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Matsumoto et al.

[11] **3,800,153**

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[54] **ELECTROPHOTOGRAPHY CHARGING DEVICE**

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[52] **U.S. Cl.** ..... **250/325,** 317/262 A

[51] **Int. Cl.** **G03g 15/02**

[58] **Field of Search** ..... 250/324, 325, 326; 317/262 A

[56] **References Cited**

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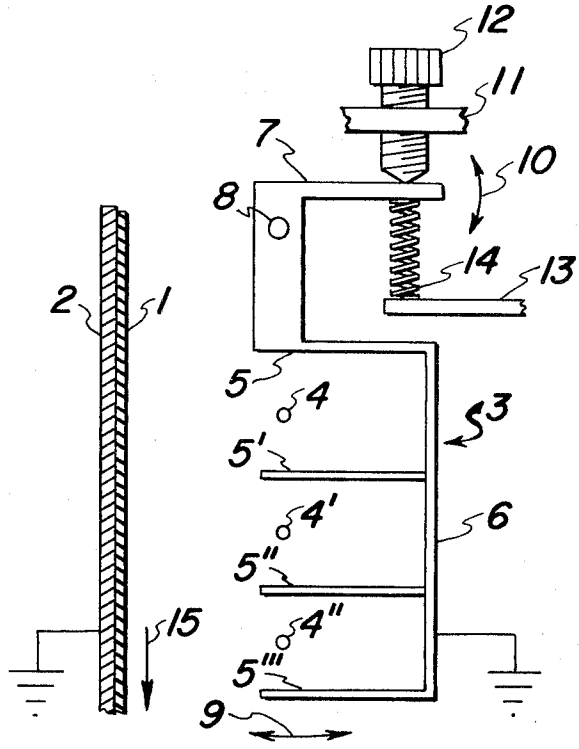
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Primary Examiner—William F. Lindquist

[57] **ABSTRACT**

A fulcrumed charging electrode to accurately space a corona generator wire or wires from a photoconductive surface for charging the same. The corona wire and associated shield are pivoted about an axis parallel to the wire and several specific means are shown for effecting the desired pivot action and adjustment.

4 Claims, 3 Drawing Figures



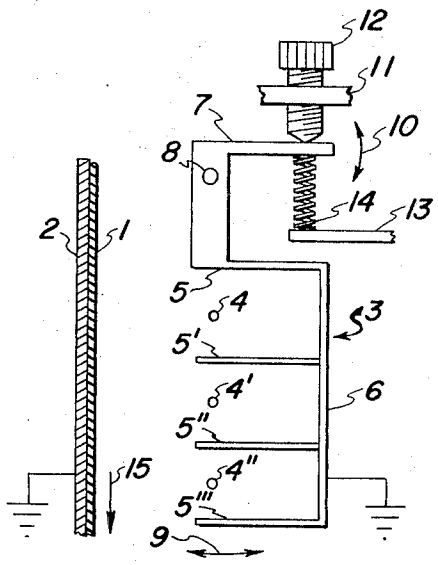


FIG. 1

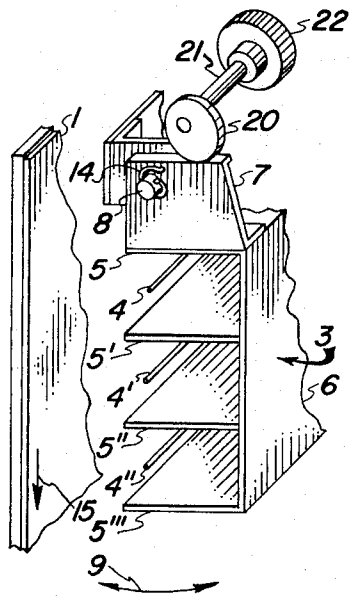


FIG. 2

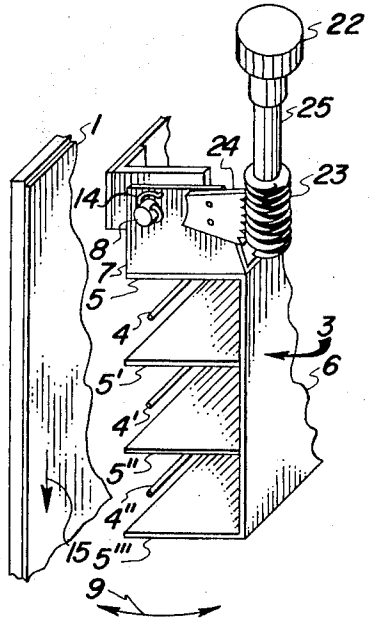


FIG. 3

ELECTROPHOTOGRAPHY CHARGING DEVICE

BACKGROUND OF THE INVENTION

This invention relates to electrophotography apparatus, and more particularly to a device for controlling the amount of charge uniformly distributed on a photoconductive surface.

Xerographic processes and apparatus in general need not be described in detail herein, since various printed publications and patents are available in which these details are set forth. Examples of such publications are the books "Electrophotography" by R. M. Schaffert, and "Xerography and Related Processes" by John H. Dessauer and Harold E. Clark, both first published in 1965; and the numerous patents and other references cited in these books. All of these references are hereby incorporated in this specification.

As is well-known in xerography, a photoconductive insulation is placed on a conductive surface and charged, usually by a corona discharge means, so that the photoconductive surface is at a certain potential relative to the grounded conductive plate. Upon exposure of this charged photoconductive surface, the photoconductive insulation becomes conductive and discharges its potential to the conductive grounded plate. The pattern of this electrical discharge is the pattern of the object which is being exposed; i.e., an electrostatic image.

It is important to the quality of the electrostatic image that the charge imparted to the photoconductive surface be uniform. In addition, it is desirable that the apparatus for effecting such charging be adjustable to compensate for various conditions of the charging apparatus itself, the photoconductive surface, the photoconductive surface, the atmosphere, the toner to be used, and other variables.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a photoconductor charging means, specifically a corona generator apparatus, with associated mechanism for adjusting the level of charge imparted to the photoconductor.

Briefly, the present invention is practiced in general by a charging electrode, including a corona wire and associated shield, disposed for pivotal movement relative to a photoconductive surface about an axis parallel to the corona wire.

For a better understanding of this invention, reference is made to the following detailed description given in connection with the accompanying drawings.

DRAWINGS

FIG. 1 is a somewhat schematic view of a charging electrode and photoconductor according to one embodiment of this invention.

FIG. 2 is a perspective view showing a second embodiment of this invention.

FIG. 3 is a perspective view showing a third embodiment of this invention.

DESCRIPTION

Referring now to FIG. 1, a photoconductive surface is shown at 1 and is mounted on a grounded conductive surface or plate 2. A charging electrode apparatus is generally shown at 3 and includes one or more corona wires 4, 4', 4'' extending along or across the plane

of the photoconductor 1 and parallel thereto. A grounded corona shield 6 is disposed in semi-enclosing relationship to the corona wires, and includes separators 5', 5'', and 5''' extending between individual corona wires 4 and creating, in effect, separate corona shields.

The charging electrode 3 is supported on a lever arm mechanism 7 which is in turn pivotally mounted on a fulcrum 8 which is on an axis parallel to that of the corona wire 4. Lever arm 7 and charging electrode 3 traverse an arcuate locus, respectively indicated at 10 and 9, about the fulcrum 8.

In the FIG. 1 embodiment, this movement of lever arm 7 and electrode 3 is controlled by a screw 12 which is operatively associated with a fixed frame member 11 and is in abutting relationship against the lever arm 7. Return movement of the lever arm 7 against the screw member 12 is provided by a compression spring 14 which is mounted between lever arm 7 and another fixed frame member or abutment 13.

In operation, it will be apparent that by adjusting the screw 12 in a desired direction, the charging electrode 3 with wires 4 and shield 6 are all swung together toward or away from the photoconductor 1. By this means, a fine adjustment of the charge level on the photoconductive surface can be made.

Referring now to FIG. 2, the lever arm 7 connected to the charging electrode 3 is in contact with a cam 20 which is connected to a shaft 21 and a control handle 22. Shaft 21 is laterally offset from the fulcrum 8 so that when shaft 21 and cam 20 are rotated, the result is to move the lever arm 7 about the fulcrum 8 with the same result as described in connection with FIG. 1.

Referring now to FIG. 3, the lever arm 7 is provided at one end with a gear sector 24 which engages with a worm gear 23 which in turn is mounted on a shaft 25 having a control handle 22. The gear action between worm gear 23 and gear sector 24 motivates the lever arm 7 and charging electrode 3 in the desired direction along its arcuate locus, similarly as described in connection with FIGS. 1 and 2.

In FIGS. 2 and 3, a spring device is shown mounted between the fulcrum 8 and the lever 7 for the purpose of eliminating play in the mechanism.

It will be apparent that by use of the apparatus described in this specification, a charging electrode can be accurately positioned relative to a charge-receptive surface.

The foregoing description of an embodiment of this invention is given by way of illustration and not of limitation. The concept and scope of the invention are limited only by the following claims and equivalents thereof which may occur to others skilled in the art.

What is claimed is:

1. A charging device for electrophotographic apparatus in which a photoconductive surface is sensitized by the application thereto of electrostatic charge, said charging device including:

a grounded corona shield pivotally mounted to a frame for arcuate movement relative to said photoconductive surface on an axis parallel to said photoconductive surface, said corona shield being thereby arcuately displaceable toward and away from said photoconductive surface for adjustment of its operative position relative thereto,

said corona shield including an integral lever arm extending from said axis,

adjustment means mounted on said frame to variably cause said lever arm and said corona shield to arcuately displace about said axis,

a corona wire supported within, and insulated from, said corona shield and extending parallel to said axis,

the locus of all points on the arcuate path of said corona wire intersecting said photoconductive surface,

whereby said corona wire is adjustably movable toward and away from said photoconductive surface to increase and decrease, respectively, the level of electrostatic charge applied to said photoconductive surface.

2. A charging device as defined in claim **1** in which said adjustment means includes:

a frame-mounted screw bearing against said lever arm and adjustable relative to its mount to effect movement of said lever arm, and

a frame-mounted spring biasing said lever arm against said screw.

3. A charging device as defined in claim **1** in which said adjustment means includes:

a cam rotatably mounted relative to said frame and bearing against said lever arm, said cam effecting displacement of said lever arm in response to rotation of said cam.

4. A charging device as defined in claim **1** in which said adjustment means includes:

a first gear integral with said lever arm,

a second gear rotatably mounted relative to said frame and mating with said first gear, said first and second gears coacting to effect displacement of said lever arm in response to action of said second gear.

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