(No Model.)

A. WURTS.

LIGHTNING ARRESTER.

No. 497,509. Patented May 16, 1893.

Fig. 1.

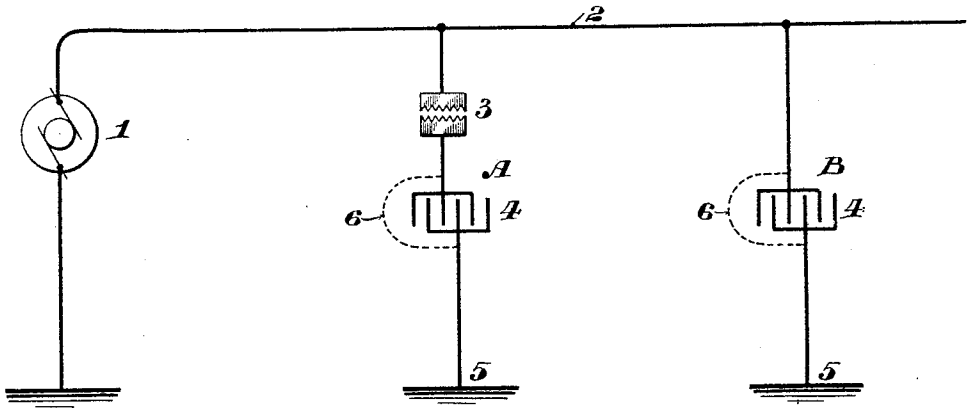


Fig. 2.

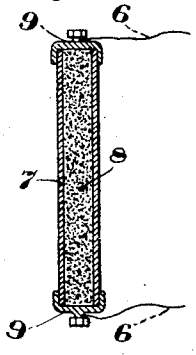
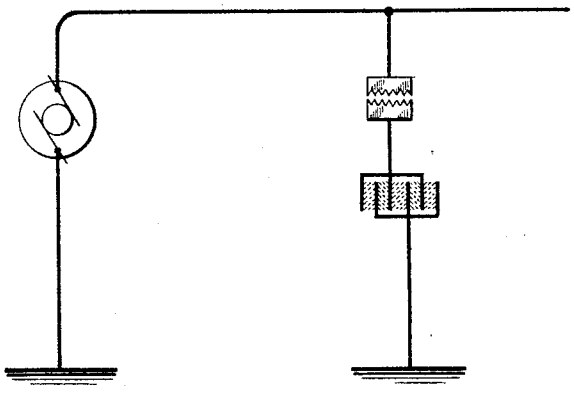


Fig. 3.



WITNESSES:

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UNITED STATES PATENT OFFICE.

ALEXANDER WURTS, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO THE WESTINGHOUSE ELECTRIC AND MANUFACTURING COMPANY, OF SAME PLACE.

LIGHTNING-ARRESTER.

SPECIFICATION forming part of Letters Patent No. 497,509, dated May 16, 1893.

Application filed December 22, 1892. Serial No. 456,076. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER WURTS, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Lightning-Arresters, (Case No. 534,) of which the following is a specification.

My invention has relation to devices for protecting electric wires and connected apparatus from the destructive effects of atmospheric electricity.

One object of my invention is to accomplish the discharge of all static electricity which may accumulate upon the wires by means which at no time present a path for the dynamo current, and such means acting either by successive impulses or by a gradual draining of the line.

Another object of my invention is to do away with all movable parts or complex mechanism for the purpose of preventing generators being grounded by formation of an arc at the point of discharge.

My invention is illustrated in the accompanying drawings in which—

Figure 1 is a diagrammatic view of a generator and its circuit, showing the relation of my device thereto. Fig. 2 is a longitudinal section of a special form of leak preferably employed by me; and Fig. 3 is a modification of the arrangement shown in Fig. 2.

I have shown the generator at 1, and two forms of lightning arrester at A and B, the line being shown at 2. Connected to the line 2 is an ordinary spark arrester 3, connected with one plate of a condenser 4. The opposite plate of this condenser is grounded as at 5.

Around the condenser I provide a leak of such extremely low conductivity as to afford no opportunity for the passage of an appreciable dynamo current. This leak is indicated by dotted lines at 6. In the form shown at A, the conductivity of this leak need only be low enough to prevent passage of enough dynamo current to hold a spark across the air gap. In this case, there will, of course, be no loss of current during normal arcing.

In order that discharges may take place from the line before very high difference of potential between the line and ground shall have developed, the points 3 should be placed very near together. Indeed, I have found that my arrester may be made practical without the air gap as is shown at B in Fig. 1.

One form of device employed as a high resistance leak is shown in Fig. 2. The insulating tube 7, preferably made of glass, contains a mixture of conducting and non-conducting materials shown at 8. This may be any of the well known resistant mixtures used in the electric arts, and of these a compound of plaster of paris and powdered graphite will be found useful. By properly proportioning these ingredients, any desired degree of conductivity may be obtained. The ends of this tube are provided with conducting caps 9, to which may be connected the two sides of the leak line 6. These are generally wires connecting the resistance tube with the two sides of the condenser. The form of arrester shown at B acts simply to cause a continual slow removal of static charge from the line, without affording a path for the dynamo circuit; at the same time this arrangement, as well as form A, acts to offer increased capacity for the accommodation of sudden charges and consequent reduction of potential. These condensers, arranged in the ways above described, may be connected at one or more points with the line to be protected, and thus, if desired, a long line may be kept discharged by means of small condensers.

In Fig. 3 I have shown a modification, wherein a special leak 6 is done away with. Where the condensers employed are made with a leaking dielectric, the condenser charge will quickly be lost. This is indicated by fine dotted lines between the plates of the condenser. Of course, if desired, the spark gap may be done away with in the form shown in Fig. 3, as in the form B in Fig. 1. Whenever this gap is absent, a portion of the leakage from the condenser will take place through the generator or translating devices. This being a slow process, will not harm the apparatus. The same result namely leakage through the generator or translating devices may be attained in any of the forms shown wherein spark gaps are employed by provid-

ing a high resistance leak between the two plates of the spark gap either in addition to or instead of the high resistance 6, or leaky dielectric shown in Fig. 3.

It will be remarked that the high resistance shunt or leak 6 may in the case of form B, be connected directly with the ground and with the line anywhere near the branch leading to the condenser. In form A, this shunt may connect the lower toothed plate 3 directly to the ground.

In all three forms or arrangements shown, it will be seen that a line of high resistance is provided between the main line and the earth, said line having in forms A and B two branches, 6 and 4; while in the form shown in Fig. 3, the line is single. In all forms a condenser is introduced into the line between the main line and the ground.

It will be apparent to those skilled in the art that, although in the drawings I have shown a system of distribution having a grounded return, mere duplication of the devices shown will enable one to protect both branches of an all metallic circuit.

What I claim is—

1. As a means for protecting electric lines from the effects of atmospheric electricity, a branch line of high resistance between the main line and ground, and a condenser in said branch line, in combination with permanent means for causing leakage of static charge from said condenser, substantially as described.

2. As a means for protecting electric lines from the effects of atmospheric electricity, a condenser having one plate connected to the line and the other plate grounded, and a high resistance leak around said condenser, substantially as described.

3. As a means for protecting electric lines from atmospheric electricity, a condenser, connections between one condenser plate and the line, said connection including a spark gap, a resistance leak between said plate and ground and a connection between the second plate and the ground, substantially as described.

In testimony whereof I have hereunto subscribed my name this 20th day of December, A. D. 1892.

ALEXANDER WURTS.

Witnesses:

JAMES W. SMITH,

HAROLD S. MACKAYE.