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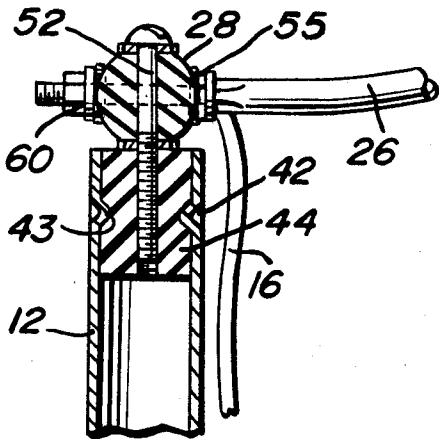
[54] **MAST-MOUNTED LOOP ANTENNA**
11 Claims, 5 Drawing Figs.

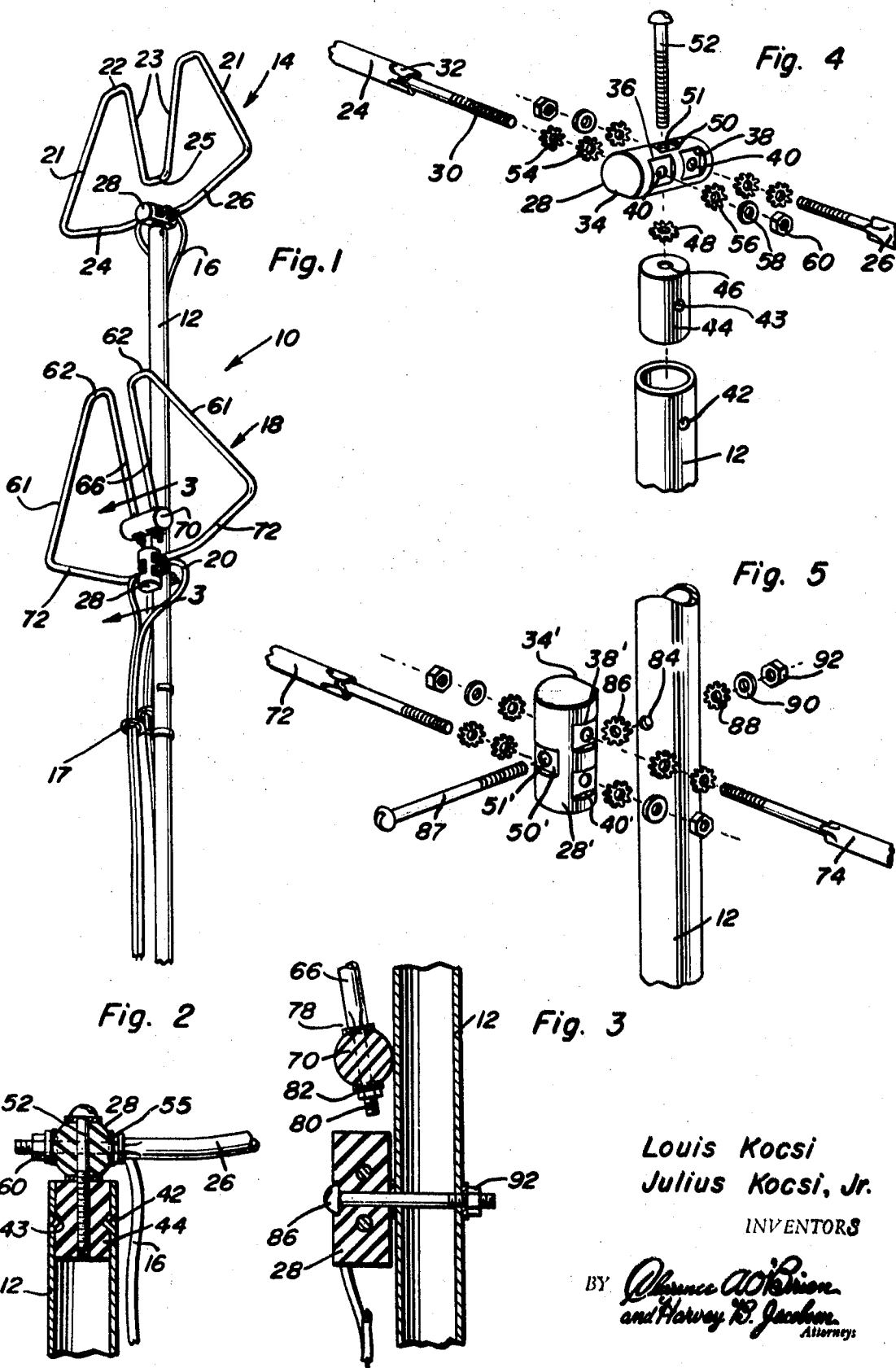
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ABSTRACT: An antenna assembly including separate antennas for receiving UHF and VHF signals disposed along spaced points on an antenna mast. The UHF antenna forms a closed configuration aligned in a plane at the top of the mast while the VHF antenna is characterized by two triangular members fastened to the mast in side-by-side relation aligned in a plane at an angle to the mast. Specially formed cylindrical insulative blocks, connected to the mast, furnish anchoring mounting support for the antennas.





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MAST-MOUNTED LOOP ANTENNA

The present invention relates to UHF and VHF antenna assemblies.

All television sets currently manufactured must be provided with UHF and VHF tuners. Generally, the television manufacturer includes a single loop UHF antenna and a "rabbit ear" antenna for VHF reception. These are mounted on the TV housing. Such indoor antennas provide satisfactory reception in a limited number of areas where reception is strong. UHF transmission is rather directional and requires line of sight alignment of the antenna relative to a UHF transmitter. Similar problems have always existed in regard to the reception of VHF signals. Thus, it would be highly desirable for a television owner to have at his disposal an antenna assembly to be mounted outdoors and including separate efficient antennas for UHF and VHF reception.

The present invention includes separate UHF and VHF antenna members to assure maximum reception efficiency. The design of each antenna has been found to be superior to many existing designs so that maximum television receiver performance can be realized. Further, the present invention lends itself to rapid assembly and is designed for rigid construction by utilizing easily and inexpensively fabricated components.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIG. 1 is a perspective view illustrating the present invention.

FIG. 2 is a partial sectional view depicting the means for mounting the upper, UHF antenna to the mast.

FIG. 3 is a sectional view illustrating the mounting of the lower, VHF antenna member to the mast.

FIG. 4 is an exploded view illustrating the mounting components for the upper, UHF antenna member.

FIG. 5 is an exploded view illustrating the mounting components for the lower, VHF antenna member.

Referring to the drawings and more particularly FIG. 1 thereof, the present antenna assembly is generally indicated by reference numeral 10 and is seen to include a central antenna mast 12 of conventional design mounting a first UHF antenna or active element generally indicated by reference numeral 14 atop the mast. Suitable antenna cable 16 is connected to the antenna and is secured to the mast by standoff insulators 17 in the usual manner.

A second VHF antenna or active component 18 is mounted beneath the first antenna, at an intermediate point along the length of the mast 12. A suitable antenna cable 20 is connected to the VHF antenna and as in the case of the aforementioned antenna cable 16, is fastened by means of standoff insulators 17 to the mast 12. The opposite ends of the cables are connected in the usual manner to a television receiver.

Considering the particular shape of antenna 14, it may fairly be characterized as a generally sinusoidal shape having upwardly inclined conductor sections 21 extending to arcuate peak sections 22 separated by a valley portion including downwardly and confrontingly inclined sections 23, the latter terminating at a short bridging section 25. Generally horizontal base sections 24 and 26 extend toward one another from the upwardly inclined sections 21. The ends of the connecting sections are disposed an insulative block 28, which is fastened atop the mast 12.

The length of the antenna is, of course, related to the wavelength of the energy transmitted thereto, in accordance with conventional electromagnetic theory. The shape of antenna 14 is such that it extends upwardly in a relatively compact configuration from the lowermost portion from which signal energy is transmitted to the receiver.

The particular means for mounting the antenna to the insulative block will be better appreciated by referring to FIG. 4 wherein there is shown the actual construction of the ends of base sections 24 and 26 which are tubular rods. Since both

base sections are provided with the same mounting structure only the end of base section 24 is described. A threaded connector shaft 30 is inserted within the tubular end of base section 24 which is crimped to the shaft as indicated by 32. The mounting block 28 which anchors the threaded shafts 30 includes a flattened surface 34 abutting the upper end of the mast. A chordal recess 36 is disposed 90° from the flattened surface 34. A second chordal recess 38 is formed adjacent the recess 36 and bored apertures 40 pass through the central portions of the recesses 36 and 38. An identical pair of recesses are formed diametrically opposite to the recesses 36 and 38 through which the bored apertures 40 extend.

With continued reference to FIG. 4, the threaded shaft 30 associated with section 24 passes through the cylindrical block 28 and exits through recess 36. Likewise, the threaded shaft from section 26 passes inwardly through the recess 38 and exits through the recess on the diametrically opposite side of the block. Suitable hardware to be discussed hereinafter secures the threaded shafts in the block.

The components for securing the block 28 to the mast include a vertically disposed cylindrical block 44 having an axial bore 46 formed therethrough. This cylindrical plug is inserted into an upper end portion of the mast 12 having inwardly extending and diametrically opposite detent projections 42. The diameter of the cylindrical plug 44 is such as to permit press-fitting of the projection 42 in the recess 43 formed in the block 44, and the upper end of the mast is disposed in coincidence with the upper end of the block. The planar surface 34 of the block 28 abuts a lockwasher 48 positioned between the planar surface 34 and the end face of the cylindrical plug 44 in order to prevent relative rotation therebetween. A square chordal recess 50 similar to the aforementioned recesses 36 and 38 is formed in the block, diametrically opposite the flat surface 34. A bore 51 extends through the recess and is adapted to be disposed in spaced axially aligned relation to the bored aperture 46 in cylindrical member 44. The alignment of the bored apertures 51 and 46 allows the insertion of a fastener bolt element 52 through apertures 51 and 46. In order to permit the securement of the bolt within the cylindrical member or plug 44, the bored aperture 46 is threaded.

Since the hardware employed in fastening the threaded shafts 30 of both sections 24 and 26 in the cylindrical block 28 is identical, only one set of hardware will be described. A pair of juxtaposed lockwashers 54 are positioned on the portion of threaded shaft 30 passing into the block 28, one lockwasher 54 making planar contact with the confrontingly positioned recess formed in the block. In a preferred embodiment of the present invention, the lockwashers 54 serve to clamp or sandwich a terminal lug 55 (FIG. 2) of signal lead 16. It is via this connection that electrical continuity between the antenna member 14 and the signal cable 16 is effected. The threaded shaft 30 is prevented from withdrawal from the block 28 by means of a lockwasher 56 disposed on the outwardly extending end portion of the threaded shaft 30. The lockwasher 56 flatly engages recess 36 formed in the block. A plain washer 58 and outwardly disposed nut 60 complete the fastening assembly on the threaded shaft end. Thus, the antenna 14 is secured to the top of the mast substantially aligned with a plane containing the longitudinal axis of the mast.

Referring once again to FIG. 1, the antenna 14 while of a one-piece construction, the antenna 18 is made from two separate but equal members of lengths to accommodate reception of signal energy at the desired wavelengths. The design characteristics of the VHF antenna 18 may be fairly characterized two right triangular conductor members retained in side-by-side planar relation. Each of the members includes an outer hypotenuse leg section 61 extending to an upwardly disposed arcuate apex section 62. Each triangular member further includes an inner vertical leg section 66 extending downwardly from the arcuate apex portion 62 and terminating short of the base sections 72. The free ends of the sections 66 are connected together by an insulator block 70.

The base sections 72 are integrally connected with the hypotenuse section. The free ends of the base sections 72 extend inwardly in confronting relation with one another. These free end portions are anchored within a cylindrical insulator block 28' identical to the previously discussed cylindrical block 28.

Referring to FIG. 3, the foreshortened end portions 66 of each triangular antenna 18 includes a threaded shaft 80 crimped thereto in the same manner as previously discussed in connection with the threaded shaft 30 in FIG. 4. A lockwasher 78 is placed on the threaded shaft 80 and is received within a recess formed in the block 70. A nut 82 and associated locking hardware threadingly engages the outwardly extending portion of the threaded shaft 80 thereby effecting the securement of the foreshortened sections 66 to the block 70. Recesses are formed in block 70 to accommodate the locking hardware associated with each nut 82.

Referring to FIG. 5, the fastening hardware associated with cylindrical block 28' is illustrated. A bored aperture 84 extends diametrically through shaft 12 thereby permitting the passage of a threaded fastener bolt element 86 therethrough. The cylindrical block 28' is oriented in a vertical direction so that the flattened surface 34' lies in juxtaposition with respect to the mast 12. The threaded bolt 86 passes through the bored aperture 51' formed through recess 50'. A lockwasher 87 is located between the flattened surface 34' and the shaft 12 to prevent rotational motion between the block 28' and mast 12. The outwardly passing end of bolt 86 mounts three fasteners including a lockwasher 88 for contacting the mast 12, a plain washer 90 being placed in engaging relation with the lockwasher 88, and a nut 92 for effecting securement of block 28' to the mast 12. The finally assembled disposition of block 28' against the mast 12 is illustrated in FIG. 3. The antenna 18 is thereby secured to the mast substantially aligned with a plane disposed at an acute angle to the longitudinal axis of the mast.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention.

What is claimed as new is as follows:

1. A support assembly for reactively loaded loop antenna having a pair of spaced conductor sections, comprising a mast, a generally cylindrical insulator block having a planar portion confronting the mast, a fastener element extending through the block and into the mast substantially perpendicular to said

planar portion, assembly means mounted on the fastener element in engagement with the mast holding the block assembled thereon in an orientated position, and elongated connectors extending from the conductor sections through the block in substantially perpendicular spaced relation to the fastener element.

2. The combination of claim 1 wherein said mast is tubular in cross section having an open upper end, said assembly means comprising a nonconductive plug closing said upper end through which the fastener element extends.

3. The combination of claim 2 wherein the block is formed with axially spaced recesses, on either side of the fastener element, through which the connectors extend.

4. The combination of claim 1 wherein the block is formed with axially spaced recesses, on either side of the fastener element, through which the connectors extend.

5. The combination of claim 1 wherein said assembly means comprises washers mounted on the fastener element on opposite sides of the mast and a nut threadedly mounted on the fastener element clamping the mast between said washers with the planar portion of the block substantially parallel to the mast.

6. The combination of claim 5 wherein the block is formed with axially spaced recesses, on either side of the fastener element, through which the connectors extend.

7. The combination of claim 2 including a second antenna having spaced conductor sections and a second insulator block identical to the first-mentioned block, a second fastener element extending through the second block and the mast in vertically spaced relation below the upper end and clamping means mounted on the second fastener element holding the second block assembled on the mast, the conductor sections of the second antenna having connectors extending through the second block laterally spaced from the mast.

8. The combination of claim 7 wherein the second antenna includes a connector block interconnecting said conductor sections and held in abutment with the mast above the second insulator block.

9. The combination of claim 8 wherein each of the insulator blocks is formed with axially spaced recesses, on either side of the fastener element, through which the connectors extend.

10. The combination of claim 1 wherein said antenna includes two substantially triangular configurations having bases formed by said spaced conductor sections, said triangular configurations being interconnected above the insulator block.

11. The combination of claim 10 wherein the triangular configurations are interconnected by a nonconductive connector block in abutment with the mast.

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