

N^o 7494



A.D. 1908

(Under International Convention.)

Date claimed for Patent under Patents and Designs Act, 1907, being date of first Foreign Application (in the United States), } 5th Apr., 1907

Date of Application (in the United Kingdom), 4th Apr., 1908

At the expiration of twelve months from the date of the first Foreign Application, the provision of Section 91 (3) (a) of the Patents and Designs Act, 1907, as to inspection of Specification, became operative

Accepted, 16th July, 1908

COMPLETE SPECIFICATION.

"Improvements in Wireless Signalling"

I, REGINALD AUBREY FESSENDEN, of Brant Rock in the State of Massachusetts, United States of America, Electrical Engineer, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

- 5 My invention relates to simultaneous sending and receiving of signals without wires and more particularly to the simultaneous transmission and receipt of telephonic messages, and to multiplex wireless telegraphy and telephony generally. Its primary object is the simultaneous transmission and receipt of one or more telegraphic or telephonic messages at a wireless station, and also
- 10 the transmission of messages to and from a wireless station over wire lines.

The accompanying drawing shows in diagram a suitable arrangement for carrying out the invention.

- In the drawing 1 and 2 at the bottom of the diagram represent wire lines leading to a telegraph office or a telephone central, 3 and 4 represent the magnet coils of telephone relays, and 5 and 6 the microphones or their equivalents.
- 15 7, 8, 9, 10 represent the primaries of the telephone induction coils and 11, 12, 13, 14, the corresponding secondaries. 15 is a resistance to balance resistance of the telephone line 1, 2. The primaries and secondaries are so wound and connected that signals or speech impulses transmitted by means of the microphone 6
- 20 are balanced as regards their effect on the magnet coil 3. 16 is a local battery, 17 (at the top) is a source of voltage, preferably a continuous current dynamo, or otherwise may be storage batteries, 18 is an adjustable resistance, 19 is a discharge gap, 20, 23, 24, 25, 26, 27, 28, 29 are variable capacities; 21, 22, 30, 31 are the primaries of the transformers whose secondaries are 32, 33,
- 25 34, 35. 37 is an inductance which may be variable, 38 a resistance, 39 an inductance preferably variable and 40 an antenna grounded at 41, and 42 is a variable capacity.

- These primaries and secondaries are so wound and connected, and the various inductances and capacities so adjusted empirically that on sending by the
- 30 sending-key 44 (or when this is short circuited by the switch 45, then on talking or telegraphing by the line 1, 2) it will not affect the receiver 46. This receiver 46 is connected in with an interference preventor as shown, 47, 48 being the primaries and 49 and 50 the corresponding secondaries, 51 a capacity and 52 a potentiometer. The condenser 26, inductance 37 and resistance 38 form
- 35 what may be called a "phantom antenna"; namely they appear to absorb energy to the same extent and to the same amount as the antenna 40 and its connections to ground, and to balance it. This arrangement therefore is believed to be some-

[Price 8d.]

BIRMINGHAM
FREE
LIBRARIES.

Pessenden's Improvements in Wireless Signalling.

what similar in principle to the balancing arrangement shown at the lower part of the figure in connection with the wire lines and above described.

In operation, on sending a telegraphic or telephonic current through the line 1, 2, the switch 45 being closed, the telephonic or telegraphic currents actuate the relay 3, 5, and cause signals to be sent out from the antenna 40 5 without affecting the receiver 46, or only affecting it to a very slight extent. On the other hand, electric waves simultaneously received on the antenna 40 actuate the receiver 46 and by the means of the telephonic relay 4, 6, are transmitted back on the line 1, 2.

Similarly, if the switch 45 be open, a similar result is obtained on tele- 10 graphing with the key 44, in which case the operator may listen to signals received or sent by means of the telephone receiver 53.

Where it is desired to transmit and receive simultaneously, a number of messages, different antenna may be suspended from the same tower or the same antenna may be used by duplicating the apparatus as shown to the right of 15 figure, corresponding pieces of apparatus being there indicated by corresponding figures with the prime mark added. The sending and receiving circuits on the right of the figure are tuned to a different frequency from that of the circuits on the left-hand side.

By means of the apparatus and operation described, it is possible simul- 20 taneously to send and receive one or more telephonic or telegraphic messages, either directly from the wireless station, or from local stations connected by wires with the wireless station.

I do not limit myself to the specific arrangements herein set forth, as there are many alternative arrangements which may be used which are fully 25 equivalent or which come under the broad invention as claimed.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. In the art of simultaneous transmission and receipt of wireless signals, the 30 method of neutralising the effect of the local sending circuit at a station on a local receiving circuit also adapted for the simultaneous receipt of non-locally generated signals, which consists in operatively connecting a balancing circuit and the local sending source to the antennae, adjusting said circuits so as to maintain approximately zero potential difference between two points in 35 said circuits when transmitting, and connecting the receiving circuit operatively to the aerial and between said points.

2. In the art of simultaneous transmission and receipt of wireless signals, the method of neutralising the effect of the local sending circuit at a station 40 on the local receiving circuit, adapted for the simultaneous receipt of non-locally generated signals, which consists in neutralising the effect of the local sending circuit on the local receiving circuit by means of a balancing circuit, while maintaining the local receiving circuit in an unbalanced condition as regards the received oscillations.

3. In the art of simultaneous transmission and receipt of wireless signals, the 45 method of neutralising the effect of the local sending circuit at a station on the local receiving circuit, while permitting the simultaneous receipt of non-locally generated signals, which consists in neutralising the effect on the receiving circuit of the electrical oscillations produced in the antenna circuit by the local sending circuit by means of a phantom antenna circuit, and main- 50 taining the receiving circuit in an unbalanced condition as regards impulses received by the antennae from another station.

Dated this 4th day of April, 1908.

ABEL & IMRAY,
Birkbeck Bank Chambers, London. W.C. 55
Agents for the Applicant.

[This Drawing is a full-size reproduction of the Original.]

