

UNITED STATES PATENT OFFICE.

THOMAS C. ROCHE, OF BROOKLYN, ASSIGNOR TO THE E. & H. T. ANTHONY & COMPANY, OF NEW YORK, N. Y.

PHOTOGRAPHIC PLATE.

SPECIFICATION forming part of Letters Patent No. 519,645, dated May 8, 1894.

Application filed January 31, 1893. Serial No. 460,470. (No specimens.)

To all whom it may concern:

Be it known that I, THOMAS C. ROCHE, a citizen of the United States, and a resident of the city of Brooklyn, in the county of Kings and State of New York, have invented a new and useful Photographic Plate and Film, of which the following is a specification.

My invention relates to improvements in photographic plates or sensitive surfaces.

The purpose of the invention is to prevent halation.

Before explaining the invention, I will define somewhat the state of the art as at present practiced. It is as follows: The theory of halation is this: that the rays of light from the brightly lighted portions of the picture, penetrate the glass or other surface which supports the sensitive coating and passing through the glass or other transparent support are reflected from its rear surface back again onto the sensitive surface, thus producing a blurred or haloed picture, and it is a well recognized fact that in photographing interiors, more particularly, those where strong light is directly in front of the lens, as for instance, sunlight entering windows, or when photographing any subject out of doors, where there is great contrast of light and shadow, that the sensitive surfaces are solarized or "halated" in those parts where the light has acted strongest. To prevent this to some extent at least, the old silver bath plates and collodio emulsion plates have been coated on the back with an opaque non-actinic color, usually mixed with gum, or have had dark paper pasted on the back. This was done to prevent the reflection from the back of the transparent support. The modern gelatine dry plates which are now mostly used are from twenty to fifty times as rapid as the old collodion plates made for general work. Nevertheless under the circumstances above stated, they also show halation badly, and the old mode of backing is still used, which backing has to be cleaned off, before development. Lately a new mode of preparing these gelatine plates to avoid halation has been introduced, *i. e.*, the plates are first coated with a slightly sensitive gelatine emulsion; when this is dry, they are coated

twice as sensitive, and then a third time coated with an extremely quick gelatine emulsion. This mode of preparing the plates is slow and expensive, requiring from ten to twelve hours drying between each coating. Most interiors require long exposures, and where the light is strong in front of the lens, as stated above, there is produced on this extremely rapid surface, *i. e.*, the outermost coating, a reverse picture, that is to say, a positive, instead of a negative on development. On this and other accounts, and because of their cost, these plates are objectionable.

What I have invented and discovered is, that plates can be coated with a single sensitive coating of gelatino bromide of silver or gelatino bromo iodide of silver emulsion, which will accomplish the desired effect of stopping halation for all practical purposes. To do this, I make a departure from anything that has heretofore been done, so far as I know; that is to say, instead of coating the back of the glass or other support for the sensitive surface with an opaque backing, I prevent the rays of light, measurably, at least, from entering the support by applying color on the front side of the support. The coloring matter which I employ is non-actinic, and is soluble in water or weak acid, so that it may be washed out or otherwise removed. The coloring matter must also not be injurious to the sensitive coating. By that I mean, that the coloring matter must be inert, that is, have no injurious effect on the vehicle, the support, or the silver or other salts employed, no matter how long it may be in contact with them. Also it must not be injuriously affected by any of the solutions or liquids used, either for development, fixing or washing, and it must be removable by at least one of them. The non-actinic colors, which I prefer to use are green, yellow, orange and red.

There are various ways of applying the coloring matter to the front side of the support for the sensitive surface. In this present case, I will confine myself to one method only, which is as follows: First, I flow upon the surface of the glass or other transparent support, a substratum of my coloring material, upon which the sensitive coating is applied after the substratum is dry. To make this kind of plate

or film, I incorporate the above mentioned coloring matters with gelatine or with plain thin collodion, and after cleaning or washing the glass or other transparent support, the sub-stratum, in other words, the solution of gelatine and coloring matter or collodion and coloring matter as the case may be, is flowed on the support and is there allowed to dry. The plates are then coated in the usual manner with the sensitive emulsion deposited on top of the sub-stratum, or plain gelatine or plain collodion can be flowed on the glass or other transparent support and when set, it may be dipped into a solution of the coloring matter, whereupon the sub-stratum coating will take up the coloring matter to such density as may be required, depending upon the density in color of the solution. The sensitive emulsion will then be applied as before. A useful formula for this method will be: water, ten ounces: gelatine, about sixty to one hundred grains: coloring matter, about thirty to sixty grains. The denser the coloring the longer the exposure may be without detriment to the results; and in stating the above formula, I have used the coloring matter known as "uranin" as a basis. When using other coloring matters, a deviation from the above proportions may be found desirable. I am aware that certain aniline dyes have been used, being added to the gelatine bromide of silver to give "color value" to the plates in photographing oil paintings and such work, called "ortho-chromatic work." These dyes, however, have been used for a totally different purpose and they have been very greatly diluted (one in one thousand of water) and would be of no use whatever in this invention. In fact, the colors used for ortho-chromatic work have invariably been so diluted that they are not non-actinic enough to prevent halation. My use of them is for a totally different purpose; I use them in a much more concentrated form, so that they are sufficiently non-actinic to prevent halation, and up to the present time, so far as I am aware, no coloring matter has ever been used as I use it, to prevent halation, and no plates have ever been offered in the market made to prevent halation, so far as I am aware, excepting the triple coated plates above referred to. After the film or plate has been exposed, developed and fixed, it requires a thorough washing. If, after this washing, there remains any "off color" in the plate, it should be immersed in a solution of water, twenty ounces; muriatic acid, one dram, the dish containing the solution and plate being rocked for a short time. A strong solution of alcohol may be used for the purpose. Then wash well again for final cleansing. I wish it to be distinctly understood that I do not limit myself to uranin alone, as any color sufficiently non-actinic, and which is not injurious to the silver and which is soluble in water, alcohol, alkali or weak acid will answer the purpose.

I claim—

1. A transparent support for a sensitive surface, having a sub-coating of non-actinic coloring matter, which is not injurious during the entire photographic process, and is soluble in the developer employed during said process, and a coating of sensitive emulsion upon the sub-coating, substantially as and for the purpose set forth.
2. A transparent support for a sensitive surface having a layer of non-actinic coloring matter upon its front side, which is not injurious during the entire photographic process and is soluble in the developer employed during said process, substantially as and for the purpose set forth.

Signed at New York, in the county of New York and State of New York, this 24th day of January, A. D. 1893.

THOMAS C. ROCHE.

Witnesses:
 PHILLIPS ABBOTT,
 E. SIMPSON.

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