

V. POULSEN.  
 RECEIVER FOR WIRELESS TRANSMISSION OF SIGNALS.  
 APPLICATION FILED SEPT. 16, 1905.

1,059,391.

Patented Apr. 22, 1913.

Fig 1

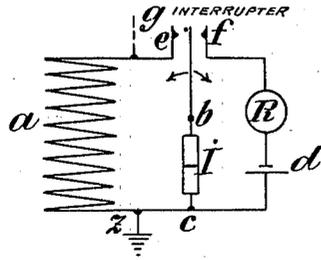


Fig 2

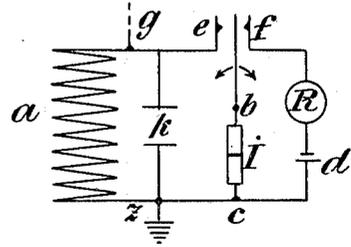


Fig 3

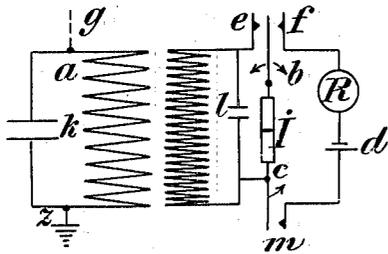


Fig 4

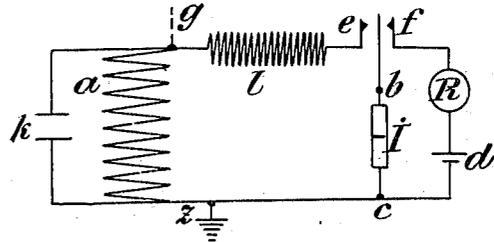


Fig 5

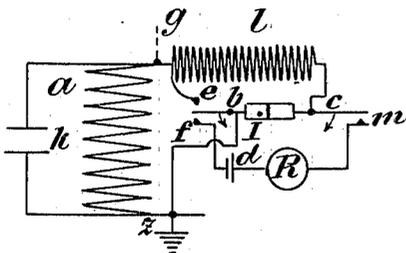
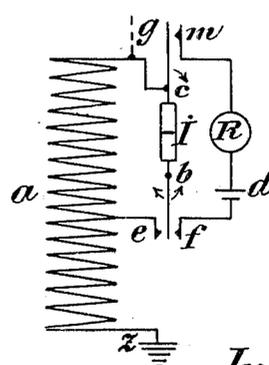


Fig 6



Witnesses  
 Valdo M. Chapman  
 William C. Law

Inventor  
 Valdemar Poulsen  
 by  
 Rosensam & Stockbridge  
 Attys.

# UNITED STATES PATENT OFFICE

VALDEMAR POULSEN, OF COPENHAGEN, DENMARK.

RECEIVER FOR WIRELESS TRANSMISSION OF SIGNALS.

1,059,391.

Specification of Letters Patent.

Patented Apr. 22, 1913.

Application filed September 16, 1905. Serial No. 278,777.

To all whom it may concern:

Be it known that I, VALDEMAR POULSEN, electrical engineer, resident of Steen Blichersvej 22, Copenhagen, Denmark, have invented a new and useful Improvement in Receivers for Wireless Transmission of Signals, which is fully set forth in the following specification.

This invention relates to the wireless transmission of signals.

In the majority of transmitters now employed in wireless telegraphy, the oscillations are not only rapidly damped, but also have a comparatively long interval between each interruption, and it is the common practice to use in the receiving system a coherer or magnetic detector, which is permanently connected in the receiving circuit. In such a system, however, it is impossible to obtain the highest degree of resonance, since the dampening of the oscillations and the intervals between them tend to prevent resonance. In order to obtain the highest degree of resonance it is desirable to use a transmitter comprising an interrupter of some character that is capable of sending out the waves continuously and uniformly. Such interrupters have been devised, but have not been generally put into use. In this class of interrupter I may refer to the Wehnelt interrupter, the Cooper Hewitt mercury vapor interrupter, and the Duddell interrupter, described in British Patent No. 21,629 of 1900. Transmitters employing interrupters of this character tend to produce vibrations in the receiving device of a tuned system, of the highest amplitude. But in experiments with such apparatus, I have found when the coherer or wave detector is permanently in circuit with the resonant circuit, that it interferes with the action of the resonance, preventing the circuit from retaining or continuously building up its resonance. This is due to the fact that the resistance of the coherer is not controllable and the iron of the magnetic detector tends to dampen the vibrations.

The object of the present invention is, therefore to provide a system in which by the use of a transmitter capable of sending out continuous waves the highest possible resonance is obtained in the receiver, and is not interfered with by other devices or apparatus forming a part of the tuned receiving system.

The invention comprises means whereby

the wave detector forming a part of the receiving system is only intermittently connected with the receiving system proper or resonant circuit, whereby the intervals of disconnection will afford time for the vibrations to build up to the highest amplitude undisturbed by the coherer or other wave detector.

In carrying out my invention, a terminal or the terminals of the wave detector, is, or are, alternately connected with the resonant circuit, and the relay circuit by means of an ordinary vibrator similar to that used in an electric bell.

Referring to the accompanying drawing, Figures 1 to 6 illustrate diagrammatic examples of the arrangement of a receiving system according to my invention.

The various figures show modifications in the manner of connecting up the various apparatuses, all covered within the scope of the invention.

*g* indicates the antenna, *a* the receiving coil or resonance, *z* the earth connection, *I* the coherer or wave indicator or detector, either chemical or any other sort, having the terminals *b* and *c*; *R* the relay in the local circuit, which also includes the battery *d*.

*e* and *f* are respectively terminals of the receiving coil *a*, and the local or relay circuit *R*.

The invention comprises means more particularly hereinafter described for alternately connecting one or both of the terminals *b* and *c* of the detector with the receiving coil and the local circuit. For instance, in Fig. 1, the terminal *b* is extended into a vibrating blade which plays between the contacts *e* and *f*. Its motions are made at approximately from 8 to 15 vibrations per second depending upon the operation of the vibrator or circuit controller that is used for the purpose. It is understood that the vibrations of the device *b* are extremely slow in comparison to the vibrations of a wave oscillation circuit, while at the same time extremely fast with respect to signals of Morse or other code. The oscillations of a wireless receiving circuit are at the rate of from 200,000-300,000 a second, so that the circuit closing positions of the device *b* at each terminal amount to quite a long circuit closure when considered from the standpoint of the wireless waves. On the other hand, the vibrations of the device *b* are so rapid in

comparison to Morse code signaling that each Morse dash amounts to a very long circuit closure in comparison to device *b*. In case a tapper is employed with a detector 5 having iron filings, the same considerations apply.

Fig. 2 is the same as Fig. 1, except that a condenser *k* is inserted to increase the capacity of the coil *a*.

10 In Fig. 3, the vibrations in the coil *a* induce other vibrations in the coil *l*, the structure being a transformer and a condenser *k* being used as before to increase the capacity. In this arrangement also the 15 terminal *c* of the coherer is intended to be connected with the contact *m* of the local circuit simultaneously with the connections of *b* and *f*.

In Figs. 4 and 5 a coil *l* of fairly high 20 inductance is electrically connected with the coil *a*, the other connections being in Fig. 4 the same as those of Fig. 1 and in Fig. 5 the same as those of Fig. 3. This coil serves to raise the potential in a well-known manner, 25 which in itself forms no part of the present invention.

In Fig. 6 the arrangement is such that the contact *e* with which the indicator *I* makes

connection can be adjusted to connect with that part of the coil *a* which simultaneously 30 possesses the maximum of tension with opposite signs, and the coil *a* can act either in connection with an antenna as receiver or be electrically connected to the receiver proper. The coil *a* of Fig. 6 constitutes an ordinary 35 auto-transformer.

Having thus described my invention, I claim:

In a receiver for wireless transmission of signals, the combination of a wave detector, 40 a device which receives energy from space, and a circuit independent of said device, means for intermittently disconnecting the wave detector from said device, and a source 45 of extraneous power for continuously operating said means, whereby said detector is periodically in said circuit independent of said device.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses. 50

VALDEMAR POULSEN.

Witnesses:

J. HENN. CHRISTENSEN,  
CECIL VILHELM SCHOU.