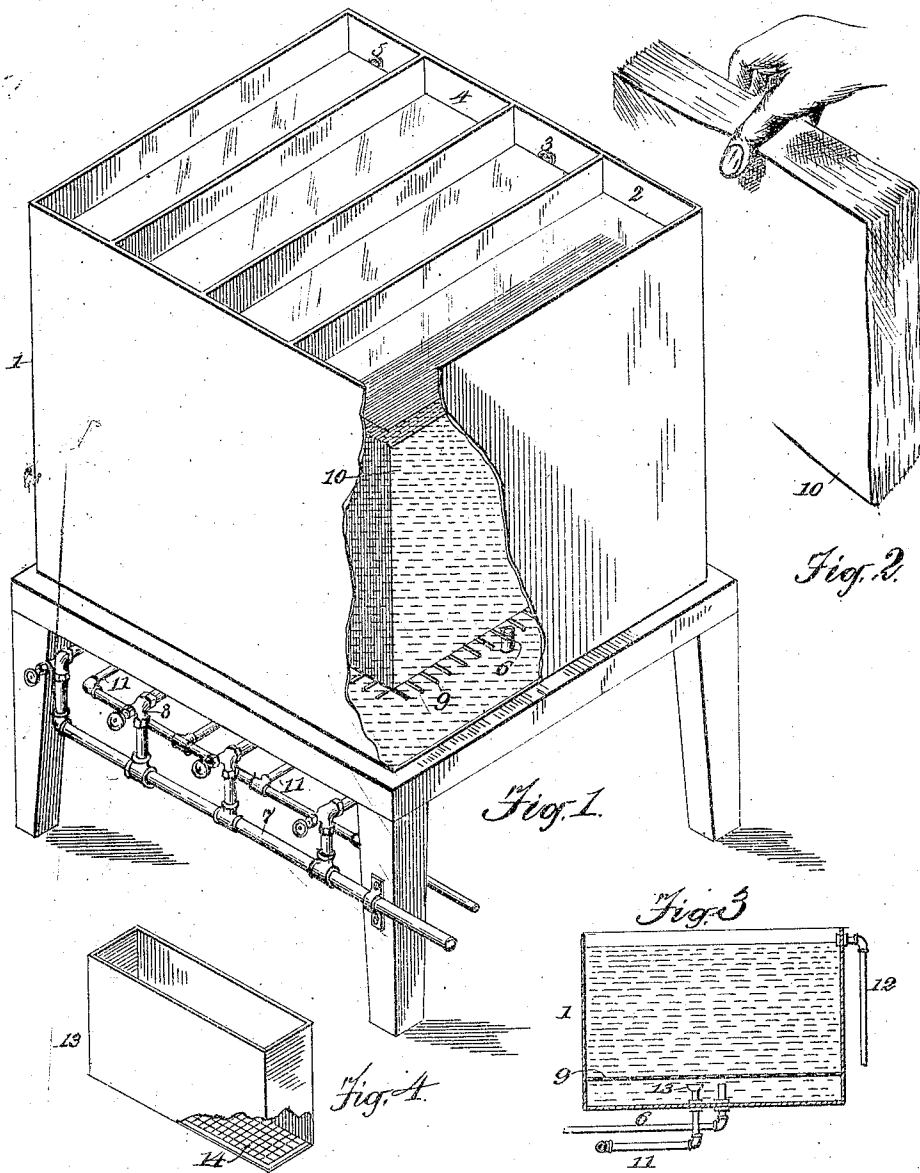


F. W. NORTON.
 PHOTOGRAPHIC DEVELOPING PROCESS.
 APPLICATION FILED JULY 19, 1915.

1,197,533.

Patented Sept. 5, 1916.



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UNITED STATES PATENT OFFICE.

FRANK W. NORTON, OF CEDAR RAPIDS, IOWA.

PHOTOGRAPHIC DEVELOPING PROCESS.

1,197,533.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, FRANK W. NORTON, a citizen of the United States, residing at Cedar Rapids, in the county of Linn and State of Iowa, have invented certain new and useful Improvements in Photographic Developing Processes; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to the art of developing, fixing and washing photographic prints, and specifically to a method or process by which a large number of such prints may be treated simultaneously.

Mechanism by means of which the process is carried out is shown and described in Letters Patent No. 1,074,572, issued to me on the thirtieth day of September, 1913. The same conforms, in the main, to the mechanism shown in the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a view in perspective of apparatus adapted for the working of the process. Fig. 2 shows how a bunch of prints may be handled. Fig. 3 is a vertical section of one cell or unit in a series of liquid-holding tanks commonly used in the practice of the process. Fig. 4 shows a removable container for a pack of print-sheets, by means of which they are most conveniently handled.

The essential steps in the process are the following:

First, a thorough immersion of the prints, preferable separate when so immersed, in water, or other suitable liquid, thereby to prevent their sticking together during the subsequent steps of the process.

Second, assembling the wet sheets in a fairly symmetrical pack. This may be done in the act of immersing the sheets in a rather deep tray, the operator simply slipping each sheet in the liquid edgewise, so as to thoroughly wet both sides, and stacking the sheets neatly in the tray, without effort or loss of time.

Third, placing a pack of such assembled wet sheets edgewise down in a tank but little larger than the pack, and containing the desired liquid or solution agitated by air forced therein edgewise of the sheets, and allowing the pack to remain therein the requisite length of time.

Finally, separating the sheets, after removal from the tank, and permitting them to dry.

The foregoing applies as well to the various operations incident to development, as to the whole series of operations. That is to say, the process applies as well to development, rinsing, fixing and final washing, considered separately, as to these operations in a series. In practice the process is even more useful as applied to fixing, or to final washing, than to developing or rinsing, since either of the former operations consume much more time than either of the latter. Normally the sequence of operations is: immersion to thoroughly wet the prints and prevent sticking together in the pack; assembling in a pack; immersion in the developer; rinsing *en masse*; fixing *en masse*; washing *en masse*; final separation and drying. It is apparent, however, that some of these operations might be performed by another method, but the process would apply to the remaining operations. Thus the briefer operations of developing and rinsing to arrest development might be done separately, and the pack arranged after such rinsing, but the process would still apply to the subsequent operations of fixing and washing. In practice it is of course desirable to treat the prints *en masse* in all operations following the initial immersion preceding development, but it is not absolutely necessary so to do in the practice of the process.

In the drawings I have shown the simple apparatus necessary to the carrying out of the process.

The numeral 1 refers to a tank having a separate series of compartments, 2, 3, 4 and 5. In the normal order of operations 2 would contain developer, 3, clear water, preferably flowing, the water being admitted through a supply pipe 6 and the over-flow passing out at 12. In 4 would be placed the hypo or fixing solution, and in 5 clear, flowing water, as in 3. It has not been deemed necessary to illustrate the apparatus for the first step, though this step is of the greatest importance. Any suitable tray or pan will serve for the preliminary immersion and assembling of the sheets horizontally, or the transferring container 13, having a perforated bottom 14 may be sunk in a tank of clear water, and the prints slipped into it separately and edge down. Once so assembled the pack is the most easily trans-

ferred from one compartment to another in the general tank, though such pack, 10, may be handled as shown in Fig. 2.

In practice all of the compartments of the general tank are supplied with running water, or rather piped therefor from a general supply-pipe 7, each provided with a valve 8. The pack should be suitably supported above the water inlet, and also that of the air, as by a perforated false bottom 9. Air under pressure is admitted to each compartment through a pipe 11. The direction of the incoming air should be edgewise of the sheets, and preferably from the bottom of the tank, the sheets standing on edge while subjected to the action of the agitated liquid. By this simple process excellent results are secured, and at a rate of production almost incomparably greater than would be possible in any single treatment of the prints without greatly increased labor.

In order to obtain the highest efficiency in the apparatus where a large production is sought, there should be a larger number of cells provided for the fixing and washing operations than for that of development, inasmuch as they require much more time, as previously set forth.

In the normal sequence of operations it is to be considered that the rinsing of the prints after immersion in the developer, might, to a limited extent, be dispensed with, its main purpose being to wash off developer solution, arrest further development, and prevent adulteration of the hypo bath with developer. Subject to these objections, which in extended operations would be serious, the pack might, with satisfactory results be passed a number of times, more or less, from the developer directly to the hypo. In extended operations, however, for which the process is peculiarly adapted the rinse is to be considered as one of the essential operations in normal development, as hereinbefore stated.

Having thus described my invention, I claim:

1. An improved process in the development of photographic prints, which consists in immersing the prints in liquid to prevent subsequent adherence, assembling the wet sheets in a pack, immersing the pack, edge down, in a suitable bath into which air un-

der pressure is forced edgewise of the pack, and finally removing from the bath separating and drying.

2. An improvement in the method of treating photographic prints in the development thereof, which consists in immersing each sheet in liquid so as to wet its entire surface, assembling a pack of the wet sheets in a suitable container adapted to admit liquid freely from below, immersing the pack while so held in a suitable bath in which air under pressure is forced edgewise of the pack, and finally removing from the container, separating and drying the sheets.

3. An improved method of developing photographic prints, which consists in first immersing the prints in liquid to thoroughly wet the surface of each sheet, assembling the wet sheets in a pack, exposing the pack to the action of developing, fixing and washing baths, into which air under pressure is forced edgewise of the pack, and finally removing from the bath separating the sheets and drying them.

4. An improved method of developing photographic prints, which consists in immersing the sheets in liquid to thoroughly wet both surfaces of each sheet, assembling the sheets in a pack and in a container adapted to admit liquid freely from below, and successively immersing said pack while so held, in developing, fixing and washing baths into which air under pressure is forced edgewise of the sheets, and finally removing from the bath separating and drying the sheets.

5. An improved method of developing photographic prints, which consists in thoroughly wetting both surfaces of each print, assembling the wet prints in a pack, immersing the pack, edge down, in successive baths of developer, rinse-water, hypo, and wash-water, into which baths air under pressure is forced in a direction edgewise of the pack, and finally removing from the bath separating and drying said prints.

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

FRANK W. NORTON.

Witnesses:

MAUDE FLINT MORHEAD,
J. M. ST. JOHN.