

UNITED STATES PATENT OFFICE.

JAMES W. McDONOUGH, OF CHICAGO, ILLINOIS.

ART OF PRODUCING COLORED PHOTOGRAPHS.

SPECIFICATION forming part of Letters Patent No. 471,187, dated March 22, 1892.

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To all whom it may concern:

Be it known that I, JAMES W. McDONOUGH, a citizen of the United States, residing at Chicago, Illinois, have invented a certain new and useful Improvement in the Art of Producing Colored Photographs, of which the following is a specification.

I take a support of plain glass, celluloid, paper, or other suitable substance, upon the surface of which is a sensitive photographic coating, preferably forming what is known as an "orthochromatic dry-plate." This may be rendered tacky by immersion in water or diluted glycerine. If preferred, however, the plate may be used before it becomes quite dry in the course of its manufacture. I dust the plate, either while it is somewhat moist in the course of its manufacture or after it has become tacky, as above explained, with a mixture of colors composed of fine or powdered particles containing the colors desired. I thus obtain a colored surface composed of particles lying side by side, which have the properties of stippled colors instead of the properties of a true mixture of pigments. In order to get these colored particles, I use colored powdered glass, transparent pigments, gelatine, rosin, shellac, or similar substances stained by aniline dyes, &c. In the preparation of the colors by means of shellac I take a sufficient quantity of clean white shellac dissolved in alcohol, to which I add aniline colors—say, for one lot red and yellow colors—in such proportions that the result will be a red, which when viewed by transmitted light in layers will cut off or absorb as much green, blue, violet, and yellow as possible, or which, in other words, will transmit as far as possible a pure red. Another lot is colored with as pure a green as may be formed by mixtures adding yellow to absorb blue. Another lot is colored blue. As the mixture of colors formed in this way by red and green does not form a bright yellow, I may use in addition another lot colored as near the yellow of the spectrum as possible. These lots after being thus colored are allowed to dry, forming colored masses, which are then reduced to powder by grinding, sifting, &c. If now proper proportions of red and green are mixed, a nearly black or gray mass will be formed,

and if proper proportions of red, green, yellow, and blue are mixed a mass will be formed that is nearly black or gray; but if this same mixture is dusted or finely spread upon the prepared sensitive surface it will reflect or transmit a mixture of all these colors, which will be white in proportion to the purity of color, cleanliness of mixture, and quantity of light transmitted or reflected. The glycerine may be washed out, so that only the colored particles in the mass in which they are arranged remain. When viewed under the microscope, the white surface is seen to be composed of a multitude of different-colored particles lying side by side and separated by small distances. This surface may be flowed with a thin coat of gelatine, which will penetrate the spaces between the colored particles, or the ground and colored particles may be coated with gelatine before applying them to the tacky surface by mixing them with a small quantity of dissolved gelatine and regrinding them, according as a mat or smooth surface is required.

The process of producing the effect called "color," above described, is by absorption of light; but inasmuch as color effects may also be produced by refraction, dispersion, or diffraction of light I do not mean to limit myself to absorption only as the means of producing them.

The photographic plate thus obtained consisting of colored particles applied to its sensitive surface may be exposed to the action of the light from the object to be photographed through a camera in such manner that this light will pass through the colored particles and affect the sensitive film, thus producing a latent image of the object. The plate may then be developed by the use of the so-called "alkaline-pyrodeveloper," so that the colored particles will adhere to the surface which is penetrated by the same colored light as the particles themselves, because gelatine is rendered insoluble in proximity to the silver particles in the sensitive compound where acted upon by light. Thus particles which do not allow the passage of colored rays on account of absorption may be washed off, because as to such particles the gelatine remains soluble. Thus blue rays will cause

blue particles to remain as an image, white light all the colored particles in that space acted upon by white light, and all will be removed where black occurs, which does not
5 act upon the photographic film. After the development the picture may be treated with thiosulphate of soda to remove the sensitive compound not acted on by the light and developer. By thus developing the plate a picture
10 is produced composed of the particles of silver and the colored particles remaining on the plate after the development. This picture may be used as a negative or backed with a black or other colored surface, as in an
15 ambrotype. The colored image is formed by the reflection of light from the particles or through the particles from the silver image or by the transmission of light through them when not cut off by the image. The use of
20 the orthochromatic sensitive plates and colored screens before the camera for the purpose of sifting light and regulating the action of different colors upon the film is too well known to require explanation. I will merely
25 add that the particles are dusted, spread, or placed upon the plate in such proportions as to produce a white or transparent surface.

What I regard as new, and desire to secure by Letters Patent, is—

1. The process of preparing photographic plates, which consists in applying to their sensitive surface particles of glass or other substances which show colors by absorption, refraction, dispersion, or diffraction, substantially as described. 30

2. The process of preparing photographic plates and pictures, which consists in applying a sensitive compound to them, covering them with colored particles lying side by side and in such proportions as to produce a white or light-colored transparent surface, and then washing out such particles as are not acted upon by light, substantially as described. 35

3. A plate for photographic purposes, having a sensitive surface to which is applied a layer of different-colored particles lying side by side and in such proportions as to produce a white or light-colored transparent surface, substantially as described. 40 45

JAMES W. McDONOUGH.

Witnesses:

SAMUEL E. HIBBEN,
ANNIE C. COURTENAY.