

Aug. 29, 1933.

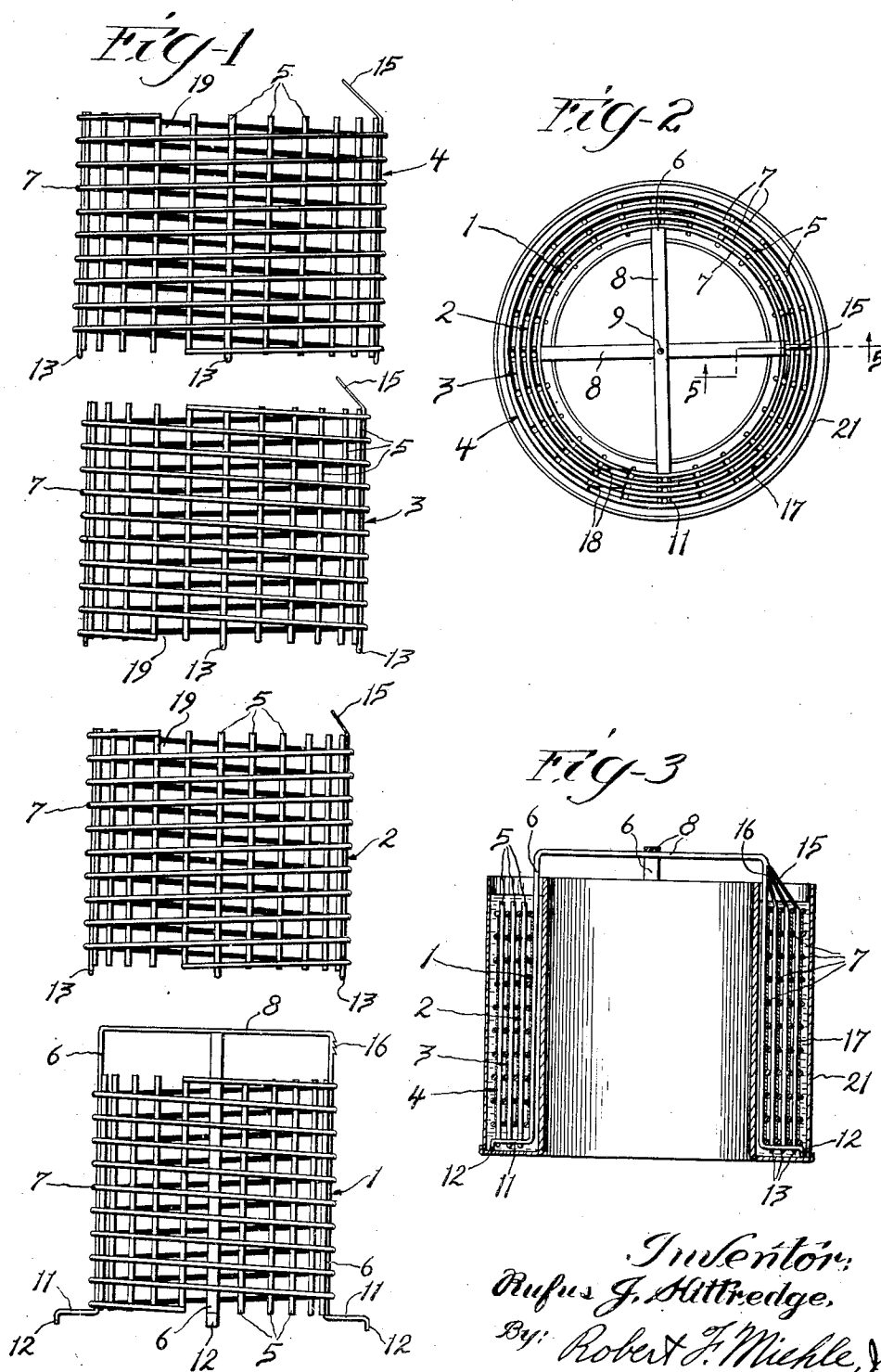
R. J. KITTREDGE

1,924,944

PHOTOGRAPHIC FILM STRIP DEVELOPING DEVICE

Filed Oct. 23, 1931

2 Sheets-Sheet 1



Inventor:
Rufus J. Kittredge,
By: Robert F. Miehle, Jr.
Atty.

Aug. 29, 1933.

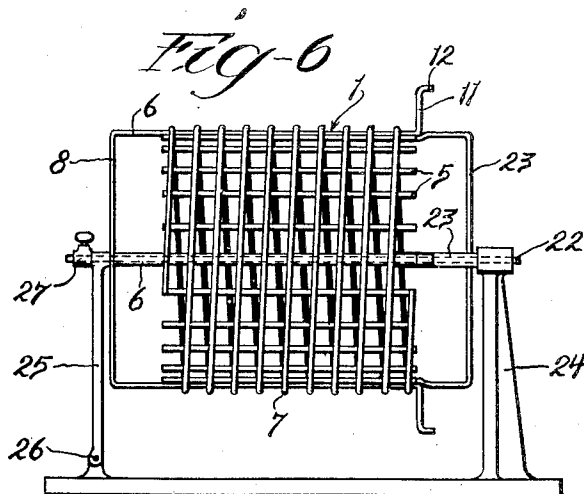
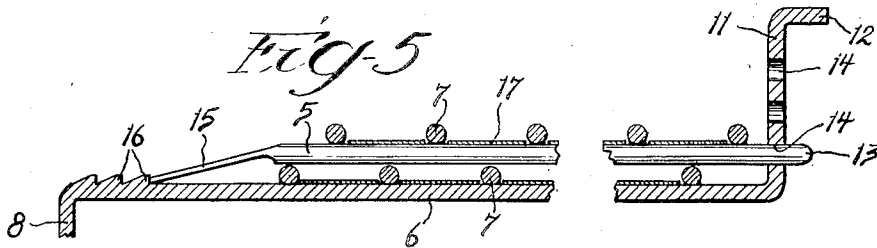
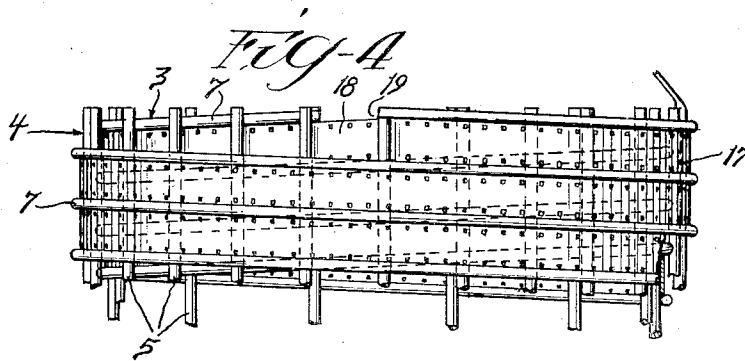
R. J. KITTREDGE

1,924,944

PHOTOGRAPHIC FILM STRIP DEVELOPING DEVICE

Filed Oct. 23, 1931

2 Sheets-Sheet 2



Inventor:
Rufus J. Kittredge,
By: Robert A. Miehle, Jr.
Kittredge

UNITED STATES PATENT OFFICE

1,924,944

PHOTOGRAPHIC FILM STRIP DEVELOPING
DEVICE

Rufus J. Kittredge, Evanston, Ill.

Application October 23, 1931. Serial No. 570,665

16 Claims. (Cl. 95—100)

My invention relates particularly to developing devices for developing motion picture film strips although not limited to this use alone.

5 The general object of the invention resides in the provision of a simple, compact and convenient device for carrying photographic film strips for the developing thereof, particularly with a view toward the requirements of the amateur in developing motion picture film.

10 With this object in view my invention consists in certain features of novelty in the construction, combination, and arrangement of parts of which the said features and certain other features, hereinafter appearing, are effected, all as fully described with reference to the accompanying drawings and more particularly pointed out in the appended claims.

In the said drawings—

20 Figure 1 is a view of the several drum members of my invention, hereinafter described, arranged in separated relation;

Figure 2 is a top plan view of the device in the assembly in which it carries a film strip for developing and inserted in a developing tank;

25 Figure 3 is a central vertical section of the structure shown in Figure 2;

Figure 4 is an enlarged view in side elevation of a portion of the device with film arranged thereon;

30 Figure 5 is an enlarged vertically condensed partial section on the line 5—5 of Figure 2; and

Figure 6 is a side elevation of one of the drums of the device mounted for the winding of film thereon.

35 Like characters of reference indicate like parts in the several views.

Referring to the drawings, 1, 2, 3 and 4 designate four drum members of different diameters adapted to be nested one upon the other by relative axial movement thereof. See Figures 1, 2 and 3.

40 These drum members are preferably reticulated and, as shown, comprise as follows.

Of these drum members, the smallest or inner drum member 1 comprises longitudinal metal members 5 and 6 angularly spaced about the axis of the drum member and a metal helical member 7 surrounding the longitudinal members and secured therewith at the points of intersection as by solder. The members 5 and 7 are formed of suitable wire while the members 6 are formed of relatively wide flat strips and are four in number arranged in diametrically opposite pairs. See Figures 1, 2, 3 and 6.

55 The members 6 extend longitudinally beyond the upper end of the drum 1, and each of said

pairs thereof is connected by an integral transverse portion 8 disposed diametrically of the drum and spaced beyond the said end thereof, and these portions 8 are suitably secured in overlying relation at their intersection and are apertured coaxially of the drum, as designated at 9, see Figure 2.

60 At the lower end of the drum 1, the members 6 are extended and bent radially outward, as designated at 11, to form an exterior shoulder formation at this end of the drum member, while the extreme corresponding ends of the members 6 are bent longitudinally and away from the drum member, as designated at 12, to form feet for supporting this drum member in upright position with the portions 11 spaced from the surface on which the feet rest.

75 The other drum members 2, 3 and 4 comprise longitudinal members 5 angularly spaced about the axes of these drum members and metal helical members 7 surrounding the longitudinal members and secured therewith at the points of intersection as by solder, the members 5 and 7 being formed of suitable wire as is the case with the drum 1.

80 As before stated, the drum members are adapted to be nested one upon the other, as shown in Figures 2 and 3, and the drum members 2, 3 and 4 have certain of the longitudinal members 5 thereof, spaced correspondingly with the members 6 of the drum 1, extended at their lower ends, as designated as 13, for engagement in apertures 14 of the portions 11 of the members 6 to prevent relative rotation of the drum members when they are nested, the shoulder formation 90 formed by the portions 11 supporting the drum members 2, 3 and 4 from the drum member 1 when in upright position. See Figures 1, 2, 3 and 5.

95 One longitudinal member 5 of each of the drum members 2, 3 and 4 is extended at its upper end by a thin resilient finger 15, and these fingers are slanted upwardly and inwardly for engagement with downwardly facing ratchet teeth 16 formed on one of the members 6 of the drum 1 to cooperate with the shoulder formation formed by the portions 11 in fixing the drum members axially when they are nested, see Figures 1, 3 and 5. The fingers 15 are manually disengaged from the ratchet teeth 16 for separating the drum members.

100 The drum members 1, 2, 3 and 4 are adapted for the carrying of a continuous strip of film 17, see Figures 2, 3, 4 and 5, wound thereon corresponding with the helical members 7 and be- 110

tween convolutions thereof, so that a relatively long film strip is compactly carried.

In order that the passage of the film strip from one drum member to an outwardly adjacent one is short and direct, as indicated at 18 in Figures 2 and 4, the helical members 7 are threaded in opposite directions upon adjacent drum members, and the construction of the drum members and the termination of the helical members 7 at the ends thereof form in effect openings on the drum members 2, 3 and 4, as designated at 19, for the passage of the film from one drum member to the outwardly adjacent one. See particularly Figure 4.

Thus, the passage 18 of the film strip from one drum member to an outwardly adjacent one is short and direct, and while there is an inclination of a slight bulge in the film strip at these passages, due to the change in direction of the strip edgewise, it is not sufficient to be detrimental.

The film strip is wound on the drum members with the emulsion face thereof outward so that this face is not in contact with the drum members, the exterior projection of the helical members 7 protecting the emulsion face of the film from contact, as will be seen in Figures 3, 4 and 5.

The inner drum member being open from the lower end thereof, that is, the end at which is arranged the aforementioned shoulder formation, the assembled drum members with the film strip thereon may be inserted into an annular developing tank 21, see Figures 2 and 3, thus providing for the development of the film strip with a relatively small quantity of developing solution, the portions 8 of the upwardly extended members 6 of the inner drum member providing for conveniently carrying the drum members carrying the film strip and for agitating the same in the developing tank to free the surface of the film strip from air bubbles.

Referring to Figure 6, the film strip is wound on the drum members in the following manner.

The inner drum member 1 is mounted for rotation on a shaft 22 by means of the shaft 22 extending through the aperture 9 of the portions 8 and a skeleton bushing or cylinder, formed of crossed U shaped members 23 secured together at their intersection, frictionally engaged in the open end of the drum member 1 and having a central aperture through which the shaft 22 extends.

One end of the shaft 22 is secured on the upper end of a fixed standard 24 while the other end of the shaft is supported by a second standard 25 which is hinged, as designated at 26, for the mounting and dismounting of the drum member 1 on the shaft, a set screw collar 27 being detachably engaged on the shaft to hold the standard 25 in upright position.

An end of the film strip is secured in a suitable manner on the drum member 1 at its lower end, and the film strip is then wound thereon between the convolutions of the helical member 7 by rotating the drum member on the shaft 22.

When this drum member is wound completely, the next drum member 2 is nested on the inner drum member and the film strip is transferred thereto and wound thereon. This procedure is followed until the film strip is completely wound upon the assembled drum members, and, after fastening the outer end of the film strip to the outermost drum member in a suitable manner,

the assemblage is complete for the development of the film.

After development and drying the film is removed from the drum members by reversing the process of its mounting on the drum members.

While I have described and claimed the preferred embodiment of my invention I do not wish to be limited to the precise details of construction as changes may readily be made without departing from the spirit of my invention, but having thus described my invention, I claim as new and desire to secure by Letters Patent the following.

1. In a device of the character described the combination of a plurality of drum members of different diameters adapted to be nested by relative axial movement thereof one upon another and adapted to carry, while nested, portions of a continuous strip, wound helically thereon.

2. In a device of the character described the combination of a plurality of reticulated drum members of different diameters adapted to be nested by relative axial movement thereof one upon another and adapted to carry, while nested, portions of a continuous strip, wound helically thereon and in opposite directions upon adjacent drum members.

3. In a device of the character described the combination of a plurality of reticulated drum members of different diameters adapted to be nested one upon another, helical formations projecting exteriorly on said drum members for the carrying, while nested, of portions of a continuous strip, wound correspondingly on said drum members between the convolutions of said helical formations.

4. In a device of the character described the combination of a plurality of drum members of different diameters adapted to be nested one upon another, helical formations projecting exteriorly on said drum members and threaded in opposite directions upon adjacent drum members for the carrying, while nested, of portions of a continuous strip, wound correspondingly on said drum members between the convolutions of said helical formations.

5. In a device of the character described the combination of a plurality of drum members of different diameters, adapted to be nested one upon another, helical formations projecting exteriorly on said drum members and threaded in opposite directions upon adjacent drum members for the carrying, while nested, of portions of a continuous strip, wound correspondingly on said drum members and between convolutions of said helical formations, the drum members other than the inner one being provided with end openings arranged oppositely on adjacent drum members for the passage of the strip from one drum member to the outwardly adjacent one.

6. In a device of the character described the combination of a plurality of drum members of different diameters adapted to be nested by relative axial movement thereof one upon another and adapted to carry, while nested, portions of a continuous strip, wound helically thereon, and an exterior shoulder formation on the inner drum member forming a support for the other drum member or members.

7. In a device of the character described the combination of a plurality of drum members of different diameters adapted to be nested one upon another and adapted to carry, while nested, portions of a continuous strip wound helically thereon and in opposite directions upon adjacent

drum members, an exterior shoulder formation one one end of the inner drum member and forming a support for the other drum member or members, and releasable means cooperating with said shoulder formation for axially fixing said drum members.

8. In a device of the character described the combination of a plurality of drum members of different diameters adapted to be nested one upon another and adapted to carry, while nested, portions of a continuous strip, wound helically thereon, an exterior shoulder formation on the inner drum member forming a support for the other drum member or members, releasable means cooperating with said shoulder formation for axially fixing said drum members, and means for angularly fixing said drum members.

9. In a device of the character described the combination of a plurality of reticulated drum members of different diameters adapted to be nested one upon another, helical formations projecting exteriorly on said drum members and threaded in opposite directions upon adjacent drum members for the carrying, while nested, of portions of a continuous strip, wound correspondingly on said drum members and between convolutions of said helical formations, an exterior shoulder formation on one end of the inner drum member and forming a support for the other drum member or members, and a carrying structure on the other end of said inner drum member.

10. In a device of the character described the combination of a plurality of reticulated drum members of different diameters adapted to be nested one upon another, helical formations projecting exteriorly on said drum members and threaded in opposite directions upon adjacent drum members for the carrying, while nested, of portions of a continuous strip wound correspondingly on said drum members and between convolutions of said helical formations, the drum members other than the inner one being provided with end openings arranged oppositely on adjacent drum members for the passage of the strip from one drum member to the outwardly adjacent one, an exterior shoulder formation on one end of the inner drum member and forming a support for the other drum member or members, a carrying structure on the other end of said inner drum member, releasable means cooperating with said shoulder formation for axially fixing said drum members, and means for angularly fixing said drum members.

11. An article of the character described con-

sisting of a drum member adapted to have a strip wound helically thereon and open from one end for the insertion of the drum member into an annular tank.

12. An article of the character described consisting of a reticulated drum member provided with an exterior helical formation adapted to have a strip wound thereon between the convolutions of said helical formation and being open from one end for the insertion of the drum member into an annular tank, and a carrying structure at the other end of said drum member.

13. An article of the character described consisting of a reticulated drum member provided with an exterior helical formation adapted to have a strip wound thereon between the convolutions of said helical formation and being open from one end for the insertion of the drum member into an annular tank, an exterior shoulder formation on said end of the drum member, and a carrying structure at the other end of said drum member.

14. An article of the character described in the form of a reticulated drum member comprising longitudinal members angularly spaced about the axis thereof and a helical member surrounding said longitudinal members and secured therewith.

15. An article of the character described in the form of a reticulated drum member comprising longitudinal members angularly spaced about the axis thereof and a helical member surrounding said longitudinal members and secured therewith, certain of said longitudinal members having extended ends thereof at one end of the drum member extending radially outward of the drum member, and a carrying structure at the other end of said drum member.

16. In a device of the character described the combination of a plurality of drum members of different diameters adapted to be nested one upon another, each comprising longitudinal members angularly spaced about the axis thereof and a helical member surrounding said longitudinal members and secured therewith, certain of said longitudinal members of the inner drum member at one end thereof extending radially outward of this drum member, and the corresponding ends of certain of the longitudinal members of the other drum member or members being extended for engagement with the radial portions of the longitudinal members of said inner drum member to prevent relative angular movement of said drum members.

RUFUS J. KITTREDGE.

60 135
65 140
70 145
75 150