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Description

This invention relates to a film holder for use in a photographic developing tank as claimed in Claim 1.

Photographic processing tanks for processing lengths of exposed photographic film are well known and they consist essentially of a light-tight tank in which the film, arranged in a spiral coil, is supported on a holder. The film is loaded on to the holder under darkroom conditions, such as safelight illumination or in total darkness. The holder is then placed in the tank and the tank is made light-tight. Thereafter, the processing can be accomplished with the tank in normal lighting conditions.

The processing solutions are introduced in turn into the tank. The tanks function with the minimum of processing solutions (dictated by the exhaustion rate of the processing solutions) and yet not only allow for rapid filling and emptying of the liquids, but also ensure that the formation of air bells on the film surface is inhibited to a maximum extent.

The processing solutions must be able to move freely over the film surface so that solutions which have been exhausted in certain areas of the film emulsion may be moved to other areas of the film. Similarly, solutions which have not been involved in a great deal of activity, and are, therefore, not exhausted, must be moved to those areas of the film where interaction with the film emulsion is greater. This periodic movement of the processing solution is conveniently brought about by completely inverting the processing tank at regular intervals.

U.S. Patent 2835181 describes a film handling reel, for use in a tank, which comprises a central column and a pair of annular plates mounted in spaced apart relation on the column. Each plate has a spirally arranged rib, or film directing means, mounted thereon. The plate has as a plurality of parts or orifices which extend through the plates.

U.S. Patent No. 2151907 describes a film processing device which consists of a reel comprising three discs. Two of the discs have a helical wall, defining a helical groove, formed on the face thereof, whereas the middle disc has a helical wall formed on both faces. Each of the three discs is provided with openings through the faces thereof in order to allow for the passage of liquid.

In the present invention, the film holder for use in such a tank comprises a central column and a pair of annular plates mounted in spaced apart relation on the column. Each plate has a number of radially extending ribs which carry a further rib arranged in a spiral. The film is carried in the holder with the lateral edges of the film in the spaces between the turns of the respective spirally arranged further ribs.

According to the present invention, the further rib on each annular plate has such a depth relative to the radial ribs thereon to provide extra strength thereby allowing the spacing between adjacent turns of the further rib to be increased.

Some of the advantages of the invention are (a) that the speed at which the tank may be filled and emptied is increased;

(b) the formation and trapping of air bells is lessened;

(c) the flow of processing solution during inversion of the tank is improved; and

(d) residual solution in the tank at the end of the final processing stage can efficiently be washed out.

Conveniently, the shaped further rib produces a "venturi effect" which assists in the flow of processing liquid. All these advantages are achieved without resorting to a tank of larger volume than that generally required for satisfactory processing of 35 mm and/or 120/220 roll film lengths and widths.

In order that the invention may be more readily understood, it will now be described, by way of example only, with reference to the accompanying drawings, in which:—

Figure 1 is a diagrammatic side elevation of a film holder;

Figure 2 is a plan view of part of a holder;

Figure 3 is a section on the line 3—3 of Figure 2; and

Figure 4 is a section on the line 4—4 of Figure 2.

A holder for a film processing tank comprises a generally cylindrical hollow tube 1 having an enlarged foot 3. A pair of annular plates 5, each with an integral stub-column 7, are mounted on the tube 1. The two stub-columns are arranged in overlapping relation so that the annular plates are in spaced apart relation. The amount of overlap of the stub-columns can be adjusted so as to vary the spacing between the plates 5 and thereby accommodate films of different widths. Each annular plate has a plurality of radially extending ribs 9 and these ribs support a further rib 11 integral therewith which is arranged on the ribs 9 in the form of a spiral.

As shown in Figure 4, each radial rib 9 is of generally rectangular cross-section with one side providing a support surface for the film. One of the corners 13 of the support surface is chamfered. Each turn of the further rib 11 has a first part 15 which projects beyond the support surface of the ribs 9 and a second part 17 which extends almost to the side of the rib which is opposite the support surface.

Adjacent sides of adjacent turns of the further rib diverge at the first part 15 and also diverge at the second part 17 so that the space 19 between adjacent turns is in the form of a venturi.

The further rib is of more rigid construction than has been known heretofore and this permits the spacing between adjacent turns of the rib to be increased.

Claims

1. A film holder for use in a photographic developing tank, the holder including a central column (1) and a pair of annular plates (5) mounted in spread-apart relation on the column, each plate

including a number of radially-extending support ribs (9) which carry a spiral rib (11) forming a spiral channel between its turns for retaining the edge of the film, the said spiral rib (11) having an elongate cross-section which has a first portion (15) which is tapered inwardly in the axial direction facing towards the other plate and which projects beyond the support of the radial ribs (9), and a second portion (17) which is tapered inwardly in the axial direction facing away from the other plate and extends across a major part of the depth of the radial ribs (9) towards the side which is opposite the support surface.

2. A film holding according to claim 1 in which each radial rib has a chamfered surface (13) facing the leading edge of a film as it is fed into the spiral, to facilitate entry of the film.

Patentansprüche

1. Filmhalter zur Verwendung in einer photographischen Entwicklungsdose mit einer zentralen Säule (1) und einem Paar ringförmiger, getrennt voneinander auf der Säule angebrachter Platten (5), von denen jede eine Anzahl radial verlaufender Trägerrippen (9) aufweist, die eine spiralförmige Rippe (11) tragen, die zwischen ihren Windungen einen spiralförmigen Kanal zum Halten der Filmkante bildet, wobei die spiralförmige Rippe (11) einen länglichen Querschnitt hat, dessen ersten Teil (15) sich in der axialen Richtung auf die andere Platte hin nach innen verjüngt und über den Träger der radialen Rippen (9) hinaus vorsteht und dessen zweiter Teil (17) sich in der axialen Richtung von der anderen Platte weg nach

innen verjüngt und sich über einen größeren Teil der Tiefe der radialen Rippen (9) zu der der Trägeroberfläche gegenüberliegenden Seite hin erstreckt.

2. Filmhalter nach Anspruch 1, bei dem jede radiale Rippe zur Erleichterung des Filmeintritts eine abgeschrägte Oberfläche (13) hat, die der Eintrittskante des Films bei dessen Einführung in die Spirale zugewandt ist.

Revendications

1. Porte-film pour une cuve de développement photographique, lequel porte-film comprend une colonne centrale (1) et deux plaques annulaires (5) montées à une certaine distance l'une de l'autre sur la colonne, chaque plaque incluant un certain nombre de nervures de support radiales (9) qui portent une nervure hélicoïdale (11) formant un canal en hélice entre ses spires pour retenir le bord du film, ladite nervure hélicoïdale présentant une section allongée qui a une première partie (15) s'effilant vers l'intérieur dans la direction axiale faisant face à l'autre plaque, et une seconde partie (17) qui s'effile vers l'intérieure dans la direction axiale orientée à l'opposé de l'autre plaque, ladite seconde partie s'étendant à travers la majeure partie de la profondeur de la nervure radiale (9), vers le côté qui est opposé à la surface de support.

2. Porte-film selon la revendication 1 caractérisé en ce que chaque nervure radiale a une surface biseautée (13) faisant face au bord antérieur du film qui est avancé dans l'hélice, afin de faciliter l'entrée du film.

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FIG. 1.

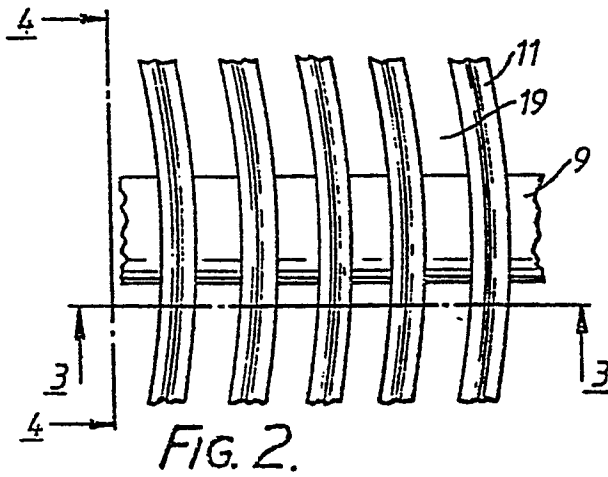
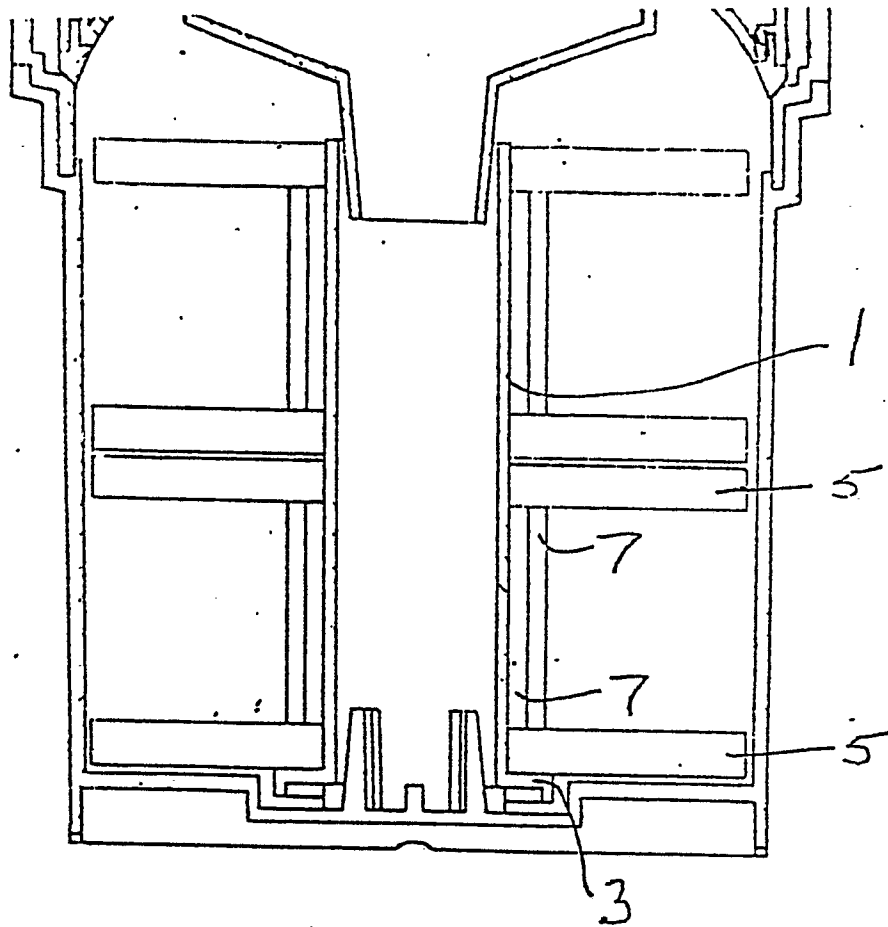


FIG. 2.

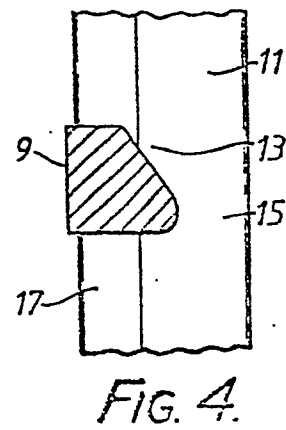


FIG. 4.

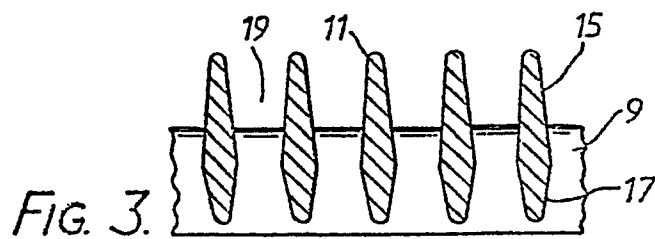


FIG. 3.