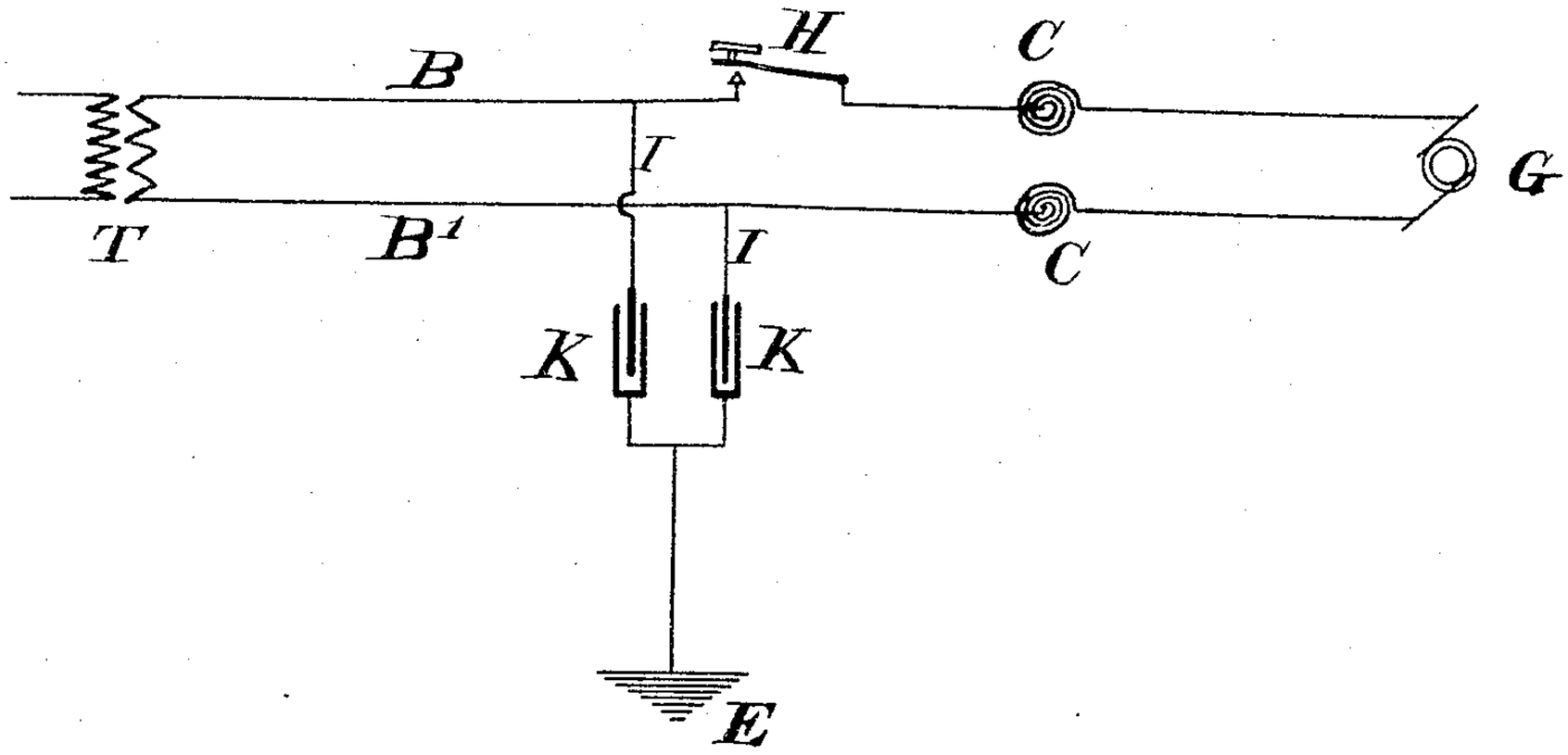
No. 771,820. PATENTED OCT. 11, 1904.

L. DE FOREST.

PROTECTING DEVICE FOR HIGH FREQUENCY APPARATUS.

APPLICATION FILED JUNE 9, 1904.

NO MODEL.



WITNESSES:

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No. 771,820. Patented October 11, 1904.

UNITED STATES PATENT OFFICE.

LEE DE FOREST, OF NEW YORK, N. Y.

PROTECTING DEVICE FOR HIGH-FREQUENCY APPARATUS.

SPECIFICATION forming part of Letters Patent No. 771,820, dated October 11, 1904.

Application filed June 9, 1904. Serial No. 211,741. (No model.)

To all whom it may concern:

Be it known that I, LEE DE FOREST, a citizen of the United States, and a resident of the city, county, and State of New York, have invented certain new and useful Improvements in Protecting Devices for High-Frequency Apparatus, of which the following is a specification.

My invention relates to an improvement in protective devices for high-frequency apparatus, and will be defined in its scope by the claims.

The object of my invention is to protect apparatus used in connection with high-frequency currents from injury by surgings produced in other parts of the apparatus.

The drawing illustrates diagrammatically and in a simple form an apparatus embodying my invention.

In the operation of high-frequency electrical transformers such as are used in wireless signaling it often happens that the high-frequency impulses or surges set up flash back into the generator or other analogous apparatus and burn it out. To prevent this, choke-coils have been inserted in the leads between the transformer and the generator. While this is of considerable efficiency, I have discovered that by connecting the leads between the transformer and generator to the earth through condensers of a proper capacity the dangerous high-frequency oscillations are shunted off through the condensers to the earth.

In the drawing, G represents an alternating generator; C C, choke-coils; B B′, leads from the generator; T, a transformer; E, the earth connection; K K, condensers; I I′, connections from the leads to the condensers, and H a key or other analogous device for producing the signals. These devices are all represented in a conventional and diagrammatic manner.

The relief or safety ground E is connected with the leads B and B′ not directly, but through the interruption of condensers K K, so proportioned in size and capacity that they will not to any considerable extent pass the normal currents flowing between the generator and the transformer, but will permit passage of the higher-frequency surgings induced when the key is operated. This earth connection by means of a condenser acts as a safety-valve to discharge those surgings which would likely be dangerous to the generating apparatus without affecting other and lower-frequency currents. The point at which connection should be made with the leads is between the source of the high-frequency surgings and the apparatus to be protected. The apparatus to be protected may be other than a generator, although such apparatus is what would most ordinarily require such protection.

The device described will work satisfactorily without the use of the choke-coils C, shown as inserted in the leads B B′ between the points where the earth-leads I are connected with the leads B B′ and the generator. A larger measure of safety is, however, secured by the use of choke-coils in the position shown, and I therefore prefer in many cases to use such choke-coils in combination with the safety earth connection described. In practice I have found that such devices efficiently protect the generating apparatus from the high-frequency waves.

What I claim is—

1. The combination in an apparatus, a portion of which is subject to high-frequency electrical surgings, of an earth connection employing therein a condenser and located between the portion which is subject to said surgings and other portions of the apparatus.

2. The combination in an apparatus, a portion of which is subject to high-frequency electrical surgings, of a high-tension transformer, a primary source of electromotive force and an earth connection with each side of the circuit between said primary source of electromotive force and the transformer and containing a condenser in the connection with each branch of the circuit.

3. In an apparatus, a portion of which is subject to high-frequency electrical surgings, in combination, a generator, a transformer, leads connecting said parts, a choke-coil in each lead between the generator and transformer, and an earth connection through a condenser for each lead between said choke-coils and the transformer.

4. In an apparatus, a portion of which is

subject to high-frequency electrical surgings, in combination, a generator, a transformer, leads connecting said parts, and means connected with said leads and adapted to shunt high-frequency back-surgings from said transformer off to earth.

In testimony whereof I have hereunto affixed my signature, this 7th day of June, 1904, in the presence of two witnesses.

LEE DE FOREST.

Witnesses:
PHILIP FARNSWORTH,
HENRY L. REYNOLDS.