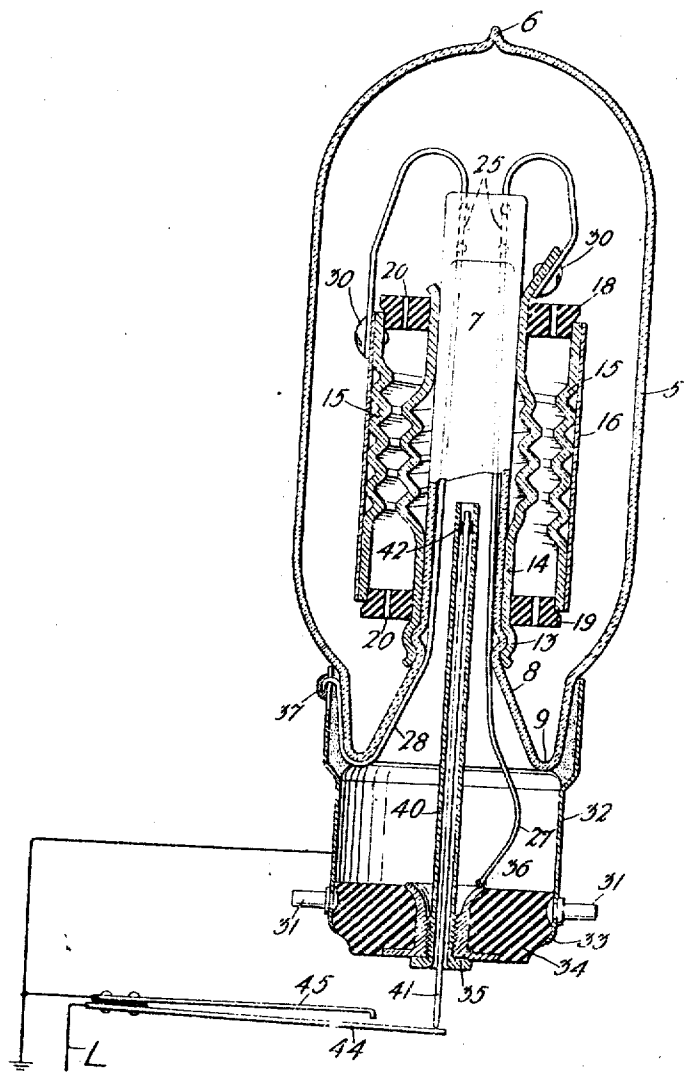


1,242,014.

D. T. MAY.
LIGHTNING ARRESTER.
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Inventor:
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UNITED STATES PATENT OFFICE.

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LIGHTNING-ARRESTER.

1,242,014.

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To all whom it may concern:

Be it known that I, DAVID T. MAY, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Lightning-Arresters, of which the following is a full, clear, concise, and exact description.

This invention relates to lightning arresters, and particularly to arresters of the vacuum type.

Under some conditions of service, it is desirable to provide, in connection with lightning arresters, means for establishing a conducting path of low resistance in parallel with the arc, if an arc injurious to the arrester persists between the electrodes for longer than a certain period of time. Means for this purpose is shown and claimed in a patent issued in my name, No. 1,101,752, dated June 30, 1914, for lightning arresters. In the device shown in said patent, after the means for establishing a conducting path of low resistance in parallel with the arc has operated, it is necessary, in order to restore the arrester to its normal condition, to more or less completely disassemble the device and rebuild it.

The general object of the present invention is to provide new and improved means for establishing a conducting path of low resistance in parallel with the arc, if an injurious arc between the electrodes persists longer than a certain period of time, such that the arrester can easily be restored to normal condition without extensive disassembling.

The drawing shows, partly in section and partly diagrammatically, a vacuum lightning arrester having the present invention embodied therein.

The evacuated container 5, within which the electrodes of the arrester are mounted, may be of glass or other suitable material formed and evacuated in the same well-known manner as are incandescent lamp bulbs, the point 6 indicating the place at which the bulb is sealed after the evacuation. Within the container 5 is an electrode support comprising a hollow stem 7 resembling the well-known form of stem used in incandescent lamps, said stem having a flared bottom 8, the edges of which are welded at 9 to the edges of the container 5. The hollow stem 7 projects well up into the container 5

and serves as a support for the electrodes of the arrester. As shown in the drawing, the stem 7 carries an inner cylindrical electrode 14, which may be of sheet metal having the threaded form shown and having a series of grooved leaves 13, which engage with a boss formed in the stem 7 and hold the electrode 14 in place. The outer electrode 15 is also cylindrical and may be of sheet metal having the threaded form shown in the drawing; and may be surrounded by a sheet metal shell 16, as shown. The outer electrode 15 is held in proper relation to the inner electrode 14 by washers 18 and 19 of insulating material, which may be perforated, as shown at 20, in order to permit the ready evacuation of the space between the electrodes and to afford vents for the relief of any pressure created in said space by an arc between the electrodes. The form of the washers 18 and 19 and the manner in which they cooperate with the electrodes 14 and 15, are apparent from the drawing, from which it is evident that the electrode structure can be easily assembled before the stem is placed within the container 5.

Electrical connection with the electrodes 14 and 15 is obtained through leading-in wires 27 and 28, which pass through the length of the hollow stem 7 and through the end thereof into which they are sealed. The necessary airtight seal may be obtained in the well-known manner by interposing pieces of platinum 25 in said leading-in wires within the glass seal. The inner ends of the leading-in wires 27 and 28 are connected to the electrodes 14 and 15 in any suitable manner, as by welding or soldering, or by the screws 30, as shown. The outer ends of said leading-in wires are connected to any suitable form of base which may be cemented to the outside of the container 5. The base shown in the drawing resembles an incandescent lamp base of well-known form, but instead of being threaded on its outer surface, is provided with projections 31 which are adapted to cooperate with slots or grooves in a supporting socket so as to provide a so-called "bayonet connection". The projections 31 may be riveted or otherwise suitably attached to the shell 32, which may be of brass or other suitable material. At its bottom, the shell 32 is spun in, as shown at 33, and is embedded in molded insulated material 34, in which is also em-

bedded a brass sleeve 35, hereinafter more fully described. In manufacture, the base consisting of the shell 32, the molded material 34 and the sleeve 35 is cemented to the end of the container 5, to which has been welded the hollow stem 7, supporting the electrodes. Before attaching the base, the leading-in wire 27 should be soldered to the sleeve 35, as is shown at 36. The other leading-in wire 28 is brought out between the container 5 and the shell 32, and is soldered to the edge of the shell, as shown at 37.

The means for establishing a conducting path of low resistance in parallel to the arc, if an injurious arc persists for longer than a certain period of time, will now be described: This means is located entirely outside of the evacuated container 5, and is arranged to be readily renewable. As shown, it comprises a tube 40 having a threaded end adapted to screw into the sleeve 35, and a rod 41, which extends through the tube 40 and is soldered thereto at 42 near the inner end thereof. The rod 41 projects from the base of the lightning arrester, and is adapted to engage a spring contact member 44 and to hold it away from the contact member 45 with which the spring contact 44 tends to engage. A circuit in which the lightning arrester might be used is indicated in the drawing, which shows the contact spring 44 connected to the line L to be protected, and the contact member 45 and shell 32 of the arrester permanently connected to ground.

The tube 40 and rod 41 are of such a length that the inner ends thereof are located inside of the hollow stem 7 at a point where the solder 42 will receive heat from an arc between the electrodes 14 and 15. The melting point of the solder 42 should be such that the heat received by it from an injurious arc which persists between the electrodes for longer than a certain period of time, is sufficient to melt the solder. The proper solder can easily be determined by experiment. When the solder 42 melts, the rod 41 is moved upward by the spring 44, which moves into engagement with the con-

tact 45, thereby electrically shunting the electrodes 14 and 15 and completing a circuit from the line L directly to ground. After the shunting device has operated, it is a simple matter to restore the lightning arrester to its normal condition, because all that is necessary is to remove the arrester from its supporting socket, and then to remove the tube 40 and rod 41 and to either resolder them or replace them by a new tube and rod properly soldered together, after which the arrester may be restored to its socket.

While the present invention is shown embodied in a vacuum lightning arrester of a particular kind, it will be understood that it is adapted for use in connection with vacuum arresters of many different types.

What is claimed is:

1. In a vacuum lightning arrester, an evacuated container, electrodes therein, a hollow stem projecting into said container, and means in said stem and actuated by the heat of the arc between said electrodes for electrically shunting said electrodes if an injurious arc persists between them longer than a certain period of time.

2. In a vacuum lightning arrester, an evacuated container, a hollow stem projecting into said container, electrodes supported thereby, and means projecting into said stem and actuated by the heat of the arc between said electrodes for electrically shunting said electrodes if an injurious arc persists between them longer than a certain period of time.

3. In a vacuum lightning arrester, an evacuated container, a hollow stem projecting into said container, hollow electrodes supported thereby, a tube within said stem, a rod extending into said tube, fusible means securing said rod to said tube at a point within said electrodes, and contact means controlled by said rod for short-circuiting said electrodes if an injurious arc persists between them longer than a certain period of time.

In witness whereof, I hereunto subscribe my name this 3rd day of June A. D., 1916.

DAVID T. MAY.