Oct. 12, 1926. 1,602,931

J. R. POPE

APPARATUS FOR DEVELOPING PHOTOGRAPHIC PLATES AND THE LIKE

Filed May 16, 1924 4 Sheets-Sheet 1

Fig. 1.

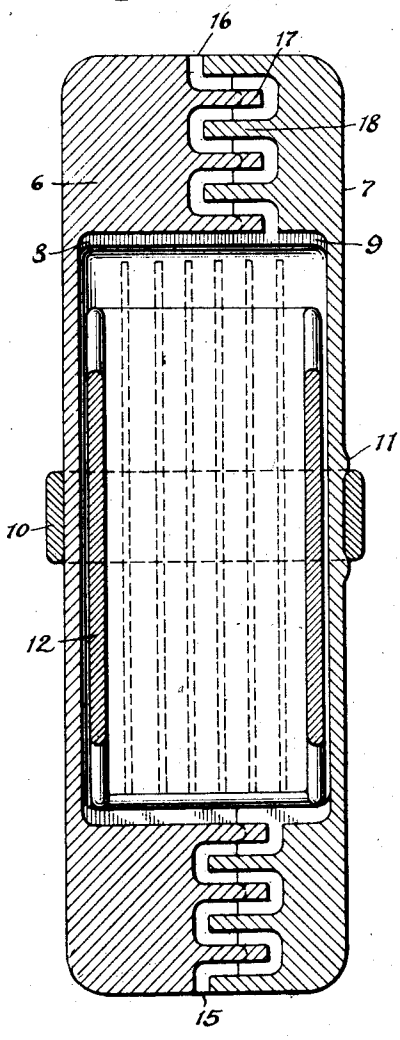
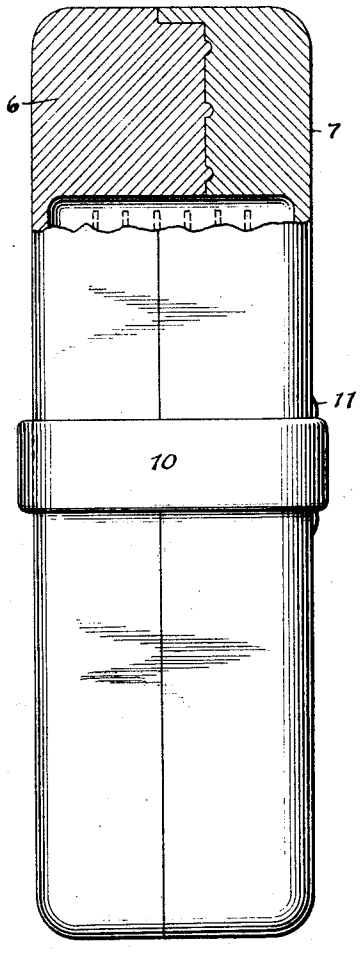


Fig. 2.



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Fig. 3.

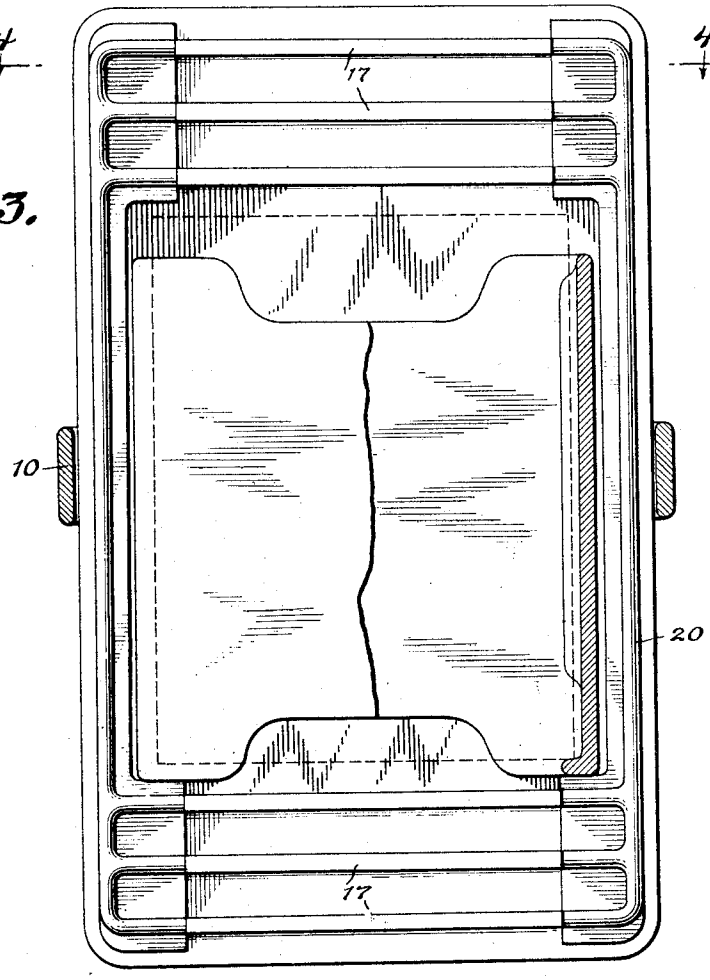
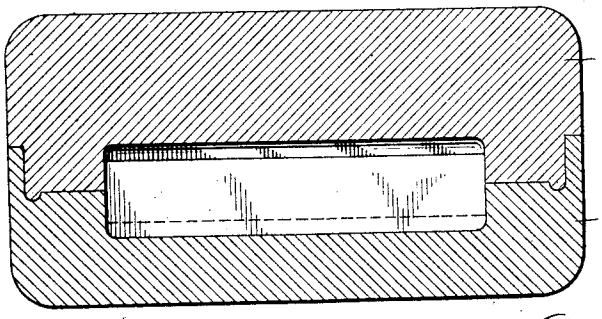


Fig. 4.



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Fig. 5.

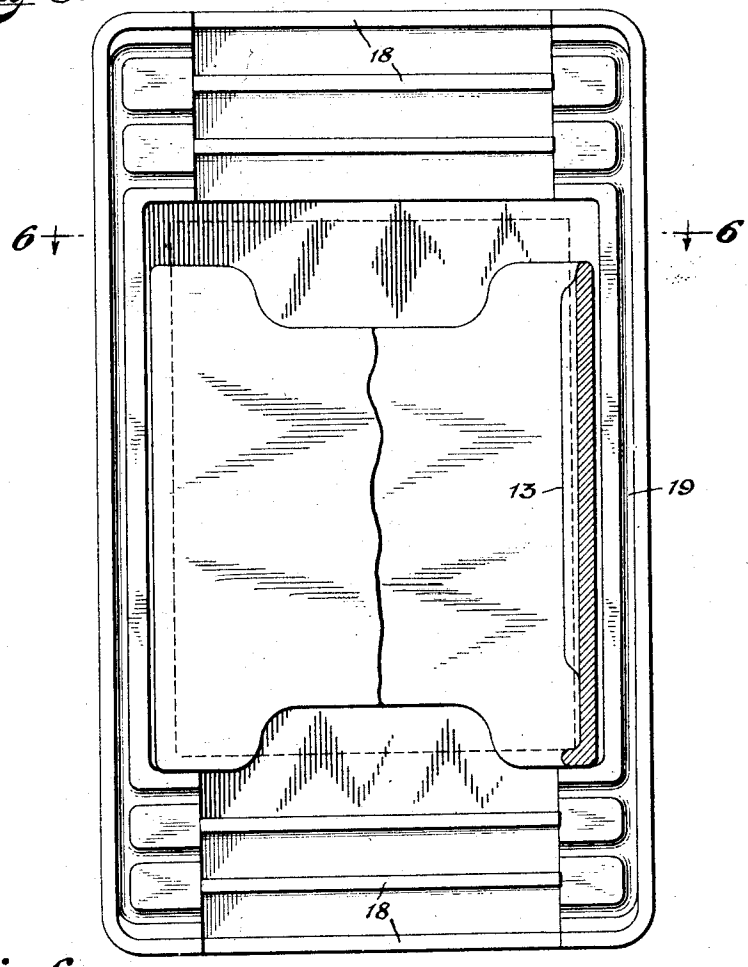
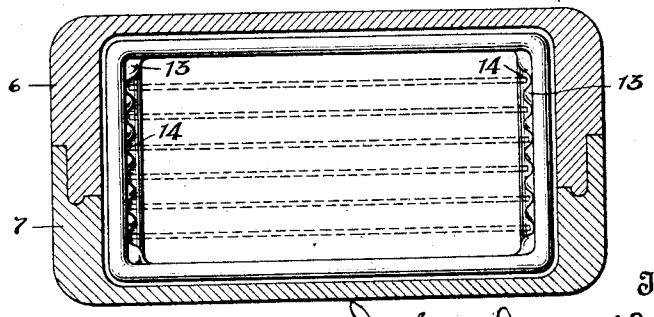


Fig. 6



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Fig. 8.

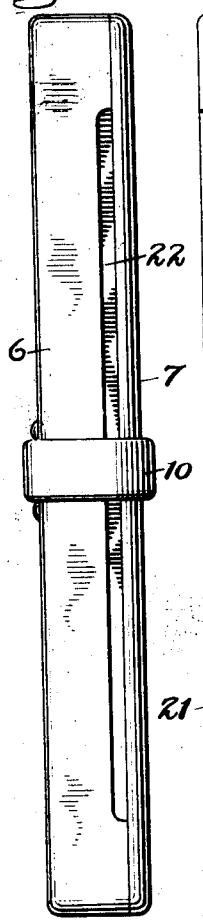


Fig. 7.



Fig. 9.

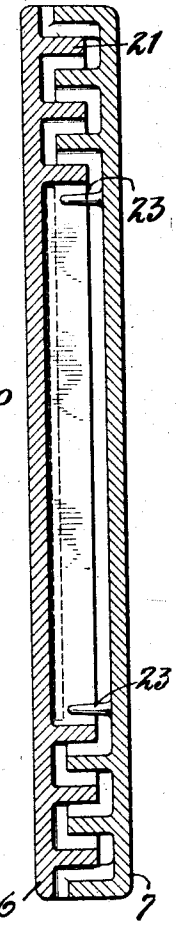


Fig. 10.

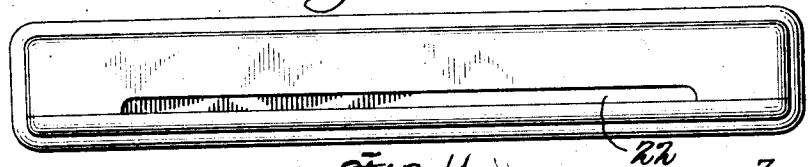
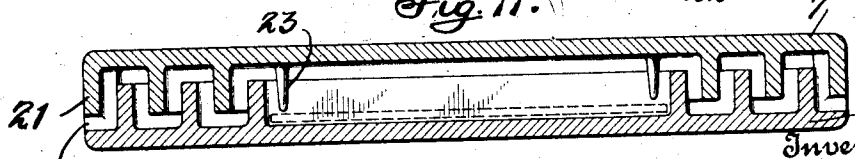


Fig. 11.



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Patented Oct. 12, 1926. 1,602,931

UNITED STATES PATENT OFFICE.

JOHN RUSSELL POPE, OF NEW YORK, N. Y.

APPARATUS FOR DEVELOPING PHOTOGRAPHIC PLATES AND THE LIKE.

Application filed May 16, 1924. Serial No. 713,811.

This invention relates to an apparatus for developing photographic plates, films, papers and the like.

The usual dark room method of development is attended by certain disadvantages, such for instance as the necessity for directly handling the plates and also the possibility of the development of a light fog on the plates. Likewise, the present method of daylight development is attended by the disadvantage of having to fill, empty and wash the tank for each solution used. In each case there is possibility of the production of an unsatisfactory plate, film or paper and in the latter case a considerable amount of time is unnecessarily consumed.

The present invention obviates these disadvantages and makes it possible to develop a photographic film, plate or paper in the daylight with the greatest possible assurance of success and in the shortest time.

I have illustrated and described one form of the invention but it is to be understood that the details of construction may be varied without departing from the spirit of the invention or exceeding the scope of the claims.

In the drawing:

Fig. 1 is a vertical sectional view of the apparatus illustrating the fluid entrance and exit,

Fig. 2 is an elevational view of the plate holder with a part thereof broken away to show the manner in which the cover is held thereto,

Fig. 3 is an inside face view of the cover of the plate holder,

Fig. 4 is a sectional view on line 4—4 of Fig. 3, looking in the direction of the arrows,

Fig. 5 is a face view of the cover of the plate holder,

Fig. 6 is a longitudinal sectional view on line 6—6 of Fig. 5, and

Figs. 7 to 11 inclusive are views of a modified form of plate holder.

For convenience I will describe the invention in its application to the development of photographic plates, but it is equally applicable to photographic films or papers or the like.

The invention includes a lightproof holder for the photographic plate or film in which the plates may be successively subjected to the action of the developing, fixing and washing solutions which holder is, however, so constructed that the various solutions and air may have free entrance to and exit from the plate containing chamber. This construction, while excluding the light with its detrimental effect, permits the operator to flow the various solutions in and out of the holder and on the plates freely, evenly and without the opposition of the escaping air.

This plate holder in one of its forms is provided with a plate containing chamber and at least one passage thereto which is so constructed and arranged that, while the solution will be permitted to flow into the plate containing chamber, the light will be excluded therefrom. The holder, however, may be provided with more than one passage. Whether the holder be provided with one or more than one passage, the arrangement is such that when the holder is submerged in the solution the inflowing solution will force the air contained within the holder above the surface of the solution and from the holder, thus obviating the necessity for the air bubbling through the solution with the attending disadvantages. This result is accomplished, broadly, by the provision of a passage or passages of such form and arrangement that when the holder is filled with the solution there will always be a direct escape of the air through the passage or passages above the surface of the solution. Furthermore, the passage or passages are so arranged that the position of the holder may be reversed in operation and yet the solution will be permitted to enter and the air to escape in the manner hereinbefore described.

The form of plate holder shown in Figs. 1 to 6 inclusive comprises a body portion 6 and a cover 7, the former having a recess 8 therein and the latter a complemental recess 9. These recesses, when the cover and body portion are assembled, form a chamber for the reception of the plate rack and the photographic plates carried thereby. A binding element 10 which, in the form illustrated, is movable longitudinally of the holder and removable therefrom, is adapted to secure the body portion and the cover together, the binding element being held in its operating position by suitable means such as enlargements 11 on the face of the holder.

In order that the photographic plates (when more than one are being treated) may be held in their proper position within

the holder I have provided a rack 12 which is adapted to fit within the chamber of the holder and be removable therefrom. This rack may be of such a form as shown in Figs. 1 to 6 inclusive and includes a series of partitions 13 which form corresponding slots 14 for the reception of the photographic plates. It will be noted that the size of the plate rack is such that while it will be free to move within the chamber of the holder it will maintain its operative position and retain the plates in such positions that they will be subjected, properly, to the action of the various solutions.

In order that the plates may be successively subjected to the various solutions within the plate containing chamber of the holder, in daylight, without any possibility of the exposure of the plate to daylight I have provided the ends of the holder with sinuous passages 15 and 16.

These passages are formed between the base 6 and the cover 7 by a series of overlapping but spaced baffles 17 and 18, one set of baffles being carried by the base 6 and the other set by the cover 7. It will be obvious that with this arrangement the solution may enter through one of the passages and the air escape from the other passage when the holder is submerged. Because, however, of the overlapping arrangement of the baffles 17 and 18 the light is excluded from the plate containing chamber of the holder.

In order that the joint between the base 6 and the cover 7 of the plate holder may be made light-tight, I have provided the contacting edges of these elements with interlocking joints, the particular form illustrated in the drawing including channels 19 on one of the elements and beads or tongues 20 on the complemental element which latter are adapted to seat in the channels 19.

In the form of plate holder shown in Figs. 7 to 11 inclusive the general construction is substantially the same as in the form shown in Figs. 1 to 6 inclusive except that the baffles 21 extend completely around the cover and body and the passages 22 into the plate receiving chamber extend in from all four edges of the holder. The plate is held in position by projections 23. Thus in this form, which is admirably adapted for portable use, the solutions may enter from all four edges which will facilitate the even and quick flow of the solutions over the plates.

In operation the plate or plates are placed within the plate holder and the cover secured to the base by the application of the binding element 10. The plates, thus positioned, are protected from the light by the interaction of the baffles 17 and 18 and yet access is had to the plate containing chamber through the solution passages 15 and 16. It will be obvious that with the plate or plates within the holder the same may be treated with the proper solution and as the plate holder is preferably submerged in a solution, or to be more exact, in the necessary solutions, the same enter the plate containing chamber through the lowermost of the passages 15 and 16 and the air escapes through the uppermost of these passages during the entrance of the solution. It will be noted that as the solution enters the lowermost of the passages 15 and 16 it fills the plate containing chamber of the holder and the air will be forced above the surface of the solution and from the uppermost of these passages thus permitting the even application of the solution to the plates. When the holder is removed from the solution the latter will flow out of the holder, into a suitable container, the upper passage acting in this instance also as an air duct, permitting the quick outflow of the solution and the replacement of it in the chamber by the inflowing air. To complete the development fixing and washing of the film it will be obvious that the holder can be successively submerged in and removed from the necessary solutions. It is, of course, to be understood that either end of the holder may be submerged in the solutions.

It is desirable to wash the plates in fresh water after the same have been developed and this may be accomplished by a quick reciprocating movement, that is to say, a quick submergence and withdrawal within a receptacle containing wash water because of the fact that the entrance of the water into the plate containing chamber through one passage and the simultaneous escape of the air above the surface of the incoming water permits the quick filling and emptying of the chamber.

The provision of a plate holder of the type where the solution enters the plate containing chamber and the air escapes from the same in advance of and without passing through the solution makes the rapid operative manipulation of the holder possible in contradistinction to the relatively slow manipulation where the liquid escapes or enters through the same effective opening which permits the escape or entrance of the air into the holder in which latter case the holder is in effect a container for the solution rather than a lightproof receptacle for the plates which permits the free flow of the liquid to and from the plate containing chamber.

This construction is attended by many advantages. In the first place it makes possible the developing, fixing and washing of a photographic film in the daylight without necessitating the usual changes of the solutions in the containers and without the possibility of the film becoming cloudy. Furthermore, because of the rapid filling and

emptying features of the film holder it may be of a simple construction so that all parts are accessible to the successive solutions and therefore all traces of the solutions may be instantly removed by washing.

Moreover, the construction of the plate holder is such that the parts thereof may be disassembled and completely cleaned and free from any of the solutions or crystals by a rapid wiping or sponging of the same so that there will be no deposit during the period of non-use.

Then again, the construction of the plate holder where the air is forced from the plate containing chamber above the surface of the incoming solution makes possible the quick washing and rinsing of the plates and also the even application of the solutions to the surface of the plates. The reversability of the plate holder likewise facilitates the handling of the plates since, no matter which end of the holder be submerged, the action of the solution on the plates will be the same due to the forcing of the air from the plate containing chamber above the surface of the incoming liquid.

What I claim is:—

1. In an apparatus of the kind described, the plate holder comprising a base and cover portion forming a chamber between them, said parts having a light-proof connection and a sinuous passage from the outer surface to the chamber, said passage being partly in one member and partly in the other member of the plate holder.

2. In an apparatus of the kind described, the plate holder comprising a base and cover portion forming a chamber between them and having a light-proof connection, said parts having a plurality of sinuous passages from the exterior to the chamber, said passages being formed partly in the base and partly in the cover of the plate holder.

3. An apparatus of the kind described comprising a plate holder having a base and a cover with a light proof joint between the two parts and a chamber between the base and cover, passages extending from the exterior of the plate holder to the chamber, and baffles spaced apart and co-acting, said baffles being formed on the base and cover respectively and extending into the aforesaid passages to exclude light.

In testimony whereof, I have signed my name to this specification this 13th day of May, 1924.

JOHN RUSSELL POPE.