

PATENT SPECIFICATION

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(19)



(54) IMPROVEMENTS RELATING TO LIGHTNING PROTECTION

(71) We, ENERGIE FROIDE INTERNATIONAL S.A., a Swiss Company of 36, Avenue Krieg, Geneva, Switzerland, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to lightning protection installations, for example for buildings and boats.

Since the invention of the lightning rod by Benjamin Franklin, efforts with a view to improving lightning protection have been directed to the improvement of ionizing means, leading to the use of radio-activity, by means of which the captor components or rods of certain modern lightning protection systems have reached what can be considered as a high and permanent efficiency. But this only emphasises the weak point in every lightning protection system, namely the dangers in transporting the captured discharge from the lightning rod down to ground.

The norms specified for the lightning protection of boats mention the dangers in the grounding of lightning along a bare cable passing close to other cables and metallic structures, due to sparking or even a transfer of the charge itself to these other cables or metallic structures.

These dangers also occur in buildings. Cables, television antenna downleads and other conducting components are frequently concentrated in narrow channels through which it is also necessary to pass the lightning rod grounding cable.

One must also examine the so-called influencing phenomena produced during the transport of lightning between the rod and ground. These phenomena may interfere with the functioning of important electronic or electrical installations and even cause them to break down, especially telecommunications installations on boats.

Finally one must bear in mind the ageing of grounding components in lightning protection installations, the electrical resistance of which can become much greater than that

of other installations or nearby structures, which has on frequently recorded occasions led to severe damage.

A knowledge of these dangers acquired through a long experience and a thorough examination of the international maritime norms on lightning protection has led us to search and find a solution eliminating all of the aforesaid inconveniences.

According to the invention, a lightning protection installation comprises a rod-grounding conductor formed by a conducting core of a shielded coaxial cable comprising an outer conducting sheath insulating separated from said core, said sheath also being grounded.

The single figure of the accompanying drawings is a cross-section through an embodiment of a grounding conductor of a lightning protection installation according to the invention, given by way of example.

The lightning protection installation comprises a lightning rod (not shown) fixed on the upper part of a structure and connected to a ground-plate by a conductor constituted by the conducting core of a sheathed or coaxial cable including a central insulating core 1 in plastics material, 9.3 mm in diameter for example. The central core 1 is surrounded, in this example, by said conducting core 2 constituted by a cable made up of copper wires each 1.38 mm in diameter, the core 2 having an exterior diameter of 12.1 mm. This core 2 is surrounded by an intermediate insulating layer 3 which can be of polyvinyl chloride with an exterior diameter of 17.3 mm. Around this layer 3 is placed a conducting casing 4 constituting the electrical sheathing and made up of fifty-four copper wires each 0.90 mm in diameter, the casing 4 having an outer diameter of 19.1 mm and being covered by an insulating exterior cover 5, for example in polyvinyl chloride and with an outer diameter of 24.2 mm.

The conducting core 2 is connected at its upper end to the lightning rod and at its lower end to a ground-plate. The conducting casing 4 is also connected at its lower end

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to a ground-plate, which can be the same as that of the core 2. This conducting casing 4, as well as the insulating central core 1 and the two insulating layers 3 and 5, encase the conducting core 2 along its entire length between the base of the lightning rod and the ground-plate.

During the conduction of lightning from the rod to ground by the core 2, the presence of the conducting casing 4 prevents sparking, transfer of the charge, and influence effects between the core 2 and nearby electrical installations and metallic structures, thereby ensuring a total protection of the latter.

The described installation is particularly useful for the protection of boats. To provide a ground-plate on boats, the maritime norms foresee the fixing of a copper plate on the hull, said plate having a surface area of from 0.5 to 2 m². It is always difficult and sometimes even impossible to secure such a plate in a satisfactory manner, particularly in the case of balanced wood hulls, or hulls of plastic or with a false bottom. In addition, problems arise due to vegetable and animal proliferations and to other degradations which can occur to such a ground-plate, causing it to dangerously lose its efficiency. For these reasons, the ground-plate for the core 2 and the casing 4 is provided, in the described installation when used for the protection of a boat, by connecting the conducting core 2 and the conducting casing 4 of the sheathed conductor or coaxial cable to the rudder or the propeller of the boat, or to both. Experience has proven the advantage of such a ground-plate relative to conventional plates.

The installation preferably comprises radio-active sources fixed around the point of the lightning rod, for example, Am-241 sources, so as to maintain a powerful ionization around the lightning rod, thereby ensuring the efficiency of the latter.

WHAT WE CLAIM IS:—

1. A lightning protection installation, comprising a rod-grounding conductor formed by a conducting core of a shielded coaxial cable comprising an outer conducting sheath insulatingly separated from said core, said sheath also being grounded.

2. A lightning protection installation according to claim 1, in which said shielded coaxial cable successively comprises: a central insulating core, said conducting core, an intermediate insulating layer, said outer conducting sheath, and an outer insulating cover.

3. A lightning protection installation according to claim 1 or claim 2, comprising a radioactive ionising source in the vicinity of the point of the lightning rod.

4. A lightning protection installation according to any one of the preceding claims used on a boat, in which said conducting core and said outer conducting sheath are connected to a ground plate formed by the rudder and/or propeller of a boat.

5. A lightning protection installation substantially as hereinbefore described with reference to the accompanying drawing.

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