

UNITED STATES PATENT OFFICE.

CHARLES N. WEST AND ALICE M. WEST, OF SAN FRANCISCO, CALIFORNIA, ASSIGNORS, BY DIRECT AND MESNE ASSIGNMENTS, OF ONE-HALF TO WILLIAM E. DEACON, OF BAKERSFIELD, CALIFORNIA, AND ONE-FOURTH TO SAID CHARLES N. WEST AND ONE-FOURTH TO SAID ALICE M. WEST, OF SAN FRANCISCO, CALIFORNIA.

PRODUCING IMPRESSIONS ON METAL PLATES.

No. 916,236.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, CHARLES N. WEST and ALICE M. WEST, citizens of the United States, residing in the city and county of San Francisco and State of California, have invented new and useful Improvements in Producing Impressions on Metal Plates, of which the following is a specification.

Our invention relates to a method of producing pictorial impressions, prints or pictures of any person or thing upon or into the surface of a metal plate, by the action of light alone, and fully developing the said picture by the same means.

It consists in the method of preparing the surface of the metal plate and rendering it sensitive to the action of light, and controlling said action by a picture or other representation of the thing to be pictured or engraved upon the plate, which thing may be placed over and upon the sensitized plate so as to be imprinted thereon, after which the plate is submitted to a chemical solution, which removes all sensitive conditions, and after thoroughly washing with water, and being dried and varnished, a permanent picture is formed within the material of the plate.

In carrying out our process, we first cut a plate from suitable commercial sheet metal to any required size. We then render its surface smooth and clean by sand blast or any other suitable method. We have found that a sand blast driven by compressed air in the ordinary manner, will render the surface of the plate smooth and chemically pure. After the plate has been properly prepared in this manner, it is subjected to a further polishing process by means of a brush wet with water, having soda in it to form a soda solution. We then gently brush the plate with fine emery; then wash it clean with running water, after which the plate thus prepared is placed in an ordinary silver plating bath, and coated with silver until it possesses a pure white granulated appearance; the surface consisting of exceedingly fine crystals of silver, which seem to produce the best results in our process. When the metal sheet has been thus plated to the de-

sired extent, it is removed and washed well in running water, after which it is thoroughly dried.

We have found that a strong blast of compressed air directed upon the plate will remove all moisture, and any impurities which may have lodged or been deposited thereon. The plate is then slightly warmed over an alcohol lamp, or by other means, and taken into a perfectly dark room, where it is subjected, first, to the vapors of any suitable hydrocarbon such as coal oil. The plate remains above the receptacle for the hydrocarbon for one or two minutes, and a portion of the insensible vapor arising from the hydrocarbon, will be deposited on the surface of the plate, which is then subjected to the vapor of iodine for from fifteen to twenty seconds of time, more or less. It is then subjected to the vapor of bromide of lime or calcium. The treatment of the plate to the action of the hydrocarbon vapor appears to render the surface of the plate more receptive to the vapors of the iodine and bromine which are afterward applied. Experience has shown that with the plate thus treated, the work is facilitated. The lime having been first slaked and heated to the greatest extent by burning in a vacuum after slaking, the bromine is then added and this substance produces a certain vapor which we have called bromine of lime, over which the plate is placed, remaining subject to this vapor from ten seconds to a minute, as experience and results show best. After this last exposure, it is returned again to be subjected to the vapor of iodine, remaining as before from fifteen to twenty seconds of time. It is then carried over the vapor of bromine and lime, remaining over it about the same time as described for its first subjection to this vapor. These exposures may be repeated alternately for six or more consecutive times as found best by experience, the last exposure being preferably over the iodine, and the whole of this portion of the process is carried out in the dark, or with only such light as produced by a ruby glass or colored papers which will destroy the actinic light ray. After the vaporizing treatment pre-

viously described, the plate is placed over the negative which may be of glass, paper or any sufficiently transparent or translucent substance having the desired figure, text, 5 either written or printed, or pictorial representation of any description, and the whole placed in a suitable printing frame, which is afterward taken into the light, and exposed from five to fifteen minutes in the sunlight; 10 twenty to sixty minutes in daylight where the direct sun is not present, and an intermediate time when exposed to an electric light. After a sufficient exposure to the light, which may be known by practice and 15 experience, the plate is returned to the dark room and removed from the printing frame, the face of the plate being kept downward and untouched by hand or otherwise. The plate is then placed in a pan of sufficient size 20 and depth to hold a solution and admit the plate to be quickly plunged into it with the picture side up. The plate is sufficiently inclined as it enters, to allow the fluid to flow across the surface in a continuous wave 25 so that it will wash and drive from the surface any remaining substance liable to leave a stain. When thus immersed, the plate may be tipped gently from one side to the other, so that the fluid will flow back and 30 forth over the surface until all remains of vapor or deposit upon the surface has been removed. The fluid which we have found very satisfactory for this purpose, is formed by dissolving hypo-sulfite of soda, sulfite of 35 soda, hydrochinon and chrome-alum in water. The proportions that we have found very satisfactory are about—8 ounces hypo-sulfite dissolved in one gallon of water, 2 ounces sulfite of soda dissolved in one quart 40 of water, to which we add 20 drops of chemically pure sulfuric acid. 1 grain of hydrochinon and one grain of chrome alum, dissolved each in one pint of water. After these are all dissolved, they are poured together, well shaken and then placed in any 45 suitable vessel for use as above described. It will be understood that these proportions may be varied as use may suggest; the object of the solution being to destroy the sensitive condition to which the plate had previously been brought, so that light will have 50 no further action upon it, and the picture will be fixed, no development being necessary further than is effected by the exposure 55 when the picture is being made. After the plate has been removed from this solution, it is thoroughly washed with water until no sensitive condition remains.

The picture may be intensified, its tones 60 changed or improved by gently shaking or rocking it in water, to which have been added a few drops of a weak solution of chrome alum. It is then washed, placed in a solution of aristo-platina, or a solution of

chlorid of gold. Either or both of these may 65 be used, as in ordinary photographic methods, the plate being gently tilted back and forth in a shallow pan, the pictured side of the plate being uppermost, so that the operation can be observed. After this work is 70 completed, the plate is washed in running water, and may be dried in any suitable manner, preferably by a blast of compressed air of any desired pressure. This method of drying serves to greatly protect the sur- 75 face of the plate from the development of stains, and to remove any impurities which may have been deposited from the water, or from other causes. The plate may be finally varnished or lacquered, either imme- 80 diately or after a suitable lapse of time, and the process will then be complete.

It will be understood that the plates for this process may be made of any metal which can be plated or coated as herein 85 described.

Having thus described our invention, what we claim and desire to secure by Letters Patent is—

1. The process of producing pictures and 90 like imprints upon metal plates consisting of surfacing and cleansing said plates, coating the plates with silver, subjecting the plates successively to hydrocarbon, iodine and bromine vapors, covering the prepared plate 95 with the negative to be imprinted and exposing to the light, washing the plate in a cleansing and fixing solution, and finally washing with water.

2. The process of producing pictures and 100 like imprints upon metal plates, consisting in cleansing and surfacing said plates by means of compressed air sand blast, and subsequent brushing with water and emery, subjecting the plate to a silver plating bath, 105 coating the prepared plate by successive applications of vapors adapted to receive impressions, placing the sheet to be printed in juxtaposition with the prepared surface, and subjecting it to the action of light, re- 110 moving the sheet, washing the plate in a fixing bath, then washing and cleansing the plate and coating the surface with a protecting varnish.

3. A process for producing pictures on 115 metal plates consisting in subjecting commercial steel or iron plate to a compressed air sand blast, brushing it with fine emery, plating the surface thus produced with silver, subjecting the plated surface alternately to 120 vapors of hydrocarbon, iodine and bromine, transmitting the picture by exposure to light through a superposed negative when contiguous to the prepared surface, fixing and washing the plate. 125

4. The process of producing pictures, said process consisting in preparing a smooth surface upon a metal plate; subjecting said plate

to the action of a hydrocarbon vapor and a sensitizing medium; applying a previously prepared negative or picture to the prepared surface; subjecting the said surface to light
5 sufficient to transfer the picture to the plate, and then fixing and washing the plate.

In testimony whereof we have hereunto

set our hands in presence of two subscribing witnesses.

CHARLES N. WEST.
ALICE M. WEST.

Witnesses:

EDWARD L. THOMAS,
JAMES D. SULLIVAN.