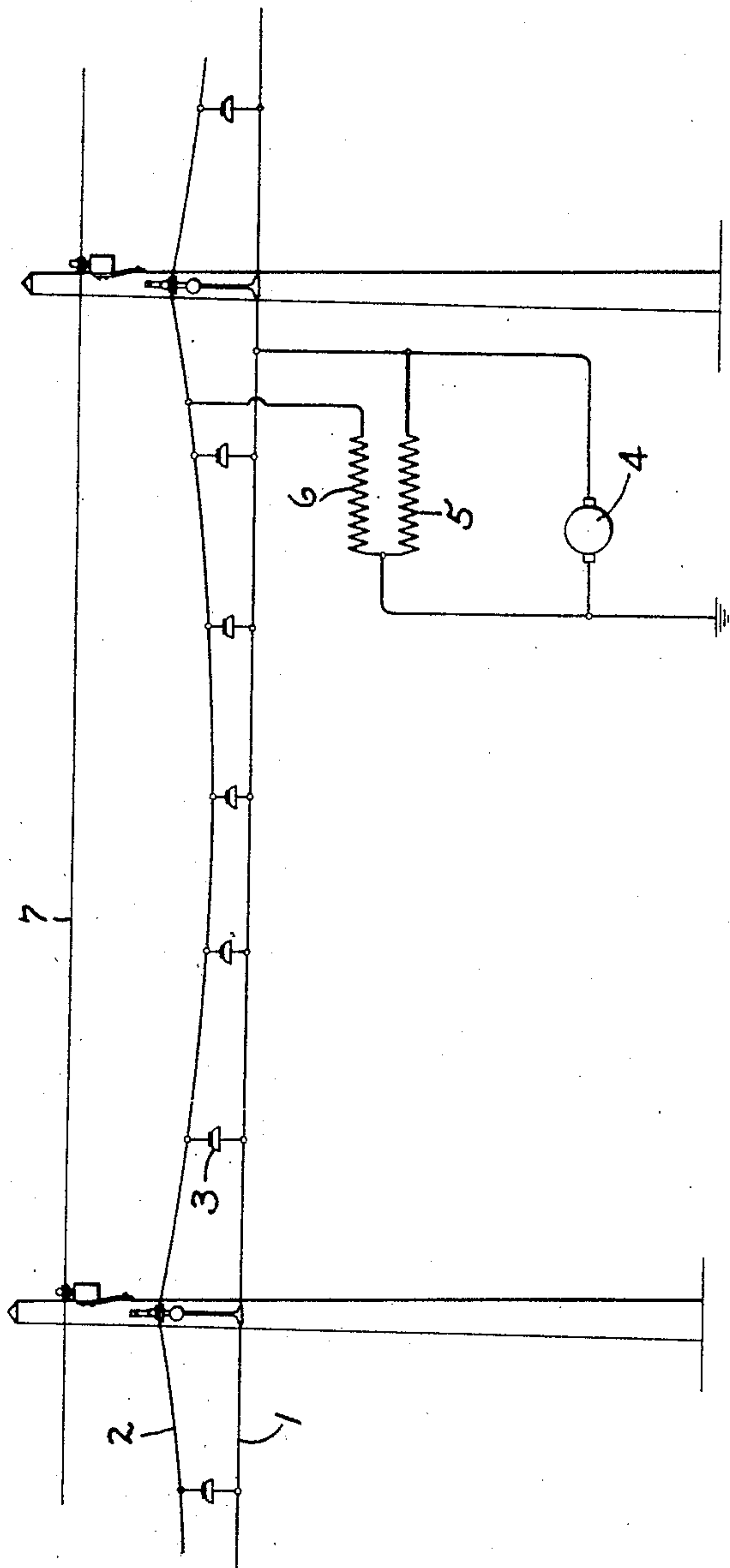


No. 890,593.

PATENTED JUNE 16, 1908.

A. H. ARMSTRONG.  
SYSTEM OF DISTRIBUTION.  
APPLICATION FILED SEPT. 13, 1907.



WITNESSES:

Lester H. Fulmer.  
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INVENTOR

ALBERT H. ARMSTRONG.

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ATTY.

# UNITED STATES PATENT OFFICE.

ALBERT H. ARMSTRONG, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

## SYSTEM OF DISTRIBUTION.

No. 890,593.

Specification of Letters Patent.

Patented June 16, 1908.

Application filed September 13, 1907. Serial No. 392,663.

*To all whom it may concern:*

Be it known that I, ALBERT H. ARMSTRONG, a citizen of the United States, residing at Schenectady, county of Schenectady, State of New York, have invented certain new and useful Improvements in Systems of Distribution, of which the following is a specification.

My invention relates to alternating-current distribution, and particularly to railways operated by alternating current. If a low-voltage conductor, such as a telegraph or telephone wire, extends in close proximity to a conductor carrying single-phase alternating current, the low-voltage conductor is subject to disturbances due to induction both static and magnetic. Thus, in a single-phase alternating-current railway a telegraph wire on the same poles with the working conductor is subject to such disturbances. The disturbances due to magnetic induction are largely avoided when sub-stations are connected to both ends of the working conductor. For instance, if a section of the working conductor extending between two sub-stations is considered, it will be seen that with a car in the middle of the section, the current in one half the section will neutralize the inductive effect of the current in the other half, and when the car is not in the center the tendency to neutralization continues, since when the car is nearer one end of the section than the other, the shorter part of the section carries a greater current.

The object of my invention is to provide in such a system a simple arrangement for preventing the disturbing effects of static induction. In accomplishing this I make use of the catenary, which is usually employed in the suspension of trolley wires, and provide means for maintaining this catenary at a potential approximately equal but opposite to that of the trolley wire. That is, I keep the catenary at the same potential as the trolley wire, but with its potential wave displaced approximately 180 degrees from that of the trolley wire. Under this condition, a telegraph or telephone wire located in proximity to the trolley wire will be subject to the static inductive effect of both the trolley wire and the catenary, and owing to the fact that the voltage of these conductors is at every instant approximately equal but oppo-

site the resultant effect on the adjacent telegraph or other wires will be *nil*.

In carrying out my invention I provide insulation between the catenary and the trolley wire and connect these wires to ground through the coils of a transformer. In this way a potential may be at all times maintained on the catenary equal to the potential on the trolley wire but with its wave displaced 180 degrees from the wave of the trolley wire.

My invention will be most easily understood from reference to the accompanying drawing which shows diagrammatically a system of distribution on a single-phase railway, arranged according to my invention.

Referring to the drawing, 1 is a trolley wire furnishing alternating current, this wire being supported from a catenary 2 in any usual and well known manner, except for the fact that the trolley wire and the catenary are insulated from one another. For the purpose of insulation between the catenary and trolley wire, strain insulators 3 may be interposed in the wires by which the trolley wire is suspended from the catenary, or any other suitable arrangement may be used for the same purpose. The alternating current generator, which furnishes current for the line, is indicated at 4 and is shown connected to the trolley wire on one side, and to the ground or track on its other. The trolley wire is connected to ground through the primary 5 of a transformer, and the catenary is connected to ground through the secondary 6 of this transformer, as shown diagrammatically in the drawings. Telephone, telegraph or other wires are indicated at 7 supported on the same poles as the trolley wire.

The operation of the system of distribution illustrated will be clear from the foregoing description. The transformer will impress a potential on the catenary equal to the potential on the trolley wire, but with its potential wave displaced approximately 180 degrees from that of the trolley wire. The telegraph or other wires will be subject to the static inductive effect of both the trolley wire and the catenary and, as above explained, these will practically counteract one another.

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

1. In a railway system operated by alter-



nating current, a trolley wire, a catenary suspension therefor, and means for maintaining the catenary at a potential approximately equal but opposite to that of the trolley wire.

5 2. In a railway system operated by alternating current, a trolley wire, a catenary for suspending the same, insulation between the catenary and the trolley wire, and a trans-

former through the coils of which the trolley and catenary are connected to ground. 10

In witness whereof, I have hereunto set my hand this 11th day of September, 1907.

ALBERT H. ARMSTRONG.

Witnesses:

BENJAMIN B. HULL,  
MARGARET E. WOOLLEY.