June 20, 1933. C. S. FRANKLIN 1,914,887

WIRELESS TELEGRAPH AND TELEPHONE AERIAL

Original Filed Sept. 22, 1926

Fig. 1

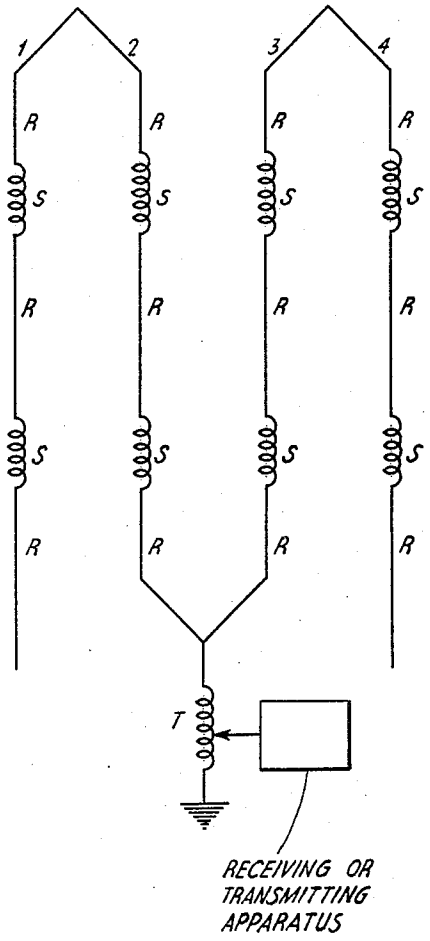
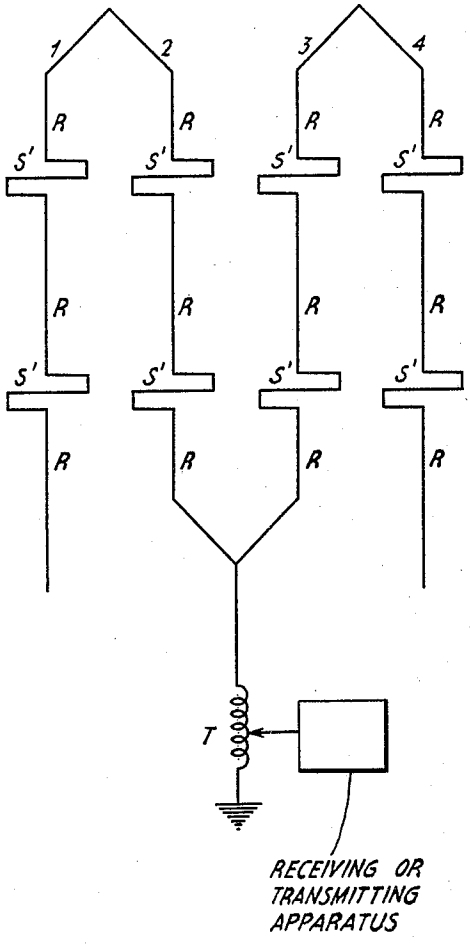


Fig. 2



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UNITED STATES PATENT OFFICE

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WIRELESS TELEGRAPH AND TELEPHONE AERIAL

Original application filed September 22, 1926, Serial No. 136,908, and in Great Britain October 7, 1925. Divided and this application filed December 14, 1932. Serial No. 647,108.

This invention relates to improvements in aerial systems for use in wireless telegraphy and telephony, and more particularly to systems comprising a plurality of aerials of the kind described in my United States Patent No. 1,821,936 granted September 8, 1931, wherein there is described an aerial in which strong directive qualities are obtained by suppressing radiation from every alternate half wave length. The present application is a division of my copending application Serial No. 136,908, filed September 22, 1926.

According to one feature of the present invention a plurality of aerials, such as are described in United States Patent No. 1,821,936, supra, are coupled or connected together in such manner that currents of the correct frequency in any of the aerials cause currents of the same phase in adjacent aerials.

Such aerial systems may be constructed in various ways according to the particular form which the aerial may take.

For example, in the case of an aerial system constructed of aerials each of which is made non-radiating over alternate half wave lengths by folding the half wave lengths so that radiation therefrom is annulled, the aerials are coupled together at the folded portions.

In a modification, in which the aerial system is constructed as a line of aerials, each of which is so formed that radiation from alternate half wave lengths is suppressed by forming these lengths as electrical equivalents, the extreme radiating sections of each aerial are bent over and directly connected in pairs. In such an arrangement the aerial may, in effect, form one continuous wire and, if desired, it may be so made.

In a further modification the aerial system comprises a continuous wire bent back and forth upon itself, each of the straight portions forming an aerial half a wave length long.

The mean distance between the aerials comprising the system may be varied to a considerable degree, but, in general, best results are obtained when the mean distance is approximately half a wave length.

Other features and advantages will hereinafter appear.

In the accompanying diagrammatic drawing which illustrates the nature of the invention, Figure 1 shows an arrangement in accordance with my invention wherein four aerials are directly connected to maintain currents in phase, and Figure 2 is a modification of Figure 1.

Referring to Figure 1, there are shown four aerials 1, 2, 3 and 4 of a type similar to that described in United States Patent 1,821,936, supra, each aerial comprising three radiating sections R and two non-radiating sections S, the latter being formed each as a coil of wire electrically equivalent to one half wave length of the aerial. The end radiating sections of each aerial are bent over and directly connected in pairs, so that the aerial system is formed, in effect, of one continuous wire, and may be so made, if desired.

The juncture of the aerials 2, 3 is supplied with current through an aerial transformer T.

Since the oscillations in the several aerials are in phase they will substantially neutralize each other in a direction along a plane passed through the several aerials, but will add together to radiate a beam of energy in a direction normal to their plane. By adjusting the phase of the current in the several aerials the desired direction of radiation may be obtained.

The arrangement shown in Figure 2 differs from that of Figure 1 only in that the non-radiating sections S′ of the aerials are formed each of a length of aerial electrically equivalent to one half wave length bent back and forth upon itself to annul or suppress the radiation.

Having now particularly described and ascertained the nature of my invention, what I claim is:

1. A directional aerial system comprising a plurality of aerials wherein radiation is suppressed from every alternate half wave length, whereby each aerial has alternate radiating and substantially non-radiating sections, and means for serially connecting the

aerials together in pairs at their extreme radiating sections.

2. An antenna for radio wave communication comprising a plurality of parallel linear half wave length radiators, and means for serially connecting said radiators together.

3. An antenna system comprising a plurality of parallel linear half wave length radiators spaced apart, the spacing between adjacent radiators being equal to one half wave length, and means for serially connecting the radiators together.

4. An antenna system comprising a plurality of parallel linear half wave length radiators, and means for connecting corresponding ends of adjacent radiators together alternately so as to constitute the whole a single series circuit of generally zigzag form.

5. An antenna system comprising two parallel elements each an odd multiple of a half wave length long, and a conductor a multiple of a half wave length long electrically connected between said elements.

6. An antenna system comprising a plurality of parallel elements each an odd multiple of a half wave length long, and a plurality of conductors each a multiple of a half wave length long and connected electrically in series between different elements.

7. An antenna system comprising a plurality of parallel elements each an odd multiple of a half wave length long, and a plurality of conductors each a multiple of a half wave length long, said conductors being included between corresponding terminals of adjacent elements alternately whereby the arrangement constitutes a zigzag antenna.

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