

Jan. 17, 1950

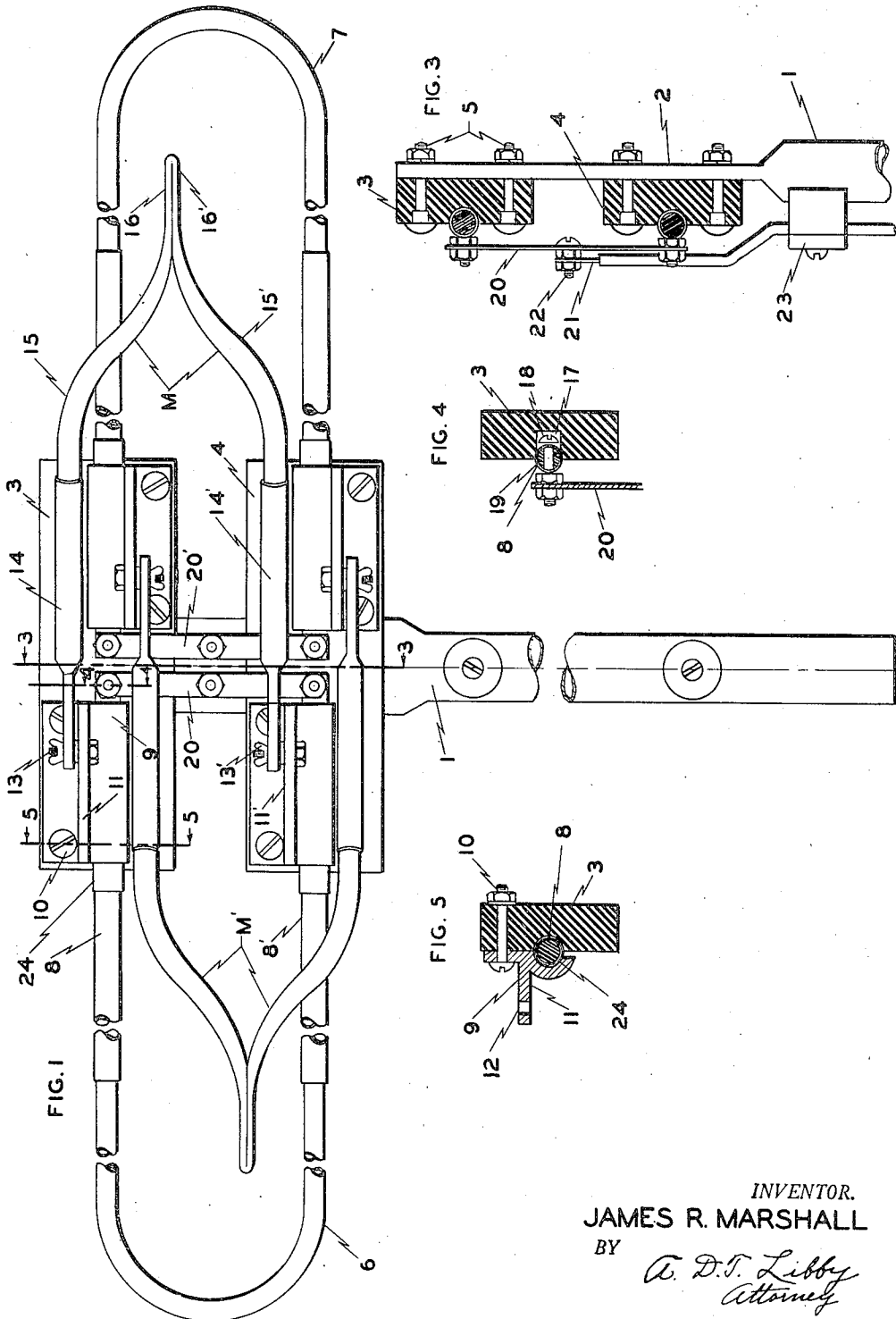
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2,494,665

DIPOLE ANTENNA CONSTRUCTION

Filed Aug. 9, 1946

2 Sheets-Sheet 1



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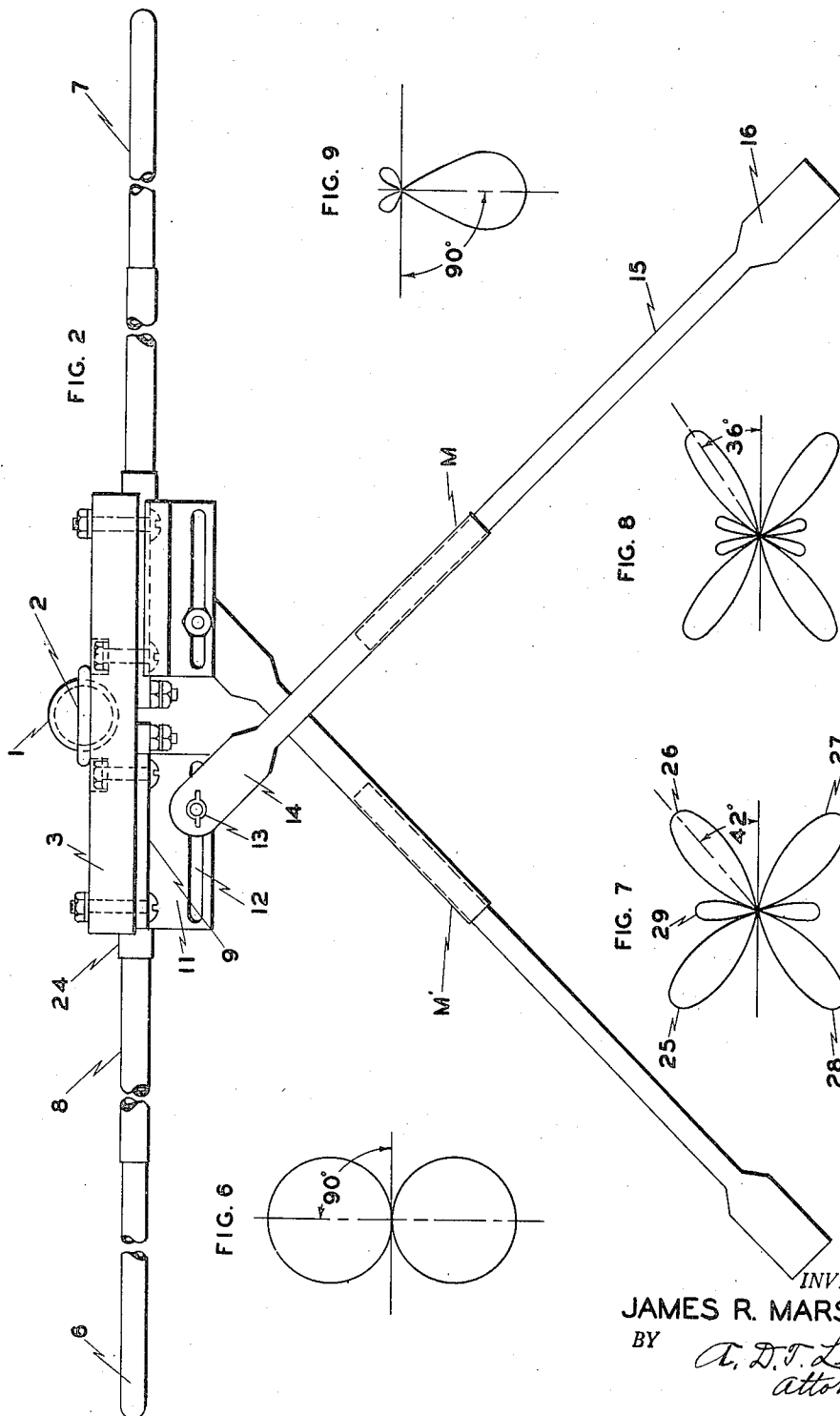
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DIPOLE ANTENNA CONSTRUCTION

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2,494,665

DIPOLE ANTENNA CONSTRUCTION

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Application August 9, 1946, Serial No. 689,420

10 Claims. (Cl. 250-33)

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This invention relates to a form of antenna especially adapted for use in television reception.

The principal object of my invention is to provide an antenna construction which is fundamentally a broad band half wave dipole with at least one modifying element projecting from the innermost end of each element for the purpose of altering the field pattern of the antenna when it is being used as a receiving antenna for the channels in the upper television band, 174 to 216 mc.

A further object of my invention is to eliminate undesirable side lobes in the horizontal radiation pattern when the antenna is being used to receive signals in the upper TV band.

A further object of my invention is to have the antenna maintain the characteristics of a half wave dipole throughout the lower television band; and by the use of modifying elements attached to the inner ends of the dipole elements and projecting obliquely to the plane of the dipole, to alter the field pattern of the half wave dipole when it is in use in the upper television band so that the antenna will be directive toward the front the same as it is in the lower television band.

A further object of my invention is to provide an antenna construction in which the previously mentioned objects may be obtained in a relatively simple and inexpensive manner.

My improved type of antenna construction is shown in the attached drawings wherein,

Figure 1 is a front elevation of the structure.

Figure 2 is a plan view of the structure shown in Figure 1.

Figure 3 is a section on the line 3-3 of Figure 1.

Figure 4 is a section on the line 4-4 of Figure 1.

Figure 5 is a section on the line 5-5 of Figure 1.

Figure 6 is a schematic view of the radiation field pattern in a horizontal plane containing the antenna elements when the main elements form a dipole of one-half wave length and when the modifying elements are not used.

Figure 7 illustrates a pattern taken from the same dipole antenna as from which the pattern of Figure 6 has been taken but when the frequency has been increased, or the wavelength has been decreased, to a point where the main elements of the antenna form a dipole of three halves wave length long.

Figure 8 is a view similar to Figure 7 but illustrating the condition when the frequency has been increased to the point where the main ele-

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ments of the antenna form a dipole of two wave lengths long.

Figure 9 is a diagram illustrating the radiation field pattern of the antenna in a horizontal plane containing the elements at the condition shown in Figures 7 and 8 when the modified elements of my improved constructions are utilized.

Referring now to the details wherein like numbers refer to corresponding parts, 1 is a standard for supporting the various parts of the antenna. The standard 1 is preferably made out of tubing, the upper end of which is flattened at 2 and on this flat portion is mounted a pair of insulators; 3 and 4 of suitable material, these insulators being fastened to the part 2 of the standard by any satisfactory means as by screw studs, lock washers and nuts, generally referred to by the number 5. The main part of the dipole antenna comprises two sections, 6 and 7 which are preferably made of tubing of suitable metal such as aluminum or copper. The section 6 has base portions 8 and 8' which telescopically receive the two arms of section 6. The sections 8 and 8' are alike so the description of one will do for both. The portion 8 is fastened to the insulator 3 as illustrated in Figure 5 by means of a slotted clamp 9 which engages a reinforcing sleeve 24 that is fastened to the insulator 3 by screw stud 10. The clamp 9 has a projection 11 with a slot 12 therein to receive a clamping stud 13 positioned in the end 14 of one end of the section 15 of one of the modifying members. The section 15 may be telescopically mounted in its cooperative part 14 and terminates in a flat end 16 which is welded or riveted to a cooperative frame portion 16' of section 15' that may be telescopically positioned in the part 14' that is pivoted at 13' to a member 11'.

From the above description it will be seen that the radiating field pattern modifying member M is composed of the sections 14 and 15 and 14' and 15' and is adjustable on its mountings and the cooperative portions are telescopically adjustable, one with respect to the other. The modifying member M shown in the left hand portion of Figure 1 is similar in construction in its mounting as M and acts to modify the radiating field action of the dipole section 6 in the same manner as the modifier M acts in connection with the dipole section 7.

Figures 3 and 4 show the connections made with respect to the main antenna sections containing elements 6 and 8. It is seen by reference to Figure 4 that the insulator 3 has a recess 17 therein. Positioned in this recess is a screw

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18 which passes through the section 8 of the antenna as well as through a stiffening member 19 that may be of wood and extends outwardly even into the arm of the antenna. The screw 18 also passes through and is fastened to a connecting strap 20 that goes across and connects to the opposite arm of the antenna 6 as illustrated in Figures 1 and 3. An electrical conductor 21 is fastened to the bar 20 at its center, in any satisfactory manner as by screw stud and associated parts 22. This conductor 21, which is preferably insulated, is supported by an insulator 23 that is fastened to the standard 1 in any satisfactory manner. An electrical connection is made to the antenna section 7 in a similar manner by a metallic strap 20'.

In order to clarify the following paragraphs, Figures 6, 7, 8 and 9 represent a polar plot of the radio frequency voltage produced across the terminals of the antenna as a function of rotation of the antenna, in degrees, in the plane of the elements when the antenna elements lie in the plane perpendicular to the electromagnetic flux lines of the polarized field of the transmitting signal, referred to as a horizontal plane in present television practice.

It will be seen from Figure 2 that the supplemental antenna section M, and M' which I referred to as modifiers have an arcuate movement as well as individual close fitting telescopic action between the parts. By reason of this construction I am able to adjust these modifiers so as to produce a variety of effects, one being the results depicted diagrammatically in Figure 9 wherein the objectionable features illustrated by the lobes 25, 26, 27, 28 and 29 in Figure 7 and all of the similar lobes in Figure 8 are eliminated.

It is then possible by this mechanical and electrical design to control the magnitude and electrical phase relationship of any induced radio frequency currents flowing in the elements of the above-described antenna by mechanical movement of the elements so as to produce current flow in the elements that are orientated in the field of the transmitted radio frequency signal as indicated by Figure 9.

As previously stated this above modification applies only at the condition when the main elements are one and one-half or two wave lengths long as described with respect to Figures 7 and 8. It does not disturb its function as a half-wave dipole described in Figure 6.

Having thus described my invention, what I claim is:

1. A dipole antenna construction including a support, a pair of U-shaped members, comprising the main part of the antenna, insulatively mounted on the support with the arms of the U's projecting toward each other in substantially the same alignment and plane, the extremities of each U member being electrically connected together by a metallic member of very low impedance, the said members having means for making an electrical connection thereto midway between said U extremities and means comprising modifying elements directly connected to the inner ends of each of the said main parts and projecting therefrom in opposite directions to said parts to which they are connected for eliminating undesirable lobes in the horizontal radiation pattern of the antenna when certain undesirable radio waves encounter said main parts of the antenna construction.

2. A dipole antenna construction as set forth

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in claim 1 further defined in that said second mentioned means comprises two modifying devices, one for each of the main parts of the antenna, each of said devices having spaced arms at least electrically connected to the arm of its associated main antenna part, said spaced arms converging to a junction and anchored together thereat.

3. A dipole antenna construction as set forth in claim 1 further defined in that said second mentioned means comprises two modifying devices, one for each of the main parts of the antenna, each of said devices having spaced arms mechanically and electrically connected to the corresponding arms of its associated main antenna part, the arms being laterally spaced from and extending at an angle with the arms of the main antenna parts and converging to a junction and anchored together thereat.

4. A dipole antenna construction as set forth in claim 1 further defined in that said second mentioned means comprises two modifying devices, one for each of the main parts of the antenna, each of said devices having spaced arms at least electrically connected to the arm of its associated main antenna part, the arms having adjustable sections and being laterally spaced from the arms of the main antenna parts and extending at an adjustable angle with respect thereto, the two arms of each device converging to a junction and anchored together thereat.

5. A dipole antenna construction including a support, a pair of U-shaped members, comprising the main part of the antenna, insulatively mounted on the support with the arms of the U's projecting toward each other in substantially the same alignment and plane, the extremities of each U member being electrically connected together by a metallic member of very low impedance, the said members having means for making an electrical connection thereto midway between said U extremities and means comprising modifying elements connected electrically to the inner ends of the main dipole elements and projecting therefrom obliquely to the plane of said main elements for eliminating undesirable lobes in the horizontal radiation pattern of the antenna when the frequencies of the signals being received are outside the band of frequencies for which the main elements of the antenna were designed.

6. A dipole antenna construction as set forth in claim 5 further defined in that said second mentioned means includes a modifying device for each main antenna part, each of said devices having a pair of spaced arms, one end of which is pivotally and slidably mounted and at least electrically connected to the arms of their associated main antenna parts, the arms converging to a junction and anchored together thereat.

7. A dipole antenna construction including a support, a pair of U shaped members, comprising the main part of the antenna, insulatively mounted on the support with the arms of the U's projecting toward each other in substantially the same alignment and plane, the extremities of each U member being electrically connected together by a metallic member of very low impedance, the said members having means for making an electrical connection thereto midway between said U extremities, and modifying means comprising mechanical devices connected to the ends of the U members preferably adjustably mounted and so formed and connected as described to control the magnitude and phase re-

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lationship of any induced radio frequency currents flowing in the main antenna parts whereby objectionable features as illustrated and described are eliminated.

8. A dipole antenna construction including a support, insulating means carried by the support, the two members of the dipole being fastened to said insulating means and means comprising U-shaped modifier elements directly connected to the adjacent ends of the dipole members and projecting in front of the plane of said dipole members for eliminating undesirable side lobes in the horizontal radiation field pattern of the antenna when radio waves of a frequency higher than that for which the main members are designed, encounter the antenna.

9. A dipole antenna construction as set forth in claim 8 further characterized in that each modifier element consists of at least one arm connected to an inner end of one of the main members and extending therefrom in front of the other main member.

10. A dipole antenna construction comprising a pair of U-shaped tubular electrical conducting

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members the arms of which are in sections that are telescopically adjustable with respect to each other, the said arms having their ends carried in reinforcing means on insulators in adjacent relationship, the two members being diametrically oppositely positioned but in the same plane, connectors for at least electrically connecting the ends of U members, support means for said insulators and further means carried by said support means for making electrical connections to the center of said connectors.

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