March 11, 1952 A. N. BROWN 2,588,696

FILM DEVELOPING APPARATUS

Filed Dec. 8, 1947

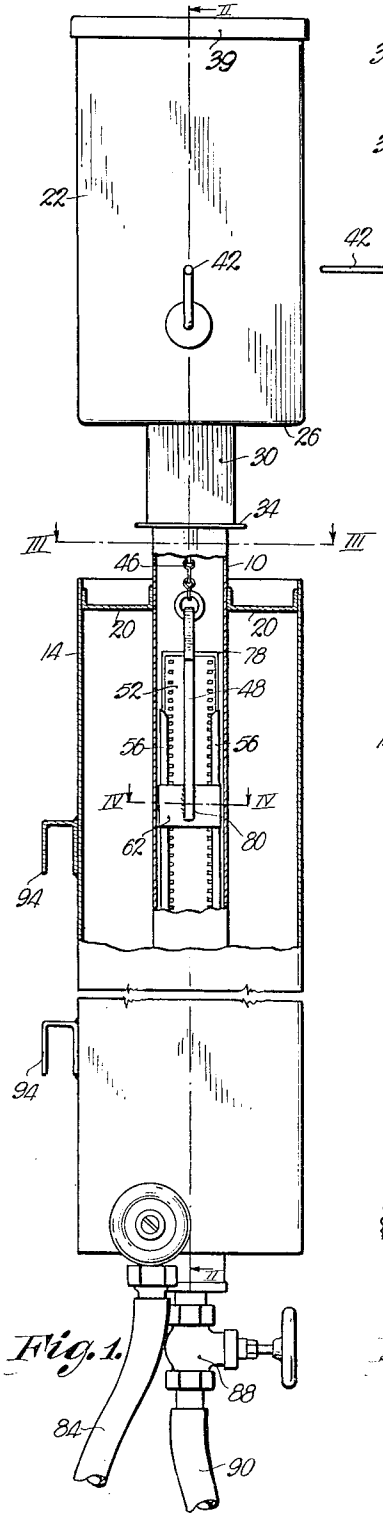



Fig. 1.

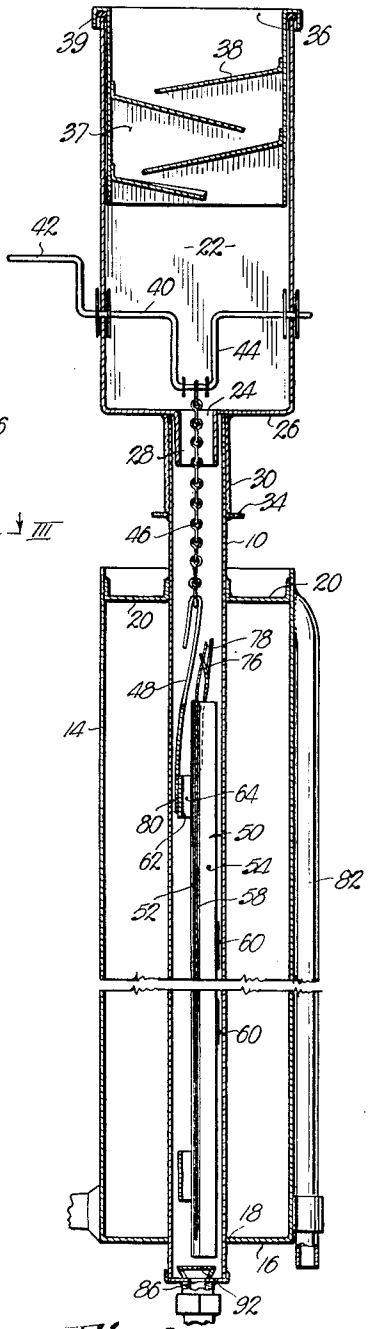



Fig. 2.

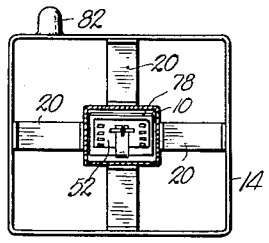



Fig. 3.

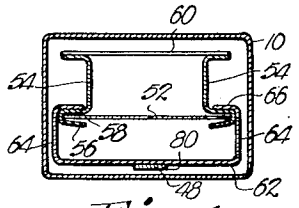



Fig. 4.

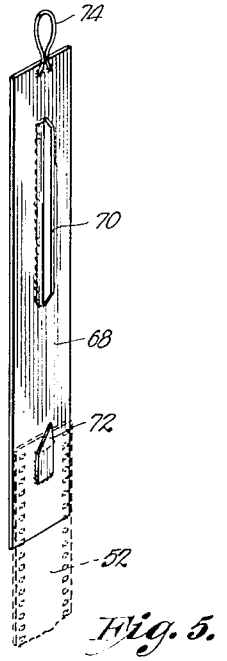



Fig. 5.

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## FILM DEVELOPING APPARATUS

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1 Claim. (Cl. 95—100)

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This invention relates to the field of photography and more specifically to apparatus for developing film, the primary object being to provide simple, inexpensive and easily operated structure particularly adaptable for use by the amateur photographer.

It is well known in the art that one of the most important factors in film developing lies in maintaining the correct temperature of the chemical solutions used. In addition, the length of time for development is an important factor since this with the element of temperature, effects directly the color rendition.

A third highly important consideration in the development of film lies in the agitation of such film within the solutions used throughout the process. In order, therefore, to approach absolutely perfect development, there should be maintained a time-temperature-agitation relationship.

It is the most important object of this invention, therefore, to provide film developing apparatus having means to maintain a predetermined temperature in the developing solutions used, structure permitting reduction in time of the entire developing process and means for agitating the film within the solution sufficiently during such process.

Another important object of this invention is the provision of film developing apparatus having means for quickly and easily directly the developing solution into a tank wherein the film is disposed and at the same time preventing the entrance of light into such tank as the solution is being poured thereinto.

Another object of this invention is the provision of film developing apparatus having means for further speeding up the developing process through the medium of structure permitting extremely rapid removal of the solution from the developing tank and also, at the same time, preventing entrance of light into such tank while the solution is being drained therefrom.

A further object of this invention is the provision of film developing apparatus having a specially formed frame for the film to be developed, said frame having means thereon for detachable connection to manually operable structure for agitating such frame and the film within the developing tank.

A still further object of this invention is to provide film developing apparatus having a film supporting frame as above mentioned, said frame being specially formed to give absolute protection to the film as the same is being placed thereon and throughout the entire developing operation which includes agitation within the developing tank.

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Other objects of this invention include the provision of a specially formed and inexpensive bobbin for facilitating threading of the film on the above mentioned frame; the way in which the aforesaid funnel is constructed for detachable mounting upon the developing tank to positively prevent admission of light into the tank; the manner in which the film frame is detachably secured to the structure for agitating the same within the developing tank; the way in which such detachable means may be utilized to support the film frame upon the developing tank; and the manner in which the developing solution is maintained at a predetermined even temperature through the medium of a circumscribing tank adapted to contain a coolant.

Many additional minor objects will be made clear or become apparent as the following specification progresses, reference being had to the accompanying drawing, wherein:

Figure 1 is a side elevational view of film developing apparatus made in accordance with my present invention, parts being broken away and in section to reveal details of construction.

Fig. 2 is a substantially central longitudinal cross sectional view taken on line II—II of Fig. 1.

Fig. 3 is a transverse cross sectional view taken on line III—III of Fig. 1, looking in the direction of the arrows.

Fig. 4 is a detailed cross sectional view taken on line IV—IV of Fig. 1; and

Fig. 5 is a perspective view of the film threading bobbin per se showing the same operably attached to said film.

In the drawing, an elongated, hollow, open top developing tank, broadly designated by the numeral 10, has a second outer tank 14 circumscribing substantially its entire length. This outermost tank 14 has a bottom 16 provided with an opening 18 through which the developing tank 10 passes and to which it is tightly secured as by welding.

The tank 10 is held in substantially central longitudinal alignment with the tank 14 through the medium of a plurality of braces 20 disposed near the top of tank 14 and between the outer walls of tank 10 and the innermost walls of tank 14.

A funnel 22 designed to be supported by the tank 10 at its uppermost end has an opening 24 within its bottom wall 26 that registers with a relatively short down-turned tube 28. Circum-

scribing this short tube 28 and depending from the wall 26, is a longer tube 30 having a diameter greater than the diameter of the tube 28. This tube 30 slidably circumscribes the uppermost end of the tank 10 and rests upon an out-turned flange 34 on the tank 10. The relatively short tube 28 depending from the opening 24 of the bottom wall 26 of funnel 22 has an outside diameter less than the inside diameter of the tank 10 and is telescopically received by the latter.

It is thus clear that the members 28 and 30, together with the uppermost end of the tank 10, cooperate when the funnel 22 is in place to positively prevent any outside daylight from entering the developing tank 10 when the same is in use. During the process of developing of the film within the tank 10, the relatively large open end 36 of the funnel 22 permits quick and easy pouring of the developing solution into the tank 10 without danger of spilling or without undue loss of time. In order to prevent entrance of light into the tank 10 and yet permit the pouring of such liquid solutions into the funnel 22 and thence the tank 10, a plurality of inclined overlapping baffles 38 are secured to opposed innermost faces of a section 37 of the funnel 22 as clearly indicated in Fig. 2 of the drawings. This section 37 constitutes a hollow, open ended tubular member having a hooked-shape continuous flange 39 at its uppermost end that is looped over the uppermost edge of the main section of funnel 22. Inclining of these baffles 38 permits ready flow of the solution downwardly through the funnel 22 and the overlapping condition of such baffles 38 positively prevents entrance of light into the uppermost open end of the tank 10.

A shaft 40 rotatably interconnecting opposed side walls of the funnel 22 has a manually operable crank 42 disposed exteriorly of funnel 22 and an offset U-shaped portion 44 intermediate its ends. This U-shaped portion 44 receives a chain or the like 46, such chain 46 having one end thereof pivotally secured to the portion 44 of crank 40 at its bight. The chain 46 depends downwardly from the crank 40 through the hollow member 28 of funnel 22 and thence into the tank 10.

The lowermost link of the chain 46 detachably receives a hook 48 forming a part of a supporting frame broadly designated by the numeral 50 for film 52 to be developed within the tank 10. This frame 50 comprises a pair of spaced apart U-shaped members 54, each having one leg thereof rebent as at 56 to present a channel 58 for receiving the longitudinal marginal edge of the strip of film 52.

The distance between the innermost ends of the channels 58 is substantially the same as the width of the film 52, there being sufficient clearance for permitting easy sliding of such film 52 into the frame 50 which supports such film 52.

The opposed legs of the two elongated members 54 opposite to the rebent ends 56, are interconnected by a plurality of relatively narrow cross bars 60 and the legs of members 54 having the channels 58 next adjacent thereto are connected by a number of members 62. These members 62 each have opposed legs 64 for forming a part thereof and inturned ears 66 secured to the members 54 to one side of the legs of members 54 having the in-turned ears 56 thereon. These legs 64 of the members 62 maintain such members 62 spaced from the film 52 where the same will not interfere in any way when such film 52 is threaded into the channels 58. These members 62 are likewise relatively narrow and are spaced in staggered relationship with respect to the cross bars 60 to the end that when the film is exposed to light, there will be no interference and such light will readily pass directly through such film 52. The forming of such members 60 and 62 relatively narrow will permit such light to reach the film 52 at an angle throughout its entire length.

A specially formed bobbin, clearly illustrated in Fig. 5, facilitates the threading of the film 52 within the frame 50. This bobbin consists of an elongated relatively flat plate 68 having a rib 70 formed thereon for purposes of rigidity and a relatively sharp pointed prong 72 extending laterally from one face thereof.

The width of the plate 68 is substantially the same as the distance between the channels 58 of the frame 50 and when the same is placed in use, plate 68 is threaded into the channels 58, whereupon film 52 is secured to the sharp prong 72 by simply piercing the same as illustrated in Fig. 5.

A loop 74 mounted upon one end of the plate 68 opposite to the prong 72 permits movement of this plate 68 longitudinally along the frame 50 thereby threading film 52 thereon. When such threading is completed, the plate 68 is removed and the film 52 secured to the frame 50 by hooking the same over a prong 76. This prong 76 extends laterally from a plate 78 secured to the members 54 of the frame 50 at the one end thereof adjacent the hook 48. This hook 48 has one end thereof secured to the uppermost cross member 62 as at 80.

The outermost tank 14 is designed to contain a coolant to maintain the developing solution within the tank 10 at a predetermined temperature and in the event such coolant includes ice and overflow is likely, a pipe 82, secured to the outermost face of the tank 14 and registering therewith at its uppermost end accommodates such overflow.

A drain tube 84 communicating with the tank 14 at its lowermost end has connection with any suitable point of discharge, not shown. The developing tank 10 has an opening 86 formed in the lowermost end thereof that communicates with a manually manipulable valve 88 of conventional character that in turn registers with a conduit 90. This conduit 90 may discharge into any suitable container (not shown).

A substantially U-shaped platform 92 overlies this opening 86 to the end that the liquid may escape from the tank 10 when valve 88 is opened without permitting the entrance of light into the tank 10.

A pair of U-shaped brackets 94 secured in any suitable manner to the outermost face of the tank 14, permits hooking of the entire assembly over a suitable support thereby permitting quick and easy removal as desired.

It is apparent from the foregoing that film developing apparatus has been produced that is relatively inexpensive to manufacture and simple to operate even for the most unskilled amateur.

The film 52 to be developed may be easily inserted in the frame 50 through the use of the bobbin 68. After such film is thus positioned, it may be secured in place by hooking the same over the out-turned spur 76. When the frame 50 and its contained film 52 is inserted within the uppermost open end of tank 10, this frame 50, by its inherent construction, will prevent damage to the film 52 by holding it out of engaging relationship with the innermost faces of the walls of

the tank 10. Until such time as the operator can move the funnel 22 in position, the hook 48 of frame 50 may be utilized by looping the same over the uppermost edge of the tank 10 holding the frame 50 and film 52 against falling downwardly within the tank 10.

The next step on the part of the operator is to hook the chain 46 over the loop 48 and then positioning funnel 22 upon the tank 10. With the film 52 thus entirely enclosed against outside light, the operator may quickly pour the developing solution into funnel 22 and immediately commence agitation of frame 50 and the film 52 by turning the crank 42. Solutions may be easily and quickly changed by opening the valve 88, such solution within tank 10 flowing rapidly by gravity into the hose 90. Closing of the valve 48 and pouring other chemicals into the funnel 22 makes the apparatus ready for the next step of the developing process. When the film 52 is to be removed from the tank 10 for exposing the same to light, it is not necessary for the operator to leave any finger prints or other damaging marks on the film 52 or emulsion thereon since he may easily grasp the members 54 of frame 50. In all respects therefore, it is easily seen that the time element, the necessary agitation of the film 52 and the maintenance of the chemicals within the tank 10 at a predetermined temperature, have all been adequately accomplished through the use of the device above described.

Manifestly, many changes and modifications may be made particularly with respect to details of construction without departing from the broad principles herein contemplated and it is, therefore, desired to be limited only by the spirit of this invention as defined by the appended claims.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

A holder for roll film comprising a pair of identical, elongated members, each member being U-shaped in cross-section, presenting a pair of legs; a plurality of cross bars on one side of the members and joining proximal legs of the opposite U-shaped members for holding the members



in spaced opposed parallelism; a plurality of U-shaped elements on the other and opposite side of the members and joining the opposite legs thereof, said elements being offset along the members relative to the cross bars, said opposite legs having portions outwardly rebent with respect to the elongated member and opposite each other thereby presenting a pair of opposed V-shaped channels coextensive in length with the members, the distance between the apexes of the channels being substantially the same as the width of a film to be held thereby whereby the latter is frictionally gripped along the marginal edges thereof, the bights of said elements being spaced outwardly from said channels; a plate carried by the members at one end thereof having a film-receiving prong thereon; and a hook on one of said U-shaped elements adjacent said one end of the members for supporting the holder and the film carried thereby.

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