No. 894,518. PATENTED JULY 28, 1908.

M. MILCH.

LIGHTNING ARRESTER.

APPLICATION FILED JAN. 16, 1907.

Fig. 1.

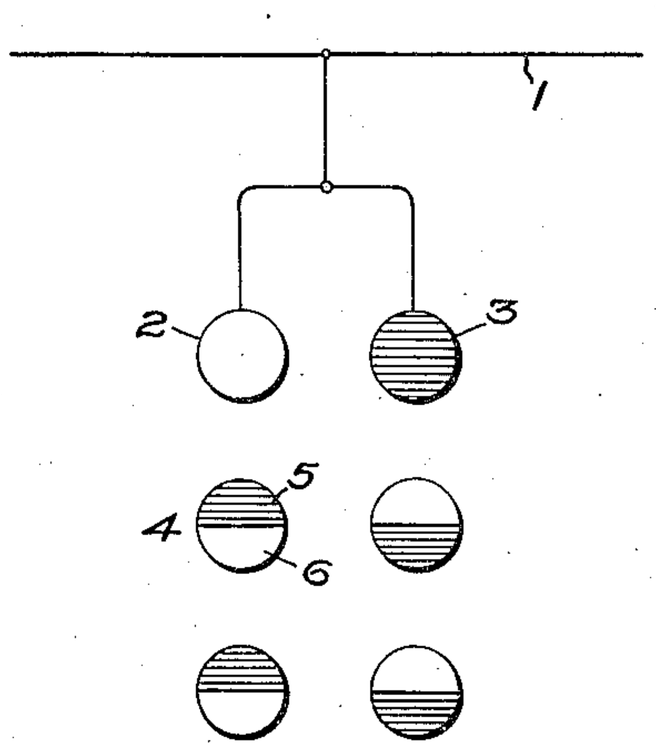
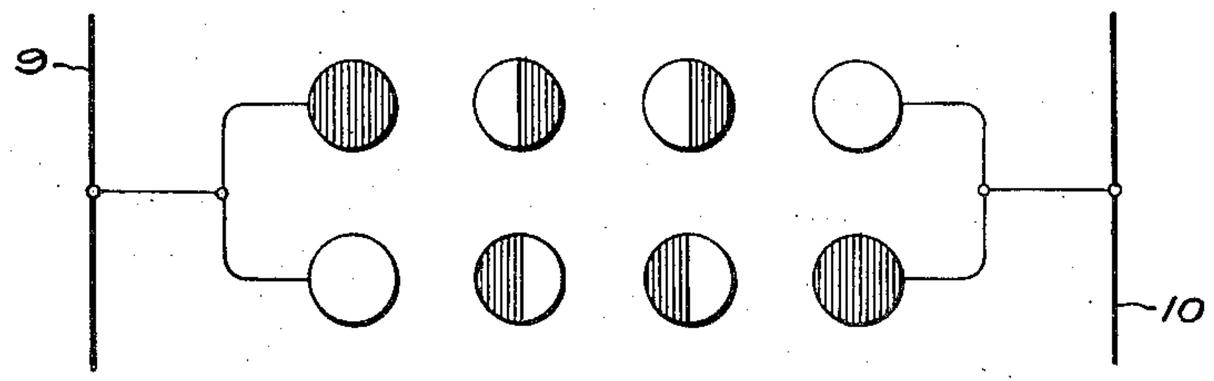


Fig. 2.



Witnesses:
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UNITED STATES PATENT OFFICE.

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LIGHTNING-ARRESTER.

No. 894,518. Specification of Letters Patent. Patented July 28, 1908.

Application filed January 16, 1907. Serial No. 352,516.

To all whom it may concern:

Be it known that I, MAURICE MILCH, a subject of the King of Hungary, residing at Nagy Bittse, Austria-Hungary, have invented certain new and useful Improvements in Lightning-Arresters, of which the following is a specification.

This invention relates to an improvement in protective means for electrical conductors subjected to abnormal potential because of lightning or other atmospheric disturbances, or because of static, resonance, or other phenomena arising in the transmission systems of which the conductor is a part.

My invention includes an arrangement of conductors, such as metal balls, disks, or cylinders, in such a way that spark gaps are formed between adjacent conductors, and a discharge path thereby established between the conductor and ground or between two conductors of a system. These conductors are so disposed that the surface of one conductor is presented toward a conductor consisting in whole or in part of a different metal. I find that this difference in the character of the arcing materials gives to an arc playing therebetween, a resistance or counter E. M. F. which is different for different directions of the current. The spark gap may, in a certain sense, be termed an asymmetric conductor, permitting the flow of current in one direction more readily than in the other. This phenomenon is utilized in my present invention to insure more certain interruption of the arc or discharge current when the direction of potential across the gap reverses.

The metals brass or iron are suitable as materials for the opposing electrodes in my improved lightning arrester, and the conductors may be of the cylindrical form heretofore used in the so-called multi-gap arresters. Although the conductors may be disposed to form but a single asymmetric path for the discharge, I may arrange two groups, one to serve as a path for current flowing in one direction, and the second group as a path for the reverse current. This shifting of current from one group to the other materially assists in extinguishing the arc for reasons which will be apparent.

In the drawing forming a part of this specification, I have illustrated the invention only diagrammatically, and it should be understood that the proportion or size of the various parts may be varied, and that the number of groups may be increased or diminished to correspond with the potential of the line or with other requirements of service.

Figure 1 is a diagrammatic representation of a plurality of conductors disposed to form two groups of spark gaps between the line conductor and ground; and Fig. 2 is a similar arrangement disposed between line and line.

In Fig. 1, the line conductor 1, to be protected, is connected directly with a brass ball or cylinder 2 and an iron ball or cylinder 3. Adjacent to the brass ball is a composite ball or cylinder 4 having an iron surface 5 adjacent to the brass conductor 2, and a brass surface 6 on the opposite side. One or more other composite conductors may be arranged in this group, the number being proportional to the voltage of the line. The group terminates in an iron conductor 7 connected directly to ground. This group presents a path in which brass conductors are always opposed to iron conductors in such a way that current flowing from the line conductor to ground must always pass from brass to iron.

The second or parallel group, terminating in iron ball 3 and brass ball 8, offers a similar path through which the current from the line must pass from iron to brass. There are, therefore, two parallel paths open to the flow of current from the line, one of these paths opposing a relatively high resistance or counter-electromotive force to the flow of energy, and the other opposing a relatively low resistance or counter-electromotive force. The result is a rapid, if not instantaneous, interruption of the current flow when the potential of the line reverses in direction.

The arrangement shown in Fig. 2 is similar to that of Fig. 1, except that the two groups of conductors are connected directly between the line conductors 9 and 10. The gaps are here shown as arranged horizontally, but the rectifying or asymmetric qualities of the two paths are the same as in the apparatus of Fig. 1.

What I claim as new and desire to secure by Letters Patent of the United States, is,—

1. In a lightning arrester, a plurality of conductors of different material disposed to form a plurality of air gaps having a greater resistance to the flow of current in one direction than in the other.

2. In a lightning arrester, a group of con-

ductors disposed in series with adjacent arcing surfaces of different material, to establish an asymmetric path for current flowing through said group.

3. A lightning arrester comprising a plurality of conductors disposed to form a plurality of spark gaps, the corresponding conductors of each gap being of one material and the opposing conductors of a different material.

4. The combination, with a line conductor of a high voltage alternating current system subject to high potential charges, of a path to ground therefor including a metal conductor, and an opposing conductor separated therefrom to form an air gap, said conductors being of different metal.

5. In a lightning arrester, a group of conductors spaced apart to form air gaps, the arcing surface on one side of said gaps being of one material and on the other side of a different material to permit the passage of current more easily in one direction than in the other, and a second group in parallel with said first group to permit the flow of current more easily in the reverse direction.

6. A lightning arrester in which a plurality of brass surfaces are opposite a plurality of iron surfaces, to form air gaps offering less resistance to the flow of current in one direction than in the other.

In witness whereof, I have hereunto set my hand this 29th day of December, 1906.

MAURICE MILCH.

Witnesses:
EUGENE HERRANY,
CHARLES E. ZALTUN.