

A. H. ARMSTRONG.  
 PROTECTED HIGH POTENTIAL RAIL.  
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907,712.

Patented Dec. 29, 1908.

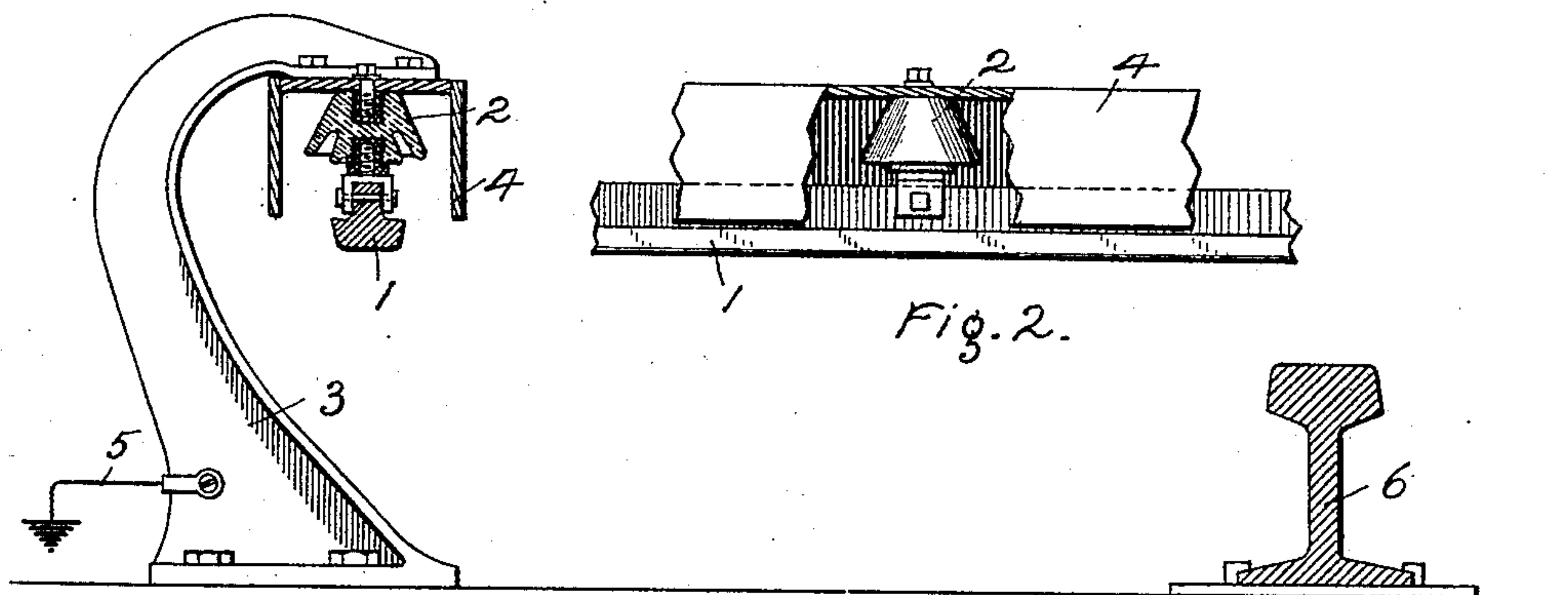


Fig. 1.

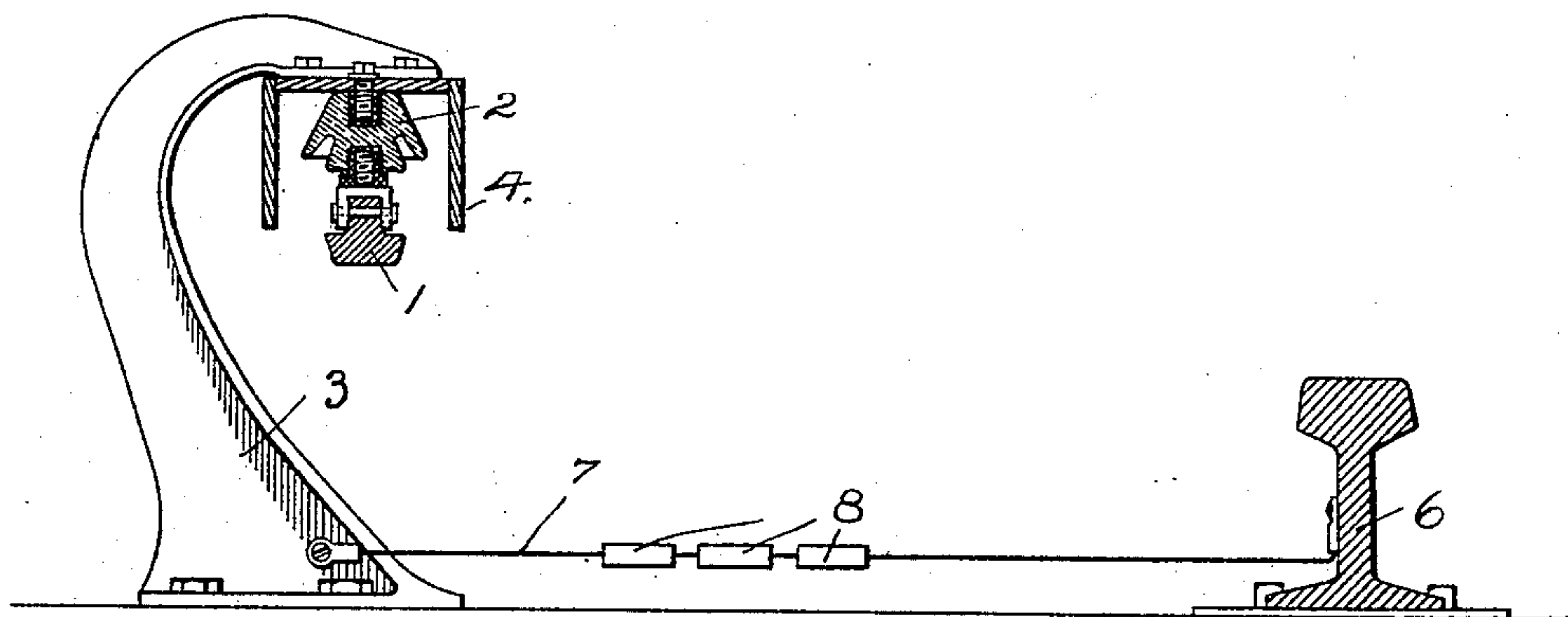


Fig. 3.

WITNESSES

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# UNITED STATES PATENT OFFICE.

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

## PROTECTED HIGH-POTENTIAL RAIL.

No. 907,712.

Specification of Letters Patent.

Patented Dec. 29, 1908.

Application filed July 21, 1906. Serial No. 327,168.

*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 Protected High-Potential Rails, of which the following is a specification.

It is important that third rails, particularly those which carry currents at a high potential, should be securely supported and protected in such a manner as to minimize the danger of injury to persons coming in contact therewith. A shield or covering made of metal is to be preferred since it is strong and durable and may conveniently serve to support the conductor at points between the main supports. It has been found, however, that there will be a leakage of current from the conductor to the shield, producing a static charge in the shield. This charge, in cases where the line potential is much higher than the five or six hundred volts ordinarily employed, is sufficient to produce serious shocks to persons coming in contact therewith.

The object of the present invention is to provide means for preventing the maintenance of a static charge under the conditions described above. This may be accomplished by connecting the metallic covering to the negative side of the line, so that the current which leaks past the insulators does not remain as a static charge in the covering but flows on through the distribution system. If the covering were connected directly to the negative main there would be danger of an arc starting between the third rail and its covering. To prevent this a high resistance of some sort is preferably placed in the invention between the covering and the negative main. If a ground connection is made, the resistance of the earth is sufficient to prevent the formation or holding of an arc between the third rail and its covering. At the same time, a person standing on the ground and coming into contact with the covering will receive no shock since the covering and the ground are at substantially the same potential.

A fuller understanding of the present invention may be had from the following de-

tailed description, while its scope will be apparent from appended claims.

In the accompanying drawing, Figure 1 is a cross-section of a roadway showing one track rail and a third rail supported and protected in accordance with the present invention; Fig. 2 is a detail, showing the means for supporting the conductor from the shield or covering; and Fig. 3 is a view corresponding to Fig. 1, showing, however, a different modification.

Reference being had to Figs. 1 and 2, 1 is a third rail carrying high potential currents, this rail being supported at intervals from insulators 2 which in turn may be secured either to the main standards 3 or to the metallic protective covering 4, or to both. 5 is a conductor which positively connects the protective covering to the ground, as for example, through the medium of the main standards. The small leakage of current which takes place from the third rail past the insulators to the protective covering passes through conductor 5 and then, by way of earth, back to the negative side of the line which is indicated by track rail 6. The earth resistance introduced between the shield and track rail is sufficient to prevent the starting of an arc or the sustaining of an arc between the third rail and its metallic covering, as might be the case if the covering were connected directly to the track rail.

In Fig. 3, the conductor 7 corresponds to conductor 5 in Fig. 1, but is connected to track rail independently of the ground. The conductor 7 includes, however, a high resistance 8 of such a capacity as to limit the current flowing with possible short circuit to so small an amount as to prevent the maintaining of the arc between the third rail and its protective cover. This resistance is preferably in the form of sticks of carborundum, graphite or similar substance.

It will be seen that in both forms of my invention there is no possibility of injury from static charges to any one coming in contact with the protective covering, so that this covering may be made of materials having the best mechanical characteristics without regard to its electrical qualities.

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



1. In combination, a third rail, a return  
conductor, a protective covering for said  
third rail, and an electrical connection in-  
cluding a resistance between said covering  
5 and the return conductor.

2. In combination, a third rail, a return  
conductor, a metal protective covering for  
said third rail insulated therefrom, and an  
electrical connection containing a resistance

between said covering and said return con- 10  
ductor.

In witness whereof, I have hereunto set  
my hand this 19th day of July, 1906.

ALBERT H. ARMSTRONG.

Witnesses:

BENJAMIN B. HULL,  
HELEN ORFORD.