UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN PHOTO-CHEMICAL PRINTING.

Specification forming part of Letters Patent No. **173,381**, dated February 8, 1876; application filed November 20, 1875.

To all whom it may concern:

Be it known that I, WILLIAM WILLIS, Jr., of Birmingham, England, engineer, have invented Improvements in Photo-Chemical Printing, of which the following is a specification:

This invention has for its object improvements in the chemical treatment of the surfaces of paper, wood, and other suitable materials employed for receiving images from photographic negatives, or from similar objects that may be interposed between the light and such prepared paper or other surface.

For this purpose, according to my invention, I apply to surfaces of paper, wood, and other suitable materials solutions or coatings of simple or compound salts of platinum, iridium, or gold, or a mixture of such salts. In all cases I must use for these coatings the salt or salts of the metal or metals in which the picture is to be produced. After the solution or coating has dried on the paper or other material I sometimes apply another coating of a salt or salts of other metals. I finally coat the paper or other material with a solution of ferric oxalate or tartrate, or a combination of these salts with others, and again dry the same. I then expose the coated surface to light, under a photographic negative or other suitable object, till a faint-brown image appears. After this I apply to the coated surface a solution of the neutral oxalate of potassium or other suitable oxalate, which speedily changes the brown tints to black ones. I then wash the surface thus treated for a short time in a dilute acid, and finally wash it in water; but I sometimes immerse the surface in a solution of chloride of sodium, or hyposulphite of sodium, or other suitable salt, before giving it the final wash in water.

In carrying my invention into practice I proceed as follows: I coat paper with a solution of chloroplatinite of potassium containing about ten grains of the salt to one ounce of water. After drying the paper I coat it with a solution of the nitrate of lead, (using about forty grains of this salt to one ounce of water,) or with nitrate of silver, (eight grains of silver to one ounce of water,) and dry it again. I then coat it with a solution composed of ferric oxalate, about sixty grains to one ounce of water, with as little oxalic acid as is sufficient to render the ferric oxalate soluble. I then dry the paper and expose it to light under a negative. On removing it from the negative I float it, face downward, on a hot solution of potassic oxalate. I then wash it in a weak solution of oxalic acid, then in plain water, and then immerse it in a solution of hyposulphite of soda, chloride of sodium, or solution of ammonia, or other liquid suitable for removing the salts remaining in the paper; and I prefer to finish by washing the latter in plain water.

Or I may modify the above process as follows: I coat the paper with a solution of platinic bromide, (about twelve grains to one ounce of water,) and then dry it. I then coat the paper with a strong solution of ferric tartrate and dry it. I next expose this paper to light under a negative, and afterward float it, face downward, on a hot solution of potassic oxalate. I then immerse it in a weak solution of oxalic acid, and finish by washing it in plain water.

In some instances I vary the above-described operations, or invert their order, or omit one or more of them; but in all modifications of my invention it is necessary to apply to the paper or other material a solution of potassic or other suitable oxalate.

I do not intend to confine myself to the use of aqueous solutions of the chemicals hereinbefore referred to, as the salts may be dissolved and used with any suitable solvent.

I sometimes mix two or more of the salts used for coating the paper or other material before their application to the same.

I claim as my invention—

In the process of producing on suitable surfaces photographic pictures in platinum, iridium, and other metals, the application of solutions of potassic, ammonic, or other suitable oxalate to such surfaces after they have been exposed to light under a negative or other suitable object, and which surfaces have been coated, previous to their exposure to light, with ferric and other salt or salts, one of which must be the salt of the metal in which the picture is to be produced, substantially as described.

WILLIAM WILLIS, JR.

Witnesses:

HY. JAS. NOONE,

JAS. EDWARDS.