Sept. 15, 1925. 1,553,315

L. E. GOULD

LOOP FOR RADIORECEPTION

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Fig. 1.

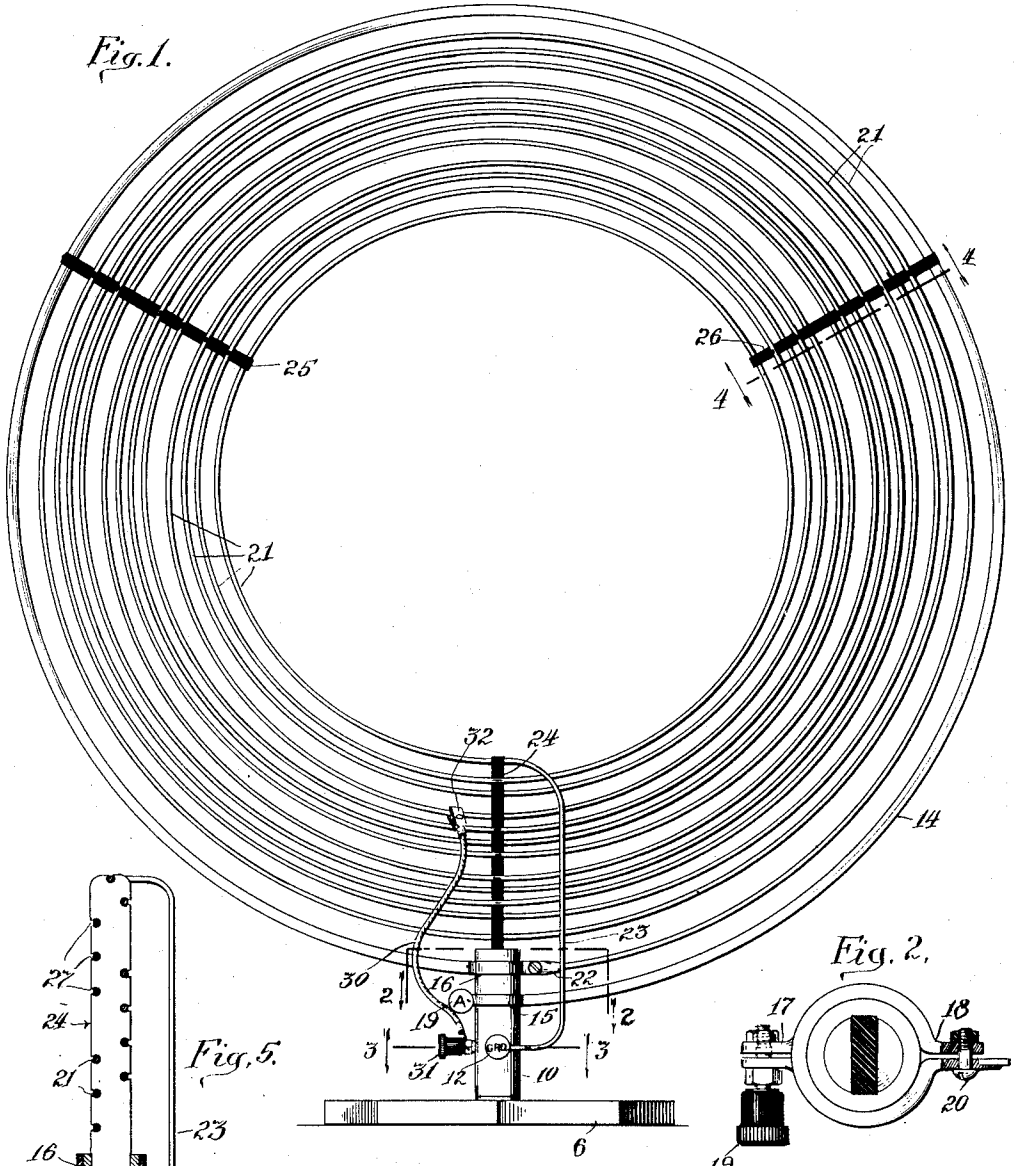


Fig. 2.

Fig. 5.

Fig. 3.

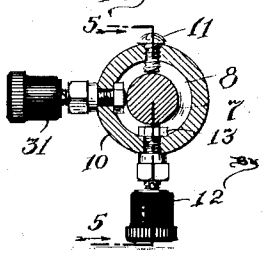
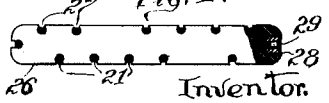


Fig. 4.



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UNITED STATES PATENT OFFICE.

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LOOP FOR RADIORECEPTION.

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To all whom it may concern:

Be it known that I, LAWRENCE E. GOULD, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Loops for Radioreception, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to radio receiving loops, and has for its object to provide an improved loop that will possess superior energy, collecting ability and directional selectivity as compared with prior devices of the kind. I accomplish this object as illustrated in the drawings, and as hereinafter described. What I regard as new is set forth in the claims.

In the accompanying drawings,—

Fig. 1 is a front elevation of my improved loop;

Fig. 2 is a horizontal section on line 2—2 of Fig. 1;

Fig. 3 is a horizontal section on line 3—3 of Fig. 1;

Fig. 4 is a transverse section on line 4—4 of Fig. 1; and

Fig. 5 is a vertical section on line 5—5 of Fig. 3.

The efficiency of a radio receiving loop for its intended purpose is dependent upon a number of factors, such as the size and shape of the loop structure, and the length, size, shape and electrical characteristics of the electrical conductor used. The effectiveness of a loop as an energy collecting medium attached to a radio receiving and tuning apparatus also is dependent on the potential difference not only built up in the loop, but delivered to the input terminals of the receiving set. All material used in the construction of the loop, and not an actual part of the potential building circuit, absorbs energy, or short-circuits the working conductor, thereby reducing the effective potential built up at the set terminals. Likewise the corona effects, or fields around each active conductor may be so superimposed as to have a cumulative electrical capacity effect which increases the effective resistance, or partially short-circuits the potential, thereby increasing the fundamental wave length of the loop as an energy collecting device, and narrowing the band of wave lengths to which it may be tuned with any given set.

With the foregoing considerations in mind, my improved loop has been designed to provide maximum length of conductor with maximum wire spacing to include transpositions and still occupy a narrow plane. Such materials are used that one or more turns may be made of active conductor, strong enough to support a number of additional turns of smaller cross-section, thereby providing a self-sustaining loop characterized by the absence of, or the use of a minimum of, extraneous energy absorbing materials. A loop of this character may be, and preferably is, built of bare conductor, thereby cutting down the wave absorbing material adjacent to the conductor, as well as enabling the active conductor to be tapped at the actual nodal point, or at any other desired point or points, by means of a flexible terminal or external connection, so that the receiving set with which the loop is connected may be served to the best advantage. Furthermore the use of a bare conductor admits of securing the wire composing the turns of the loop at such points as may be necessary to provide them with such support as may be required for spacing or other purpose, by swaging the wire into pockets or specially formed slots in spacing or supporting members, thereby further reducing the use of extraneous energy absorbing material in the construction of the loop.

Proceeding now to a description of my improvements as embodied in the loop illustrated in the accompanying drawings, which realizes the desirable characteristics above pointed out, 6 indicates a base of suitable size and shape to provide a stable support for the loop, said base being preferably made of wood. Rising centrally from the base 6, and preferably secured thereto by providing its lower end with screw-threads adapted to screw into a threaded socket in the base, is a spindle 7, also preferably of wood, which

at an intermediate point is provided with a horizontally disposed annular groove 8, from which a narrow channel 9 leads to the upper end of the spindle, as best shown in Fig. 5. A sleeve 10, of suitable dielectric material, is journaled on said spindle to turn freely thereon, and is normally prevented from slipping off by a screw 11 which extends through the sleeve and into the groove 8. The sleeve may however be removed by turning it so that the inner end of the screw 11 registers with the channel 9. A binding post 12 is secured to the sleeve 10 at such a point that its inner end, which is secured by a nut 13, lies in the groove 8, as best shown in Fig. 3. The binding post, therefore, does not interfere with rotation of said sleeve, and rotates with it about the spindle 7.

The loop proper, which is preferably circular in general contour, but may be square or of any other suitable form, comprises an outer or supporting turn 14 of solid or tubular wire of comparatively large cross-sectional area, and is best made of aluminum. The end portions 15, 16 of the outer turn 14 are spaced apart and firmly secured to the sleeve 10 so as to rotate therewith, by clamps 17, 18, respectively, as best shown in Figs. 1 and 2, and the clamp 17 carries a binding post 19 that serves also as a securing device for said clamp. A screw 20 secures the clamp 18, as shown in Fig. 2.

The loop also comprises a number of turns 21 of considerably finer wire, wound in spiral form, the outer end of such finer wire being connected, preferably by soldering, with the inner end portion 16 of the wire 14, as shown at 22 in Fig. 1. The innermost turn 21 has a lead 23 that is connected with the binding post 12.

The outermost turn 14 is made strong and stiff or heavy enough not only to be self-sustaining, but also to support the inner turns, so that the loop as a whole is self-sustaining,—that is to say, the upper portion of the loop receives its support from the outer turn 14, which is itself supported only at the bottom. The several turns 21 are, however, held in spaced relation to each other and to the turn 14, by spacers 24, 25, 26, in the form of strips of suitable dielectric material, having notches or pockets 27 in their side margins and inner ends to receive the turns 21. The spacer 24 is firmly secured at its lower end in the sleeve 10 so that it rotates therewith and with the supporting outer turn 14. The spacers 25, 26 have notches 28 in their outer ends also, to receive the turn 14, as best shown in Fig. 4. The notches 27 are made by boring holes of the proper size in the spacer strips near their margins and then sawing through the margins to such holes in such manner as to provide passages through which the wire may be forced to fit tightly in the recesses so formed. The wire of the outer turn 14 is best secured in the notches 28 by screws 29, as shown in Fig. 4. I prefer to use three spacers placed equal distances apart, but the number and position of such spacers may be varied, if desired.

It will be seen from Figs. 4 and 5 that the notches 27 in the side margins of the spacers are so disposed that those in one margin are staggered with reference to those in the opposite margin, and that the turns 21 are so wound that they are disposed principally in triangular groups, which arrangement provides the widest spacing between adjoining turns, the advantage of which in radio loops is well recognized.

As has been pointed out, the wire of all the turns is bare, and to provide for making connection with the loop at any desired point a flexible wire 30 is connected at one end with a binding post 31 secured to the sleeve 10, as shown in Fig. 3, and at its other end carries a clamp 32 that may be attached to any of the turns 21, as desired.

From the foregoing description it will be seen that I have provided a self-sustaining loop in which the use of energy absorbing materials is reduced to the minimum, and one of such design that the conductor may be made of maximum length, and with the maximum wire spacing while still occupying a narrow plane. Obviously the same general construction may also be used for a flat spiral receiving loop or tuning inductance. While I prefer to arrange the supporting wire 14 in a single turn, my invention is not limited to that arrangement, as a plurality of turns may be used. It should be understood that while I have described my invention as a radio receiving loop, it may also be used for sending, and the claims hereinafter made are therefore to be construed accordingly.

What I claim as my invention and desire to secure by Letters Patent, is—

1. A radio receiving loop comprising a supporting turn of conducting wire, a finer conducting wire one end of which is connected with one terminal of said supporting turn, said finer wire being wound to form a plurality of turns, spacing means serving to space the several turns apart and support the turns of finer wire from said supporting turn, and a support on which said supporting turn is mounted.

2. A radio receiving loop comprising a self sustaining outer turn of conducting wire, a finer conducting wire one end of which is connected with one terminal of said outer turn, said finer wire being wound to form a plurality of turns disposed within said outer turn, spacing means between the several turns and supporting the inner turns from said outer turn, and a support on which said outer turn is mounted.

3. A radio receiving loop comprising a supporting turn of bare conducting wire, a finer bare conducting wire one end of which is connected with one terminal of said supporting turn, said finer wire being wound to form a plurality of turns, spacing means serving to space the several turns apart and support the turns of finer wire from said supporting turn, and a support on which said supporting turn is mounted.

4. A radio receiving loop comprising a self sustaining outer turn of bare conducting wire, a finer bare conducting wire one end of which is connected with one terminal of said outer turn, said finer wire being wound to form a plurality of turns disposed within said outer turn, spacing means between the several turns and supporting the inner turns from said outer turn, and a support on which said outer turn is mounted.

5. A radio receiving loop comprising a supporting turn of conducting wire, a finer conducting wire one end of which is connected with one terminal of said supporting turn, said finer wire being wound to form a plurality of turns, spacing means serving to space the several turns apart in triangularly disposed groups and support the turns of finer wire from said supporting turn, and a support on which said supporting turn is mounted.

6. A radio receiving loop comprising a self sustaining outer turn of conducting wire, a finer conducting wire one end of which is connected with one terminal of said outer turn, said finer wire being wound to form a plurality of turns disposed within said outer turn, spacing means between the several turns and supporting the inner turns from said outer turn in triangularly disposed groups, and a support on which said outer turn is mounted.

7. A radio receiving loop comprising a supporting turn of conducting wire, a rotatable member to which the end portions of said supporting wire are attached, a finer conducting wire one end of which is connected with one terminal of said supporting turn, said finer wire being wound to form a plurality of turns, and spacing means serving to space the several turns apart and support the turns of finer wire from said supporting turn.

8. A radio receiving loop comprising a self sustaining outer turn of conducting wire, a rotatable member to which the end portions of said supporting wire are attached, a finer conducting wire one end of which is connected with one terminal of said outer turn, said finer wire being wound to form a plurality of turns disposed within said outer turn, and spacing means between the several turns and supporting the inner turns from said outer turn.

9. A radio receiving loop comprising a supporting turn of conducting wire, a rotatable member to which the end portions of said supporting wire are attached, a finer conducting wire one end of which is connected with one terminal of said supporting turn, said finer wire being wound to form a plurality of turns, spacing means serving to space the several turns apart and support the turns of finer wire from said supporting turn, and a connector attached to said rotatable member and adapted to connect with said finer wire.

10. A radio receiving loop comprising a supporting turn of conducting wire, a finer conducting wire one end of which is connected with one terminal of said supporting turn, said finer wire being wound to form a plurality of turns, spacing members serving to space the several turns apart, said spacing members having notches in their opposite margins to receive the finer wire and being connected with said supporting turn. and a support on which said supporting turn is mounted.

11. A radio receiving loop comprising a supporting turn of conducting wire, a finer conducting wire one end of which is connected with one terminal of said supporting turn, said finer wire being wound to form a plurality of turns, spacing members serving to space the several turns apart, said spacing members having notches in their opposite margins to receive the finer wire and having notches in their outer ends to receive said supporting turn, and a support on which said supporting turn is mounted.

12. A radio receiving loop comprising a supporting turn of conducting wire, a finer conducting wire one end of which is connected with one terminal of said supporting turn, said finer wire being wound to form a plurality of turns, spacing means serving to space the several turns apart and support the turns of finer wire from said supporting turn, a rotatable support on which said supporting turn is mounted, and a spacing member for the finer turns secured to said support.

13. A radio receiving loop comprising a base having an upright spindle, a sleeve journaled on said spindle, a supporting turn of conducting wire having its end portions secured to said sleeve, a spacing member secured to said sleeve, a finer conducting wire one end of which is connected with one terminal of said supporting turn, said finer wire being wound to form a plurality of turns and spacing members serving to space the several turns apart and support the turns of finer wire from said supporting turn.

14. A radio receiving loop comprising a base, a spindle secured thereto, said spindle having an intermediately disposed annular

groove, a sleeve journaled on said spindle, a supporting turn of conducting wire having its end portions secured to said sleeve, a finer conducting wire one end of which is connected with one terminal of said supporting turn, said finer wire being wound to form a plurality of turns, spacing means serving to space the several turns apart and support the turns of finer wire from said supporting turn, and a binding post carried by said sleeve opposite said groove and connected with the other end of said finer wire.

LAWRENCE E. GOULD.