J. G. CAPSTAFF.

APPARATUS FOR TREATING MOTION PICTURE FILMS.

APPLICATION FILED MAR. 29, 1918.

1,351,834.

Patented Sept. 7, 1920.

2 SHEETS—SHEET 1.

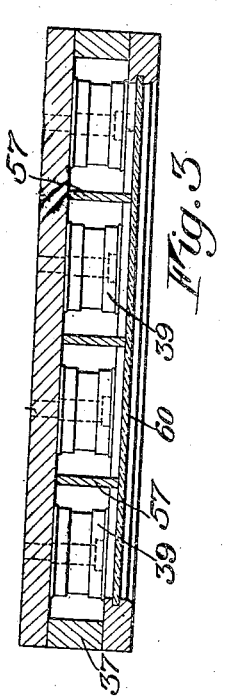

Fig. 5

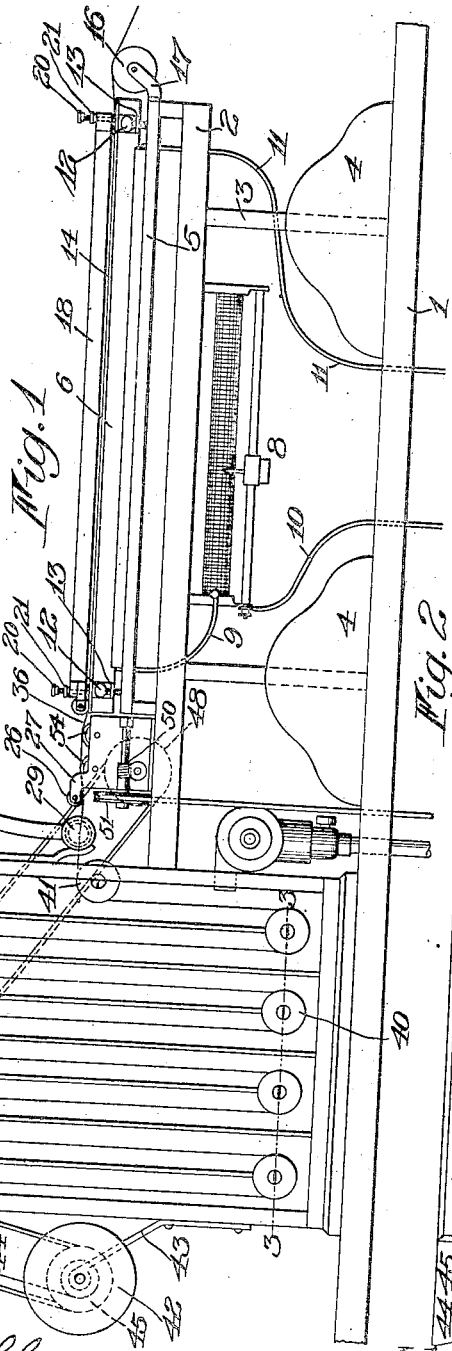

Fig. 1

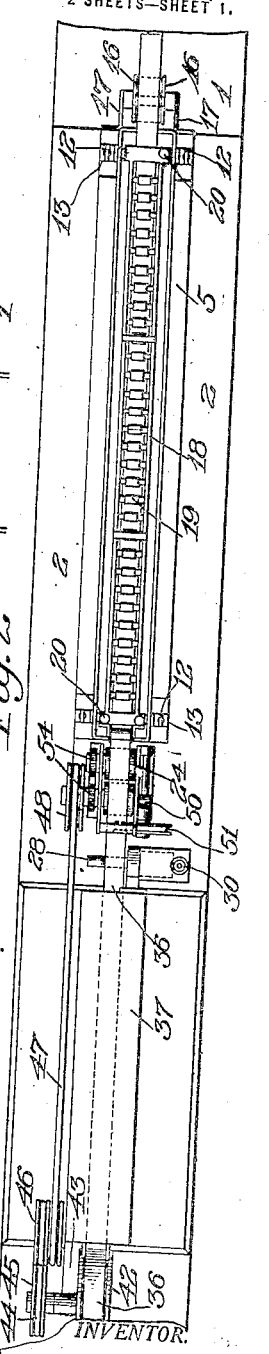

Fig. 2

WITNESSES:

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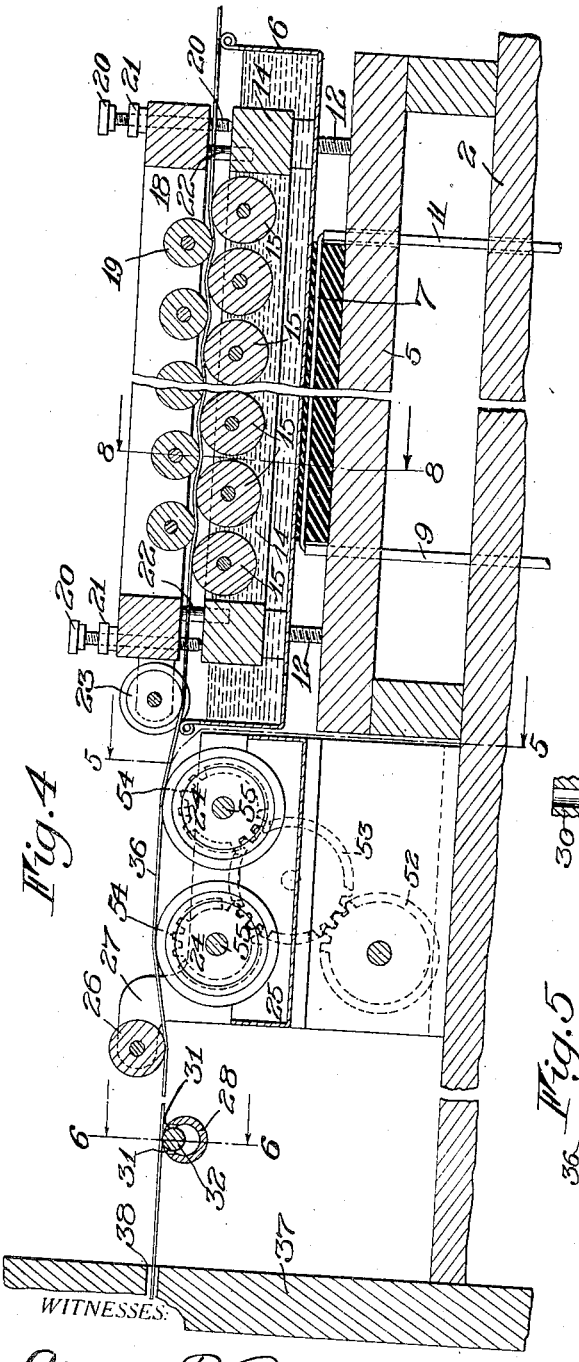

Fig. 4

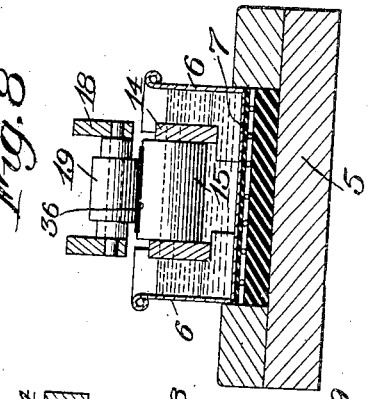

Fig. 8

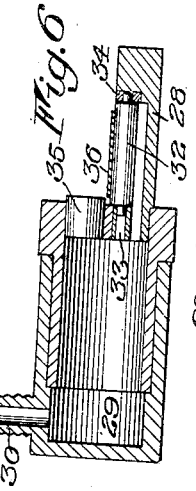

Fig. 6

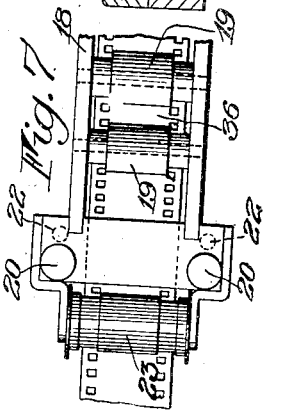

Fig. 7

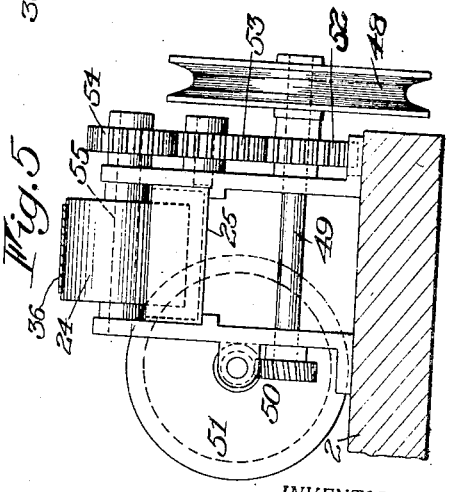

Fig. 5

WITNESSES:

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UNITED STATES PATENT OFFICE.

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APPARATUS FOR TREATING MOTION-PICTURE FILMS.

1,351,834. Specification of Letters Patent. Patented Sept. 7, 1920.

Application filed March 29, 1918. Serial No. 225,388.

To all whom it may concern:

Be it known that I, JOHN G. CAPSTAFF, of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Apparatus for Treating Motion-Picture Films; 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 fluid treating apparatus adapted to act upon motion picture film in continuous lengths and the invention has for its object to provide a simple and compact machine upon which the faces of the strip of film may be independently treated with one or more fluids and then dried in a continuous operation. 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 elevation of a film treating apparatus constructed in accordance with and illustrating one embodiment of my invention;

Fig. 2 is a top plan view thereof;

Fig. 3 is an enlarged section taken substantially on the line 3—3 of Fig. 1;

Fig. 4 is an enlarged and fragmentary longitudinal central section through the portion of the machine that applies the liquid to the surface of the film;

Fig. 5 is a section taken substantially on the line 5—5 of Fig. 4 looking in the direction of the arrows;

Fig. 6 is an enlarged detail section taken substantially on the line 6—6 of Fig. 4;

Fig. 7 is an enlarged fragmentary view of a portion of the device as shown in Fig. 2, and

Fig. 8 is a detail section on the line 8—8 of Fig. 4.

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

The machine of the present embodiment of the invention is designed for the dyeing of film adapted to project motion pictures in colors. In certain processes of color photography, two colors are used in the film, one red and the other green, and they are applied to opposite faces of the film strip. The present machine applies a coat of dye to one side of the strip as the latter is passed through the machine and it is then run through again to receive the other color on the other side. Referring first to Fig. 1, 1 indicates a support upon which is a table 2 having legs 3 and feet 4. Above the table is a platform 5 which supports a fluid dye container 6 preferably in the form of an open pan. Between the bottom of the latter and the platform is an electrical heating element 7 controlled by a rheostat indicated generally at 8, the terminal wires to and from the rheostat being shown at 9 and 10 and the other terminal wire at 11. The fluid container 6 is supported on thumb screws 12 threaded into brackets 13 on the container so that the latter may be moved toward and from the heating element to increase or lessen the transfer of heat.

Within the container 6 is a frame 14 spaced from the bottom thereof and carrying a plurality of parallel capillary rolls 15. The film strip is drawn by means to be later described from the guide roll shown at 16 over the rolls 15 which are thereby revolved in the dye and carry the desired amount thereof on their surfaces and apply it to the under face of the strip. The guide roll 16 is carried on brackets 17 at the right hand end of the platform 5.

Above the frame 14 is a frame 18 having a plurality of parallel tension rolls 19 journaled therein and extending between adjacent units of the series of rollers 15. These tension rolls regulate the contact of the film strip with the surfaces of the capillary rolls 15 and hence control the amount of dye that is applied. They may be adjusted back and forth with reference to the lower rolls and the film by screw posts 20 on the frame 18 that rest upon the frame 14. These screw posts are provided with lock nuts 21 and the two frames are held in accurate relationship by guide posts 22.

As the strip passes out of the container 6 it travels under an idler 23 on the frame 18 and thence over two capillary rolls 24 that are partly submerged in a tray or container 25 for mordanting solutions. The mordant is applied in substantially the same manner as the dye and the film strip then passes beneath an idler 26 supported in

brackets 27 on the container 25 and over a device shown in detail in Fig. 6 for removing excess liquid from the under surface thereof. This device consists, in the present instance, of a tube 28 connected to a vacuum box 29 having an exhausting connection 30. The tube is slotted at 31 to receive a roller 32 parallel with its geometrical axis and rotatable in bearings 33 and 34 in the tube. The diameter of the roller 32 is not quite equal to the width of the slot 31 so that tangential passages are provided at each side of the roller parallel and adjacent to the line of contact of the latter with the film strip 36. Through these passages, the excess liquid is sucked from the under side of the film as it passes over the roller. In Fig. 6 the vacuum box 29 is shown provided with a removable plug 35 above the roller bearing 33 which is adapted to be replaced by another tube similar to tube 28 so that another exhausting device may be placed on top of the film, if necessary or desirable.

The film having been dyed, mordanted and the excess liquid removed from its surface, it is passed into a drying chamber in a casing 37 having an entrance slot 38. This drying apparatus forms the subject-matter of my pending divisional application Serial No. 862,716, filed September 21, 1914, but will be briefly described herein to explain the ultimate disposition of the film. At the top of this drying chamber are a plurality of roller supports 39 and there is a similar series 40 at the bottom. The film strip first passes over a roll 41 adjacent to the slot 38 and thence downwardly under the first of the roller supports 40, thence upwardly over the first of the roller supports 39 and so back and forth so that it is disposed in vertical loops until it finally emerges at the last roll 39 which is in a wall of the casing 37 whereupon the strip passes downwardly and is wound upon a take-up roll 42 supported in brackets 43 on the exterior of casing 37. This roll is driven by a belt 44 passing over a pulley 45 thereon and thence over a pulley 46 on the casing 37, which pulley 46 is in turn driven by a belt 47 running to a pulley 48 on a shaft 49 (see Fig. 5). Shaft 49 is driven through worm gearing 50 by a pulley 51 that is connected to a source of power. Also fixed to the shaft 49 is a gear 52 meshing with an intermediate gear 53 that meshes with each of two gears 54 on the respective shafts 55 of the mordanting rolls 24 so that these rolls are positively driven and in a direction that assists the passage of the film strip through the machine. Otherwise, the strip is drawn through the machine by the take-up roll 42.

I claim as my invention:

1. In a machine for treating continuous lengths of motion picture film, the combination with a liquid container, means for passing a film strip over the same and means carried by the container for applying the contents of the container to the strip, of a heating element beneath the container and adjustable supports for the latter adapted to move it toward and from the heating element.

2. In a machine for treating continuous lengths of motion picture film, the combination with a liquid container, capillary rolls therein and means for passing a film strip over the rolls with its under face in contact therewith, of a frame above the container, tension rolls carried thereby and each contacting the top face of the film between two capillary rolls and means for adjusting the frame vertically toward and from the capillary rolls.

3. In a machine for treating continuous lengths of motion picture film, the combination with a liquid container, a frame therein, capillary rolls carried by said frame, a second frame overlying the first, tension rolls mounted thereon, each of which lies between two capillary rolls, means for regulating the separation of the frames and their respective rolls and means for passing a film strip between the latter.

4. In a machine for treating continuous lengths of motion picture film, the combination with a liquid container, means for passing a film strip over the same and means for applying the liquid to the strip, of a roller engaging the coated side of the film adjacent to the container, and an exhauster having a narrow intake passage tangential to the roller.

5. In a machine for treating continuous lengths of motion picture film, the combination with a liquid container, means for passing a film strip over the same and means for applying the liquid to the strip, of an exhauster having a slot therein and a roller mounted in said slot to engage the coated surface of the film, the roller being spaced from the walls of the slot to form tangential intake openings.

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Witnesses:
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T. G. MCCROSSEN.