Jan. 12, 1954 E. J. EHRBAR ET AL 2,666,138

ANTENNA

Filed May 25, 1950

FIG. 1

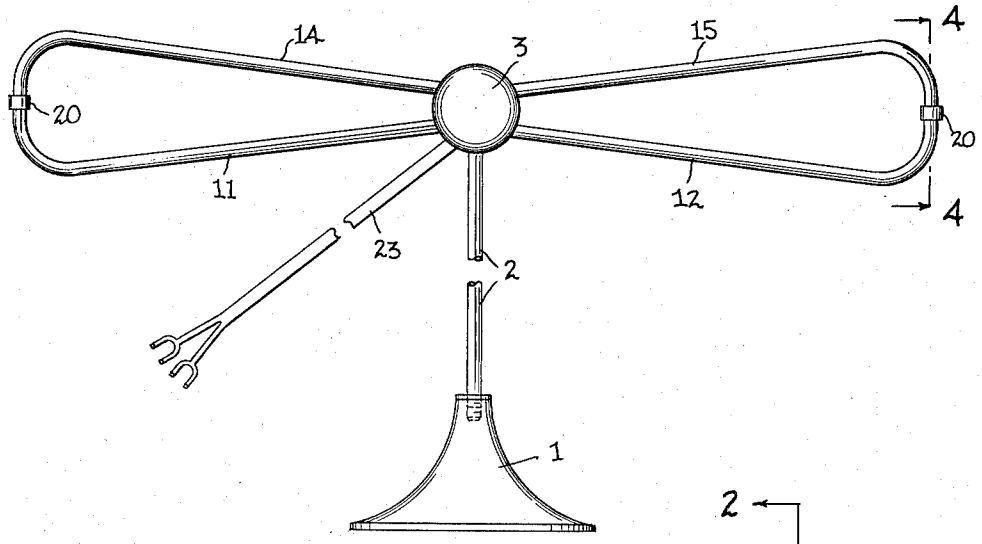
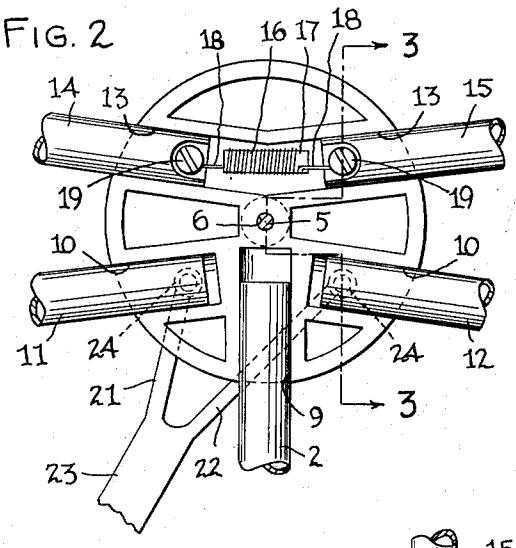


FIG. 2



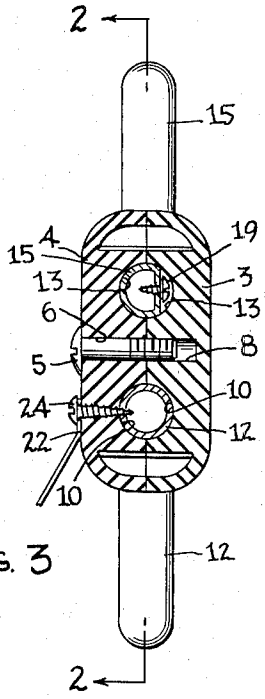


FIG. 3

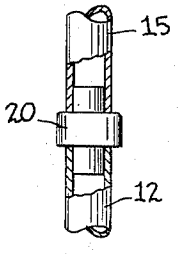


FIG. 4

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7 Claims. (Cl. 250—33)

1

This invention relates, as indicated, to an antenna, but has reference more particularly to an improved indoor antenna, which is particularly adapted for use in connection with television sets.

A primary object of the invention is to provide an antenna of the character described, which is of simple, sturdy construction, and is so designed as to be broadly resonant to all present broadcasting channels.

Another object of the invention is to provide an antenna of the character described, comprising two sets of dipoles, one of which is so designed as to be in resonance electrically with television broadcasting stations in the present high band television allocation or spectrum, and the other of which comprises elements of a combination which is in resonance electrically with television broadcasting stations in the present low band television allocation or spectrum.

A further object of the invention is to provide an antenna of the character described, consisting of two sets of dipoles, one of which is mechanically as well as capacitatively coupled with the other.

A still further object of the invention is to provide an antenna of the character described, which is highly efficient in use, and well adapted for indoor use, producing a signal strength which is superior to those of other indoor antenna conventionally used for television purposes.

Other objects and advantages of the invention will be apparent during the course of the following description.

In the accompanying drawings, forming a part of this specification, and in which like numerals are employed to designate like parts throughout the same.

Fig. 1 is a front elevational view of an antenna, embodying the principal features of the invention;

Fig. 2 is a fragmentary view, at full size scale, of the central portion of the antenna, with the front cover plate or disc removed, and taken on the line 2—2 of Fig. 3;

Fig. 3 is a cross-sectional view, taken on the line 3—3 of Fig. 2, and

Fig. 4 is a fragmentary cross-sectional view, taken on the line 4—4 of Fig. 1.

Referring more particularly to the drawings, the antenna will be seen to comprise a base 1, molded from a plastic material, such, for example, as Bakelite, and having threadedly secured thereto a mast 2 formed of metallic tubing, preferably aluminum tubing.

2

Mounted on the upper end of the mast 2 is a circular antenna support, consisting of a front plate or disc 3 and a rear plate or disc 4, the discs 3 and 4 being molded from a plastic insulating material, such as Bakelite, and being removably secured to each other, as by a screw 5 passing through a central aperture 6 in the rear plate and into a threaded axial recess 8 in the front plate. The plates 3 and 4 are molded to provide radial recesses 9, of semi-circular corss-section, which coact to receive and snugly engage the upper end portion of the mast 2.

The plates 3 and 4 are also molded to provide downwardly extending divergent recesses 10 of semi-circular cross-section, which coact to receive and snugly engage the inner ends of aluminum tubes 11 and 12 which form elements of a dipole, which are so dimensioned as to be in resonance electrically with television broadcasting stations in the present righ band television allocation or spectrum, such, for example, as channels 7 to 13, inclusive

The plates 3 and 4 are also molded to provide upwardly extending divergent recesses 13 of semi-circular cross-section, which coact to receive and snugly engage the inner ends of aluminum tubes 14 and 15, which form elements of a second dipole. The inner ends of the tubes 14 and 15 are spaced from each other, and the recesses 13 are in communication with each other, forming a space between the tubes 14 and 15, in which a coil 16 is disposed. The coil 16 is an inductance coil, preferably formed of fine enameled wire, wound around a core 17 such as Bakelite, or other suitable material, the ends 18 of the coil being clamped to the tubes 14 and 15 by the heads of self-tapping screws 19 which are threaded into the tubes.

The coil 16 has an inductance, which permits the combination of the dipole elements 14 and 15 and the coil 16 to be in resonance electrically with television broadcasting stations in the present low band television allocation or spectrum, such, for example, as channels 2 to 6, inclusive.

The dipole elements 11 and 12 are bent upwardly at their outer ends, and the dipole elements 14 and 15 are similarly bent downwardly at their outer ends extending downwardly to points spaced from the outer ends of the elements 11 and 12. Buttons 20, formed of a plastic insulating material are employed as means for mechanically joining the dipole elements 11 and 12 to the dipole elements 14 and 15 at their ends. From an electrical standpoint, the buttons 20

form the dielectric material for condensers or capacitors, which consist of these buttons and the portions of the dipole elements which they connect. They serve to couple voltage at the ends of the dipole formed by the elements 14, 15 and 16 to the lower dipole made up of the elements 11 and 12, that is to say, the dipoles are coupled electrically by means of capacitance established through the insulating material of buttons 20.

The dipole 14—15 is electrically loaded at the center by means of the coil 16 and the combination of these is capacitatively coupled to the dipole 11—12 at their ends. While the entire antenna might be considered as a combination of inductive and capacitative coupling, the major coupling is capacitative.

Although the use of aluminum tubing has been referred to, it will be understood that brass tubing or other tubing of a conductive material may be employed.

The terminals or contacts 21 and 22 of a transmission line 23 are secured electrically to the tubes 11 and 12, as by clamping such contacts to the plate 4 by means of the heads of self-tapping screws 24 which extend through the plate 4 and into threaded engagement with the tubes 11 and 12. The transmission line 23 is a conventional one employed to connect the antenna to the television set or receiver.

While the lower dipole elements are shown as in divergent relation to the upper dipole elements, it will be understood that they can also be parallel with each other.

An antenna, as thus constructed, has been found highly efficient in use, and well adapted for indoor use, producing a signal strength which is superior to those of other indoor antenna conventionally used for television purposes.

The parts are easy to manufacture and assemble, and the construction is relatively inexpensive, and well adapted for mass production.

It is to be understood that the form of our invention, herewith shown and described, is to be taken as a preferred example of the same, and that various changes in the shape, size and arrangement of parts may be resorted to, without departing from the spirit of our invention or the scope of the subjoined claims.

Having thus described our invention we claim:

1. An antenna for television purposes and the like, comprising a base, a mast, a pair of connected discs of insulating material mounted on said mast and disposed with their axes in a substantially horizontal plane, a pair of dipole elements mounted in said discs with their inner ends in spaced relation from each other, a second pair of dipole elements mounted in said discs above said first-named pair, and with their inner ends in spaced relation from each other, and an inductance coil disposed within said discs, in the space between said second pair of dipole elements, and having its ends connected to said second pair of dipole elements.

2. An antenna, as defined in claim 1, in which said first pair of dipole elements have upturned outer ends, and said second pair of dipole elements have downturned outer ends in spaced relation to the upturned ends of the first elements, and buttons of insulating material are disposed in the spaces between said outer ends and are mechanically connected to said outer ends.

3. An antenna for television purposes and the like, comprising a base, a mast supported by said base, a pair of substantially flat discs of insulating material mounted on said mast and disposed with their axes in a substantially horizontal plane, screw means interconnecting said discs and clamping said discs to said mast, a pair of divergent dipole elements mounted in said discs with their inner ends in spaced relation to each other, a second pair of divergent dipole elements mounted in said discs above said first-named pair, and with their inner ends in spaced relation from each other, and an inductance coil disposed within the space between said second pair of dipole elements, and having its ends connected to the inner ends of said second pair of dipole elements, said first pair of dipole elements having upturned outer ends, and said second pair of dipole elements having downturned ends in spaced relation to the upturned ends of the first elements, buttons of insulating material disposed in the spaces between said outer ends and mechanically connected to said outer ends, a transmission line having terminals, and means electrically connecting said terminals to the inner ends of said first pair of dipole elements.

4. An antenna, as defined in claim 3, in which said means comprises screws extending through one of said discs and to the inner ends of said first pair of dipole elements, the heads of said screws clamping said terminals to said disc.

5. An antenna for television purposes and the like, comprising a dipole comprising spaced rod-like elements having upturned ends, and a second dipole comprising spaced rod-like elements having down-turned ends in spaced relation to the upturned ends of the first elements, buttons of insulating material disposed in the spaces between said ends and mechanically connected to said ends, and an inductance coil connecting the elements of the second dipole.

6. An antenna, as defined in claim 5, in which the elements of the first dipole extend downwardly from the space between them and diverge from each other, and the elements of the second dipole extend upwardly from the space between them and diverge from each other.

7. An antenna, of the character described, comprising a base, a mast, a pair of connected discs of insulating material mounted on said mast, dipole elements in spaced relation to each other mounted in said discs, and other dipole elements mounted in said discs and capacitatively coupled to said first-named elements, said second dipole elements being connected by an inductance coil disposed within said discs.

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