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DRYING APPARATUS FOR AUTOMATIC CAMERAS

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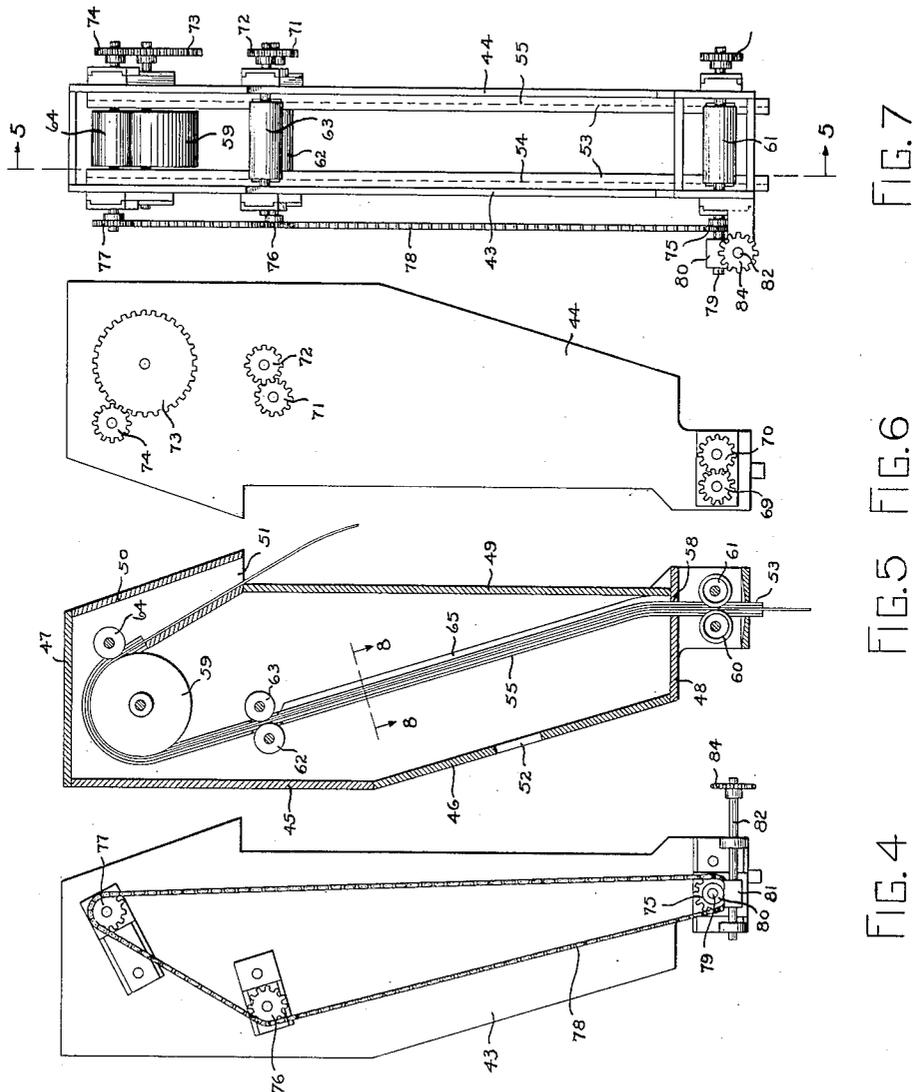


FIG. 7

FIG. 6

FIG. 5

FIG. 4

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## DRYING APPARATUS FOR AUTOMATIC CAMERAS

Application filed July 2, 1929. Serial No. 375,547.

This invention relates to automatic photographing and developing apparatus and more particularly to a drying means adapted to be used in conjunction with the developing apparatus.

In a copending application, Serial No. 211,031, filed August 6, 1927, and entitled Automatic photographing apparatus, we have described a coin operated camera, designed upon the insertion of a coin to successively feed a strip of sensitized paper past a lens system, making a series of exposures, sever the strip and feed it to and through a series of developing and finishing tanks.

The present invention is an improvement on the apparatus of said prior application, said improvement consisting specifically of a drying apparatus for use in conjunction therewith. The particular embodiment of the invention herein described, is designated for use in connection with the arrangement of camera and developing tanks disclosed in our subsequently filed application, Serial No. 365,601, filed May 24, 1929, and entitled Photographic and developing apparatus.

In automatic cameras of the type described in our above mentioned applications, it is the usual practice to provide a source of artificial illumination, either operated continuously or brought into operation by the coin operated mechanism, in order to insure uniform lighting conditions at all times. This source of light may consist of incandescent filament lamps, mercury arc lamps or any other suitable source of illumination. Since the light efficiency of such sources of artificial illumination is low, most of the energy is dissipated as heat.

It is one of the objects of our invention to utilize the waste heat produced by the light source, as a drying medium for the strip of sensitized material as it emerges from the developing and fixing solutions.

In accordance with our invention we enclose the light source within a tight enclosure, preferably of good heat insulating character and provide such enclosure with an outlet conduit, which in connection with a blower continuously withdraws the heated air from the enclosure and delivers it to the drying

apparatus. The drying apparatus may consist of a casing composed of heat insulating material, mounted adjacent the outlet of the last developing and fixing tank so as to receive the developed strip therefrom. Suitable guide means and strip feeding means are arranged within the casing to direct and feed the sensitized strip therethrough. The strip feeding mechanism is so arranged in the casing in relation to the heated air inlet and outlet that the strip is completely dried in transit through the casing.

A pair of feed rollers having soft rubber faces for squeezing the excess fluid from the strip may be provided adjacent the inlet of the drier but outside of the drying chamber so as not to be subjected to the heat thereof.

The mechanism for feeding and directing the sensitized strip through the drier preferably consist of a suitable shaped guideway, engaging the side margins of the strip and a plurality of sets of feed rollers disposed at suitable distances apart. The feed rollers may be operated by a direct driving connection from the shaft from which the developing tank feed mechanism is operated.

In order that the invention may be more fully understood reference will be had to the accompanying drawings in which:

Figure 1 is a front elevation, partly in section, of the light enclosing casing and the apparatus for delivering the heated air to the drier;

Figure 2 is a side elevation partly in section showing one embodiment of our invention;

Figure 3 is a rear elevation of the drier showing its location in the frame relative to the photographing and developing apparatus;

Figure 4 is a side elevation of the drier;

Figure 5 is a vertical sectional view through the drier taken on the line 5—5 of Figure 7;

Figure 6 is a side elevation of the opposite side from that illustrated in Figure 4;

Figure 7 is a rear view of the drier with the rear of the casing removed; and

Figure 8 is a section on the line 8—8 of Figure 5.

Referring to Figure 1, we have shown the light source for illuminating the object being photographed, as comprising a mercury vapor lamp 10 mounted upon a suitable supporting plate 11, and a number of incandescent filament lamps 12. The incandescent filament lamps serve as an additional source of illumination and also supply the red rays in which the mercury vapor lamp is deficient, thus destroying the ghastly effect of the mercury vapor lamp. The lamps 10 and 12 are enclosed in a tight enclosure 13 having a transparent or translucent screen 14 in the front thereof for transmitting the light to the person being photographed. The top, bottom, side and rear walls 15, 16, 17 and 18 respectively are preferably formed of heat insulating material, such as sheet asbestos. The rear wall 18 is provided with an outlet 19 having a conduit 20 connected thereto. The conduit 20 conducts the heated air to the inlet 21 of the drying apparatus 22. A blower 23 is disposed intermediate the ends of the conduit 20 for insuring a steady passage of heated air to the drier. A number of openings 24 are provided in the bottom of the light enclosure to permit the ingress of air to replace the air withdrawn by the blower.

A suitable frame, consisting of vertical side angle irons 25, horizontal bottom angle irons 26 and 27 and horizontal top angles 28 and 29, forms a skeleton frame upon which the photographing apparatus, not shown, is supported, within which the developing tanks 30 and drying apparatus 22 are disposed and about which the enclosing cabinet for the device is positioned. The rear wall 31 only of the cabinet is illustrated. A transverse plate 32 extends between the angles 29 and serves to support a motor 33 for driving the blower. This motor, it should be understood, may be the same motor employed for operating the photographing apparatus, as disclosed in our above mentioned application, Serial No. 211,031. It also serves to drive the feeding mechanism of the developing tanks through the gears 34, 35, sprocket 36, chain 37, sprocket 38, shaft 39, chain 40, sprocket 41 and shaft 42. The shaft 42 extends longitudinally of the developing tanks and is directly geared to the feed roller thereof, not shown. The feed mechanism for the drying apparatus is also operated from the shaft 42 in a manner to be described hereinafter.

The drying apparatus comprises a casing composed of heat insulating material, such as asbestos. The casing has two side walls 43 and 44 shaped as illustrated in Figures 4 and 6 respectively, a vertical front wall 45 having a lower inclined portion 46, a top wall 47, bottom wall 48, a vertical rear wall 49 and an inclined rear wall 50 offset from the wall 49 to provide an outlet opening 51 for the egress of the strip of pictures. The front wall 46 has an opening 52 with which the conduit 20 is

aligned for the entrance of the heated air to the drier, the heated air emerging from the casing through the opening 51.

The drying apparatus 22 is mounted upon the developing tank 30 with an inlet guideway 53 disposed directly above the outlet of the tank, so that the completely developed and washed strip of paper is fed from the tank into the drying apparatus. The guideway 53 consists of two spaced parallel strips 54 and 55 secured to the side walls 43 and 44 by screws 56 (see Figure 8). Each of the strips 54 and 55 has a U-shaped groove 57 therein adapted to receive the margin of the paper. As will be clear from Figure 5 the guideway extends from adjacent the outlet opening of the tank vertically through an opening 58 in the bottom wall 48, thence diagonally through the drying chamber and around the large roller 59.

A pair of soft rubber rollers 60 and 61 are positioned between the guide strips 54 and 55 beneath the bottom wall 48 so as to be out of the heat zone, these rollers serving the double function of feeding the strip into the drying apparatus and squeezing the excess liquid therefrom. Additional sets of feed rollers 62, 63 and 59, 64 are provided along the guideway, the roller 59 acting also as a guide in conjunction with the strips 54 and 55 for directing the strip downwardly through the outlet 51.

A plate 65 extends between the guide strips 54 and 55 from the base 48 of the drier to the feed rollers 62, 63 and has a series of ribs 66 against which the paper rides. The plate 65 is provided for the purpose of resisting the pressure of the air directed against the sensitized surface 67 of the paper by the blower 23. A number of perforations 68 are provided in the plate 65 to permit the air to pass freely therethrough.

Referring to Figures 6 and 7, it will be seen that the shaft of each of the sets of feed rollers 60, 61; 62, 63 and 59, 64 are provided with sets of intermeshing gears 69, 70, 71, 72 and 73, 74 respectively. The opposite ends of the shafts of feed rollers 60, 62 and 64 are each provided with sprocket wheels 75, 76 and 77 respectively, about which a single continuous chain 78 extends, for driving the feed rollers in unison. The shaft 79 of the feed roller 60 is driven by spiral gears 80 and 81 from the shaft 82 which in turn is driven from the shaft 42 by a chain 83 disposed around the sprocket wheels 84 and 85.

The strip as it emerges from the drying apparatus is fed through a guideway 86 extending through the rear wall 31 of the cabinet.

The feed rollers 62 and 63 are composed of metal and are highly polished so that in passing therethrough the emulsion surface of the strip obtains a high polish or glazed surface. The strip in passing through the

heat zone between the feed rollers 60, 61 and the rollers 62, 63 is dried to such an extent that when it reaches the metal rollers 62, 63 the emulsion surface does not adhere there-  
 5 to and the heated rollers are effective to produce the glazed surface.

While we have shown but a single embodiment of our invention, it is to be understood that it is susceptible to many modifications and changes and we do not desire to be limited to the particular details shown and disclosed except in accordance with the appended claims.

What we claim is:

15 1. Drying apparatus for a photographic and developing device having a substantially closed casing, a guideway comprising spaced parallel channel members extending through said casing, feed rollers within the  
 20 casing for advancing a strip of sensitized material through said casing with the margins only of said strip engaging said channel members, said guideway extending outside of the casing, feed rollers outside of said  
 25 casing for feeding the strip into said guideway, and means for circulating heated air through said casing.

2. Drying apparatus for a photographic and developing device having a substantially  
 30 ly closed casing, a guideway comprising spaced parallel channel member extending through said casing, a plurality of sets of feed rollers for pushing a strip of sensitized material through said casing with the margins  
 35 only of said strip engaging said channel members, and means for circulating heated air through said casing, one set of feed rollers having resilient surfaces and being protected from the heat of said drier and serving to  
 40 squeeze the excess liquid from said strip.

3. Drying apparatus for a photographic and developing device having a substantially  
 45 spaced parallel channel members extending through said casing, a plurality of sets of feed rollers for pushing a strip of sensitized material through said casing, and means for circulating heated air through said casing with the margins  
 50 only of said strip engaging said channel members, one set of feed rollers having soft rubber faces and being disposed outside of said casing out of contact with the heated air and serving to squeeze the excess liquid from said strip.

4. Drying apparatus for a photographic and developing device having a substantially  
 55 closed casing, a guideway comprising spaced parallel channel members extending through said casing, a plurality of sets of feed rollers for advancing a strip of sensitized material  
 60 through said casing with the margins only of said strip engaging said channel members, means for blowing heated air against said strip and a supporting plate extending be-  
 65 tween said channel members for supporting

one side of said strip against the pressure of said heated air.

5. Drying apparatus for a photographic and developing device having a substantially  
 70 closed casing, a guideway comprising spaced parallel channel members extending through said casing, a plurality of sets of feed rollers for advancing a strip of sensitized material through said casing with the margins  
 75 only of said strip engaging said channel members, means for blowing heated air against said strip and a supporting plate extending between said channel members for supporting one side of said strip against the  
 80 pressure of said heated air, said supporting plate having a series of ribs for contacting with said strip.

6. Drying apparatus for a photographic and developing device having a substantially  
 85 closed casing, a guideway comprising spaced parallel channel members extending through said casing, a plurality of sets of feed rollers for advancing a strip of sensitized material through said casing with the margins  
 90 only of said strip engaging said channel members, means for blowing heated air against said strip and a supporting plate extending between said channel members for supporting one side of said strip against the pressure of  
 95 said heated air, said supporting plate having a series of ribs for contacting with said strip and a plurality of apertures for permitting the air to pass therethrough.

7. Drying apparatus for a photographing and developing device comprising a substantially  
 100 closed casing having spaced parallel side plates, a guide member secured to each of said side plates and having a U-shaped channel therein, to form a guideway for engagement with the margins of a sensitized  
 105 strip, a plurality of sets of feed rollers for advancing said strip through the drying apparatus, said guide members extending partially around one of said feed rollers and cooperating therewith to reverse the direction  
 110 of travel of the strip through the drying apparatus.

8. Drying apparatus for a photographing and developing device comprising a substantially  
 115 closed casing having spaced parallel side plates, a guide member secured to each of said side plates and having a U-shaped channel therein, to form a guideway for engagement with the margins of a sensitized  
 120 strip, a plurality of sets of feed rollers for pushing said strip through the drying apparatus, shafts for said feed rollers, gears on one end of each shaft for driving the rollers of each set in unison and driving means connected to one roller of each set for operat-  
 125 ing all of said feed rollers in unison.

9. Drying apparatus for a photographing and developing device comprising a substantially  
 130 closed casing having spaced parallel side plates, a guide member secured to each

of said side plates and having a U-shaped channel therein, to form a guideway for engagement with the margins of a sensitized strip, a plurality of sets of feed rollers for  
 5 pushing said strip through the drying apparatus, shafts for said feed rollers, gears on one end of each shaft for driving the rollers of each set in unison, sprocket wheels on the opposite end of one shaft of each set, and  
 10 a common chain disposed about said sprocket wheels for driving all of said sets of feed rollers in unison.

In testimony whereof, we have hereunto subscribed our names this 24th day of June,  
 15 1929.

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