UNITED STATES PATENT OFFICE.

JOSEPH F. FRITSCH, OF BROOKLYN, NEW YORK.

PROCESS OF PRODUCING PHOTOGRAPHIC PICTURES ON PORCELAIN.

SPECIFICATION forming part of Letters Patent No. 581,004, dated April 20, 1897.

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To all whom it may concern:

Be it known that I, JOSEPH FRANK FRITSCH, a citizen of the United States, and a resident of Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Processes of Producing Photographic Pictures on Porcelain, of which the following is a full, clear, and exact specification.

My invention relates to reproducing objects and pictures; and it consists of the hereinafter-described process whereby such reproductions are produced on porcelain and of the hereinafter-described composition of materials required in the process.

The reproduction may be made either directly from the object or from a photographic picture or from a photographic negative, and is done in the following manner: First I prepare a "transit-plate." This is a pane of transparent glass of sufficient size coated with a composition prepared as follows: To one hundred and fifty grams of distilled water five to six grams of molasses are added, five grams of gum-arabic and five grams of potassium bichromate. The quantity of molasses is determined by the season, larger quantity being used in hot weather and smaller when the temperature is low. The mixture is shaken until all its ingredients are fully dissolved, and then filtered through filtering-paper, whereupon ten drops of liquid ammonia are added to it. Before using the preparation it must be kept still and protected from light for about two days, which is necessary for the complete assimilation of all ingredients.

The coating of the transit-plate is made by pouring thereon—the pane of glass having been previously cleaned with alcohol and laid horizontally upon a tray—the liquid composition and spreading it evenly thereon. This coating and "drying" of the transit-plate must be done in a dark room to preserve its sensitiveness to light.

The coating composition spread on the transit-plate thickens to the consistency of gelatin and is similarly adhesive on its surface. The exposure to atmospheric influence produces also a slight brownish tinge on the coating, but does not, however, affect its absolute transparency.

The transit-plates may be prepared beforehand and kept stored in dark and dust-proof inclosures, care being taken that each plate is securely separated. Then I produce a positive plate of the object (or picture) in the same manner as photographic negatives are produced, and using also the same material therefor, laying the positive plate upon the coating of the transit-plate, and then expose the same to the light for a period of from two to five minutes—the length of this exposure being governed by the intensity of the light—in such position that the rays of the light will pass through the positive plate.

The surface of the coating is adhesive, as stated above, and the effect of the exposure will be that in those places where the light will strike unobstructed through the positive plate to the surface of the coating the adhesiveness of its surface will be destroyed, the light producing a smooth surface thereon. In the places where the light cannot penetrate (shades, lines, &c.) the adhesiveness of the surface will be retained either fully in absolute dark features of the picture or partially in those parts where the shades pass gradually into light. Thus an effect corresponding with the lines and features of the picture will be produced on the adhesive surface of the transit-plate, which I call the "copying" of the picture. The process producing this effect is facilitated if the exposed plate is kept at a temperature of from 70° to 80° Fahrenheit.

After the exposure the positive plate is withdrawn from the transit-plate and the produced copy "developed" with some mineral color, such as iridium oxid, prepared in a fine pulverized state and applied to the surface of the coating by means of fine brushes.

The coloring-powder will stick only to the places where the coating was covered by the features of the positive picture, and the more of it will be retained the darker (consequently more preventive of the effects of the light) the features of the picture were, the quantity diminishing gradually toward the places that were exposed to the effect of the light.

The developed picture will represent the

same effect as to the light and shaded features of the picture as the original positive, and the picture will appear on the plate in the same form (positive) as on the plate from which it was copied.

When the picture on the transit-plate is satisfactorily developed, the plate is again placed in exact horizontal position and liquid collodion poured thereon. After the collodion coating is sufficiently dry the edges around the glass plate are ripped, and then the plate with the picture immersed in a bath composed of pure water, to which a small quantity of sulfuric acid (seven to eight drops to each pint of water) has been added. In this bath the transit-coating of the plate is dissolved, but the deposited coloring substance is securely retained on the collodion coating. The collodion sheet is then repeatedly (three or four times) washed in pure water to remove all traces of the chemicals used in the composition of the coating and also of the sulfuric acid used in the bath, and then immediately immersed in a solution of gelatin (seven to eight parts of gelatin to ten parts of water) and spread upon the surface of a panel or other object on which the picture is to be reproduced, the side to which the depositing coloring substance adheres being turned toward the panel.

Care must be taken to remove the air that may be inclosed between the collodion sheet and the surface of the panel or object on which the picture is to be reproduced, and then the whole is left to dry in the air. The drying will require from one and one-half to two hours and must not be forced, to prevent the forming of wrinkles. Then the panel or object on which the picture is to be reproduced is slowly heated to about from 90° to 100° Fahrenheit, whereby the deposition of the coloring substance forming the picture is secured to the surface of the panel. The panel is then allowed to cool off and after that is immersed in a bath composed of equal parts of ether, oil of lavender, and alcohol and left there submerged for twelve hours, during which time the collodion sheet is dissolved, but the deposition of coloring material remains intact, adhering to the surface of the panel in the same manner as it originally was produced on the sensitized glass (transit) plate.

When the panel is perfectly dried on the surface to which the picture is affixed, it is coated with a composition known in the art as "grounding-oil." This coating is spread, by means of fine brushes, evenly over the surface of the picture, and finally a suitable glazing composition in powder form is spread evenly over the whole surface and the panel then immediately deposited in a horizontal position in a suitable furnace, where the glazing process is finished.

The heat in the furnace melts the glazing substance, transforming it into liquid glass, and produces an absolutely transparent and weatherproof coating over the picture.

My improved process is most suitable for producing pictures and ornaments for decorative purposes on the exterior of buildings, tombs, gravestones, tombstones, and the like where these ornaments or pictures are necessarily exposed to rough weather and atmospheric influences generally.

I claim as my invention and desire to secure by Letters Patent—

The process of producing photographic pictures on porcelain and similar products, the process consisting of the following steps: first producing a positive of the picture on a transparent sheet; second depositing this transparent positive picture on the surface of a sensitized plate, coated with an adhesive and sensitive substance and exposing it for from two to five minutes to the action of light; third depositing on the surface of the sensitized plate some mineral color (such as iridium oxid) in fine pulverized state, spreading as much of it as will adhere to the surface; fourth fixing the picture thus developed by a coating of collodion; fifth dissolving the original sensitive coating of the transit-plate transferring the deposit of coloring substance to the collodion coating, by ripping the edges of the collodion-sheet, and immersing the plate in a bath composed of pure water to which a small quantity of sulfuric acid is added; sixth, washing the collodion sheet repeatedly in pure water, immersing it in a solution of gelatin and spreading it with the side to which the deposit of coloring substance is affixed, upon the surface on which the picture is to be reproduced and drying the same thereon; seventh, removing the collodion from the surface of the picture by immersing it in a bath composed of equal parts of ether, oil of lavender and alcohol, and eighth fixing the picture to the surface of the porcelain by coating with grounding-oil depositing thereon an even layer of a glazing substance prepared in powder form and finally burning it in a furnace, whereby the glazing substance is melted and transformed into glass.

In witness that I claim the improvements described in the foregoing specification I have signed my name in the presence of two subscribing witnesses.

JOSEPH F. FRITSCH.

Witnesses:
CARL WEIZERZICH,
HENRY SCHREITER.