

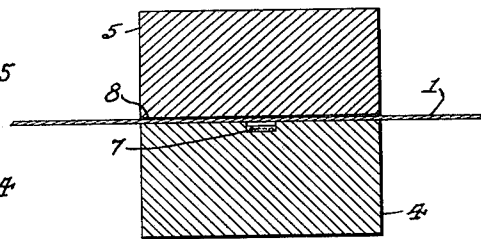
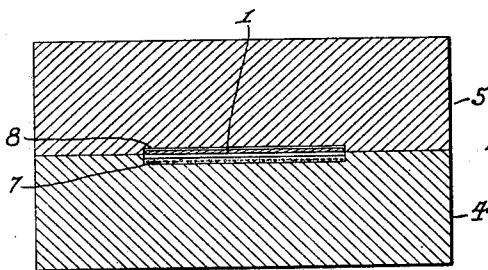
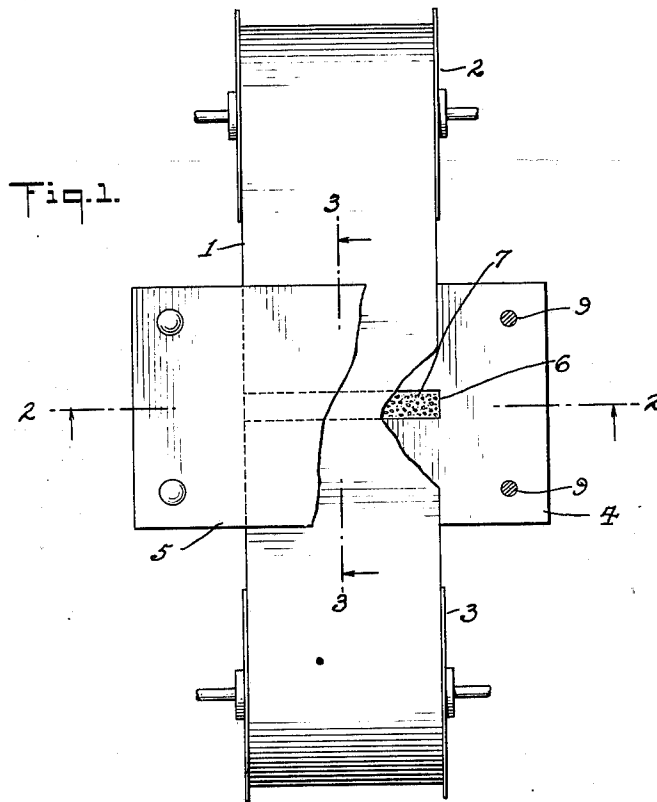
July 21, 1936.

L. C. BILSTEIN

2,048,490

STATIC NEUTRALIZATION

Filed Aug. 16, 1934



Louis C. Bilstein
INVENTOR

BY John J. Rogan
ATTORNEY

UNITED STATES PATENT OFFICE

2,048,490

STATIC NEUTRALIZATION

Louis C. Bilstein, Chatham, N. J., assignor to
Radium Luminous Corporation, New York,
N. Y., a corporation of Delaware

Application August 16, 1934, Serial No. 740,049

7 Claims. (Cl. 175-264)

This invention relates to static neutralization and more particularly to methods and means for discharging and/or neutralizing the static charges on web like-materials, filamentary materials and the like.

An object of the invention is to provide a safe, highly efficient and economical attachment for discharging and/or neutralizing electric charges which tend to accumulate on moving members such as belts, webs, filaments and the like.

While the use of radioactive materials has been proposed heretofore for discharging static electricity from moving filaments or webs, such methods have not achieved any considerable commercial success heretofore, particularly where the material to be discharged is of considerable surface extent or is moving at relatively high velocity.

I have found that the use of materials which are only weakly radioactive do not have any appreciable effect in discharging static electricity. In this class may be mentioned radioactive ores, uranium, thorium, radioactive waste products, etc. While such substances as ionium, actinium, radium "D", may possess enough radioactivity to be useful as static dischargers, they do not exist in sufficient commercial quantities to render them feasible in a device for attachment to commercial machines such as paper making or reeling machines and the like. In this latter class of substance may also be included polonium, radiumthorium, thorium "A" etc., which occur not only in very limited commercial quantities, but are of too short a life to be of any practical commercial use. I have found that the most desirable materials for use in constructing a commercially practical static discharger are radium salts and/or salts of mesothorium. However, even with these last mentioned materials I have found it necessary to employ a particular arrangement and disposition of the material if the proper static discharging effect is to be achieved.

Accordingly, one of the principal objects of this invention is to provide a static discharging device employing a salt, or salts, of radium or mesothorium capable of use in an attachment for commercial machines such as winding or reeling machines generally, for example machines for reeling and unreeling web materials such as paper, cellophane, celluloseacetate sheets or the like.

I have also discovered that the character of the binder or adhesive which is employed to hold the radioactive salt in place in the device, is of extreme importance as far as the rapidity and

efficiency of the discharging and/or neutralizing effect is concerned.

A feature of the invention therefore relates to an improved device for attachment to various type of reeling or winding machines and the like, whereby the efficiency of the radioactive material in discharging charged surfaces is greatly enhanced.

Another feature of the invention is to provide an attachment whereby the moving web or filament to be discharged is capable of movement in as close proximity as possible to the radioactive material, preferably a distance of the order of from 1 to 5 millimeters.

Another feature relates to a carrier and an enclosure for the radioactive material whereby a perfectly uniform discharging surface is provided.

A further feature relates to a carrier for the radioactive material whereby the losses due to screening action between the radioactive material proper, and the surface to be discharged, are reduced to a minimum.

A further feature relates to the method of applying and obtaining a uniform smooth layer of the radioactive material on the carrier.

A still further feature relates to a static discharging attachment for winding or reeling machines, whereby the static discharging action of the radioactive material may be utilized without any personal danger to the machine attendants or operatives.

A still further feature relates to the novel organization, arrangement and relative location of parts which go to make up a thoroughly reliable, economical and safe attachment for discharging static electricity in winding, reeling machines and the like.

Other features and advantages not specifically enumerated will be apparent after a consideration of the following description and the appended claims.

While the drawing represents in schematic form one particular structure of static discharging attachment, it will be understood that this is done merely for purposes of explanation and while the drawing is essentially diagrammatic, the following descriptions will enable one to embody the inventive concept in a wide variety of adaptations. Accordingly, in the drawing:

Fig. 1 is a plan view of an attachment according to the invention, with certain of the parts broken away to show more clearly the internal structure of the attachment.

Fig. 2 is a sectional view of Fig. 1 taken along the line 2—2 thereof.

Fig. 3 is a sectional view of Fig. 1 taken along the line 3—3 thereof.

Referring to the drawing the numeral 1 indicates the material which is to be subjected to the static discharging and/or neutralizing action. Merely for purposes of explanation there is shown only a pay-off reel 2 and take-up reel 3 of any well known form of machine, such for example as a paper reeling machine, a film winding machine or the like. It will be understood of course that the invention is not limited to any particular mechanism for moving the web 1.

Suitably attached to the winding or reeling machine proper, is a static discharging device according to the invention, in the form of a two-part chamber consisting of a lower section 4 and an upper or cover section 5. Preferably both sections 4 and 5 are of lead or some other heavy material of sufficient thickness to prevent any harmful rays or particles from the radioactive material emerging into the open air.

The section 4 is provided with a groove or recess 6 of a length substantially the same as the maximum width of the web 1 to be discharged. Recess 6 is adapted to contain the static neutralizing and/or discharging material and preferably this recess is so designed that when the radioactive material 7 is placed therein, there is only a very slight distance between the surface of this material and the upper face of section 4, so that the web 1 when moving past the radioactive material is separated therefrom a distance preferably of the order of from 1 to 5 mm. The recess 6 may be of any desired width in the direction of movement of the web 1, for example of the order of one-half to two inches in width.

While the radioactive material 7 may be deposited in the recess 6 in any suitable manner, it is preferred in accordance with the present invention to incorporate this material in a suitable carrier in the form of a strip so that it may be readily inserted in and removed from the recess 6. Preferably also substantially pure salts of radium or salts of mesothorium are employed and in order to obtain a sufficiently large emission of alpha, beta and gamma rays, the materials are so applied that the individual crystals thereof are preferably not covered at any point with more than 0.002 mm. of the binder or adhesive. Furthermore, the diluent for the radioactive materials should be such that the beta and gamma rays are subjected to the minimum screening action. For example, the diluent may be barium sulphate or any similar material. It is also important to select the proper adhesive or binder for the radioactive crystals. It has been found that ordinary glues, lacquers, gums and varnishes are not desirable for the reason that such materials are rapidly attacked by the radioactive materials whereupon the adhesive coating becomes brittle and rapidly disintegrates leaving the radioactive material loose, with consequent loss of material and creation of industrial hazards. Preferably the radioactive material is fused into a thin layer of metal or glass or similar vitreous substance, which may be placed in the bottom of a shallow metallic container, the container preferably having a higher melting point than the sheet of metal or glass. With the container in a horizontal position, heat is applied to cause the strip of metal or glass positioned therein to fuse and while in fused condition, the mixture of the radioactive material and the diluent such as

barium sulphate is distributed over the fused metal or glass in such a way that the fused metal or glass just barely covers the crystals of the radioactive material. Preferably the metal or glass strip which acts as the carrier for the radioactive materials should be of the order of one tenth of a millimeter or less in thickness and the container should be so chosen that when the metal or glass carrier is fused it firmly adheres to it. When the carrier hardens, there results a substantially smooth and uniform strip wherein the radioactive material is as close as possible to the surface of the strip so that the material of the carrier exerts substantially negligible screening action on the radioactive materials. The carrier with its container may then be inserted in the groove 7 as shown in the drawing.

In order that the web 1 may be properly guided over the discharging material, the lower face of the section 5 is provided with a shallow groove 8 having a width corresponding to the width of the web 1 and having a depth of the same order as the thickness of the said web. The cover section 5 may be provided with suitable dowel pins and the section 4 may be provided with corresponding recesses, so that the said sections 4 and 5 may be readily assembled with the groove 8 in alignment with the groove 6. In order that the attendants or operatives of the machine to which the above described device is to be attached may be protected, preferably the members 4 and 5 are so designed that the groove 6 is positioned at least 1 inch from all faces of the assembled device thus ensuring that no harmful rays or particles reach the open air. If desired the assembled device may be grounded but this procedure is not absolutely essential.

As the web 1 moves past the groove 6 it loses any electrical charge that it may possess and because of the particular disposition and arrangement of the radioactive material with respect to the web 1, the discharging effect is achieved with the utmost rapidity thus enabling the web 1 to move at its desired speed through the machine without any danger of the discharge being curtailed.

While the invention is not limited to any particular amount of radioactive materials, amounts ranging from several micrograms to several milligrams, expressed in the equivalent of gamma-radiation of radium may be employed, this amount varying with the nature and size of the surface to be discharged.

While one specific structure of the discharging device has been disclosed herein, it will be understood that various changes and modifications may be made therein without departing from the spirit and scope of the invention. For example while the drawing shows a device for discharging an electric charge from one face of the weblike member, it will be understood that a similar device may also be simultaneously employed to discharge the opposite face of the web or if desired the cover member 5 may be provided with a groove 6 and also containing a quantity of the radioactive material so that both faces of the web may be simultaneously discharged. Furthermore in place of discharging a web or filament the device may be applied to discharge any material where an electrostatic charge is undesirable e. g., inflammable or explosive materials where ordinary discharging devices are not practical. While the invention is shown as applied to a transverse strip of the material to be discharged the discharge may be effected at any desired point

or area of the surface to be discharged, and while the drawing shows a stationary discharging device and a movable web, if desired the device itself may be movable with respect to the surface to be discharged.

What I claim is:

1. A device for discharging static electricity from a movable web comprising a container having a groove on the interior thereof, a quantity of radioactive material in said groove, said container being provided with guiding means and means for spacing said web from said material while substantially entirely screening said material on all sides and while allowing direct action of the radiation from said material on said web.

2. A device for discharging static electricity from a moving surface comprising a quantity of radioactive material embedded in a carrier having a smooth hard and uniform surface, means for shielding said material substantially entirely on all sides while allowing the radiations from said material to act directly on said surface, means for concentrating the radiations from said material upon successive transverse strips of said surface, and means within the shielding means for guiding said surface to maintain it uniformly spaced from said carrier.

3. A device for discharging static electricity from a moving web comprising a quantity of radioactive material in a carrier presenting a smooth uniform surface, a container for said material, said container comprising a pair of metal blocks, one of said blocks having a groove therein to receive the radioactive material, the other of said blocks serving as a cover for said groove, and means for fastening said blocks together to define a guiding channel extending transversely across

said groove and to maintain said web uniformly spaced from said carrier while moving.

4. A device for discharging static electricity from a moving web comprising a two-part container, one part of said container having a recess to receive a quantity of radioactive material, the other part of said container having a guiding channel for guiding said web uniformly past said material, the opposed assembled surfaces of said parts being arranged to space said web uniformly a distance of from 1 to 5 mm. from said material.

5. A device for discharging static electricity from a moving web comprising a member with a flat smooth surface having embedded therein a quantity of radioactive material, another member having a groove to receive said strip, a third member for covering the said groove and for defining a guiding channel for guiding said web past said material.

6. A device according to claim 5 in which said material is enclosed on all sides by the walls of said second and third members, said walls having a thickness not less than one half inch.

7. A device for discharging static electricity from a moving surface comprising a member having a recess therein, a quantity of radioactive material in said recess, a strip-like carrier for said material being sufficiently thin to subject said material to substantially negligible filtration, said carrier being positioned in said recess, another member for closing-off said recess both of said members when assembled defining a channel through the device for guiding the surface to be discharged past said recess and for uniformly spacing the moving surface from said strip-like carrier.

LOUIS C. BILSTEIN.