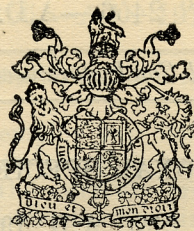


N<sup>o</sup> 2456



A.D. 1912

Date of Application, No. 2456, 30th Jan., 1912

„ „ No. 2457, 30th Jan., 1912

Complete Specification Left, 26th July, 1912

(Section 16 of the Patents and Designs Act, 1907.)

Complete Specification Accepted, 2nd Jan., 1913



PROVISIONAL SPECIFICATION.

No. 2456, A.D. 1912.

**Improvements in Aerial Conductors used in Wireless Telegraphy.**

We, MARCONI'S WIRELESS TELEGRAPH COMPANY LIMITED, and CHARLES EDMOND PRINCE, Electrical Engineer, both of Watergate House, York Buildings, Adelphi, in the City of Westminster, do hereby declare the nature of this invention to be as follows:—

5 This invention relates to improvements in the aerial conductors used in wireless telegraphy by means of which signals may be received from one direction but not from another or the direction from which signals are coming may be determined.

Hitherto the directional effect has been obtained by the difference in phase of the oscillations produced in horizontal aerials or in two vertical aerials by waves coming from different directions. When however long waves are employed such aerials have to be provided with a large amount of inductance which renders them less efficient or else they have to be of very large dimensions.

15 According to this invention we employ as the receiving aerial, a closed circuit arranged in a vertical plane and unconnected with the earth. The circuit is preferably arranged in the form of a rectangle with two sides horizontal and with the receiver in the lower of these sides and may be tuned by means of a condenser or condensers.

Such an aerial is an efficient receiver for waves whose length greatly exceeds 20 its base-line and will be actuated most powerfully by waves coming from a direction in its plane and not at all by those coming from a direction at right angles thereto.

Aerials of this type are particularly useful when it is desired to receive from one direction without interference from a direction approximately at right angles, 25 or when it is desired to determine the direction from which signals are coming. For the latter purpose we may employ two such aerials set in planes approximately at right angles to one another, and by comparing or equalising the currents produced in the two aerials by any of the well-known means we may determine the direction from which the signals are coming.

30 Dated this 29th day of January, 1912.

MARCONI'S WIRELESS TELEGRAPH CO. LTD.

S. GEOGHEGAN,  
ALFONSO MARCONI,  
Directors.  
HENRY W. ALLEN,  
Secretary.

35

C. E. PRINCE,

[Price 8d.]

PRICE 8d.

M. inv. N<sup>o</sup> 10823



*Improvements in Aerial Conductors used in Wireless Telegraphy.*

## PROVISIONAL SPECIFICATION.

No. 2457, A.D. 1912.

**Improvements in Wireless Telegraph Receiving Apparatus.**

We, MARCONI'S WIRELESS TELEGRAPH COMPANY LIMITED, and CHARLES EDMOND PRINCE, Electrical Engineer, both of Watergate House, York Buildings, Adelphi, in the City of Westminster, do hereby declare the nature of this invention to be as follows:—

This invention relates to improvements in wireless telegraph receiving apparatus whereby the direction from which signals are coming may be determined with accuracy. 5

According to our invention we employ one directional aerial, and one non-directional aerial, and we determine the direction from which signals are coming by measuring or equalising the intensity of the signals on these two aerials. 10

We prefer to employ for the directional aerial a closed circuit tuned by means of a condenser or condensers and so to adjust the two aerials that the intensity of the signals on the non-directional aerial may be equal to the maximum signals on the directional aerial. For the purpose of determining the direction from which signals are coming it is then only necessary to reduce the signals on the non-directional aerial to equality with those on the directional aerial, the amount of such reduction being a measure of the angle between the directional aerial and the direction from which the signals are coming. In one convenient form of apparatus we employ for thus reducing the signals a rotating coupling so arranged that the angle through which the rotating part is turned to produce equality of signals is equal to the angle required so that no further calibration or calculation is necessary. 15 20

Dated this 29th day of January, 1912.

MARCONI'S WIRELESS TELEGRAPH CO. LTD.

S. GEOGHEGAN, 25  
ALFONSO MARCONI,  
Directors.  
HENRY W. ALLEN,  
Secretary. 30

C. E. PRINCE.

## COMPLETE SPECIFICATION.

**Improvements in Aerial Conductors used in Wireless Telegraphy.**

We, MARCONI'S WIRELESS TELEGRAPH COMPANY LIMITED, and CHARLES EDMOND PRINCE, Electrical Engineer, both formerly of Watergate House, York Buildings, Adelphi, but now of Marconi House, Strand, in the City of Westminster, 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:— 35

This invention relates to improvements in the aerial conductors used in wireless telegraphy by means of which the direction from which signals are coming may be determined. 40



*Improvements in Aerial Conductors used in Wireless Telegraphy.*

According to this invention we employ two closed circuit aerials set in planes approximately at right angles to one another and unconnected with the earth and by comparing or equalising the currents produced in the two aerials by any of the well known means we determine the direction from which the signals are coming.

In place of using two closed circuit aerials we may employ one closed circuit aerial, and one non-directional aerial, and determine the direction by comparing or equalising the intensity of the signals on these two aerials.

Our invention is illustrated by the accompanying diagrams.

Figure 1 shows two closed circuit aerials A A<sup>1</sup> set in planes approximately at right angles to one another with two detector circuits connected to a key K so that by rapidly changing the key from one position to the other we may easily compare the sounds produced in the telephone T by the currents in the two aerials. Any well known method of equalising these sounds may be employed such as adjustable resistances R.

Figure 2 shows an alternative method of ascertaining the direction of the transmitting station, A being a directional aerial and a a non-directional aerial such that the intensity of the signals produced on it is equal to the maximum signals obtainable on the aerial A.

For the purpose of determining the direction from which signals are coming it is then only necessary to reduce the signals on a till they are equal to those on A for instance by means of a rotating coupling B so arranged that the angle through which the rotating part is turned to produce equality of signals is equal to the angle required so that no further calibration or calculation is necessary.

We are aware that Specification No. 21,299 of 1907 speaks of a "closed circuit" aerial unconnected with the earth and describes a method of determining the direction from which signals are coming by combining the effects of the signals from two such aerials in planes at right angles to one another but the aerials therein shown and described are not strictly speaking "closed circuits" but open and they oscillate as open circuits that is with a stationary wave.

Aerials constructed in accordance with the present invention differ from those of the specification referred to in that they are really closed circuits and oscillate as closed circuits and moreover we determine the direction of the incoming signals by comparing the signals on the two aerials instead of by combining them.

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

1. The combination of two closed circuit aerials arranged in planes at right angles to one another with means for comparing or equalising the signals produced on them substantially as described.

2. The combination of a closed circuit aerial, a non-directional aerial, and means for comparing or equalising the intensity of the signals produced on them substantially as described.

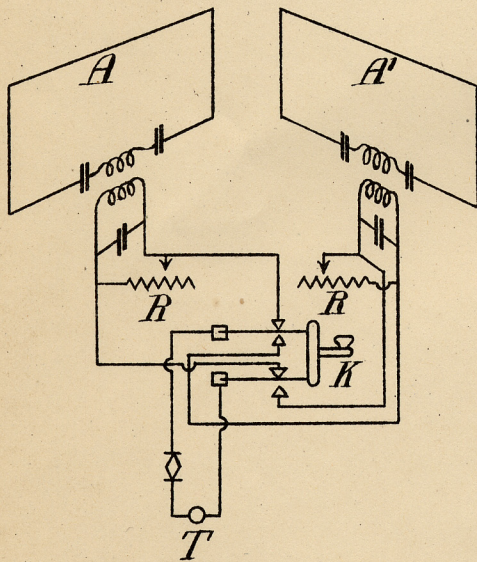
Dated this 25th day of July, 1912.

CARPMAEL & Co.,  
Agents for Applicants,  
24, Southampton Buildings, London, W.C.

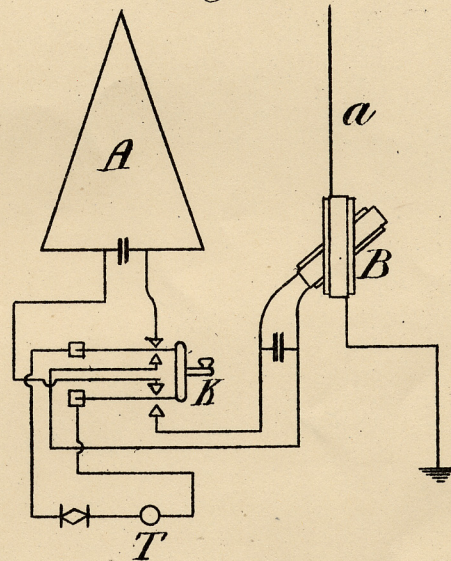


(2<sup>nd</sup> Edition)

*Fig. 1.*



*Fig. 2.*



[This Drawing is a reproduction of the Original on a reduced scale.]