J. J. CALLAGHAN.

APPARATUS FOR PROPAGATING AND INTENSIFYING ELECTRICAL OSCILLATIONS.

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1,347,440. Patented July 20, 1920.

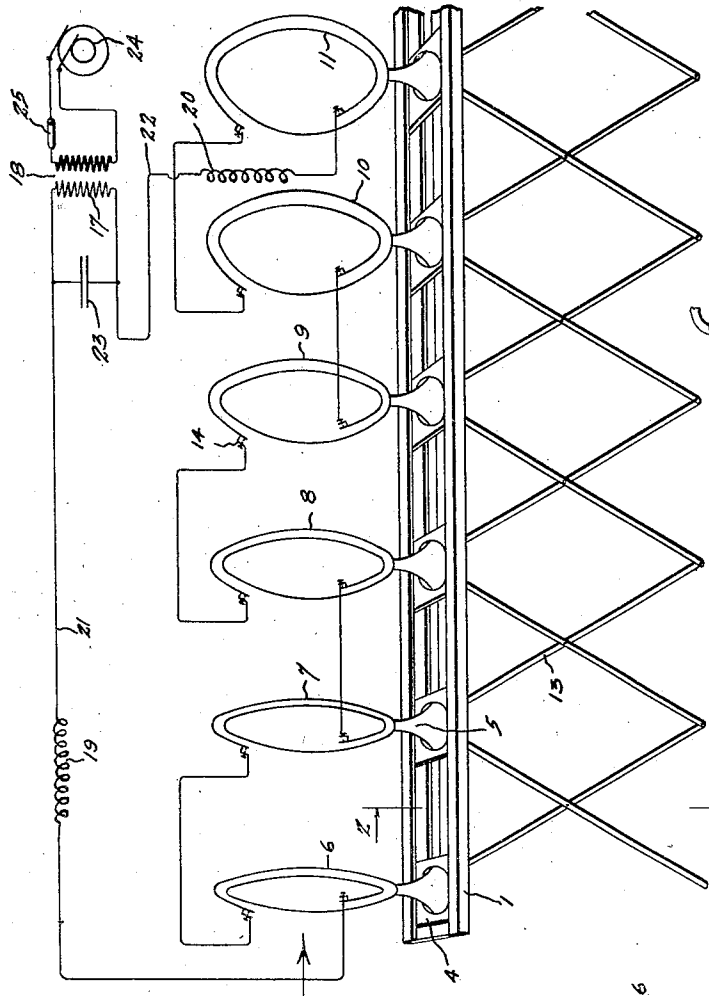


Fig. 1.

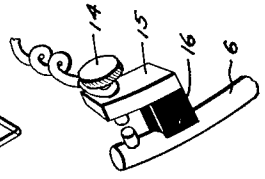


Fig. 3.

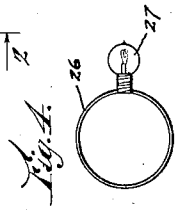


Fig. 4.

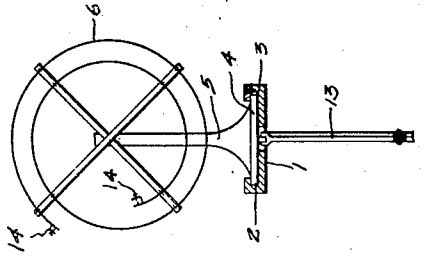


Fig. 2.

WITNESSES

Frank J. Faggiani.

A. L. Ritchin.

INVENTOR

John J. Callaghan,

BY Munn & Co

ATTORNEYS

UNITED STATES PATENT OFFICE.

JOHN J. CALLAGHAN, OF LIVERMORE, CALIFORNIA, ASSIGNOR TO HENRY J. CALLAGHAN, OF LIVERMORE, CALIFORNIA.

APPARATUS FOR PROPAGATING AND INTENSIFYING ELECTRICAL OSCILLATIONS.

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To all whom it may concern:

Be it known that I, JOHN J. CALLAGHAN, a citizen of the United States, and a resident of Livermore, in the county of Alameda and State of California, have invented a new and Improved Apparatus for Propagating and Intensifying Electrical Oscillations, of which the following is a full, clear, and exact description.

This invention relates to wireless apparatus and has for an object the provision of an improved construction for propagating and intensifying electrical oscillations so as to approach the frequency of light waves.

Another object in view is to provide an arrangement of short period oscillating coils in line, with their respective planes parallel in conjunction with a reflecting surface whereby the propagated wave will be unidirectional.

A further object of the invention is the provision of a number of short period oscillating coils adjustably positioned on a support with a gap at both ends of the coil, the coils being in series, the entire arrangement being positioned opposite a mirror and in such a way as to be adjustable toward and from the mirror.

In the accompanying drawing:

Figure 1 is a diagram showing one arrangement of an embodiment of the invention.

Fig. 2 is a sectional view through Fig. 1 on line 2—2 disclosing the connection between the lazy tong structure and the support of the coils.

Fig. 3 is a detail fragmentary perspective view showing the spark gap positioned at each end of each coil.

Fig. 4 shows a simple form of detector which may be used in connection with the structure shown in Fig. 1.

In wireless outfits which are in common use at this time an aerial is provided which is elevated to a greater or less extent according to the strength of the current and according to other conditions. Ordinarily the higher the aerial the greater the radius and greater the response to disturbances. However, in most wireless outfits which use an aerial the wave propagated is sent out in all directions and may be caught by any receiving station in proper radius. Various refinements have been made to limit the stations capable of receiving from a sending station but without entirely satisfactory results. In the present invention the usual sending instruments are provided, but an arrangement of coils and associate parts are used whereby the propagated electric wave is sent in one direction only and is intensified so as to have a comparatively great radius. The primary use of the device is for sending wireless messages, but it is evident that other uses may be provided for the intense electric wave of the current produced. A number of different forms of apparatus may be constructed for utilizing the principle involved, but in order to fully disclose said principle one embodiment is shown in the accompanying drawing in which 1 represents a supporting platform of any desired kind provided with grooves 2 and 3 for receiving the sliding plates 4 on which the standards 5 are mounted. In the drawing six standards are shown, but it will be evident that a greater or less number could be used without departing from the spirit of the invention. The base 4 may be of any material, as for instance a good insulating material and the standard 5 may also be of any material as for instance an insulating material. In any event, however, the various coils 6, 7, 8, 9, 10 and 11 must be insulated from their supports, said coils being preferably of some metal, as for instance silver or copper highly polished which will have a high conductivity. It will be observed that the coils 6 to 11 are short period coils and that all the coils are exactly alike, or as near alike as possible. These coils are adjustable toward and from each other and also toward and from the reflecting surface 12 which may be an ordinary mirror or polished metal. In order to adjust the coils 6 to 11 and at the same time keep them properly spaced a lazy tong structure 13 is connected to the respective base plates 4 so that when the lazy tong is collapsed or expanded the coils will be correspondingly moved and all maintained at the proper distance apart. In addition the lazy tongs together with all of the coils may be moved bodily toward or from the reflecting surface 12, or if desired the entire structure 1 together with the carriage may be moved toward or from the reflecting surface 12. The intention is to provide an adjustability toward and from the mirror and also an adjustability between the respective coils

as occasion may demand. It will be observed that all of the coils are spiral or of a pan-cake construction and that the planes of the various coils are parallel to each other and also parallel to the plane of the mirror 12. At each end of each coil there is arranged a spark gap as shown in Fig. 3, said spark gap being made preferably by using the screw 14 as one of the terminals, said screw being of course adjustable. This screw is maintained on a plate 15 which is connected with the coils by means of suitable insulation 16. The various coils are arranged in series with one spark gap of coil 6 connected to the secondary 17 of the transformer 18, while one spark gap of the coil 11 is connected to the opposite end of the secondary 17. Choke coils 19 and 20 are interposed in wires 21 and 22 while a suitable condenser 23 spans the secondary 17. The primary of the transformer 18 is connected to a suitable source of current 24, which may be a dynamo or other source of current as desired, also a suitable switch or make and break 25 is provided in the circuit of the primary of the transformer.

When this device is in operation current is supplied to the coils and wireless waves will be propagated and intensified by the reflecting surface 12 so that the wave will approach almost to the period of light waves and will be projected only in one direction, said projection being independent of any aerial or antennæ. It will, of course, be understood that the distance between the various coils 6 to 11 and the distance between the coil 6 and the mirror 12 has been properly adjusted before the coils are excited and when so adjusted an electric wave of high frequency will be produced. At the receiving station a coil of exactly the same period as the propagating coils must be used and placed in the line of influence. When the receiving coil is placed as just mentioned there will be set up a current in the receiving coil which may be detected in various ways, as for instance that shown in Fig. 4, wherein a receiving coil 26 is a closed coil having in its circuit a small electric lamp 27. At each time the coils 6 to 11 are excited the receiving coil 26 will be excited and the lamp 27 will flash.

When it is desired to use the device for other purposes the current may be stronger so that the propagated wave will fire explosives of proper mixture. The arrangement of the coils in line and the arrangement of the reflecting surface 12 in line with the coils results in the projected oscillation traveling in one direction only, so that to receive the message the receiving station must be in line, or substantially in line with the axis of the system of coils 6 to 11 and must have a proper detector, as for instance that shown in Fig. 4.

What I claim is:

1. A wireless apparatus comprising a plurality of identical coils arranged with their axes in line, means for exciting said coils, and a reflecting surface arranged with its axis coincident with the axis of said coils.

2. A wireless outfit comprising a plurality of short period oscillation coils arranged on the same axis, means for exciting said coils, and a reflecting surface arranged adjacent the end coil and positioned in a plane parallel with the end coil.

3. A wireless apparatus comprising a plurality of short period oscillation coils of pan-cake construction arranged in parallel planes, all having the same axis, means for exciting said coils simultaneously, and a reflecting surface arranged in axial alinement with the coils whereby the propagated wave will be propagated in one direction.

4. A wireless apparatus comprising a plurality of coils, means for exciting said coils, means for adjustably supporting said coils so that they may be moved toward and from each other, and a reflecting surface arranged in axial alinement with said coils.

5. A wireless apparatus comprising a plurality of short period oscillation coils of pan-cake construction, a lazy tongs connected to said coils whereby the coils may be moved toward and from each other simultaneously for the same distance, said coils being continually maintained in a parallel plane and with the axis of each coil in axial alinement, and a reflecting surface arranged adjacent one of the end coils, said reflecting surface being in a plane parallel to said end coil.

6. A wireless apparatus comprising a reflecting surface, a plurality of short period oscillation coils, means for adjusting said coils toward and from said reflecting surface and maintaining said coils in alinement therewith, and means for exciting said coils whereby the waves propagated by the coils will be uni-directional.

7. A wireless apparatus comprising a reflecting surface, a plurality of short period oscillation coils of pan-cake construction, means for adjusting said coils toward and from each other and toward and from said reflecting surface, means for connecting the coils in series, and means for exciting said coils, said coils being in line with each other and with said reflecting surface whereby the propagated wave will be uni-directional.

JOHN J. CALLAGHAN.