

No. 846,776.

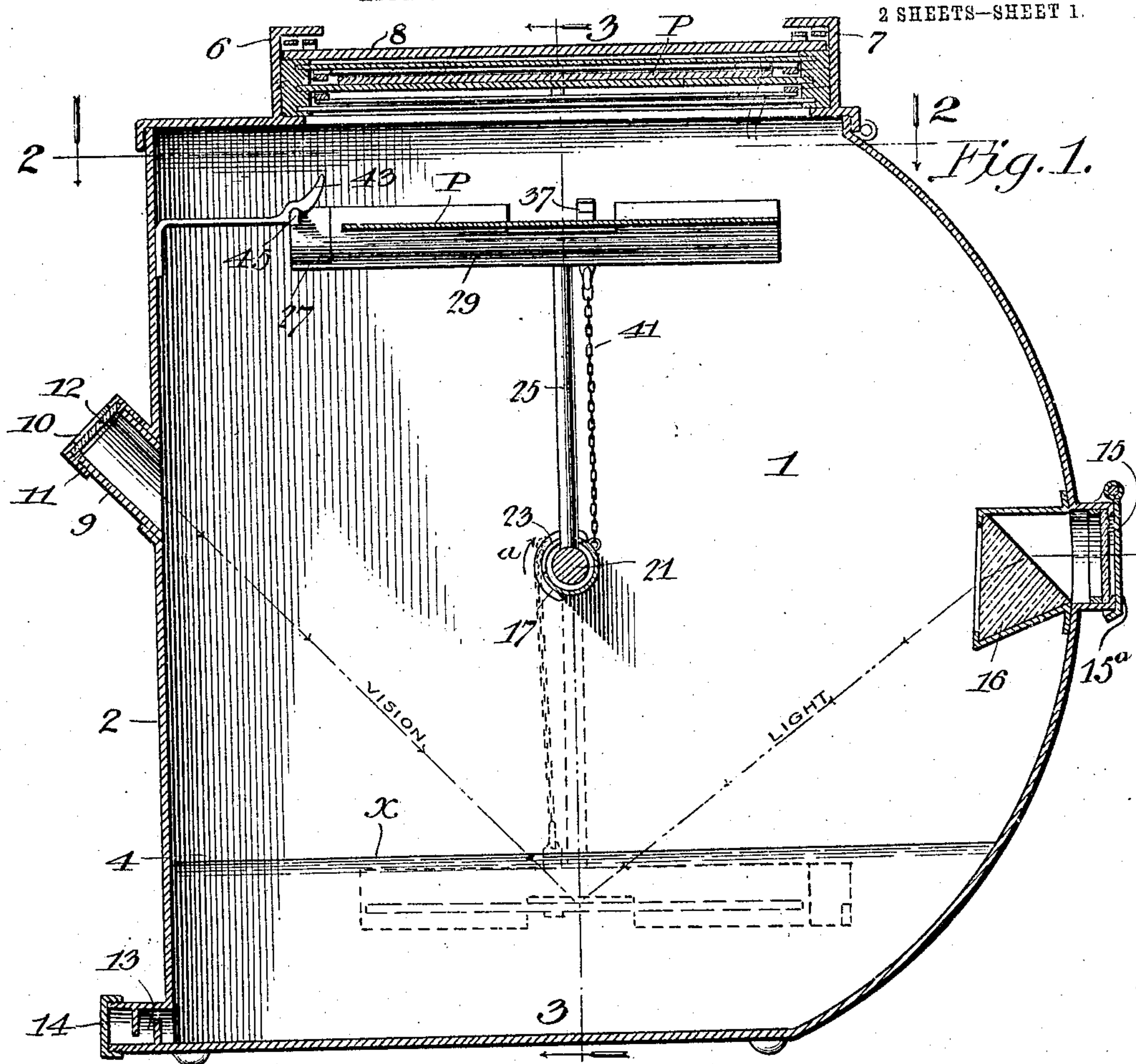
PATENTED MAR. 12, 1907.

W. H. BROWN.

MACHINE FOR DEVELOPING PHOTOGRAPHIC PLATES.

APPLICATION FILED JUNE 15, 1903.

2 SHEETS—SHEET 1.



Witnesses

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Fig. 2.

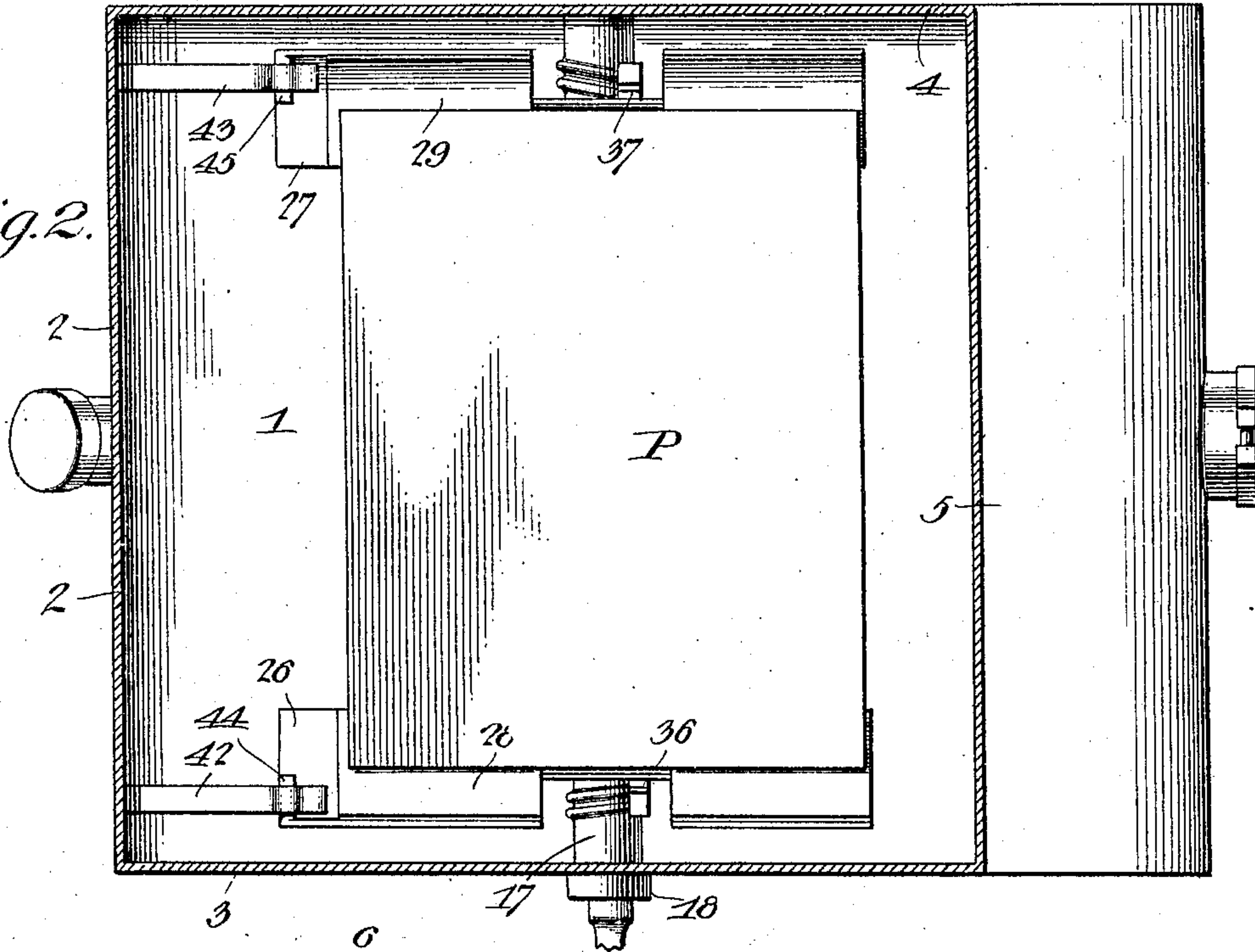


Fig. 3.

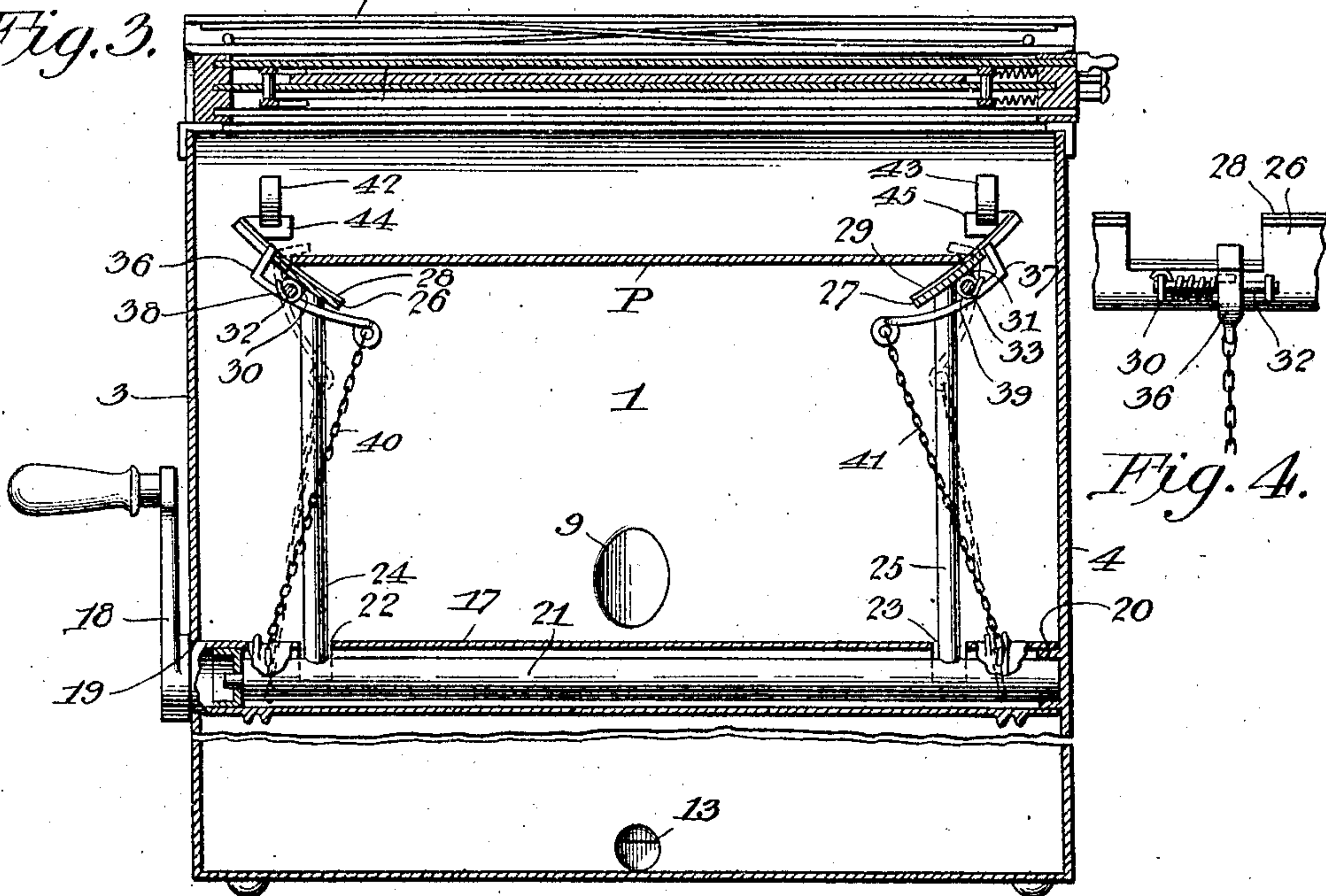


Fig. 4.

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# UNITED STATES PATENT OFFICE.

WILLIAM H. BROWN, OF LOCKHART, TEXAS.

## MACHINE FOR DEVELOPING PHOTOGRAPHIC PLATES.

No. 846,776.

Specification of Letters Patent.

Patented March 12, 1907.

Application filed June 15, 1903. Serial No. 161,576.

*To all whom it may concern:*

Be it known that I, WILLIAM H. BROWN, a citizen of the United States, residing at Lockhart, in the county of Caldwell and State of Texas, have invented a new and useful Machine for Developing Photographic Plates, of which the following is a specification.

This invention relates to machines for developing photographic plates.

The principal object of the invention is to provide a machine of the class described, into which plates may be conveniently introduced from the plate-holder in which the exposure of the plates takes place and by means of which the development and fixation of the plate may be carried on expeditiously and conveniently without the aid of a dark room.

A further object of the invention is to provide a developing-machine by means of which the photographer may observe the progress of the developing process without danger of fogging the plate.

A further object of the invention is to provide a developing-machine of simple and inexpensive construction the parts of which are so proportioned and arranged that the possibility of derangement thereof is reduced to a minimum and the initial cost of the machine made sufficiently small to place the machine within the reach of any photographer.

The machine consists, generally speaking, of a tank provided at the top with means for securing a plate-holder in light-excluding contact therewith, a shiftable carrier within the machine which is adapted to receive a plate when released from the plate-holder, and means for watching the developing process as it goes on within the machine.

In the accompanying drawings, forming a part of this specification, there is illustrated one form of embodiment of the invention capable of carrying the same into practical operation, it being understood that changes may be made in the form, proportions, and exact mode of assemblage of the elements therein exhibited without departing from the spirit of the invention or sacrificing any of its advantages.

In the drawings, Figure 1 is a vertical section through the apparatus, showing a plate-holder in position at the top of the apparatus and a plate in position on the carrier. Fig. 2 is a horizontal section on the line 2 2 of Fig. 1, the view being taken in the direction indi-

cated by the arrow. Fig. 3 is a vertical section in the plane indicated by the line 3 3 in Fig. 1 looking in the direction indicated by the arrow. Fig. 4 is a detail view of a portion of one of the plate-supporting strips and one of the plate-clamping fingers pivotally mounted on said strips.

Corresponding parts are designated by the same characters of reference throughout the various views in which they appear.

Referring to the drawings by reference characters, 1 designates generally a tank having a flat front 2, flat ends 3 and 4, and a curved back 5. The tank is provided at the top with a removable cover secured thereto in any suitable manner and comprising stationary strips 6 and 7, extending longitudinally of the tank at the front and rear thereof and forming ways for guiding a plate-holder and a spring-pressed member 8, disposed between the strips 6 and 7 and adapted to hold the plate-holder P in firm contact with the ways provided therefor.

In the front side of the tank about midway between the bottom and top is provided the obliquely-disposed tube 9, the inner end of which is disposed downward, as shown, and the outer end of which is covered by a cap 10, consisting, essentially, of a flange 11, encircling the tube, and a plate 12, of transparent material, adapted to permit the passage of non-actinic rays of light, but to cut off the actinic rays, such material being found in a piece of ruby glass. The tube 9 serves for the introduction of developers and other liquids within the tank, as will be afterward explained, and also facilitates the observation of the plate during the developing process.

At the bottom of the tank is provided an outlet-tube 13, preferably tortuous, as shown, to prevent the entry of light into the tank and preferably covered on the interior with a light-absorbing coating, as black enamel, and provided at its outer end with a cap 14, which is adapted to be firmly secured, as by screwing, upon the end of the tube.

About midway between the bottom and top on the curved back of the tank is provided a window 15, preferably of ruby glass, which is secured in an opening in the wall of the tank. A shutter 15<sup>a</sup> is provided outside of the window 15 to cut off the light therefrom when desired, and there is placed within the tank adjacent to the window 15 a prism 16, so disposed that it directs down-



ward the colored light which passes through the window 15.

Extending longitudinally of the tank in about the same horizontal plane as the window 15 is a hollow shaft 17. At one end the shaft 17 extends beyond the wall of the tank and terminates in a crank 18, as best seen in Fig. 3, bearings being provided for the crank end of the shaft at 19. The other end of the shaft may be supported in the tank in any preferred manner. In the form of the invention illustrated a short tube 20, attached to the wall of the tank, extends within the open end of the shaft 17 and forms a journal therefor. The hollow shaft 17 incloses a solid shaft 21, one end of which is journaled within the short tube 20 and the other end of which is supported in a socket formed therefor at the crank end of shaft 17. The hollow shaft 17 and solid shaft 21 are movable relative to each other, the movement of the shaft 21 within hollow shaft 17 being limited, as will presently be explained. The shaft 21 binds with considerable pressure upon the short tube 20 and within the socket, so that the same will be held by friction against rotating independently of the tubular shaft 17 while the arms 24 and 25 are being swung upward or downward.

The hollow shaft 17 is slotted at 22 and 23 to permit the passage of arms 24 and 25, respectively, which are rigidly secured to shaft 21 and which project therefrom at right angles to said shaft and parallel to each other. The arms 24 and 25 have rigidly secured to the free ends thereof curved strips of metal 26 and 27, which are disposed at right angles both to said arms and to shaft 21. The strips 26 and 27 are concave on the surfaces turned away from the shaft 21 and are arranged with their concavities oppositely and inwardly disposed. The strips are also attached to arms 24 and 25 in such manner that the outer edges are further from shaft 21 than the inner edges for reasons that will be afterward explained.

When the strips 26 and 27 are in the position shown in Fig. 3, the concave surfaces thereof are directed upward and are just below the top of the tank and in position to receive a plate when released from the holder supported on the ways provided therefor by the strips 6 and 7. In order to cushion the fall of a plate upon the strips 26 and 27, they are preferably faced with rubber, as indicated at 28 and 29. On the outer side of each of the strips 26 and 27 are provided lugs 30 and 31, in which are journaled short shafts 32 and 33, each of which has rigidly secured thereto a clamping-finger, as indicated at 36 and 37, which has one end disposed at right angles to the remainder of the finger and is held normally out of position to engage a plate resting upon the strips 26 and 27 by a spring, as indicated at 38 and 39. Each of

the strips 26 and 27 has the upper edge thereof notched adjacent to its clamping-finger to permit sufficient freedom of movement of the clamping-finger toward the plate.

In order to swing the clamping-fingers into operative position to clamp a plate firmly upon the strips 26 and 27, there are attached to the inoperative ends of said clamping-fingers chains 40 and 41, the other ends of which are secured to the hollow shaft 17, as best seen in Fig. 3. The tension of springs 38 and 39 normally holds the clamping-fingers in inoperative position, and then the hollow shaft 17 and solid shaft 21 are in the position shown in Fig. 1. When the clamping-fingers are in inoperative position, the arms 24 and 25 lie at one end of slots 22 and 23, and when it is desired to swing the clamping-fingers into operative position to permit the deposition of a plate upon strips 26 and 27 hollow shaft 17 must be turned in the direction indicated by the arrow *a* until in the position shown in dotted lines in Fig. 3, when the arms 24 and 25 will be at the opposite ends of slots 22 and 23. This turning of shaft 17 winds the chains 40 and 41 on shaft 17 in grooves provided for that purpose and swings the clamping-fingers into operative position. To prevent the turning of solid shaft 21 when the hollow shaft 17 is turned in the direction indicated by the arrow *a*, I provide at the top of the tank on the front side thereof spring-catches 42 and 43, which engage with lugs 44 and 45, provided at one end of strips 26 and 27, respectively. The spring-catches 42 and 43 engage with the lugs 44 and 45 on strips 26 and 27 and prevent any movement of said strips in the direction indicated by arrow *a* until the arms 24 and 25 reach the ends of slots 22 and 23 and also limit the movement of strips 26 and 27 in the opposite direction.

In operation the developer will be introduced into the tank through the tube 9, the cap 10 will be placed in position thereon, and the plate-holder will be forced along the ways provided at the top of the tank until it reaches the limit of its movement thereon. The slide covering the lower plate will then be withdrawn and the plate will be released and allowed to fall upon the cushioned surfaces of strips 26 and 27, which, it will be understood, are then in position to receive a plate, with the clamping-fingers retracted, as shown in solid lines in Fig. 3. When the plate is in position on the strips 26 and 27, the shaft 17 will be turned in the direction indicated by the arrow *a*, and the clamping-fingers will swing to operative position and engage the plate to hold it in position face downward on the strips 26 and 27. Continued movement of the shaft 17 will cause the lugs 44 and 45 to pass out of engagement with spring-catches 42 and 43, which will permit the plate to travel around to the



position shown in dotted lines in Fig. 1, where it will be held with the sensitized surface in position to be acted upon by the developer, the level of which is indicated at  $x$ .  
 5 If light is now admitted through the window 15, it will be thrown by the prism 16 upon the plate, and by means of the observation-tube 9 the appearance of the image upon the plate may be observed. The time taken for  
 10 the image to begin to appear is observed, the window 15 is then closed by means of the shutter 15<sup>a</sup>, and the plate is left until developed, the time of development being determined by any of the well-known systems—  
 15 as, for example, by the Watkins' factorial system. When the plate is fully developed, the shaft 17 will be turned until the plate is carried to the top of the tank. Then the cap on tube 13 will be removed and the developer  
 20 poured out. Water will then be introduced through the tube 9 and the bottom of the machine rinsed out therewith. Then the cap 14 will be placed in position on the tube 13 and the solution of hyposulfite of soda  
 25 for fixation of the developed negative will be poured in through the tube 9 and the cap 10 placed in position thereon. Shaft 17 will next be turned to bring the plate into the fixing solution and the plate will be left until  
 30 fixation is complete, when the plate will be returned to the top of the tank and the shaft 14 turned until the clamping-fingers are drawn out of engagement with the plate, so that it may be removed through the top  
 35 of the tank by removing the cover.

The machine described may be used with any form of plate-holder which is provided with means for releasing the plate therefrom without exposing the plate; but I prefer to  
 40 use therewith a plate-holder, hereinafter described, which is especially adapted for use with the developing-machine constructed as already explained.

It will be observed that by means of the  
 45 developing-machine constructed as described in the foregoing pages the development of a plate without the use of a dark room and without danger of fogging may be very conveniently carried on. Furthermore, it will  
 50 be seen that the number of parts employed in the construction of the developing-machine is comparatively small and the movements necessary for the manipulation of the machine are simple and easily performed.

55 Having thus described the construction and operation of my invention, what I claim as new, and desire to secure by Letters Patent, is—

60 1. The combination in apparatus of the class described, of a tank adapted to exclude actinic light, a hollow shaft journaled in said tank, an oscillatory carrier mounted in said shaft, and means operated by movement of the shaft for clamping a photographic plate  
 65 on said carrier.

2. The combination in an apparatus of the class described, of a tank adapted to exclude actinic light, a hollow shaft journaled in said tank, an oscillatory carrier on said shaft and pivoted fingers operated by the movement  
 70 of said shaft for clamping a plate on said carrier.

3. The combination in apparatus of the class described, of a suitable tank, a horizontal shaft mounted for oscillatory movement  
 75 in said tank, arms projecting from said shaft, plate-supporting members secured to said arms at the outer ends thereof, and means for clamping a photographic plate on said supporting members.

4. The combination in apparatus of the class described, of a suitable tank, a shaft mounted for oscillatory movement in said tank, arms projecting outward from said shaft, supporting members presenting a con-  
 85 cave supporting-surface attached to said arms at the outer ends thereof, and means for clamping a photographic plate on said members.

5. The combination in apparatus of the class described, of a suitable tank, a shaft  
 90 mounted for oscillatory movement in said tank, plate-supporting members carried by said shaft, cushions provided on the supporting-surface of said members, and means for  
 95 holding a plate in contact with said cushions.

6. The combination in apparatus of the class described, of a suitable tank, a shaft mounted for oscillatory movement in said tank, plate-supporting members carried by  
 100 said shaft, normally inoperative devices for securing a plate in position on said members, and means for holding said members in position to receive a plate.

7. The combination in apparatus of the class described, of a suitable tank, a shaft  
 105 mounted for oscillatory movement in said tank, plate-supporting members carried by said shaft and having lugs at one end thereof, spring-catches on the wall of said tank to en-  
 110 gage said lugs, and means for holding a plate in position on said members.

8. The combination in apparatus of the class described, of a suitable tank, plate-supporting members shiftably mounted in  
 115 said tank, spring-retracted clamping-fingers, and means for operating said fingers to clamp a plate on said supporting members.

9. The combination in apparatus of the class described, of a suitable tank, shiftable  
 120 plate-supporting members within said tank, spring-retracted clamping-fingers pivotally mounted on said members, and means for swinging said clamping-fingers positively into operative position.

10. The combination in apparatus of the class described, of a suitable tank, plate-sup-  
 125 porting members shiftably mounted in said tank, clamping-fingers pivotally mounted on said supporting members, and springs adapt-  
 130



ed to hold said fingers normally in inoperative position.

11. The combination in apparatus of the class described, of a suitable tank, plate-supporting members shiftably mounted within said tank, clamping-fingers pivotally mounted on said members, springs to hold said fingers normally in inoperative position, and means for overcoming the tension of said springs to turn said fingers into clamping position.

12. The combination in apparatus of the class described, of a suitable tank, a shaft mounted for oscillatory movement within said tank, plate-supporting members shiftably mounted within said tank, clamping-fingers pivotally mounted on said supporting members, springs for keeping said clamping-fingers normally in inoperative position, and flexible connections between said clamping-fingers and said shaft, whereby said fingers may be thrown into operative position.

13. The combination in apparatus of the class described, of a suitable tank, a shaft mounted for oscillatory movement within said tank, a hollow shaft surrounding the first-mentioned shaft and movable relative thereto, plate-supporting members carried by the first-mentioned shaft, clamping-fingers on said members and normally held in inoperative position, and flexible members connecting said clamping-fingers and said hollow shaft, whereby said clamping-fingers may be thrown into operative position.

14. The combination in apparatus of the class described, of a suitable tank, a shaft mounted for oscillatory movement in said tank, and having arms projecting therefrom, plate-supporting members mounted on said arms, clamping devices normally held in in-

operative position provided on said members, a hollow shaft surrounding the first-mentioned shaft and provided with slots through which said arms project, and flexible connections between said clamping devices and said hollow shaft whereby said clamping devices may be thrown into operative position.

15. The combination in apparatus of the class described, of a suitable tank, means at the top of said tank for holding a plate-holder horizontally in light-excluding contact with said tank, and oscillatory plate-supporting members within said tank and adapted to receive a plate when released from a plate-holder secured in position at the top of said tank.

16. The combination in apparatus of the class described, of a suitable tank, ways for a plate-holder at the top of said tank, a spring-pressed member adapted to hold a plate-holder in engagement with said ways, and shiftably plate-supporting devices within said tank and adapted to receive a plate when discharged from a plate-holder on said ways.

17. The combination in apparatus of the class described, of a suitable tank, plate-supporting devices within said tank, a tube in the side of said tank, a screen mounted in said tube and adapted to exclude actinic light, and a prism provided within said tank and adjacent to said screen to direct light transmitted through said screen.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

WILLIAM H. BROWN.

Witnesses:

W. R. SMITH,

J. D. McMURTREY.