United States Patent [19]

Kidd

[11] **3,868,182**

[45] **Feb. 25, 1975**

[54] **LAMP ASSEMBLY**

[75] Inventor: **Wayne L. Kidd,** Fairport, N.Y.

[73] Assignee: **Xerox Corporation,** Stamford, Conn.

[22] Filed: **May 29, 1973**

[21] Appl. No.: **364,446**

[52] **U.S. Cl.** ..... **355/67,** 240/1.3, 240/41 R

[51] **Int. Cl.** **G03b 27/54**

[58] **Field of Search** ..... 240/41 R, 41.35 R, 1.3; 355/67

[56] **References Cited**

UNITED STATES PATENTS

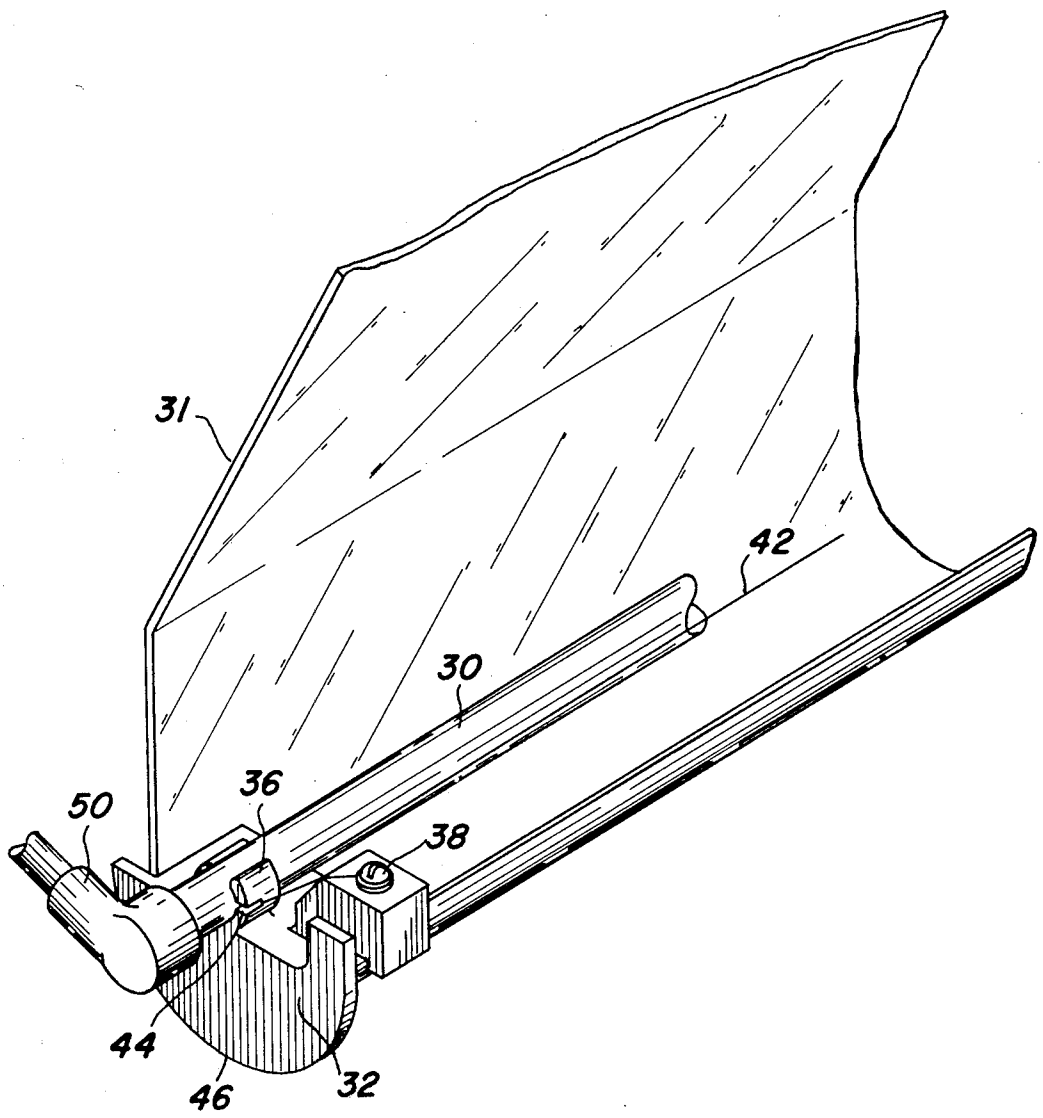
3,692,994 9/1972 Hirschman et al..... 355/67 X

Primary Examiner—Richard M. Sheer

[57] **ABSTRACT**

A lamp assembly for use with an arc discharge type lamp employing an external trigger wire to provide the required conductive field to establish threshold voltage for initiating current through the lamp.

3 Claims, 3 Drawing Figures



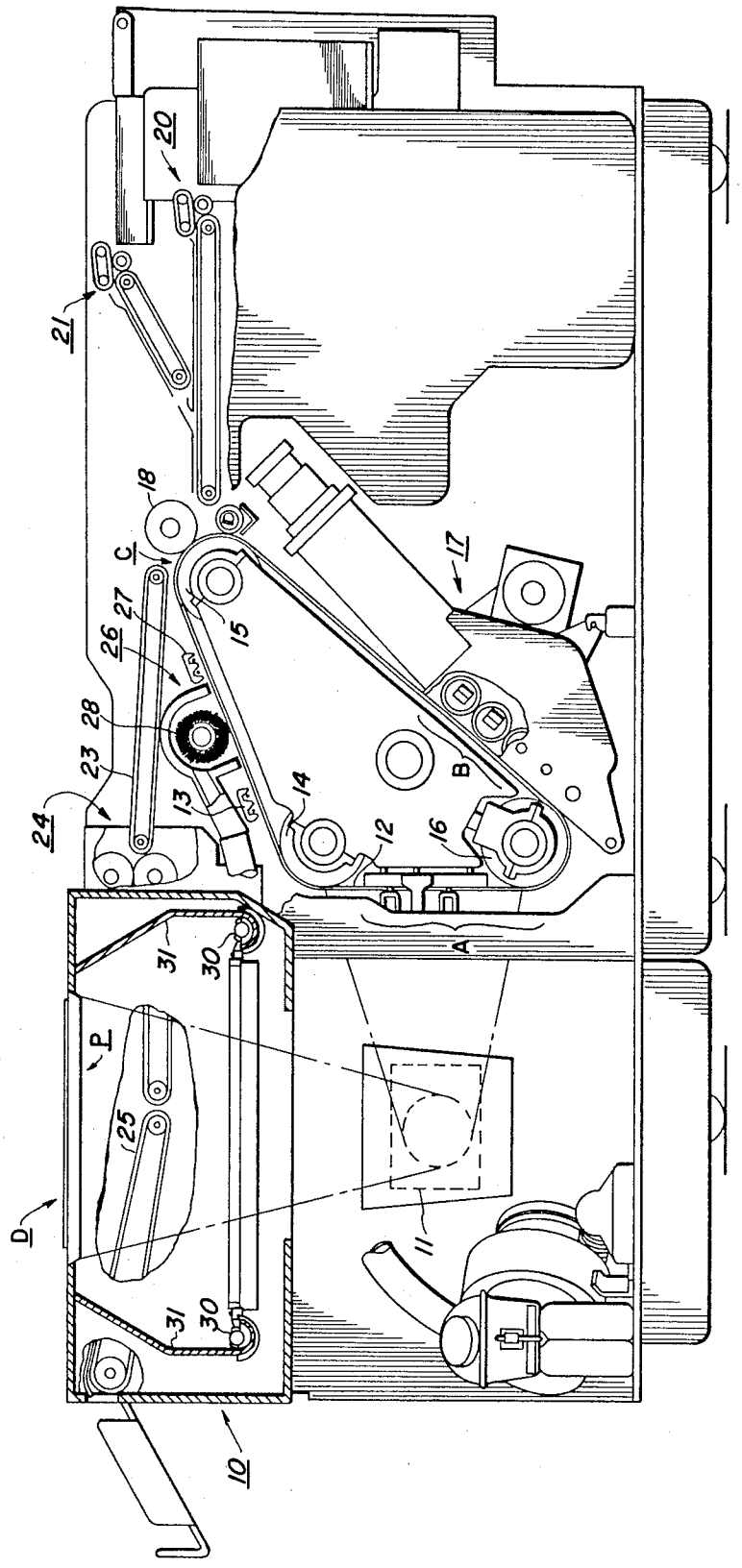


FIG. 1

FIG. 2

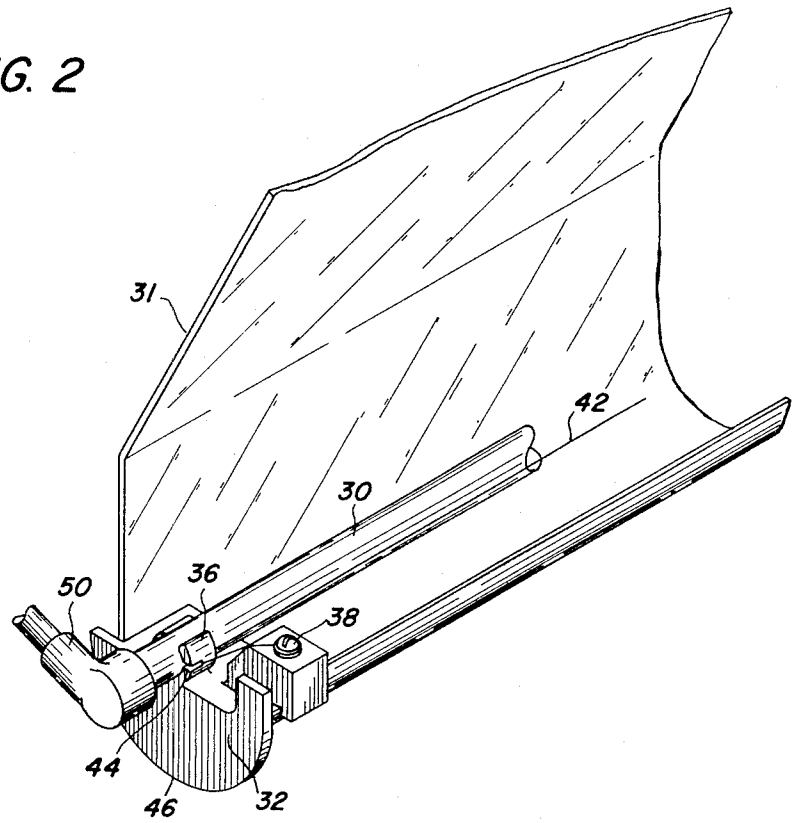
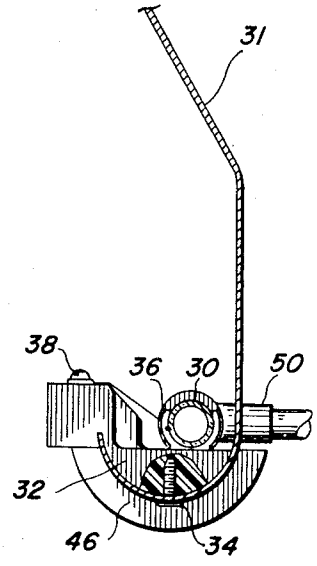


FIG. 3



LAMP ASSEMBLY

BACKGROUND OF THE INVENTION

In xerographic copy machines it has been the practice to illuminate the document to be copied by use of florescent lamps and utilize a scanning system to project reflected rays from the document onto a moving photoreceptive surface to provide a latent image thereon in conformity with the image on the document.

In order to provide higher speed copiers, the scanning speed and the rate of movement of the photoreceptive surface has been increased. However, there is a practical limit to the speed at which the mechanical components of the scanning system may be operated. For high speed copying therefor, a xerographic machine having a belt type photoreceptive surface adapted for flash exposure may be employed to obviate the need for a scanning system. Due to the operating speed of the machine, the illumination system must be capable of providing intense uniform illumination of the document at extremely short intervals.

This may be accomplished by using lamps of the xenon arc discharge type. To allow rapid flashing of a xenon flash tube, a voltage may be provided across the flash tube just below the voltage level necessary to establish conduction therethrough. A trigger wire may be placed along side the tube, ordinarily by wrapping the tube with the wire. Voltage provided to this wire will produce a conductive field along side the tube to ionize the xenon gas therein, allowing the applied voltage to exceed the threshold voltage and flash the tube. For proper illumination of the document, the tube may be utilized with suitable reflectors.

SUMMARY OF THE INVENTION

This invention relates to a lamp assembly for illuminating a document to be reproduced on a reproduction machine including a reflector having tubular lamp means spaced therefrom for flash illuminating the document to produce a latent electrostatic image of the document on a photoconductive surface in the reproduction machine. Clamp means are mounted on the reflector for releasably securing the lamp means in spaced relation to the reflector, the clamp means being adapted to maintain a flash triggering wire parallel to and adjacent to lamp means in spaced relation from the reflector to prevent arcing from the wire to the reflector.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a schematic sectional view of a xerographic reproduction machine employing the lamp assembly of the present invention;

FIG. **2** is a perspective view of an assembled lamp assembly; and,

FIG. **3** is an end view of the lamp assembly of FIG. **2.**

DESCRIPTION OF THE PREFERRED EMBODIMENT

For a general understanding of an electrostatic processing system in which the invention may be incorporated, reference is had to FIG. **1** in which various components of the system are schematically illustrated. As in all electrostatic systems such as a xerographic machine, a light image of an original to be reproduced is projected on to the sensitized surface of a xerographic

plate to form an electrostatic latent image thereon. Thereafter, the latent image is developed with an oppositely charged developing material comprising carrier beads and smaller toner particles triboelectrically adhering thereto to form a xerographic powder image corresponding to the latent image on the plate surface. The powder image is then electrostatically transferred to a support surface to which it may be fixed by a fusing device whereby the powder image is caused permanently to adhere to the support surface.

In the illustrated machine, an original D to be copied is placed upon a transparent support platen P fixedly arranged in an illumination assembly generally indicated by the reference numeral **10.** While upon the platen the illumination system flashes light rays upon the original thereby producing image rays corresponding to the informational areas on the original. The image rays are projected by means of an optical system **11** to an exposure station A for exposing the photosensitive surface of a moving xerographic plate in the form of a flexible photoconductive belt **12.** In moving in the direction indicated by the arrow, prior to reaching the exposure station A, that portion of the belt being exposed would have been uniformly charged by a corona device **13** located at a belt run extending between belt supporting rollers **14** and **15.** The exposure station extends between the roller **14** and a third support roller **16.**

The exposure of the belt surface to the light image discharges the photoconductive layer in the areas struck by light, whereby there remains on the belt a latent electrostatic image in image configuration corresponding to the light image projected from the original on the support platen. As the belt surface continues its movement, the electrostatic image passes around roller **16** and through a developing station B located at a third run of the belt wherein there is positioned a developing apparatus generally indicated by the reference numeral **17.** The developing apparatus **17** comprises a plurality of brushes which carry developing material to the adjacent surface of the upwardly moving inclined photoconductive belt **12** in order to provide development of the electrostatic image.

The developed electrostatic image is transported by the belt **12** to a transfer station C located at a point of tangency on the belt as it moves around roller **15** whereat a sheet of copy paper is moved at a speed in synchronism with the moving belt in order to accomplish transfer of the developed image. There is provided at this station a transfer roller **18** which is arranged on the frame of the machine for contacting the non-transfer side of each sheet of copy paper as the same is brought into transfer engagement with the belt **12.** The roller **18** is electrically biased with sufficient voltage so that the developed image on the belt **12** may be electrostatically transferred to the adjacent side of a sheet of paper as the same is brought into contact therewith.

There is also provided a suitable sheet transport mechanism adapted to transport sheets of paper seriatim from paper handling mechanisms **20** and **21** to the developed image on the belt as the same is carried around the roller **15.** A programming device (not shown) operatively connected to the paper handling mechanisms and the illumination device is effective to present a developed image at the transfer station C in timed sequence with the arrival of a sheet of paper.

After the sheet is stripped from the belt **12** it is conveyed by the stripper transport **23** into a fuser assembly generally indicated by the reference numeral **24** wherein the developed and transferred xerographic powder image on the sheet is permanently affixed thereto. After fusing, the finished copy is discharged from the apparatus at a suitable point for collection externally of the apparatus. The toner particles remaining as residue on the developed images, background particles, and those particles otherwise not transferred are carried by the belt **12** to a cleaning apparatus positioned on the run of the belt between rollers **14** and **15** adjacent the charging device **13.** The cleaning device comprises a corotron **27** for neutralizing charges remaining on the particles and a rotating brush **28** for removing the neutralized toner particles from the belt.

Referring now to FIGS. **2** and **3** there is illustrated one of the reflector-lamp assemblies utilized in the illumination system of the machine. The lamp **30,** which is preferably a xenon flash tube, is mounted in spaced relation to a suitable reflector **31** to provide intense, even illumination of the document on the platen P. For a more complete description of the relationship between the lamps, the reflectors, and the platen P to provide optimum illumination of the document, reference may be had to U.S. Patent Application Ser. No. 270,750, filed July 11, 1972, now U.S. Pat. No. 3,777,135, granted Dec. 4, 1973.

The tube is held in the proper spaced position relative to the reflector by suitable clamps **32** which may be secured to the reflector by means of self-tapping screws **34.** Tabs **36,** conforming to the curvature of the tube **30,** are provided on clamp **32,** preferably by being molded thereon to resiliently hold tube **30** in clamp **32.**

In order to locate the trigger wire **42** adjacent the tube, a small notch **44** is provided near the base of one of the tabs **36** on each clamp. The trigger wire is secured to the clamp by suitable means such as screw **38,** looped around tab **36** where it is retained in position by notch **44** and stretched along the surface of the tube **30** to the opposite end of the tube where an identical clamp is provided for mounting the opposite end of the tube and the wire.

It can be seen by reference to FIG. **3** that the tube is mounted within the reflector **30** in a position which is offset from the axis of the curved portion of the bottom of the reflector. The disclosed arrangement positions the trigger wire along side the tube at a location on the tube to provide the maximum distance possible between the trigger wire and the reflector to prevent arcing between the trigger wire and the reflector.

The reflector-clamp assembly provides a means for mounting the tube in relation to the reflector while allowing the end portions of the tube to extend beyond the reflector and clamp for adequate cooling thereof and to prevent excess transmission of heat to the clamp. Also, by extending the tube beyond the clamp, the possibility of arcing from the electrical connections at the ends of the tube to the reflector or clamp is minimized. To further reduce the possibility of arcing either from the trigger wire or the electrical connectors on the ends of the flash tube, a depending flange **46** is formed on the clamps to increase the arc path distance between the connections and the end and lower portions of the reflector. Suitable electrical connectors **50** are provided for connecting the ends of the tube to a suitable source of electrical power (not shown).

The trigger voltage is supplied to trigger wire **42** by suitable wires (not shown) which may be connected to screws **38.**

From the foregoing it can be seen that the lamp assembly heretofore described accurately positions the tube relative to the reflector, positions the trigger wire at an optimum location relative to the tube and the reflector to prevent arcing to the reflector when voltage is supplied to the wire for triggering the tube, allows mounting of the tube such that the heat generated at the electrical connectors thereto is not transmitted to the clamp or reflector assemblies, and minimizes the possibility of arcing between the electrical connections and the reflector or clamps.

While I have described a preferred embodiment of my invention it is to be understood that the invention is not limited thereto but may be otherwise embodied within the scope of the following claims:

What is claimed is:

1. A lamp assembly for flash illuminating a document to be reproduced on a xerographic machine comprising:

a reflector;

dielectric clamp means provided at each end of said reflector for engagement therewith, said clamp means including resilient lamp tube retaining means,

a tubular lamp, having electrical contact surfaces at each end thereof said tubular lamp being retained in said clamp means, in a predetermined position relative to said reflector by said resilient means, the ends of said lamp extending beyond said clamp means, said lamp being adapted for connection at each end thereof to a source of electrical power, the electrical contact surfaces of said lamp being spaced from said clamp means and said reflector to prevent arcing therebetween; and,

a trigger wire positioned along side said lamp parallel to the axis thereof, said wire being located and retained against said tubular lamp between said resilient means and said lamp.

2. A lamp assembly according to claim **1** wherein said lamp is mounted asymmetrically relative to said reflector, said trigger wire being positioned on the side of said lamp furthest from said reflector.

3. A lamp assembly according to claim **2,** wherein each of said clamp means is provided with a depending flange formed thereon extending below the lower surface of said reflector to provide a dielectric shield on the end of said reflector and thereby increase the arc path distance between said trigger wire and the electrical contact surfaces and said tubular lamp and the end portions of said reflector.

* * * * *