Aug. 2, 1938. R. H. DRAEGER 2,125,285

PROCESSING FILM HOLDER

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Fig. 1.

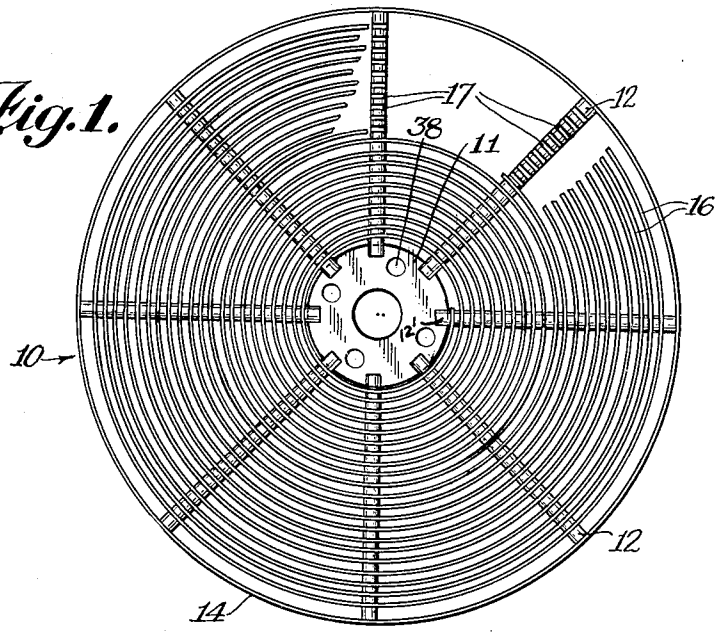

Fig. 2.

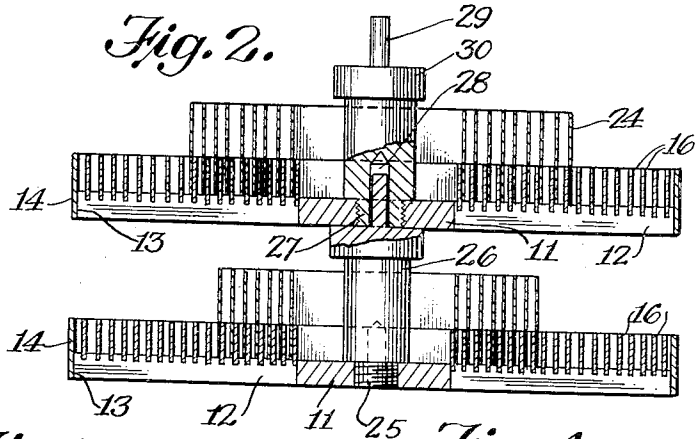

Fig. 3.

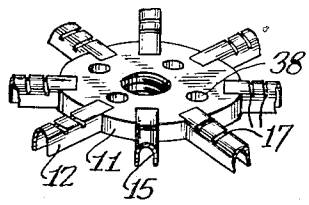

Fig. 4.

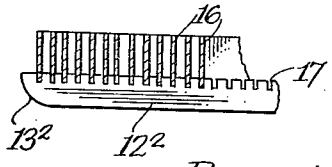

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Fig. 5.

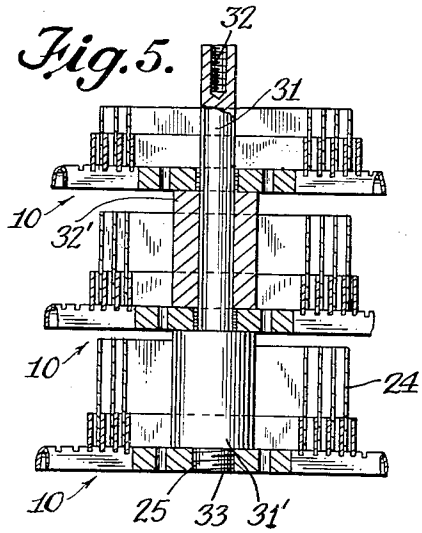


Fig. 6.

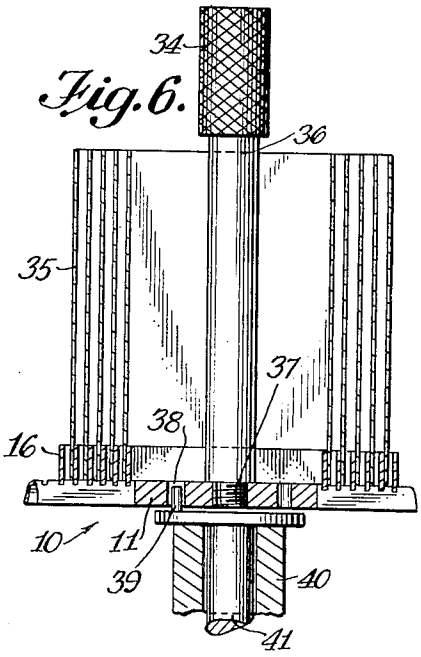


Fig. 7.

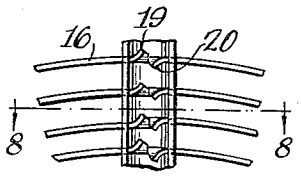


Fig. 10.

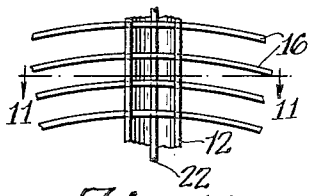


Fig. 9.

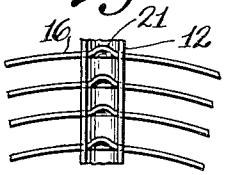


Fig. 8.

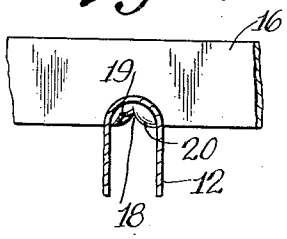


Fig. 11.

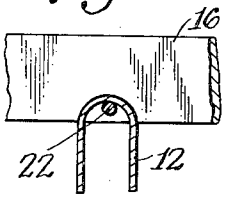
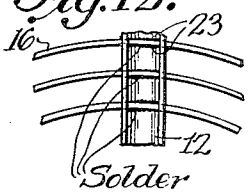


Fig. 12.



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UNITED STATES PATENT OFFICE

2,125,285

PROCESSING FILM HOLDER

Rupert H. Draeger, United States Navy

Application November 14, 1935, Serial No. 49,756

6 Claims. (Cl. 242—77)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

This invention relates to a processing film holder and it is an object of the invention to provide an improved holder especially intended for use in processing film or photographic paper; that is, for holding long strips of film or photographic paper while it is being processed by being placed in chemical solutions or water baths during the development and fixing of the pictures on film or photographic paper.

A further object of this invention is to provide a holder capable of receiving and holding film not only in the conventional sizes but also in extra wide sizes, such as 70 mm. or larger, as compared with the conventional widths 35, 16 or 8 mm.

A further feature of this invention is that the holder is serviceable not only while the film is being processed, that is, actually in the processing solutions, but will also serve to hold the film while the solutions are being drained therefrom or while the film is being removed from one and being placed in another solution and which holder will allow the solution to readily drain therefrom.

Another feature of this invention is the method of assembling the holder and of forming the holder so that it will not act to carry an appreciable amount of the solution along when transferring the film from one solution to the other.

As a further feature of this invention, the holder is so arranged that a plurality of holders with the film thereon may be placed in superimposed relation to each other, each holder acting as a support for the next holder.

A further feature is the holder which is so arranged that it may easily be manipulated to quickly position the film or paper therein ready for processing.

With the above and other objects in view, the invention consists in the construction, combination and arrangement of parts as will be hereinafter more fully described.

In the drawings:

Fig. 1 is a top plan view of the holder per se;

Fig. 2 is a sectional view through a pair of superimposed holders with the film thereon;

Fig. 3 is a perspective view of the holder center with portions of spider arms attached thereto;

Fig. 4 is a sectional view, partly broken away, of a modified form of a spider arm;

Fig. 5 is a partly sectional, partly broken away view of a plurality of superimposed holders showing a modified form of supporting the upper holders on the lower holders;

Fig. 6 is a partly sectional view of a holder showing the means for rotating the same and showing an extra wide film or photographic paper in position thereon;

Fig. 7 is a bottom detail view of one form of securing the spiral to the spider arm;

Fig. 8 is a sectional view on line 8—8 of Fig. 7;

Fig. 9 is a bottom detail view of another form of securing means between the helix and the spider arm;

Fig. 10 is a bottom detail view of still another form of securing means between the spiral and spider arm;

Fig. 11 is a section on line 11—11 of Fig. 10; and

Fig. 12 is a bottom detail view of yet an additional form of securing the spiral to the spider arms.

The photographic film and photographic paper strips were made for record purposes as well as for movie films or a series of individual recordations are generally in the form of long narrow strips often as long as 100 feet. Such film or paper must be processed, that is, exposed to different chemicals in certain order so as to develop and fix the optical images thereon. In order to hold the film during this processing, it is desirable to provide a holder which will allow the emulsion surface of the entire strip to be uniformly exposed to the action of the processing solutions. The holder 10 of this invention provides such a means for holding the strips and includes a center base 11 to which is secured a plurality of spider arms 12, eight spider arms being shown therewith but it is obvious that a greater or lesser number of spider arms may be provided.

The spider arms 12 are preferably equally spaced about the periphery of the center base 11 and the outer ends 12 are connected by a reinforcing strip 14. Each of the spider arms 12 is inverted-U-shaped in cross-section, the bight of the U being in a smooth curve as is clearly shown at 15 in Fig. 3.

A long strip of metal somewhat longer than the maximum length of the film to be held is formed into a spiral 16 and each of the spider arms 12 is provided across the bight 15 with a plurality of appropriately spaced slits 17. These slits 17 are equally spaced along each spider arm 12 but starting at the particular spider arm 12', the slits on each succeeding arm are spaced a slight distance farther out from the base 11 and when there are eight spider arms, this distance is just equal to one-eighth of the space between the succeeding slits 17 so that a perfect spiral 16 may be supported in the slits 17.

In Figs. 7 to 12, inclusive, different methods of securing the spiral 16 to the spider arms are illustrated. In Figs. 7 and 8 it is shown that the portion of the spiral member 16 that extends through the slit into the bight of the spider arm is split as at 18 and one edge of the split 19 is bent in one direction and the other side of the split 20 is bent in the other direction, thus locking the spiral member 16 to the spider arm. It is obvious that both corners could be bent in the same direction.

In Fig. 9 the portion of the spiral member 16 extending into the bight of the spider arm 12 is deformed toward one side as at 21 to lock it in position. This deformation may be of an S-curve or other form.

As shown in Figs. 10 and 11 the spiral strip 16 is perforated just below the bight of the spider arm 12 and a locking pin 22 passes through the perforations of each succeeding coil of the spiral to lock it to the spider arm.

In Fig. 12 a drop of solder 23 may be spaced on each side of the spiral member 16 where it extends into the bight of the spider arm 12.

Instead of forming the spider arms with a square end, as shown at 13 in Fig. 2, the spider arm 12^2 may have its end 13^2 form in a curve as shown and not have any outer supporting flange.

The holder 10, as thus far described, provides a convenient support or holder for photographic film 24 or photographic paper strip 35, the strips 24 and 35 being supported at the bottom, the spiral form of the strips aiding in holding the material in the desired vertical position.

The center base 11 at Figure 2 is provided with a threaded aperture 25 and this threaded aperture may be used for receiving a supporting spindle 26, the spindle being provided with a threaded boss 27 which cooperates with the threaded aperture 25 in the base 11. This threaded boss 27 is provided with a cylindrical recess 28 adapted to receive therein a cylindrical pin 29 extending outwardly from an enlarged head 30 of the top of the spindle 26 whereby the head 30 acts as a support for an upper holder 10, the pin 29 entering the cylindrical recess 28 of the next upper spindle 26.

In this manner an indefinite number of holders may be supported, one above the other, allowing the photographic strips 24 to be processed thereon.

As a result of the curvature 15 at the bight of the spider arms, no solution will be held thereon, as the case would be if the top were flat. Furthermore, this curvature reduces the total fluid held by capillary attraction which otherwise would be present if the spider arm had a flat top and thus this curvature allows more rapid drainage of the solution from the spiral. Instead of using spindle 26 a handle rod 31 as shown at Fig. 5 may be screwed into the center base 11. Handle rod 31 is formed with a threaded boss 33 adapted to fit threaded aperture 25, has an enlarged cylindrical end 31' the length of which is slightly greater than the film width, and a slender cylindrical portion of less diameter than aperture 25 of any desired length having an internally threaded recess 32 in the upper end. When this rod is screwed into lower holder 10 another holder 10 may then be placed over the handle rod 31 and supported on the enlarged lower end 31'. A hollow spool 32 slightly longer than the width of the film strip 24 may be placed on the second holder and a third holder 10 placed thereover. This may be continued indefinitely and the handle rod 31 may be used to transport any number of holders so superimposed. A handle knob such as shown at 34 in Fig. 6 may be secured to the top of the handle rod 31 by having an externally threaded pin extend from handle 34 and screwed into the recess 32 at the top of handle rod 31.

In Fig. 6 the holder 10 is shown as being used with an extra wide photographic paper or film strip 35. In this case a handle rod 36 is threaded as at 37 into the base 11. As will be observed, the base 11 is provided with a plurality of apertures 38, the apertures 38 being adapted to cooperate with a pin 39 on the top of a rotatable spindle 40 supported on a shaft 41. By placing the holder on the spindle 40 it may easily be rotated and the film strip may quickly be loaded in between the convolutions of the spiral member 16. When the photographic paper strip or film has been put in place on the holders, the holders are placed in tanks or appropriate solutions for processing the same.

The invention described herein may be manufactured and used by or for the Government of the United States of America for governmental purposes without the payment of any royalties thereon or therefor.

I claim:

1. A processing film holder comprising a base, a plurality of spider arms extending outwardly from said base and a spiral coil supported on said spider arms, said spider arms being substantially inverted-U-shape in cross-section, said spider arms each being provided with a plurality of spaced slits across the bight to receive an edge of the spiral coil therethrough, and means for securing the edge of the coil within each slit, said means comprising a split formed in the portion of the coil extending through the bight with the edges of the split turned.

2. A processing film holder comprising a base, a plurality of spider arms extending outwardly from said base and a spiral coil supported on said spider arms, said spider arms being substantially inverted-U-shape in cross-section, said spider arms each being provided with a plurality of spaced slits across the bight to receive an edge of the spiral coil therethrough, and means for securing the edge of the coil within each slit, said means including a pin extending through an aperture in the portion of the coil extending through the slit in the bight.

3. A processing film holder comprising a base, a plurality of spider arms extending outwardly from said base, a spiral coil supported on said spider arms, said spider arms being substantially inverted-U-shape in cross-section, said base having a centrally threaded aperture therein, and a support having a threaded boss at one end adapted to be threadedly secured to said base, said threaded boss having an internal cylindrical recess formed therein and a cylindrical pin integrally extending from the upper end of said support of a diameter not greater than the diameter of the cylindrical recess in its base whereby a plurality of holders may be supported one above the other.

4. A processing film holder comprising a base, a plurality of spider arms extending outwardly from said base, a spiral coil supported on said spider arms, said spider arms being substantially inverted-U-shape in cross-section, said base having a centrally located aperture therein, a handle adapted to be removably mounted in said aperture of said base and a spacer spindle adapted to be mounted on said handle for spaced-

ly supporting a superimposed film holder above the first mentioned film holder.

5. A processing film holder comprising a base, a plurality of spider arms extending outwardly from said base, a spiral coil supported on said spider arms, said spider arms being substantially inverted-U-shaped in cross-section, said base having a centrally threaded aperture therein, and a support having a threaded boss at one end adapted to be threadedly secured to said base, a cylinder next to said boss larger in diameter than said boss and longer than the width of the film being processed and an upper cylinder smaller in diameter than the said aperture in said base.

6. A processing film holder comprising a base having a central aperture, a plurality of spider arms extending outwardly from said base, a spiral coil supported on said spider arms, a handle adapted to be removably mounted in the aperture of said base, and a spacer adapted to be mounted on said handle for spacedly supporting a superimposed film holder above the first mentioned film holder.

RUPERT H. DRAEGER.