M. H. STOCKWELL.

DAYLIGHT DEVELOPING AND FIXING APPARATUS FOR ROLL FILMS.

APPLICATION FILED NOV. 22, 1920.

1,395,160.

Patented Oct. 25, 1921.

3 SHEETS—SHEET 1.

FIG. 1a.

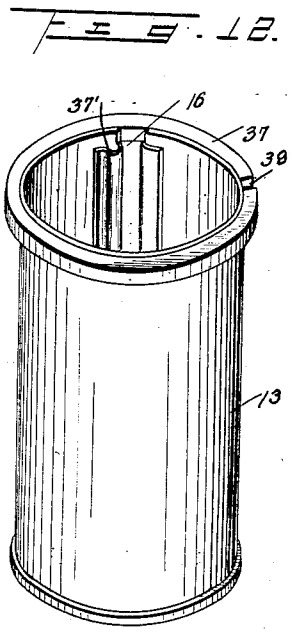


FIG. 1.

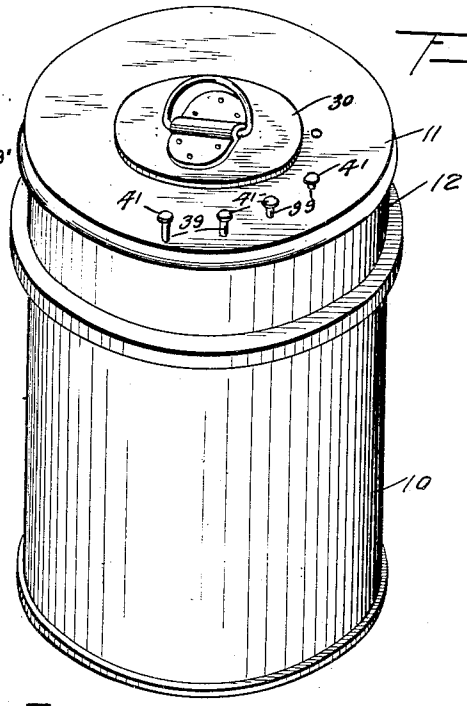


FIG. 2.

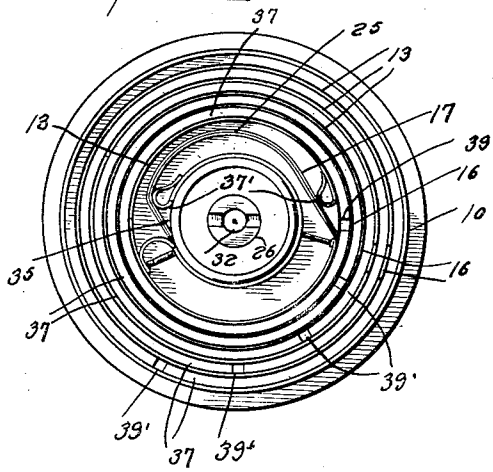
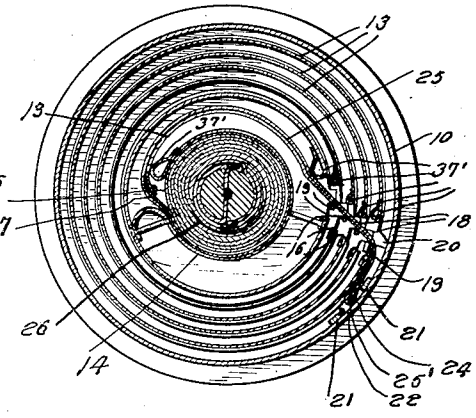


FIG. 3.



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3 SHEETS—SHEET 2.

FIG. 4.

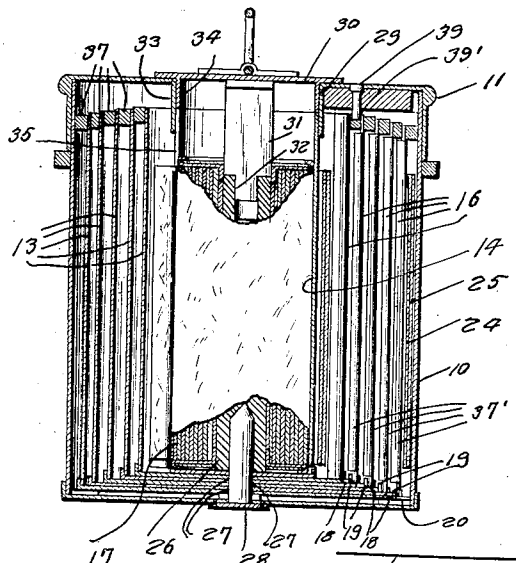


FIG. 10.

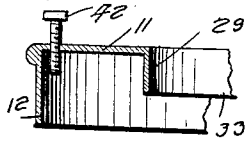


FIG. 8.

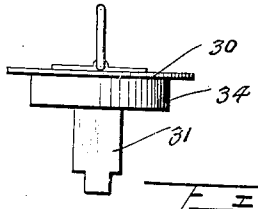


FIG. 9.

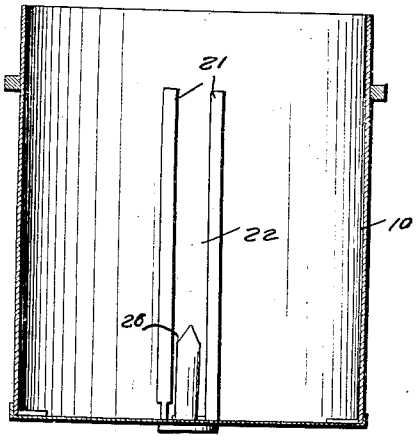
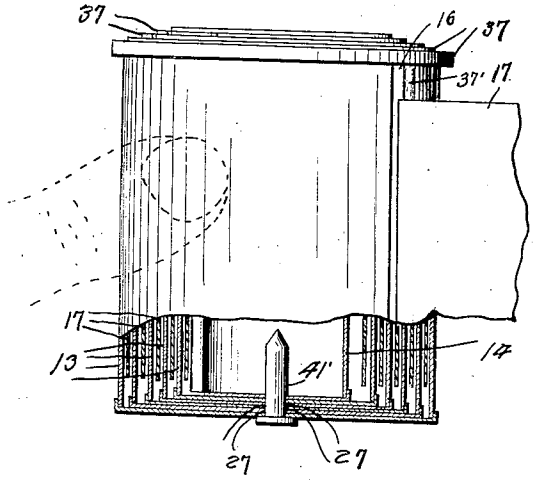


FIG. 11.



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3 SHEETS—SHEET 3.

FIG. 5.

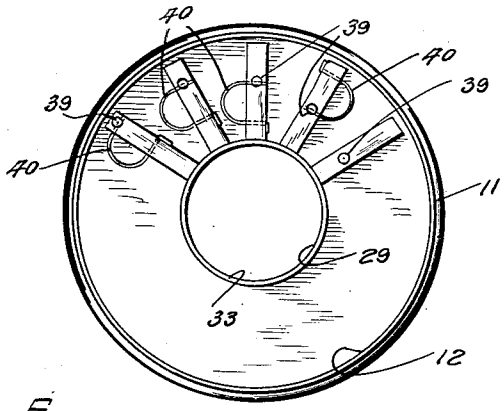


FIG. 6.

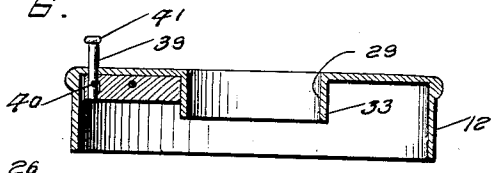


FIG. 7.

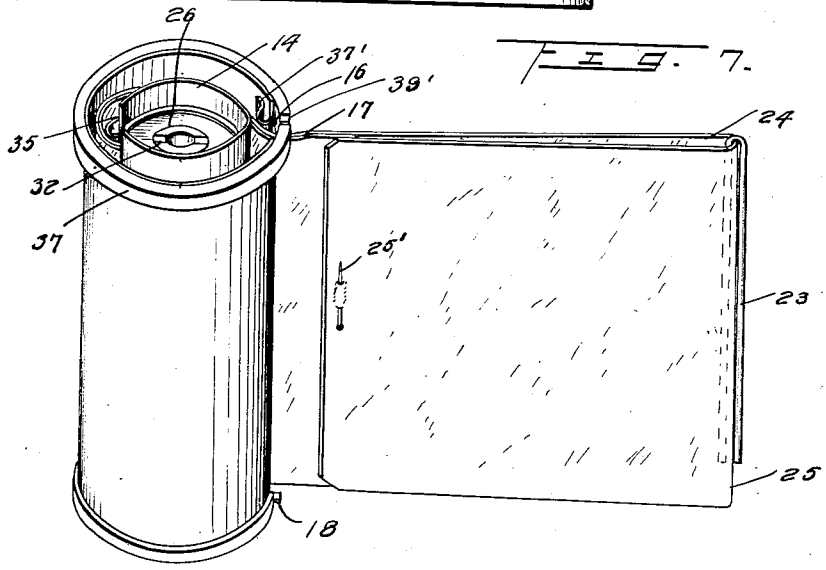
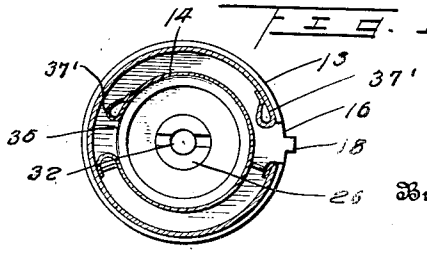


FIG. 13.



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UNITED STATES PATENT OFFICE.

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DAYLIGHT DEVELOPING AND FIXING APPARATUS FOR ROLL-FILMS.

1,395,160. Specification of Letters Patent. Patented Oct. 25, 1921.

Application filed November 22, 1920. Serial No. 425,764.

To all whom it may concern:

Be it known that I, MYRON H. STOCKWELL, a citizen of the United States, residing at Geneva, in the county of Ontario and State of New York, have invented certain new and useful Improvements in Daylight Developing and Fixing Apparatus for Roll-Films; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The object of the invention is to provide a comparatively simple and relatively inexpensive apparatus of a compact portable form which may be used as a means for developing and fixing roll films without resorting to a dark room, to the end that the operation may be performed in the field wherever it may be desirable or convenient to develop a film, to prevent the deterioration or fading of the same when, for example, a considerable time must elapse between the exposure and the possibility of having access to a dark room for developing and printing; and with this object in view the invention consists in a construction and combination of parts of which a preferred embodiment is shown in the accompanying drawing wherein,

Figure 1 is a perspective view of an apparatus embodying the invention,

Fig. 2 is a plan view of the same with the revoluble head omitted,

Fig. 3 is a horizontal sectional view,

Fig. 4 is a central vertical sectional view,

Fig. 5 is an inverted or inside view of the head,

Fig. 6 is a detail sectional view of the head showing one of the locking means whereby the drums are independently and respectively secured to the head for communicating rotary motion thereto,

Fig. 7 is a view of the inner drum and spool seat removed from the casing and showing the extremity of the safety strip extended and looped and having engaged therewith the terminal anchoring pin,

Fig. 8 is a detail view of the removable cap or stopper with the attached key for engagement with the spool which carries the film,

Fig. 9 is a sectional view of the casing with the drums omitted to show the anchoring bars arranged on the inner surface of the wall thereof,

Fig. 10 is a detail view of a revoluble head showing a modified form of locking means for engaging the drums,

Fig. 11 is a view of the nested drums applied to a center pin after the completion of the developing and fixing operation to facilitate the removal of the film therefrom,

Fig. 12 is a detail perspective view of the inner drum, and

Fig. 13 is a sectional view taken on a plane extending horizontally through the inner drum and spool seat.

The apparatus consists essentially of a cylindrical casing or container 10 having a revoluble and preferably removable head 11 which in the construction illustrated is provided with an exterior flange 12 embracing the open end of the casing, a series of nested concentric telescoping cylindrical drums 13 arranged within the casing, and adapted for independent revoluble movement, with a tubular spool seat 14 arranged in and concentric with and secured to the innermost drum and adapted to rotate therewith. The drums are provided respectively with longitudinal film slots 16 to permit of the passage therethrough of the film 17 and each drum is provided with means for limiting the rotary movement thereof in opposite directions with relation to the drum in which it is fitted or the drum of next larger diameter. In this construction illustrated, these stop or limiting means consist of a radial lug 18 on each drum preferably at the bottom for engagement with an upstanding lug or pin 19 on the drum of next larger diameter, with the exception that the outermost drum or drum of largest diameter, is provided with a radial lug 20 for engagement with a channeled rib 21 on the side wall of the casing, represented by parallel bars or projections between which is formed a seat or channel 22 for the reception of an anchor pin 23 of the split key type adapted to be engaged with a looped portion 24 of the safety strip 25 to the end that the end of the film is secured or anchored to the casing to permit of the movement independently thereof of the several drums, to extend said film between the walls of the drums and thus expose the surfaces thereof to the developing or fixing liquid. The end of the safety strip

is folded back and secured by a pin 25′ or the equivalent thereof to form a loop with which the anchoring pin may be engaged, and when this pin is arranged in the seat in the casing, it is held from displacement therefrom by the adjacent surface of the outermost rotary drum to permit of the independent rotation respectively of said drums and therefore the extension of the film between the drums, the film being unreeled or unrolled from the spool 26 during such operation.

The drums are provided in their lower ends or bottoms with central registering openings 27 for engagement with a terminally pointed or reduced centering pin 28 projecting upward centrally from the bottom of the casing and serving as a spindle for the drums in the rotary movement thereof, while fitted in an opening 29 in the revoluble head is a removable stopper or cap 30 having a depending key 31 for engagement with the end of the spool, which is provided with a socket 32 for that purpose, so that rotary motion may be communicated to the spool.

In addition to the exterior flange with which the head is provided, it carries an inner concentric flange 33 fitting within the upper end of the innermost drum to thus combine with the drums and casing to form an annular dark chamber in which the drums operate, and between which the film may be extended without risk of being light struck even should the stopper or cap be removed from the center of the head, and said stopper or cap is fitted with an inwardly extending flange 34 to fit snugly within the end of the tubular spool seat.

As above indicated, the spool seat is secured in the innermost drum and the longitudinal slot 35 thereof is disposed in an angular relation with the slot in said drum, for example at an angle of 180 degrees therefrom, so as to provide an annular light trap between the spool seat and said innermost drum, to permit of the removal of the stopper or cap during the developing operation without risk of damaging the film.

The drums are preferably provided at their upper edges with reinforcing and spacing ribs or rims 37 serving to hold the walls of the several drums at the desired interval to afford a free passage for the film therebetween, and the edges of the slots in the walls of the drums are preferably rolled or beaded as shown at 37′ to avoid abrading the film and to cause the same to slide freely thereover during the winding and unwinding of the film.

The means for communicating rotary motion respectively and consecutively to the drums consists in the construction illustrated of a series of locking pins 39 mounted upon the head and adapted for terminal engagement respectively with notches or sockets 39 in the upper edges of the drums or in the reinforcing and spacing ribs thereof, said pins being yieldingly held in their inoperative or disengaged positions by springs 40 and being provided at their upper ends with knobs or enlargements 41 upon which the operator may press to interlock any desired drum with the head to turn the drum to unwind or extend the film, it being understood that such extension is necessary after the film has been arranged in the apparatus to expose all portions of the surface thereof to the developing and fixing liquid.

After the extension of the film as described, the key carrying stopper or cap 30 should be removed by turning it to the right and at the same time raising it so as to unwind the safety paper therefrom and remove the spool. The surplus paper should then be cut away from within the spool seat after which the developing liquid should be poured into the apparatus through the opening from which the stopper has been removed.

After the film has been properly developed and fixed the liquid should be poured off, and then after removing the cover the tank may be inverted and the nest of drums removed therefrom and placed as indicated in Fig. 11 upon a center pin 41′ (which is otherwise independent of the apparatus and is used merely for convenience), whereupon by holding the outside drum with one hand the film may be withdrawn with the paper from the nested drums for printing or other use.

As hereinabove indicated, in applying the film to the apparatus in the first instance, the end portion of the safety paper is removed and discarded. In other words the safety paper should be unrolled until it is possible to see the end of the film and then should be cut off to leave a projecting portion of six or eight inches. This projecting end should then be folded back and pinned or fastened in any like suitable manner over the film to itself and to the film to form a loop. This serves to secure the loose end of the film and prevent it from catching in the edges of the drums and at the same time the loop of paper provided serves as a means for engaging the pin 25 by which the extremity of the film is anchored in the casing.

In the modified construction of locking means shown in Fig. 10, the drum engaging means consist of screws 42 mounted in the head and adapted for terminal engagement with sockets or notches in the several drums. Also obviously having secured an interlocking engagement between the head and one of the drums, the rotation of the former will impart a similar movement to the latter until the movement of the drum is checked by the stops provided for that purpose as

hereinabove described. The drums may be successively turned in one direction or the other to either extend or rewind the film.

What is claimed is:—

1. A roll film developing and fixing apparatus having a casing provided with a revoluble head, a series of independently revoluble nested drums each having a film outlet slot, a central spool seat, means for anchoring the free end of the film to the casing, and means for respectively and consecutively locking the drums to the head.

2. A roll film developing and fixing apparatus having a casing provided with a revoluble head, a series of independently revoluble nested drums fitted in the casing and each having a film outlet slot, a central spool seat within and carried by the innermost drum and provided with a film outlet slot in angular relation to that of the said drum to form a light trap, means for anchoring the free end of the film to the casing, and means for respectively and consecutively locking the drums to the head.

3. A roll film developing and fixing apparatus having a casing provided with a revoluble head, a series of independently revoluble nested drums each having a film outlet slot, a central spool seat, means for anchoring the free end of the film to the casing, and means for respectively and consecutively locking the drums to the head, stops being provided to limit the rotary movement of each drum with relation to the drum of next larger diameter.

4. A roll film developing and fixing apparatus having a casing provided with a revoluble head, a series of independently revoluble nested drums each having a film outlet slot, a central spool seat, means for anchoring the free end of the film to the casing, and means for respectively and consecutively locking the drums to the head, stops being provided to limit the rotary movement of each drum with relation to the drum of next larger diameter, and consisting of a lug on the former for engaging a pin on the latter.

5. A roll film developing and fixing apparatus having a casing provided with a revoluble head, a series of independently revoluble nested drums each having a film outlet slot, a central spool seat, means for anchoring the free end of the film to the casing, and means for respectively and consecutively locking the drums to the head, stops being provided to limit the rotary movement of each drum with relation to the drum of next larger diameter, and consisting of a lug on the former for engaging a pin on the latter, the outermost drum having a stop lug for engagement with limiting means on the wall of the casing.

6. A roll film developing and fixing apparatus having a casing provided with a revoluble head, a series of independently revoluble nested drums each having a film outlet slot, a central spool seat, means for anchoring the free end of the film to the casing, and means for respectively and consecutively locking the drums to the head, the means for anchoring the end of the film consisting of a channeled rib on the wall of the casing and a split pin for engaging a terminal loop carried by the film.

7. A roll film developing and fixing apparatus having a casing provided with a revoluble head, a series of independently revoluble nested drums each having a film outlet slot, a central spool seat, means for anchoring the free end of the film to the casing, and means for respectively and consecutively locking the drums to the head, each of said drums being provided in its lower end with a centering opening for engaging a centering pin projecting from the bottom of the casing.

8. A roll film developing and fixing apparatus having a casing provided with a revoluble head, a series of independently revoluble nested drums each having a film outlet slot, a central spool seat, means for anchoring the free end of the film to the casing, and means for respectively and consecutively locking the drums to the head, each of said drums being provided at its upper edge with a reinforcing and spacing rib.

9. A roll film developing and fixing apparatus having a casing provided with a revoluble head, a series of independently revoluble nested drums each having a film outlet slot, a central spool seat, means for anchoring the free end of the film to the casing, and means for respectively and consecutively locking the drums to the head, said locking means consisting of pins on the head for engaging notches or sockets in the upper edges of the drums.

10. A roll film developing and fixing apparatus having a casing provided with a revoluble head, a series of independently revoluble nested drums each having a film outlet slot, a central spool seat, means for anchoring the free end of the film to the casing, and means for respectively and consecutively locking the drums to the head, said locking means consisting of spring repressed pins carried by the head for terminal engagement with notches or sockets in the adjacent edges of the drums.

11. A roll film developing and fixing apparatus having a casing provided with a revoluble head, a series of independently revoluble nested drums each having a film outlet slot, a central spool seat, means for anchoring the free end of the film to the casing, and means for respectively an consecutively locking the drums to the head, said head having an inwardly directed

flange to fit within the upper end of the innermost drum to form therewith an annular dark chamber in which the coöperating drums are housed.

12. A roll film developing and fixing apparatus having a casing provided with a revoluble head provided with a central opening therein, a series of independently revoluble nested drums fitted in the casing and each having a film outlet slot, a central spool seat within and carried by the innermost drum and provided with a film outlet slot in angularly disposed relation to that of the said drum to form a light trap, means for anchoring the free end of the film to the casing, and means for respectively and consecutively locking the drums to the head, a removable stopper or cap being fitted in said central opening in said head.

13. A roll film developing and fixing apparatus having a casing provided with a revoluble head provided with a central opening therein, a series of independently revoluble nested drums fitted in the casing and each having a film outlet slot, a central spool seat within and carried by the innermost drum and provided with a film outlet slot in angularly disposed relation to that of the said drum to form a light trap, means for anchoring the free end of the film to the casing and means for respectively and consecutively locking the drums to the head, a removable stopper or cap being fitted in said central opening in the head and provided with an inwardly directed flange to fit the adjacent end of the spool seat.

14. A roll film developing and fixing apparatus having a casing provided with a revoluble head provided with a central opening therein, a series of independently revoluble nested drums fitted in the casing and each having a film outlet slot, a central spool seat within and carried by the innermost drum and provided with a film outlet slot in angularly disposed relation to that of the said drum to form a light trap, means for anchoring the free end of the film to the casing, and means for respectively and consecutively locking the drums to the head, a removable stopper or cap being fitted in said central opening in the head and provided with an inwardly directed flange to fit the adjacent end of the spool seat, said stopper or cap carrying a spool engaging key.

In testimony whereof I affix my signature in presence of two witnesses.

MYRON H. STOCKWELL.

Witnesses:

Mrs. M. Stockwell,

Mrs. Perry Swinehart.