

[54] MULTIBAND QUAD AND LOOP ANTENNA

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3,089,140	5/1963	Monola.....	343/722

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Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 158,424, June 30, 1971.

[57]

ABSTRACT

[52] U.S. Cl..... 343/744, 343/730, 343/750

[51] **Int. Cl.** **H01q 11/12**

[58] **Field of Search**..... 343/726, 741-744,
343/730, 750

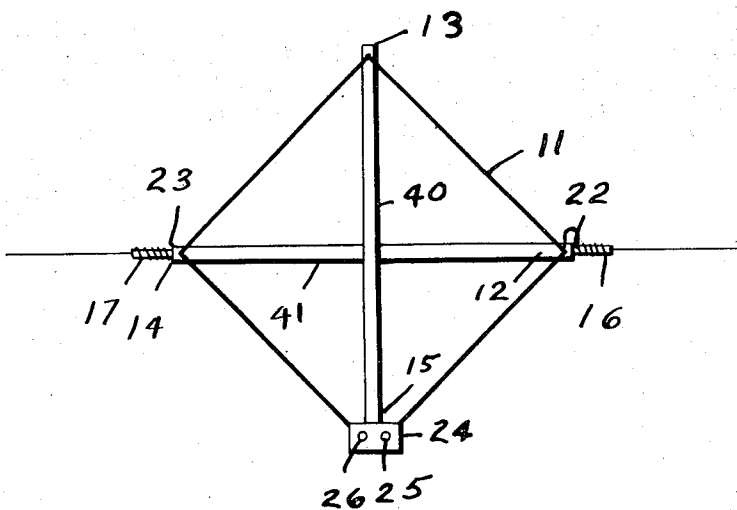
The specification discloses a structure of a single and a dual band antenna utilizing two loading units, each comprising a single inductor and a single capacitor connected in series therewith and mounted 180° apart at the high voltage points of the quad or loop antenna, and with the feed point midway between.

[56]. References Cited

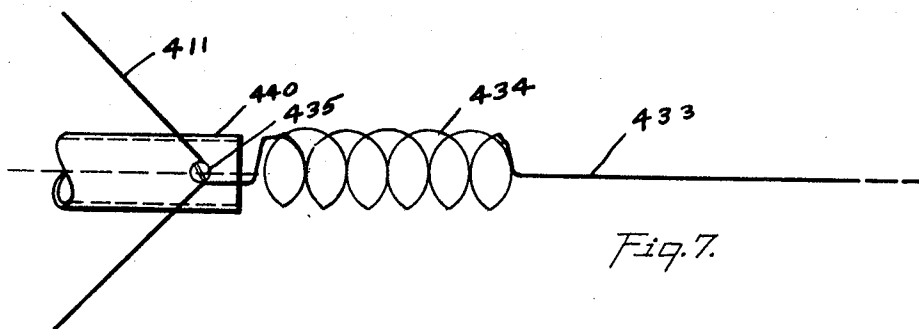
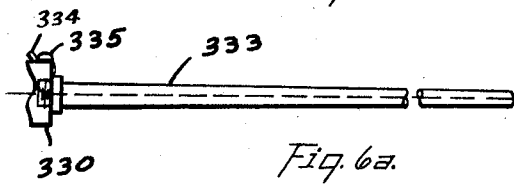
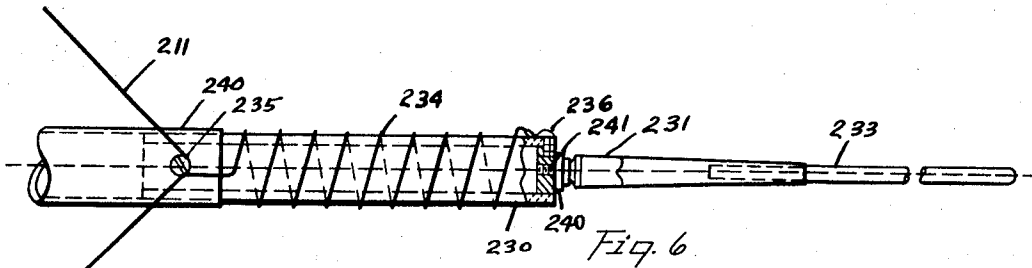
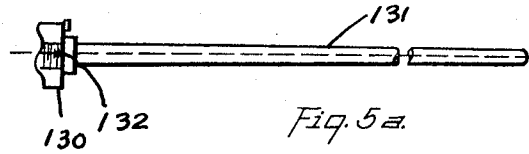
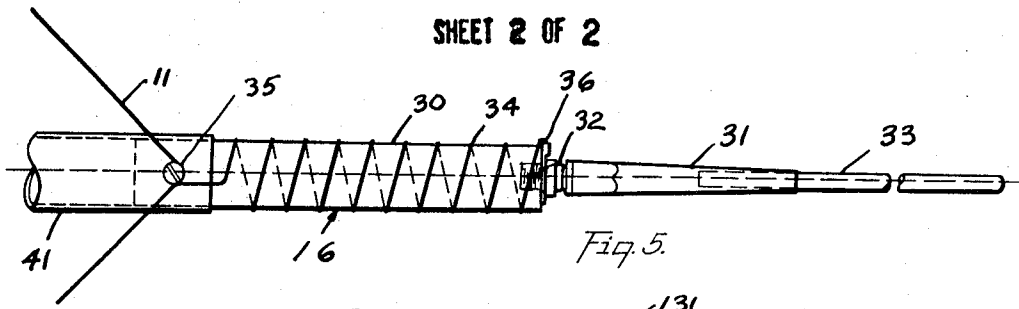
UNITED STATES PATENTS

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6 Claims, 9 Drawing Figures



SHEET 2 OF 2



MULTIBAND QUAD AND LOOP ANTENNA

REFERENCE TO CO-PENDING APPLICATION

This application is a continuation-in-part of my co-pending application, Ser. No. 158,424, filed June 30, 1971.

GENERAL DESCRIPTION OF THE INVENTION

The design is basically similar to the disclosure in co-pending U.S. Pat. application, Ser. No. 158,424, filed June 30, 1971, except that the capacitor in the present design consists of a single straight piece of metallic tube or rod in place of the ring and radial spoke assembly as shown in the said application. The antenna is disclosed as applied to a single or dual application only. However, the antenna may be applied where size and cost is of prime importance as in citizen band and amateur radio operation.

GENERAL DESCRIPTION OF THE DRAWINGS

FIG. 1 shows a complete quad antenna with the loading units mounted 180° apart at the high voltage points and connected thereto.

FIG. 2 shows a circular loop antenna with loading units mounted 180° apart at the high voltage points.

FIG. 3 shows another embodiment of the antenna with the loop having an elliptical form.

FIG. 4 shows another embodiment of the antenna with the loop having a rectangular form.

FIG. 5 shows an enlarged view of one of the loading units.

FIG. 5a shows the same arrangement as FIG. 5 but with a one piece capacitor section in place of the telescoping section.

FIG. 6 shows another embodiment of the coil form.

FIG. 6a shows another embodiment of the capacitor with the coil form of FIG. 6.

FIG. 7 shows yet another embodiment of the coil form and capacitor.

DETAILED DESCRIPTION OF THE DRAWINGS

Now with more particular reference to the drawings, the embodiment of the invention shown in FIG. 1 shows a single element quad antenna comprising a wire radiator 11 fastened to the four ends 12, 13, 14 and 15 of a supporting cross element made up of insulating tubular support members 40 and 41. The support elements 40 and 41 are of sufficient structural strength to support the loading units 16 and 17 mounted on the ends that are diammetrical to each other at 22 and 23 and connected to the radiator 11. A terminal board 24 made of insulating material is attached to the insulator cross member 40 and the terminals 25 and 26 of the terminal board are connected to the wire radiator 11 for fastening to transmission line.

The antenna is made up of two loading units. The loading units 16 and 17 are supported 180° apart at each end of the support member at the high voltage points of the unit and are connected to the wire radiator as shown.

For single frequency operation the wire loop is first made to any convenient size and the two loading sections are then designed to resonate the complete assembly at the desired frequency.

For dual frequency operation, the wire loop must be made approximately one full wavelength around at the higher of the two desired frequencies and the two load-

ing sections in combination with the wire loop are designed to be resonant at the lower desired frequency.

In FIG. 5, an enlarged view of one of the loading units 16 is shown, which is a solid coil form 30 inserted into an end of the tubular cross member support 41. The coil form 30 is preferably cylindrical in shape and is made of insulating material with a telescoping capacitor section 31 threaded into the outer end of the coil form 30 at 32. The telescoping capacitor has the outer end part 33 which slides into the inner part in a manner known to those skilled in the art. The telescoping capacitor allows for precise frequency adjustment, if necessary. A coil 34 is wrapped around the coil form 30 and connected at its inner end to the radiator 11 by screw 35. Thus the screw 35 performs two functions; it holds the coil form 30 in position in the tubular member 41 and it forms an electrical contact between the radiator 11 and the coil 34.

The outer end of the coil 34 is connected to the capacitor 31 by means of the solder lug 36.

In the embodiment of the invention shown in FIG. 5a, an arrangement similar to that shown in FIG. 5, however, a one-piece capacitor indicated at 131 is shown connected to a coil form 130 and threaded thereinto at 132.

In the embodiment of the invention shown in FIG. 6, a tubular coil form 230 is shown supported on a support member 240 by inserting the coil form into the end of the tubular member 240. A radiator 211 is shown electrically connected by the screw 235 to the coil 234. The outer end of the coil 234 is connected to the capacitor 231 by a screw 236. The capacitor 231 is threaded into the metal insert 240 at 241. The capacitor 231 has a telescoping outer part 233 similar to the embodiment shown in FIG. 5.

The embodiment shown in FIG. 6a, shows a coil form 330 receiving the fixed capacitor 333 and a coil 334 is connected to the capacitor by the screw 335.

In the embodiment of the invention shown in FIG. 7, a self-supporting coil 434 is shown that is wound in the form of a helix as shown. The coil is connected to the support 440 by screw 435 which likewise connects the coil to the radiator 411. The outer end of the coil is straight for a proper length indicated at 433.

The embodiments of the invention shown in FIGS. 2, 3, and 4 show cross members 540 and 541, 640 and 641, and 740 and 741 respectively having the circular radiator 511 in FIG. 2, the elliptical radiator 611 in FIG. 3, and the rectangular radiator 711 in FIG. 4. The loading units 16 and 17 in each embodiment are illustrated as the same.

The embodiments of the invention shown in FIGS. 2, 3, and 4 have the terminal boards 524, 624 and 724 respectively and having terminals 525 and 526, 625 and 626, and 725 and 726 respectively.

The foregoing specification sets forth the invention in its preferred practical forms but the structure shown is capable of modification within a range of equivalents without departing from the invention which is to be understood is broadly novel as is commensurate with the appended claims.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. An antenna comprising a radiator consisting of a single continuous loop of wire having two spaced ends defining terminals and forming a geometrical configu-

ration having a total distance around the said loop of one wavelength at the higher of two frequencies, said radiator having loading units supported 180° apart and 90° from said terminals at the high voltage points of said radiator and connected to said radiator, 5
 said loading units each consisting of a coil and a capacitor unit connected in series with said coil, said coil and said loading capacitor each acting as an additional electrical length to said radiator at the lower predetermined frequency, 10
 said radiator having its high voltage points supported on a rigid insulating support member extending across said loop, and said loading units being supported on opposite ends of said support member, 15
 said loading units being in the form of a coil and a straight metallic capacitor extending colinearly with the support, one end of said coil being electrically connected to said radiator at said high voltage point thereof. 20
 2. The antenna recited in claim 1 wherein said support member is in the form of a tube and said coil is supported on a cylindrical coil form, end of said cylindrical coil form being received in an 25

end of said tube, and a screw connecting said coil to said radiator, said screw extending through said support member into said coil form, and said capacitor being rigidly fixed to the distant end of said coil form and connected to said coil.
 3. The antenna recited in claim 2 wherein said capacitor comprises two parts telescopically connected together.
 4. The antenna recited in claim 1 wherein said coil and said capacitor are self supporting and said coil is helical in shape.
 5. The antenna recited in claim 2 wherein said coil form is tubular and has an insert in its outer end, and said capacitor is threadably received in said insert, and said coil is electrically connected to said capacitor by a second screw extending through said coil form and into said insert and having an end of said coil connected to said screw and to said capacitor.
 6. The antenna recited in claim 1 wherein said capacitors are made of elongated members telescopically connected together whereby the said antenna can be adjusted.

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