

917,002.

Fig. 1.

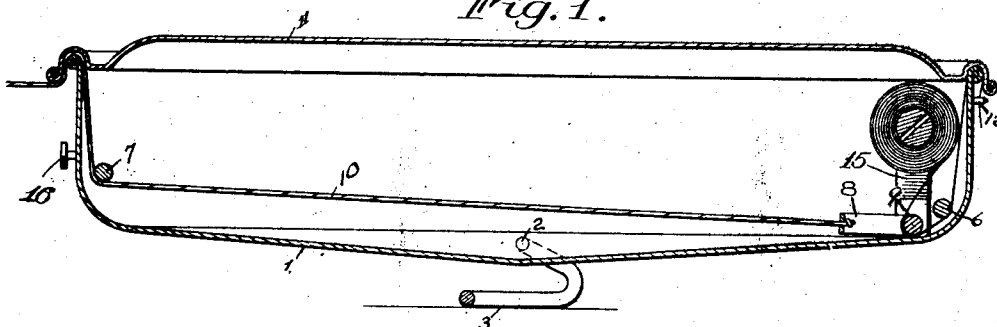


Fig. 2.

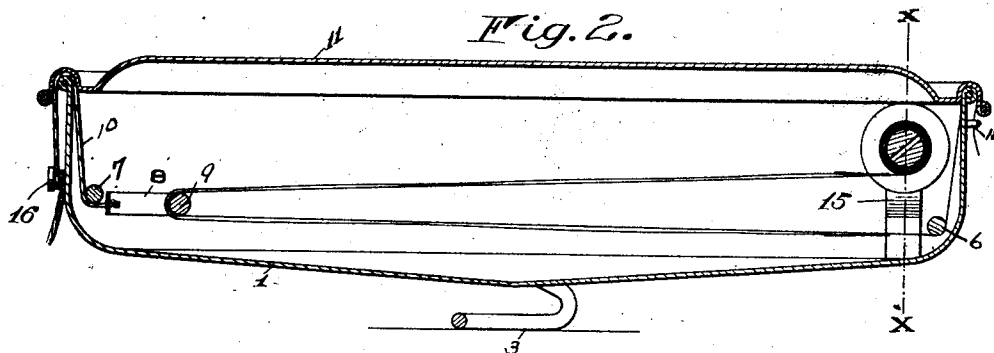


Fig. 3.

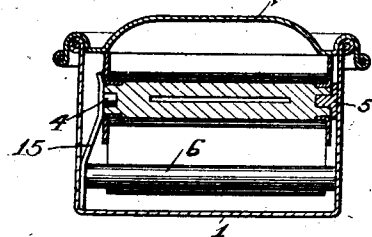
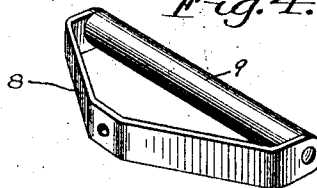


Fig. 4.



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UNITED STATES PATENT OFFICE.

FREDERICK F. CHURCH, OF ROCHESTER, NEW YORK, ASSIGNOR TO EASTMAN KODAK COMPANY, OF ROCHESTER, NEW YORK, A CORPORATION OF NEW YORK.

DEVELOPING APPARATUS.

No. 917,002.

Specification of Letters Patent.

Patented April 6, 1909.

Application filed November 7, 1906. Serial No. 342,337.

To all whom it may concern:

Be it known that I, FREDERICK F. CHURCH, of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Developing Apparatus; and I 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.

My present invention relates to an apparatus or machine adapted for the development of photographic film, and particularly film cartridges, whereby the operation necessary for developing, washing and fixing the film may be carried on without resort to a dark room, and the use of the ordinary developing tray.

The invention consists in certain instrumentalities whereby the daylight cartridges which are adapted to machine development, may be inserted in the receptacle and the film unwound from the coil or spool, after the cover is placed upon the receptacle to subject it to the action of the liquid in a simple manner, the apparatus as a whole being simple and of such a construction that it may be placed upon the market at a nominal cost.

To these and other ends the invention consists in improved devices hereinafter described, the novel features being pointed out in the claims at the end of the specification.

In the drawings: Figure 1 is a longitudinal sectional view of the apparatus with the film spool or cartridge in a position to have the film withdrawn. Fig. 2 is a similar view showing the film withdrawn and in position for development. Fig. 3 is a sectional view on the line *x-x* of Fig. 2, and Fig. 4 is a perspective view of the film withdrawing device.

Similar reference numerals in the several figures indicate similar parts.

The tray or receptacle which forms the container is indicated by 1 in the accompanying drawing and is preferably constructed of metal and of a length about half that of the strip of film to be developed, being pivotally mounted at 2 upon a base or support 3 connected to the receptacle in such a manner as will permit the latter to be rocked or tilted to cause the liquid contained therein to be moved from end to

end to act upon the film. Arranged at one end of this receptacle is a holding device for the spool or coil film, consisting in the present instance of studs 4 and 5, one of which may be rigidly secured to the side of the receptacle at some distance above the bottom, and the other mounted on a spring arm 15, and relatively movable toward and from the former, so that the studs or projections may constitute the bearings for the coil or film spool, and by the separation of these studs as by the movement of the spring arm outwardly, the spool or coil may be placed between them.

Located at the same end of the receptacle as the coil holder, and preferably below it, is a guide in the form of a transverse rod or roller 6, beneath which the leading end of the film may be extended, as will be described. At the opposite end of the receptacle or container, and preferably some distance above the bottom thereof, is located another transverse guide or roller 7.

8 indicates a yoke or member having an operating arm or portion, preferably formed by a small roller 9, said member being movable lengthwise of the receptacle by a suitable operating means such as a flexible cord 10 connected at one end to the yoke and extending beneath the guide or roller 7; thence extending upwardly and over the edge of the end of the receptacle and beneath the cover 11 of the latter, when in place.

Film cartridges as ordinarily constructed, embody a spool or roller having apertures in its ends for the holding and winding devices, and having wound upon it a strip of sensitized film, each convolution or coil being protected by a strip of black paper, which is wound with it upon the spool; the ends of said black paper extending beyond the film, and the latter being attached to the paper at both ends. Other film cartridges have been made in which the film strip was provided at its ends only with pieces of black paper or other suitable light-excluding material, serving as a light protecting covering for the film when wound upon the spool or roller, so that the cartridge might be inserted in and removed from the camera or roll holder in daylight, without liability of damaging the film.

In using the developing apparatus forming the subject matter of this application, the coil or roll of exposed film is placed in

the holding devices by inserting the studs or projections 4 and 5 in the apertures at the ends of the spool. Then the leading end of the film or paper is passed downwardly, first through the aperture in the yoke 8, thence downwardly beneath the rod or guide 6; thence upwardly, and the end is passed out over the end of the receptacle, where it may be held by the hand of the operator, or secured by impaling it upon a short pin or projection 12 on the outside of the receptacle, as shown in Fig. 1. The roller or bar on the yoke is in contact with the outer surface of the black paper, or of the film. After the parts have been arranged in this manner, the developing, washing or fixing liquid may be placed in the receptacle, and the cover applied and secured by any suitable means. Then the operator grasping the end of the cord 10, which extends outside of the receptacle, draws upon the latter, causing the film to be unwound from the spool, which latter revolves freely in its bearings, until the parts assume the position shown in Fig. 2, the film at this time being wholly withdrawn and lying in a loop with its surfaces substantially parallel, and the sensitized surface out of contact with any of the parts of the apparatus, and in a position to be subjected to the action of the liquids, either by a rocking of the tray on its pivots, or otherwise. After having been treated for a sufficient length of time, the cover of the receptacle may be removed and the developed or fixed film taken out and dried in the usual manner.

While the device is particularly adapted for the development of film cartridges, it will be understood that it can be used as well for the development of ordinary film, not provided with a backing, as the yoke is only brought in contact with the rear or non-sensitized side, while it is being extended within the receptacle, and the sensitized surfaces of the film are all the time kept out of contact with any surfaces or parts liable to be abraded or otherwise harmed.

It will be understood that sufficient tension will be afforded on the spool by the spring 15 to prevent the latter from turning and the film from becoming loose. Instead of having the cord extend to the exterior of the receptacle, it could be drawn longitudinally of the casing by other means.

In order to hold the film supporting yoke in position after the film is withdrawn from the roll, I provide a suitable holding device for the cord or connector on the outer side of the receptacle, such for instance as a pin or hook 16, around which the cord may be wound or otherwise fastened.

I claim as my invention:

1. In a developing apparatus, the combination with an elongated receptacle having a cover extending over a side of the greater

dimension, a film roll support at one end of the receptacle and means similarly located for securing the end of the film, of a support for engaging the film between its secured end and the roll and means for moving the said engaging support longitudinally of the receptacle and supporting the loop of film in parallelism to the cover.

2. In a developing apparatus, the combination with an elongated receptacle having a cover extending over a side of the greater dimension, a film roll support at one end of the receptacle and means similarly located for securing the end of the film, of a support for engaging the film between its secured end and the roll and means for moving the said engaging support longitudinally of the receptacle and supporting the loop of film in parallelism to the cover, said means being passed between the edge of the receptacle and the cover.

3. In a developing apparatus, the combination with an elongated receptacle having a cover extending over a side of the greater dimension, a film roll support at one end of the receptacle and means similarly located for securing the end of the film, of a support for engaging the film between its secured end and the roll and means arranged to travel in advance of the film and said engaging support for moving the latter longitudinally of the receptacle and supporting the loop of film thus formed.

4. In a developing apparatus, the combination with a receptacle, of a film roll support arranged near one end thereof, a film guide arranged below the support, an attaching means for the end of the film arranged above the roll support and a support adapted to engage a film between the guide and roll support when extended from the latter, below the guide and back to the securing means, said engaging support being movable toward the opposite end of the receptacle to unwind the film from the roll and to support the loop thus formed.

5. In a developing apparatus, the combination with a receptacle, of a film roll support arranged near one end thereof, a film guide arranged below the support, an attaching means for the end of the film arranged above the roll support and a support adapted to engage a film between the guide and roll support when extended from the latter, below the guide and back to the securing means and a flexible connector attached to the said engaging support and movable toward the opposite end of the receptacle to unwind the film from the roll and to support the loop thus formed.

6. In a developing apparatus, the combination with a receptacle, of a roll support arranged therein and comprising a pair of studs, one of which is arranged upon a movable arm, means for securing the end of the

film when the roll is mounted on the support and a movable support for engaging the film between the roll and its attached end to unwind it from the roll and support the loop thus formed.

5 7. In a developing apparatus, the combination with the receptacle, the cover therefor, the roll support therein, the film guiding rod and the projection on the exterior
10 of the receptacle for engaging the film when passed from the roll beneath the rod and under the cover, of a movable yoke arranged in the casing having a roller for engaging
15 the film between the guide and roll support and a flexible connector operable from the

exterior of the receptacle for moving the yoke to withdraw and support the film.

8. In a developing apparatus, the combination with the receptacle, the roll support and the film guide at one end thereof, and 20 the cord guide at the opposite end, of a yoke adapted to engage the film extending between the roll support and film guide and a flexible connector extending beneath the cord guide and operable from the exterior of the 25 casing.

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