

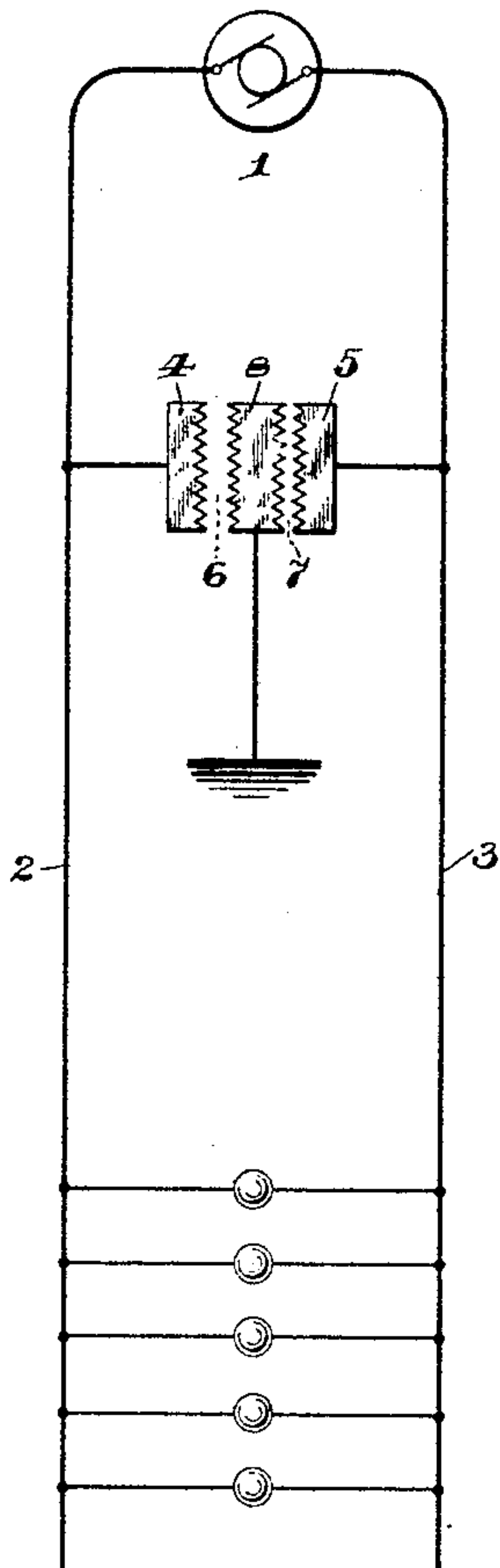
(No Model.)

A. WURTS.  
LIGHTNING ARRESTER.

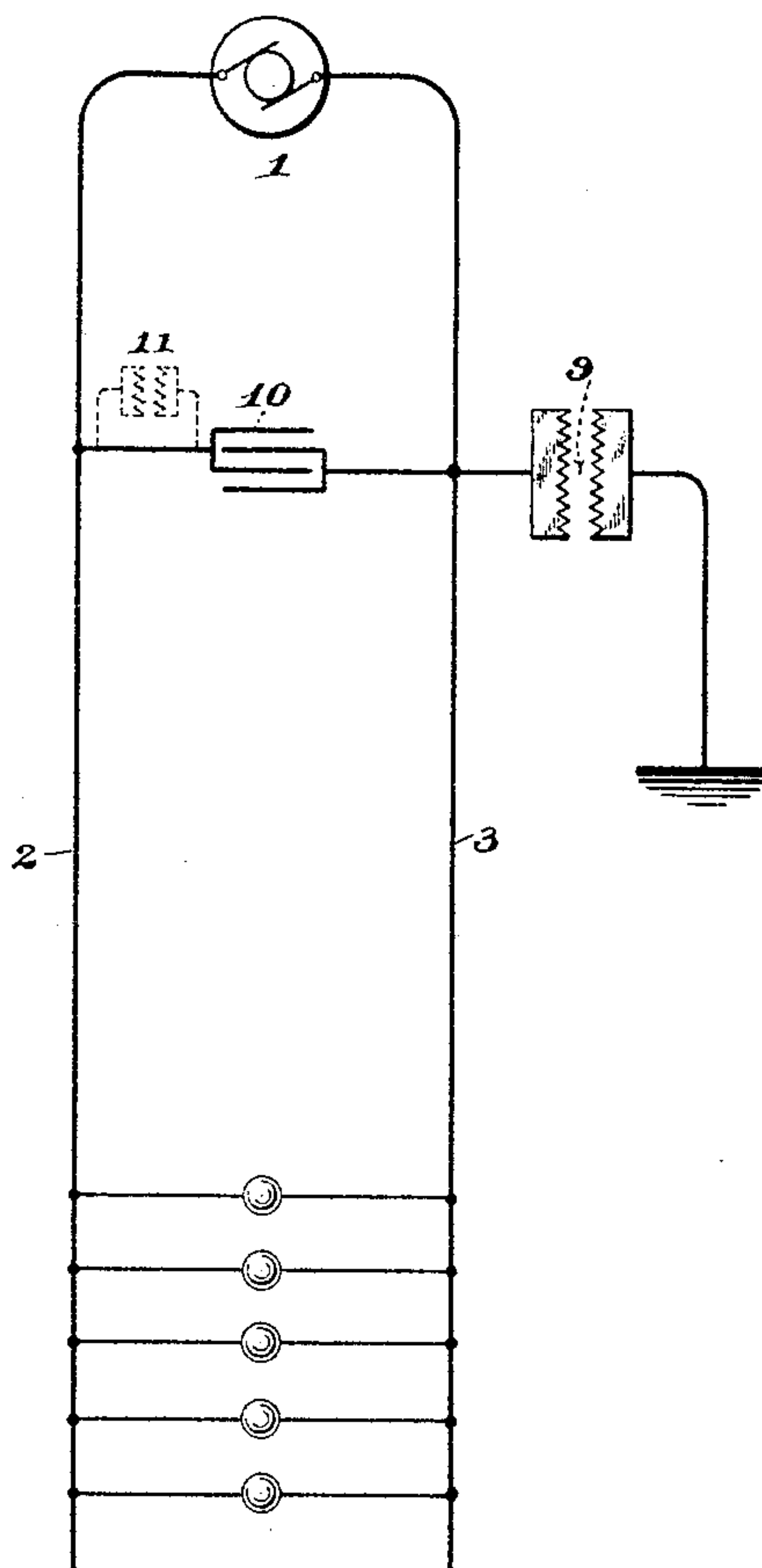
No. 497,508.

Patented May 16, 1893.

*Fig. 1.*



*Fig. 2.*



WITNESSES:

*George Brown*  
*H. L. Tener*

INVENTOR

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BY  
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ATTORNEYS

# 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. 497,508, dated May 16, 1893.

Application filed December 22, 1892. Serial No. 456,075. (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. 533, B,) of which the following is a specification.

The object of my invention is to provide means whereby a system of electric wires may be rid of a static charge without providing a path for the dynamo current, and whereby a difference of potential may be prevented from being developed between the two branches of the circuit which might be sufficiently high to cause damage to the insulation of the armature.

Throughout this specification in speaking of difference of potential, static difference will be understood, the relatively small difference of potential incident to the transmission of dynamic electricity being ignored for the purposes of this description.

Where an all metal circuit is to be protected and it is desired to provide a lightning arrester for each leg of the circuit, considerable difficulty has been experienced in so arranging the lightning arresters that the two legs of the circuit may be discharged at practically the same potential. When this result is not obtained, one leg of the system will be discharged through the arrester before the other, and, being momentarily grounded, will cause a stress upon the armature insulation due to the whole difference of potential between the undischarged leg of the system and the earth.

In the accompanying drawings, Figure 1 shows the best typical forms of arrester in such a manner as to illustrate the difficulty above mentioned; and Fig. 2 shows my invention as applied to an all metal circuit and exhibits the means whereby I obviate these difficulties.

In Fig. 1, let 1 be the generator and 2 and 3 the two legs of the circuit connected respectively to the terminals 4 and 5 and adapted to discharge across the two air-gaps 6 and 7 to the plate 8 and so to the ground. As

shown in Fig. 1, the air-gap 6 seems to be greater than the air-gap 7. This is a difficulty which it is almost impossible to avoid in practice, inasmuch as the most careful measurement of the air-gaps at one or more points along the combs will not give any adequate notion of the relative resistance to discharge on the two sides of the center plate. Where this inequality is present, it is evident that even though the legs 2 and 3 be charged statically at the same potential, the gap 7 being less than the gap 6, the leg 3 will discharge first, and will be momentarily grounded. The consequence of this momentary ground is the establishment of an excessive strain upon the insulation due to the difference of potential between the leg 2 of the system and the ground. The result of this stress will almost inevitably be the dismantling of the armature through giving way of the insulation. My method of obviating this difficulty is shown in Fig. 2, wherein 2 and 3 are the two legs of the circuit, and at 9 is shown the ordinary air-gap arrester as typical of any form of arrester connected to only one leg 3 of the system.

Between the two legs of the system I introduce a condenser 10 for the following purpose: When a discharge takes place across the air-gaps 9 the difference of potential between 2 and 3 is immediately established and then compensated for by a charge of the opposite plates of the condenser 10, and the two legs of the system are thus brought to the same potential without any strain upon the insulation of the armature 1. The condenser 10 will hold its charge for an inappreciable time, as such charge will leak around through the conductors of the system with great rapidity without endangering such conductors or any apparatus connected to them.

What I claim is—

1. As a means for protecting an all metal circuit from atmospheric electricity, a lightning arrester connected to one leg of the circuit and a condenser having its opposite plates connected respectively with the two legs of said circuit, substantially as described.

2. As a means for protecting all metal circuits from atmospheric electricity, a connec-

tion from one leg of the circuit to the ground containing an air-gap, and a condenser having its opposite plates respectively connected to two legs of the circuit, substantially as described.  
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3. As a means for protecting all metal circuits from atmospheric electricity, surfaces of large capacity connected to both legs of the circuit, and a lightning arrester connected to

one leg of the circuit, substantially as described. 10

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.