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 [21] Appl. No. **798,876**
 [22] Filed **Feb. 13, 1969**
 [45] Patented **Aug. 10, 1971**
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 [32] Priority **Feb. 16, 1968**
 [33] **Japan**
 [31] **11,379**

[56]

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Primary Examiner—Samuel S. Matthews

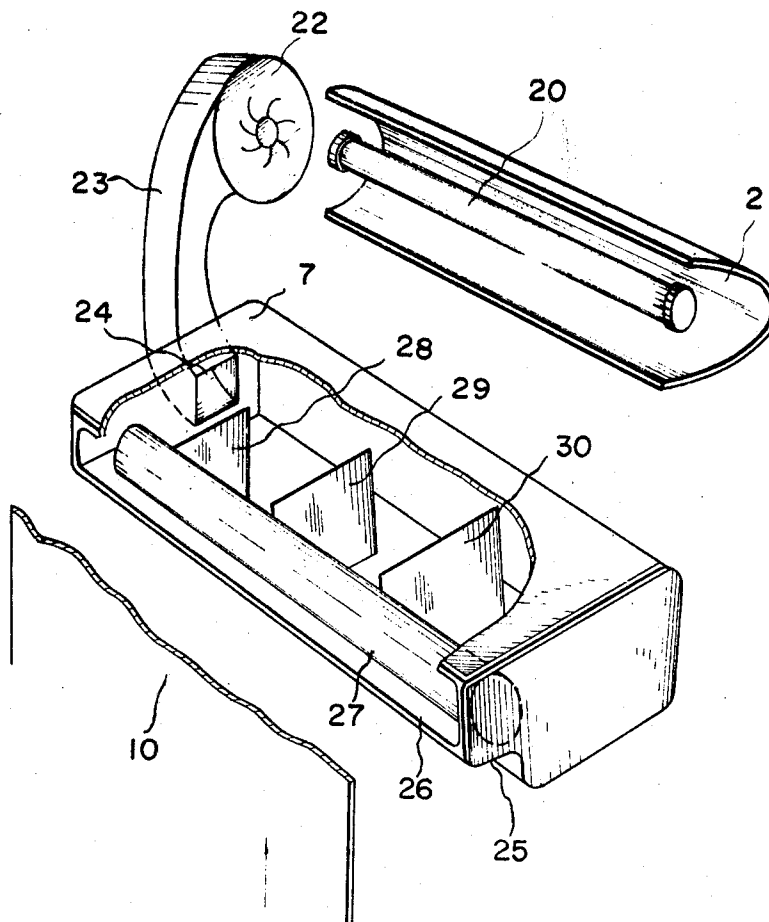
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[54] **DRYING DEVICE FOR ELECTRO
 PHOTOGRAPHIC COPYING MACHINES**
6 Claims, 3 Drawing Figs.

[52] U.S. Cl. 355/10,
 353/57, 353/61, 355/27, 355/30, 355/67
 [51] Int. Cl. G03b 27/54
 [50] Field of Search. 355/10, 27,
 28, 30, 67; 353/52, 53, 57, 61

ABSTRACT: Hot air from the light source chamber is forced into a housing having an air inlet and an air outlet in close proximity to the exposed photosensitive paper. A heat radiation source is mounted in the outlet in the path of the air. Guide plates are mounted in the housing in the airstream from the inlet to change the air flow direction approximately 90°. Both the size of the guide plates and the extent to which they extend into the airstream are successively increased in accordance with the distance of the plates from the air inlet.

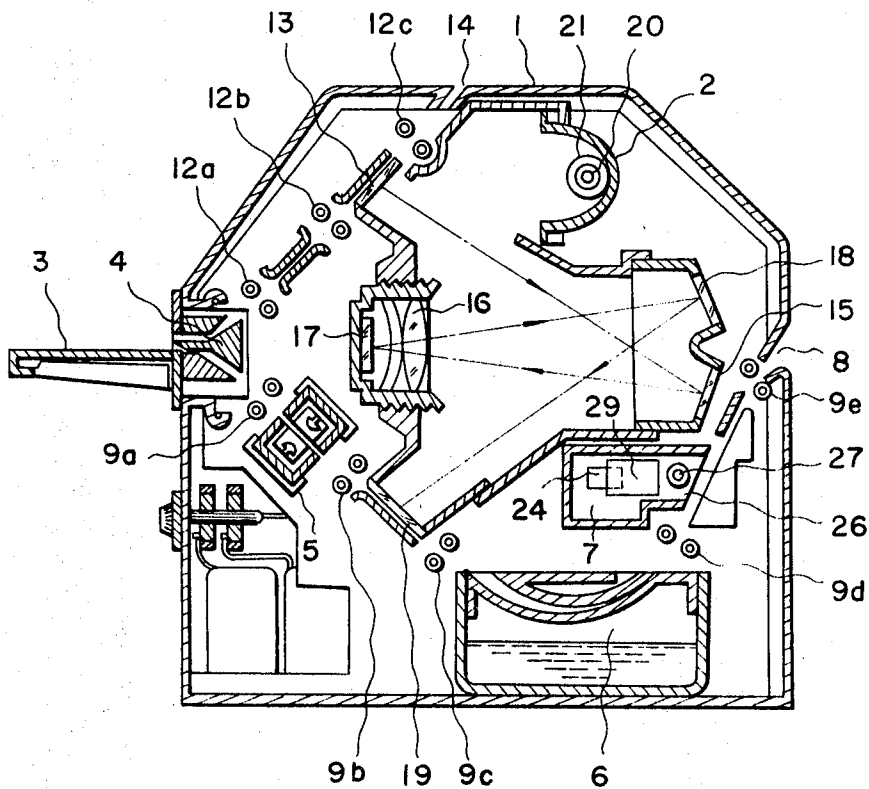


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SHEET 1 OF 2

FIG. 1



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FIG. 2

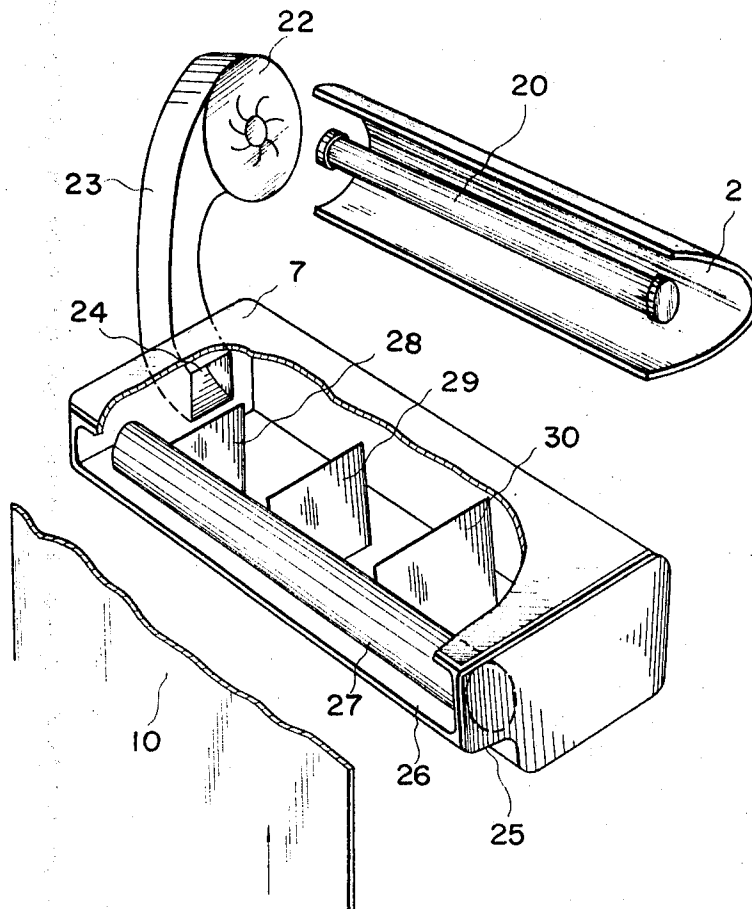
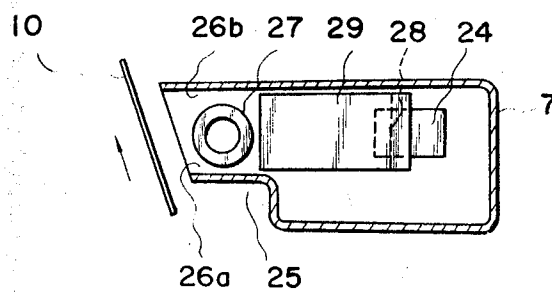


FIG. 3



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DRYING DEVICE FOR ELECTRO PHOTOGRAPHIC COPYING MACHINES

BACKGROUND OF THE INVENTION

Drying devices are known wherein waste air heated by cooling of the light source is forced onto photosensitive paper to dry it after it has been developed by a wet developing process. This type of the copying machine, however, has a disadvantage in high speed operation in that the available waste air is insufficient to dry the photosensitive paper.

Generally, in electrophotographic copying machines of the type referred to herein, photosensitive paper is transported through the drying device with the same speed as that of its transportation through the developing assembly. If the efficiency of the drying device is poor, a longer time is required for the complete drying of the photosensitive paper. This can be somewhat alleviated with the sacrifice of using a larger drying device and copying machine. On the other hand, if a small and compact machine is desired, there is a disadvantage that the drying of the photosensitive paper requires a reduction in the transportation speed of the paper which results in a slower copying process.

SUMMARY OF THE INVENTION

The object of the present invention is to eliminate the aforementioned disadvantage and to obtain a more highly efficient drying device for electrophotographic copying machines. In accordance with the invention the drying device contains a slit-type nozzle extending across the width of the transported photosensitive paper. A fan is provided at the entrance of an air-supply duct which furnishes waste air heated while cooling the light source chamber. A tubular heat radiation source is suspended along the nozzle, and hot air is injected out of louvers between the tubular heat radiation source and the nozzle. In order to inject the hot air from the nozzle uniformly over the width of the traveling photosensitive paper, the drying device is provided with a plurality of guide plates facing the air-supply opening. Both the size of the guide plates and the extent to which they extend into the airstream are increased as the distance of the guide plates from the opening increases.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side sectional view of the electrophotographic copying machine embodying features of the invention.

FIG. 2 illustrates the light source chamber and the drying device, where a part of the casing is cut open to give a clear view of the inside by locating the nozzle of the drying device in the opposite direction to that shown in FIG. 1.

FIG. 3 is a side sectional view of the drying device shown in FIG. 2.

DESCRIPTION OF THE PREFERRED EMBODIMENT

With respect to FIG. 1, the feeding table 3 located on the front side of the casing 1 affords a means for inserting the document original and photosensitive paper in superposing relationship with each other in a face-to-face fashion with the former on top of the latter. The document original is separated from the photosensitive paper by the dividing means 4, then the document original is transported diagonally upwardly and forwardly to the exit opening after passing through the feed rollers 12a, 12b, and 12c driven by a motor not shown in the illustration. During its transportation, the document original travels through the slit-type document scanning aperture 13.

Simultaneously therewith, the photosensitive paper is transported to its respective exit opening in a hyperbolic curve by the driven feed rollers 9a, 9b, 9c, 9d, and 9e. During the process, the photosensitive paper is charged by the charging device 5, is exposed to the image of the document original while passing through the slit-type image-forming aperture 19, is developed by the damp-developing bath 6, and is completely dried by the drying device 7.

The cylindrical arcuate reflex mirror forms the light source chamber 2, in which the tubular light source 20 having strong light emission is suspended in the center of the chamber, and illuminates the document original as it passes through the document scanning aperture 13. The light dispersed from the document original through the scanning aperture 13 is reflected by the first mirror 15, again reflected by the second mirror 18 after passing through the mirror-lens assembly comprised of the lens 16 and the mirror 17, and forms the image on the photosensitive paper traveling through the slit-type image-forming aperture 19.

The suction opening 21 of heated air from the light source chamber 2 has a fan within, as illustrated in FIG. 2. The heated waste air in the light source chamber is blown by the fan through the duct 23 toward the air-supply opening 24 in the sidewall of the drying device 7.

The drying device 7 contains the nozzle 26 which faces the photosensitive paper 10 traveling between the driven feed rollers 9d and 9e and extends across the traveling photosensitive paper. The tubular heat radiation source 27 is disposed across the traveling photosensitive paper at the slit-type nozzle throat 25 which forms nozzle 26. The heated waste air in the light source chamber 2 is blown by the fan 22 into the drying device 7 from the air-supply opening 24 after passing through the air-supply duct 23, and injected onto the photosensitive paper 10 through the louvers 26a and 26b each of which is formed by the sidewall of the nozzle 26 and the side face of the tubular heat radiation source 27 (refer to FIG. 3).

The guiding plates shown by 28, 29, and 30 distribute the heated waste air from the air-supply opening into the nozzle 26 and are disposed in front of the air-supply opening 24 at approximately the same spacing between adjacent plates. The guide plate 28, the smallest among the three, is positioned nearest to the air-supply opening 24, and the size of the guide plates 29 and 30 become larger in size in proportion to the distance from the air-supply opening. The desirable arrangement of the guide plates is shown in FIG. 3, where the guide plate 28, nearest to the air-supply opening 24, is disposed to cover the smallest area of the air-supply opening 24 to the nozzle side, when projected perpendicularly, and the area of projection covered by the guide plate is made larger as the guide plate distance from the air-supply opening increases. According to the present invention, as the tubular light source 20 in the light source chamber 2 is turned on and the fan 22 is put into operation, the fan 22 blows air heated by the tubular light source 20 in the light source chamber 2 into the drying device 7 through the air-supply 23, and fresh cool air introduced by the fan cools off the light source chamber 2. On the other hand, the heated waste air blown into the drying device 7 from the air-supply opening 24 is distributed equally lengthwise over the nozzle by the guide plates 28, 29, and 30. The air is heated furthermore by the tubular heat radiation source suspended within the slit-type nozzle throat 25, and is injected through the nozzle 26 onto the photosensitive paper 10 traveling in front. Therefore, the photosensitive paper 10 is heated to dry at high speed by both the injected heated air and the radiation heat from the tubular heat radiation source. Even drying of the paper results because the heated air is injected uniformly over the width of the traveling photosensitive paper 10.

The present invention makes it possible to increase the copying speed and to minimize the size of the copying machine, since, as mentioned above, the operation time and space required are decreased as much as possible.

We claim the features of the present invention as follows:

1. Drying apparatus for electrophotographic reproducing apparatus of the type using photosensitive paper exposed from a light source chamber, comprising:

a housing mounted in said reproducing apparatus and having an air inlet and an air outlet, said outlet is in proximity to the exposed photosensitive paper in said reproducing apparatus to expel air thereupon,

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a duct interconnecting said light source chamber and said inlet and including means for forcing heated air from said chamber to said inlet, and

a heat radiation source mounted in said outlet in the path of the expelled air to project heat onto said exposed photosensitive paper.

2. Drying apparatus as in claim 1 wherein said housing further includes means for guiding air from said inlet to said outlet.

3. Drying apparatus as in claim 2 wherein said means for guiding comprises a plurality of upstanding guide plates mounted perpendicular to the flow of air from said inlet.

4. Drying apparatus as in claim 3 wherein the size of said guide plates is determined by the distance of a plate from said inlet, said plate size successively increasing from said inlet side of said housing to the opposite side of said housing.

5. Drying apparatus as in claim 3 wherein the edges of said guide plates intercepting the airstream from said air inlet extend successively further into the airstream in accordance with the distance of the plates from said air inlet.

6. Drying apparatus as in claim 3 wherein said air inlet and said air outlet are substantially perpendicular to one another.

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