

April 22, 1930.

E. F. ANDREWS
PORTABLE LOOP AERIAL
Filed April 2, 1923

1,755,530

Fig. 2.

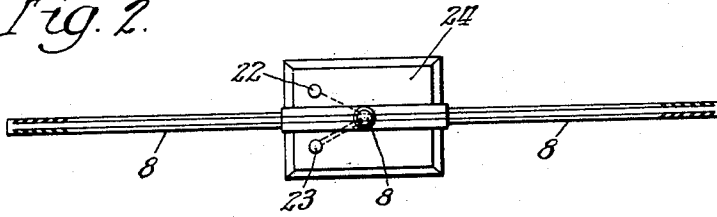


Fig. 1.

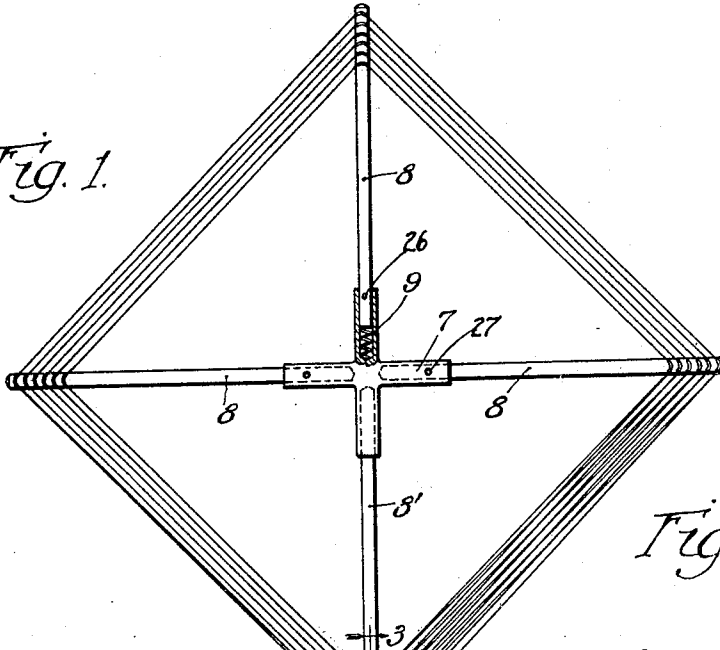


Fig. 3.

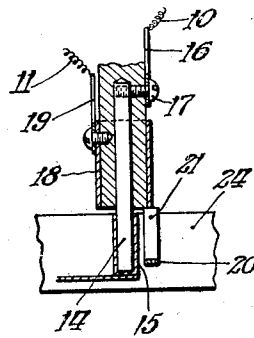


Fig. 4.

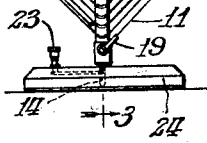
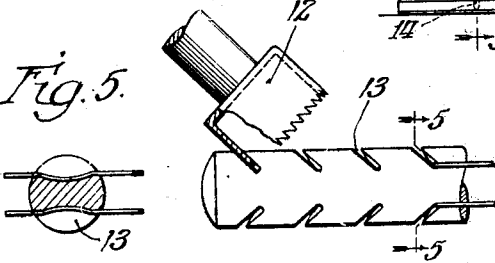


Fig. 5.



Inventor:
Edward F. Andrews.
By: George C. Mueller
Atty.

UNITED STATES PATENT OFFICE

EDWARD F. ANDREWS, OF CHICAGO, ILLINOIS

PORTABLE LOOP AERIAL

Application filed April 2, 1923. Serial No. 629,322.

My invention relates to loop aerials and is directed more particularly to portable loop aerials, an object being to provide a loop aerial which is light, strong and attractive in appearance, which will pivot on its base and can be readily separated therefrom, at the same time making contact with terminals on the base; and which will be simple and easily manufactured, at a comparatively low cost.

A feature of my invention is the provision of a loop aerial having small external dimensions with a maximum length of wire and small capacity and inductance changes.

Another feature of my invention is the provision of an aerial loop in which the wires, although supported only on the radially extending arms of the frame, are maintained under a continuous tension, to automatically take up any slack that might otherwise result from stretching.

There are other features of my invention and these will be more particularly pointed out in the ensuing part of the specification and appended claims.

For a better understanding of my invention reference is to be had to the accompanying drawing, in which

Fig. 1 is a side elevation of the preferred form of my invention;

Fig. 2 is a top plan view of Fig. 1;

Fig. 3 is a vertical sectional view along the line 3—3 of Fig. 1;

Fig. 4 is an enlarged end view of one of the arms, showing the method of cutting the circular or curved-bottom slots therein; and

Fig. 5 is a sectional view along the line 5—5 of Fig. 4.

Referring now more in detail to my invention as shown, I provide a central frame having a plurality of arms 7 extending radially in a single plane, said arms having sockets in which the loop supporting arms 8 extend. The frame 7 is preferably made of metal and I use aluminum for this purpose, as it is light. The arms 8 are preferably of a nonconducting material, and I use wood for this purpose. The lower arm 8' is preferably driven tightly into its socket, while the other three arms 8 are slidably supported in their sockets, with a spring 9 positioned in the socket and

tending to press the arms outwardly. This gives a relative outward movement of the arms, so as to hold the wire wound thereon under a continuous tension and prevent sagging, which would otherwise occur from the stretching thereof. By holding the wires taut in this way, the change in capacity and inductance effects of one wire upon the other is reduced to a minimum. If these wires were permitted to sag and materially change their relative distances apart, the capacity and inductance of the entire aerial would change, and this, of course, is objectionable.

Now as to the aerial loop, I preferably by my improved construction and arrangement provide a loop aerial having small external dimensions, and at the same time having each turn of the wire upon it include the maximum enclosed area consistent with the external dimensions of the aerial, at the same time maintaining a proper separation of each wire from the other. To this end I provide two spiral windings, one placed upon each side of the supporting arms, preferably starting one winding at the bottom of the supporting stick 8' at 10, and winding the spiral inwardly, or toward the center of the loop, until half the number of the desired turns have been put on, then crossing the wire over to the opposite side of the frame and winding it spirally outwardly until it terminates at the lower end of the supporting stick 8' at 11, and which is opposite the starting point 10 of the opposite coil.

Another advantage of my improved coil arrangement is that the device is evenly balanced, and also maintains a balanced pressure upon the sticks by the springs 9.

It will also be seen that by the use of the coils on opposite sides of the frame, the mean area enclosed by all the turns is considerably increased, without any increase in the external outside dimensions of the device, as the width is of course determined by the thickness of the supporting arms, which would be practically the same for a single spiral as for the double spiral. For the purpose of supporting the wire upon the frame, I provide a novel means in the form of curved slots the bottoms of which are curved where

they support the wire, thereby eliminating any sharp kinks in the wire and permitting the wire to readily slide therein as the sticks are pressed outwardly, to maintain the loops taut.

5 These curved slots are cut in the arms preferably by means of a hollow milling cutter, or hollow circular saw, 12. In cutting these slots I preferably hold the sticks on the table
10 of a drill press, setting the sticks at the proper angle, and then feeding the cutter 12 down into the sticks to cut the slots 13. By reason of the peculiar cutter used, aided by the angle at which the slots are cut, I provide a rounded
15 bottom in which the wire readily slides and is supported at a gradual bend, without any sharp angles at the supporting points.

I preferably arrange the aerial loop portion of the device so that it may rotate on a base, and to this end I insert a pivot pin 14
20 into the end of the stick 8', which pin sets into a metallic socket 15, carried in the base 16. The pin preferably rests upon its end, so as to support the weight of the device at this
25 point. The pin 14 also acts as a terminal for the loop, the end 10 of the wire being fastened to a terminal clip 16, connected with the pin 14 by a screw 17.

In order to provide a second connection
30 from the loop to the base 16, and one which will act as a good conductor although permitting rotation of the aerial, I secure a metallic ferrule 18 to the bottom of the stick 8', and connect the end 11 of the loop therewith by means of a terminal connector 19.
35 This ferrule 18 not only acts as a contactor for the loop, but also protects the end of the stick 8 which is made of a small diameter and thus readily chipped or cracked at the bot-
40 tom.

In order to extend a connection from the ferrule 18 to the base, I provide a spring member 20 fastened to the bottom of the base and having a portion 21 extending up through
45 the base, adapted to be engaged by the edge of the ferrule 18. The tension of spring 20 is such that it will permit the aerial pin 14 to rest in the bottom of the socket 15, but strong enough to maintain a good sliding contact with the ferrule, and at the same time not
50 interfere with a free rotation thereof.

The socket 15 and spring member 20 are connected to suitable binding posts 22 and 23, respectively, so that the device may be
55 readily connected as desired.

It will also be seen that the aerial member may be readily lifted out of the base 24 and plugged into a suitable socket in a desk or radio set, or wherever desired.

60 In winding the loops upon the framework I preferably hold the frame in a suitable jig, with the sticks placed inwardly against the tension of springs 9. The wire is then wound thereon and fastened to the terminals 16—19.
65 The device is then removed from the jig and

the springs 9 are free to press the arms outwardly and hold the wire under a constant pressure.

A feature of my loop aerial is that it may be shipped knocked down but readily assembled without the use of any special jigs, tools, or machinery. To this end the arms, central cross-piece or support, wire and base are shipped separated, and to assemble the parts
70 the arms are first inserted in the sockets of the central cross piece or frame, with the springs 9 in place. It is understood, of course, that the wire is not yet wound on the frame. The three spring-pressed arms 8 are then pushed into the sockets until the holes 26 in the arms
75 8 and the holes 27 in the frame arms register. I then stick a nail or wire rod through the holes to hold the arms against the tension of the springs 9. The wire 11 is now wound on the supporting arms and secured at its terminals 16—19. The nails are then with-
80 drawn from the holes in the arms, thus permitting the springs 9 to act upon the arms 8 and press them outwardly, thereby making the wire taut and holding it under constant pressure.

In the preferred form of constructing and winding my improved loop aerial, there are certain electrical advantages arising more particularly from the opposed spiral wind-
85 ings, but it is thought unnecessary to go into the matter, as these will be readily apparent from the use of the device.

What I claim as new and desire to secure by United States Letters Patent is:

1. In a loop aerial, a central frame having four fixed radially extending sockets therein, one for each supporting arm of the device, aerial wire supporting arms extending outwardly from said sockets, an aerial loop spirally supported upon said arms, and resilient means pressing outwardly upon one or more of said arms to hold the loop under tension and prevent slack therein.

2. In a loop aerial, radially extending loop supporting arms, said arms having curved-bottom inwardly slanting slots cut in the side thereof for supporting the loop wire with a gradual bend in the plane of the loop.

3. In a loop aerial, radially extending loop supporting arms, said arms having curved slots in the side formed so as to have the slots slant inwardly with a curved bottom to support the loop wire with a gradual bend in the plane of the loop.

4. In a loop aerial, a base having a vertical conducting socket therein, a contact member in the base adjacent the socket, a loop support having a downwardly extending conducting plug for insertion in the base socket and by which the support may turn, an aerial loop on said support, a ferrule at the bottom of support surrounding the plug and for slidingly contacting with the base contact,

70

75

80

85

90

95

100

105

110

115

120

125

130

and means for connecting the terminals of an aerial loop with the plug and ferrule.

5 5. In a loop aerial, a frame comprising radially disposed arms having wire supporting means on opposite sides at the outer ends thereof, and a loop supported by said means comprising two spiral windings one on each side of the arms, one winding starting at the outer end of a supporting one of said arms and continuing spirally toward the center, 10 then crossing to the other side and continuing spirally outward, terminating at said supporting arm, terminals on said arm to which the ends of the two windings are secured, one 15 of said terminals being a plug and the other a ferrule on the arm, said plug being adapted to act as a pivot by which the aerial may turn.

20 6. In a loop aerial, a frame comprising radially disposed arms having wire supporting means on opposite sides at the outer ends thereof, and a loop supported by said means comprising two spiral windings one on each side of the arms, one winding starting at the 25 outer end of a supporting one of said arms and continuing spirally toward the center, then crossing to the other side and continuing spirally outward, terminating at said supporting arm, terminals on said arm to which 30 the ends of the two windings are secured, a two-contact swivel plug at the end of the supporting arm to which said winding ends are connected, and a cooperating two-contact jack for the plug, in which the aerial may 35 turn.

7. The method of providing wire supporting slots for a loop aerial supporting arm which consists of cutting a circular slot angularly into the side of the arm.

40 8. In a loop aerial, a loop support having a downwardly extending support, a ferrule on the end of said support and a central plug therein, said ferrule and plug acting as contact terminals for the loop, a base, terminals 45 on the base, and a socket for rotatably holding the support in the base including stationary contact means for electrically connecting the ferrule and plug with said terminals.

50 9. In a loop aerial, a frame comprising radially disposed arms having wire supporting means along opposite sides thereof, and a loop supported by said means comprising a continuous winding of two spirals, one on each side of the arms, and wound so that the 55 traversing current will flow from the outer end of one spiral toward the center and then over to and from the center of the other spiral toward the outer end, and in a like direction spirally in both spirals on the same axis.

60 In witness whereof, I hereunto subscribe my name this 8th day of March, A. D. 1923.

EDWARD F. ANDREWS.