F. W. MIDGLEY.

RECEIVING APPARATUS.

APPLICATION FILED FEB. 25, 1909. RENEWED SEPT. 30, 1910.

974,985. **Patented Nov. 8, 1910.**

Fig. 1.

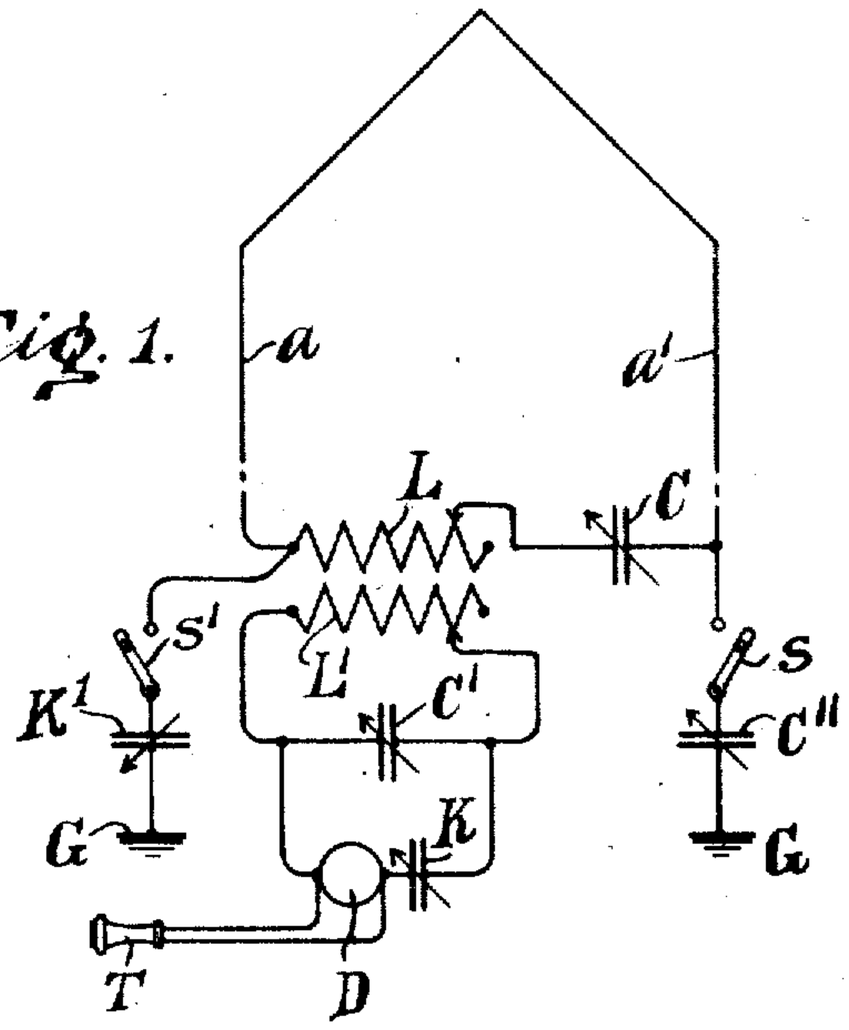
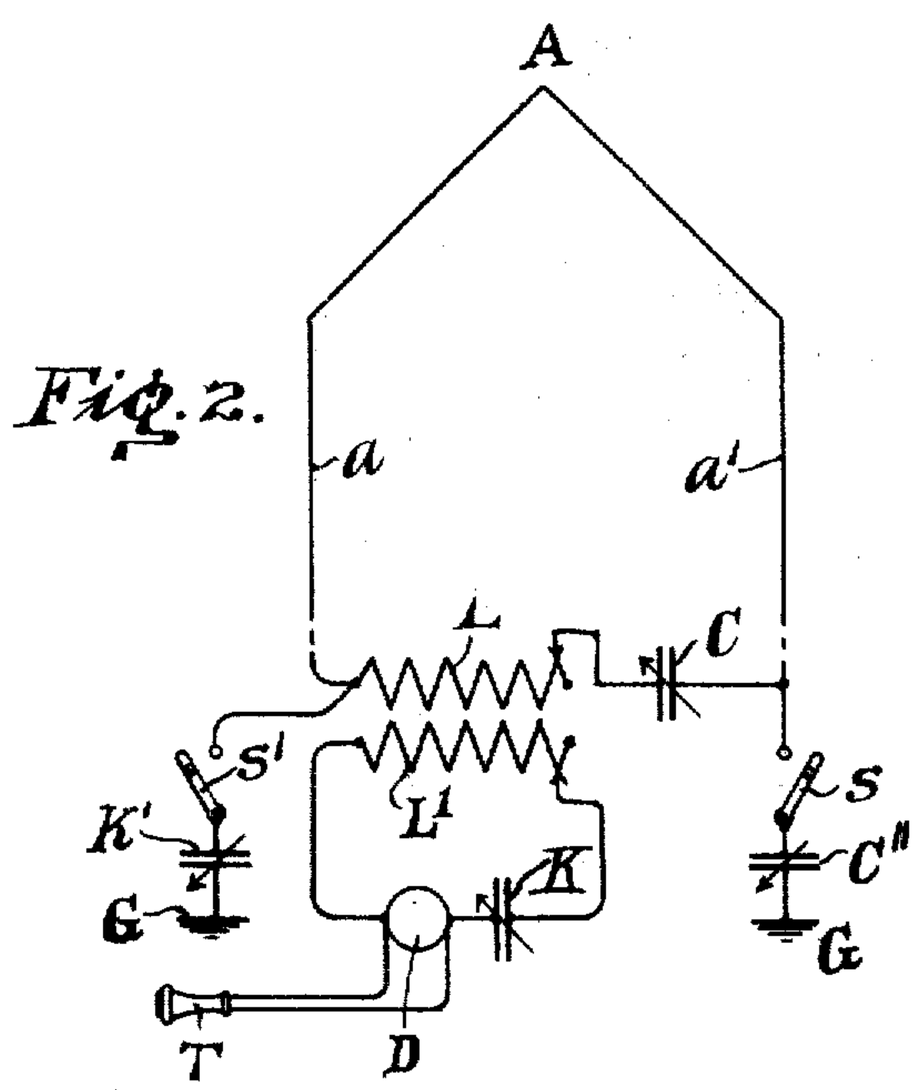


Fig. 2.



WITNESSES

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RECEIVING APPARATUS.

974,985. Specification of Letters Patent. Patented Nov. 8, 1910.

Original application filed January 26, 1906, Serial No. 297,957. Divided and this application filed February 25, 1909, Serial No. 479,918. Renewed September 30, 1910. Serial No. 584,764.

To all whom it may concern:

Be it known that I, FREDERICK W. MIDGLEY, a citizen of the United States, residing at Jersey City, in the county of Hudson and State of New Jersey, have invented a new and useful Receiving Apparatus, of which the following is a specification.

My invention relates to electrical signaling systems wherein the message is represented during transmission by electro-radiant energy transmitted through the natural media.

My invention resides in the receiving apparatus employed in such signaling systems, and has for its object the selective reception of signals.

In some localities reception of signals is rendered difficult because of numerous false signals caused by atmospheric or static electricity, or other natural electrical effects.

It is the object of my invention to render receiving apparatus indifferent to such effects as well as to render the receiving apparatus highly selective of only those messages intended to be received by it. To this end, I provide a looped aerial conductor, which is closed through suitable frequency determining elements or tuning elements, and in inductive relation with the looped aerial circuit is associated a circuit containing a condenser and wave-responsive device serially connected, or such wave-responsive device and serially connected condenser connected in shunt to another condenser.

This application is a division of my prior application Serial No. 297,957, filed January 26, 1906.

For an illustration of some of the forms my invention may take, reference is to be had to the accompanying drawing, in which:

Figure 1 is a diagrammatic view of a looped aerial conductor, the wave-responsive device being in a circuit inductively related to the looped aerial conductor. Fig. 2 is a diagrammatic view of a looped aerial conductor with an inductively associated circuit including a wave-responsive device.

In Fig. 1 of the drawing, A represents a looped aerial conductor having the legs *a* and *a'* connected together at their upper ends and spread apart a distance of practically one-fourth the length of the wave transmitted from the station with which the apparatus is to coöperate. The spread of the legs of the loop may, however, be greatly varied from this fraction without departing from the spirit of my invention. The legs of the loop are connected together at their bases through the adjustable condenser C and the inductance L, which forms also the primary of an oscillation transformer, whose secondary is L'. Obviously, L and L' may both be adjustable.

L and C are frequency determining elements or tuning elements for tuning the loop A and for closing the circuit of the loop. In circuit with the secondary L' is an adjustable condenser C', and in shunt to the latter are serially connected the wave-responsive device D and the adjustable condenser K.

T is the signal translating instrument, such as a telephone, controlled by the wave-responsive device D. The wave-responsive device D may be of any suitable type and as here represented, requires no local battery, as, for example, a primary cell detector. By adjusting L or C, or both, the loop A is tuned; and by adjusting C' and K very sharp selectivity is obtained.

As thus far described, the looped aerial conductor is ungrounded, and when ungrounded serves well for selective reception and for minimizing the effects of static, atmospheric, or other natural electricity. However, the loop A may be connected to earth G either through the condenser K' or through the condenser C'', both condensers being adjustable or variable. This is accomplished by closing either switch *s'* or the switch *s*.

In Fig. 2, the parts are the same, except that the condenser C' of Fig. 1 is omitted. Here, again, high selectivity is obtained when the loop is ungrounded by adjustment of L and C, L' and K. Or the loop may be connected to earth G through either condenser K' or condenser C'' by closing either switch *s'* or switch *s*.

From the foregoing description, it is apparent that my invention covers the looped aerial conductor and associated inductive

circuit either when the loop is ungrounded or grounded at either side of the condenser and inductance in the loop.

What I claim is:

1. In a wireless signaling system, a looped aerial conductor, capacity and inductance connected in said loop to form a closed circuit, said closed circuit forming a single path through all the inductance in series, a circuit in inductive relation with said loop, and a wave-responsive device and a condenser serially connected in said associated circuit.

2. In a wireless signaling system, a looped aerial conductor, frequency determining elements of different kinds connected in said loop to form a closed circuit, a circuit in inductive relation with said loop, a wave-responsive device and a condenser serially connected in said associated circuit, and a connection from said looped aerial conductor to earth through another condenser.

3. In a wireless signaling system, a looped aerial conductor, frequency determining elements of different kinds connected in said loop to form a closed circuit, a circuit in inductive relation to said loop, a condenser in said inductively related circuit, and a wave-responsive device connected in a path in parallel to said condenser.

4. In a wireless signaling system, a looped aerial conductor, frequency determining elements of different kinds connected in said loop to form a closed circuit, a circuit in inductive relation to said loop, a condenser in said inductively related circuit, a wave-responsive device connected in a path in parallel to said condenser, and a connection from said looped aerial conductor to earth through another condenser.

5. In a wireless signaling system, a looped aerial conductor, frequency determining elements of different kinds connected in said loop to form a closed circuit, a circuit in inductive relation with said loop, a condenser in said inductively related circuit, and a wave-responsive device and condenser serially connected in shunt to said condenser.

6. In a wireless signaling system, a looped aerial conductor, frequency determining elements of different kinds connected in said loop to form a closed circuit, a circuit in inductive relation with said loop, a condenser in said inductively related circuit, a wave-responsive device and condenser serially connected in shunt to said condenser, and a connection from said looped aerial conductor to earth through another condenser.

7. In a wireless signaling system, a looped aerial conductor, a circuit in inductive relation therewith, a condenser in said inductively related circuit, and a wave-responsive device and a condenser serially connected in shunt to said condenser.

8. In a wireless signaling system, a looped aerial conductor, a circuit in inductive relation therewith, a condenser in said inductively related circuit, a wave-responsive device and a condenser serially connected in shunt to said condenser, and a connection from said looped aerial conductor to earth through another condenser.

9. In a wireless signaling system, a looped aerial conductor, capacity and inductance included in said loop to form a closed circuit, means for connecting said loop to earth from a terminal either of said inductance or of said condenser, a circuit in inductive relation to said loop, and a wave-responsive device connected in said inductively related circuit.

10. In a wireless signaling system, a looped aerial conductor, capacity and inductance included in said loop to form a closed circuit, means for connecting said loop to earth from a terminal either of said inductance or of said condenser, a circuit in inductive relation to said loop, and a wave-responsive device and condenser connected in said inductively related circuit.

11. In a wireless signaling system, a looped aerial conductor, capacity and inductance included in said loop to form a closed circuit, means for connecting said loop to earth from a terminal either of said inductance or of said condenser, a circuit in inductive relation to said loop, a condenser included in said inductively related circuit, and a wave-responsive device and a condenser connected in shunt to said condenser.

In testimony whereof I have hereunto affixed my signature in the presence of the two subscribing witnesses.

FRED'K W. MIDGLEY.

Witnesses:
M. F. CARROLL,
E. D. HOLLENBECK.