No. 778,906. PATENTED JAN. 3, 1905.

C. H. SHAW.

PHOTOGRAPHIC DEVELOPING APPARATUS.

APPLICATION FILED MAR. 5, 1904.

2 SHEETS—SHEET 1.

Fig. 1.

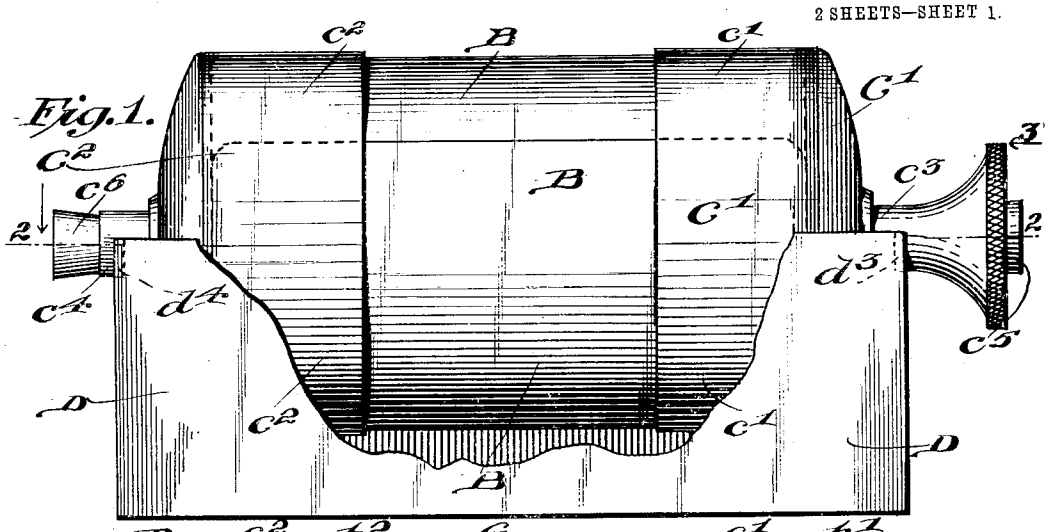


Fig. 2.

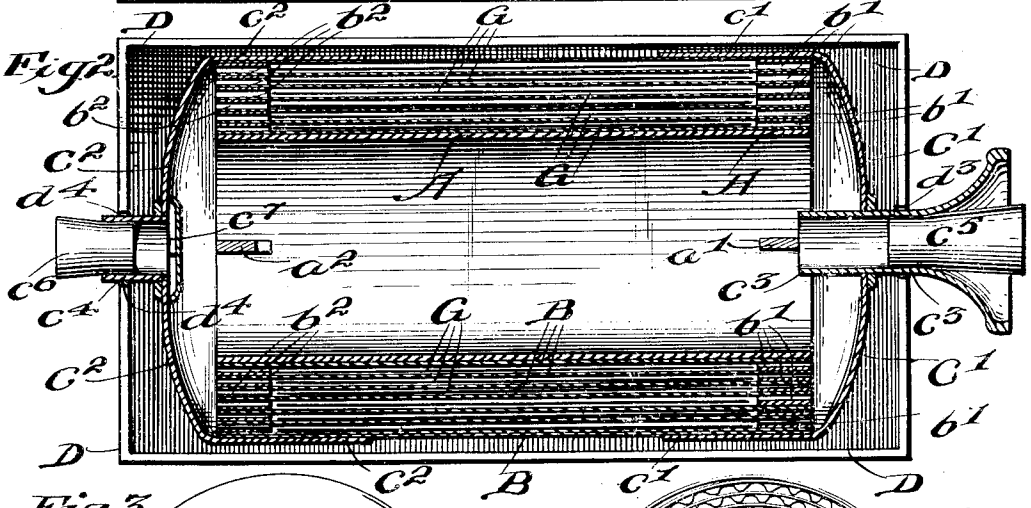
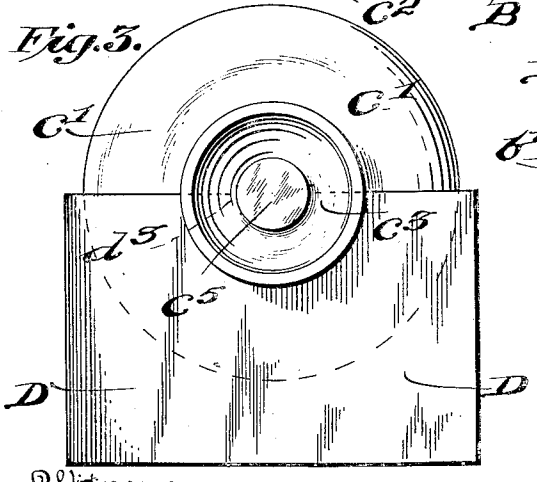


Fig. 3.



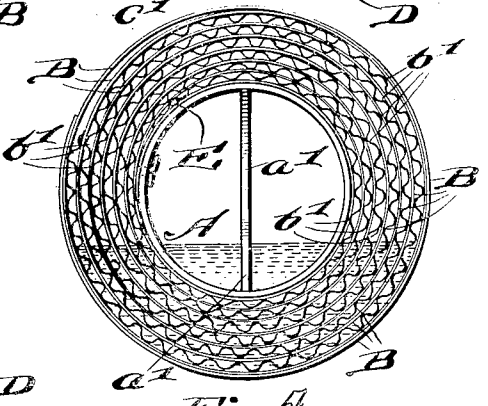


Fig. 4.

Witnesses
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F. W. Ashley.

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Inventor

By his Attorney Edmund H. Brown

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2 SHEETS—SHEET 2.

Fig. 5.

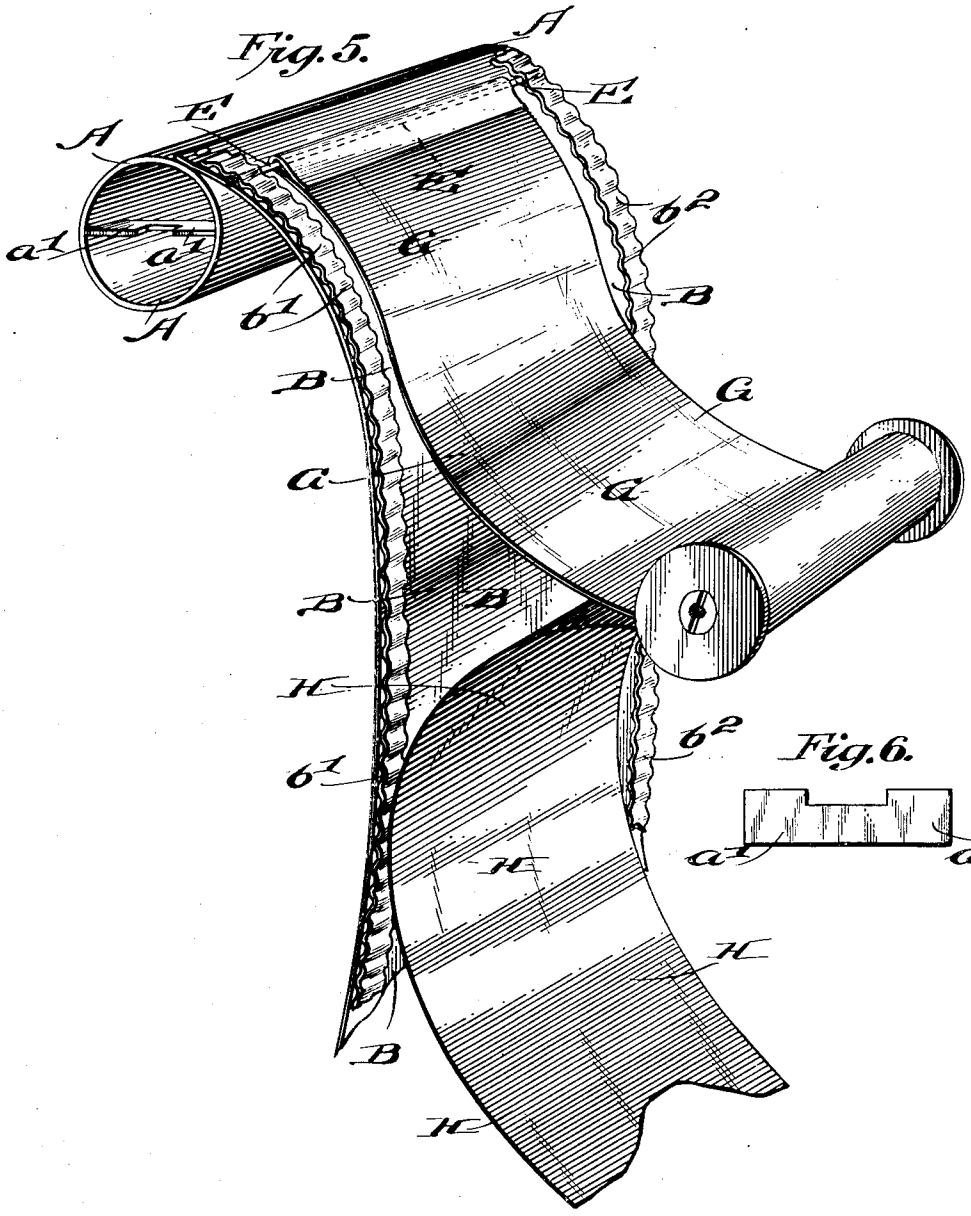

Fig. 6.

Witnesses
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No. 778,906. Patented January 3, 1905.

UNITED STATES PATENT OFFICE.

CHARLES HARRIS SHAW, OF NEW YORK, N. Y.

PHOTOGRAPHIC DEVELOPING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 778,906, dated January 3, 1905.

Application filed March 5, 1904. Serial No. 196,763.

To all whom it may concern:

Be it known that I, CHARLES HARRIS SHAW, a citizen of the United States, residing at No. 637 Putnam avenue, in the borough of Brooklyn, county of Kings, city and State of New York, have invented certain new and useful Improvements in Photographic Developing Apparatus, of which the following is a specification.

This improvement relates to means whereby photographic films may be developed in any place regardless of light and to means especially adapted for use by amateur photographers in developing their films.

My improvement comprises combinations of a cylinder open at both ends, a strip connected at one end to the outer side of the cylinder and capable of being wound into a volute coil and provided on one side near its longitudinal edges and throughout most of its length, but not at the outer extremity, with projections for keeping its convolutions separate, and caps adapted to be slipped over the ends of said strip when properly coiled and to make tight contact therewith. By means of these caps light will be excluded from the spaces between the convolutions of the strip and yet provision will be afforded for keeping a suitable quantity of the developing liquid within said spaces. If only a moderate quantity of developing liquid be used, it can be made to circulate throughout said spaces. A suitable movement may conveniently be given to the contrivance by providing the caps with trunnions, fitting the latter to recesses in a rectangular box, which may be constructed so as to be entirely open to light. If the trunnions be made hollow and provided with stoppers, the developing liquid may be introduced through one and discharged through the other.

The features described are the more important ones involved in my invention; but others will be explained in a more detailed description, which I am about to give.

In the accompanying drawings, Figure 1 is a side elevation of means embodying my improvement, a portion of the outer box being broken away, so as to reveal other parts. Fig. 2 is a horizontal section of the various parts except the outer box, which is shown in plan. Fig. 3 is an end view. Fig. 4 is a transverse section without the outer box. Fig. 5 is a perspective view of the central cylinder already mentioned, the coilable strip, a photographic film, and a light-excluding strip, such as is a common appurtenance of a photographic film. Fig. 6 is a side view of an appurtenance of the central cylinder.

Similiar letters of reference designate corresponding parts in all the figures.

A designates a cylinder which may be made of any suitable material, such as sheet metal. It is open at both ends. As here shown it is provided near its ends with diametrically-arranged cross-bars a' a^2, which also may be made of metal and may be secured in position by any suitable means, such as solder.

B designates a coilable strip which may be made of any suitable material and which is of a width substantially corresponding to the length of the cylinder A and of a length greater than that of the photographic film which is to be developed. This strip may advantangeously be made of thin sheet metal. At one end, which will be its inner end in use, it is secured so as to be contiguous to the outer surface of the cylinder A. Rivets or eyelets may be employed as means for securing it.

The strip B is provided near its longitudinal edges and preferably upon one side only—namely, the same side as the film—with projections b' b^2. These projections may conveniently be made by transversely corrugating narrow strips of sheet metal and fastening the same by solder or otherwise to those portions of the strip B where they are to be used. The projections just formed will be hollow, and therefore will provide for the circulation of liquid through them.

The cylinder A, strip B, and projections b' b^2 are to be of such relative sizes that the latter will form between the convolutions of the strip B a volute-shaped space along which a photographic film may be coiled.

The projections b' b^2 extend throughout most of the length of the strip B and ought to extend throughout a part of the length of

said strip equaling the length of the photographic film to be developed. Beyond the point where the projections b' b^2 terminate the strip B is prolonged, so that it may fit closely against the outer surface of the outermost convolution of the strip B and make therewith a tight joint impervious to liquid.

C' C^2 designate caps preferably made of sheet metal and having rims c' c^2, which extend over the end projections of the strip B after the latter shall have been coiled. By the use of these caps the strip B is made to constitute a receptacle for a photographic film to be developed and also for a developing liquid. While the shape of the caps is not vital, they may advantageously be made dome shape, as represented.

If the caps C' C^2 are provided with trunnions, the device as a whole may be conveniently supported by a rectangular box D open to light and having in its ends notches d^3 d^4 to receive the trunnions. Such trunnions may be made hollow and then will facilitate the ingress and egress of developing liquid. Such devices are shown and are designated c^3 c^4. Stoppers of any suitable kind may be used. In the present instance corks c^5 c^6 are employed.

To prevent the entrance of light, the liquid-inlet c^3 is extended inwardly beyond the cap C' and into the cylinder A. To permit of this and yet have the cross-bar a' close to its end of the cylinder, I preferably notch this cross-bar. For excluding light at the outlet c^4 a plate c^7 extends across the inner end thereof, but has openings at intervals around its edge, so as not to interfere with the flow of liquid.

Any convenient means may be employed for attaching a photographic film to the inner end portion of the strip B. For instance, a rod E may be secured to the inner end portion of the strip in any suitable manner a short distance away from the strip itself, so that the outer end of the photographic film may be slipped under it and then bent over the photographic film itself to make a connection.

When the device is to be used, the caps C' C^2 are detached and the strip B unrolled. Then the outer end of the photographic film is secured to the inner end portion of the strip.

G designates a photographic film suitably attached to the strip B.

H is a light-excluding strip of black material, such as ordinarily accompanies a photographic film. This strip H is torn off and thrown away after the attachment of the outer end of the film to the inner end portion of the strip B. Afterward the film G and strip B are rolled together around the cylinder A, whereby the photographic film may be made to occupy the spaces already mentioned as existing between the convolutions of the strip B.

The last end of the photographic film, which was its inner end before the coiling of the film with the strip B, may advantageously be attached to the strip B in a manner already described for the attachment of its other end.

The outer extremity of the strip B will be coiled tightly against the adjacent convolutions of the strip B and the caps C' C^2 slipped onto the ends of the strip B. Before the application of the caps C' C^2 a final tightening of the strip B will be desirable and will be greatly facilitated by using either of the cross-bars a' a^2 as a handle while grasping the coiled strip somewhat loosely.

Developing liquid will be introduced through the inlet c^3. A small quantity will suffice if the strip B and its appurtenances shall be rotated or otherwise suitably moved. Motion may perhaps best be imparted by supporting the device as a whole in the outer box, already described, and rotating it while supported therein. The liquid may be discharged through the outlet c^4 after use.

By my improvement I employ a coilable strip having means for separating its convolutions to provide a volute-shaped space in which the photographic film rolled up with the strip will be accommodated, and I utilize the strip itself as a receptacle for developing liquid, covering only its ends, so as to exclude light and confine the developing liquid. Thus I produce a very simple means for developing photographic films even in broad daylight, excepting only that some means for intercepting light should be used while introducing the film.

The means which I produce by my improvement are very simple and very compact and are used with a box open to light. They are also advantageous because they will make a very small quantity of developing liquid suffice. Obviously the projections b' b^2 might be made separately from the strip B and wound and unwound with it.

Having described my invention, what I desire to obtain and secure by Letters Patent is—

1. Means for developing a photographic film, comprising a coilable strip constituting when coiled a receptacle for developing liquid, and caps for closing the ends of the spaces between the convolutions and provided with rims adapted to slip closely ever the ends of the coiled strip.

2. Means for developing a photographic film, comprising a coilable strip having projections for keeping its convolutions separate and having a prolongation beyond such projections, so that the extremity may lap closely to the next inner contiguous convolution, and caps slipped over the ends of the coil and fitting tightly upon the said prolonged portion of the strip.

3. Means for developing a photographic film comprising a coilable strip constituting when coiled a receptacle for developing liq-

uid, caps for the ends of the coiled strip, trunnions extending from said caps, and a box open to light receiving said trunnions.

4. Means for developing a photographic film, comprising a coilable strip, projections for keeping the convolutions of the coilable strip separate, said projections stopping so as to leave a prolongation of the strip beyond them for lapping closely to the next inner contiguous convolution, and caps provided with rims and adapted to slip closely over the strip.

5. Means for developing a photographic film, comprising a coilable strip constituting when coiled a receptacle for developing liquid, caps provided with rims adapted to slip over the ends, and tubular parts for the ingress and egress of developing liquid.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

CHARLES HARRIS SHAW.

Witnesses:
EUGENE N. ROBINSON,
OLIN A. FOSTER.