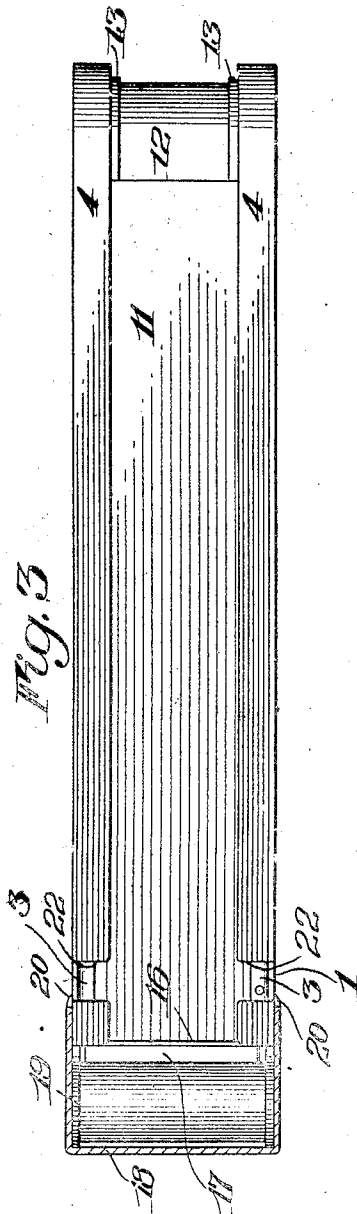
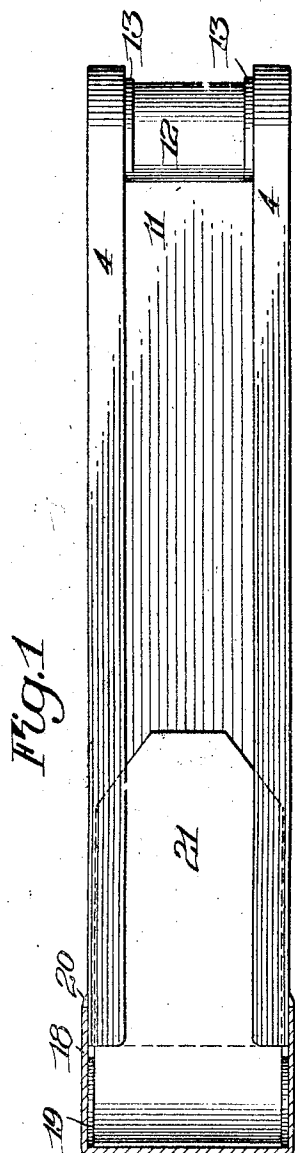


1,237,657.

Patented Aug. 21, 1917.  
 2 SHEETS—SHEET 1.



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1,237,657.

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 2 SHEETS—SHEET 2.

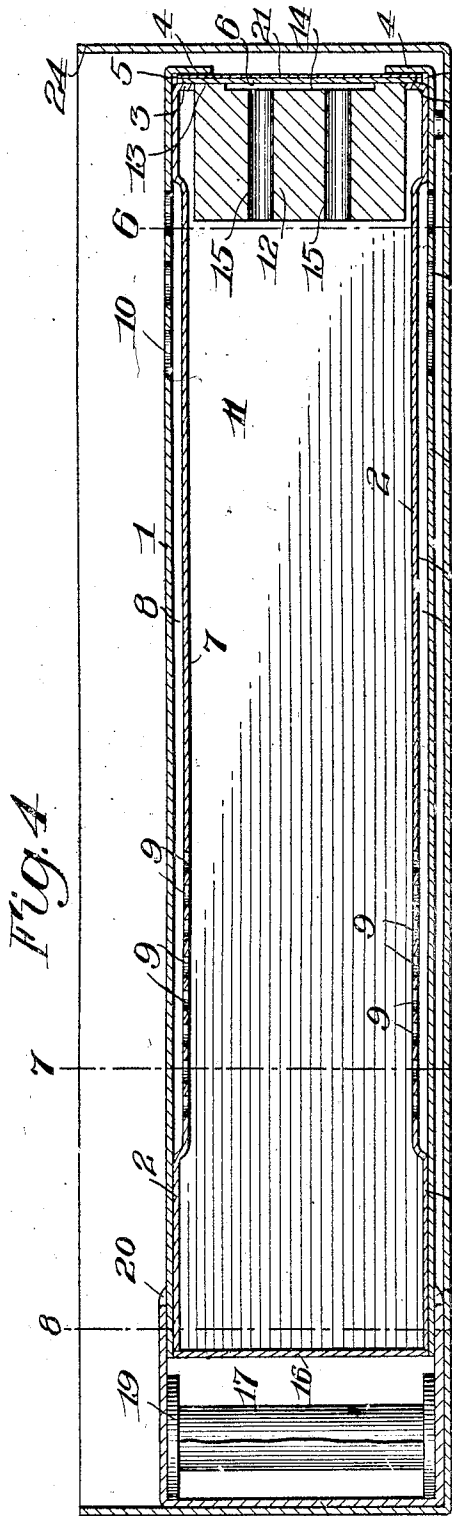


Fig. 4



Fig. 5

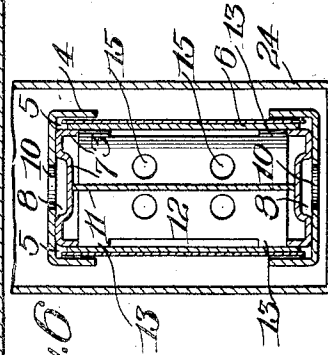


Fig. 6

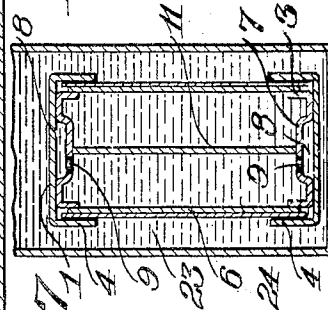


Fig. 7

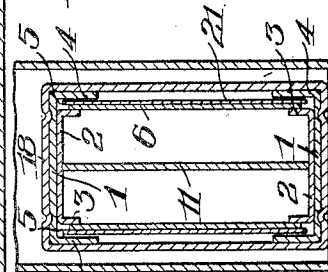


Fig. 8

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# UNITED STATES PATENT OFFICE.

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## PHOTOGRAPHIC DEVELOPING APPARATUS.

1,237,657.

Specification of Letters Patent. Patented Aug. 21, 1917.

Application filed April 13, 1917. Serial No. 161,702.

*To all whom it may concern:*

Be it known that I, ROBERT KROEDEL, of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Photographic Developing Apparatus; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the reference-numerals marked thereon.

My present invention relates to photography and more particularly to devices for developing photographic film in strips or rolls such as those used in six to twelve exposure cartridges and it has for its object to provide a simple and efficient developing apparatus of this nature particularly adapted for amateur use and which can be produced at a low cost. To these and other ends the invention resides in certain improvements and combinations of parts all as will be hereinafter more fully described, the novel features being pointed out in the claims at the end of the specification.

In the drawings:

Figure 1 is a side view partly in section of a developing apparatus constructed in accordance with and illustrating one embodiment of my invention, a roll of film being shown therein in process of being extended for development;

Fig. 2 is a top view;

Fig. 3 is a view corresponding to Fig. 1 but of the opposite side of the device;

Fig. 4 is a longitudinal sectional view, enlarged showing the device in position in a tray or container, the section being taken on the line 4—4 of Fig. 5;

Fig. 5 is a horizontal section in a plane at right angles to the plane of the section of Fig. 4;

Fig. 6 is a transverse section taken substantially on the line 6—6 of Fig. 4 and

Figs. 7 and 8 are sections taken on the line 7—7 and 8—8, respectively, of Fig. 4.

Similar reference numerals throughout the several views indicate the same parts.

In the embodiment of the invention shown, the device is constructed mainly of sheet metal and in general comprises a support having guides for supporting a strip of film by its edges only, said guides extending along one side of the support around the end and back along the length of the

other side. The top and bottom walls of the support are composed of two long narrow flanged plates 1 and 2, the latter fitting inside of the former in each instance so that the inwardly turned flange 3 thereof is parallel to and spaced but slightly from the inwardly turned flange 4 on the outer plate, providing a film guide 5 at the top and a film guide 5 at the bottom of the support for the opposite longitudinal edges of a film strip 6. The inner plates 2 are embossed at 7 to provide a space 8 for developing fluid to flow between them and the embossed portion of each inner plate is perforated at 9 out of alinement with perforations 10 in the outer plate so that a tortuous passage is thereby provided for the flow of liquid from the exterior to the interior of the support.

The two inner plates 2 and hence the top and bottom sides of the support are connected together by a central web or plate 11. The guides 5 extend around only one end of the support, as shown, and at this end the top and bottom sides are further connected by a crosspiece 12 secured to the web 11. It may consist of two wooden blocks fastened to opposite sides of the web and the crosspiece is rounded with a raised portion or rib 13 adjacent each guide 5 and a depressed portion 14 between the guides. The depressed portion 14 allows of the passage of developing fluid between the crosspiece and the surface of the film strip 6 and the crosspiece is further rendered pervious to the developing liquid by perforations 15 extending between the depressed portion and the interior of the support. At the opposite end another end plate or cross piece 16 connects the pairs of plates 1 and 2 and the central web 11 together.

This cross plate 16 forms one wall of a film spool or roll holding chamber 17, the other walls of which are constituted by a box 18 that provides a detachable roll holder in which a film spool 19 is adapted to closely fit. It slidably engages telescopically at its open side with the end of the support on which latter are stop lugs 20 to hold it in correct relationship. The operation of the device is as follows:

The guides 5 communicate with the interior of the roll chamber 17. The box or roll holder 18 is removed and the film roll and spool 19 inserted therein, the operator at the same time drawing the free end of the film

strip 6, together with its usual black paper backing 21 into the guides 5 on one side of the support, as shown in Fig. 1, this operation, of course, being performed in a dark room. The strip is thence drawn through the guides which are in the form of parallel loops and doubled down one side of the support and back on the other, as best shown in Fig. 5, the end being secured by being drawn out through notches 22 cut in the guide flanges 4 near the end piece 16. The inner sensitive surface of the film 6 with the exception of its unexposed edges, is thus completely spread out of contact with the support on the interior thereof, while the paper backing 21 protects it from light and, in effect, constitutes the side walls of a dark box chamber within the support. The latter is then submerged with the film edge down in a body of developing solution 23 within a developing tank or tray 24. The solution wells up through the perforations 10 and 9 at the bottom, the air escaping through the perforations 9 and 10 at the top until the support is completely filled, the solution being in contact with the film surface at all points by reason of the perforations 15 and the depression 14 at one end, the two parts into which the interior of the support is divided by the central web plate 11 being in communication with each other. The tray may be rocked if desired to agitate the developer and after the usual period of development has elapsed, the support is removed from the tray, the roll holder 18 taken off and the film strip withdrawn from the guide.

It will be noted that the vents 9 and 10 not only permit the air to escape freely from the interior but the vertical position of the film strip reduces to a minimum the liability of air bubbles being trapped and adhering to the surface thereof, resulting in lack of uniformity in the action of the solution. The device can be constructed very cheaply, is easy to load with film in darkness and can be thereafter operated in a good light without liability of the film becoming fogged.

I claim as my invention:

1. A roll film developing apparatus embodying a support having two parallel looped guides adapted to receive the opposite edges of a doubled film strip.

2. A roll film developing apparatus embodying a support having two parallel looped guides adapted to receive the opposite edges of a doubled film strip, the loops of the guides being connected by a cross piece pervious to developing fluids.

3. A roll film developing apparatus embodying a support having two parallel looped guides adapted to receive the opposite edges of a doubled film strip, the guides being connected by two cross pieces, one of which is arranged at the loops thereof and perforated to transmit developing fluids.

4. In a roll film developing apparatus, the combination with a support having two parallel looped guides adapted to receive the opposite edges of a doubled film strip, of a film roll support at the end thereof opposite to the loop of the guides.

5. In a roll film developing apparatus, the combination with a support having two parallel looped guides adapted to receive the opposite edges of a doubled film strip, of a roll film chamber at the end thereof opposite to the loop of the guides.

6. In a roll film developing apparatus, the combination with a support having two parallel looped guides adapted to receive the opposite edges of a doubled film strip, of a detachable member fitting over the support at the end thereof opposite to the loop of the guides and providing a roll film chamber from which a film strip may be drawn into the guides.

7. A roll film developing apparatus embodying a support having two parallel looped guides adapted to receive the opposite edges of a doubled film strip, each guide being formed of a pair of flanged plates arranged one inside of the other.

8. A roll film developing apparatus embodying a support having two parallel looped guides adapted to receive the opposite edges of a doubled film strip, each guide being formed of a pair of flanged plates arranged one inside of the other and the two guides being connected together by a central web.

9. A roll film developing apparatus embodying a support having two parallel looped guides adapted to receive the opposite edges of a doubled film strip, each guide being formed of a pair of flanged plates arranged one inside of the other and spaced apart to admit developing fluid between them, one plate having an opening to the interior of the support out of alinement with an opening in the other to the exterior.

10. In a roll film developing apparatus, the combination with two parallel pairs of flanged plates the plates of each pair being arranged in spaced relation, one inside of the other, to form a pair of looped guides for the opposite edges of a doubled film strip, and being provided with unaligned openings, of a central web connecting the pairs of plates, a rounded crosspiece connecting them at the looped end in spaced relation to the guides and a film roll chamber at the opposite end.

11. A roll film developing apparatus comprising a support having oppositely arranged spaced pairs of parallel inturned flanges extending along one side, around the end and thence along the other side of the support to provide guides for supporting a doubled strip of film at its edges.

12. A roll film developing apparatus com-

prising a support having oppositely arranged spaced pairs of parallel inturned flanges extending along one side, around the end and thence along the other side of the support to provide guides for supporting a doubled strip of film at its edges, said support being provided with a tortuous passage for the entrance of fluid between the doubled portions of such film.

13. In a roll film developing apparatus, the combination with a support having guides adapted to engage and support the edges of a film extending along one side, around the end and thence along the other side of the support, of a roll holder at the other end of said support.

14. A roll film developing apparatus embodying a support having parallel guides adapted to hold a strip of film by its opposite longitudinal edges, the support being recessed between the guides to contain a body of developing liquid in contact with the inner face of the film.

15. A roll film developing apparatus embodying a support having parallel guides adapted to hold a strip of film by its opposite longitudinal edges, the support being recessed between the guides to contain a body

of developing liquid in contact with the inner face of the film and provided with a tortuous passage for introducing the liquid to said recess.

16. In a roll film developing apparatus, the combination with a support having parallel guides adapted to hold a strip of film by its opposite longitudinal edges, the support being recessed between the guides to contain a body of developing liquid in contact with the inner face of the film, of a roll holder on said support at one end of the guides.

17. In a roll film developing apparatus, the combination with a support having parallel guides adapted to hold a strip of film by its opposite longitudinal edges, the support being recessed between the guides to contain a body of developing liquid in contact with the inner face of the film, of a detachable box adapted to fit over one end of the support and having a roll holding chamber communicating with said guides.

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Witnesses:

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HELEN M. FRASER.