April 3, 1928. 1,664,731

G. C. BEIDLER

COIL FILM DEVELOPER

Filed May 8, 1926 2 Sheets-Sheet 1

Fig. 1.

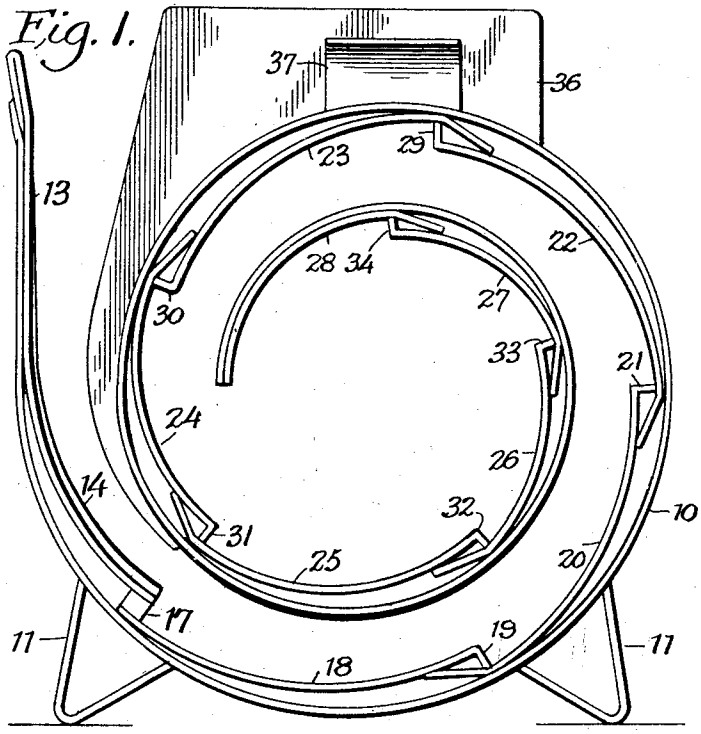


Fig. 2.

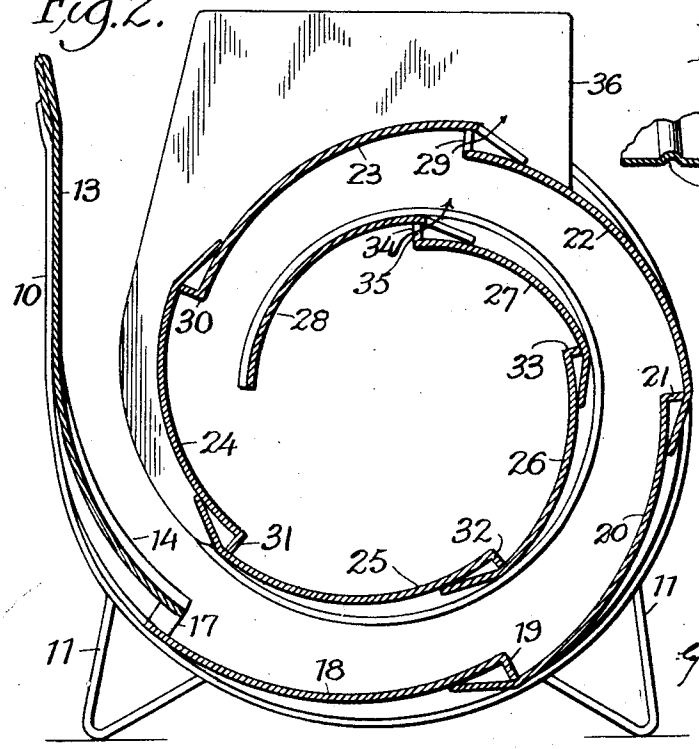
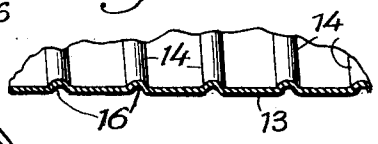


Fig. 5



Inventor,
George C Beidler,
by Frank A. Appleman,
Attorney.

April 3, 1928. 1,664,731

G. C. BEIDLER

COIL FILM DEVELOPER

Filed May 8, 1926 2 Sheets-Sheet 2

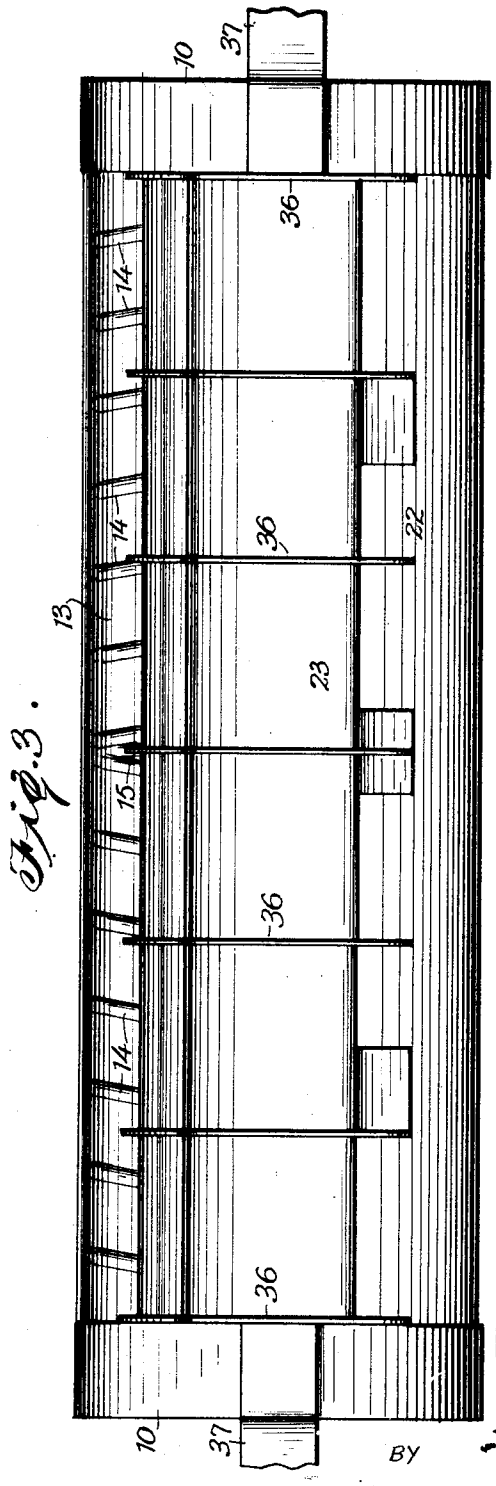


Fig. 3.

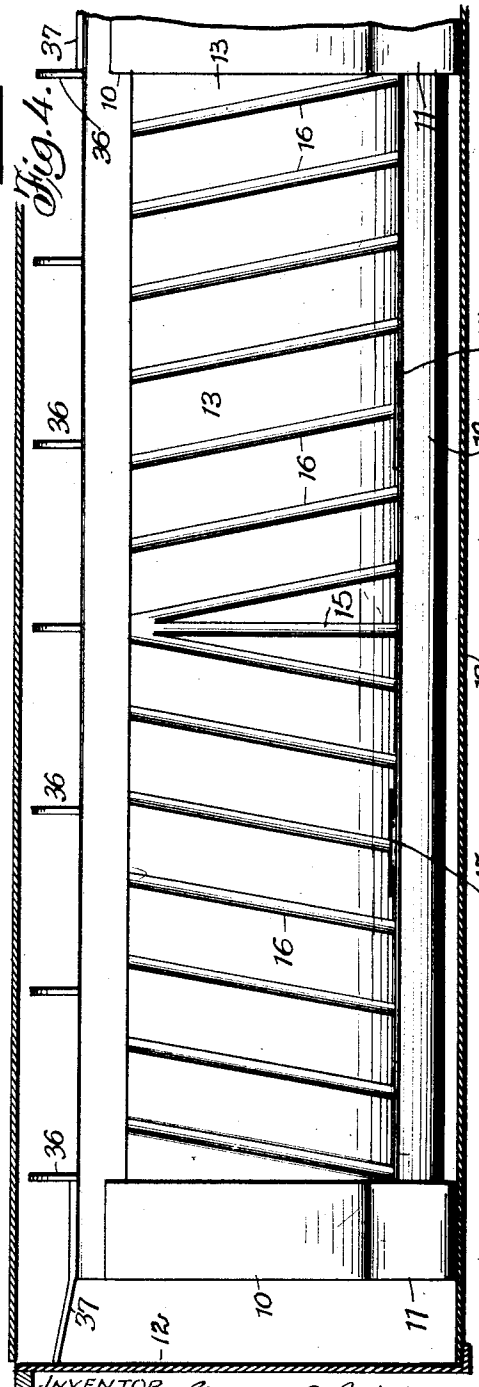


Fig. 4.

INVENTOR, George C Beidler,

BY Francis Appleman, ATTORNEY.

Patented Apr. 3, 1928. 1,664,731

UNITED STATES PATENT OFFICE.

GEORGE C. BEIDLER, OF ROCHESTER, NEW YORK.

COIL FILM DEVELOPER.

Application filed May 8, 1926. Serial No. 107,798.

This invention relates to photography, and particularly to devices for developing film, and the invention has reference to improvements in devices for holding the sensitized medium that is to be subjected to the action of fluid, as in the developing processes.

A patent was issued to applicant on July 13, 1920, #1,346,780, for method of and device for developing film, and the present invention may be regarded as an improvement on the device of that patent and is intended for operation under the conditions set forth in the said patent, though the present invention is designed to facilitate the movement of film in its travel into and from the film holder or coil.

It is an object of this invention to produce a coil in which provision is made for insuring the interposition of fluid between the coated surface of the film and the surface of the film holder, regardless of the length of the film which is delivered to the holder, and it has been found in practice that through the employment of means such as has been referred to, a film holder can be constructed having increased capacity for receiving wide and long films, and satisfactory results may be had with such provision of means, even though the film is of great flexibility and has absorption qualities which renders the film rather limp as it is being delivered to the holder and subjected to fluid, in which the holder is wholly or partially immersed.

While the device of the patent to which reference has been made has proven satisfactory in practice, the improved device has been found to facilitate the operation of developing film of large area, and especially so when the film is highly flexible or porous.

It is a further object of this invention to produce a film holder having advantages in points of capacity and efficiency.

It is a still further object of this invention to provide a receptacle for fluid in association with which the film holder is assembled.

With the foregoing and other objects in view, the invention consists in the details of construction, and in the arrangement and combination of parts to be hereinafter more fully set forth and claimed.

In describing the invention in detail, reference will be had to the accompanying drawings forming part of this application, wherein like characters denote corresponding parts in the several views, and in which—

Figure 1 illustrates a view in end elevation of a film developing holder embodying the invention;

Figure 2 illustrates a transverse sectional view thereof;

Figure 3 illustrates a plan view thereof;

Figure 4 illustrates a front view in elevation of a fragment of the holder showing the same applied to a fluid receptacle; and

Figure 5 illustrates a sectional view of a fragment of the apron.

In the present embodiment of the invention, the holder comprises end elements or bands 10 on which the sections of the holder are secured, and the said end elements each has feet or supports 11 which rest on the bottom of the tank or container 12 of the fluid which is intended to act on the coated surface of the film. An apron or guiding plate 13 has its side surfaces at its ends secured to the end elements by any approved method, as by soldering, spot welding, brazing or the like, and hereafter in the specification where reference is made to the securing of elements to one another, it will be understood that such securing methods as have been stated, or other appropriate means which one skilled in the art would employ, will be considered as included in the disclosure.

The apron is bent on itself at its upper edge to produce a finish and to increase the strength of the structure, and the inner surface of the apron has a plurality of downwardly but diagonally disposed ribs 14 which diverge from a vertically straight central rib 15, and preferably in the formation of these ribs, the apron is stamped, and in doing so, corresponding grooves 16 are formed in the outer surface of the said apron. As stated, this apron is secured to the end elements. For a portion of the depth of the apron, it is concentric with the end elements, but it diverges toward its lower edge, and for a portion of its depth the apron is eccentric to the said elements, and the lower edge of the apron is secured, as will presently appear, in spaced relation to the said end elements

In the formation of the coil or holder, a succeeding segment or curved plate 18 is employed, whose front edge underlies the

lower edge of the apron, and the said plate 18 at its front edge and for a portion of its width is concentric with the end element and it is secured to said end element. The curved plate has its edge located under the inner edge of the apron and the apron and plate are held in spaced relation to each other by metal blocks 17 arranged at intervals in the length of the apron and plate, and these blocks secure the apron and plate together and fluid can circulate between the apron and the plate. The advanced edge of the plate 18 is provided with a flange 19 and it overlies a succeeding plate 20, which likewise for a portion of its width is concentric with the end element, and toward its advanced edge it is eccentric to the said end element. The flange of the plate 18 lies on and is secured to the plate 20, and the plate 20 has a flange 21 at its edge.

The holder further comprises a series of plates 22, 23, 24, 25, 26, 27 and 28, and the plates 22, 23, 24, 25, 26 and 27 have flanges 29, 30, 31, 32, 33 and 34, respectively, which overlap and are secured to successive plates, whereas the last plate 28 is concentric with the end element throughout its width. The flanges are also secured to the plates throughout their lengths, except that the last flange 34 is cut away and provided with slots such as indicated by the dart 35, and the plate 23 is cut away to form openings in alinement with openings in the flange of the plate 22. The openings just mentioned are provided to permit the escape of air in order that air bubbles will be prevented from accumulating or collecting on the upper convolutions of the holder. It is well known, of course, that if air is in the holder, it will serve to displace fluid and the film might not, therefore, be coated uniformly; hence, by providing for the escape of air, the likelihood of unequal development is eliminated.

An inspection of the drawing will show that the flanges are of different depths, those nearest the entrance to the holder being deeper and they gradually recede. While the arrangement shown is the preferred construction, and the relation of parts as shown is preferred in view of the advance so far made, the inventor does not wish to be limited with respect to these features.

The holder illustrated in the drawing is designed for film of certain maximum length, and it can be operated in conjunction with films of less length. If a holder is desired for films of greater length than the capacity of the holder illustrated, such holder could be made, of course, by increasing the number of convolutions of the holder.

The upper surface of the holder is provided with a plurality of fins or plates 36 whose edges that are in proximity to the apron are inclined and near their lower ends curved to form guides for the film as it travels into the holder, it being seen that the space between the edges of the fins and the apron taper downwardly, and this arrangement of parts insures that the film shall enter the holder. It is well known that some film is curled, due to its being wound on a spool, and hence the guides are desirable elements of the apparatus, and the degree of curl varies with the character of the film and the diameter of the roll.

The ends of the holder at the top have outwardly extending plates 37 which engage the end walls of the tank 12 which is intended to contain the developing fluid, and the holder is therefore properly positioned with respect to the mechanism with which it is intended to be associated.

It will be seen from an inspection of the drawing that as the film is delivered to the holder edgewise and pushed into said holder its advancing portions pass from one shoulder to another, but in operation, when the film leaves one of the plates, it encounters fluid and floats or moves in the fluid until the succeeding plate is encountered, and it then is guided by the succeeding plate until it passes the shoulder at its inner edge, when it is again floated, so that by this arrangement, the film does not encounter a large area of guiding surface and it will therefore travel with greater freedom and with less likelihood of its adhering to the guiding elements comprised in the holder.

I claim:

1. In a film developing apparatus, a coil-form film holder having rigid convolutions to guide film when the free advancing end of the film is pushed into it edgewise, and means at locations within the coil for holding the film out of engagement with the structure forming the convolutions.

2. In a device relating to photography, a member having rigid convolutions around which film may be pushed and coiled, and elements at intervals within the volutions for guiding film and restricting the surface contact between the film and the material forming the convolutions.

3. In a developing apparatus, a coil-form film holder having rigid convolutions to guide film when the free advancing end of the film is delivered to it edgewise, an apron at the mouth of the film holder for guiding the film, and ribs comprising parts of the said guiding structure.

4. In a developing apparatus, a coil-form film holder having rigid convolutions to guide film when the free advancing end of the film is delivered to it edgewise, an apron at the mouth of the film holder for guiding the film, a central vertical rib, and downwardly disposed ribs diverging with respect to the central rib.

5. In a developing apparatus, a coil-form film holder having rigid convolutions to guide film when the free advancing end of the film is delivered to it edgewise, an apron at the mouth of the film holder for guiding the film, a central vertical rib, and downwardly diagonally disposed ribs comprising parts of the apron.

6. In a film developing apparatus, a coil-form film holder comprising a plurality of curved plates overlapping one another at their edges, elements to which the plates are anchored to produce a coil-form film holder, the plates having their advanced edges in stepped relation to the succeeding plate.

7. In a device relating to photography, a member having convolutions around which film may be curled, the volutions of the holder having air escapes at the tops thereof.

8. In a device relating to photography, a member having convolutions around which film may be curled, the said holder having openings at the tops of the volutions of the holder for the escape of air.

GEORGE C. BEIDLER.