a thunder stroke in order to dissipate charges induced at a structure to be protected, the ground or the like for decreasing the electric field, thus preventing abrupt transfer of the charges and preventing damages due to direct lightning strokes.

RELATED ART DOCUMENT

PATENT DOCUMENTS

[0004]

Patent Document 1: Japanese Laid-Open Patent Application,

Publication No. S53-39450

Patent Document 2: US Patent No. 5043527

SUMMARY OF THE INVENTION

PROBLEM TO BE SOLVED BY THE INVENTION

[0005]

These charge dissipaters are composed of thin wires of small diameter, that is, protruding rods, however, and therefore there is a risk that these charge dissipaters may be damaged due to occurrences of self-induced vibrations when used in an environment in which swept areas of the charge dissipaters are increased by icing, snow accretion or the like or in an environment in which strong wind blows.

[0006]

Embodiments~~The present invention has been made under these situations, and it is an objective~~ of the present invention seek to provide a lightning protection facility that can prevent damages due to self-induced vibrations.

MEANS TO SOLVE THE PROBLEM

[0007]

According to an aspect of t~~T~~he present invention, there is provides~~d~~ a lightning protection facility comprising:

a pole erected on a structure or on the ground;

a plurality of needle-like conductive objects disposed on a tip of the pole and extending radially therefrom; ~~and~~

a reinforcement member disposed to cross two or more of the plurality of needle-like conductive objects and fixed to the needle-like conductive objects~~.~~; and a cylindrical-shaped tube through which base ends of the plurality of needle-like conductive objects are inserted, the base ends of the plurality of needle-like conductive objects being joined to the tip of the pole, the cylindrical-shaped tube covering a joint portion between the base ends of the plurality of needle-like conductive objects and the tip of the pole and having a tapered top end portion with an increasing diameter toward a top end of the cylindrical-shaped tube.

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EFFECT OF THE INVENTION

[0008]

Embodiments of t~~T~~he present invention provides a lightning protection facility which, even when used in an environment in which swept areas of a plurality of needle-like conductive objects are increased by icing or the like or in an environment in which strong wind blows, can prevent damages of the needle-like conductive objects due to self-induced vibrations to stably contribute to preventing damages due to direct lightning strokes.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009]

FIG. 1 is a schematic diagram showing a lightning protection facility according to an embodiment of the present invention.

FIG. 2 is a diagram showing a charge dissipater viewed from above in FIG. 1.

FIG. 3 is a diagram showing a charge dissipater viewed laterally in FIG. 1.

FIG. 4 is a perspective diagram of a fastener shown in FIG. 3.

FIG. 5 is a diagram showing a state of a pole and a plurality of protruding rods just joined by thermite welding.

FIG. 6 is a partially broken enlarged diagram of a nugget and a wrapper tube of FIG. 5, viewed from an X direction.