Nov. 20, 1956 W. J. HALL 2,771,015

FILM DEVELOPING DEVICE

Filed Feb. 19, 1954

FIG. 1.

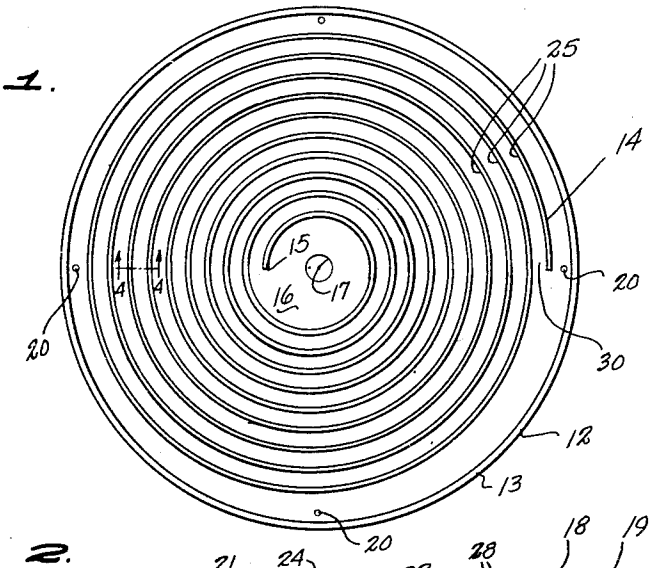


FIG. 2.

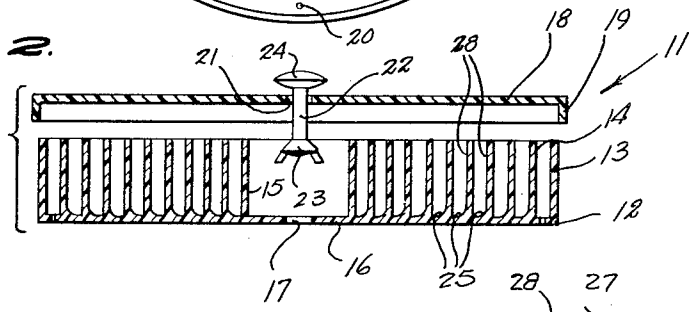
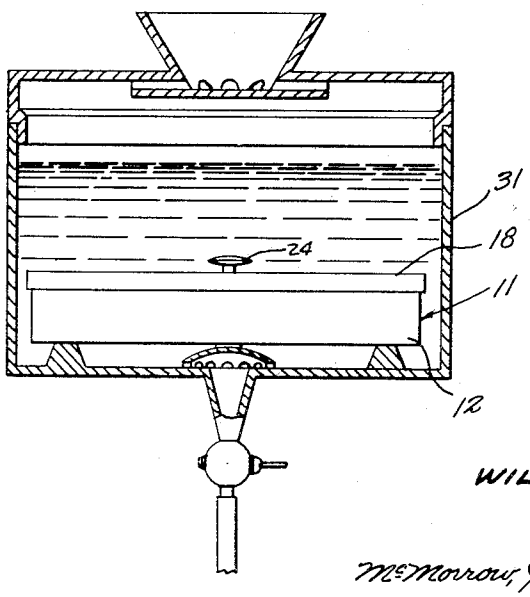


FIG. 3.



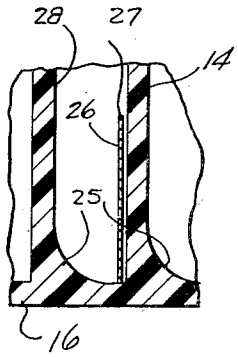


FIG. 4.

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United States Patent Office 2,771,015 Patented Nov. 20, 1956

2,771,015

FILM DEVELOPING DEVICE

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Application February 19, 1954, Serial No. 411,455

3 Claims. (Cl. 95—90.5)

This invention relates to photographic equipment, and more particularly to an improved film supporting box to be used in a film developing tank.

A main object of the invention is to provide an improved film supporting box for use in a film developing tank such as a "daylight" developing tank, the improved supporting box being simple in construction, being arranged to prevent contact of the emulsion side of the film with any surface, and being further arranged so that the film is supported only on its edge as it is guided into the box.

A further object of the invention is to provide an improved film strip supporting box for use in a "daylight" developing tank, said film supporting box being inexpensive to manufacture, being rugged in construction, being arranged to reduce the possibility of fogging or contaminating the film developing material or the emulsion side of the film, being easy to clean, and being provided with means for supporting the film strip inserted into the box on its edge and for preventing said strip from engaging the surface of the recess in which the strip is guided.

Further objects and advantages of the invention will become apparent from the following description and claims, and from the accompanying drawings, wherein:

Figure 1 is a top plan view of an improved film strip supporting box according to the present invention, the cover of the box being removed.

Figure 2 is a vertical transverse cross sectional view taken through the film strip supporting box, according to the present invention.

Figure 3 is a vertical cross sectional view taken through a "daylight" developing tank in which is supported a film strip supporting box according to the present invention.

Figure 4 is an enlarged vertical cross sectional detail view taken on the line 4—4 of Figure 1 and showing in cross section a film strip supported in the box.

Referring to the drawings, the improved film strip supporting box is designated generally at **11** and comprises a generally circular main receptacle **12** having an upstanding peripheral wall **13** formed integrally therewith and being integrally formed with an upstanding spiral rib **14** equal in height to the peripheral wall **13** and being substantially concentric therewith. The spiral rib **14** has a substantial number of spiral turns spaced uniformly from each other to receive a strip of film to be developed and to support said film strip between the turns, the spiral rib **14** terminating at **15** near the center of the circular box. The bottom wall of the box, shown at **16**, is formed with a central aperture **17** to allow developing liquid to enter the box. Designated at **18** is a circular cover having the depending peripheral flange **19**, the cover being engageable on the top rim of the main receptacle **12** and the flange **19** being adapted to frictionally engage over the top portion of the outer wall **13** of the main receptacle to provide a relatively close fit thereon.

The bottom wall **16** is formed with a plurality of additional apertures **20** for the entrance of developing liquid. The top cover **18** is formed with a central aperture **21** in which is loosely positioned a handle member having the shank **22**, the lower enlarged portion **23**, and the top handle knob **24**. The handle member has a relatively loose fit in the aperture **21**, whereby developing liquid may flow freely through said aperture.

The surface of the bottom wall **16** is arcuately curved upwardly from the lower end of one turn of the spiral rib **14** to the lower end of the next adjacent turn, as shown at **25**, to prevent contact of the surface **26** of a film strip **27** positioned in the spiral groove defined by the spiral rib **14**, with the surface **28** of the rib opposite the surface **26**. The surface **26** of the strip is the emulsion side thereof, and thus, the arcuately curved bottom surfaces **25** of the spiral groove position the strip away from the surface **28** to prevent contact of the emulsion of the film with the said surface **28**.

In using the box **11**, the cover **18** is removed, and the box is loaded with the film to be developed, the emulsion side of the film being arranged adjacent the surfaces **28**, which merge with the upper ends of the arcuate surfaces **25**. The film strip is fed into the box in the usual manner, inserting the film strip into the inner end portion **30** of the groove defined by the spiral rib **14** and pushing the strip into the groove until the entire strip is received therein. As above explained, the arcuate bottom walls **25** of the groove serve to limit movement of the strip toward the surfaces **28** opposite the emulsion surfaces of the strip, and thus act as guides for the bottom edges of the strip to protect the emulsion surface thereof against damage as the strip is being pushed through the groove or while the film is being wound on the reel.

After the strip has been positioned in the spiral groove, the cover **18** is engaged on the main receptacle **12** and the box is then placed in the "daylight" developing tank, shown at **31**, for processing the film.

The improved film strip supporting box above described may be obviously employed either for motion picture film or for roll type film employed to make still photographs. The improved film box of the present invention is especially advantageous for the processing of 8 mm., 16 mm., 35 mm., and 70 mm. aerial mapping film.

The box may be made of any suitable inert material, and is preferably made of plastic material, such as clear plastic of the Lucite type.

The reason for using clear plastic is to enable the tank to be employed for insuring an even re-exposure of the film. In the tank of the present invention, made of clear plastic material, light impinging on any part of the clear plastic tank would circulate through the clear plastic and re-expose the film, even though only a limited area of the tank is exposed to the light.

If the tank were made of opaque material, such as metal, or of dark plastic material, a considerable amount of extra effort would be required if it were desired to re-expose the film to light, as when processing the reversible type of movie film, and especially is required when developing positive color film, which requires re-exposure on both sides. Thus if the tank were not made of clear plastic, such as Lucite, it would be necessary to remove the color film from the reel, increasing the possibility of injuring the film.

In the present invention, the reel is placed in the central space defined by the inner portion of the spiral rib **14**, and the end slot in the reel is engaged by the depending projections provided on the lower enlarged portion **23** of the handle shank **22**. Thus by rotating the handle knob **24**, the film may be pushed outwardly

through the groove defined by the spiral rib **14**, or may be rewound on the reel.

Obviously, the box may be readily cleaned, since the cover **18** is easily removed by means of the handle member, as by pulling upwardly on the handle knob **24**, allowing access to the interior of the box.

While a specific embodiment of the improved film strip supporting box for use in a daylight developing tank has been disclosed in the foregoing description, it will be understood that various modifications within the spirit of the invention may occur to those skilled in the art. Therefore, it is intended that no limitations be placed on the invention except as defined by the scope of the appended claims.

What is claimed is:

1. A film supporting device for use in a daylight developing tank comprising a generally circular box, an upstanding spiral rib of substantial height rigidly secured to the bottom wall of said box, said rib being substantially concentric with the box and having a substantial number of spiral turns spaced from each other to receive a strip of film to be developed and to support said strip between the turns, said bottom wall being apertured to allow developing liquid to enter the box, the surface of the bottom wall being arcuately curved upwardly from the lower end of one turn of the spiral rib to the lower end of the next adjacent turn to engage the bottom edge of the film strip and to prevent contact of the emulsion surface of the film strip with the surface of said next adjacent turn of the spiral rib.

2. A film supporting device for use in a daylight developing tank comprising a generally circular box having an outer upstanding peripheral wall, an upstanding spiral rib similar in height to said outer peripheral wall and rigidly secured to the bottom wall of said box, said rib being substantially concentric with the box and having a substantial number of spiral turns spaced from each other to receive a strip of film to be developed and to support said strip between the turns, said bottom wall being apertured at its central and outer portions to allow developing liquid to enter the box, the surface of the bottom wall being arcuately curved upwardly from the

lower end of one turn of the spiral rib to the lower end of the next adjacent turn to engage the bottom edge of the film strip and to prevent contact of the emulsion surface of the film strip with the surface of said next adjacent turn of the spiral rib.

3. A film supporting device for use in a daylight developing tank comprising a generally circular box having an outer upstanding peripheral wall, an upstanding spiral rib similar in height to said outer peripheral wall and rigidly secured to the bottom wall of said box, said rib being substantially concentric with the box and having a substantial number of spiral turns spaced from each other to receive a strip of film to be developed and to support said strip between the turns, said bottom wall being apertured at its central and at its outer portions to allow developing liquid to enter the box, the surface of the bottom wall being arcuately curved upwardly from the lower end of one turn of the spiral rib to the lower end of the next adjacent turn to engage the bottom edge of the film strip and to prevent contact of the emulsion surface of the film strip with the surface of said next adjacent turn of the spiral rib, a circular cover engaged on the top rim of said box, said cover having a depending peripheral flange frictionally engaging over the top portion of said outer wall, said cover having a central aperture, and a handle member loosely secured in said last-named aperture.

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