UNITED STATES PATENT OFFICE.

WILHELM WINTER, OF PRAGUE, AUSTRIA.

IMPROVEMENT IN PROCESSES OF PRODUCING ENLARGED PICTURES UPON FABRICS.

Specification forming part of Letters Patent No. **196,510**, dated October 23, 1877; application filed April 19, 1877.

To all whom it may concern:

Be it known that I, WILHELM WINTER, of Prague, in the Empire of Austria, have invented a certain new and useful Improvement in Photography, of which the following is a specification:

The object of this invention is to produce magnified positive photographs on woven fabrics, such as linen, cotton, silk, or wool, and with the use of iodide or bromide of silver.

The process consists, essentially, in impregnating the woven fabric with iodide or bromide of silver, and thereby making it so sensitive to light that from a negative plate of about eight square inches a magnified positive photograph of up to more than forty square feet may be produced on the said woven fabric. When electric light is employed the positive photograph may be produced in from one to four minutes.

The iodides and bromides are in general use for producing negatives, but hardly at all for positives; and, although many attempts have been made to utilize the sensibility of these salts for the purpose of rapidly producing magnified photographs on paper, these experiments have nearly always remained futile.

The proportions of the chemicals to be used vary not only according to temperature, but also according to the density and material of the woven fabric, so that, in the case of lower temperatures and denser woven fabrics, which do not so easily absorb fluids, the solutions must be made stronger, and iodides must be used in preference to bromides.

By way of example, there shall now be described the proportions that may be used at a temperature of from 20° to 23° centigrade, and with linen or cotton fabrics of average density and fineness. This description will serve as a measure for the possible variations under the previously-mentioned circumstances.

The woven fabrics must be first freed from all chemical impurities, and the subsequent operations may then follow, in the manner now to be described.

First, the treatment with bromides: The woven fabric is passed through a solution composed of four (4) parts by weight of bromide of potassium, one (1) part of bromide of cadmium, and two hundred and forty (240) parts of water, so as to be equally wet on both sides, and is then hung up to dry.

Secondly, the treatment with silver: The dried woven fabric is passed through a solution of four (4) parts by weight of nitrate of silver, one (1) part of citric acid, and one hundred and forty (140) parts of water, and again dried.

Thirdly, the exposure to light: For this purpose it is generally preferable to use electric light, which may be produced by a dynamo-electric apparatus. In all other respects the proceedings are the same as in the production of magnified photographs by means of the solar camera. The sensitized woven fabric is exposed to the light until the positive photograph is distinctly visible thereon. The time necessary for this exposure depends upon the size and strength of the negative. Generally one to four minutes are required.

Fourthly, the development: A solution composed of ten (10) parts of pyrogallic acid, forty-five (45) parts of citric acid, and four hundred and ten (410) parts of water is put into a large flat pan, and the woven fabric is left in this solution until the photographic picture or *print* thereon is sufficiently developed.

The remaining proceedings are as usual in photographic processes. The picture is well washed, then toned and fixed, and finally again well washed.

It is evident that, without departing from the substance of this invention, other sources of light and other iodides and bromides may be used for producing magnified photographs or prints on woven fabrics.

I claim—

1. In the art of photography, the process of producing positive photographs directly upon a fabric by preparing said fabric with a solution of bromide or iodide of potassium and bromide or iodide of cadmium, or their equivalents, substantially as described.

2. In the art of photography, the process of preparing a fabric by first treating the same with a solution of bromide or iodide of potassium and bromide or iodide of cadmium, and afterward with a solution of nitrate of silver and citric acid, substantially as described, for the purpose specified.

3. The process of producing positive pho-

tographs directly upon a fabric, consisting in first preparing the fabric with a solution of bromide of potassium and bromide of cadmium, or their equivalents, then sensitizing the fabric by means of a solution of nitrate of silver and citric acid, exposing the fabric so prepared to the electric light for the production of the positive photograph, and developing such positive photograph by means of a solution of pyrogallic acid and citric acid, and finally toning and finishing in the usual manner, substantially as hereinbefore specified.

In witness that I claim the foregoing I have hereunto set my hand this 13th day of March, 1877.

WILHELM WINTER.

Witnesses:
C. O. PAGET,
T. BARHAL.