acid, eikonogen, hydrochinon, or other usual developing preparation, and is finally cleared and fixed in a bath, such as of hyposulfite of soda. The negative thus developed and fixed is thoroughly washed to eliminate the fixing agent and may be dried, or subjected at once to my process. In practice it is convenient to begin the treatment while the negative is still wet, as otherwise time will be required to enable the solutions to soften the gelatin

and to permeate the same. The negative may be first placed in a bath of dilute sulfuric acid, say, from 3 to 5% solution, to clear it, or this step may be omitted. I have found it somewhat advantageous to employ such bath, and to leave the negative therein for a brief time, say from one to five minutes, preparatory to the next step, which consists in subjecting it to the action of a bleaching agent capable of taking away the dark color from the high-lights of the picture and rendering the same white or substantially so, and capable of reflecting light. A convenient way of performing this operation is to place the negative in a closed chamber or vessel containing chlorin gas, the action in such case being quite uniform and liability of injury to the negative by direct contact with chemicals or chemical solutions being thus avoided. After a short time the negative, acted upon by the chlorin, begins to whiten, and the face or film side of the negative, viewed with the light falling upon said face as an ordinary positive print would be viewed, has the appearance and effect of a positive print, but is peculiarly soft and clear. Its appearance is not unlike that of a fine ivory-type or porcelain print, yet even softer and more delicate than either of these. The chlorin, if not thoroughly eliminated, is apt to leave the negative slightly tinged with yellow. I find it advantageous, therefore, to place the negative in a bath of dilute sulfuric acid after treatment by the chlorin or after the bleaching has been performed. This solution may have a strength of from 3 to 5%, though I do not restrict myself to the precise proportions, it being necessary only that the solution be a weak one. The negative should then be washed in running water or in several changes of water and dried the usual way, when it is ready for use either as a negative or as a positive.

Instead of subjecting the negative to the action of a bleaching agent in the form of gas, vapor or fumes, a bleaching solution may be employed, as, for instance, chlorin water or bromin water of suitable strength. The strength of this solution may vary. A comparatively weak solution will perform the operation, but will require considerable time. Provided only that the solution be not of such strength as to attack or injure the sensitized coating of the plate or film, any strength desired may be adopted. Numerous other preparations will readily suggest themselves to those familiar with the subject of chemistry and its application to the arts, but the foregoing explanation will be sufficient to enable any one to practice my invention successfully and produce with certainty the positive-negative above described.

Various modifications of, additions to and refinements upon the process herein de-

scribed are possible in so far as they fall within the scope of the claims. The present invention, however, consists broadly in converting the darkened portions of a negative into light-reflecting surfaces or bodies and thereby giving to the negative the double properties of a positive and a negative, at the same time.

I am well aware that under former and well known processes of photographic work, positives have been produced directly in or upon the plate, as, for instance, in the case of daguerreotypes, ferrotypes, and the like. So too, the ambrotype is in its finished condition a positive, but none of these can be used as a negative. My invention is therefore distinguishable from such positive plates in that it is at once a positive and a negative.

Practical experience demonstrates the fact that though the high-lights in the negative treated by my process are white, or approximately so, they nevertheless serve to preclude or lessen the transmission of light through the negative sufficiently to give good contrasts and good printing qualities to the plate, yet permitting enough light to pass to produce a peculiarly soft and artistic print on sensitized paper or other sensitized body, printed from the negative in the usual way of producing positives.

Having thus described my invention, I claim:

1. A negative having light-reflecting high-lights and transparent shadows of such highly contrasting degree as to produce a clear and well-defined positive when viewed from the side upon which the light falls upon the negative, and in which the film or coating and image are permanent, fixed and stable and not liable to disintegration or perforation when subjected for a considerable time to the atmosphere.

2. The herein-described method of treating a photographic negative to produce a negative-positive, which consists in subjecting the negative after development and fixation to the action of the fumes or vapors of a bleaching agent.

3. The herein-described method of producing a positive-negative, which consists in exposing a sensitized plate or film in a camera, developing the latent image thereon and fixing the same in the usual way; clearing the negative by subjecting it to the action of an acid bath; and finally subjecting the negative to the fumes or vapors of a bleaching agent and thereby bleaching and rendering light-reflecting the darkened portions of the negative.

4. The herein-described method of producing a positive-negative, which consists in exposing a sensitized plate or film in a camera, developing the latent image thereon and fixing the same in the usual way; clear-

ing the negative by subjecting it to the action of an acid bath; subjecting the negative to the action of the fumes or vapors of a bleaching agent and thereby rendering light-reflecting the darkened portions of the negative; and finally clearing the negative by subjecting it to the action of an acid bath.

In testimony whereof I have signed my

name to this specification in the presence of the subscribing witnesses.

ARTHUR W. McCURDY.

Witnesses:

THEPTIMUS MACE,

W. D. MACE,

WILLIAM W. DODGE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."