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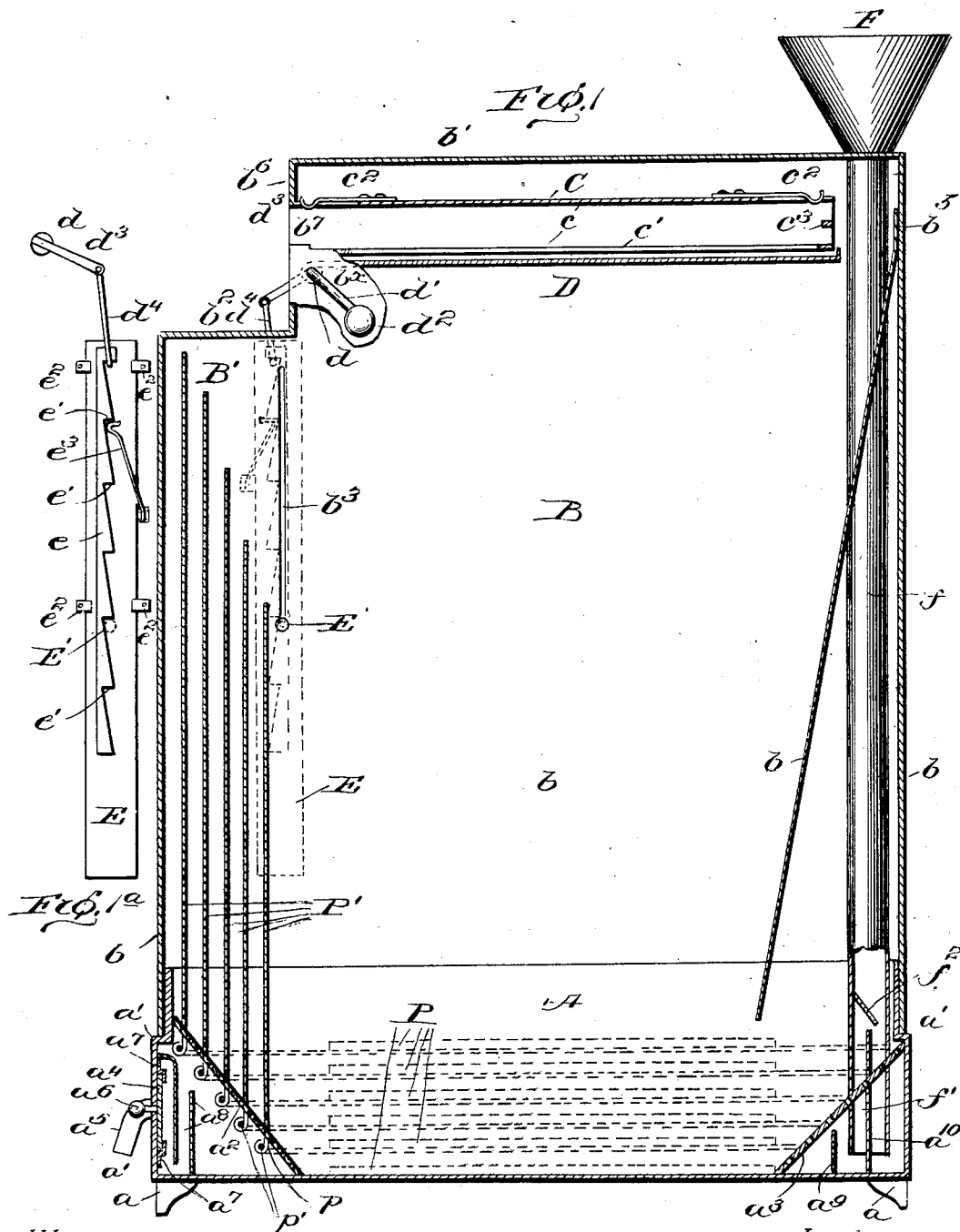
PATENTED SEPT. 8, 1903.

F. ST. J. DAVENPORT.  
PHOTOGRAPHIC DEVELOPING APPARATUS.

APPLICATION FILED FEB. 14, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



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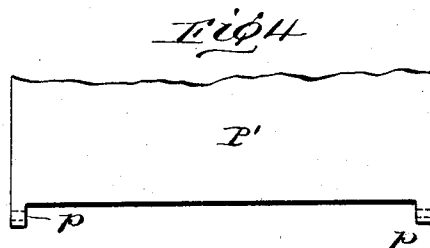
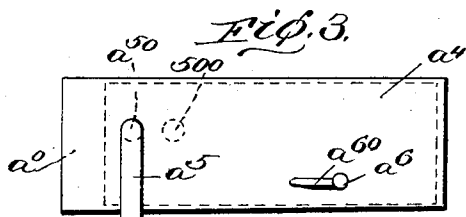
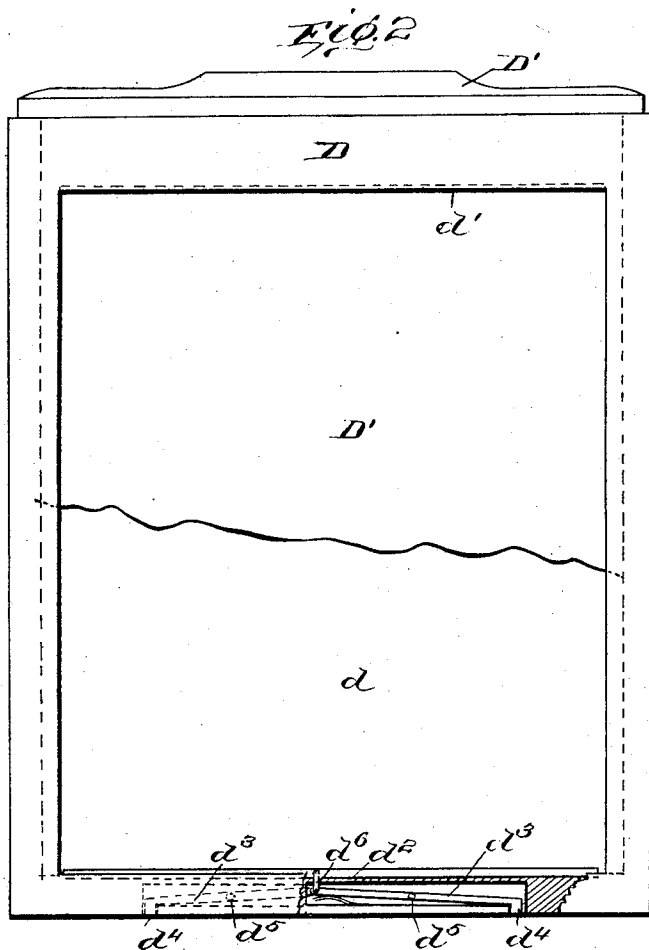
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2 SHEETS—SHEET 2.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

FREDERICK ST. JOHN DAVENPORT, OF ATLANTA, GEORGIA, ASSIGNOR OF TWO-THIRDS TO CORNELIUS JEROME SIMMONS AND FRANK VAN LEAR TURNER, OF ATLANTA, GEORGIA.

## PHOTOGRAPHIC DEVELOPING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 738,665, dated September 8, 1903.

Application filed February 14, 1903. Serial No. 143,281. (No model.)

*To all whom it may concern:*

Be it known that I, FREDERICK ST. JOHN DAVENPORT, a citizen of the United States, and a resident of Atlanta, Fulton county, Georgia, have invented certain new and useful Improvements in Photographic Developing Apparatus, of which the following is a specification.

My invention relates to photographic developing apparatus, and particularly to what are known as "dark" cabinets in portable form for the treatment of plate-negatives.

The object of my invention is to do away with the necessity for a dark room in developing, fixing, and washing photographic plates after exposure, enabling operators, whether artists or amateurs, to develop their plates immediately after exposure or under unfavorable circumstances where no dark room could be available, as when on a journey or during an expedition afield. The invention is not limited to any particular field of usefulness, however, but can be advantageously employed wherever plate-negatives are used.

In the design herewith presented of one form of the invention it is particularly applicable to the handling of dry plates.

In designing an apparatus to accomplish the above object I have found the problem to involve the following points: First, the apparatus must be portable, of convenient size, and absolutely impervious to light when in use, even with the most careless handling; second, it must be possible to transfer the plates from the plate-holders to the cabinet without handling the plates and without danger of exposing them in the slightest degree to cloud the negatives; third, from the moment of inserting a plate in the machine until it has been fixed and washed the operations must be mechanical, confined entirely within the machine, and produced automatically through the agency of simple acts on the part of the operator; fourth, all parts of the apparatus must be simple in construction and easily accessible for cleaning or repairs.

My invention successfully solves the problem presented and embodies features covering the points stated, as follows: I provide a containing vessel of suitable size and shape

to receive the plates and to contain the solutions employed, and over this I place an inverted open covering vessel containing means for receiving the plates and mechanically-actuated means for transferring them to the lower vessel. These two vessels are detachably joined together by a light-proof connection, which may be readily sundered and they separated for inspection, for the final removal of the plates, for cleansing, or what not. The various detail features of invention will be more fully stated in the following specification and pointed out in the appended claims.

My invention is fully illustrated in the accompanying drawings, in which—

Figure 1 is a vertical section of my complete apparatus with some parts in side elevation. Fig. 2 is a view of a plate-holder used with my apparatus. Figs. 3 and 4 are detail views to be referred to. Fig. 1<sup>a</sup> is also a detail view to be read in connection with Fig. 1.

Referring to Fig. 1, A is a rectangular containing vessel, which I shall hereinafter designate as the "tray." Its length and breadth are proportional to the dimensions of the plates to be treated and its depth to their number. It may be made of hard rubber or other similar material molded into shape; but I preferably use metal in sheet form with a heavy coating of japan or other protective material. It has four legs *a* to prevent injury to the bottom, with consequent leakage. These are not essential, however. Near its upper edge the tray has an offset *a'*, extending all around its side walls, forming a reduced neck, over which the cover B is fitted snugly, forming a light-proof joint. This cover B is therefore rectangular in plan, conforming to the tray, with its bottom open, but its upper part completely closed against the admission of light and of a height to receive the various parts to be referred to. I make this cover B also of sheet metal coated with japan or the like. It has side walls *b*, a top *b'*, and an offset or shoulder *b''*, forming a chamber B' within the cover, for a purpose that will presently appear. Above this offset and in the face *b''* is a rectangular opening *b'* for the insertion of the plate-holders.

This opening communicates with the interior of a transversely and horizontally arranged receiving-box C, whose upper wall *c* is continuous except for small openings, in which lie springs *c*<sup>2</sup> *c*<sup>2</sup>, whose function is to press down the plate-holder into intimate contact with the lower inner face or wall *c*, in which there is an opening *c*<sup>1</sup> exactly the size of the plate. At the inner end of the box C, I arrange one or more projections *c*<sup>3</sup> for a purpose which will appear later.

Within the offset *b*<sup>2</sup> and extending from side to side of the box B beneath the box C is a spindle or shaft *d*, having its ends protruding through the side walls *b* *b*. On one end, presented toward the observer in Fig. 1, is rigidly mounted a crank *d*<sup>1</sup>, with handle *d*<sup>2</sup>, whereby the shaft may be turned. On the farther end is likewise rigidly mounted a crank-arm *d*<sup>3</sup>, carrying a depending finger *d*<sup>4</sup>, pivoted to swing against the teeth *e*<sup>1</sup> of a ratchet *e*, projecting from the face of a slide E, moving in a vertical path and maintained in position by clips *e*<sup>2</sup> *e*<sup>2</sup> *e*<sup>2</sup> *e*<sup>2</sup>. As this slide lies against the side of the cover B, it covers a slot *b*<sup>3</sup> in the latter, and a pin E', attached to the slide, extends through the slot into the interior of the cover B, lying in front of the pivoted separator-plates P' when the latter are turned up, as shown. These plates are pivoted to pintles passing across the tray A from side to side behind the perforated partition *a*<sup>2</sup>, the partition being arranged, preferably, at an angle of forty-five degrees, as shown, and being somewhat too short to extend entirely across the tray, so that the lower ends of the separator-plates can straddle it, as shown in Fig. 4, with their projecting ends *p* *p*, which take onto the pintles *p*<sup>1</sup> *p*<sup>1</sup>. Attached to the shaft *d* within the cover B and so positioned as to lie flat against the under side of the box C in normal position of disuse, as shown in Fig. 1, is the unloading-tray D, having an upturned lip *d*<sup>5</sup> at its inner edge. In operation when the crank *d*<sup>1</sup> is turned this unloading-tray swings around in the arc of a circle of which the center is in the axis or shaft *d*. This circle is shown in dotted lines in Fig. 1 and marked with an arrow to show its direction of movement and the letter S.

The separator-plates P' when the apparatus is to be used are turned up, as shown in Fig. 1; but at other times they lie flat in the tray A, their free ends resting on the partition *a*<sup>3</sup>, perforated and arranged at an angle similar to that of partition *a*<sup>2</sup>. This partition *a*<sup>3</sup> does not extend clear across the tray, but leaves a space behind it on the side farthest removed from the observer of Fig. 1, in which lies the lower end of the tube *f*, with its deflector *f*<sup>2</sup> extending over the vertical dam-plate *a*<sup>10</sup>, having a shorter companion plate *a*<sup>9</sup>. The tube *f* is carried by the cover B, being expanded at its upper end outside the top of the cover-box into a funnel F to receive the developing and fixing solutions and the washing-

water. Lying about the middle of the chamber within the cover B and secured to the side wall thereof is a long leaf-spring *b*<sup>3</sup>, whose purpose will appear from the statement of operation.

Behind the partition *a*<sup>2</sup> is a slide-plate *a*<sup>4</sup>. (Shown in section in Fig. 1 and in front elevation in Fig. 3.) This plate slides on a horizontal line, being confined by clips *a*<sup>7</sup>, and is moved at will by means of a button *a*<sup>6</sup> on the end of a pin attached to the plate and extending out through a slot *a*<sup>60</sup> in the end wall of the tray A. In said end wall is set a spout *a*<sup>5</sup>, having a communicating opening *a*<sup>50</sup> into the interior, normally closed by the slide, but adapted to be opened when the latter is moved from the position shown in Fig. 3 to the left by reason of its then registering with a similar opening *a*<sup>500</sup> in the slide. Inside the slide is a damming-partition extending up from the bottom of the tray and another extending down from the side wall above the slide, (lettered *a*<sup>8</sup>.) All these dams protect the openings from stoppage and the interior of the box from the admission of light—a much more important feature. Due examination of the entire device will show no way by which the slightest ray by reflection, refraction, or in diffusion can enter when in operation.

The apparatus thus described will receive plate-holders of standard shape and construction, but for its easy manipulation requires a simple device for disengaging the plates therefrom, which will now be pointed out and then the operation described.

At the inner end of the box C a pair of projections *c*<sup>3</sup> are fixed to trip the plates from the holder into the unloading-tray D. The plate-holder is shown in Fig. 2. The frame G has the usual slide or cover G' for the plate, fitted to be withdrawn before developing and shown in position by the dotted lines, but broken away across the middle of the figure to expose the plate *g*. This plate *g* is sustained in the holder by a lip *g*<sup>1</sup> at the upper end and by a movable strip *g*<sup>2</sup> at the lower end. The latter is connected from its middle point by a link *g*<sup>6</sup> to the inner ends of two pivoted levers *g*<sup>3</sup> *g*<sup>3</sup>, pivoted at points *g*<sup>5</sup> *g*<sup>5</sup> and having their outer ends *g*<sup>4</sup> lying flush with the lower edge of the holder. The surface of the holder-frame is shown broken away on the right of Fig. 2, with the lever in full lines, but intact on the left, with that lever in dotted lines. A spring *g*<sup>7</sup> normally keeps the inner ends of the levers up and the strip *g*<sup>2</sup> out over the edge of the plate. Pressure on the ends *g*<sup>4</sup>, however, will pull back the strip *g*<sup>2</sup> and permit the release of the plate.

The operation of this improved developing apparatus is as follows: The tray A being clean and the separator-plates P' being turned up, the cover B is placed in position with slide E in its lowermost position, as shown in Fig. 1, and the handle *d*<sup>2</sup> turned up also in the position shown, so that the unloading-tray D lies up against box C. A

plate-holder G is then inserted in the opening  $b^7$  of the face  $b^6$  of the cover and shoved into the box C, which it fits fairly. So long as the end of the plate-holder covers the opening  $b^7$ , however, the plates and the body of the holder may vary in size without demanding a change in the size of box C. When the holder is nearly home in the box, the slide G' is pulled out and the holder shoved sharply against the rear wall of the box C, when the projections  $c^3$  press in the ends of the levers  $g^3$  at  $g^4$ , thereby tilting them and pulling back the strip  $g^2$ . The plate is thus released from the holder and falls face down on the unloading-tray D, which may be provided with a raised border or raised strips or raised points or other devices for supporting the plate without injury to the film on its face. I have not deemed it necessary to illustrate this. The handle  $d^2$  is now turned down as far as it will go. By this movement the unloading-tray D is swung down on circle S until it reaches a vertical position, when the plate falls forward, its upper edge describing a curve, (indicated by dotted lines S' in the direction of the arrow by the letter,) and in falling impinges on the spring  $b^3$ , whose function is to break the impetus of the plate and deprive it of momentum to avoid breakage. The plate then falls flat upon the bottom of the tray face up, having turned completely over. As the unloading-tray D is turned down the crank  $d^3$  on the farther end of shaft  $d$  is being lifted and through the link or finger  $d^4$  is lifting the slide E, with its pin E'. When the tray D has reached the limit of its movement, the slide and pin have moved up, so that the pin clears the top of the first separator-plate P', which falls forward and when the unloading-tray is turned up again falls down into the position shown, in dotted lines at the lower part of the tray A, overlying the plate already fallen and protecting it from the next one to come. The separator-plates thus down are lettered P and rest with their ends on partition  $a^3$ . The handle  $d^2$  having thus been returned to its first position, another plate can be inserted and unloaded in the same manner as the first, and so on with as many as the tray A will receive and the separator-plates P' will separate. Each time the handle  $d^2$  is turned down the crank  $d^3$  is lifted up and the slide E is raised another tooth, being maintained in position as it is raised step by step by the spring-detent  $e^3$ . Each step raises the pin E' to permit another separator-plate P' to fall until they are all down, and the machine is then full. Developing solution, fixing solution, and water for washing, with any other washes that may be desired or any solutions, are introduced in due sequence through the funnel F and tube  $f$  and withdrawn through the spout  $a^5$  by manipulating the slide  $a^4$  with its button  $a^6$ . By leaving this slide in position to open the spout-passage a continuous stream of water may be sent through the

tray over the plates and thorough washing attained. The tray and cover being light may be moved and tilted or shaken to agitate the solutions in use, if desired, and, in fact, the plates can be treated precisely as in a dark room, except as to one thing—they cannot be inspected to determine the degree of sharpness attained, &c. This is not deemed a drawback in ordinary work, however, as the solutions employed are so uniform and so accurately prepared that the time required for a given effect to be produced is capable of determination with accuracy, and even in fine work an artist will soon become expert in estimating without seeing the effects. This lack of inspection has an advantage, in that it saves some spoiled plates—mishandled or accidentally clouded.

When the successive solutions have been poured in and drawn off from the tray A and the process of washing completed, the cover may be removed, and, if desired, the tray may be tilted up on edge and used for a rack until the plates have drained. The cover may be used with another tray meanwhile, and, in fact, one cover will in most cases be used with two or more trays.

When the apparatus has been used, it is restored to its normal condition by turning up the separator-plates, pressing back the finger  $d^4$  and spring-pawl  $e^3$  to let slide E down, and turning up the handle  $d^2$ , the cover being placed on the tray and the slide  $a^4$  in the latter closed. Everything is then ready for another operation.

It will be noted that the plates are not handled once from the time they are unloaded until they are finally washed and finished, all manipulations being by handles  $d^2$  and  $a^6$ . The interior parts are all accessible for cleansing and repairs, and no skill is required in handling the machine.

I do not wish to limit my claims to the specific apparatus described, as I believe many details may be changed without affecting either the character or the functions of the apparatus, all such changes falling within the scope and purview of my invention.

What I claim, and desire to secure by Letters Patent of the United States, is—

1. A photographic developing apparatus comprising a tray and a cover separably connected to form a dark cabinet, means for delivering a plate into the cover, and means within the cover to transfer the plate to the tray, substantially as described.

2. A photographic developing apparatus comprising a tray, a cover therefor, and unloading mechanism in the cover adapted to receive a plate and transfer it to the tray, said mechanism operable from without the cover, substantially as described.

3. A cabinet for the treatment of photographic plates having a dark chamber and tray, a receptacle within the chamber having an outer opening to receive a plate-holder, and means within the chamber operable from

without to transfer a plate from the holder into the tray, substantially as described.

4. In a photographic developing apparatus, a dark chamber and tray, a receiver for plate-holders connected with said chamber, a transfer or unloading member within the chamber adapted to receive a plate from the holder, and external means to move said unloading member to deliver the plate from its holder to the tray for treatment, substantially as described.

5. A photographic dark cabinet comprising the following instrumentalities: a developing-tray and inclosing cover forming a dark chamber, means for introducing to and withdrawing from the tray developer or other liquids as desired, a slide-box in the chamber adapted to receive a plate-holder together with means to release a plate from the holder while in the box, a movable unloading member in proximity to said box and adapted to receive the plate and when moved to deliver the same into the tray, together with a suitable handle on the outside of the cabinet, with connections therefrom to the movable member, substantially as described.

6. A photographic dark cabinet having an inclosed chamber provided with a protected opening through the inclosure for the reception of a plate-holder, an unloading member in proximity to said opening adapted to receive a plate from the holder, and means to move said member to deposit the plate within the chamber, and thereafter to return the member into position to receive another plate, substantially as described.

7. In a photographic dark cabinet, a developing-tray, separators therefor normally held out of position and permitting free access to the tray, an inclosure forming a dark chamber over the tray, means for introducing plates, one at a time, into the chamber and thence into the tray, and means for moving the separators into the tray so as to alternate with and separate the plates, substantially as described.

8. A photographic developing-tray comprising a body adapted to hold plates and to receive suitable liquids for treating the same, movable separators attached to the tray and normally exposing the latter, but adapted to be moved into position in the tray to separate the plates, substantially as described.

9. A photographic developing apparatus comprising a tray, movable separators for said tray normally turned up out of the tray, an inclosed dark chamber over the tray, means for introducing plates into said chamber and thence separately into the tray, a detent in the chamber for the separators, and means to trip the detent and move down one separator at a time after each plate as the latter passes to the tray, substantially as described.

10. In a photographic dark cabinet, a light-proof inclosure, a box therein adapted to receive a plate-holder from without, a pivoted unloading-tray within the inclosure and in proximity to the box to receive a plate from the holder when inserted, means operable from without to move the unloading-tray, to deposit the plate, and to return the tray to position, whereby one or more plates may be passed into the inclosure without exposure to light, substantially as described.

11. In a photographic dark cabinet, a light-proof inclosure, a slide-box therein adapted to receive a plate-holder, an unloading-tray within the inclosure and in proximity to the box to receive a plate from the holder when inserted, a shaft for supporting said unloading-tray passing through the wall of the inclosure and fitted with a handle without the same, separators within the inclosure, a slide-plate on the outside thereof having a detent extending into the inclosure and maintaining the separators in inoperative position, and a connection from the said shaft to said slide to move the latter, the whole so arranged as to deposit the plates and throw down the separators, singly and alternately, substantially as described.

12. In a photographic apparatus, a dark cabinet, a slide-box therein, a plate-holder adapted to be inserted in said box, a plate, a detent normally maintaining said plate in said holder, and means in the box adapted to trip the detent and release the plate when the holder is inserted in the box, substantially as described.

13. In a photographic apparatus, a frame and a cover, a plate fitted to the frame, a detent in the frame normally extending over the edge of the plate and maintaining it in position, a pivoted releasing-lever in the frame connected with the detent, and adapted when moved to withdraw the same, substantially as described.

14. In a photographic dark cabinet, an inclosure, means for moving plates into said inclosure, and a spring secured within the same and extending into the path of the plates, substantially as described.

15. In a photographic developing apparatus, the tray A and cover B, the slide-box C and unloading-tray D, the separators P' and slide E, with shaft *d* and cranks *d'* and *d''*, the whole connected and arranged as and for the purpose intended, substantially as described.

In witness whereof I have hereunto subscribed my name, in the presence of two witnesses, this 12th day of February, A. D. 1903.

FREDK. ST. JOHN DAVENPORT.

Witnesses:

DONALD A. LAYLESS,  
E. D. THOMAS.