

E. A. TAYLOR.
DEVELOPING MACHINE FOR PHOTOGRAPHIC FILMS.
APPLICATION FILED SEPT. 4, 1908.

938,287.

Patented Oct. 26, 1909.

3 SHEETS—SHEET 1.

Fig. 1.

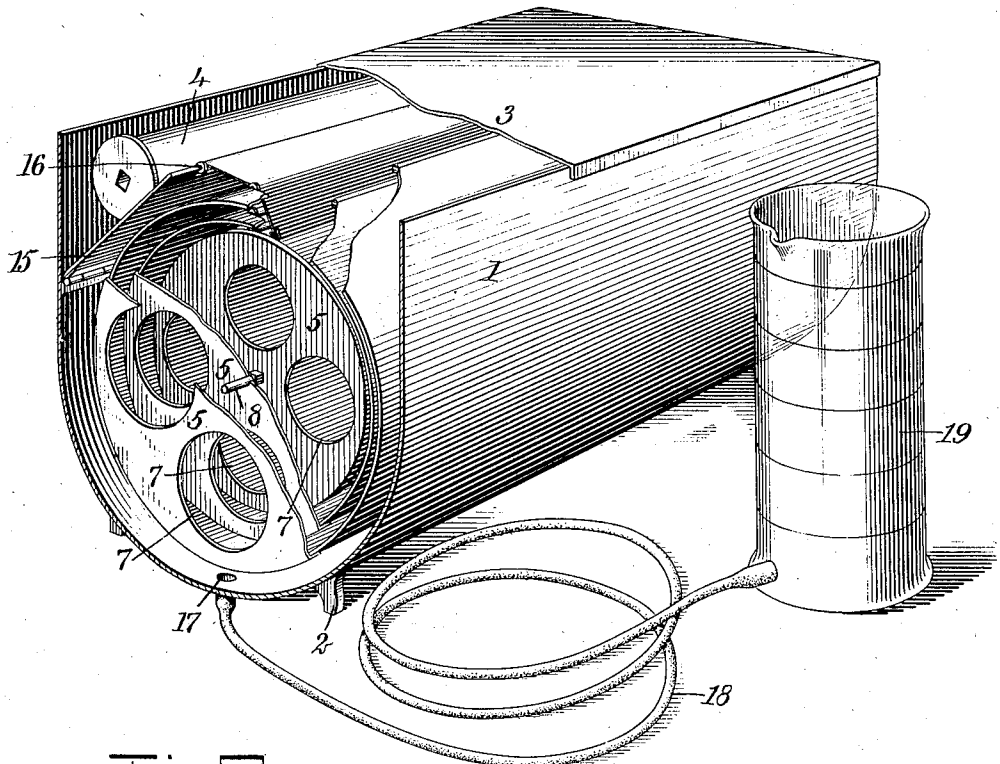
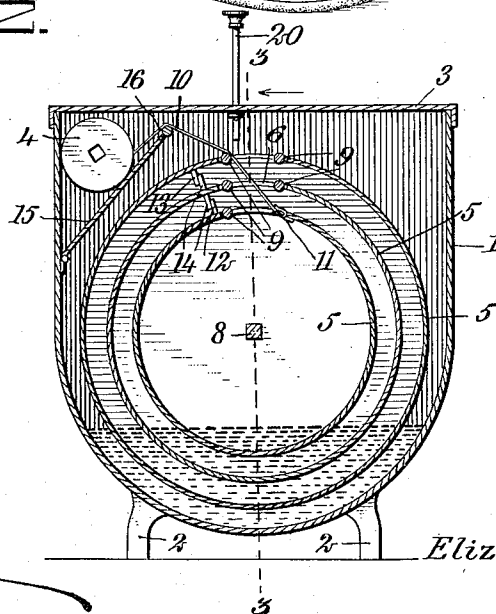


Fig. 2.



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3 SHEETS—SHEET 2.

Fig. 3.

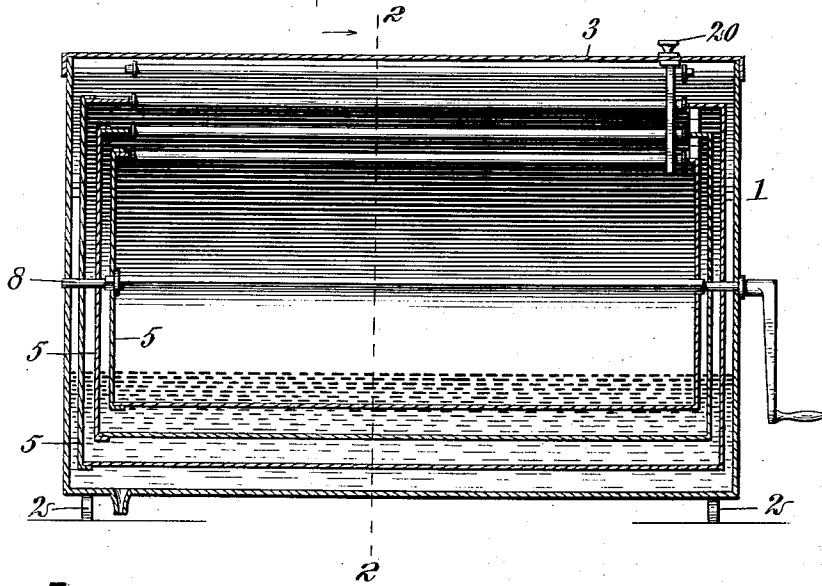


Fig. 4.

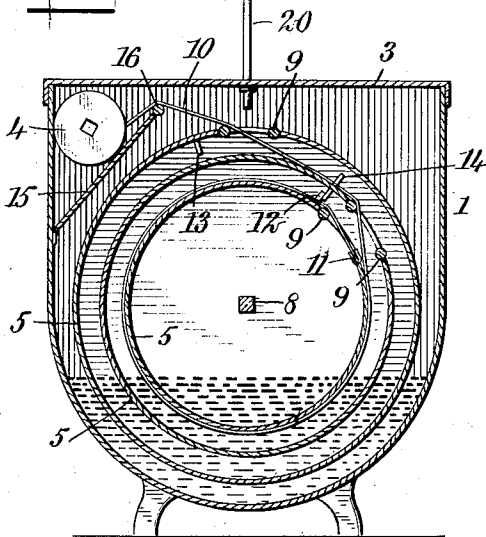
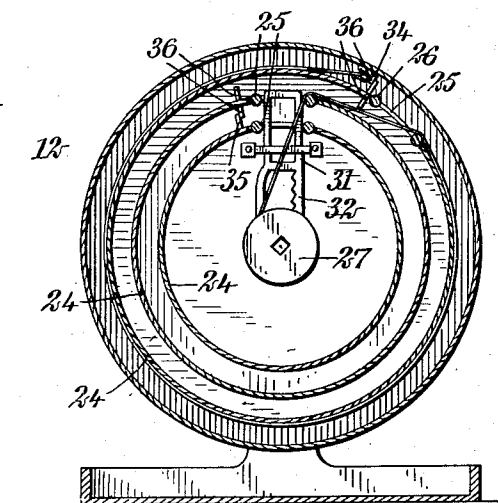


Fig. 5.



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3 SHEETS—SHEET 3.

Fig. 6.

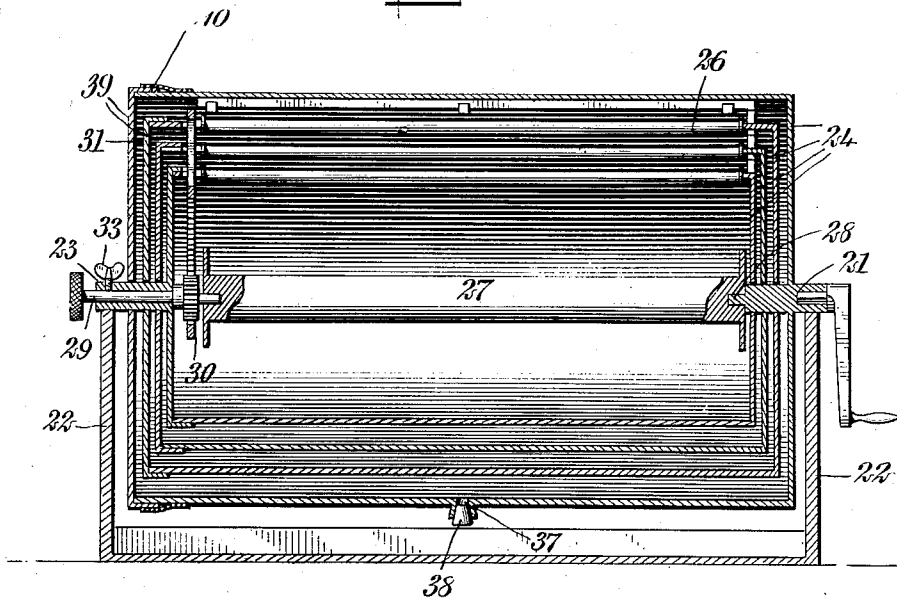
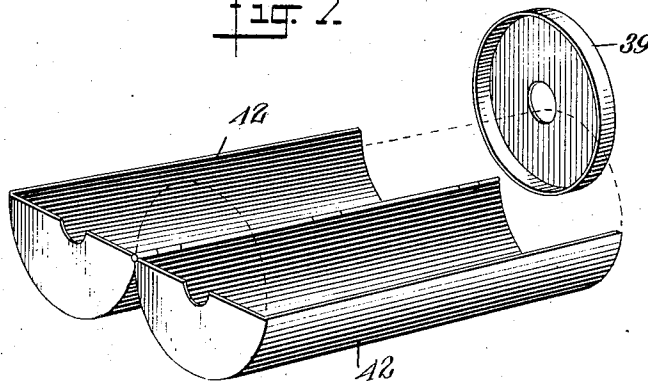


Fig. 7.



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UNITED STATES PATENT OFFICE.

ELIZABETH A. TAYLOR, OF STEILACOOM, WASHINGTON.

DEVELOPING-MACHINE FOR PHOTOGRAPHIC FILMS.

938,287.

Specification of Letters Patent.

Patented Oct. 26, 1909.

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To all whom it may concern:

Be it known that I, ELIZABETH A. TAYLOR, a citizen of the United States, and a resident of Steilacoom, in the county of Pierce and State of Washington, have invented a new and Improved Developing-Machine for Photographic Films, of which the following is a full, clear, and exact description.

10 The invention relates to developing machines for photographic films, and consists of a plurality of cylinders of different diameters, disposed one within the other respectively, each of the cylinders having a longitudinal slot therein. Rollers are mounted to revolve at the sides of the slots to prevent the film from becoming scratched, and there is a means by which one of the ends of a film may be secured to one of the cylinders, which will permit the film to be drawn out as the cylinders are rotated, means being provided to rotate one of the cylinders. There is a projection on one of the cylinders, which is adapted to engage a projection which is secured to an adjoining cylinder. Means are provided to rotatably mount the film so that it may be drawn out around the cylinders. A brake is provided by means of which the rotation of the cylinders may be controlled, and there is an opening in the outer cylinder, a pipe being secured thereto, the other end of the terminal of the pipe being secured to a graduating glass. Each of the cylinders may be made in two halves and without one or both heads, the halves of the cylinders being hinged together, and one of the heads being made in the form of a cap, so that it will hold the halves together when it is in place over one of the ends of the cylinder.

Still other objects of the invention will appear in the following complete description.

45 In this specification I will describe the preferred form of my invention, but it will be understood that I do not limit myself thereto, as I consider myself entitled to all forms and embodiments of the invention which may be held to fall within the scope of the appended claims.

50 Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures, in which—

Figure 1 is a perspective view showing

one form of my invention, the parts being broken away to show the inner cylinders; Fig. 2 is a sectional view on the line 2—2 of Fig. 3; Fig. 3 is a sectional view on the line 3—3 of Fig. 2; Fig. 4 is a view similar to the view shown in Fig. 2, but with the film disposed around the inner cylinder; Fig. 5 is a cross sectional view of another form of my invention; Fig. 6 is a longitudinal sectional view of the form of my device shown in Fig. 5; and Fig. 7 is a perspective view showing a modification in which the halves of a cylinder are hinged together and a cap is provided for holding the halves together.

By referring to the drawings, it will be seen that in the form of my invention shown in Fig. 1, I provide a casing 1, to which are secured supports 2, the casing 1 having a cover 3, which may be removed, in order that the operator may place in position and remove a film roll 4. In the casing 1, are disposed three cylinders 5, each of the cylinders having a longitudinal slot 6 therein, the cylinders being of different diameters and being disposed one within the other respectively. At one or both ends of the cylinders there are openings 7 to permit them to communicate with the casing 1. The several cylinders 5 which, as has been stated, are disposed one within the other, are mounted on a shaft 8, to which the innermost cylinder is secured, the other cylinders being free to revolve relatively to the shaft 8. At the sides of each of the longitudinal slots are rotatably disposed rollers 9, the object of these rollers being to prevent a film 10 from becoming scratched against the sides of the said slots, but inasmuch as the film 10 is secured (see Figs. 2 and 4) to one side of the slot in the innermost cylinder 5, it is unnecessary to guard this side 11 by one of the rollers 9. The innermost cylinder has a projection 12 on its periphery. The outer cylinder 5, has an inwardly disposed projection 13 and the cylinder 5 disposed between the innermost and outermost cylinders, has projections 14, one disposed outwardly and the other inwardly. When the slots 6 of the several cylinders are in alinement and the device is in position for operation, the projection 12 on the innermost cylinder is at one side of the projections 14 on the next adjoining cylinder, and the projection 13 on the outermost cylinder is at the other side of this projection 14. A hinged shelf 15 is

provided on one side of the interior of the casing 1, and on this shelf may be disposed the film roll 4, the shelf having a roller 16 on its edge, to prevent the film 10 from be-
 5 coming scratched as it is drawn over the shelf. At the bottom of the casing 1 there is an opening 17, and to this opening 17 a rubber tube 18 is secured, the other end of the rubber tube 18 being secured to the bot-
 10 tom of a graduating glass 19. A brake 20 projects through the top of the cover 3 and it is adapted to project through the slots 6 in the cylinders 5 at one side, so that it will prevent the cylinders from rotating. The
 15 end of the paper on which the film 10 is carried, is secured at one side of the slot 6 in the innermost cylinder 5, by a clamp shown at 11.

In the other form of my invention, shown
 20 in Figs. 5 and 6, a crank 21 is journaled to one side of a support 22, and a stud 23 is journaled to the other side of the support 22. The cylinders of different diameters are disposed one within the other in the same
 25 way as in the construction shown in Figs. 1 to 4. In the construction shown in Figs. 5 and 6, the outermost of the cylinders 24 is secured to the crank 21 and the other cylinders are adapted to rotate relatively to the
 30 said crank. The other ends of the cylinders are mounted to rotate on the stud 23. The cylinders with the exception of the outer one, have longitudinal slots 25 therein, and there are rollers 26 rotatably mounted at
 35 the sides of the slots in the same manner as has been described with reference to the other form of the invention. A film roll 27, is mounted to rotate on projections 28 and 29, which extend from the crank 21 and the stud 23 respectively. The projection 29
 40 is in the form of a stem and is disposed in an opening in the stud 23. To this stem is secured a gear wheel 30, around which there is disposed a brake 31, the brake having a
 45 rack 32 on one of its sides. The brake 31 is adapted to extend up through the slots 25 in the cylinders to prevent them from rotating, and the rack 32 meshes with the gear wheel 30 so that when the stem 29, to which
 50 the gear wheel is secured, is rotated, the brake 31 will be moved upwardly or downwardly, to pass through the slots in the cylinders as has been stated. A thumbscrew 33 passes through the stud 23 until it engages
 55 the stem 29, so that when the thumbscrew is screwed down, it will hold the stem in place and prevent the movement of the brake 31 relatively to the cylinder. There is a pro-
 60 jection 34 on the inner surface of the outer cylinder 24; there is a projection 35 on the outer surface of the innermost cylinder 24 and there are inner and outer projections 36 on the remaining cylinders 24, which are disposed between the innermost cylinder and
 65 the outermost cylinder. These projections

are adapted to engage each other so that when the outer cylinder is rotated, it will draw the film around once, when it will contact with the projection on the next inner cylinder, and as the outer cylinder continues
 70 to rotate, it will cause the adjoining cylinders to revolve with it, until another rotation is completed, when the third cylinder will be caused to rotate, because its projection will contact with the inner projection
 75 on the neighboring cylinder which is disposed around it. In the outer cylinder there is an opening 37 which is plugged by a cork 38, and this cork 38 may be removed and the rubber tube 18 may be connected with
 80 the opening 37.

In using the invention, the brakes 20 or 31 are disposed through the slots in the cylinders to prevent their rotation; the film roll is disposed either on the shelf 15 or is
 85 mounted on the stem 29 and the projection 28, after which the end of the paper on which the film 10 is carried, is secured either to one side of the slot on the innermost cylinder in one form of the invention, or to
 90 the projection 34 on the outermost cylinder in the other form of the invention.

In the construction shown in Figs. 5 and 6 in the drawings the film roll 27 is mounted to rotate on projections 28 and 29, by re-
 95 moving the caps 39 which close one set of ends of the cylinders 24. A rubber band 40 is disposed around the joint made by the cap 39 and the outer cylinders 24, to make it light-tight and the inner cylinders 24 have
 100 openings in their ends to permit the developing fluid to circulate. After the film roll is adjusted the brake 20 or 31, is then moved to permit the cylinder to which the film is secured to rotate, and after one rotation the
 105 brake is again moved to permit the next adjoining cylinder to rotate and so on until the film is wound around the several cylinders; Fig. 4 showing the film wound around the innermost cylinder and partly around
 110 the next adjoining cylinder in one form of the invention, and Fig. 5 showing the film wound around one of the outer cylinders in the other form of the invention. As has been stated, when one cylinder has made a
 115 complete revolution, the projection secured to it will cause the next adjoining cylinder to rotate, and so on, until all the cylinders are connected and are rotated together and the film is wound around the several cylin-
 120 ders, there being one layer on each cylinder. The rubber tube 18 is then connected with the device, and a developing fluid is poured into the graduating glass 19 and the glass is raised above the device so that the fluid will
 125 run from the rubber tube into and between the cylinders, the cylinders having the openings 7 at their ends in both forms of construction. The cylinders are then rotated together, so that the developing fluid will
 130

reach all parts of the film, and when the film has been subjected to the action of the developing fluid for a sufficient period of time, the graduating glass is lowered, to permit the developing fluid to run out through the rubber tube into the graduating glass. The developing fluid is then removed from the graduating glass and water is substituted in place of it. The graduating glass is again raised to permit the water to pass through the rubber tube into the device, and the cylinders are again rotated to wash the film. The water is then drawn off and the fixing solution is introduced into the device in the same way, the cylinders being rotated to permit the fixing solution to reach all parts of the film. Then the film is again washed, after which the water is drawn off and the film is removed from the device.

In the modification shown in Fig. 7, the cylinder is cut into halves 42, one of the heads of the cylinder being removed, and a cap 39 being provided, to be disposed over the headless end to hold the halves of the cylinder together. The cylinder shown in Fig. 7 is the outer one used in the construction shown in Figs. 5 and 6 of the drawings, but it is obvious that a slot may be made in the cylinders so that the film may pass out at its periphery in the manner shown in connection with the inner cylinders.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. In a developing machine, a plurality of cylinders of different diameters, disposed one within the other respectively, the inclosed cylinders having slots therein and being mounted to rotate, means to rotate one of the cylinders, means which will automatically rotate an adjoining cylinder after a predetermined period in the rotation of the first cylinder, means to rotatably mount a film roll, means to secure one end of the film to one of the cylinders, and a brake to prevent the rotation of the different cylinders.

2. In a developing machine, a plurality of cylinders of different diameters, disposed one within the other respectively, the inclosed cylinders having slots therein, rollers which are rotatably mounted at the sides of the slots, the cylinders being mounted to rotate, a projection on one of the cylinders, a projection on an adjoining cylinder which is adapted to engage said first named projection, means to rotatably mount a film roll, means to secure one end of the film to one of the cylinders, and a brake to prevent the rotation of the different cylinders.

3. In a developing machine, a plurality of cylinders of different diameters, disposed one within the other respectively, the inclosed cylinders having slots therein and being mounted to rotate, means to rotate

one of the cylinders, means which will automatically rotate an adjoining cylinder after a predetermined period in the rotation of the first cylinder, means to rotatably mount a film roll, means to secure one end of the film to one of the cylinders, a brake to prevent the rotation of the different cylinders, a pipe connected to the outer cylinder, and a receptacle which is in communication with the other terminal of the pipe.

4. In a developing machine, a plurality of cylinders of different diameters disposed one within the other respectively, the inclosed cylinders having slots therein and being mounted to rotate, means to rotate one of the cylinders, means which will automatically rotate an adjoining cylinder after a predetermined period in the rotation of the first cylinder, means to rotatably mount a film roll, means to secure one end of the film to one of the cylinders, and a brake which is adapted to be adjusted through the slots to prevent the rotation of the cylinders.

5. In a developing machine, standards, a bearing in one of the standards, a crank journaled therein, a stud in another standard, a plurality of cylinders of different diameters disposed one within the other respectively, the inclosed cylinders having slots therein and being rotatably mounted on the stud and on the crank, the crank being secured to one of the cylinders, a stem which is disposed in an opening in the stud, the stem and crank being adapted to support a film roll, a gear wheel secured to the stem, a brake which is adapted to be disposed in the slots, the brake having a rack which engages the gear wheel, means to rotate the stem, means to secure the end of a film roll to one of the cylinders, and means to rotate each of the cylinders after one of its neighboring cylinders has rotated a predetermined distance.

6. In a developing machine, a standard, a crank journaled in a bearing therein, a stud in the opposite standard, a plurality of cylinders of different diameters disposed one within the other, the inclosed cylinders having slots therein and being rotatably mounted on the stud and crank, the crank being secured to one of the cylinders, the stud and crank being adapted to support a film roll, means to automatically rotate one of the cylinders after a neighboring cylinder makes a complete revolution, and means on one of the cylinders to which the end of the film may be secured.

7. In a developing machine, a standard, a bearing in the standard, a crank journaled therein, a stud in the standard, a plurality of cylinders of different diameters disposed one within the other respectively, the inclosed cylinders having slots therein and being rotatably mounted on the stud and on

the crank, the crank being secured to one of the cylinders, a stem which is disposed in an opening in the stud, the stem and crank being adapted for supporting a film roll, a
 5 brake which is adapted to be disposed in the slots, means for securing the end of a film roll to one of the cylinders, and means for rotating each of the cylinders after one of its neighboring cylinders has rotated a
 10 predetermined distance.

8. In a developing machine, a plurality of cylinders of different diameters disposed one with the other, one of the cylinders being cut in half, a cap over the halves of
 15 the cylinder to hold them together, and means for winding a film on one of the cylinders.

9. In a developing machine, a plurality of cylinders of different diameters disposed
 20 one within the other respectively, one of the cylinders being cut in two, a cap over the halves of the cylinder to hold them together, means for rotating one of the cylinders, and means for rotating another cylinder after a

predetermined period in the rotation of the
 first cylinder. 25

10. In a developing machine, a plurality of cylinders of different diameters disposed one within the other respectively, one of the cylinders being cut in two, a cap for the
 30 halves of the cylinder to hold them together, there being a slot in the cylinder which is cut in two, guards secured to the side of the slot, the guards having surfaces which are adapted for moving relatively to the cylin-
 35 der on lateral contact with another object, means for rotating one of the cylinders, and means for rotating another cylinder after a predetermined period in the rotation of the
 40 first cylinder.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ELIZABETH A. TAYLOR.

Witnesses:

C. E. TAYLOR,
 FRED T. TAYLOR.