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RADIOACTIVE PROTECTIVE APPARATUS, SUCH AS LIGHTNING ARRESTERS AND HAIL PROTECTORS

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Fig. 1.

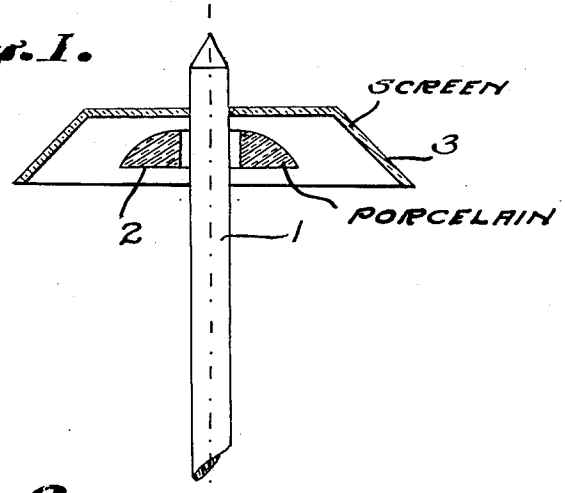
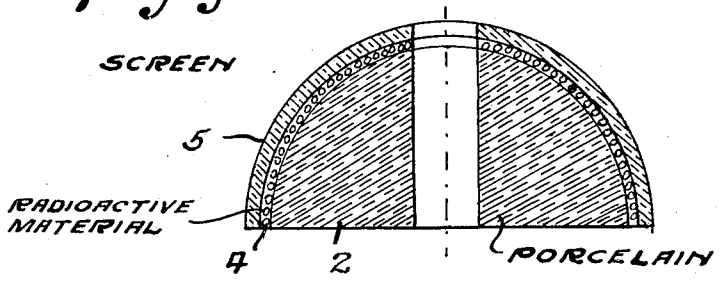


Fig. 2.



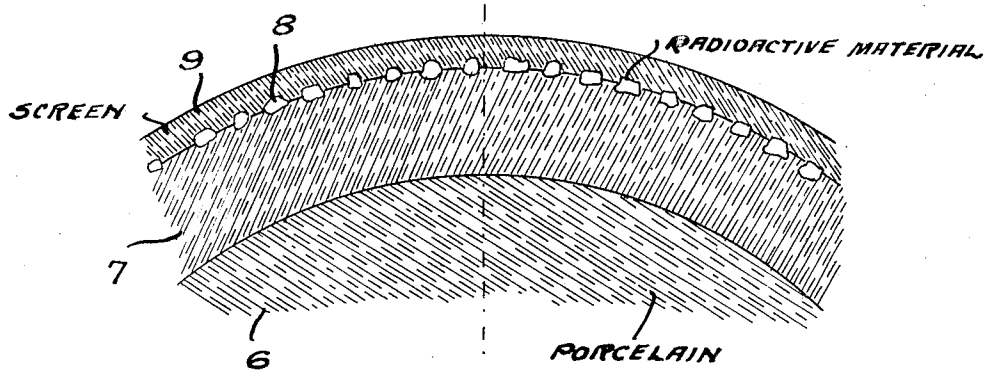


Fig. 3.

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RADIOACTIVE PROTECTIVE APPARATUS, SUCH AS LIGHTNING ARRESTERS AND HAIL PROTECTORS

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7 Claims. (Cl. 173—31)

The efficiency of apparatus for protection against lightning, thunderbolts, and the like can be much increased by arranging in the neighborhood of the points of such apparatus radioactive bodies, and by applying to the ions furnished by these bodies an increasing potential.

The methodical observations made in the past few years about the localization of falls of hail show that such falls are particularly frequent in regions where the ground emits a notable quantity of negative ions.

It is thus possible to suppress the falls of hail or to reduce their quantity by placing on the spots to be protected, devices capable of emitting positive ions which will neutralize the negative ions emitted by the ground.

The sign of the ionization is of considerable importance and recent studies have shown that lightning strikes more frequently in places where negative ionization prevails.

With these considerations in view, the present invention relates to means for acting not only upon the total ionization of the apparatus in question, but also upon the relation between the negative ionization and the positive ionization with correlative modification and dose distribution of the proportions of negative and positive ions emitted by the apparatus.

For this purpose a mixture of radioactive bodies in selected proportions is used. Some of these bodies emit only negative ions, and others emit only positive ions in well defined proportions.

It is thus possible by a suitable dose distribution of the radioactive bodies, to obtain an emission consisting of negative ions and positive ions in the desired proportion.

If it is intended to strengthen the emissions of a lightning conductor in negative ions it is desirable to form the radioactive element in its major part through bodies having beta rays, such as radium D, actinium or mesethorium.

If on the contrary it is intended to improve the operation of a hail protector, it is the emission of positive ions which must be strengthened, and the radioactive part can be formed mainly of salts of uranium, or ionium, of polonium, of protoactinium, or of thorium, bodies which have an alpha ray.

There can also, in both cases, be made use of, radioactive bodies possessing both rays and reduce one of them, for instance, the alpha rays by means of suitable screens, in such manner as to obtain the desired ratio between the negative ions and the positive ions.

When use is made of a radium salt, it is preferably selected insoluble, as for example as radium sulphate, which can be obtained through precipitation of a double solution of two soluble salts, for example, radium bromide and barium bromide. The mixture thus prepared is preferably passed through a sieve, in order to obtain grains having about the same size.

In the accompanying drawing, which shows by way of example practical embodiments of devices according to the present invention, Figure 1 is a diagrammatic view of the end of a lightning conductor, with a screen for filtering the ions.

Fig. 2 is a diagrammatic view relative to the case where the screen is formed on the surface itself of the body of porcelain, and

Fig. 3 is a similar view to part of Fig. 2 drawn to an enlarged scale, illustrating a modification.

In Figure 1, showing the end of a radioactive lightning conductor, **1** is the metal stem thereof, **2** is the porcelain carrying radioactive bodies, **3** is the thin screen of frusto-conical form, which stops a high ratio of alpha rays with the positive charge they bear.

In the modification of Fig. 2, the screen is formed by the enamel itself of the porcelain carrying the radioactive bodies **3**. In order to protect, against mechanical and thermal reactions, the radioactive salts, they are applied in the form of a layer **4** which is embedded in the enamel. The enamel itself forms an outer layer numbered **5** which acts as a screen for the alpha rays. In order to modify and to adjust the influence of the screen, the size of the grains of the radioactive salts are modified, the density of the enamel and its thickness so as to obtain a more or less marked filtration of the rays.

Referring now to the modification of Fig. 3, **6** is a solid support upon which I first apply an adhesive layer **7**. Upon this layer are evenly spread or diffused the grains **8** of the radium salt or radiferous mixture prepared as has been hereinbefore described. The surface thus powdered or sprinkled, is then covered or laid over with one or more layers of the substance which is intended to act as a screen; the density of this substance and the thickness of the final layer **9** enable the filtration of the alpha and beta rays to be adjusted to the desired value.

The whole is then consolidated by a suitable process such as baking, vitrification, polymerization and the like.

As a more particular example there is hereafter described the adaptation of the previous means, to porcelain having a radioactive layer.

The member of crude porcelain or steatite is dipped in a bath of enamel, e. g. of so called "great-fire enamel". The surface of the member is thus laid over with a somewhat thin layer of enamel which keeps soft and wet for some time. A quantity of a mixture of barium sulphate and radium sulphate, radiferous salt, which has been carefully sifted, is then taken and put in a state of suspension in a small quantity of water. By means of a compressed air pistol this suspension is atomized upon a wet layer of enamel while the member is made to turn regularly or evenly about its axis in such manner as to effect a good distribution of the radiferous salt. The member is then left to dry.

If it is desired to obtain the maximum alpha and beta rays the member is allowed to bake for a suitable period. In this case the enamel vitrifies at a temperature which is selected lower than the melting points of the mixture of barium sulphate and radium sulphate and thereby enclosed at its surface the grains 8 of this salt. If oppositely it is desired to get a filtration, a further layer 9 of enamel is applied upon the member, preferably with a pistol, the thickness of which layer 9 can be adjusted at will and the whole is then baked. The second layer 9 of enamel constitutes a thin sheet which covers the grains 8 of the radioactive salt and produces the desired filtration effect.

As supplemental advantages inherent to the improved process it is to be mentioned that the use of the steatite and of an enamel baked at high temperature, provides products and articles which are not sensitive to temperature modifications and to solvents of any kind.

In all cases, varnish, paint, or the like, which should be used in a similar manner, can be substituted for the enamel.

Various other changes might be made without departing from the spirit and scope of the invention as defined by the appended claims.

Having now described my said invention, I declare that what I claim is:

1. In an apparatus for affording protection against lightning and similar phenomena: a support, a radioactive substance carried by said support, a screen receiving the radiations emitted by said substance and controlling the ratio between the positive ions and the negative ions of the radiations issuing from said screen.

2. In an apparatus for affording protection against lightning and similar phenomena: a support, a plurality of radioactive substances emitting different radiations and carried by said support, a screen receiving the radiations emitted by said substances and controlling the ratio between the positive ions and the negative ions of the radiations issuing from said screen.

3. In an apparatus for affording protection against lightning and similar phenomena: a support, a plurality of radioactive substances carried by said support, some of said substances emitting positive radiations and others emitting negative radiations, a screen receiving the radiations emitted by said substances and controlling the ratio between the positive ions and the negative ions of the radiations issuing from said screen.

4. In an apparatus for affording protection against lightning and similar phenomena; a support, a radioactive substance carried by said support, a screen arranged at a certain distance from said support and receiving the radiations emitted by said substance, said screen controlling the ratio between the positive ions and the negative ions of the radiations issuing from said screen.

5. In an apparatus for affording protection against lightning and similar phenomena: a support, a radioactive substance carried by said support, a screen covering the radioactive substance and the support, said screen receiving the radiations emitted by said substance and controlling the ratio between the positive ions and the negative ions of the radiations issuing from said screen.

6. In an apparatus for affording protection against lightning and similar phenomena: a support, a layer of paint covering said support and forming screen, a radioactive substance incorporated in said layer of paint, said screen receiving the radiations emitted by said substance and controlling the ratio between the positive ions and the negative ions issuing from said screen.

7. In an apparatus for affording protection against lightning and similar phenomena: a support, a layer of adhesive product which, by baking, has been made insensitive to atmospheric agents and to variations of temperature, said layer covering said support, a radioactive substance dispersed over said layer, a screen applied on said layer, said screen receiving the radiations emitted by said substance and controlling the ratio between the positive ions and the negative ions of the radiations issuing from said screen.

PIERRE GRENIER.