Nov. 10, 1925. 1,561,249

S. B. KRAUT

SPARK GAP LIGHTNING ARRESTER

Filed April 7, 1922

Fig. 6.

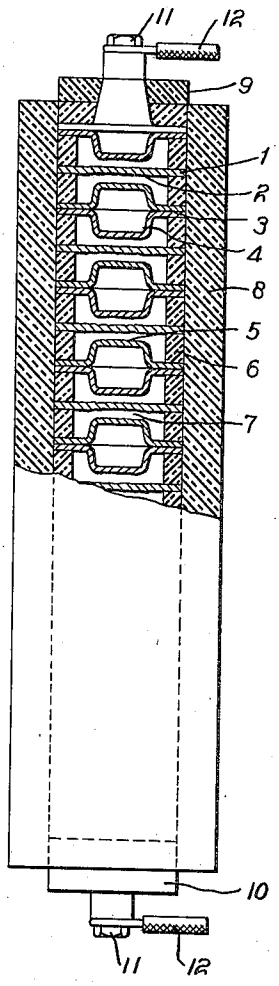


Fig. 1.

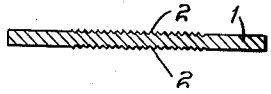


Fig. 2.

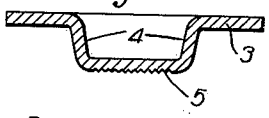


Fig. 3.

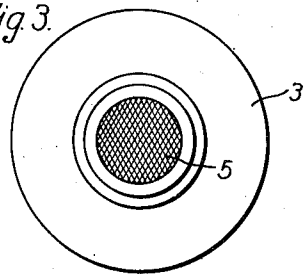


Fig. 4.

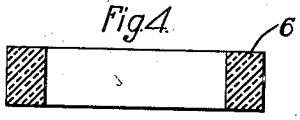
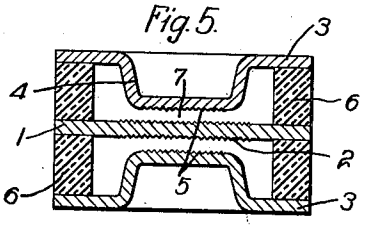


Fig. 5.



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UNITED STATES PATENT OFFICE.

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SPARK-GAP LIGHTNING ARRESTER.

Application filed April 7, 1922. Serial No. 550,277.

To all whom it may concern:

Be it known that I, SAMUEL B. KRAUT, a citizen of Russia, and a resident of East Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Spark-Gap Lightning Arresters, of which the following is a specification.

My invention relates to lightning arresters, more especially to arresters of the spark-gap type, and it is among the objects thereof to provide a device of this general type which shall be of simple, compact structure and which shall be efficient in operation when placed in transmission circuits and the like.

Another object of my invention is to provide a lightning arrester of the type above designated in which the structural parts are adapted to be assembled in any desired number of units for a given capacity.

Another object of my invention is to provide a lightning arrester of the spark-gap type which shall be more compact for a given number of gaps and, consequently, less expensive than similar devices heretofore employed.

In the accompanying drawing constituting a part hereof and in which like reference characters designate like parts,

Figure 1 is a cross-sectional view of a disc electrode constituting one of the elements of my invention;

Fig. 2 is a cross-sectional view, partially in elevation, of another type of electrode;

Fig. 3 is a bottom elevational view of the electrode, shown in Fig. 2;

Fig. 4 is a cross-sectional view of an insulating spacing ring;

Fig. 5 is a cross-sectional view of a plurality of electrodes and insulating spacing rings assembled in accordance with my invention; and

Fig. 6 is an elevational view, partially in cross-section, of a lightning arrester made in accordance with my invention.

The electrodes, Figs. 1 and 2, consist of a flat metal disc 1, preferably of brass, having roughened surfaces 2, and a metal disc 3 having a dish-shaped depression 4, the outer surface 5 of which is roughened, as by knurling. The electrodes 1 and 3 are assembled, as shown in Fig. 5, with insulating spacing rings or washers 6 of porcelain or other suitable material disposed therebetween to form gaps 7 between the flat surfaces 2 and the projected surfaces 5 of the electrodes 1 and 3, respectively.

A plurality of such sets of electrodes are assembled in a tubular housing 8, of porcelain or other suitable insulating material, and the ends of the housing are closed by end plates 9 and 10, having terminals 11 projecting therethrough for connecting the device to the leads 12 of an electrical circuit. A suitable number of sets of electrodes and spacing rings may be employed to provide the capacity desired and the end electrodes are secured to, or otherwise held in contact with, the terminals, or they may be separated therefrom by a distance equivalent to the gap between the successive electrodes. The ends of the tube are sealed to protect the device against atmospheric changes, particularly against moisture.

The peculiar shape of the electrodes I employ permits a greater number of gaps to be placed in a given space and for a given amount of insulating material, as it will be readily seen that two electrodes having dish-shaped projecting surfaces, when employed with a flat disc-shaped electrode, will be more efficient than two or more similar dish-shaped electrodes having a single gap between the projecting surfaces, such as were commonly employed in previous structures. The lengths of the gaps 7 are determined by the height of the spacing rings 6 and may be varied in accordance with the resistance necessary to prevent a spark-over at normal voltage and, if desired, a resistor element may be disposed within the tubing housing and electrically connected to the electrode to insure against break-down thereof under other than abnormal conditions.

It will be readily understood, from the above description of my invention, that lightning arresters made in accordance therewith are more efficient and less expensive than prior devices, in that a lesser number of electrodes are required to provide the same number of air gaps in series. This effects a saving in the metal electrodes employed which are relatively expensive and also enhances the efficiency of such devices.

Although I have described a specific embodiment of my invention, it will be obvious to those skilled in the art that various modifications may be made in the details of construction thereof and in the materials em-

ployed without departing from the principles set forth. For instance, the electrodes may be of any suitable conducting material and the spacing rings may be made of an insulating composition, such as molded materials of suitable dielectric strength, and the shapes of the electrodes may be altered to provide a greater or less surface area of the gaps and thus alter the volume of discharge across the same.

I claim as my invention:

1. In a lightning-arrester, a discharge gap device comprising a flat sheet-metal electrode, two tubular insulating spacers one on each side of said flat electrode, two sheet-metal electrodes enclosing the open sides of said spacers, and having dished portions projecting towards said flat electrode to constitute discharge gaps on both sides thereof, said spacers and electrodes constituting separated chambers one on each side of said flat electrode.

2. A discharge gap device comprising two similar sheet metal electrodes having dished central portions projecting towards each other, a flat sheet metal electrode plate of the same diameter as said electrodes interposed between said projecting portions and constituting therewith two discharge gaps, and tubular spacers between said electrodes and in engagement with the edges thereof and constituting therewith two separated pressure retaining chambers one on each side of the flat electrode, said spacers being substantially of the same diameter as said electrodes.

3. A lightning-arrester comprising a tubular casing, a discharge gap unit in said casing, said discharge gap unit comprising two spacing rings, a flat metal disc held between said rings and dished metal discs enclosing the open sides of said rings, and having projecting portions extending towards said flat disc, said discs and rings being disposed one on the top of the other and being held in place by the walls of said casing.

In testimony whereof, I have hereunto subscribed my name this 31st day of March, 1922.

SAMUEL B. KRAUT.