

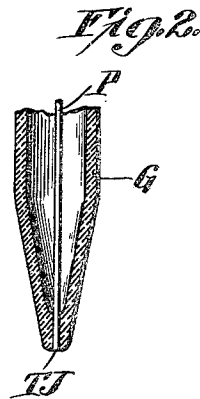
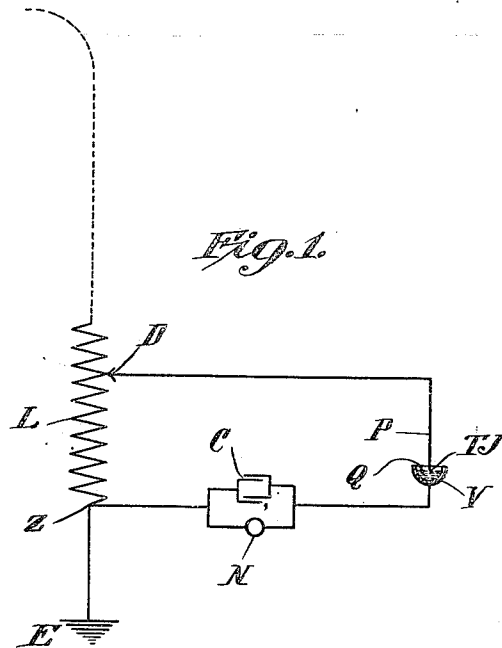
No. 845,316.

PATENTED FEB. 26, 1907.

G. W. PICKARD.

MEANS FOR RECEIVING INTELLIGENCE COMMUNICATED BY ELECTRIC WAVES.

APPLICATION FILED NOV. 23, 1906.



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Inventor:

by *Greenleaf Whittier Pickard*
Phil. Parraworth Atty

UNITED STATES PATENT OFFICE.

GREENLEAF WHITTIER PICKARD, OF AMESBURY, MASSACHUSETTS.

MEANS FOR RECEIVING INTELLIGENCE COMMUNICATED BY ELECTRIC WAVES.

No. 845,316.

Specification of Letters Patent.

Patented Feb. 26, 1907.

Application filed November 23, 1906. Serial No. 344,693.

To all whom it may concern:

Be it known that I, GREENLEAF WHITTIER PICKARD, a citizen of the United States of America, and a resident of the town of Amesbury, State of Massachusetts, have invented certain new and useful Improvements in Means for Receiving Intelligence Communicated by Electric Waves, the principles of which are set forth in the following specification and accompanying drawing, which disclose the form of the invention which I now consider to be the best of the various forms in which its principles may be embodied.

This invention relates to means for receiving intelligence communicated by electric waves.

The object of the invention is to obtain a sensitive and stable detector of such intelligence.

The invention consists of a detector constituted by a thermojunction between a couple consisting of a metal and a conducting liquid.

Figure 1 is a diagrammatic showing and Fig. 2 is a detail of the invention.

In the drawing, Figure 1, the thermojunction is shown at TJ between the metal P and the conducting liquid Q in the receptacle V. The circuit of the detector may include in series, as shown, a portion of the inductance L, connected to earth E and adjustable at D, and the detector-circuit may include also in series the condenser C and indicating instrument N, which may be an ordinary telephone-receiver, the devices C and N being connected in parallel with each other, as shown, and connected at Z to a part of the inductance L, which is of substantially earth potential. No source of electromotive force is used other than the energy of the electric waves which cut the antenna-circuit and set up oscillations therein and in the local oscillation-circuit L, D, P, TJ, Q, V, C-N, Z. There is only one circuit through the thermojunction TJ, as shown. The thermocouple P Q constitutes means for translating the communications into intelligible form exclusively by the energy of the oscillations received in the detector-circuit. The metal P and liquid Q of the couple may be of any materials which will constitute a thermojunction at TJ. For example, the member P may be copper, and the liquid Q may be copper sulfate, the vessel V being also of copper. Such a device is extremely sensitive and stable and a practical device, as I have demonstrated by trial under com-

mercial conditions. Since the member P of the couple and the vessel V containing the liquid are both formed of the same metal—i. e., copper in the case specified—all action is prevented except the thermo-electric regenerative action at the junction TJ. The liquid member Q of the couple may be a saturated solution of copper sulfate, (CuSO_4). The member P of the couple, of copper when the liquid is copper sulfate, may conveniently be in the form of a small wire two or three millimeters in diameter, arranged to have at least its end surface covered by the liquid member Q. The vessel V may be of sheet-copper stamped to shape.

When used as described, the energy of the received oscillations is converted into heat at the high-resistance junction between the members P and Q, the amount of resulting heat being proportional to the product of the square of the current and the resistance, according to Joule's law. The action of the thermojunction TJ then converts this heat into a direct electric current, which occurring abruptly cause a click in the telephone N. No polarization can take place, because the parts P and V are alike, and no local source of energy is used.

An advantageous form for the metal member P of the thermocouple is shown in Fig. 2, wherein the copper wire is sealed in a drawn-out glass tube G. It has been believed that platinum was the only metal which could be sealed with glass on account of the similar coefficient of expansion. I have discovered, however, that a copper wire can be sealed with glass irrespective of its different coefficient of expansion, provided that the copper wire be not of too large diameter. I have found that when the drawn-out glass tube containing a copper wire of the diameter above stated is heated the wire becomes superficially oxidized, so that when the glass melts the oxid coating is dissolved in the glass, thus firmly uniting and sealing the copper and glass. By proper manipulation in the sealing-flame the glass will run flush with the cut end TJ of the wire P, Fig. 2, or, if desired, the end of the glass tube and wire may be ground off flush after sealing.

The invention apparently possesses all the advantages of my silicon detector (which is a thermojunction between solid members of a couple) except the usual inconvenience of using a liquid instead of a solid.

I claim—

A detector of intelligence communicated by electric waves, which comprises a solution of a good conducting metal, and a cooperating member of the same metal as the solution; said cooperating member having only a small portion of its area exposed to the metallic solution, in order to effectively concentrate at the junction of exposure the energy of the received signal-currents; said cooperating member having such relatively substantial cross-sectional dimension, in addition to its inherent good conducting property, as to offer no effective resistance to the passage of the received signal-currents, in order to permit those currents to have effect-

ive access to the concentrated junction of exposure to the metallic solution; said solution having high specific resistance, producing a high-resistance junction, to convert into heat an effective amount of the energy of the received and concentrated signal-currents; and the solution and cooperating member having high thermo-electromotive force in order to convert into direct currents an effective amount of the heat generated at the junction. 20 25

GREENLEAF WHITTIER PICKARD.

Witnesses:

MIRIAM OLIVER PICKARD,
SAMUEL T. PICKARD.

Correction in Letters Patent No. 845,316.

It is hereby certified that in Letters Patent No. 845,316, granted February 26, 1907, upon the application of Greenleaf Whittier Pickard, of Amesbury, Massachusetts, for an improvement in "Means for Receiving Intelligence Communicated by Electric Waves," an error appears in the printed specification requiring correction, as follows: In lines 66-67, page 1, the word "millimeters" should read *mils*; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 2nd day of April, A. D., 1907.

[SEAL.]

E. B. MOORE,

Acting Commissioner of Patents.