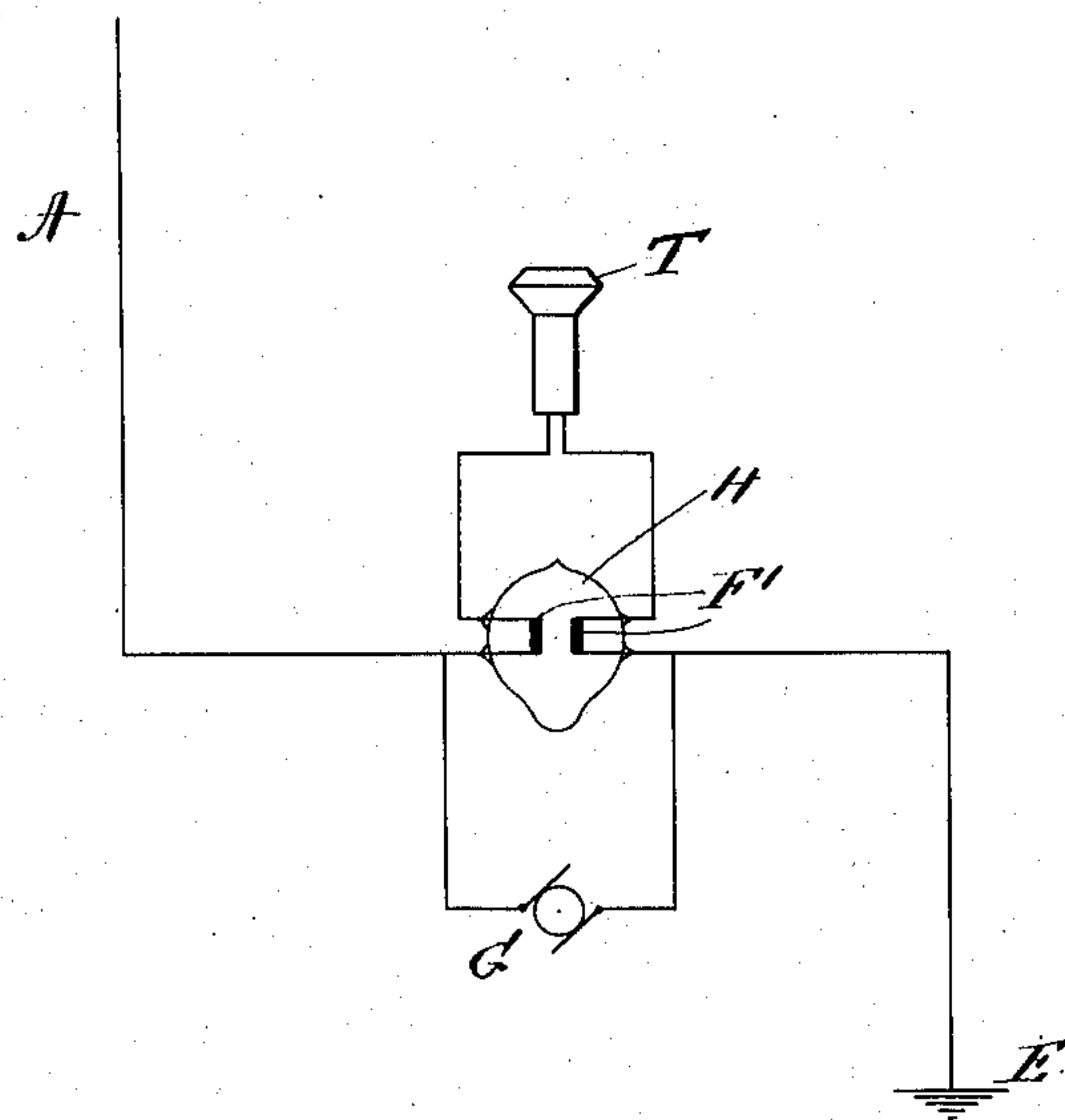


No. 867,876.

PATENTED OCT. 8, 1907.

L. DE FOREST.
OSCILLATION RESPONSIVE DEVICE.

APPLICATION FILED APR. 4, 1906.



WITNESSES=

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UNITED STATES PATENT OFFICE.

LEE DE FOREST, OF NEW YORK, N. Y., ASSIGNOR TO GEORGE K. WOODWORTH, OF BOSTON, MASSACHUSETTS.

OSCILLATION-RESPONSIVE DEVICE.

No. 867,876.

Specification of Letters Patent.

Patented Oct. 8, 1907.

Original application filed February 2, 1906, Serial No. 243,913. Divided and this application filed April 4, 1906.
Serial No. 309,762.

To all whom it may concern:

Be it known that I, LEE DE FOREST, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented a new and useful Improvement in Oscillation-Responsive Devices, of which the following is a specification.

My invention relates to an improvement in the sensitive member used in systems of wireless telegraphy to detect electrical waves or oscillations and comprises the novel features hereinafter shown and described and particularly pointed out in the claims.

In the accompanying drawing I have shown, and in the description thereof will point out, one form of construction which may be employed in carrying out my invention.

The figure represents a receiving set for a wireless telegraph system, having a sensitive member embodying the principles of my invention.

In the figure, A is an antenna or receiving conductor; or wave intercepting means; E, the earth connection; F¹, the electrodes of the oscillation responsive device, shown in the present case as included in series with the antenna and earth connection; G, a source of current, such as a dynamo; and T, the receiving or indicating instrument, which is herein shown as a telephone receiver, the same being shown only as typical of any form of indicating apparatus capable of being employed for such purpose.

I have discovered that if two bodies adapted for use as electrodes or conductive members be electrically separated, the separation between them may be neutralized sufficiently to enable them to act as a detector of electrical oscillations, if the intervening or surrounding gaseous medium be put into a condition of molecular and ionic activity, such, for instance, as would be caused by heating it in any manner, as by radiation, conduction or by the combustion of gases in the space which surrounds the electrodes. Such condition of molecular and ionic activity causes what would otherwise be a non-sensitive device to become sensitive to the reception of electrical influences. I am thus enabled to employ as such sensitive member devices which would otherwise be of no value and which comprise electrodes separated by a gaseous medium. This principle is embodied in the apparatus shown in the drawing in which the electrodes F¹ are of sufficiently great resistance to be heated by a current from a dynamo G and by their radiation heat the gas between them. This gas may be air or the electrodes may be inclosed and surrounded by any suitable gas as shown, H being a receptacle inclosing said electrodes.

The influence of the oscillations upon the gaseous

medium intervening between the electrodes F¹, which medium is maintained in a condition of molecular and ionic activity by the electrical means described, seems to vary the insulating quality of the gap so that while the influence of the oscillations lasts, the current of the local circuit is varied, thus affecting the indicating device T therein to produce a signal. This may be due to ionization of the gas intervening between the electrodes, which greatly increases the conductivity of said gas, said ionization being accomplished in the present instance by putting said gas in a condition of intense molecular activity.

This application is a division of my application Serial No. 243,913 filed February 2, 1905.

I claim:—

1. An oscillation responsive device comprising a receptacle inclosing a sensitive gaseous conducting medium, means for increasing the electrical conductivity of said gaseous medium, means for impressing electrical oscillations upon said medium, and means operatively connected therewith and responsive to alterations in the conductivity thereof.

2. An oscillation responsive device comprising a receptacle inclosing a sensitive gaseous conducting medium, electrical means for heating said gaseous medium, means for impressing electrical oscillations upon said medium, and means operatively connected therewith and responsive to alterations in the conductivity thereof.

3. An oscillation responsive device, comprising a receptacle inclosing a gas, electrical means for rendering said gas sensitive to electrical oscillations, means for impressing electrical oscillations upon said gas and means operatively connected therewith and responsive to alterations in the conductivity thereof.

4. An oscillation responsive device comprising a receptacle inclosing a gas, electrical means for putting said gas in a condition of molecular and ionic activity, means for impressing electrical oscillations upon said gas and means operatively connected therewith and responsive to alterations in the conductivity thereof.

5. An oscillation responsive device comprising a receptacle inclosing a gaseous medium, means for rendering said gaseous medium sensitive to electrical oscillations and means for impressing electrical oscillations upon said gaseous medium.

6. An oscillation responsive device comprising a receptacle inclosing a gaseous medium, means for putting said medium in a condition of molecular and ionic activity whereby it will become the sensitive element of said oscillation responsive device, and means for impressing electrical oscillations upon said gaseous medium.

7. An oscillation responsive device comprising a receptacle inclosing a gaseous medium, electrical means for heating said medium and means for impressing electrical oscillations upon said gaseous medium.

8. An oscillation responsive device comprising a receptacle inclosing a gaseous medium, electrical means for rendering said medium sensitive to electrical oscillations and means for impressing electrical oscillations upon said gaseous medium.

9. An oscillation responsive device comprising an inclosed partially conducting gaseous medium, means for

rendering said gaseous medium sensitive to electrical oscillations and means for impressing electrical oscillations upon said gaseous medium.

- 5 10. An oscillation responsive device comprising an inclosed partially conducting gaseous medium, means for increasing the conductivity of said gaseous medium to such an extent as to render the same sensitive to electrical oscillations and means for impressing electrical oscillations upon said gaseous medium.
- 10 11. A self-restoring, constantly-receptive oscillation responsive device, comprising in its construction a sensitive conducting gaseous medium inclosed in a receptacle and means for impressing electrical oscillations upon said gaseous medium.
- 15 12. An oscillation responsive device comprising a gaseous medium, electrical means for putting said medium in a condition of molecular and ionic activity and means for impressing electrical oscillations upon said gaseous medium.
- 20 13. An oscillation responsive device comprising a gaseous medium, electrical means for rendering said medium sensitive to electrical oscillations and means for impressing electrical oscillations upon said gaseous medium.
- 25 14. An oscillation responsive device comprising a gaseous medium, electrical means for heating the same and means for impressing electrical oscillations upon said gaseous medium.
- 30 15. An oscillation responsive device comprising a gaseous medium, electrical means for increasing the electrical conductivity of said medium and means for impressing electrical oscillations upon said gaseous medium.

16. An oscillation responsive device comprising a receptacle inclosing a gaseous medium, means for heating said medium and means for impressing electrical oscillations upon said gaseous medium.

17. An oscillation responsive device comprising a receptacle, two separated electrodes inclosed within said receptacle, a source of electric current associated with said electrodes, said source of electric current being so proportioned and arranged as to render the gaseous medium in oscillations and means for impressing electrical oscillations upon said gaseous medium.

18. An oscillation responsive device comprising a receptacle, two separated electrodes inclosed within said receptacle, electrical means whereby the gaseous medium intervening between said electrodes is maintained in a condition of molecular and ionic activity and means for impressing electrical oscillations upon said gaseous medium.

19. An oscillation responsive device comprising a receptacle inclosing a gaseous medium, electrical means for putting said medium in a condition of molecular and ionic activity and means for impressing electrical oscillations upon said gaseous medium.

In testimony whereof, I have hereunto subscribed my name this 5th day of March 1906.

LEE DE FOREST.

Witnesses:

FRANCIS W. FRIGOUT,
H. D. JAMESON.