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LOOP ANTENNA

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Fig. 1.

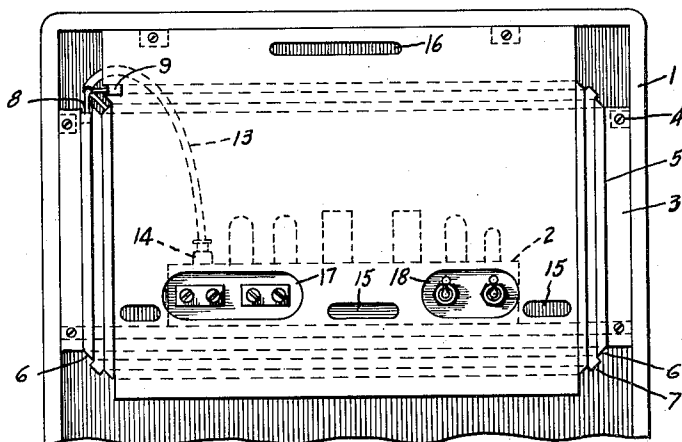
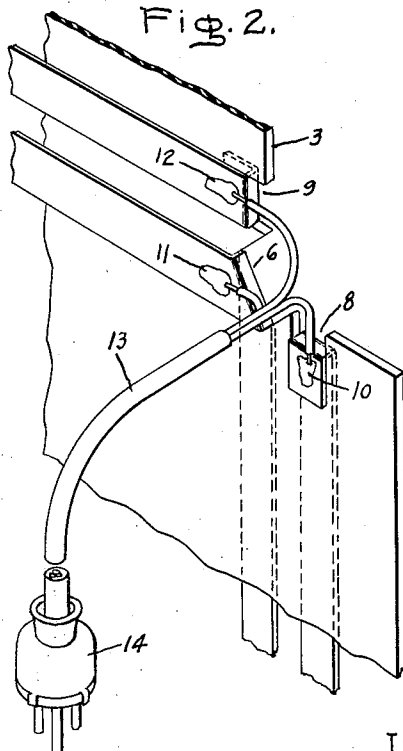


Fig. 2.



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LOOP ANTENNA

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5 Claims. (Cl. 250—33.67)

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My invention relates to radio receivers and, in particular, to loop antennas for use in such receivers. It has for one of its objects to provide a new and improved loop antenna structure which is easily manufactured in quantities at low cost.

A further object of my invention is to provide a new and improved loop antenna structure which is rugged and which is not subject to vibration due to the presence of a loud speaker in a radio cabinet.

It is a still further object of my invention to provide a new and improved loop antenna structure for a radio receiver which does not require any additional space or extra components in the receiver cabinet.

One of the features of my invention consists in utilizing the back panel of a radio receiver to support a loop antenna and winding this loop antenna as a continuous rectangular conductor having adjacent legs supported on opposite sides of the back panel.

The novel features which I believe to be characteristic of my invention are set forth with particularity in the appended claims. My invention itself, however, both as to its organization and method of operation, together with further objects and advantages thereof, may best be understood by reference to the accompanying drawings in which Fig. 1 represents a portion of a radio cabinet which includes a loop antenna constructed in accordance with my invention, and Fig. 2 is an enlarged perspective view of a portion of the antenna of Fig. 1.

Referring to Figs. 1 and 2 jointly, I have there illustrated a rear view of a radio cabinet 1 having a radio receiver chassis 2 mounted therein. Arranged behind the chassis 2 is a rear panel 3 which is attached to the cabinet by means of a plurality of screws 4. The panel 3 may be formed of any suitable insulating material, such as a pressed fiber board, and supported thereon is a loop antenna 5.

The rear panel 3 is cut away at its four corners and in each corner there is provided a plurality of notches 6 which are inclined at an angle to the edges of the panel. Each of the notches 6 is separated by a tongue 7 formed by a portion of the rear panel 3 which projects beyond the plane of the notches 6. The antenna 5 comprises an endless strip of flexible conducting material, for example, a strip of copper which is wound as a continuous winding between the notches 6 and adjacent corners of the panel 3. Furthermore, at each of the corners, the antenna 5 changes from one side of the rear panel 3 to the opposite side. In this fashion the portions of the conductive material of the antenna which extend along ad-

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jacent legs of the panel 3 are disposed on opposite sides of that panel.

In winding the antenna on the panel 3, the conductive strip is started, for example, at the upper left-hand corner of the rear panel at a horizontal notch 8 and extends along the outer surface of the panel to the upper of the inclined notches 6 at the lower left-hand corner of the panel. At that point, the strip makes a 45° bend and proceeds across the rear of the panel to the upper of the notches 6 in the lower right-hand corner. After another 45° bend, the strip passes across the outer surface of the panel to the lower of the notches in the upper right-hand corner.

The winding progresses in this fashion alternating on the inner and outer surfaces of the panel until the winding is terminated in the vertical notch 9 in the upper left-hand corner. A rear view of the upper left-hand corner is shown in Fig. 2 to illustrate how the strip is bent over the edge of the panel at the notches 8 and 9 at the beginning and termination of the winding, respectively, and how the 45° bend is made at the notches 6. Furthermore, the antenna winding is preferably secured to the back panel 3 by either cementing the conductive strip to the panel or in any other suitable fashion. Thus, the strip may have adhesive applied to one side thereof prior to the winding operation so that it adheres to the panel as it is wound thereon. Alternatively, the adhesive may be applied at the time the strip is wound on the panel. The adhesive may be such that heating by means of a heating plate is required to warm the adhesive material to obtain fastening of the strip to the panel. Alternatively, the warming may be obtained by passing current through the conductive strip and thereafter applying pressure to bring the strip into intimate contact with the panel. As another alternative, the conductive strip may be wound on the rear panel and then covered with a paper which is attached to the rear panel in any suitable manner, as by cementing.

Connections to the antenna winding may be made at any one of the corners and, in the drawings, are shown as being made at the points 10, 11, 12. Thus, if the radio receiver is to be used for reception on both the broadcast and short wave bands, a single loop may provide sufficient pick-up of energy for the broadcast band, especially if the receiver is of the low impedance input type, such as a receiver employing permeability tuning. Accordingly, such an antenna arrangement is provided by connection between the points 10 and 11. However, for short wave, it may be desirable to have two or more turns and such connection is effected by connection be-

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tween points 10 and 12. The points 10-12 may be connected by means of a cable 13 to a polarized plug 14 which is adapted to be inserted in a suitable receptacle provided in the chassis 2.

On small receivers, the panel 3 may be imperforate and sufficient ventilation for the receiving equipment provided by the cut-away portions at the four corners thereof. However, for larger receiving apparatus, it may be desirable to provide a plurality of openings 15 at the lower portion of the rear panel and an opening 16 in the upper portion of the rear panel to facilitate flow of air through the chassis and receiving apparatus to provide sufficient cooling thereof. Likewise, additional openings 17, 18 may be provided to permit access to the chassis for tuning or switching of the receiver circuits without removal of the rear panel.

While in the foregoing I have described and illustrated the antenna 5 as being rectangular in form, it is obvious that the rear panel 3 may be polygonal and have any number of edges. In such a case, the antenna 5 is wound as a continuous conductive member being placed on alternate sides of the panel for adjacent legs of the polygon.

An important advantage of my improved antenna structure is that it is both simple and low in cost to manufacture. Thus, the copper strip may be rigidly secured to the rear wall by a simple winding operation. Furthermore, the rear panel may be easily stamped by any suitable punching operation to provide a form for winding the antenna thereon.

Another important advantage is that, with the winding formed of spaced turns and cemented or otherwise secured to the rear panel, all tendency to vibrate due to reaction from the loud speaker of the receiver is eliminated.

While I have shown a particular form of my invention, it will of course be understood that I do not wish to be limited thereto since different modifications may be made without departing from the spirit and scope of my invention, and I contemplate by the appended claims to cover any such modifications as fall within the true spirit and scope of my invention.

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

1. A radio receiving system, comprising, a cabinet, a radio receiver chassis mounted in said cabinet, said cabinet including a rear panel fixed thereto and serving therewith to enclose said radio receiver chassis, said rear panel having a plurality of notches formed in each of the corners thereof, a loop antenna mounted on said panel, said antenna comprising a broad, flat strip of solid flexible conducting material wound in a continuous coil in the plane of said panel about the margin thereof, said material alternating between the front and rear sides of said panel, said alternations occurring at the corners of said panel, and said notches serving respectively as supports for successive turns of said material.

2. A radio receiving system, comprising, a cabinet, a radio receiver chassis mounted in said cabinet, said cabinet including a rear panel fixed thereto and serving therewith to enclose said radio receiver chassis, said rear panel being composed of electrical insulating material and having a plurality of notches formed in each of the corners thereof, a loop antenna mounted on said panel, said antenna comprising a broad, flat strip of solid flexible conducting material wound in a continuous coil in the plane of said panel about the margin thereof, said material alternating be-

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tween the front and rear sides of said panel, said alternations occurring at the corners of said panel, and said notches serving respectively as supports for successive turns of said material.

3. A radio receiving system, comprising, a cabinet, a radio receiver chassis mounted in said cabinet, said cabinet including a rear rectangular shaped panel fixed thereto and serving therewith to enclose said radio receiver chassis, said panel having a plurality of notches formed in each of the corners thereof, a loop antenna mounted on said panel, said antenna comprising a flat strip of solid flexible conducting material wound in a continuous rectangular coil in the plane of said panel about the margin thereof, said material alternating between the front and rear sides of said panel, said alternations occurring at the corners of said panel, said notches serving respectively as supports for successive turns of said material, and means adhesively connecting said conducting material to said panel.

4. A radio receiving system, comprising, a cabinet, a radio receiver chassis mounted in said cabinet, said cabinet including a rear rectangular shaped panel of non-conducting material fixed thereto and serving therewith to enclose said radio receiver chassis, the corners of said panel having cut portions inclined at an angle to the edges of said panel, said panel further having a plurality of notches formed in said cut portions, a flat strip of solid flexible conducting material wound between adjacent of said corners to form a rectangular antenna winding in the plane of said panel about the margin thereof, the portions of said conductor serving as adjacent sides of said rectangular winding being disposed on opposite sides of said panel, and said notches serving respectively as supports for successive turns of said material.

5. A radio receiving system, comprising, a cabinet, a radio receiver chassis mounted in said cabinet, said cabinet including a rear rectangular shaped panel of insulating material fixed thereto and serving therewith to enclose said radio receiver chassis, the corners of said panel having cut portions inclined at an angle to the edges of said panel, said panel further having a plurality of notches formed in said cut portions, a flat strip of solid flexible conducting material wound in a continuous rectangular coil in the plane of said panel about the margin thereof, said flat strip alternating between the front and rear sides of said panel, said alternations occurring at said corners, said notches serving respectively as supports for successive turns of said flat strip, and means adhesively connecting said strip to said panel.

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