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D. D. SLOAN ET AL

3,450,474

RECORD COPIER

Filed Oct. 12, 1966

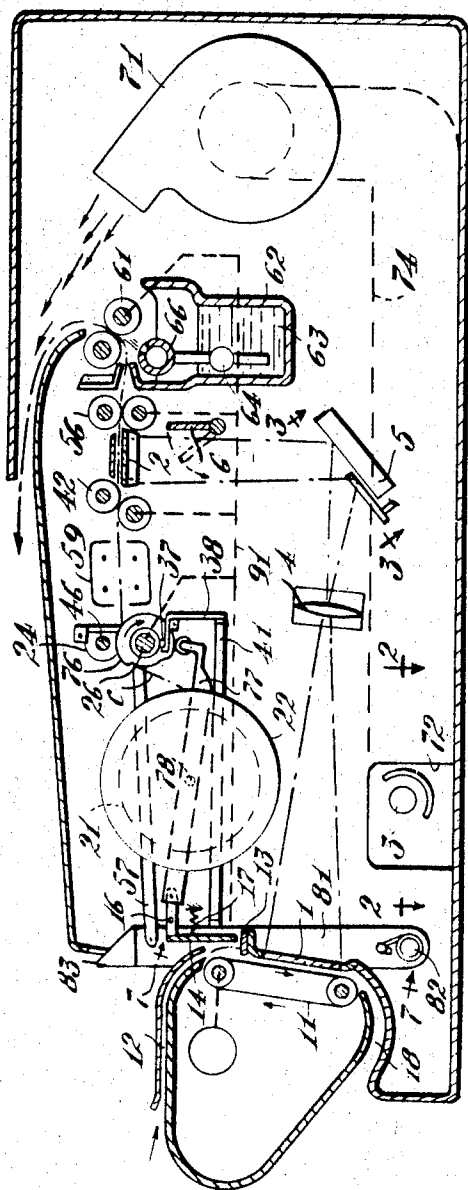


Fig. 1

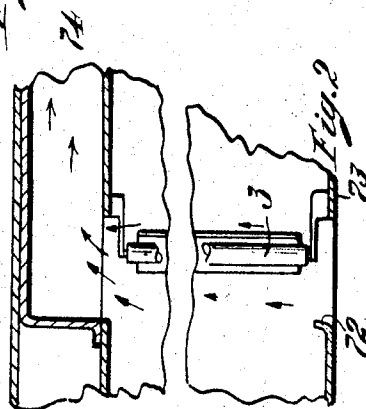


Fig. 2

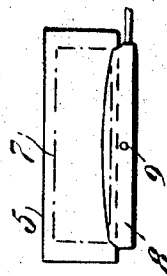


Fig. 3

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RECORD COPIER

Donald D. Sloan, Weston, Mass., and Robert W. Polley, Nashua, N.H., assignors to Dennison Manufacturing Company, Framingham, Mass., a corporation of Nevada

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U.S. Cl. 355—27

2 Claims

ABSTRACT OF THE DISCLOSURE

Apparatus having an exposure window, a lamp for illuminating a record in the window to make a copy of the record, a developer for applying liquid developer to the copy, a duct for directing air from the region of the lamp to said copy beyond said developer, and a pump to circulate air through said duct, thereby to dry the developed copy with heat derived from said lamp.

This invention relates to apparatus for copying records photographically and more particularly to electrostatic copiers. In apparatus of this kind considerable heat is generated by the means for illuminating the material to be copied and considerable time is required to dry the developed copies.

Objects of the present invention are to provide a copier which is simple and economical to produce, which is durable and reliable in use and in which the heat is dissipated rapidly and the copies are dried quickly.

According to this invention the apparatus comprises a gate through which a record may be fed, means for feeding copy sheet along a predetermined path, a lamp for illuminating a record in the gate, means for focusing the illuminated record on said sheet at one location along said path, means at a second location for applying developer to the sheet, a housing having an outlet for the sheet beyond the developer means, the housing also having an inlet and a passageway between the inlet and outlet, said passageway leading past said lamp and over said sheet between the developer means and outlet, thereby to cool the lamp and dry the sheet by air circulation. Preferably the aforesaid passageway leads from the lamp to the sheet so that the lamp warms the air before it reaches the sheet. In the preferred embodiment the lamp is elongate and the passageway extends lengthwise of the lamp.

For the purpose of illustration a typical embodiment of the invention is shown in the accompanying drawings in which:

FIG. 1 is a vertical longitudinal section largely diagrammatic;

FIG. 2 is a section on line 2—2 of FIG. 1; and

FIG. 3 is a view from line 3—3 of FIG. 1.

The particular embodiment of the invention chosen for the purpose of illustration comprises a record gate 1 for a record to be copied, an exposure window 2 in which the paper or other copy material is exposed, the record being illuminated by lamp 3 and an image of the record being projected to the material by a lens 4 and mirror 5. Between the window and mirror is a shutter 6 pivotally mounted to swing into the path of the light beam to adjust the degree of exposure. Preferably the light beam has an elongate rectangular shape such as shown at 7 in FIG. 3 and the copy material is exposed while it and the record are traveling continuously in synchronism. With an elon-

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gate beam the intensity of light decreases from the center toward the ends of the beam. To compensate for this decrease a mask 8 is disposed in the beam, the mask being shaped as shown in FIG. 3 to obstruct light in gradually decreasing degrees from the center toward each end. The mask is pivoted at 9 to swing about an axis perpendicular to the mirror so that, by tipping the mask about the axis, correction may be made for any slight misalignment of either of the windows or the mirror which results in a distance from record to copy material at one end of the elongate beam which is greater than at the other end.

Records are fed through the record gate by endless belts 11 traveling continuously in the direction of the arrows in FIG. 1 in juxtaposition to the gate 1. A record to be copied is slipped into slot 12 until its forward edge abuts the shelf 13 and then, to start the record through the gate, the forward margin of the record is pushed off the shelf and pressed against the belts 11 by a flapper 14 pivotally supported at 16 and normally held in retracted position by a spring 17. After passing through the gate the record is deposited in slot 18.

The copy material C is supplied in strip form from a roll 21 through a slot in a cylindrical container 22 which is preferably constructed as described and claimed in copending application Ser. No. 586,145, filed Oct. 12, 1966 and now abandoned. The strip feeds from the container between rollers 23 and 24 driven through a shaft 26 by a conventional cyclic slip driver until the strip reaches rollers 42 which tear off sheets S at 43 and pass them on to feed rollers 56 as described in copending application Ser. No. 586,131, filed Oct. 12, 1966. Between feed roller 23 and rollers 42 the copy sheets pass through a corona device 59 to receive an electrostatic charge in well-known manner, and between the feed rollers 42 and 56 each sheet is exposed as above described. Beyond rollers 56 is another pair of feed rollers 61 which are disposed over a tank 62 of liquid 63 for developing the electrostatic images. A stream of developer is directed against the exposed side of each sheet S by a pump 64 which projects a stream of developer through a row of apertures in a nozzle 66 directed into the nip between the rollers so as to produce vigorous agitation of the developer as it impacts the lower roller adjacent the nip between the two rollers 56. The feed rollers 61, which also serve as squeegee rolls, deliver the developed sheets through the outlet 67.

To cool the lamp 3 and dry the developed sheets a pump 71 circulates air through an inlet 72 in the casing 73, thence along the lamp to a duct 74 and thence through the outlet 67. Thus the stream of air flows around the elongate lamp 3, thence through the duct 74 and pump 71 and thence over the sheets passing to the outlet 67. Inasmuch as the air is warmed by lamp 3 before reaching the sheets S it dries the sheets quickly.

It should be understood that the present disclosure is for the purpose of illustration only and that this invention includes all modifications and equivalents which fall within the scope of the appended claims.

We claim:

1. Apparatus for copying records comprising a window in which a record may be exposed, means for feeding copy sheet along a predetermined path, a lamp for illuminating a record in the window, means for focusing the illuminated record on said sheet at one location along said path, means at a second location for applying developer to the sheet, a duct for directing air from the region of said lamp to

said sheet beyond the developer, and means to circulate air through said duct, thereby to cool the lamp and dry the sheet by air circulation.

2. Apparatus according to claim 1 wherein said lamp is elongate and the passageway extends lengthwise of the lamp.

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NORTON ANSHER, *Primary Examiner.*

5 RICHARD A. WINTERCORN, *Assistant Examiner.*

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U.S. Cl. X.R.