

Jan. 20, 1942.

P. M. LOTT

2,270,321

PRINT DRIER

Filed April 25, 1939

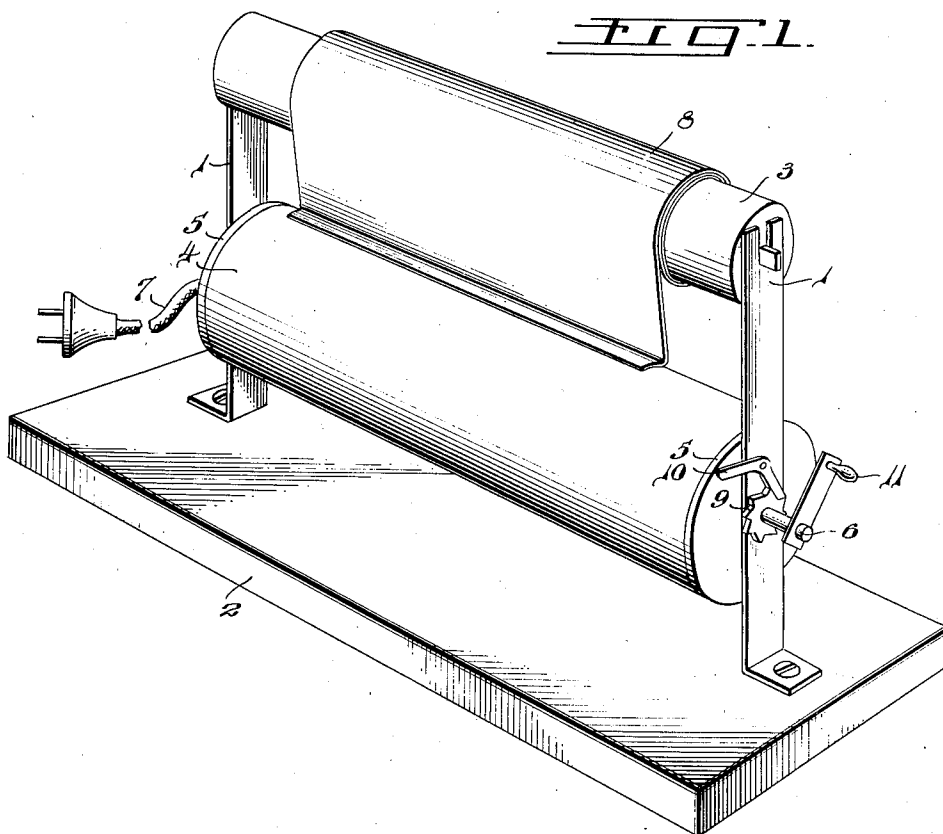


FIG. 2.

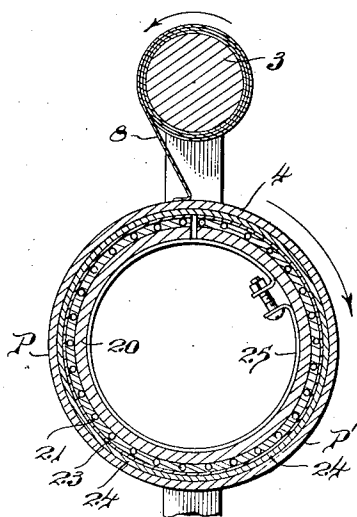
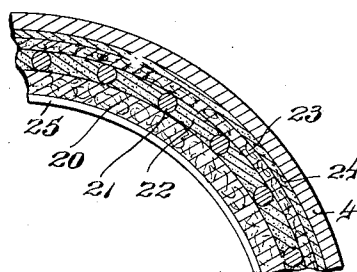


FIG. 3.



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2,270,321

PRINT DRIER

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Application April 25, 1939, Serial No. 269,935

4 Claims. (Cl. 219—19)

This invention relates to the art of print driers and, more especially, is adapted for drying printed or photographed matter requiring heat and in some instances heat and pressure and, in other instances, a smooth highly polished mirror-like surface together with heat and pressure.

In the arts of photography, blue-printing and the making of photo-stats, and in other methods of making reproductions on paper, the paper is washed in water or other liquids and must be dried. Some emulsion-bearing or coated papers have a glossy surface and must be dried with the coated side in contact with a highly polished surface in order to bring out or maintain the gloss. In practically every instance it is desirable to dry the paper on a smooth surface so that the paper will not wrinkle and to shorten the time required for the drying operation.

In general, the object of my present invention is to provide an improved form of device for drying matte as well as glossy prints and for doing this quickly and inexpensively and with better results than have been possible heretofore. My device as described herein is especially useful for both professional and amateur photographers.

More specifically, my present invention relates to an improvement over that class of drier having a cylindrical surface. Driers have been made with a curved or cylindrical heated surface so that the prints could be held against the heated surface by means of a piece of cloth or other flexible material held down on the sides in such manner as to provide pressure against the print. Heretofore, however, the cylinders of these old driers have been heated by a gas flame burning inside the cylinder, or by hot air forced into the cylinder, or by an electric heating element contained inside the cylinder but not in direct contact with the drying surface. Obviously, when the drying surface of this old form of drier has been cylindrical, it has been necessary to keep the drum or cylindrical surface constantly rotating when in use so that heat by air convection within the drum will not make one part hotter than another. In other words, if the drum of a prior device were stationary, the heated air within the drum would rise and thus cause the higher surface thereof to over-heat or at least become much hotter than the bottom or lower surface of the drum. If the drum of such an old form of drier be rotated sufficiently fast, this disadvantage of unequal heating is removed. For this reason, drum-shaped drying surfaces have had to be rotated. But, for obvious reasons, it is not practical to dry glossy prints on a rotating surface, and my present drying device solves this problem since it does not have to be in motion in order to have the drying surface temperature

uniform. This improvement constitutes one of the objects of my present invention.

When drying a glossy print, it is usually necessary after the print has been placed with its face or coated side against a highly polished surface, to rub the back of the print with a rubber blade or roll it with a soft rubber roller. In the art this is usually called "squeegeeing" and is necessary in order to remove air bubbles or air bells which may be between the print surface and the heated surface of the drier, and would cause objectionable imperfection on the print.

In using my present invention, the glossy prints are placed face down on a cylindrical surface with "squeegeeing" effect and the matte prints are placed face up, a cloth holding the prints firmly to the cylindrical surface after the surface or drum of the drier has been turned part of a complete revolution. Then, when the print or prints have been dried, they are removed from the drier upon turning the drum back to its original position. A spring in a curtain roller maintains the tension on the cloth and also serves to return the drum to its original position. The cloth not only holds the prints against the drum but also permits the moisture to evaporate through it. This particular arrangement constitutes another object of my present invention.

My present invention includes a special electric heating element firmly held against the under surface or inner surface, as opposed to the working or drying outer surface, so that uniform heat by thermal and physical conduction only is maintained. Although the heating surface of my present device is drum-shaped, the temperature is uniformly the same over the entire surface or within five or ten degrees Fahrenheit of being so; and this constitutes another object of my present invention. This feature includes a special thermal insulation so that the drying surface will receive no perceptible amount of heat by air conduction or air convection.

Other objects will appear from the following description and claims when considered together with the accompanying drawing.

Fig. 1 is a perspective view of my complete drier;

Fig. 2 is a vertical section of the drier taken for instance approximately midway of the length thereof and shows particularly the arrangement of the drum and the curtain roller; and

Fig. 3 is a full scale view in vertical section through the heating element and thermal insulation.

It is to be understood that the present form of disclosure is merely for the purpose of illustration and that there may be devised various modifications thereof without departing from the spirit of the invention as herein set forth and claimed.

As indicated in Fig. 1, the uprights 1 are attached to the base 2 of the drier and support the spring curtain roller 3 and the drum 4. The drum heads 5 each have a short piece of tubing 6 passing through their axial center and attached thereto and supported in the holes prepared in the uprights 1 so as to be capable of rotating movement therein, thereby forming an axle for the drum.

The electric cord set 7, which is electrically connected to the terminals of the heating element within the drum, passes through the tube 6 at one end of the drum.

The curtain or cloth strip 8, of a length slightly longer than the circumference of the drum, has one end attached to the spring curtain roller 3 and the other end to the drum 4, as is best shown in Fig. 2. An initial tension or wind-up on the spring in this roller when it is installed, will cause the curtain to be pulled taut against the drum surface when the drum is turned. If the drum is turned a complete rotation from the original position shown in Fig. 2, a slight additional tension is given to the curtain by virtue of the roller spring being wound up more; but if the spring in the roller be sufficiently long, this additional tension is not enough greater to be objectionable.

The ratchet 9, fixed to the tube 6, keeps the tension on the curtain from always returning the drum to the original position shown in Fig. 2, the engagement between the pawl 10 and ratchet 9 constituting a temporary holding means. That is, when a print is placed on the drum at some position P (Fig. 2), and the handle 11 is turned a half turn for instance, so that the drum 4 rotates a half turn in the direction indicated by the arrow, the drum may then be held in such position by the pawl and ratchet means and the print will be thus held in position P' to dry. Then, after the few minutes required for the drying, the pawl 10 is lifted and the drum 4 allowed to rotate back to its original position by virtue of the tension on the curtain, and the dried print may then be removed at position P.

The heating element contained in the drum 4 (Fig. 2) is itself cylindrical and covers, as much as possible, the entire inside surface of the drum with the exception of the vertical interior surface of the drum heads 5. In construction, this heating element may be considered as a lamination of some insulating material 20, as for instance heavy corrugated asbestos paper, resistance wire 21 embedded in cement 22, then another layer of insulating material 23, as for instance sheet mica. This entire heating element is held on to the inside surface of the drum 4 and is in thermal contact with it by virtue of the cement layer 24.

In making this heating element, I place a flat rectangular sheet of asbestos 20 (so cut that it will form a cylinder to fit the inside surface of the drum) on a flat surface and cover it with a coating of about one-sixteenth inch of cement 22. While this cement is still soft, I embed the wire 21 into the cement, placing the wire, in one length having the proper resistance, in parallel lines about one-half inch apart, running back and forth across the entire rectangular sheet. Then I cement on the next lamination, as above mentioned, and while the whole is still flexible, I cement it into the drum so as to occupy position

above explained. Expansion rings 25 may be used to hold the element in place and may be removed when the cement is dry.

Thus I have devised a simple and compact form of structure that is very efficient, easy to operate, and can be manufactured and sold at a comparatively low price.

What I claim is:

1. In a print drier, the combination of a rotatable electrically heated cylindrical drum, a porous cloth strip adapted to engage about the surface of the drum so as to engage a print between the same and the drum, means for rotating the drum and simultaneously winding the cloth strip thereabout for engagement of the print in drying position, releasable means for holding said drum in drying position to which rotated, and spring means tending normally to unwind the cloth strip from the drum.

2. In a print drier, the combination of a rotatable electrically heated cylindrical drum, said drum having a highly polished surface upon the exterior thereof, a strip of porous cloth having one end attached to the drum and being adapted to engage about the surface of the drum so as to engage a print between the same and the drum, means for rotating the drum and simultaneously winding the cloth strip thereabout for engagement of the print in drying position, releasable means for holding said drum in drying position to which rotated, and a rotatable spring roller having the other end of the cloth strip attached thereto and being adapted normally to wind the same thereabout so as to release the print from engagement.

3. In a print drier, the combination of a pair of spaced supports, an electrically heated drum having a highly polished cylindrical surface and being rotatably mounted between and upon said supports, a rotatable spring roller also mounted between and upon said supports and immediately adjacent said drum, a strip of porous cloth having its ends attached to said spring roller and drum, respectively, means for manually rotating said drum so as to thereby wind the strip thereabout upon insertion of a print therebetween, releasable means for holding said drum in drying position to which thus rotated, said parts being so constructed and arranged that upon release of said holding means said drum and cloth strip will be automatically returned to initial position by the force of said spring roller to permit removal of print.

4. In a print drier, the combination of a drum having a hollow cylindrical metallic body, electric heating means secured to the inner surface of said cylindrical body so as to heat the same by thermal and physical contact, thermal insulating means within said heating means for preventing heat from reaching said body by air convection, means including a hollow shaft for removably mounting said drum about its cylinder axis, an electric wire extending through said hollow shaft and connected to said electric heating means, a porous cloth strip adapted to engage about the surface of said body so as to engage a print between the same and said body, means for rotating the drum and simultaneously winding the cloth strip thereabout for engagement of the print in drying position, and spring means tending normally to unwind the cloth strip from the drum.

PARKER M. LOTT.