United States Patent [19]

Bishop

[11] **3,725,736**

[45] **Apr. 3, 1973**

[54] STATIC NEUTRALIZER

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[73] Assignee: **United Industrial Syndicate, Inc.**, Portland, Maine

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[52] **U.S. Cl.** ..... **317/2 F**

[51] **Int. Cl.** **H01t 19/04**, H05f 3/00

[58] **Field of Search** ..... 317/2 F, 4

[56] **References Cited**

UNITED STATES PATENTS

2,333,213	11/1943	Slayter	317/2 F
3,137,806	6/1964	Schweriner	317/2 F
3,370,200	2/1968	Heyl et al.	317/2 F
3,611,052	10/1971	Bishop et al.	317/2 F

Primary Examiner—L. T. Hix
Attorney—Abbott Spear

[57] **ABSTRACT**

A device is disclosed for use in neutralizing static electric charges and includes a bar provided with a lengthwise channel connected to a lengthwise parallel internal passageway by a slit through the intermediate wall with the bar being an extrusion of a material that is yieldably resilient. An insulated conductor has a plurality of discharge devices fixed thereon and is clamped in place with the conductor in the passage and the discharge points of the device extending through the slit into the channel with the walls of the slit in engagement with the discharge points. Grounded conductors are secured to the sides of the bar and they are interconnected through the bar by rivets which are located between discharge points.

7 Claims, 7 Drawing Figures

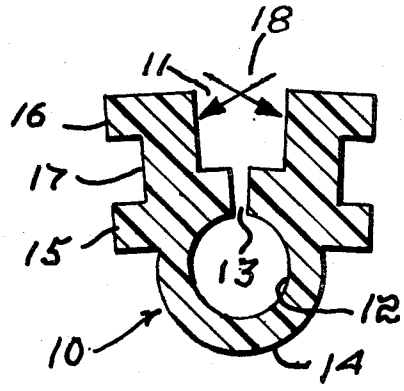


FIG. 1

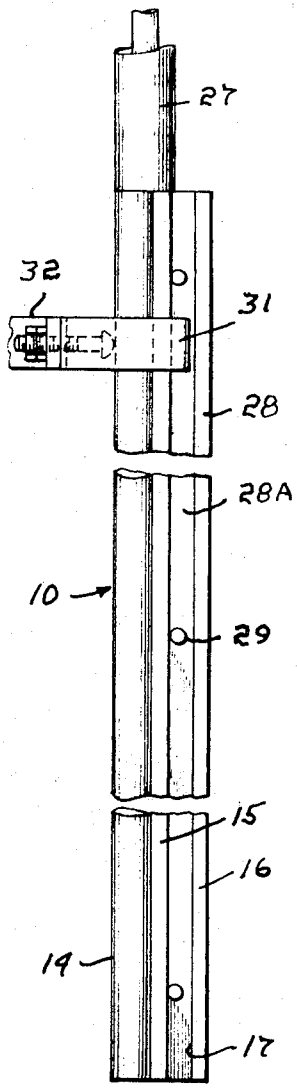


FIG. 2

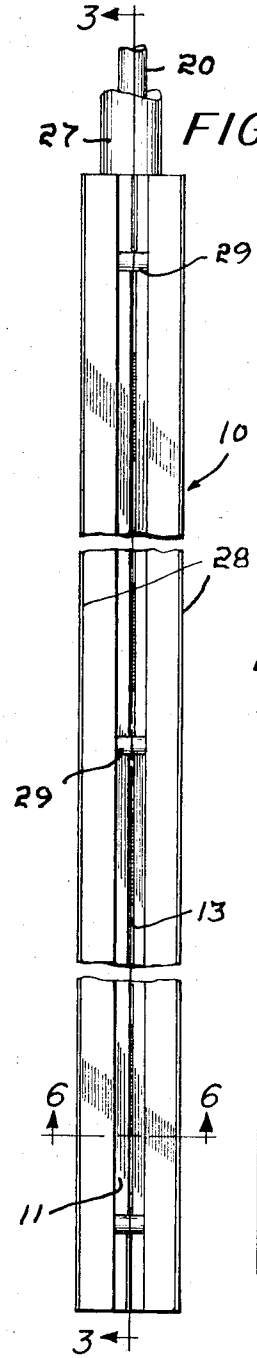


FIG. 3

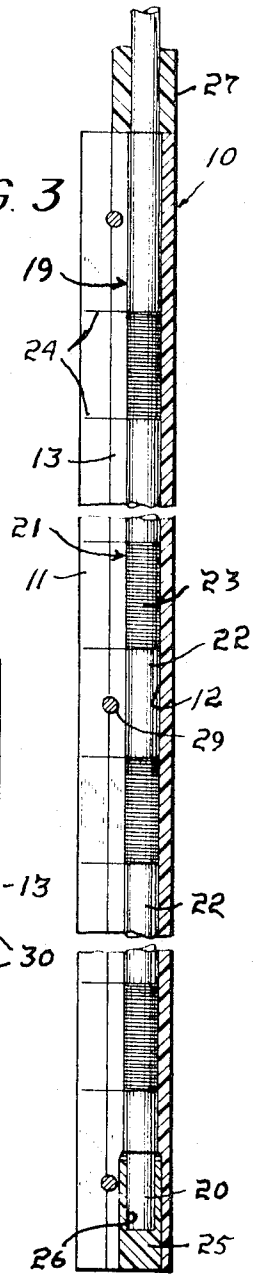


FIG. 7

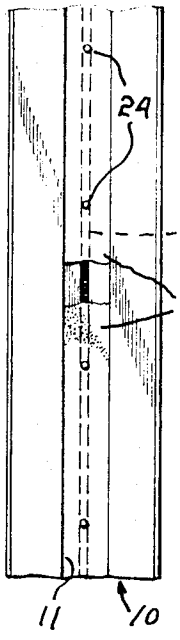


FIG. 4

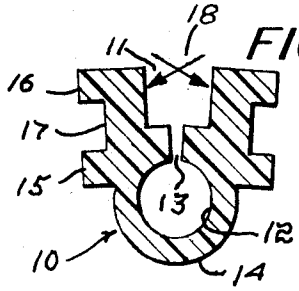


FIG. 5

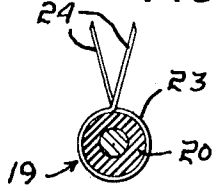
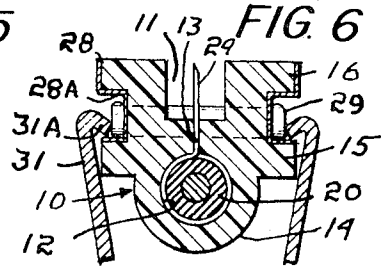


FIG. 6



STATIC NEUTRALIZER

BACKGROUND OF THE INVENTION

Devices have long been employed to neutralize static electric charges developing on articles and materials during the course of their manufacturing, processing, or use.

Such neutralizers consist, in general, of a bar provided with a ground and carrying an insulated conductor connected to a high potential source and to which a series of discharge points are capacitatively coupled. See U.S. Pat. No. 3,611,052. Problems exist where available space on a machine for the installation of a neutralizer are limited, and where the neutralizer must be located where it is likely that the operator will come into contact therewith.

THE PRESENT INVENTION

The general objective of the present invention is to provide a low cost, efficient static electric neutralizer that is particularly well adapted for use where such problems exist, an objective attained with a neutralizer bar that is a non-conductor of electricity and has an open channel extending lengthwise thereof and an internal passage extending lengthwise of the bar parallel to but spaced from the bottom of the channel with the bar material between the bottom of the channel and the passage divided by a lengthwise slit. A capacitor unit has an insulated conductor on which a plurality of discharge devices are mounted on said conductor and spaced lengthwise thereof, and having discharge points. The unit is within the bar, the conductor within the passage but exposed at one end thereof for connection to a high potential source and the discharge points extend through the slit and into said channel. Ground means extend lengthwise along at least one side of the bar, and means interconnect the sides of said bar between certain ones of the discharge points and secure the ground means with the walls of the slit engaging the discharge points.

THE PREFERRED EMBODIMENT

In the drawings, a preferred embodiment of the invention is shown of which

FIG. 1 is a side elevation of a device for neutralizing static charges, the view being broken away to foreshorten the drawing;

FIG. 2 is an elevation showing the lengthwise channel in which the discharge points are exposed;

FIG. 3 is a section taken approximately along the indicated lines 3—3 of FIG. 2;

FIG. 4 is a cross section of the device, on an increase in scale, illustrating its spreading to receive the capacitor unit consisting of the insulated conductor, the spacers and the discharge devices;

FIG. 5 is a cross sectional view of the capacitor unit;

FIG. 6 is a section taken approximately along the indicated lines 6—6 of FIG. 2; and

FIG. 7 is a fragmentary plan view of the channel sealed to close the slit.

The static neutralizer illustrated by the drawings consists of a bar 10 that is a plastic extrusion cut to the length wanted for a particular installation with the plastic being, in practice, acrylonitrile butadiene styrene.

The bar 10, as extruded, has a lengthwise channel 11 and a circular internal passage 12 parallel to the bottom of the channel 11 and connected thereto by a lengthwise slit 13. The closed edge 14 of the bar is shown as rounded and between it and the mouth of the channel 11, its side walls are somewhat thicker and include outwardly disposed, lengthwise ribs 15 and 16 defining channels 17. The bar 10, due to the nature of the material from which it is formed and its cross sectional size and shape, is sufficiently resilient so that it may be spread apart to open the slit 13 as shown in FIG. 4. A spreader is not shown but a spreading action is indicated by the arrows 18.

A capacitor unit, generally indicated at 19, consists of an insulated conductor 20 provided with a plurality of discharge devices generally indicated at 21 and device-spacing insulating sleeves 22, preferably of a plastic material. Each discharge device 21 consists of a substantial number of turns of wire to establish a wound sleeve 23 dimensioned to fit the conductor 20 with outwardly disposed ends 24 that, in the completed neutralizing device, are the discharge points. Desirably the wires from which the discharge devices are formed are cut on the bias. The spacing sleeves 22 and the wound sleeves 23 are dimensioned to be a slidable fit on the conductor 20. The diameter of the unit 19 is such that it is a tight fit in the passage 12 and in order that it may be inserted therein, the sides of the bar 10 are spread apart so that the unit 19 may be slid into position with the discharge points 24 freely entering the opened slit 13 which in practice is a close approximation of the diameter of the wire from which the discharge devices are formed, typically 0.020 of an inch.

When the unit 19 is in place, the bar 10 is relieved of the spreading forces and its sides to their normal relationship. An insulated plug 25 having a bore 26 dimensioned to receive and hold the end of the conductor 20 is cemented in one end of the plastic body 10 and an insulating sheath 27 is slipped over the other end of the conductor 20 which is connected to a suitable electrical source by any desired means.

The channel portion 28A of a ground strip 28 is then inserted in each channel 17 and these extend the full length of the bar 10 with the ground strips terminating desirably flush with the end edges of the side walls of the channel 11 and are interconnected by rivets 29 passing through the bar 10 between certain ones of the discharge points 23. If the slits 13 are not dimensioned to close against the discharge points 23, the rivets 29 so function and because of the narrowness of the slits 13, in either case, the bar is sufficiently dust and moisture proof by adding a sealing coat indicated at 30 lengthwise of the slit 13 as indicated in FIG. 7.

In an installation, a static electric neutralizer in accordance with the present invention is mounted in apparatus where its use will be most effective. For this purpose, clips of the type shown in U.S. Pat. No. 3,611,052 may be used. One such clip is shown and it includes a U-shaped clip 31 connected to a bracket 32 and with its ends, see FIG. 6, inturned as at 31A to be caught into the channel portion 28A of the ground strips 28 and clips and brackets may be employed to effect the grounding of the neutralizer.

I claim:

1. A device for neutralizing static charges, said device comprising a bar of material that is a non-conductor of electricity and has an open channel extending lengthwise thereof and an internal passage extending lengthwise of the bar parallel to but spaced from the bottom of the channel, the bar material between the bottom of the channel and the passage having a lengthwise slit effecting communication therebetween, a capacitor unit comprising an insulated conductor and a plurality of discharge devices including discharge points, said unit being within the bar, the conductor within the passage but exposed at one end thereof and the discharge points extending through said slit and into said channel, ground means extending lengthwise along at least one side of the bar, and means interconnecting the sides of said bar between certain ones of the discharge points and securing said ground means, the walls of the slit engaging the discharge points.

2. The neutralizing device of claim 1 in which the diameter of the discharge points is substantially the same as the width of the slit.

3. The neutralizer of claim 1 in which the interconnecting means hold the walls of the slit against the discharge points.

4. The neutralizer of claim 1 in which the sides of the bar are resiliently flexible whereby they can be spread apart to enable the capacitor unit to be slid into position with the slit sufficiently wide to freely accommodate the discharge points.

5. The device of claim 1 in which each discharge device comprises a plurality of turns of a wire providing a sleeve-like portion dimensioned to receive the conductor within it with its ends extending vertically and comprising discharge points.

6. The device of claim 5 and an insulating spacer between each two devices, each spacer being a sleeve dimensioned to receive the conductor within it.

7. The device of claim 1 in which the channel, slit, and passage open through both ends of the bar, and a plug of material that is a non-conductor of electricity inserted in and secured to the other end of the passage and constituting a socket holds the corresponding end of the conductor.

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