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3,369,152

DEVICE FOR COLLECTING ELECTROSTATIC CHARGES FROM POOR
CONDUCTORS BY MEANS OF A CORONA DISCHARGE

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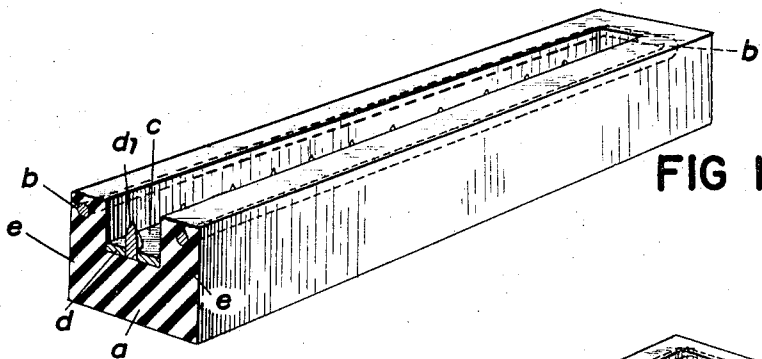


FIG 1

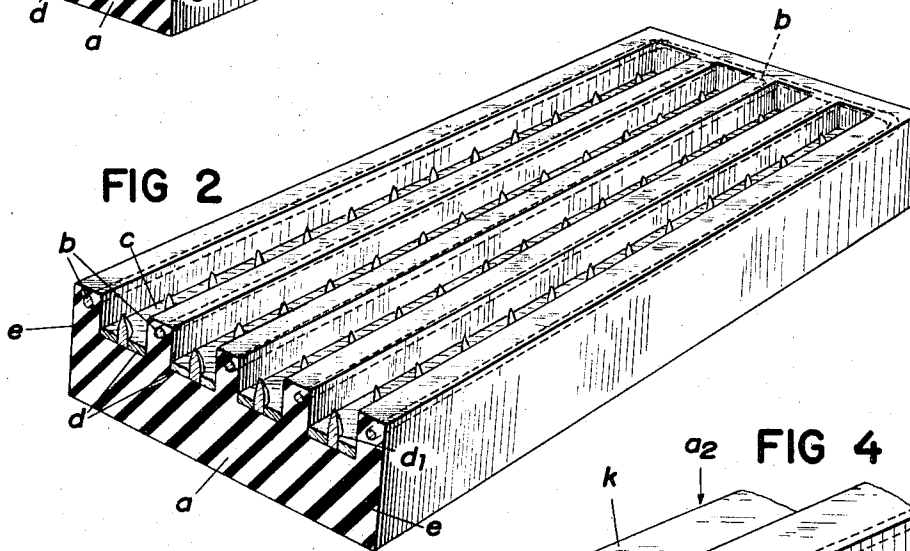


FIG 2

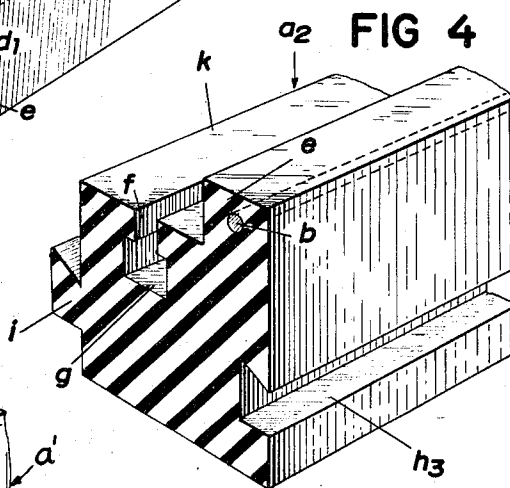


FIG 4

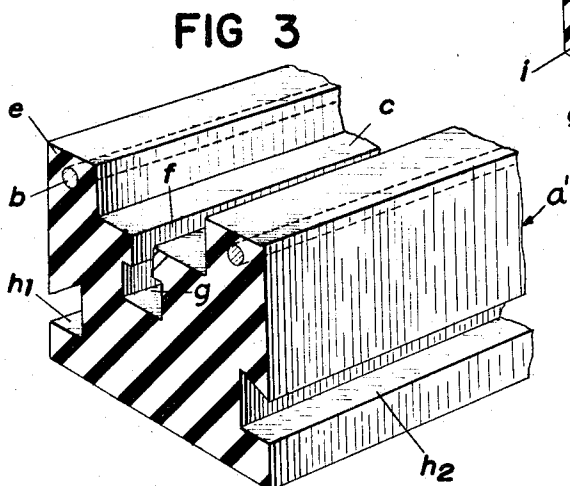


FIG 3

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DEVICE FOR COLLECTING ELECTROSTATIC CHARGES FROM POOR CONDUCTORS BY MEANS OF A CORONA DISCHARGE

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9,505/64

2 Claims. (Cl. 317—2)

ABSTRACT OF THE DISCLOSURE

A device for collecting electrostatic charges wherein a grounded electrode is located in a slot of a body of insulating material having an outwardly projecting electrode tip located entirely in such slot. An electric conductor directly connected to a high voltage source forming a counterelectrode is completely encased within such body so that when a voltage is directly applied to such conductor a corona discharge arises distributed over an entire side of said body thereby positively preventing a short circuiting and being absolutely shock proof.

This invention relates to an improvement in the construction described in my Patent No. 2,983,847, granted May 9, 1961.

The device disclosed in the above patent for the collecting electrostatic charges operates without objection so long as it is subjected to no soiling whatever or to only a slight degree of soiling. However, as soon as there is pronounced soiling, a conductive connection may be established between the live electrodes and the metallic wires running parallel thereto, which may cause a power loss or even a short circuit. With increased soiling, there is risk of electric shock for persons exposed to the voltage applied to the sunk or depressed electrode. These disadvantages are avoided by the present improvement.

It is thus an object of the present invention to provide an improved device for collecting electrostatic charges from poor conductors; which device affords a positive protection against electric shock, is positively short-circuit proof and which, thanks to a substantial decrease of the degree of soiling, avoids the power loss than always occurs in devices of known construction after a certain period of operation.

Such object is attained by embedding the metallic wires extending on both sides of the longitudinal slot, entirely in the material of the barlike body, and further by applying the operating voltage to said wires, while the rodlike tipped electrode lying in the longitudinal slot is grounded.

The present improvement is thus characterized by at least one rodlike body of insulating material provided at least on one side with at least one slot in which are sunk rodlike grounded electrodes that comprise a plurality of electrode tips which project outwardly but still are situated within said slots, and further by electric conductors that form counterelectrodes and are located in the walls that laterally define said slots; the whole in such arrangement that between the electrode tips and the conductors enclosed in the slot-defining walls there arises a corona discharge under the action of a voltage applied to said conductors, which discharge is distributed along the entire length of said rodlike body.

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Several forms of the present invention are illustrated in the drawing, in which:

FIG. 1 is a perspective view of a first form that has a single longitudinal slot,

FIG. 2 shows a form comprising four longitudinal slots, FIGS. 3 and 4 depict two further forms.

The first form (FIG. 1) which is the most simple form, comprises a body *a* of rectangular cross-section and of insulating material, which on its upper side is provided with a longitudinal slot *c* and on the bottom of which is disposed a rodlike electrode *d*. The latter comprises at regular spacings a plurality of upright electrode tips *d*¹ of which the tops still are situated within slot *c*. In the defining walls *e* that surround slot *c* are embedded metallic wires *b* which, for example, may be cast-in when making the body *a*.

When applying, for the purpose of operating the device, a grounded high tension to the metallic wires *b* across a connection (not shown) the desired corona discharges arise between the wires *b* and the grounded electrode, by means of which are neutralized the electrostatic charges of a material-web sliding over the device.

FIG. 2 shows a device that is fundamentally similar to the first form but equipped with four longitudinal slots, and which therefore ensures a more effective elimination of static charges.

In the device described, body *a* comprises a single piece so that the size of the device has to be determined a priori for each individual case and a special mold has to be made for each size. Often, however, the case arises that the actually required size of the device will be determined from the operation thereof and that a subsequent alteration becomes necessary. The possibility of subsequent adaptation to the prevailing conditions is afforded when using the structural elements shown in FIGS. 3 and 4.

FIG. 3 shows a rodlike body *a*¹ which on its upper side is provided with a slot *c* that extends over the entire length of the body and is defined longitudinally on both sides by an upstanding wall *e*. Slot *c* through a slit *f* is connected to a bore *g* of rectangular cross-section which extends through body *a*¹ longitudinally and which serves for receiving a rodlike, grounded and tipped electrode. In the sidewalls *e* are embedded longitudinal conductors *b* comprising copper strands and being connectable, by means known per se but not shown, to a high-tension source. In the lower portion of the lateral longitudinal walls are provided longitudinal grooves *h*¹ and *h*² of approximately dovetail cross-section.

FIG. 4 shows a similar rod body *a*² of which the components, as far as they accurately correspond to those of body *a*¹, in FIG. 3, have the same reference letters. Differing from body *a*¹, the body *a*² is provided on its upper side with a recess *k* which extends over the entire length thereof and which here only on one side is bounded by a wall *e*, i.e., on the right-hand side in FIG. 4. The longitudinal wall situated on this side again is provided in its lower portion with a continuous longitudinal slot *h*³ of substantially dovetail cross-section, while on the opposite side is located a ledge *i* which projects from the respective longitudinal wall and of which the cross-section is adapted to that of the longitudinal slot *h*² of body *a*¹.

When inserting the body *a*² with ledge *i* into slot *h*² of body *a*¹, a device is produced which comprises two upper longitudinal slots *c* and *k*. By joining lengthwise a plurality of bodies *a*², devices of any desired size may

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be made. On the opposite side of body a^1 also may be annexed, of course, corresponding union bodies in slot h^1 which then have to be made laterally transposed with respect to body a^2 .

What I claim is:

1. A device for collecting electrostatic charges from poor conductors by means of a corona discharge, comprising a rodlike body of insulating material having a slot with lateral walls on one side thereof, a rodlike grounded electrode located in said slot having an outwardly projecting electrode tip located entirely in said slot, and an electric conductor directly connected to a high voltage source forming a counterelectrode completely encased within said walls so that between said electrode tip and said conductor when a voltage is directly applied to said conductor a corona discharge arises distributed over an entire side of said rodlike body.

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2. A device as set forth in claim 1 wherein said rodlike body is an insulating plastic.

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