

[54] **CORONA CHARGING DEVICE AND SUPPORT ARRANGEMENT**

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[22] Filed: **Mar. 15, 1974**

[21] Appl. No.: **451,630**

[30] **Foreign Application Priority Data**

May 18, 1973 Japan..... 48-157831

[52] U.S. Cl. **250/324; 250/325**

[51] Int. Cl.² **H01T 19/04**

[58] Field of Search 250/324, 325, 326; 96/1 C; 317/262 A; 355/3

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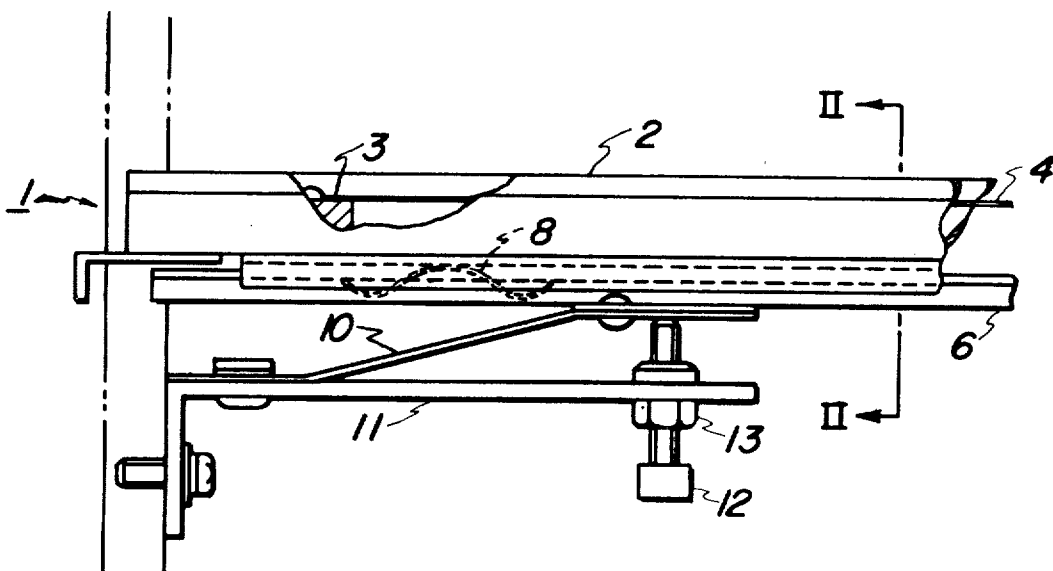
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[57] **ABSTRACT**

A corona charging device and support arrangement in which the main structure is supported on a rail which is movable vertically toward or away from a supporting base by means of a pair of plate springs adjacent each end of the rail, each spring having one end thereof attached to the supporting base and the other end thereof fixed to the bottom plane of the rail near one end thereof. The corona discharge structure is movable horizontally in the longitudinal direction of the corona structure along the rail by means of a tongue-in-groove arrangement. In addition, the supporting rail is movable toward and away from a photo-sensitive surface by means of a pair of set screws mounted on the supporting bases which, when rotated, bear against the bottom of the plate spring and move it and the rail attached thereto in the direction away from the support base and toward a photosensitive surface.

1 Claim, 2 Drawing Figures



CORONA CHARGING DEVICE AND SUPPORT ARRANGEMENT

BACKGROUND OF THE INVENTION

The present invention relates to a corona charging apparatus of the type used in electrophotographic copiers and support arrangement therefor. Electrophotographic machines, as is well known in the prior art, generally comprise a photoconductive material which is initially uniformly charged and is then exposed to light in the form of an image to generate a latent electrostatic image of the information to be copied. Thereafter, the latent image is developed by means of development particles which electrostatically adhere to the photosensitive material. A permanent copy of the image is made either by fixing it as it is, or by transferring the development particles to another support surface, then fixing the image.

The present invention relates more specifically to a mechanism for adjusting the distance between the corona charging apparatus and the photosensitive material used in an electrophotographic machine of the above noted type.

One requirement of a corona charging apparatus is that it creates a uniform charge over the surface of the photoconductive material since irregularities, in charge across the photosensitive surface, deteriorate the quality of the final copy. These irregularities in deposited charge are often caused by variations in the distance between the photosensitive material and the corona wire included in the corona charging device.

The conventional method for adjusting the placement of the corona generator along a line parallel to and in juxtaposition with the photosensitive surface is to mount it on a rail supported at its ends from the frame of the duplicator or on brackets. The shield of the corona charging device has formed on a surface thereof a groove into which flanges on the top of the rail extend. With this arrangement the shield may slide back and forth along the rail to a suitable position opposite the photosensitive surface. The same structure as noted above for horizontal movement of the corona structure is employed in this invention.

In the prior art, vertical movement, i.e., movement of the corona wire toward or away from the photosensitive surface was accomplished by adjusting the connection between the rail and the support base on which it was mounted. This procedure was troublesome and required an undue amount of time.

The present invention was designed specifically to overcome the problems noted above and one object thereof lies in providing a corona charging apparatus that is better suited for the quick and accurate adjustment of the distance between the corona wire and the photosensitive surface.

SUMMARY OF THE INVENTION

In order to overcome the above noted problems, there is provided a corona charging device and support arrangement in which the main structure is supported on a rail which is movable vertically toward or away from a supporting base by means of a pair of plate springs adjacent each end of the rail, each spring having one end thereof attached to the supporting base and the other end thereof fixed to the bottom plane of the rail near one end thereof. The corona discharge structure is movable horizontally in the longitudinal direc-

tion of the corona structure along the rail by means of a tongue-in-groove arrangement. In addition, the supporting rail is movable toward and away from a photosensitive surface by means of a pair of set screws mounted on the supporting bases which, when rotated, bear against the bottom of the plate spring and moving it and the rail attached thereto in the direction away from the support base and toward a photosensitive surface.

BRIEF DESCRIPTION OF THE VIEWS

A detailed description of the present invention will now be given with reference to the drawings, in which:

FIG. 1 is a front view of one side of the corona charging device and support arrangement of the present invention with a part thereof cut away; and

FIG. 2 is a sectional view along the line II—II of FIG. 1.

DETAILED DESCRIPTION OF THE INVENTION

Referring to FIGS. 1 and 2, there is shown a corona charging apparatus and support arrangement only one side of which is shown for the sake of clarity. The corona device 1 comprises insulation blocks 3 (only one of which is shown in the drawing) arranged at both ends of an oblong metal shield 2 having a generally concave section, with a fine wire electrode 4 made of a suitable metal properly set in place to bridge the blocks. The bottom of the shield 2 is formed to provide two grooves 5 into which tongues or flanges 18 formed on the top of a rail 6 extend so as to permit the corona structure to slide horizontally along the supporting rail 6. The corona generating structure is positioned to bring the discharge opening 19 in the shield into juxtaposition with a drum 7 constituting photosensitive surface. A spring clip 8 is positioned in the space between the bottom surface 9 of the corona generator shield 2 and the top surface of the rail 6 to push the bottom 9 of the shield upward at all time, thus eliminating any play between the flanges 18 and the walls of the grooves 5.

A plate spring 10 is fixed on one end to the bottom of the supporting rail 6, and on the other end to a supporting base 11. The base 11 may comprise a bracket or the like attached to the frame of the machine (not shown). The plate spring 10 functions in a manner so as to constantly bias or pull the supporting rail 6 in the direction of the supporting base 11.

The supporting base 11 carries a set screw 12 for varying the spacing between the supporting base 11 and the supporting rail 6. The set screw 12 has a head which is accessible for rotation from under the base 11. As the set screw is turned clockwise it moves upwardly and pushes against and moves the end of the plate spring 10 adjacent the rail 6. In this manner, the rail 6 is also moved upwardly as viewed in FIG. 1 away from the supporting base 11. Consequently, the corona wire 4 is moved closer to the drum 7.

Counterclockwise rotation of the set screw 12 moves it away from the plate spring 10 which permits the spring 10 to draw the rail 6 in a direction away from the photosensitive surface 7.

As noted hereinbefore, only one side of the corona charging device and support arrangement is shown in FIG. 1. Another plate spring 10, set screw 12 and supporting base 11, are support structure arranged to connect to the other end of the supporting rail 6 as well, thus enabling proper adjustment of any irregularity in the distance between the drum 7 and the corona gener-

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ating unit 1.

A nut 13 may be added to the set screw 12 to lock the set screw 12 in place after setting the proper distance, thus, keeping the set screw adjustment free from changes due to vibration.

What is claimed is:

1. In combination, a corona charging device comprising an elongated shield defining a chamber generally concave in cross section and having an opening on one side thereof and a wire electrode supported along the longitudinal axis of said shield by insulating blocks supported at opposed ends of said shield, an imaging surface adjacent said opening and adapted to be charged by said device, a support arrangement for permitting movement of said device in directions parallel and perpendicular to said axis, said arrangement including a

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rail extending parallel to the longitudinal axis of said shield, said rail including outwardly diverging flanges, said shield including a channel on the side thereof opposite said opening, said flanges interfitting into said channel so as to permit sliding movement of said shield along said rail generally parallel to said axis, a compression spring interposed between said rail and said device to continuously bias said shield away from said rail, a fixed support base, a leaf spring coupled intermediate said base and said rail, a set screw carried by said base, said set screw movable perpendicular to said axis for flexing said leaf spring, whereby movement of said device in a direction perpendicular to said axis is accomplished.

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