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W. H. REYNOLDS

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ANTENNA MOUNT

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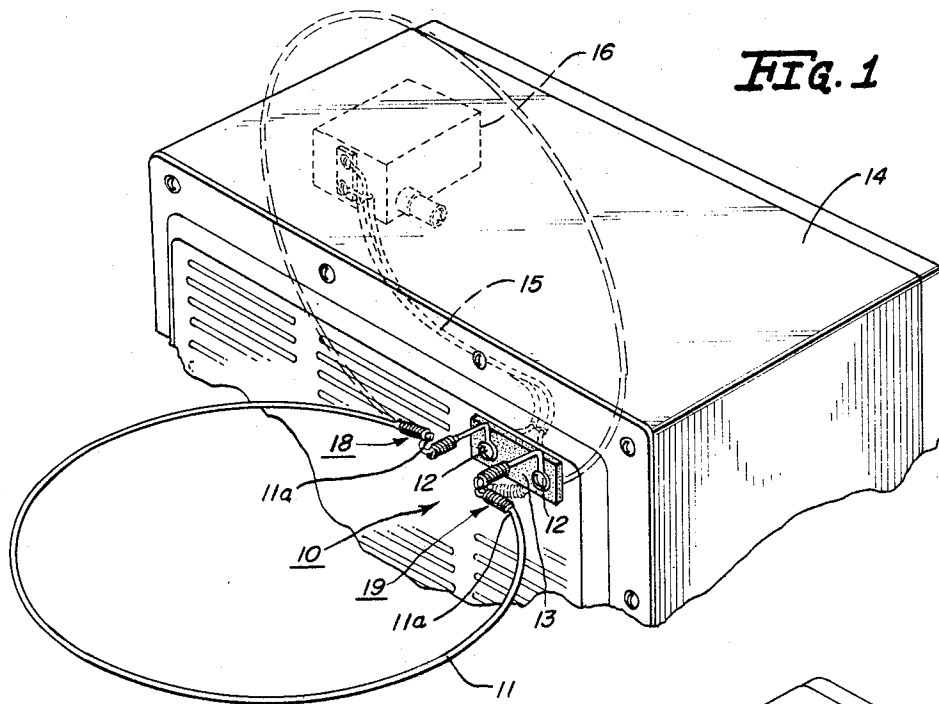


FIG. 1

FIG. 3

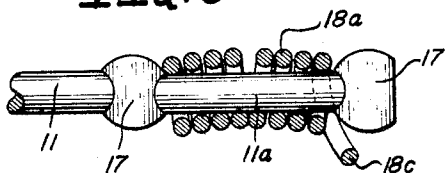


FIG. 2

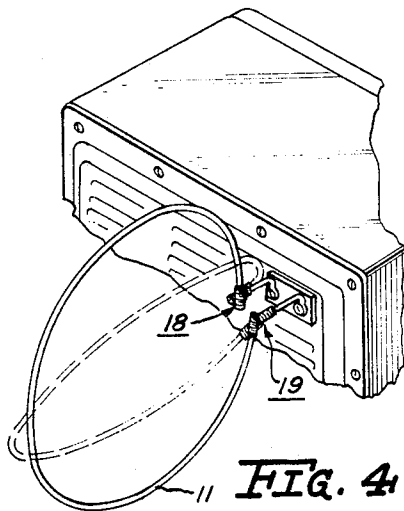
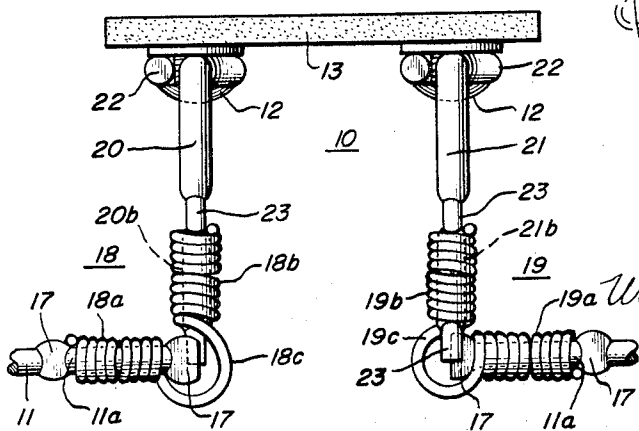


FIG. 4

INVENTOR

Wayne H. Reynolds

BY

Cornelius J. Barnett
Atty.

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ANTENNA MOUNT

Wayne H. Reynolds, Park Ridge, Ill., assignor to Zenith Radio Corporation, Chicago, Ill., a corporation of Delaware

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3 Claims. (Cl. 343-702)

This invention relates in general to antennas and in particular to a mounting arrangement for a UHF loop antenna.

The recent increase in the number of transmitting facilities in the UHF television spectrum has called attention to the fact that a fully satisfactory viewer-adjustable indoor antenna device has not been available for that spectrum. The relatively short wave lengths of UHF transmissions render the conventional monopole and dipole ("rabbit ears") antennas less than satisfactory so that resort has been had to loop type antennas. However, the characteristics of these short wave UHF transmissions are such that they are readily reflected by almost any surface they encounter. Accordingly, in order to capture a desired signal and discriminate against interfering reflected signals, the loop must be readily adjustable about at least two intersecting axes.

Toward the accomplishment of this end the prior art has resorted to metal clamps, in one form or another, for rotatably securing the loop terminals, and to pivotal posts or rivets to provide rotation of the loop about a second axis. However, such clamps and rivets tend to "spread" and/or fatigue after repeated use with the result that the frictional force relied upon to hold the loop in a desired orientation is gradually dissipated. This is of particular concern in those instances when optimum reception entails an orientation of the antenna that results in a deformation of the loop. Such deformation develops a restoring or biasing force which tends to displace the loop from the selected operating position thereby precluding optimum performance.

It is therefore an object of the invention to provide an improved universal mounting arrangement for a UHF loop antenna.

It is another object of the invention to provide a mounting arrangement for a loop antenna which adjustably secures the loop in a selected one of a multitude of possible orientations.

It is also an object of the invention to provide an inexpensive UHF loop antenna mount which eliminates the shortcomings of prior art devices.

In accordance with the invention, a universal mounting arrangement for maintaining a two-terminal loop antenna in a selected orientation relative to a television receiver or the like comprises an antenna support which includes a pair of journal members anchored to the receiver. The connecting means further comprises a pair of coupling elements each formed of a plurality of turns of a continuous wire. Each such coupling element includes a first section which is rotatably captivated in frictional engagement with one of the antenna terminals and a second section which is rotatably captivated in frictional engagement with one of the journal members. The first and second sections of each coupling element are so disposed, relative to one another, that their axes inter-

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sect. The frictional retaining force exerted by the coupling elements upon the antenna terminals and the journal members is sufficient to render the loop self-sustaining in any selected orientation achieved by rotating the loop about either or both of the aforementioned intersecting axes.

The features of the present invention which are believed to be novel are set forth with particularity in the appended claims. The organization and manner of operation of the invention, together with further objects and advantages thereof, may best be understood by reference to the following description taken in conjunction with the accompanying drawings, in the several figures of which like reference numerals identify like elements, and in which:

FIGURE 1 is a fragmentary perspective view of a television receiver embodying the subject invention, with the loop antenna also shown in dotted outline in an alternative orientation;

FIGURE 2 is a plan view of the antenna mounting arrangement shown in FIGURE 1;

FIGURE 3 is a sectional view of one of the coupling elements employed in the antenna mounting arrangement of FIGURE 2; and

FIGURE 4 is a perspective view of the antenna mount illustrating additional permissible orientations of the antenna.

FIGURE 1 shows a mounting structure 10 for electrically connecting a loop antenna 11 having a pair of free ends or terminals 11a to a pair of input terminals 12 which are threadably secured to a terminal board 13 affixed to the rear panel of a television receiver 14. Antenna 11 is formed from a length of resilient conductive wire which, in a proven commercial embodiment of the invention, comprises, approximately, a 24 inch length of .080 inch steel wire. A strip of twin-lead conductor 15 couples terminals 12 to the input circuit of a UHF tuner 16.

In addition to electrically connecting antenna 11 to terminals 12 structure 10 serves to maintain loop 11 in any selected one of a multitude of permissible orientations relative to receiver 14. To this end antenna mount 10 comprises a pair of coupling elements 18, 19, each of which includes first and second hollow sections 18a, 18b, and 19a, 19b, respectively, see FIGURE 2. Coupling elements 18, 19 are formed of a plurality of turns of a continuous electrically conductive wire with the internal surfaces of these turns presenting discrete bearing surfaces. In the aforementioned commercial embodiment, each section of coupling elements 18, 19 comprises eight turns of .041 inch steel wire. Coupling sections 18a, 18b, as well as sections 19a, 19b, have intersecting axes which, preferably, are oriented substantially normal to each other and are fixed in this relation by respective rigid bight portions 18c, 19c. As will be shown this arrangement of the coupling sections provides a "universal" mount for the antenna. Loop terminals 11a are positioned within first coupling sections 18a, 19a and adjustably secured by the frictional forces exerted thereon by the internal bearing surfaces of sections 18a, 19a. These frictional forces are preferably established by serially winding the two helical sections, while leaving a sufficient length between the sections to form the

bight portion, upon a mandrel having a diameter not less than that of the loop conductor and then, either before or after forming the bight, "knifing" or spreading a pair of adjacent turns in each section so as to impart a slight axial curvature thereto, see FIGURE 3. Accordingly, when antenna terminals 11a are inserted into coupling sections 18a, 19a biased in this fashion, the internal bearing surfaces of the helical turns exert a frictional force upon terminals 11a, sufficient to prevent a rotation of the terminals within sections 18a, 19a due to the weight of the loop. Sections 18a, 19a are captivated upon terminals 11a by upsetting or swaging those portions 17 of terminals 11a adjacent the end turns of these spring sections.

Antenna support 10 further comprises a pair of parallel electrically conductive members 20, 21 having respective journal portions 20b, 21b at one end of approximately the same diameter as loop terminals 11a and hooks or eyelets 22 at the opposite extremities which, in cooperation with terminals 12, serve to anchor members 20, 21. Journals 20b, 21b are inserted within coupling sections 18b, 19b, respectively, which, in turn are rotatably captivated by the swages 23 impressed upon those portions of journals 20b, 21b adjacent the end turns of the sections. The internal bearing surfaces of bowed sections 18b, 19b exert a frictional force on journals 20b, 21b sufficient, in this instance, to neutralize any gravitational or torsional restoring forces developed by distortion of loop 11 when rotated about journals 20b, 21b. Loop 11 is thus releasably held for rotation about either of a pair of coordinate axes by virtue of the frictional forces developed between coupling sections 18a, 19a and loop terminals 11a and between coupling sections 18b, 19b and journals 20b, 21b. Moreover, in the preferred embodiment, elements 18, 19 also serve to couple an intercepted signal from loop 11 to input terminals 12, and the frictional forces exerted by conductive helical sections 18a, 18b and 19a, 19b serve to establish a positive electrical connection between the antenna terminals and the receiver input terminals.

Consider now FIGURE 4, together with FIGURE 1, in which various orientations of the loop, helpful in understanding the operation of the antenna support means, are illustrated. Since the relatively short wavelength UHF signals tend to be reflected by almost every obstacle they encounter, it is imperative that the antenna loop be readily adjustable to any orientation within the semi-hemispherical volume or locus roughly bounded by a surface of revolution traced by the reaches of loop 11 as it is rotated about the coordinate axes defined by sections 18a, 19a and 18b, 19b. Within this locus, at least one position of the loop can establish a phasal relation between the loop and the UHF signal which, for the particular site, couples maximum signal strength to the UHF tuner concomitant with best signal-to-noise ratio.

Accordingly, while the following practice is not mandatory, it is suggested as an expeditious procedure for selecting a desired UHF channel. The loop is initially positioned in a horizontal plane, relative to earth, as shown in FIGURE 1. The loop is then rotated in either a clockwise or a counterclockwise direction, with coupling sections 18b, 19b rotating about journals 20b, 21b, until the best attainable signal, as evidenced by the quality of the picture and sound, has been captured. In the event "ghosts" appear in the reproduced picture, the loop is rotated about the coordinate axes, i.e., with antenna terminals 11a revolving within coupling sections 18a, 19a, until the interfering signal is counterphased. Because of the difficulty in ascertaining the source of reflected signals, additional adjustments of the loop about either of the coordinate axes may be required. However, regardless of how frequency or to what operating position the loop is rotated, antenna mounting structure 10 will maintain the loop in the selected position indefi-

nately by virtue of the frictional force exerted by coupling sections 18a, 18b and 19a, 19b upon the members received therein.

In summary, the invention provides a relatively simple inexpensive support for a UHF loop antenna which, by resort to a pair of coupling elements each having normally disposed helical sections, constitutes a universal mount capable of adjustably sustaining the antenna in a desired orientation.

While a particular embodiment of the present invention has been shown and described, it is apparent that changes and modifications may be made therein without departing from the invention in its broader aspects. The aim of the appended claims, therefore, is to cover all such changes and modifications as fall within the true spirit and scope of the invention.

I claim:

1. A universal mounting arrangement for maintaining a two-terminal loop antenna in any selected one of a large number of orientations relative to a wave signal receiver comprising:

antenna support means comprising a pair of journal members anchored to said receiver;
and a pair of coupling elements each formed of a plurality of turns of a continuous wire and each comprising a first section rotatably captivated in frictional engagement with one of said antenna terminals and a second section rotatably captivated in frictional engagement with one of said journal members, associated ones of said first and second sections having angularly related intersecting axes;

the frictional retaining force exerted by said coupling elements upon said antenna terminals and said journal members being sufficient to render said loop self-sustaining in any selected orientation within a locus defined by rotation thereof about either or both of said intersecting axes.

2. Means for connecting a two-terminal resilient wire UHF loop antenna to the input terminals of a wave signal receiver and for maintaining said antenna in any selected one of a large number of orientations relative to said receiver, comprising:

antenna support means comprising a pair of rigid journal members anchored to said input terminals;
and a pair of coupling elements each formed of a plurality of turns of a continuous electrically conductive wire and each comprising a first section rotatably captivated in frictional engagement with one of said antenna terminals and a second section disposed at substantially right angles to its associated first section and rotatably captivated in frictional engagement with one of said journal members;

the frictional retaining force exerted by said coupling elements upon said antenna terminals and said journal members being sufficient to render said loop self-sustaining in any selected orientation in a locus defined by rotation of said loop about either or both of a pair of coordinate axes.

3. Means for connecting a two-terminal resilient wire UHF loop antenna to the input terminals of a wave signal receiver and for maintaining said antenna in any selected one of a large number of orientations relative to said receiver, comprising:

a pair of coupling elements each comprising first and second hollow sections formed of a plurality of helical turns of a continuous electrically conductive wire, the internal surfaces of said turns presenting discrete bearing surfaces,

said first and second sections of each said coupling element being fixed relative to one another and having axes oriented substantially normal to each other; means for captivating said antenna terminals for rotation within respective ones of said first coupling sections with said bearing surfaces of said first sections exerting a frictional force upon said terminals suffi-

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cient to maintain orientation of said loop at any selected plane including the axes of said first sections; antenna support means comprising a pair of parallel fixed journal members anchored to said input terminals;

and means for rotatably captivating said second coupling sections upon respective ones of said journal members with said bearing surfaces of said second sections exerting a frictional force upon said journal members sufficient to neutralize the restoring force exerted by said antenna loop when it is rotated about the axes of said second sections, whereby said loop antenna is self-sustaining in any selected orientation

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within the locus defined by rotation with respect to a pair of coordinate axes.

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10 ELI LIEBERMAN, *Acting Examiner.*

HERMAN KARL SAALBACH, *Examiner.*