

UNITED STATES PATENT OFFICE.

AUGUSTE TOURNOUX AND FRANÇOIS SCHMALZ, OF NEW YORK, N. Y.; SAID
SCHMALZ ASSIGNOR OF ONE-HALF HIS RIGHT TO JESSE DEAN, OF TRENTON,
NEW JERSEY.

PROCESS OF PRODUCING INDELIBLE PHOTOGRAPHS ON PORCELAIN.

SPECIFICATION forming part of Letters Patent No. 260,065, dated June 27, 1882.

Application filed February 1, 1881. (No specimens.)

To all whom it may concern:

Be it known that we, AUGUSTE TOURNOUX, a citizen of the Republic of France, residing in Paris, France, and FRANÇOIS SCHMALZ, a citizen of the Republic of France, residing in the city of New York, in the State of New York, United States of America, have invented a new and useful Process of Producing Indelible Photographs on Porcelain, Faience, Enameled Copper, Glass, or other Kindred Substances, which we entitle the "Helio-Ceramic" process, of which the following is a specification.

Broadly stated, our invention consists in the following steps: first, in printing or transferring a photographic positive by means of light to or upon a metal or other suitable plate which has been coated with a preparation consisting of bichromate of ammonia, borate of soda, sugar and glycerine, and water, to fit it to receive the imprint or transfer from said positive; second, in covering or coating the image or print so produced upon said plate with vitrifiable color of any proper tint; third, in covering or coating the colored image or imprint upon said plate with a layer or film of collodion or other coagulable material, and in then removing by saturation and treatment with a solution of carbonate of potash the coating preparation upon the plate and beneath the collodion; fourth, in lifting said film when coagulated, together with the colored imprint or picture which adheres thereto, from said plate and laying it upon a porcelain, glass, or other suitable object which it is designed to decorate; and, fifth, in subjecting said decorated object to heat in a furnace or kiln in order to vitrify and render indelible the colored picture which has been produced thereon.

In order to carry the above-named process into effect, we resort to the following practice: We first take a copper or other suitable plate, the surface of which should be level, and after cleaning and washing it thoroughly we take a preparation composed of bichromate of ammonia, one part; borax or borate of soda, one part; sugar and glycerine commingled, two parts; and twenty parts of water, and pour the preparation upon the copper plate, equalizing it by a rotary movement, and drying it on the plate

while the plate is being rotated in proximity to a suitable source of heat.

The proportions of the preparation above stated are to be varied according to the state of the atmosphere. Thus in dry weather equal proportions of sugar and glycerine are to be used, while in wet weather the glycerine is not required.

The proportion of the water in the preparation is to be varied according to the tone of the image to be produced. Thus, if the image is to be a dark one, less water is employed than if the image is to be a light one.

We next place upon the plate a photographic positive, or what is technically known as a "cliché" positive, and expose the prepared plate, with the positive upon it, to the sunlight, electric or other light until a print or light impression of the positive is obtained on the prepared plate. The image will be perfect at the time when the preparation on the plate, which is natively of a golden color, has taken on a light-brown color. The plate with the image upon it is then dried. When, now, it is desired to obtain any general cast or color in the picture to be produced, vitrifiable color in powder of the proper tint is brushed on the plate. Oxide of iron with flux is an example of vitrifiable color. The whole face of the prepared plate with the image upon it by this means assumes a predetermined tint. The brush employed may be what is known as a "blaireau" brush.

The next step in our process consists in applying a collodion to the color-tinted image upon the prepared plate, which is run or flowed over the plate until it forms a thin tissue or film, to the underside of which the color-coated image adheres. We find a collodion made of one hundred parts of 95° alcohol, one hundred parts of sulphuric ether, and from four to eight parts of gun-cotton to be suitable for the purpose. The ether of the collodion is then allowed to evaporate and the collodionized plate put in a basin of water and allowed to remain therein for about one-quarter of an hour, until the water, soaking through the porous collodion, has dissolved the soluble preparation with which the plate was first coated, as hereinbefore ex-

plained. As this soaking process is not adapted to remove entirely the bichromate of the coating preparation, the plate is next to be washed with a solution of carbonate of potash and water until all surplus bichromate has been removed. The plate is then washed in filtered water to remove completely the carbonate-of-potash solution. The filtered water, penetrating beneath the collodion, effects a complete separation of the collodion film from the plate and leaves the collodion film in readiness to be lifted or removed therefrom. Many methods of effecting this removal of the film with its adherent image may be resorted to. We find a convenient method to be to make a frame, so to speak, of paper proportionate to the size of the image and to lay it upon the collodion film on the plate, scraping up the edges of the film against the exterior of the paper frame, so as to cause complete adherence of the film to the paper. The frame to which the entire collodion film adheres is then lifted (best from its corners) and laid upside down, or in a reversed position—that is to say, facing inward—upon a tile, plaque, or other object to be decorated, and the film allowed to dry upon the said object. The paper is then cut or scraped away from the edge of the film, and there remains upon the tile a film which bears the tinted image originally obtained from the positive employed. When the film is thoroughly dry the tile is burned or baked in an enameling-furnace to set the colored image, vitrify the coloring-matter, and render the whole indelible upon the tile. If desired, before baking, the picture may be painted by hand, so as to produce any artistic result desired.

Having thus described our invention, we claim—

The process of producing an indelible photographic picture upon a porcelain tile, plaque, or other object in glass, china, or other kindred material hereinbefore described, which consists, first, in preparing a metal or other plate with a chemically-soluble solution consisting of bichromate of ammonia, borate of soda, sugar and glycerine, and water; second, in printing or transferring an image from a photographic positive by means of light upon said prepared plate; third, in covering or coating the imprinted image upon the prepared plate with vitrifiable color; fourth, in covering or coating said colored image upon the prepared plate with a film, tissue, or layer of collodion or other coagulable material; fifth, in first dissolving by saturation in water, and second by treatment with a solution of carbonate of potash, the chemical solution upon the plate and beneath the collodion; sixth, in lifting said coagulated film and the colored image adhering to the under side thereof from said plate and laying it upon a tile, plaque, or other object desired to be decorated; seventh, in subjecting such decorated object to heat sufficient to vitrify and render indelible the colored image on the object, substantially as set forth.

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Witnesses:

WILLIAM GARLAND,
ALEX. CAMPBELL,
JAMES T. LAW.