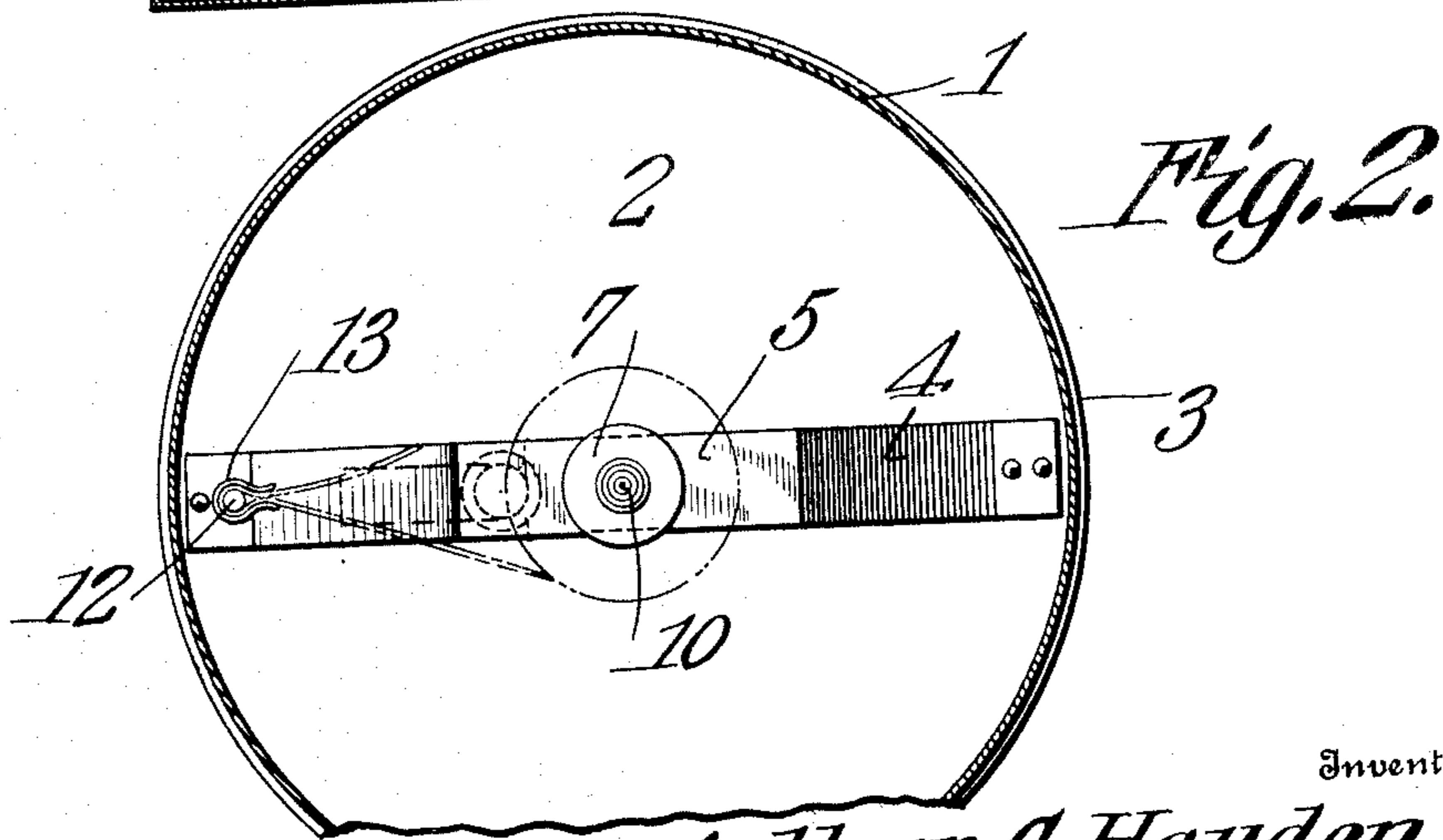
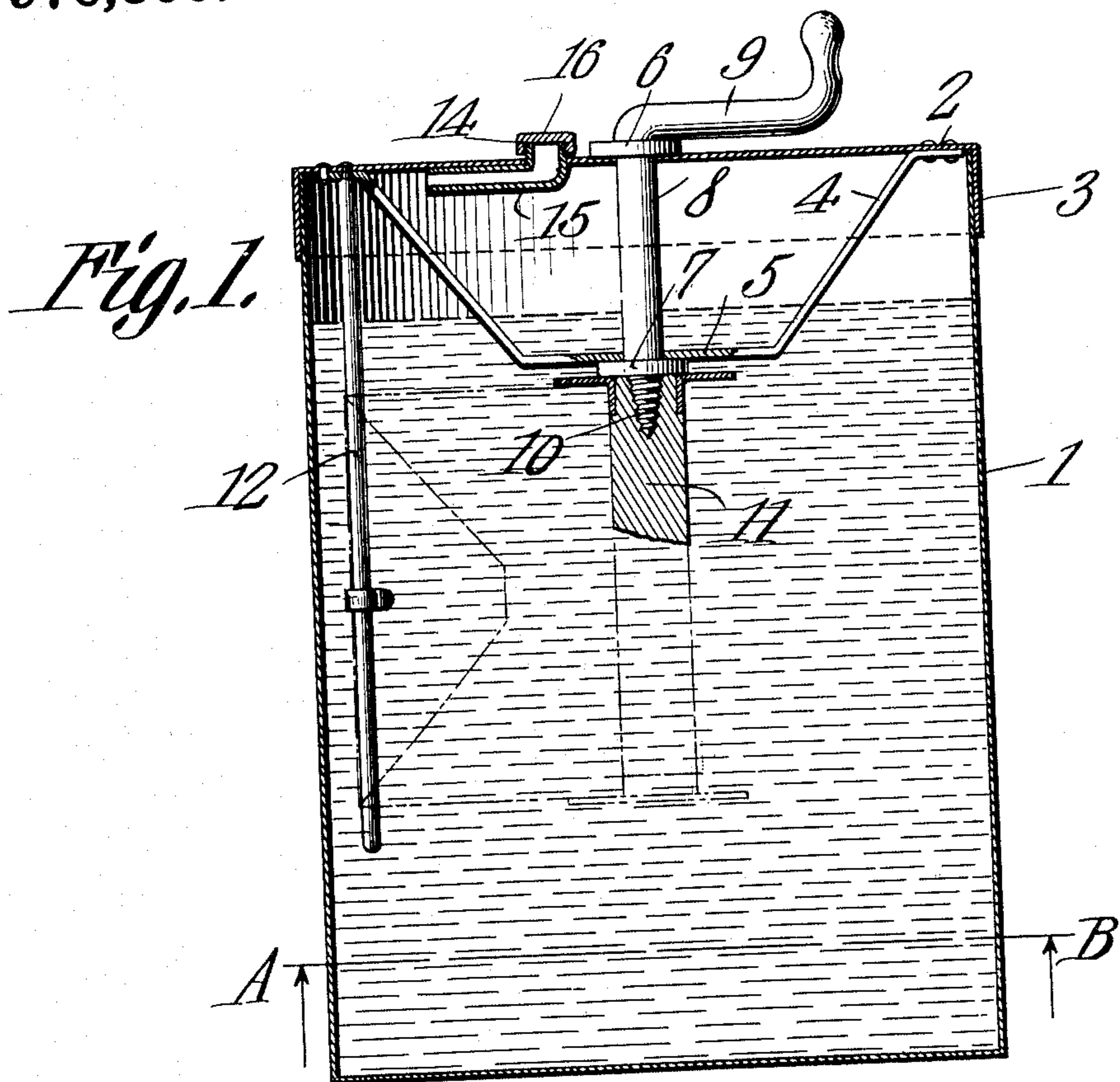


976,800.

Patented Nov. 22, 1910.



Inventor

Arthur C. Hayden.

By *C. Snow & Co.*
Attorneys

Witnesses

Witnesses
[Signature]
 F. J. Chapman

UNITED STATES PATENT OFFICE.

ARTHUR C. HAYDEN, OF BROCKTON, MASSACHUSETTS.

FILM-DEVELOPER.

976,800.

Specification of Letters Patent.

Patented Nov. 22, 1910.

Application filed May 14, 1909. Serial No. 495,911.

To all whom it may concern:

Be it known that I, ARTHUR C. HAYDEN, a citizen of the United States, residing at Brockton, in the county of Plymouth and State of Massachusetts, have invented a new and useful Film-Developer, of which the following is a specification.

This invention has reference to improvements in developing machines designed for the daylight development of photographic films without the necessity of first removing the film from the spool upon which it is wound after being exposed in the usual manner.

In accordance with the present invention there is provided a tank usually cylindrical in cross section and sufficiently long to accommodate the longest film reel it is desired to insert into the machine, while provision is made for holding reels of any length within the capacity of the machine.

Extending axially into the machine is an arbor having secured to or formed on one end a crank located exterior to the machine and this arbor extends through the center of a removable cover designed to engage the tank and close the corresponding end thereof in such manner as to exclude light and prevent the escape of liquids introduced into the tank. The arbor extends a distance below the top where it is provided with a suitable bearing and beyond this bearing is formed with a screw thread or may be otherwise shaped to enter the usual socket or perforation in the end of the film reel in such manner as to hold the latter without the necessity of any other fastening means, and furthermore, the upper end of the film reel or spool is thereby supported below the operative level of the liquids used in the tank.

Attached to the cover is a guide, usually in the form of a rod and extending down into the tank a distance greater than the center point of any reel for which the device is adapted, and applied to this rod is a clip capable of sliding along the rod.

The invention will be best understood from a consideration of the following detail description taken in connection with the accompanying drawings, forming a part of this specification, in which drawings,

Figure 1 is a diametric vertical section of the improved developing tank. Fig. 2 is a section on the line A—B of Fig. 1.

Referring to the drawings there is shown a tank 1 which may be in the form of a

cylinder or may be otherwise shaped as desired and is made usually of metal suitably protected against the action of developing and fixing solutions and this tank is open at one end, to which end there is adapted a cover 2 having a circumferential flange 3 on one side so shaped as to embrace the open end of the tank 1 sufficiently close to exclude light and to prevent any liquids introduced into the tank from spilling therefrom.

Secured to the inner surface of the cover 2 is a diametric strap 4 having a central portion 5 parallel with but spaced from the inner face of the cover and held to the cover by the ends of the strap which are appropriately bent for the purpose.

At the center of the cover there is formed a bearing 6 and at the center of the strap portion 5 there is formed a bearing 7 and these two bearings are in alinement and receive an arbor 8 extending through both bearings and exterior to the bearing 6, which is also exterior to the cover 2. The arbor is formed into or has secured thereto a crank 9 by means of which an operator may readily rotate the arbor 8.

The inner end of the arbor is formed with a screw-threaded extension 10 preferably pointed or conical so as to readily enter the usual socket or perforation in the end of a film reel indicated at 11, and this threaded end 10 is so made that it will firmly engage the reel and hold it during subsequent operations against accidental displacement.

Fast to the cover so as to project into the tank 1 when the cover is applied, near one wall of the tank and parallel thereto is a rod 12 extending into the tank a distance greater than the middle portion of any reel 11 which may be introduced into the tank and on this rod there is mounted a clip 13 so as to slide longitudinally on the rod on the application of a suitable force but which will grasp the rod sufficiently to hold the clip in adjusted positions because of the elasticity of the clip.

The film and film reel are assumed to be such as are usually employed in kodaks and other like photographic cameras and so need no special description.

When it is desired to develop or otherwise treat an exposed film the reel with the film wound thereon is secured to the arbor 8 by being screwed onto the threaded end 10 thereof and this will bring the upper end of the reel close to the under face of the part

5 of the strap 4. The usual adhesive slip is attached to the end of the film and is introduced between the legs of the clip 13 which is sufficiently stiff to grasp the paper and hold it against accidental escape from the clip.

Assuming that it is desired to develop the film a suitable developing fluid is introduced into the tank 1 and then the cover 2 is applied, this cover now carrying the film reel and film thereon with the end of the film continuation secured in the clip 13. Because of the separation of the member 5 of the strap 4 from the inner face of the cover the upper end of the film reel is supported well below the level of the developer. Now the crank 9 is turned in the proper direction to cause the unwinding of the film from the reel and this is continued until the film is in the form of an expanded spiral practically filling the tank 1 with the turns well separated so that the developer has access to all parts of the sensitive surface.

In order to permit the escape of the liquid within the tank without the admission of light to the interior of the tank there is provided a nipple 14 opening through the cover 2 and immediately beneath this opening is a deflector 15 so that light rays cannot pass directly through the opening into the interior of the tank but liquids in the tank may be easily poured out therefrom through the nipple 14. A suitable cap 16 is applied to the nipple 14 to close the same when desired. By this means the film may be readily developed, the developer poured out of the tank, washing water poured thereinto and then poured out and finally a suitable fixing fluid poured into the tank, to be followed by washing water, all without unclosing the tank or exposing the film to actinic light, although the entire operation may be carried on in daylight.

After the several operations or any of them have been performed, the film may be rolled up on the reel and the cover may then be removed, after which the reel may be unscrewed from the arbor and the end of the film extension be removed from the clip 13 and the film may then be treated in any manner desired.

It will be seen that the film reel is carried entirely by the arbor 8 engaging the upper end only of the reel and that not only will a single tank accommodate reels of different lengths but the supporting of the upper end of the reel a considerable distance below the under face of the cover insures that the fluid to which the film is treated will always fully cover the film.

What is claimed is:—

1. In an apparatus of the class described, a suitable tank, a removable cover therefor, and an arbor carried by the cover and extending beyond the inner face of the latter, said arbor having its inner end formed to receive and suspend the spool on which the film is carried in the camera.
2. In an apparatus of the class described, a tank, a cover therefor, an arbor extending through the cover and having spaced bearings carried by the cover, one of the bearings being interior to the tank when the cover is applied, and said arbor having means at its inner end for attachment to and sustaining a film reel or spool, and a guide carried by the cover at one side of the axis of the arbor and provided with means for holding the free end of the protecting envelop of the film.
3. In an apparatus of the class described, a suitable receptacle, and an arbor entering the same and provided with suspension means for the film reel or spool upon which the film is carried in the camera, said suspension means entering one end of the spool.
4. In an apparatus of the class described, a suitable receptacle, and an arbor entering the same and provided at its inner end with screw threads adapted to engage a film reel or spool within the receptacle and constituting the sole means for supporting said spool.
5. In an apparatus of the class described, a tank, a cover therefor, an arbor carried by the cover and provided with a bearing interior to the tank and spaced from the cover, said arbor being also provided with a screw-thread extension adapted to engage and sustain a film reel or spool, and a guide member carried by the cover and provided with adjustable means for holding the outer end of the protecting extension of the film.
6. In an apparatus of the class described, a suitable tank, a cover therefor, an arbor carried by the cover and provided with means for suspending a film reel or spool, and a light excluding passage through and interior to the cover for the introduction of suitable liquids into the tank and the escape therefrom without exposing the contents of the tank to light.

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

ARTHUR C. HAYDEN.

Witnesses:

E. HUME TALBERT,
F. T. CHAPMAN.