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J. E. THORNTON & C. F. S. ROTHWELL.

PHOTOGRAPHIC PLATE OR FILM FOR DAYLIGHT DEVELOPMENT AND FIXING.

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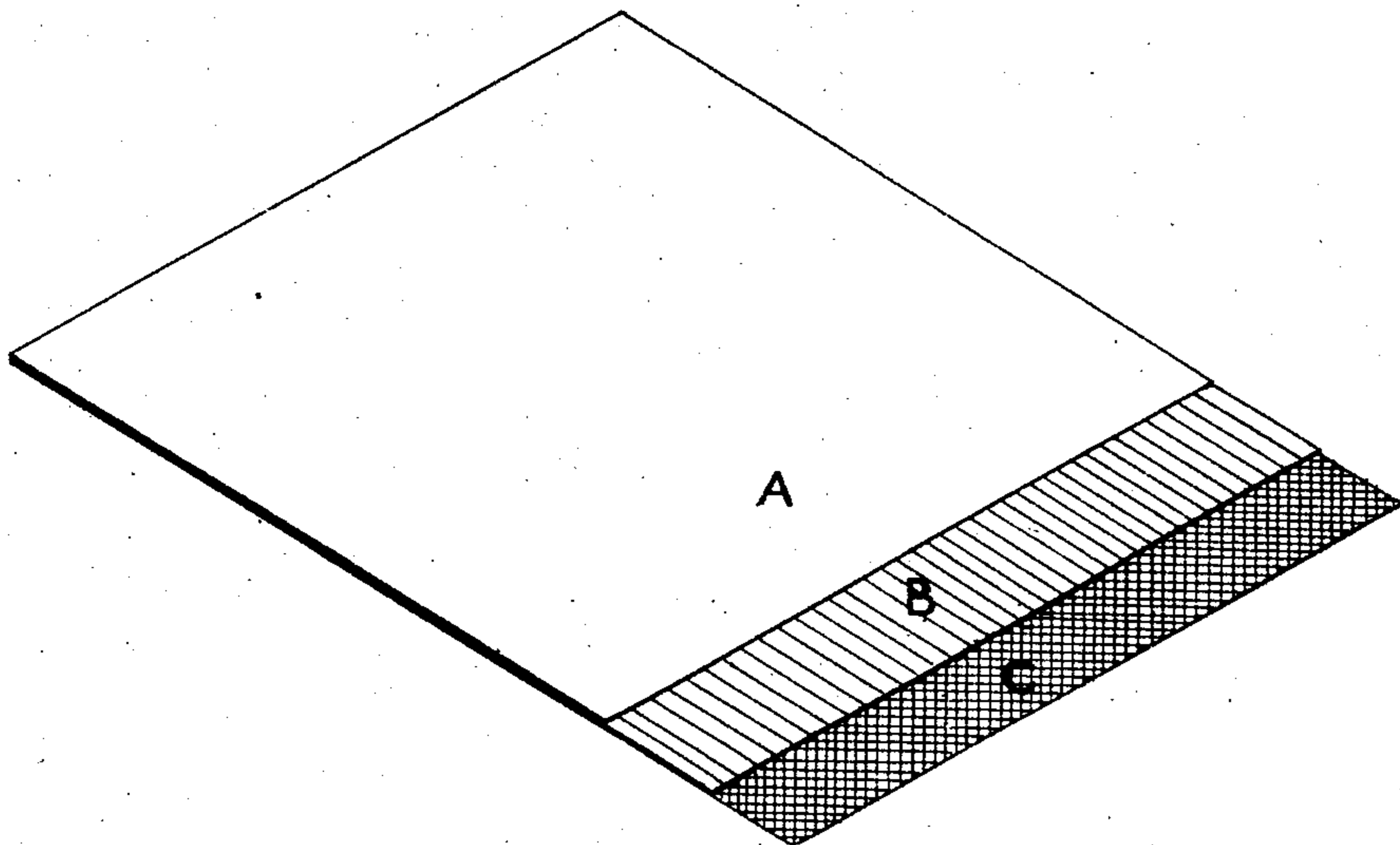


FIG. 1.

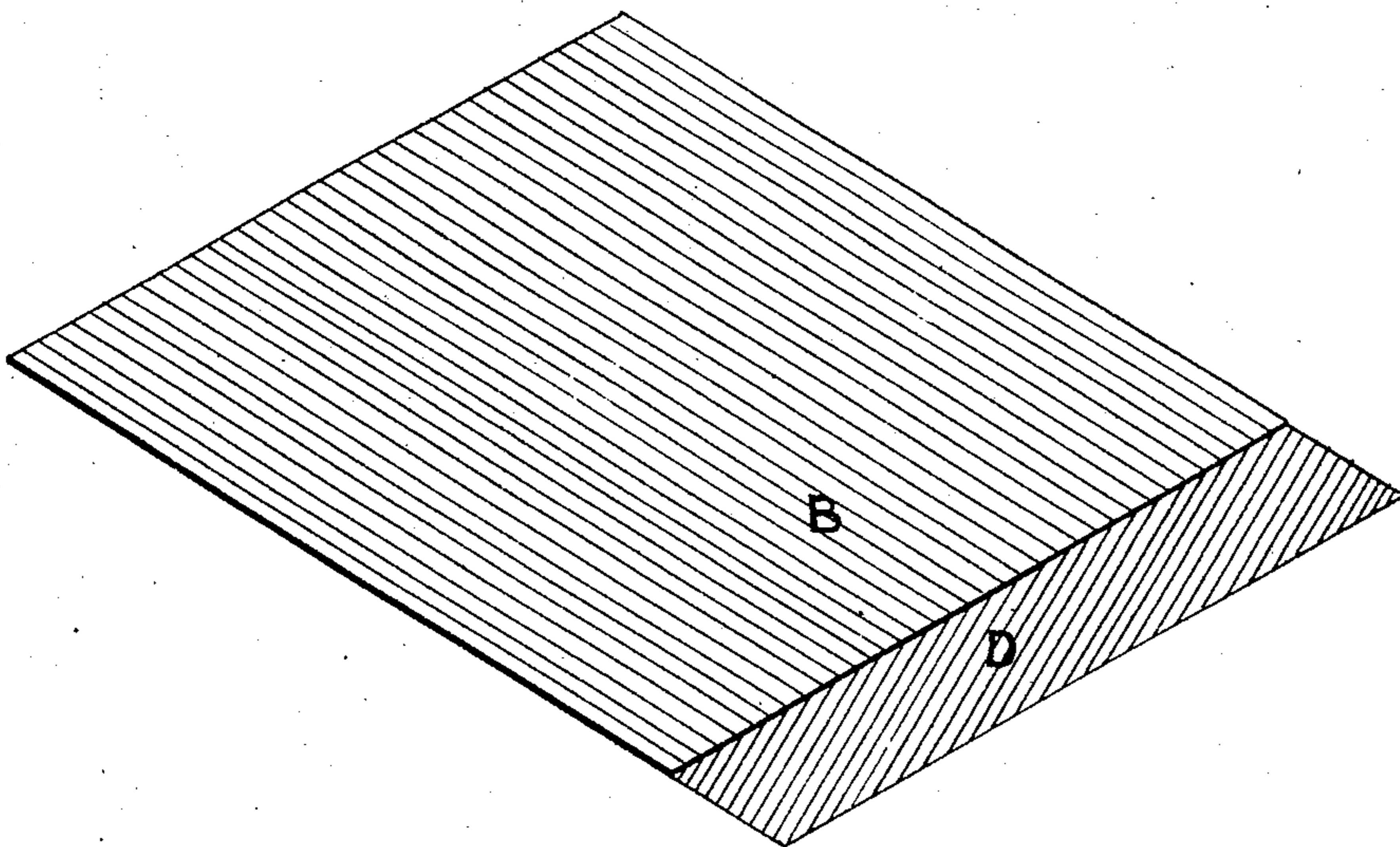


FIG. 2.

WITNESSES.

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# UNITED STATES PATENT OFFICE.

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PHOTOGRAPHIC PLATE OR FILM FOR DAYLIGHT DEVELOPMENT AND FIXING.

SPECIFICATION forming part of Letters Patent No. 786,535, dated April 4, 1905.

Application filed March 20, 1900. Serial No. 9,463.

*To all whom it may concern:*

Be it known that we, JOHN EDWARD THORNTON and CHARLES FREDERICK SEYMOUR ROTHWELL, British subjects, and residents of Manchester, in the county of Lancaster, England, have invented certain new and useful Improvements in Photographic Plates and Films for Daylight Development and Fixing, of which the following is a specification.

This invention relates to photographic plates and films prepared for use in photographic cameras for taking camera-pictures.

The object of the invention is to dispense with bottles of chemical solutions for developing and fixing photograph images, also with the usual dark room, and to provide substitutes which shall be more convenient.

Hitherto in the developing and fixing of photographic negatives after removal from the camera it has been the almost universal custom to prepare two chemical solutions and immerse the plate or film first in one and then in the other in a dark room from which the actinic rays of light have been excluded. We are aware, however, that it has already been proposed to apply to the back of each plate or film the developer by incorporating it with a cement or coating, such as gum soluble in water, which upon the immersion of the plate or film in water dissolves, forming the developing solution. The operation of fixing after development has, however, hitherto been always accomplished by immersing it in a separate solution carried in a liquid form. When the developer has been attached to the back of the plate hitherto, it has proved a failure, the chief reason for which being that the developing preparation was liable to damage the face of the adjacent plate when used in magazines and other cases where a number of plates were placed in a pack, and also the developer deteriorated by contact with the air.

The invention consists in preparing each sensitive plate or film (hereinafter called "plate") with a developer or combined developer and fixer applied thereto in suitable dry form and protected by an air-tight covering, so that the material will not deteriorate itself or damage

an adjacent plate, and by immersion in the necessary quantity of water an active solution is formed at the time of development separately for each plate sufficient for developing and fixing the negative.

Figure 1 is a view of plate with the solution containing the developer and fixer coated on back and covered; Fig. 2, a modification showing the solution containing the developer and fixer coated on the covering or sheath separate from the plate.

In carrying out the invention we incorporate the developer and the fixing medium from which when dissolved in water a solution is prepared which effects the double functions of developing and fixing the image, and this we cover with a protective covering. Although we prefer the developing and fixing medium mixed or incorporated and then applied to the plate, the developing medium only may be so applied and covered with a protective covering. Any suitable developing or developing and fixing medium may be employed which can be put up and packed with the plates in dry form.

The following may be taken as examples of suitable preparations, the proportions being enough for each plate of quarter-plate size.

*Developer.*—Pyro, two grains, (or hydroquinone three grains,) (or metol two grains and hydroquinone two grains;) sodium carbonate, (anhydrous,) ten grains; sodium sulfite, (anhydrous,) ten grains; potassium bromid, one-half grain.

*Combined developer and fixer.*—Sodium sulfite, (anhydrous,) fifteen grains; sodium hydrate, (powdered,) nine grains; sodium thiosulfate, (anhydrous,) twenty grains. Grind together and add kachin or pyrocatechin, nine grains.

The developing and fixing medium is made up in the form of a strong solution with sugar or dextrin and then applied in one of the following ways: (a) The plate A, Fig. 1, is coated on the back with the solution B, and after the latter is dry over this is placed a sheet of air-tight material C, such as paper, soluble gelatin, or other material which will prevent

the action of the air upon the developing medium and will prevent it coming into contact with adjacent plates and which will readily separate or dissolve on immersion in water.

5 (b) The prepared solution B, Fig. 2, may be coated upon a paper backing sheath or envelop D, which covers or protects the plate and which at the same time serves as an air-tight protection for the developing and fixing medium. As applied to rolls the covering material may be attached to the back of the sensitive film or a loose paper backing may be wound up with the film and removed or discarded when the film is cut up into plates.

15 The effect of the combination of the developing and fixing medium applied to the plate is a great improvement upon what has hitherto been done, because it not only dispenses entirely with all chemical solutions in bottles, 20 (a great advantage to travelers,) but it also renders a dark room entirely unnecessary, as the plate can pass from the camera after exposure direct into a trough or tank in which it is both developed and fixed. By making 25 this tank of red, yellow, or other non-actinic glass or transparent celluloid the progress of development and fixing can be easily seen and the plate removed when desired. It is, however, not essential to watch the progress, as 30 by combining the fixing with the developing operation no serious result will happen to the picture should the plate be left in the tank rather too long.

By our invention it becomes possible to re- 35 move the plate from the tank in daylight as soon as developed, whereas this was not possible hitherto, because if the plate was removed from the developing-tank to a separate fixing-tank in daylight the image became fogged by 40 the light during transference from one tank to the other, and all devices hitherto proposed in which the two tanks were inclosed from daylight by some box or covering chamber other than a dark room were unsatisfactory, 45 as accidental mixing of the solutions frequently occurred and spoiled the image. After the plates have been developed and fixed outdoors or away from home we prefer to leave the necessary operations of washing to 50 free the plate from all traces of chemicals until the operator returns home. In order to facilitate this and prevent any injury to the plates in the meantime, a grooved box or equivalent device may be employed into which 55 the wet plates can be placed without touching each other. The box is closed by a lid or door and may afterward be used as a washing-tank without removing the plates therefrom. This invention, further, overcomes 60 the objection hitherto experienced when the

developer has been applied to the back of the plate of damaging the sensitive surface of an adjacent plate by reason of the developing or developing and fixing medium being protected by an air-tight cover. To develop, the covered plate may be immersed complete in the water, which dissolves the developer and softens the covering, permitting the latter to be removed or thrown away.

We are aware that the idea of using a combined developing and fixing solution is not new and we make no claim to such a process. The point of our invention is the incorporation of the developer and fixer in some dry form attached to or supplied with each separate plate, as already described, and covered with a protective covering, which dispenses with bottles of chemical solutions and which, further, allows development to be carried on in daylight and outdoors at the scene of operations, if desired, all without a dark room or cumbersome cases or devices containing separate solutions in separate tanks.

We believe that our invention constitutes a considerable improvement or new step in the art of photography and that it will do much to simplify the present troublesome operations. It will reduce the time occupied therein and enable the operator to ascertain the results of his exposures on the spot without waiting till he returns home or carrying cumbersome developing apparatus, and, further, dispenses with all troublesome measuring and mixing of chemicals. As a consequence it will increase public interest in the art and lead to a more extensive practice of it.

What we claim as our invention, and desire to protect by Letters Patent, is—

1. In a photographic plate or film for use in a camera the combination with the base-plate or film of a sensitive coating on one side, a developing medium in a dry form applied to the other side, and a protective covering applied over the developing medium substantially as described.

2. In a photographic plate or film for use in a camera, the combination with the base-plate or film of a sensitive coating on one side, a developing and fixing medium in a dry form applied to the other side, and a protective covering applied over the developing and fixing medium substantially as described.

In witness whereof we have hereunto signed our names in the presence of two subscribing witnesses.

J. E. THORNTON.  
C. F. S. ROTHWELL.

Witnesses:

J. OWDEN O'BRIEN,  
HARRY BARNFATHER.