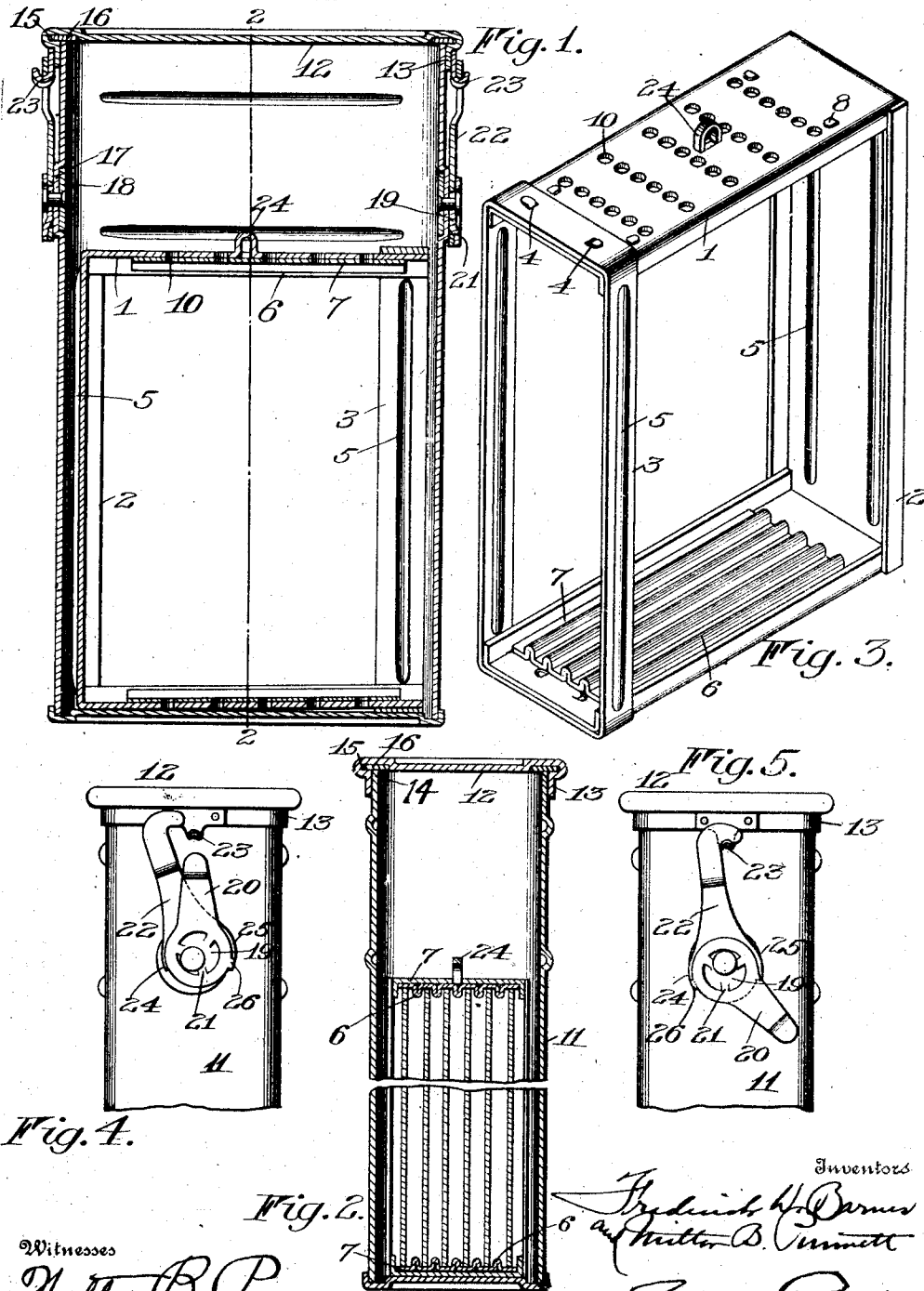


No. 887,055.

PATENTED MAY 12, 1908.

F. W. BARNES & M. B. PUNNETT.
PHOTOGRAPHIC DEVELOPING APPARATUS.

APPLICATION FILED OCT. 5, 1907.



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PHOTOGRAPHIC DEVELOPING APPARATUS.

No. 887,055.

Specification of Letters Patent.

Patented May 12, 1908.

Application filed October 5, 1907. Serial No. 395,991.

To all whom it may concern:

Be it known that we, FREDERICK W. BARNES and MILTON B. PUNNETT, of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Photographic Developing Apparatus; and we do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of the specification, and to the reference-numerals marked thereon.

Our present invention relates to the apparatus used in the development of photographic negatives and it has for its object to provide an efficient and inexpensive device of the type generally referred to as tank developers within which a plurality of photographic plates may be safely and conveniently placed and the developing process carried on, and it is also the purpose of the invention to eliminate in such device the collection of air bells upon the plates while undergoing treatment.

Our improvements are further directed toward the means for rendering the container fluid tight.

To these and other ends the invention consists in certain improvements and combinations of parts all as will be hereinafter more fully described, the novel features being pointed out in the claims at the end of the specification.

In the drawings: Figure 1 is a central vertical section of a developing tank embodying our improvements. Fig. 2 is a vertical section taken on the line 2—2 of Fig. 1. Fig. 3 is a perspective view of the plate rack. Fig. 4 shows a portion of the top of the receptacle in side elevation with one of the clamping devices for the cover in position for engagement, and Fig. 5 is a similar view with the said clamping member engaged.

One of the difficulties which arise during the development of a photographic negative by immersion in the chemical solution is due to the collection thereon of small bubbles or air bells, as they are called, which prevent in a measure, free access of the liquid to those portions of the sensitized surface to which they attach themselves and cause unequally distributed chemical action to take place, resulting in the appearance of spots upon the plate when finished. For the purpose of

economy, it is desirable to use but a small amount of solution for each operation, rendering the agitation thereof with the plates at rest difficult and tedious while, conversely, movement of the plates, under ordinary conditions, engenders the danger of scratching or breaking them. To overcome all of these objections and at the same time simplify the general process, we provide a rack having perforated ends adapted to support on edge and out of contact, a plurality of plates and a fluid tight receptacle therefor, of greater depth than the corresponding dimension of the rack, within which the latter fits to slide in two directions in such manner that the openings through which the contents have been inserted will be closed by a wall of the receptacle. The latter is filled with solution to a depth sufficient to cover the plates and by reversing it at intervals end for end, the rack is also inverted, the liquid flowing freely throughout its length by reason of the perforated ends and also forming a buffer to prevent the effects of a too severe impact of the rack against the wall of the receptacle toward which it is traveling. Further, as the usual rectangular proportions of a plate make it convenient to form both the rack and receptacle of similar shape, we provide means, in no way interfering with the foregoing manipulations, for effecting a fluid tight engagement of the cover by a rectilinear rather than a rotary movement relatively to the receptacle.

Referring now to the drawings wherein similar numerals of reference indicate similar parts, and particularly to Fig. 3 thereof, the device illustrated as an embodiment of my invention comprises a preferably rectangular frame 1 constituting a plate rack, the top, back and bottom sides of which may be conveniently formed from a single strip of material as sheet metal, the said sides having flanged edges 2 overlapped at their intersections and tied by a drop of solder or otherwise secured together. The ends of said strip are preferably connected by a band 3 secured thereto as by the tongues 4 and forming an open side to the frame at what may be termed the front face of the rack, stiffening ribs 5 being provided on said band and upon the rear wall.

Upon the inner faces of the top and bottom walls we arrange a series of oppositely disposed ridges 6 formed in the present instance

by corrugated plates 7 attached by means of the tongues 8 and between these ridges a plurality of plates 9 are accommodated and by them properly spaced to be retained with
 5 their sensitized surfaces free and out of contact, the said plates being inserted through the open side. These walls are also provided with perforations or openings 10 which communicate with the spaces between the
 10 plates for a purpose that will be hereinafter described.

11 indicates a tank or receptacle of a depth greater than the height of the rack but of a cross sectional area corresponding substantially to the breadth and thickness thereof,
 15 so that when the rack is inserted therein through the opening at the top, it will be prevented from undue lateral movement though permitted to slide longitudinally,
 20 and the plates will be held against advancement through the open face by a wall of the container.

A fluid tight cover 12 is provided for the receptacle and because of its special requirements, it is constructed and operated in a
 25 particular manner. In the first place, it is preferable to manufacture the receptacle from light sheet material with the result that its edge or rim being thin, offers but a small
 30 bearing surface against the cover and must, therefore, be tightly engaged and further, the said edge should be continuous with the walls in order to render free and convenient the insertion and removal of the rack. As
 35 before mentioned the shape of the plates and of the rack just described make it desirable to have a prismatic, as distinguished from a cylindrical tank, so that the cover must be fastened by a direct movement rather than
 40 through rotation. We, therefore, construct it as illustrated, preferably from a sheet metal plate having a continuous depending flange 13 telescopically engaging upon the exterior of the rim 14 of the receptacle. An ex-
 45 panded portion at the base of the flange forms a recess 15 extending laterally beyond the engaging face of the latter and that of the rim and also constituting a depression in the inner face of the plate. Within this recess
 50 and depression and between the cover to which it is preferably secured, and rim, is arranged a gasket 16 of yielding material such as rubber.

Formed on opposite sides of the receptacle
 55 near the top are bosses 17, reinforced by plates 18 and in contact with which are pivoted eccentrically, bosses 19 on sheet metal operating arms 20, the said bosses 19 being punched clear of the body of the arm except
 60 where connected to the supporting straps 21. Rotatably mounted on these bosses are hooks 22 which engage projections 23 on the cover and are provided with abutments 24 and 25 engaged by spurs 26 on the arms to limit the
 65 movement of the latter relatively thereto.

The frictional engagement between the hooks and operating arms is so regulated that when the former are in the released position, shown in Fig. 4, rotation of the latter will also move the bites of the hooks to points above the
 70 projections on the cover so that when the arms are depressed, as shown in Fig. 5, the eccentrics will lower the hooks vertically into engagement, while reverse motion of the
 75 arms will return them. This forms a very powerful clamp, yet it will be noticed that the rim of the receptacle is forced against the gasket 16 approximately at the center of the latter, by reason of the position of the recess within which it lies and a true and uniform
 80 engagement is effected. This would not be the case were the recess not provided and the gasket simply secured in the corner of the cover as the rim would unevenly engage near
 85 its edge and either force it out of place or wear it back to a degree that would destroy its usefulness.

In operation, the plates are inserted in the rack, as before explained, and the latter lowered into the receptacle into which a quantity
 90 of solution, sufficient to submerge it by displacement, has been previously placed. The cover is then applied and fastened and after standing a few minutes, and also at intervals during the time the plates are being treated,
 95 the tank is inverted, whereupon the rack slides to the opposite end and in so doing is not only slowed in its movement by the liquid which travels ahead of it, but displaces the latter in a manner causing it to flow through
 100 the openings 10 and between the plates in perfect circulation, removing what air bells may have collected and replacing the "dead" liquid adjacent the sensitized surfaces. The tank is as completely sealed against leakage
 105 when resting upon its cover as upon its base, while the depression 15 forms a raised portion on the exterior of the cover upon which the tank will stand evenly and firmly, even though the material thereof buckle slightly in
 110 use. A loop 24 is preferably provided upon the top of the rack through which a suitable instrument may be passed in removing it from the solution.

The use of such a device as we have de-
 115 scribed is both convenient and cleanly, as the hands need never come in contact with the discolored solutions and in this connection it will be noted that by virtue of the particular position of the gasket, the flanges of the cover
 120 by which it would naturally be grasped, cannot be reached by the liquid. The plates are uniformly bathed in a solution so thoroughly agitated as to effectually prevent the formation of bubbles thereon while presenting its
 125 maximum strength to the sensitized coating.

We claim as our invention:

1. In a photographic developing apparatus, the combination with a receptacle having a fluid tight cover, of a removable plate 130

rack contained within the receptacle and conforming substantially in width and thickness to the interior configuration of the latter, the interior of said rack being accessible for the insertion of plates only from a face adjacent a side wall of the receptacle.

2. In a photographic developing apparatus, the combination with a receptacle having a fluid tight cover, of a removable plate rack slidable within the receptacle and conforming substantially in width and thickness to the interior configuration of the latter, the interior of said rack being accessible for the insertion of plates only from a face adjacent a side wall of the receptacle.

3. In a photographic developing apparatus, the combination with a receptacle having a fluid tight cover, of a removable plate rack slidable within the receptacle and conforming substantially in width and thickness to the interior configuration of the latter, said rack being provided with openings on its top and bottom faces and the interior thereof being accessible for the insertion of plates only from a face adjacent a side wall of the receptacle.

4. In a photographic developing tank, the combination with a receptacle open at one end and adapted to contain a removable plate rack, of a cover for said receptacle having a flange arranged to telescopically engage the rim of the latter adjacent the opening and provided with an expanded portion at the base of the flange forming a recess extending laterally of the engaging face thereof, a gasket composed of yielding material arranged in the recess and between the cover

and rim and means for clamping the cover to the rim.

5. In a photographic developing tank, the combination with a receptacle open at one end and adapted to contain a removable plate rack, of a removable cover for said receptacle having a continuous flange thereon arranged to telescopically engage the rim of the receptacle adjacent the opening and provided with an expanded portion at the base of the flange forming a continuous recess extending laterally of the engaging face thereof, a gasket composed of a yielding material arranged in the recess between the cover and rim and means for clamping the cover to the rim.

6. In a photographic developing tank, the combination with a receptacle open at one end and adapted to contain a removable plate rack, of a cover for said receptacle comprising a plate having a flange thereon arranged to telescopically engage the rim of the latter adjacent the opening and provided with an expanded portion at the base of the flange forming both a recess extending laterally of the engaging face thereof and a depression in the inner face of the plate, a gasket composed of yielding material arranged within the recess and depression and between the cover and the rim of the receptacle and means for clamping the cover to the rim.

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