M. J. SHIELS.

METHOD AND APPARATUS FOR DAYLIGHT FILM DEVELOPING.

APPLICATION FILED DEC. 2, 1916.

1,317,398. Patented Sept. 30, 1919.

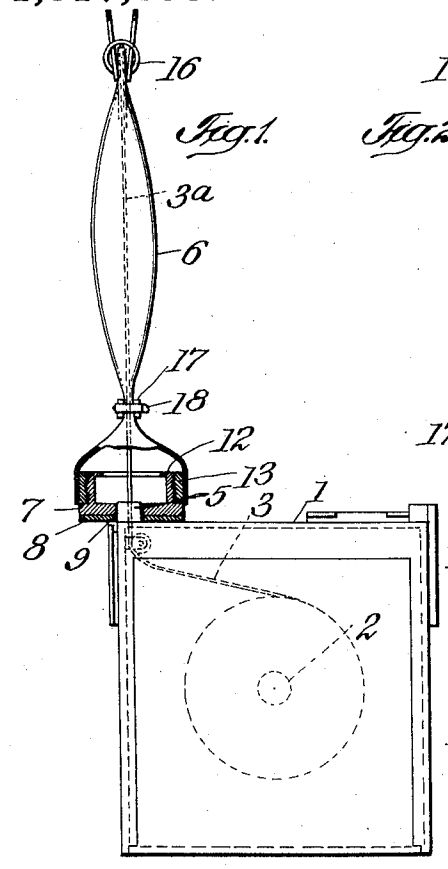


Fig. 1.

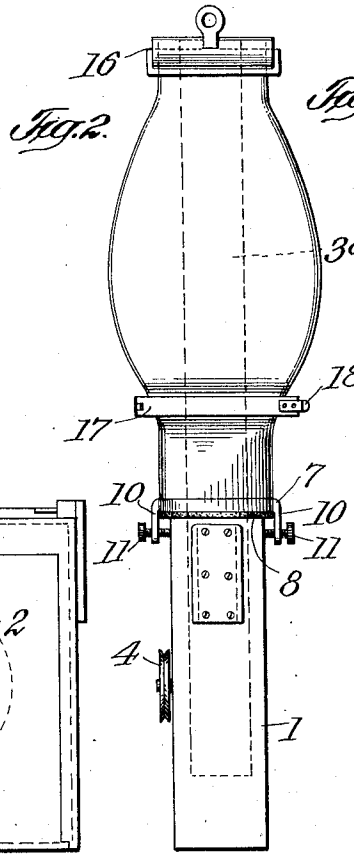


Fig. 2.

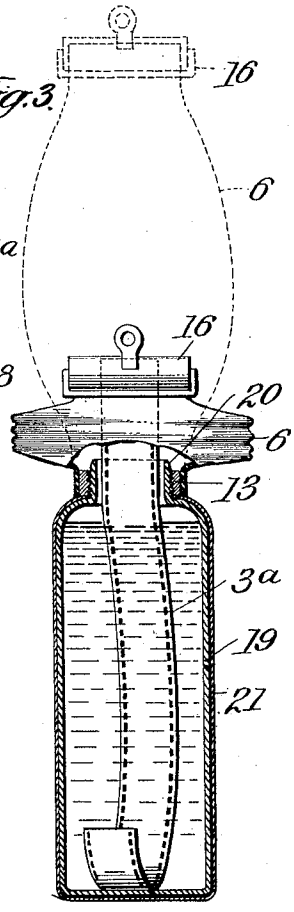


Fig. 3.

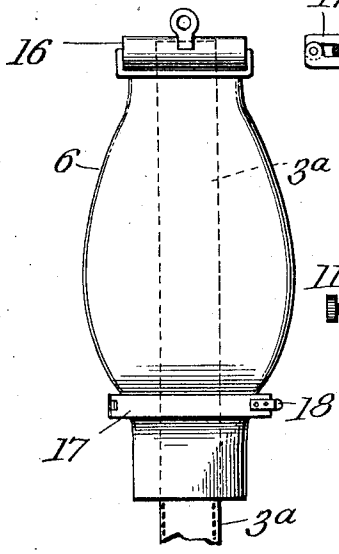


Fig. 4.

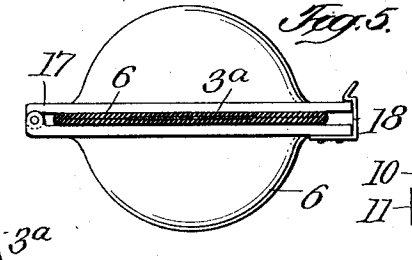


Fig. 5.

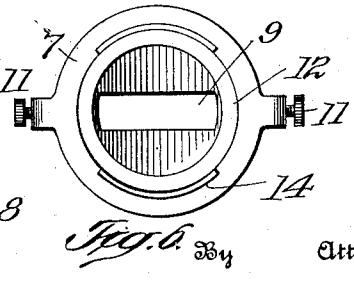


Fig. 6.

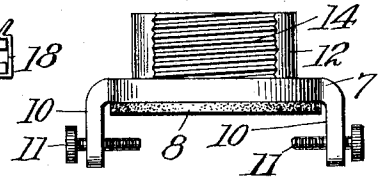


Fig. 7.

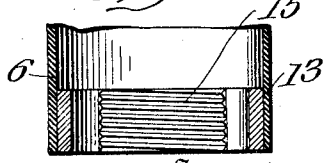


Fig. 8.

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METHOD AND APPARATUS FOR DAYLIGHT FILM-DEVELOPING.

1,317,398. Specification of Letters Patent. Patented Sept. 30, 1919.

Application filed December 2, 1916. Serial No. 134,586.

To all whom it may concern:

Be it known that I, MICHAEL J. SHIELS, a citizen of the United States, and resident of Jersey City, county of Hudson, and State of New Jersey, have made certain new and useful Improvements in Methods and Apparatus for Daylight Film-Developing, of which the following is a specification.

My invention relates more particularly to a method and apparatus for developing moving picture films by drawing the film directly from the film container into a dark receptacle, sealing it therein, and then attaching the dark receptacle to a light-proof container holding the developer and ejecting the film from the dark receptacle into the developer where it will be permitted to develop. After development, the film is withdrawn from the developer container back into the dark receptacle, again sealed therein and thereafter transferred to a light-proof container holding the fixing solution into which the film is projected and allowed to remain until fixed.

Obviously, by suitably proportioning the apparatus, my method may be adapted to films of various lengths, although in the example here given I have shown it as particularly adapted for test lengths from moving-picture films.

It frequently occurs in taking moving picture scenes that the operator is or may be miles away from a dark room or facilities for quickly developing or testing the film which is being exposed. This difficulty may result in the loss of thousands of feet of film by improper timing or exposure, and the fact not be discovered until development of the films hours or even days after the exposures have been made, when it may be impossible or difficult to reproduce the scene.

The principal object of my improved method of developing the film in daylight in the field is to provide a means whereby the operator can at once test the quality of the exposure given to the film by developing a small portion of the film without having to resort to a dark room or use the ordinary dark bag, which is clumsy and inefficient. The apparatus required to carry out my improved method of daylight development is simple and easily manipulated by the operator, so that a test can be made in a few minutes and before a large quantity of film has been exposed, thereby permitting a readjustment of the stops or shutter to give the proper exposure.

In carrying out my method, I preferably place a dark receptacle over the slit in the film container or magazine and draw into the receptacle a short length of the film, then clamp or close the mouth of the dark receptacle upon the film after which the film may be severed and the test portion thereof, contained in the dark receptacle, removed. I preferably provide bottles or other suitable fluid containers surrounded by metal or other light excluding material, said containers being provided with mouths to which the open end of the dark receptacle may be attached in order that the strip of film contained therein may be lowered or projected into each of the containers in succession, one of the containers being filled with developer and the other with fixing solution.

In the accompanying drawings, I have shown one form of apparatus adapted to be manipulated by the operator in carrying out my method of daylight film developing.

Referring to the drawings—

Figure 1 represents a side elevation of the dark receptacle attached to a film magazine, the parts at the point of attachment being shown in section.

Fig. 2 represents an end elevation of the film magazine or container with the dark receptacle attached thereto.

Fig. 3 shows one of the fluid containers in section with the dark receptacle collapsed thereon, and the strip of film projecting into the solution of the container.

Fig. 4 illustrates the dark receptacle containing a strip of film sealed therein ready to be attached to one of the solution containers.

Fig. 5 represents a section transversely of the dark receptacle just above the clamp used for closing the lower or mouth end of the receptacle.

Fig. 6 represents a top plan view of the member adapted to be attached to the film magazine over the slit therein.

Fig. 7 is a side elevation of the member shown in Fig. 6; and

Fig. 8 shows the lower or mouth end of the dark receptacle in section.

Referring to the drawings, 1 represents a film container, magazine or the like, of the ordinary or any preferred construction pro-

vided with a suitable roller 2 upon which the film 3 may be rolled after having been exposed in the camera. The usual pulley 4 (see Fig. 2) is provided on the outside of the magazine for rolling up the film. The construction of the magazine and the method of operating the same in connection with the camera is immaterial, the point being that all standard magazines are provided with a slit or slits through which the film may be drawn. The film container or magazine illustrated is provided with a slit at 5 through which the film strip is drawn while the film is being exposed. When the box is removed from the camera, the end of the film 3 preferably projects outward through the slit 5, the slit being adapted to prevent the entrance of light to that portion of the film strip within the magazine. In order to test the exposure by developing a portion of the film, I provide a dark receptacle 6 preferably of rubber or other suitable light-excluding material, the receptacle in the present instance being represented as a collapsible bag, although, obviously, it may be of any shape or material adapted for the purpose. The lower end of the dark receptacle 6 is preferably open and adapted to be attached over the film slit 5 in the film magazine in any suitable manner, it being understood that the joint therebetween should be light-tight. For this purpose I preferably provide a bracket member 7, having on its lower face a piece of felt, velvet or the like 8, and provided with an opening 9 (see Fig. 6) adapted to fit over the mouth of the slit 5, as indicated in Fig. 1 of the drawings. It will be understood that the velvet or felt washer 8 is adapted to seal the joint between the member 7 and the film magazine, so that no light can reach the film around the slit. The member 7 is preferably provided with suitable means for attaching it to the magazine, these being illustrated in the present instance by downwardly projecting lugs or ears 10 through which thumb screws 11 project in position to clamp against the side walls of the magazine, as illustrated in Fig. 2 of the drawings. The member 7 is preferably provided with an upwardly extending flange or annular ring 12, to which the lower or mouth end of the dark receptacle may be attached in any suitable manner. Preferably, I provide the mouth of the dark receptacle with a metal ring 13 to which the lower end of the bag is secured, said ring 13 and the annular flange 12 being oppositely threaded, so that one may be screwed on to the other, as illustrated in Figs. 1, 7 and 8. For convenience, the screw threads 14 on the outside of the annular flange 12 are cut away in part, as illustrated in Fig. 7, while the threads 15 on the inside of the ring 13 are similarly cut away, thereby permitting the ring 13 to be slipped completely over the flange 14 and secured in place by a quarter turn of the ring, the threads 15 taking into the threads 14 in the usual manner.

The upper end of the dark receptacle 6 may be closed, if found desirable, but I have shown it with an open end in order that the operator may get his fingers into the collapsed bag and place the end of the film in position to secure it in the outer end of the bag or receptacle 6, as illustrated in Figs. 1 and 2 of the drawings. A clamp 16 or other suitable device, is provided for attachment to the end of the film 3, which clamp, in the present instance, is adapted simultaneously to close the upper end of the bag 6, whereby the film may be drawn up into the dark receptacle in any suitable manner, or as illustrated. When the strip or film is drawn into the dark receptacle 6, it is necessary to seal the lower end of the receptacle light-tight in order that the latter may be removed from the film magazine with the test strip of film therein. For this purpose I provide a suitable clamp 17 adapted to be attached near the mouth end of the receptacle and held in place by a spring 18 or other suitable means. Obviously, any suitable clamp or valve may be used for this purpose. By clamping the dark receptacle and film together, as illustrated in Fig. 5 of the drawings, that portion 3^a of the film strip within the dark receptacle is sealed light-tight therein after which the receptacle 6 may be removed from the film magazine. This is done by loosening the ring 13 from the flange 12 on the member 7 after which the film 3 may be severed, leaving the portion 3^a sealed in the bag, as represented in Fig. 4 of the drawings.

The next step in the operation is to develop the film. For this purpose I preferably provide two bottles or other suitable containers adapted to hold a sufficient amount of developer and fixing solution for the purpose required, each container 19 being preferably formed of light-proof material, or coated with metal, paper, or the like 21, adapted to exclude light therefrom. Only one container 19 is shown, this being sufficient to illustrate the construction. The mouth or neck of the container is preferably provided at 20 with screw threaded portions similar to those illustrated in Fig. 7 as attached to the flange 12 of the member 7. The dimensions of the annular flange 12 and the container neck 20 are substantially identical, so that the ring 13 on the lower or mouth end of the bag or dark receptacle 6, may be attached to the mouth of the container 19, thereby forming a continuous light-tight compartment. If now the clamp 17 is removed from the lower portion of the dark receptacle, as illustrated in Figs. 2 and 4, and the receptacle is collapsed, the film

strip 3ª will be projected into the fluid container 19, as illustrated in Fig. 3 of the drawings. In the developer container 19, the film is allowed to remain for a sufficient time to produce the necessary development, after which it is drawn back into the dark receptacle, and the clamp 17 again attached thereto, near the mouth end of the dark receptacle, as illustrated in Fig. 4 of the drawings, after which the dark receptacle containing the developed film may be removed from the container 19 holding the developer and attached to a similar container holding the fixing solution into which the film strip 3ª may be projected after the clamp 17 has been removed, the operation being substantially the same as that just described for introducing it into the developer.

The containers 19 for the developer and fixing solution may be of any desired shape or size, but for field-testing, I preferably use the ordinary thermos bottle, since this is surrounded by a metal or other light-proof material and has the property of maintaining the solutions at the proper temperature for an indefinite period of time.

From the above description it will be understood that with the apparatus described my method of daylight film developing may be carried out readily by the operator in the field. This may be done as follows:

After a few feet or yards of the film have been exposed, the film magazine 1 is removed from the camera, the strip of film being severed, so as to leave the end thereof projecting from the slit 5 in the magazine. The member 7 is then placed over the slit 5 and clamped to the magazine by means of the clamp screws 11, the member making a light-tight joint therewith and providing the annular flange 12 to which the mouth of the dark receptacle 6 may be attached by means of the threaded ring 13, as illustrated in Fig. 1 of the drawings. The operator then collapses the bag or dark receptacle 6, without the clamps 16 or 17 thereon, gets the end of the film strip 3 into the upper end of the dark container or bag and clamps it there by means of the clip 16 or other suitable means, being sure to close the upper end of the bag light-tight. The film is then drawn into the bag by stretching the bag out into the position indicated in Fig. 1, after which the mouth end of the bag or dark receptacle 6 is closed by means of the clamp 17, as illustrated in Fig. 5 of the drawings. The dark receptacle 6 is then removed from the member 7 and the film strip severed at the slit 5, the dark receptacle with the film strip therein, as separated from the magazine, being illustrated in Fig. 4 of the drawings. The mouth end of the dark receptacle is now attached to the fluid container 19 having developer therein, and the clamp 17 is removed, thereby permitting the operator to force the strip of film 3ª downward into the container in any suitable manner, as by collapsing the dark receptacle, as illustrated in Fig. 3 of the drawings. After development, the dark receptacle is again extended to the dotted line position, indicated in Fig. 3 of the drawings, thereby drawing the strip of film out of the developer and back into the dark receptacle. The clamp 17 is again attached to the mouth of the bag 6 and the dark receptacle removed from the developing container and attached to a similar fluid container provided with fixing solution into which the film is lowered after the clamp 17 has been removed, the operation being substantially that described for lowering the film into the developer. After the film has been fixed, it may be removed from the dark receptacle and examined to determine whether the film has been properly exposed or not.

The entire operation need not take more than a few minutes, so that no time would be lost in carrying a test strip for miles to a dark room, and the operator need not expose more than a few feet of film in order to make the test, thus saving time and material, and obviously leading to the more rapid production of properly exposed films at a great saving of expense.

It will be understood that I have illustrated but one form of apparatus for carrying out my improved method of daylight film developing and obviously various modifications may be made in the specific detail of construction and other forms of apparatus may be adapted to the purpose without departing from the spirit and scope of my invention.

I claim:

1. The method herein described for daylight film developing which comprises transferring the exposed film from the film container to a dark receptacle, temporarily sealing it therein then transferring it from the dark receptacle to a developer in a light-proof container, allowing time for development, then transferring the developed film from the developer to said dark receptacle, again temporarily sealing it therein, and then transferring it from said receptacle to a fixing solution in a light-proof container all without permitting extraneous light to reach the film.

2. The method herein described for daylight film developing which comprises transferring the exposed film from the film container to a dark receptacle without exposing the film to light, sealing the film in the receptacle, attaching the dark receptacle to a light-proof container holding developer, then transferring the film to the developer allowing time for development, then withdrawing the film from the developer into said dark receptacle and again sealing it

therein, detaching the dark receptacle from the developer container and thereafter attaching it to a light proof container holding fixing solution, then transferring the film to the fixing solution from which it is withdrawn after fixing.

3. An apparatus for daylight development of films stored in a film container provided with a slit through which the film may be drawn, comprising a dark receptacle into which the film may be drawn temporarily, means for removably attaching said receptacle over the slit of the film container, means for making the joint therebetween light-tight.

4. An apparatus for daylight development of films stored in a film magazine provided with a slit through which the film may be drawn, comprising a light-proof container for the chemical solutions, said container being provided with a mouth, a member provided with an opening surrounded by a flange substantially identical in size and shape with the mouth of said container, adapted to be attached to the film magazine over the slit therein, a dark receptacle into which the film may be drawn temporarily, said receptacle being provided with a mouth adapted to fit light-tight over the flanged opening of said member and likewise over the mouth of said container, and means for closing the mouth end of said receptacle light-tight.

5. An apparatus for daylight development of films stored in a film container provided with a slit through which the film may be drawn, comprising a member having a flanged opening adapted to be removably secured light-tight over the slit in said film container, a dark receptacle provided with a mouth adapted to fit over said flanged opening for removably attaching the receptacle thereto light-tight, a member to which the end of the film may be attached for drawing it into said receptacle, and means for closing the mouth end of said receptacle light-tight after the film has been drawn therein, thereby permitting the removal of said receptacle from the film container while the film is protected against extraneous light.

6. An apparatus for daylight developing of films stored in a film container provided with a slit through which the film may be drawn, comprising a dark receptacle having a mouth at one end adapted to be removably fitted light-tight over the slit in said film container, the end of the receptacle opposite the mouth being adapted to be closed light-tight, means adapted to be attached to the end of the film for drawing it from the film container into said receptacle, and means for closing the mouth end of said receptacle so as to exclude light from a film therein when said receptacle is removed from the film container, said means attached to the end of the film being adapted for ejecting the film through the mouth of the receptacle into developer and again drawing the film into said receptacle.

7. An apparatus for daylight development of films stored in a film container provided with a slit through which the film may be drawn, comprising a member adapted to be secured light-tight over said film slit, said member being provided with an outwardly projecting flange surrounding said slit, a container for developer provided with an opening surrounded by a flange substantially identical in size and shape with the one on said member, a dark receptacle provided with a member complementary to said flanges, a mouth adapted to fit and be transferred from one to the other thereof, means attachable to the end of a film projecting through the slit in said container for manually drawing the film into or ejecting it from said receptacle through the mouth thereof, and means for closing the mouth end of said receptacle light-tight upon an inclosed film.

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