UNITED STATES PATENT OFFICE.

FRANCIS B. FORSTER, OF NEW YORK, N. Y.

PROCESS OF MAKING TRANSPARENT PHOTOGRAPHS ON GLASS.

SPECIFICATION forming part of Letters Patent No. 494,526, dated March 28, 1893.

Application filed April 14, 1892. Serial No. 429,194. (No specimens.) Patented in Belgium May 16, 1892, No. 99,446.

To all whom it may concern:

Be it known that I, FRANCIS B. FORSTER, a citizen of the United States, residing in the city, county, and State of New York, have invented a certain new and useful Improved Process of Making Transparent Photographs on Glass, (for which I have obtained a patent in Belgium, No. 99,446, bearing date the 16th day of May, 1892,) of which the following is a full, clear, and exact description.

My invention consists in the process of making transparent photographic pictures, wherein the positive image is printed in a metallic oxide from the negative, upon a medium which has been surfaced with a mixture of the material constituting the sensitive film and said metallic oxide; and the print in said metallic oxide is then transferred to and developed upon a temporary support; and said developed print is then transferred to a plate of transparent glass, and is thereon coated with a flux which fuses at about the temperature hereinafter stated; and the glass plate bearing said print and its flux is subjected to heat to fuse the flux, as and for the purpose hereinafter set forth, and my invention also consists in the process in which the medium upon which the picture is printed from the negative, is surfaced with the material constituting the sensitive film with which is incorporated a metallic oxide, as a pigment; then printing the picture upon said medium from the negative in said metallic-oxide; then transferring said print in said metallic oxide to and developing it upon a temporary support; then transferring said developed print to its permanent support, such as a glass plate, and thereon fluxing and annealing said print in said metallic oxide, as hereinafter specified.

In carrying out my invention, the sensitive medium upon which the photographic picture is printed from the negative, is surfaced with a mixture of a metallic-oxide and gelatine, or its equivalent. The metallic-oxide may be the oxide of copper, oxide of iron, or, in some cases, oxide of gold; and the sensitive coating for the said medium may be made by melting the gelatine, or its equivalent, and mixing thoroughly with it the metal oxide, said coating then being spread upon the surface of the medium, such as glass, or paper. This sensitive medium, when dried in a dark-room, is, in the well-known manner, exposed to the action of light under a photographic negative, to print the picture on the sensitive film. Of course, where the light reaches the film, through the negative, the film is rendered insoluble; and, where it is protected from the light's action by the lines of the negative, the film is soluble in warm or tepid water. When the picture is thus printed upon the sensitive medium, the integrity of the print, for the further purposes of the operations of transfer as hereinafter set forth, may be preserved by coating the surface of the film bearing the print, with a flow of collodion. The print is now ready for transference to a temporary support, such, for example, as gelatinized paper. This is accomplished by placing said paper in smooth and uniform contact with the face of the sensitive film, and, when it has become adherent thereto, withdrawing the paper, when the film will leave its glass base and appear in reversed position upon the temporary support. The print is then developed upon the said support, which may be accomplished in the usual manner by immersion in or washing with warm or tepid water, so as to dissolve and wash away the soluble portions of the film, and leave the picture, in the metallic-oxide, developed on the temporary support, and ready for transfer to its permanent transparent glass base.

In vitrifying the photographic picture upon a transparent glass base, the picture is transferred, in the metallic-oxide, from the aforesaid temporary support to the surface of the glass, by placing the face of the support bearing the picture, in uniform contact with the glass surface; and, when the film on the support has become adherent to the glass, withdrawing the temporary support. This leaves the image, in a mineral-oxide, on the glass base. The collodion coating may now be washed away by means of a flow of ether, and the insolubility of the pigment film on the glass may be preserved by the application thereto of a solution of chrome-alum. The plate and its film are then dried in the usual manner, and are then ready for the further step in the process. When dried, as set forth, the picture-film on the transparent glass base is covered with a coating of a flux which is

vitreous in character but which fuses at a lower temperature than the melting-point of the glass-base. The melting-point of glass, such as is in common use and hence which would be employed to constitute the transparent base, is above two thousand degrees (2,000°) Fahrenheit; and I find it desirable to compose a flux, for the purposes of this invention, which will fuse at, say, between six hundred degrees (600°) and seven hundred degrees (700°) Fahrenheit. A flux which meets these requirements, and which will be effective in carrying out my invention, may be composed of two hundred (200) parts of yellow oxide of lead, twenty (20) parts of borax, and eighty nine (89) parts of quartz sand. These materials are pulverized and intimately mixed, and in the form of a fine powder are placed in a thin coating covering the film picture on the glass base. The glass plate bearing the film and the flux is then subjected to a degree of heat to fuse the flux, which may be accomplished by introducing the same into a suitable kiln. The fusing of the flux acts to vitrify the metallic-oxide upon the surface of the glass base and to cover the picture with a vitreous and transparent coat, so that the picture is permanently, unchangeably and indestructibly affixed to and in the surface of the transparent glass base, and is visible by both transmitted and reflected light.

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

The process of making transparent photographic pictures which consists in printing the positive image in a metallic oxide from the negative upon a medium which has been surfaced with a mixture of the materials constituting the sensitive film and said metallic oxide; then tranferring said print in said metallic oxide to and developing it upon a temporary support; then transferring said developed print to and rendering it insoluble upon the surface of a metallic glass plate; then coating said print with a vitreous flux of the character substantially as set forth, which fuses at about the temperature stated; and subjecting the glass plate bearing the print and its flux to a degree of heat to fuse the flux, substantially as and for the purpose set forth.

FRANCIS B. FORSTER.

Witnesses:
ARDEN S. FITCH,
GEO. G. RICKWOOD.