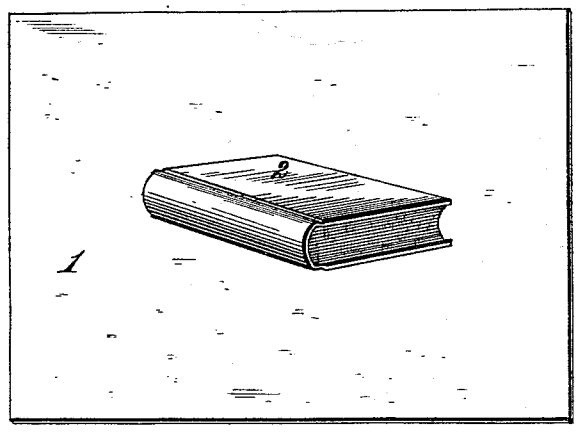
(No Model.)

I. H. HAMBURGER.

PROCESS OF PHOTOGRAPHING.

No. 457,712. Patented Aug. 11, 1891.



Witnesses.
Phil Covett.
J. A. Rutherford.

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UNITED STATES PATENT OFFICE.

ISRAEL H. HAMBURGER, OF NEW YORK, N. Y., ASSIGNOR TO THE PYRO-PHOTO COMPANY, OF SAME PLACE.

PROCESS OF PHOTOGRAPHING.

SPECIFICATION forming part of Letters Patent No. 457,712, dated August 11, 1891.

Application filed March 19, 1890. Serial No. 344,510. (No specimens.)

To all whom it may concern:

Be it known that I, ISRAEL H. HAMBURGER, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented new and useful Improvements in Processes for Producing Photographic Pictures upon Surfaces of Zylonite, &c., of which the following is a specification.

My invention relates to processes for producing photographic pictures upon surfaces of zylonite or other pyroxyline material; and the object of said invention is to provide a novel process for such purposes, whereby the pictures produced upon material of the character specified shall be securely and permanently retained thereon and protected against the injurious influences of moisture, enabled to escape injury from abrasion, and to resist in a very high degree the action of acids or alkalies, while the surface may be readily washed and cleansed when soiled.

The invention consists in the process hereinafter fully described, and then definitely pointed out in the claim following this specification.

Referring to the accompanying drawing, the figure shows a surface of zylonite or other pyroxyline material embodying my invention.

To enable others skilled in the art to practice my said invention, I will describe the same in detail, the first step consisting in the preparation of a sensitized paper capable of receiving a photographic image, which is effected in the following manner:

I dissolve in four hundred parts, by weight, of water, from one hundred to one hundred and thirty parts, by weight, of gelatine, fifteen to twenty parts, by weight, of soap, and twenty to thirty parts, by weight, of sugar. To this solution I add a suitable proportion of some pigment, stain, dye, or other coloring-matter, the quantity thereof varying with the special pigment of coloring-matter used. In ordinary cases from four to ten parts, by weight, of such pigment or color will be sufficient, it being obvious that the intensity or depth of the tint will increase with the increased quantity employed. The paper is coated with this solution upon one side and then dried in any suitable manner. After the paper is dry it is sensitized by moistening it with a solution of either bichromate of ammonia or bichromate of potash, or a mixture of both. In making this solution I prefer to use from twenty to forty parts, by weight, of ammonia bichromate in one thousand parts, by weight, of water, or from forty to fifty parts, by weight, of bichromate of potash to one thousand parts of water. When both ingredients are used together, however, they may be employed in any desired proportion—such, for example, as thirty to fifty parts, by weight, of the mixture to one thousand parts, by weight, of water. A few drops of the aqueous solution of ammonia may also be added, if preferred. The paper is moistened with said solution and is dried in a dark-room, after which it is ready to receive a photographic imprint or image.

The photographic image is produced upon the paper by exposing it in the ordinary manner to the action of light in conjunction with a photographic negative, after which the paper should be protected against the further action of light until the operator is ready to proceed with the next step of the process.

As the result of the exposure described, those parts of the sensitized coat upon the paper which are exposed to the actinic action of the light undergo a chemical change, which renders them insoluble in water, the degree of insolubility varying with the intensity of the light or with the period of exposure. The photographic image produced is not visible to the eye and is not developed until a subsequent step in the process, which will be presently described.

I now prepare the surface of the sheet or block of zylonite or other pyroxyline material in the following manner: In two thousand parts of water, by weight, I dissolve about three hundred parts, by weight, of albumen, and to this solution I add about twenty parts, by weight, of acetic acid. I then apply this solution to the zylonite or other pyroxyline material in any suitable manner—as, for example, by dipping it therein or by varnishing the zylonite surface with a brush or other suitable device. The surface thus prepared is then allowed to dry, after which the pre-

pared paper containing the photographic image is placed thereon, its coated surface being next to the block or sheet, the surface of which has been prepared in the manner set forth. In so doing care should be taken not to expose the prepared surface of the paper to the light unnecessarily, and the operation should be performed in a dark-room, or the paper should be carried from the dark-room in a closed box, and when removed therefrom placed at once upon the prepared zylonite surface. While thus in close contact the paper is moistened with cold water by using either a brush or sponge, or by immersion. It is then pressed gently upon the zylonite surface in any suitable manner—as, for example, by a roll—in order to expel the water, which penetrates between the paper and the zylonite, and bring the two close together. The picture is now to be developed upon the zylonite surface, and this step is effected as follows: The zylonite block or sheet, with the paper attached, is now immersed in warm water, which softens the paper and partly dissolves those portions of the sensitized coating which have not been chemically changed by the actinic action of the light and which have therefore been preserved in a soluble condition. The paper is then stripped off and the soluble parts of the sensitized coating are washed away, leaving upon the prepared surface of zylonite the photographic image in relief in the form of a tinted or colored film, which appears wherever the prepared surface of the paper has been acted upon by the light. This adhering film is somewhat softened while it remains in the warm-water bath and is hardened by a short immersion in cold water. It is then removed and placed in a bath composed of a strong aqueous solution of alum, for which the ordinary alum of commerce may be used. The alum fixes the film or picture securely and permanently to the zylonite or other pyroxyline surface, and after drying the process is complete.

In the drawing, the reference-numeral 1 shows a block sheet or other surface of zylonite or pyroxyline material having a film or photographic picture 2 attached in the manner set forth. It is evident that this block or sheet may be of any form or thickness, and may be also flat, curved, or of any other form.

I make no claim to the method *per se* of preparing the paper to enable it to receive the photographic image in the manner described, and the same forms part of my invention only when employed in conjunction with the other steps of the process set forth.

What I claim is—

The process herein described for producing a photographic picture in relief upon the surface of a sheet or block of zylonite or other pyroxyline material, said process consisting in coating said sheet or block with a solution of albumen acidulated with acetic acid, applying to this prepared surface a paper sensitized in any suitable manner and having a pigment or dye mingled with the sensitized coating, the latter containing an undeveloped photographic image or picture, immersing the coated surface with the paper applied in cold water, pressing the paper closely upon said surface, then immersing the same with the paper in contact in warm water, removing the paper and the soluble parts of the sensitized coating, hardening the insoluble adhering parts by immersion in cold water, fixing the picture by immersion in a strong solution of alum, and drying, substantially as described.

In testimony whereof I have affixed my signature in presence of two witnesses.

ISRAEL H. HAMBURGER.

Witnesses:
S. A. WILSON,
F. M. TURNER.