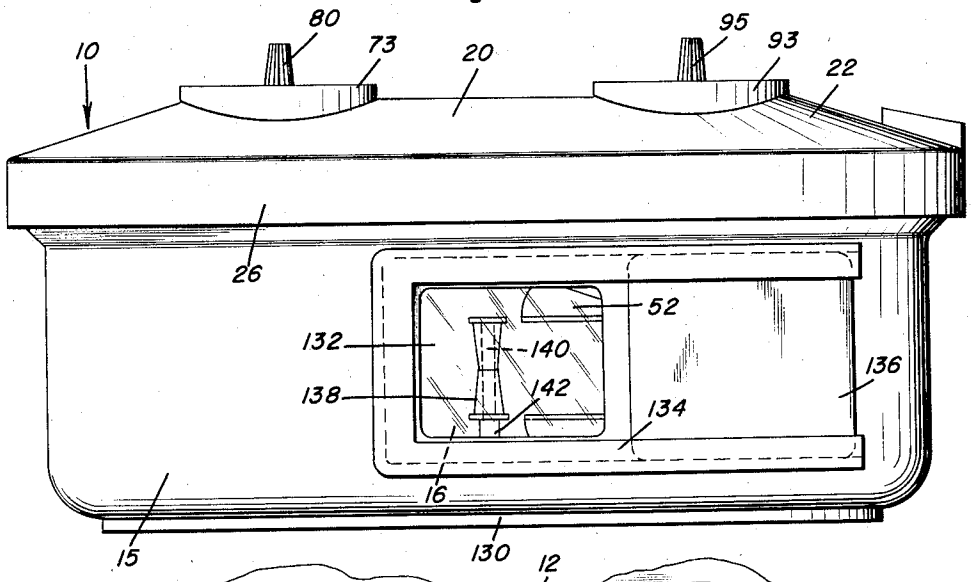
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FILM DEVELOPING TANK

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Fig. 1



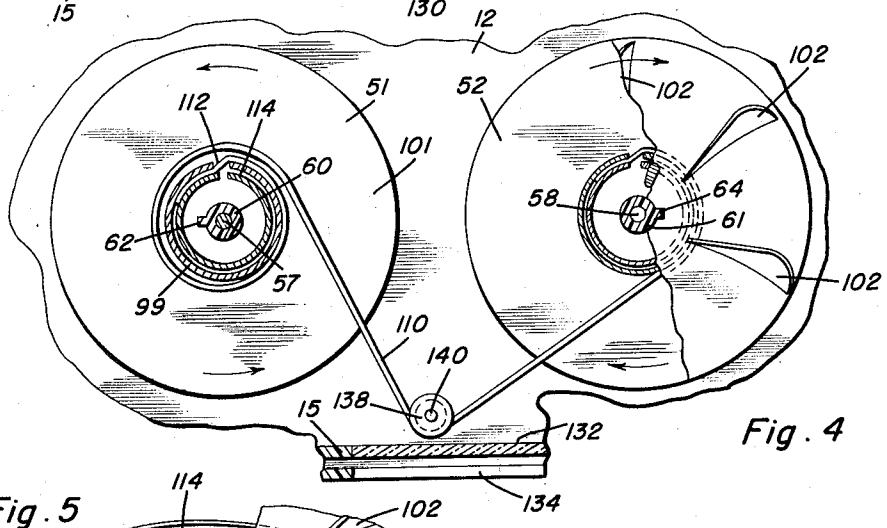
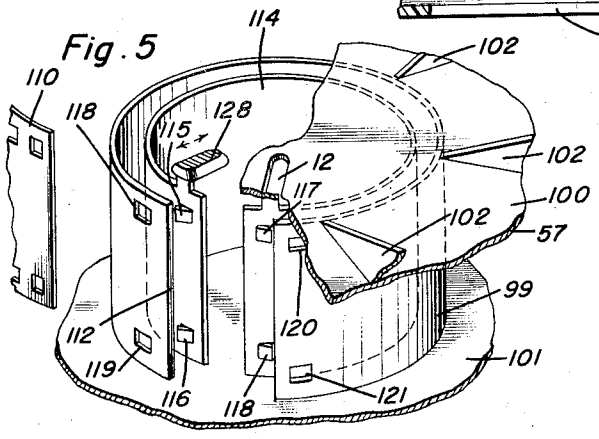


Fig. 4

Fig. 5



Walter F. Schiller
INVENTOR.

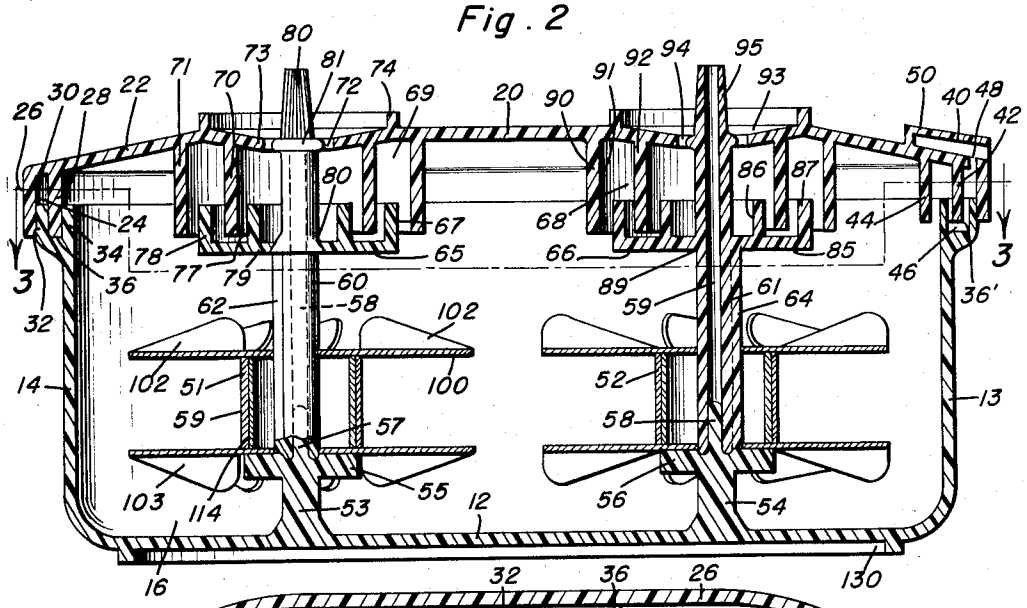
BY Clarence A. O'Brien and Harvey B. Jacobson
Attorneys

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Fig. 2



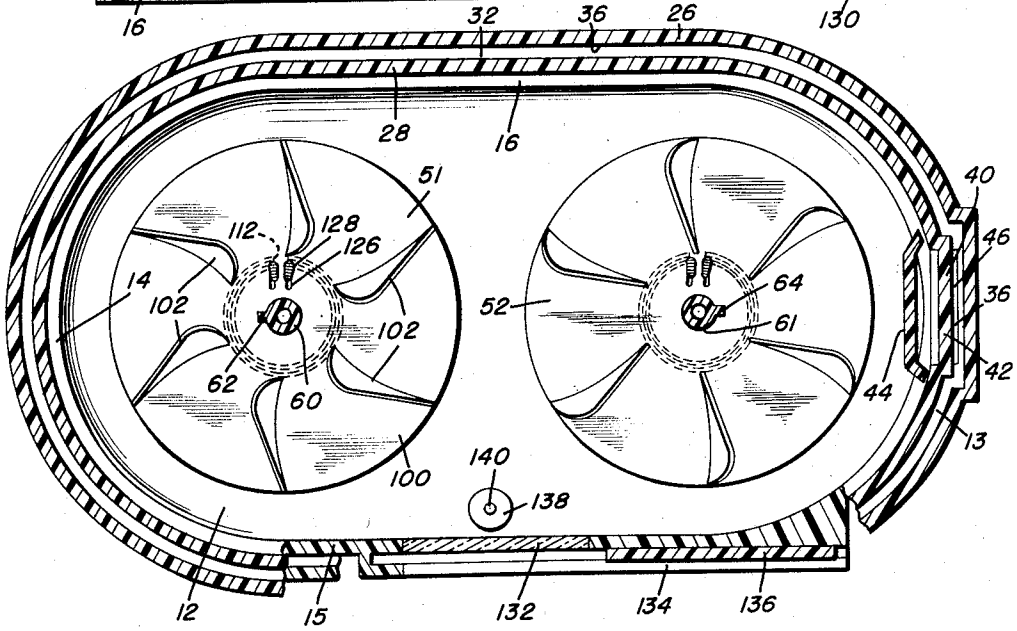


Fig. 3

Walter F. Schiller
INVENTOR.

BY Clarence A. O'Brien and Harvey B. Jacobson
Attorneys

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FILM DEVELOPING TANK

Walter F. Schiller, Hartford, Conn.

Application January 29, 1957, Serial No. 637,013

2 Claims. (Cl. 95—90.5)

This invention relates to a film developing tank and more particularly to a small, economical tank especially designed for 8 mm. film in roll form.

An object of the invention is to provide a small, economical film developing tank which is particularly useful in connection with the development of 8 mm. film and which is economical in that it requires a small quantity of solution, that is, the proper amount for the development of 8 mm. film.

A further object of the invention is to provide a film developing tank which is so constructed that shaking the tank is unnecessary inasmuch as the reels are formed with agitating vanes automatically agitating the developer, solution etc. in response to moving the film from one reel to the other.

Another object of the present invention is to provide a small, practical film development tank which is easy to use. The cover for the top of the tank when removed, exposes the entire interior of the tank so that placing a roll of exposed color or black and white film in the tank involves no difficulty. Thereafter the film is wound on the other reel and the cover is again removed so that the spool on which the exposed film was originally wound may be removed and the development tank reel returned to the tank and operatively connected with an end of the film. Then, after the cover is replaced the solution may be poured through the light trap funnels and the developing process completed, the action differing for black and white and colored film. In either case, though, the film may be developed in daylight, no darkroom being required.

Another object of the present invention is to provide a practical device of this type which may be produced at a low unit cost and yet which fulfills the need for an effective film developing tank especially designed to care for the needs in developing film. Larger tanks that is, tanks which are "universal" accommodating film of "any size" or tanks which are specifically useful in connection with the development of 35 or 16 mm. film do not have the inherent economy of my tank. The reason is that my tank accommodates enough hypo solution, etc. for the development of a 25 foot roll of double-eight mm. film and does not waste the same by extravagant use.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

Figure 1 is an elevational view of a tank which is constructed in accordance with the invention;

Figure 2 is a longitudinal sectional view of the tank in Figure 1;

Figure 3 is a sectional view taken approximately on the line 3—3 of Figure 2;

Figure 4 is a fragmentary horizontal sectional view through the reels with parts shown in elevation, this view

showing principally the threading of the film from one reel to another, and;

Figure 5 is a fragmentary perspective view of one of the reels, parts being shown in section, this view illustrating principally the manner in which the film is attached to the reel.

In the accompanying drawings there is a tank **10** which is constructed in accordance with the principles of the invention. This tank is made of a non-corroding material, such as "Bakelite" or an equivalent substance. The tank **10** has a bottom wall **12**, end walls **13** and **14**, together with a front and back wall **15** and **16** respectively. The tank **10** has an open top and is of generally oval-shape. The cover **20** of the tank is made of a top panel **22** with a light trap **24** formed along the edges thereof. This light trap is also a seal and is made by concentric skirts **26** and **28** that are parallel to each other and spaced slightly apart to form a pocket **30**. The upper edge of the side walls and end walls of the tank are formed as an upwardly directed U-shape rim with sides **32** and **34** and a pocket **36** therebetween. The pocket accommodates the skirt **28** while skirt **26** fits over the outside surface of the side **32**.

There is a light trap pouring spout **40** at one end of the tank. This is made by having the pocket **36'** wider, loosely accommodating the side **42** at this point. Deflector plate **44** depends from the inner surface of the cover **20** adjacent to and parallel to the skirt **42** to further aid in pouring operations and light entrapment. As seen in Figure 2, the enlarged part **36''** of the pocket **36** is fitted in relation to the width of side **42** to form a liquid passage **46**. The liquid then, flows through this passage and through an outlet opening **48** formed in the cover **20** beneath the shield **50**. This shield is fixed to the top of the cover and extends over the opening **48** to deflect the liquid as it is poured from spout **40**.

There are two reels **51** and **52** respectively in the tank and each is mounted for rotation on its support **53** and **54** respectively. These supports rise from the bottom **12** of the tank and have support panels **55** and **56** on which the reels **51** and **52** are seated. Centering pins **57** and **58** extend upwardly from the center of the panels **55** and **56** and are received in the bores **58** and **59** of the hollow spindles **60** and **61**. Each spindle has its key **62** and **64** respectively along one side wall thereof, and the key is adapted to be drivingly connected to the reels **51** and **52** respectively. Moreover, the upper ends of the keys serve as supports for the lower parts **65** and **66** of the light traps **67** and **68** located near the top of the tank.

Light trap **67** has an upper part **69** which is made of two rings **70** and **71** respectively, the rings being concentrically with respect to each other and with respect to liquid inlet openings **72**. The rings extend downwardly from the inner surface of the cover **20** and are discontinuous whereby there are spaces between the arcuate parts which make up each ring. A funnel **73** is formed of a part of the cover **20** adjacent to the liquid inlet opening **72** by having this part of the cover made of a conical shape and by having an upstanding wall **74** fencing the same. The lower part **65** of the light trap is somewhat similarly constructed, involving two concentric rings **77** and **78**, each ring being made of arcuate sections spaced slightly from each other to allow free circulation of liquid therethrough. Rings **77** and **78** are fixed to a bottom wall **79** that has a central opening **80** through which spindle **60** passes. Bottom **79** rests on the key **62** allowing the spindle to be rotated by the upper finger knob **80**, with respect thereto. This finger knob rises upwardly through the funnel and the bore **58** of the spindle may be keyed or made non-circular in order to accommodate crank in addition to the finger knob **80**. An enlarged deflector **81** is on the surface of

spindle **60** within the liquid entrance opening **72** light trap. Light trap **68** is constructed identically to the light trap **67** and includes the lower part **66** having bottom wall **85**, concentric rings **86** and **87** rising therefrom in a central opening **89** through which spindle **61** passes. The upper part **90** of the light trap **68** has concentric rings **91** and **92** which depend from funnel **93**. There is a central liquid opening **94** in the funnel through which the spindle **61** passes, and a finger-grip or knob **95** also rising upwardly from the tank and through the opening **94** in funnel **93**.

Reel **51** is made of a hub **99** together with an upper and lower side **100** and **101**. Upper vanes **102** are on side **100** and lower vanes **103** are on side **101**. These vanes function as agitators for the solution as the reel is revolved for the purpose of winding or unwinding film **110**. Hub **99** has a film entrance slot **112** and an inner, spring band **114** concentrically arranged therein. The band has protrusions **115** and **116** at one end thereof and protrusions **117** and **118** at the opposite end thereof. The protrusions are adapted to be engaged with notches **118**, **119**, **120** and **121** respectively which are formed in the side wall of the hub **99** adjacent to the film slot **112**. The bias of the spring inner band **114** is such as to tend to maintain the protrusions in engagement with the notches at all times. The spacing of the notches and protrusions are such that the notches in the edges of a 16 mm. film (twin-8 mm.) fit and are engaged therewith when the film is inserted in the film slot **112**.

Upper side **100** of the reel **51** has two slots **126** approximately radially arranged with finger-grips **128** passing therethrough and fixed to the ends of the inner band **114**. The purpose of having the finger-grips **128** so arranged is to manually spread the confronting ends of the band away from the hub **99** at the film entrance slot **112** and enabling the film **110** to be attached or separated from the film. Reel **52** is constructed identically.

A support ridge **130** is on the bottom wall **12** of the tank in order to hold the tank level when placed on a supporting surface, as a table. Light window **132** is formed in the front wall **15**, and there is a track **134** around the window **130** in which to accommodate the sliding door **136**. This door is movable to a position where it covers the light opening **132** or opens the light opening to admit light into the tank, this being necessary during the development of at least some types of black and white film. Film guide pool **138** is mounted for rotation on a vertical shaft **140** which is attached to and which rises from the bottom surface of the tank. Shaft **140** has a bottom spacer **142** on which the spool **138** is mounted for rotation, and it is preferred that the spool have a double taper (Figure 1) and small upper and lower flanges to assure that the film will not slip from the spool when it is moved across the light window **132** by properly rotating the reels **51** or **52**.

In operation and use of the tank the cover is first removed and one of the reels taken out. The reels, the door, the cover and all other parts are light-proof. A roll of 8 mm. film that has been exposed is inserted on the spindle from which the reel has been removed. The end of the exposed film is attached to the other reel in the tank and the cover is replaced. The film is then wound on the empty reel and the cover again removed. All during this time the door **136** is in the window closing position. The empty spool (supplied with the film) is removed from the tank and the reel, for example reel **52**, is returned to the tank and the film inserted and locked to prevent it from pulling off the reel. The cover is again replaced and the solution or other liquid poured into one or both of the funnels. A measured amount for 8 mm. film passes through the funnels so that there will be no waste.

Now, one reel is turned clockwise while the other is turned counter-clockwise winding the film from one reel to the other and at the same time agitating the liquid in the tank by means of the number of vanes on the reels **51** and **52**. It is unnecessary to rock the tank since the agitators on the reel stir the liquid sufficiently.

For re-exposure the film **110** is placed over the spool **138** and wound from one reel to the other with the window **132** opened allowing light to enter the tank. Moreover, when the type of liquid has to be changed during normal film developing operations, the tank is merely picked up in one hand and emptied by pouring through the spout **40**. It is wholly unnecessary to open the tank for the purpose of draining or for the purpose of adding liquid to it.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. A film developing tank having side walls, end walls, bottom and an open top, a cover, a combined light trap and seal separably connecting the edges of said cover to the upper edges of said tank walls, funnels formed in said cover and spaced from each other, spindles mounted for rotation in said tank and separable therefrom, said funnels each having an aperture, one of said spindles extending through each aperture and having an outer end for manual rotation, liquid agitating reels, means mounting said reels in said tank for rotation, means drivingly connecting said reels to said spindles, said apertures of said funnels constituting liquid entrances, light traps carried by said cover and said spindles respectively and operatively connected with said funnels to prevent the entry of light through said funnels to the interior of said tank, a pouring spout in said tank and cover, said first mentioned light trap operatively connected with said pouring spout and including an upwardly opening pocket at one edge of one of said walls, a skirt depending from said cover and fitted loosely within said pocket so as to form a liquid passage around said skirt and through said pocket, a deflector plate carried by said cover and located adjacent to said skirt, a pouring spout on said cover, said cover having an opening through which liquid is adapted to pass and in registry with said passage and beneath said pouring spout.

2. The film developing tank of claim 1 wherein said means mounting said spindles in said tank for rotation include a pair of supports rising from the bottom wall of said tank and having centering pins extending upwardly therefrom, lateral supporting panels attached to said supports and on which film reels are adapted to seat, and said spindles having bores within which said centering pins are accommodated thereby mounting said spindles for rotation and oscillation.

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