G. MARCONI & C. S. FRANKLIN.
REFLECTOR FOR USE IN WIRELESS TELEGRAPHY AND TELEPHONY.
APPLICATION FILED FEB. 26, 1919.

1,301,473. Patented Apr. 22, 1919.

Fig. 2.

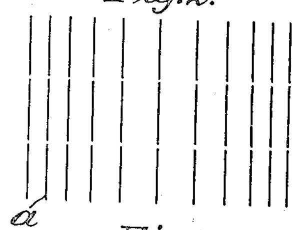

Fig. 5.

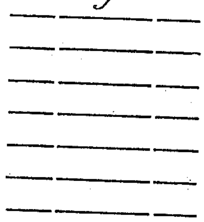

Fig. 1.

Fig. 3.

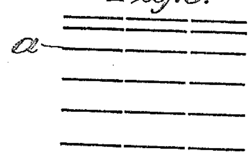

Fig. 4.

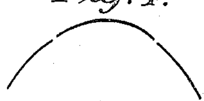

Fig. 6.

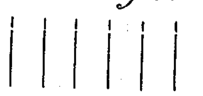

Fig. 8.

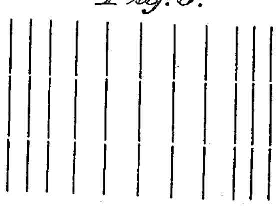

Fig. 7.

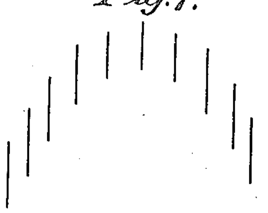

Fig. 9.

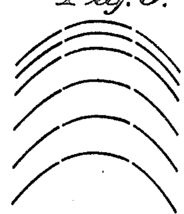

Fig. 10.

Fig. 11.

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By Shepherd & Burks
their attys.

UNITED STATES PATENT OFFICE.

GUGLIELMO MARCONI AND CHARLES SAMUEL FRANKLIN, OF LONDON, ENGLAND, ASSIGNORS TO MARCONI WIRELESS TELEGRAPH COMPANY OF AMERICA, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

REFLECTOR FOR USE IN WIRELESS TELEGRAPHY AND TELEPHONY.

1,301,473. Specification of Letters Patent. Patented Apr. 22, 1919.

Application filed February 26, 1919. Serial No. 279,410.

To all whom it may concern:

Be it known that we, GUGLIELMO MARCONI, a subject of the King of Italy, and CHARLES SAMUEL FRANKLIN, a subject of the King of Great Britain, and both residing at Marconi House, Strand, London, England, have invented new and useful Improvements in Reflectors for Use in Wireless Telegraphy and Telephony, of which the following is a specification.

This invention relates to improvements in reflectors used with transmitters and receivers in wireless telegraphy and telephony.

According to this invention a reflector is constructed of two or more sets of rods (which term includes strips and wires) arranged on a parabolic surface around the transmitting or receiving aerial as a focus, each rod being tuned to the aerial and the rods of the different sets being preferably in line with each other. By this means the efficiency and effect of the reflector are very largely increased for example, by making the reflector of three sets of rods arranged on a parabolic surface and having a focal distance of one-quarter wave length, the range may be increased from 400% to 500% as against 80% obtained with the simple reflectors before known.

The reflector may be described in other words as follows:—

On a parabolic surface surrounding a transmitter or receiver and in the correct direction having regard to the polarization of the transmitted waves is arranged a number of long wires which are divided up into elements each in tune with the transmitter. The length of each element is preferably about half a wave length, but may be made either greater or less than this by inserting in it either a condenser or an inductance. The adjacent ends of these elements may be insulated from each other or joined by inductance coils or condensers, the controlling factor being that each element when in its working position in the reflector is in tune with the aerial.

In practice we find that some of the elements may be removed slightly from the true parabolic surface provided that those elements of the reflector which are nearer the focus than they would be if on the parabolic surface are tuned to a rather longer wave, and those elements which are farther to a rather shorter wave.

For very short waves no earth connections are required or desirable, but for longer waves it is an advantage to earth the aerial and the lower elements of the reflector.

Very good results can be obtained by arranging the elements on a cylindrical parabolic surface, but better results can be obtained by arranging them on a true paraboloid, particularly when using a reflector having a focal length equal to three-quarter wave length or more.

Our invention is illustrated by the accompanying drawings. In said drawings Figure 1 is a plan, Fig. 2 a rear view and Fig. 3 a side view of a reflector constructed in accordance with this invention.

Figs. 4, 5 and 6 are plan view, rear view and side view respectively, of a second form of reflector embodying our invention.

Figs. 7, 8 and 9 are plan view, rear view and side view respectively, of a third form of reflector embodying our invention.

Figs. 10 and 11 are diagrammatic detail views each illustrating a single set of rods or wire reflector elements of which the reflectors may be built up.

Referring to the drawing more in detail, the reflector illustrated in Figs. 1, 2 and 3 has three sets of parallel rods *a* arranged on a cylindrical parabolic surface with an aerial or antenna *b* at the focus. This arrangement is for concentrating vertically polarized waves in the horizontal direction.

In the arrangement shown in Figs. 4, 5 and 6, the individual reflector members are placed in parallel planes which are spaced apart vertically instead of being spaced horizontally as in Figs. 1, 2 and 3. This arrangement is for concentrating horizontally polarized waves in the horizontal direction. In the arrangement of Figs. 7, 8 and 9, there is a reflector having three sets of parallel rods arranged on a true paraboloid instead of a cylindrical parabola; this will concentrate both vertically and horizontally polarized waves in the horizontal direction.

These figures illustrate reflectors made with three sets of parallel rods, or, stated otherwise, reflectors made up of a number of wires each divided into three elements, each element being in tune with the transmitted or received wave. As illustrated, each of these elements should be nearly half a wave length long; alternatively each of these wires may be divided up into a larger number of elements connected together by condensers.

Fig. 10 shows one wire divided into three elements each in tune with the desired wave.

Fig. 11 shows one wire divided into a number of shorter elements connected together by condensers. The capacity of each condenser must be such that if joined in circuit with the inductance of the wire joining it to the next condenser it would form a circuit in tune with the desired wave.

What we claim is:—

1. In wireless telegraphy, a reflector comprising a plurality of reflector members arranged on a substantially parabolic surface, each of said members including a plurality of elements, each element being in tune with the aerial.

2. In wireless telegraphy, a reflector comprising a plurality of reflector members arranged on a parabolic surface, said members lying in planes arranged parallel but separated a finite distance, each of said members including a plurality of elements, each element being in tune with the aerial.

3. In wireless telegraphy, a reflector comprising a plurality of sets of rods arranged on a parabolic surface around an aerial at the focus, each rod being in tune with the aerial, and the rods of each set being in line with one another.

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Witnesses:
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