June 30, 1953

J. P. GRENIER ET AL
RADIOACTIVE LIGHTNING PROTECTOR
WITH ACCELERATING ELEMENTS

2,644,026

Filed April 10, 1951

2 Sheets-Sheet 1

Fig. 1

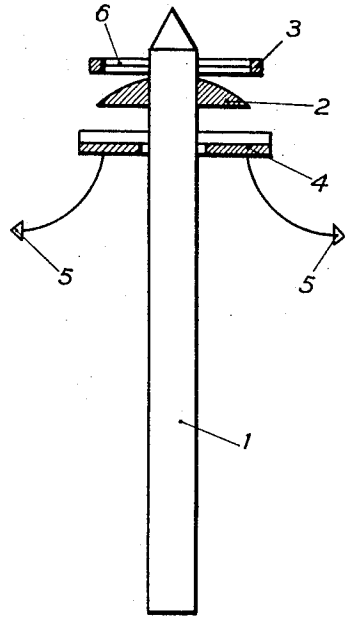
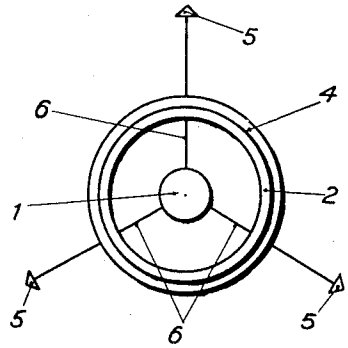


Fig. 2



Inventors:
Joseph, Pierre Grenier
and Pierre, Edouard, Eugène Lescieux
By: Michael S. Striker
Agt.

June 30, 1953 J. P. GRENIER ET AL 2,644,026

RADIOACTIVE LIGHTNING PROTECTOR WITH ACCELERATING ELEMENTS

Filed April 10, 1951 2 Sheets-Sheet 2

Fig. 3

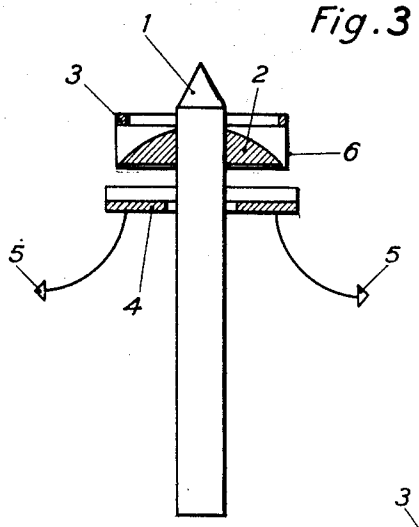


Fig. 4

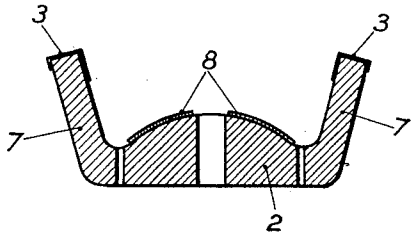
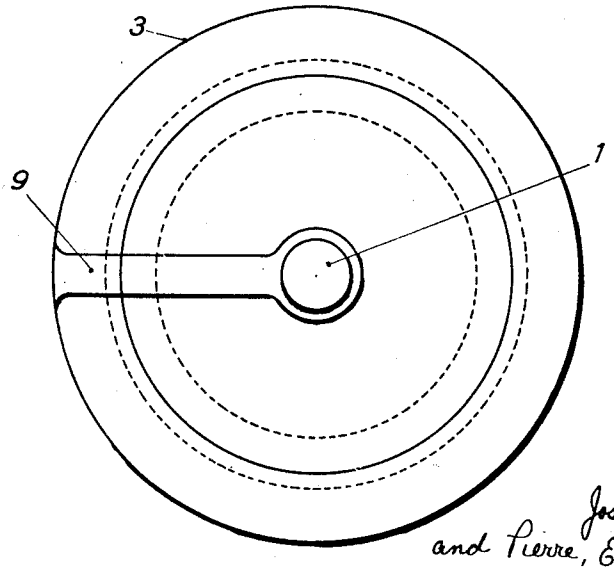


Fig. 5



Inventors:
Joseph, Pierre Grenier
and Pierre, Edouard, Eugène Lescieux
By: Michael S. Striker
Agt.

Patented June 30, 1953

2,644,026

UNITED STATES PATENT OFFICE

2,644,026

RADIOACTIVE LIGHTNING PROTECTOR WITH ACCELERATING ELEMENTS

Joseph Pierre Grenier and Pierre Edouard Eugène Lescieux, Paris, France, assignors to Ste. Helita, Paris, France

Application April 10, 1951, Serial No. 220,166
In France April 24, 1950

12 Claims. (Cl. 174—2)

1

It is known that the efficacy, that is the extent of the protection zone, of a lightning protector is considerably increased by disposing in proximity to the lightning rod radioactive elements that ionize the surrounding air and augment its conductivity.

To this end the present applicants have namely filed in France the following patents: 736,729—application September 5, 1931, for: "Improvements on Lightning and Hail Arresters"; 774,954—application September 13, 1933, for: "Improvements in Lightning Protectors, Lightning and Hail Arresters"; and 821,045—application March 13, 1937, for: "Improvements in Radioactive Lightning Protectors and Hail Arresters."

The object of the present invention is to provide an improved radioactive lightning protector, lightning or hail arrester, in which the emission of the particles proceeding from the radioactive element is facilitated by accelerating means analogous to those employed, for example, in cathode ray tubes.

The invention will be best understood by referring to the accompanying drawings which show, by way of example, some embodiments thereof and in which:

Fig. 1 is a schematic view, in sectional elevation, showing an embodiment of the present invention;

Fig. 2 is a plan view corresponding to Fig. 1;

Fig. 3 is a schematic view, in sectional elevation, showing a further embodiment of the invention; and

Figs. 4 and 5 illustrate yet a further embodiment of the invention, Fig. 4 being a sectional view of the radioactive material supporting member, and Fig. 5 a plan view showing the underside of this member.

Referring first to Figs. 1 and 2, it will be seen that the reference numeral 1 designates the lightning rod connected to earth, in the usual manner, by means of a conductor not shown, while 2 is a cap-like member made of insulating material, such for example as porcelain, encompassing the rod 1 and carrying a radioactive material, for example imbedded in the enamel with which the said cap-like member is coated.

In order to facilitate or accelerate the emission of the radioactive particles, two preferably annular electrodes 3 and 4, having the form of a cylinder, disc, rim or the like, are disposed above and below the cap 2, round the rod 1.

The electrode 3 is connected with the rod 1, while the electrode 4 is insulated from this rod and carries members 5 forming collectors of potential.

2

In case of a storm, when the potential gradient is very high, the potential to ground of electrode 4 can be very high due to the action of collectors 5. Since electrode 3 is grounded, an electrostatic field will result between electrodes 3 and 4. This field is utilized to accelerate and direct the motion of ions in proximity to the layer carried by cap 2 into a conical beam of ions, and therefore of lesser electric resistance, around and beyond the rod.

The metallic parts 6, which connect the annular member 3 with the lightning rod, should have a cross-section as small as possible in order to reduce the percentage of ions captured and neutralized by these parts. To this end, it will be advantageous to arrange these supporting parts 6 under the cap 2, as is shown in Fig. 3.

Figs. 4 and 5 show an embodiment of the invention in which the cap-like member 2 has upset flanges 7 whose peripheral portions are metallized to constitute the annular member 3, the radioactive material being disposed for example as at 8. The metallized flanges 3 are connected with the lightning rod by means of a narrow metallized band 9 disposed below the porcelain member, as is shown in Fig. 5 in which this band is viewed from underneath. The cup-like insulator 2 is provided with drainers 10.

It is to be understood that the invention is not intended to be restricted to the particular embodiments shown and described, for changes may be made therein without substantially departing from the spirit and scope of the invention which is intended to be defined in the accompanying claims.

What we claim is:

1. A lightning rod assembly, comprising, in combination, a lightning rod having a top end; electrically conductive collector means mounted on said lightning rod in the region of and spaced from said top end thereof and adapted to form an electrostatic field extending in direction of said lightning rod toward said top end thereof; and ion emissive means mounted on said lightning rod insulated therefrom and between said electrically conductive collector means and said top end of said lightning rod so that ions emitted by said ion emissive means are impelled by the electrostatic field created by said electrically conductive collector means in direction of and beyond said top end of said lightning rod extending the effective length thereof.

2. A lightning rod assembly, comprising, in combination, a lightning rod having a top end; electrically conductive collector means mounted on said lightning rod in the region of and spaced

from said top end thereof and adapted to form an electrostatic field extending in direction of said lightning rod toward said top end thereof; collector means mounted on and connected to said electrically conductive means to collect an electrical charge thereon; and ion emissive means mounted on said lightning rod insulated therefrom and between said electrically conductive collector means and said top end of said lightning rod so that ions emitted by said ion emissive means are impelled by the electrostatic field created by said electrically conductive collector means in direction of and beyond said top end of said lightning rod extending the effective length thereof.

3. A lightning rod assembly, comprising, in combination, a lightning rod having a top end; electrically conductive means mounted on said lightning rod in the region of and spaced from said top end thereof and adapted to form an electrostatic field extending in direction of said lightning rod toward said top end thereof; collector wires mounted on and connected to said conductive means to collect an electrical charge thereon; and ion emissive means mounted on said lightning rod insulated therefrom and between said electrically conductive collector means and said top end of said lightning rod so that ions emitted by said ion emissive means are impelled by the electrostatic field created by said electrically conductive collector means in direction of and beyond said top end of said lightning rod extending the effective length thereof.

4. A lightning rod assembly, comprising, in combination, a lightning rod having a top end; electrically conductive means mounted on said lightning rod in the region of and spaced from said top end thereof and adapted to form an electrostatic field extending in direction of said lightning rod toward said top end thereof; collector wires mounted on said electrically conductive means and connected thereto extending in a direction outwardly and away from said top end of said lightning rod; and ion emissive means mounted on said lightning rod insulated therefrom and between said electrically conductive collector means and said top end of said lightning rod so that ions emitted by said ion emissive means are impelled by the electrostatic field created by said electrically conductive collector means in direction of and beyond said top end of said lightning rod extending the effective length thereof.

5. A lightning rod assembly, comprising, in combination, a lightning rod having a top end; an insulator supported by said lightning rod in proximity to the top end thereof and surrounding said lightning rod; an ion emissive coating disposed on said insulator and insulated from the rod; electrically conductive means disposed below the insulator supported by said lightning rod and insulated therefrom; collector means mounted on and connected to said conductive means to collect an electrical charge thereon and conduct said charge to said conductive means so that ions emitted from said emissive coating are impelled upwardly; and ion directing means supported by the lightning rod disposed above said ion emissive coating and spaced therefrom and directing ions emitted from said coating and repelled upwardly by the charge on said conductive means into a stream upwardly and beyond said top end of the lighting rod.

6. A lightning rod assembly, comprising, in combination, a lightning rod having a top end; an insulator supported by said lightning rod in proximity to the top end thereof and surrounding said lightning rod; an ion emissive coating disposed on said insulator and insulated from the rod; electrically conductive means disposed below the insulator supported by said lightning rod and insulated therefrom; collector means mounted on and connected to said conductive means to collect an electrical charge thereon and conduct said charge to said conductive means so that ions emitted from said emissive coating are impelled upwardly; and an electrically conductive ring connected to said lightning rod and supported thereby disposed above said ion emissive coating and spaced therefrom and directing ions emitted from said coating and repelled upwardly by the charge on said conductive means into a stream upwardly and beyond said top end of the lighting rod.

7. A lightning rod assembly, comprising, in combination, a lightning rod having a top end; a disc-shaped insulator supported by said lightning rod in proximity to the top end thereof and surrounding said lightning rod; an ion emissive coating disposed on said disc-shaped insulator on that side thereof which faces said top end of said lightning rod insulated from the rod; electrically conductive means disposed below the insulator supported by said lightning rod and insulated therefrom; collector means mounted on and connected to said conductive means to collect an electrical charge thereon and conduct said charge to said conductive means so that ions emitted from said emissive coating are impelled upwardly; and ion directing means supported by the lightning rod disposed above said ion emissive coating and spaced therefrom and directing ions emitted from said coating and repelled upwardly by the charge on said conductive means into a stream upwardly and beyond said top end of the lightning rod.

8. A lightning rod assembly, comprising, in combination, a lightning rod having a top end; a disc-shaped insulator supported by said lightning rod in proximity to the top end thereof, surrounding said lightning rod, and having upstanding flanges; an ion emissive coating disposed on said insulator and insulated from the rod; electrically conductive means disposed below the insulator supported by said lightning rod and insulated therefrom; collector means mounted on and connected to said conductive means to collect an electrical charge thereon and conduct said charge to said conductive means so that ions emitted from said emissive coating are impelled upwardly; and an electrically conductive ring supported by said upstanding flanges of said insulator and connected to said lightning rod disposed above said ion emissive coating and spaced therefrom and directing ions emitted from said coating and repelled upwardly by the charge on said conductive means into a stream upwardly and beyond said top end of the lightning rod.

9. A lightning rod assembly, comprising, in combination, a lightning rod having a top end; a disc-shaped electrically conductive member mounted on said lightning rod in the region of and spaced from said top end thereof; collector means mounted on said disc-shaped member to collect an electrical charge on said electrically conductive disc-shaped member, forming thereby an electrostatic field extending in the direction of said lightning rod toward the top end thereof;

an insulating member mounted on said lightning rod between said electrically conductive disc-shaped member and said top end of said lightning rod; an ion emissive coating on said electrically insulated member disposed on the top side thereof so that ions emitted by said coating are compelled by the electrostatic field created by said electrically conductive means in a direction of said top end of said lightning rod; and a ring-shaped concentrating member disposed between said ion emissive coating and the top end of the lightning rod and electrically connected thereto and surrounding the same concentrating the ions impelled upwardly by said electrostatic field into a conical stream upwardly and beyond said rod.

10. A lightning rod assembly, comprising, in combination, a lightning rod having a top end; a disc-shaped electrically conductive member mounted on said lightning rod in the region of and spaced from said top end thereof; collector means mounted on said disc-shaped member to collect an electrical charge on said electrically conductive disc-shaped member, forming thereby an electrostatic field extending in the direction of said lightning rod toward the top end thereof; an insulating member mounted on said lightning rod between said electrically conductive disc-shaped member and said top end of said lightning rod; an ion emissive coating on said electrically insulated member disposed on the top side thereof so that ions emitted by said coating are impelled by the electrostatic field created by said electrically conductive means in a direction of said top end of said lightning rod; and a ring-shaped concentrating member supported by spokes of relatively thin cross-sections with respect to the cross-section of the concentrating member from said lightning rod and disposed between said ion emissive coating and the top end of the lightning rod and electrically connected thereto and surrounding the same concentrating the ions impelled upwardly by said electrostatic field into a conical stream upwardly and beyond said rod.

11. A lightning rod assembly, comprising, in combination, a lightning rod having a top end; a disc-shaped electrically conductive member mounted on said lightning rod in the region of and spaced from said top end thereof; collector means mounted on said disc-shaped member to collect an electrical charge on said electrically conductive disc-shaped member, forming thereby an electrostatic field extending in the direction of said lightning rod toward the top end thereof; an insulating member mounted on said lightning rod between said electrically conductive disc-shaped member and said top end of said lightning rod provided with an annular upstanding flange; an ion emissive coating on said electrically insulated member disposed on the top side thereof so that ions emitted by said coating are impelled by the electrostatic field created by said electrically conductive means in a direction of said top end of said lightning rod; and a ring-shaped concentrating member supported by said upstanding flange of said insulating member and disposed between said ion emissive coating and the top end of the lightning rod and electrically connected thereto and surrounding the same concentrating the ions impelled upwardly by said electrostatic field into a conical stream upwardly and beyond said rod.

12. A lightning rod assembly, comprising, in combination, a lightning rod having a top end; a disc-shaped electrically conductive member mounted on said lightning rod in the region of and spaced from said top end thereof; collector means mounted on said disc-shaped member to collect an electrical charge on said electrically conductive disc-shaped member, forming thereby an electrostatic field extending in the direction of said lightning rod toward the top end thereof; an insulating member mounted on said lightning rod between said electrically conductive dise-shaped member and said top end of said lightning rod provided with an annular upstanding flange provided with a metallized strip extending from the top of the upstanding flange around the outside to the lightning rod and being connected thereto; an ion emissive coating on said electrically insulated member disposed on the top side thereof so that ions emitted by said coating are impelled by the electrostatic field created by said electrically conductive means in a direction of said top and of said lightning rod; and a ring-shaped concentrating member supported by said upstanding flange of said insulating member and disposed between said ion emissive coating and the top end of the lightning rod and electrically connected to said metallized strip concentrating the ions impelled upwardly by said electrostatic field into a conical stream upwardly and beyond said rod.

JOSEPH PIERRE GRENIER.
PIERRE EDOUARD EUGÈNE LESCIEUX.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
2,025,338	Capart	Dec. 24, 1935
2,128,408	Grenier	Aug. 30, 1938