

Jan. 9, 1968

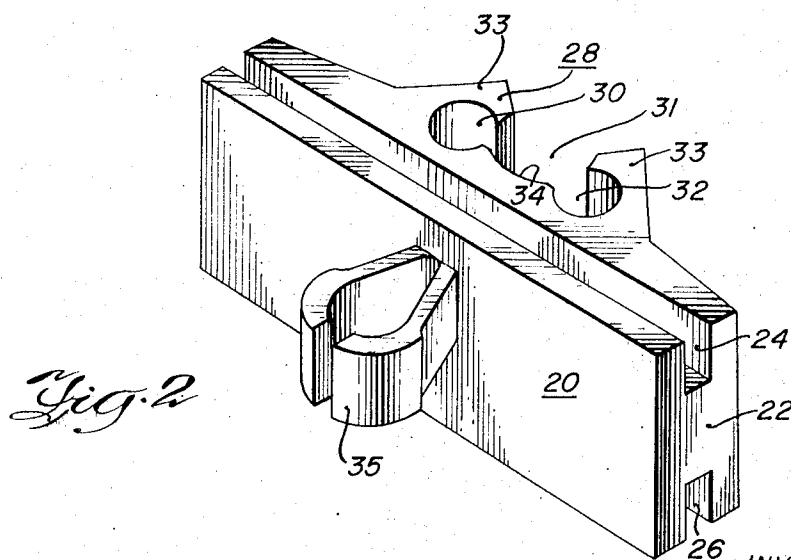
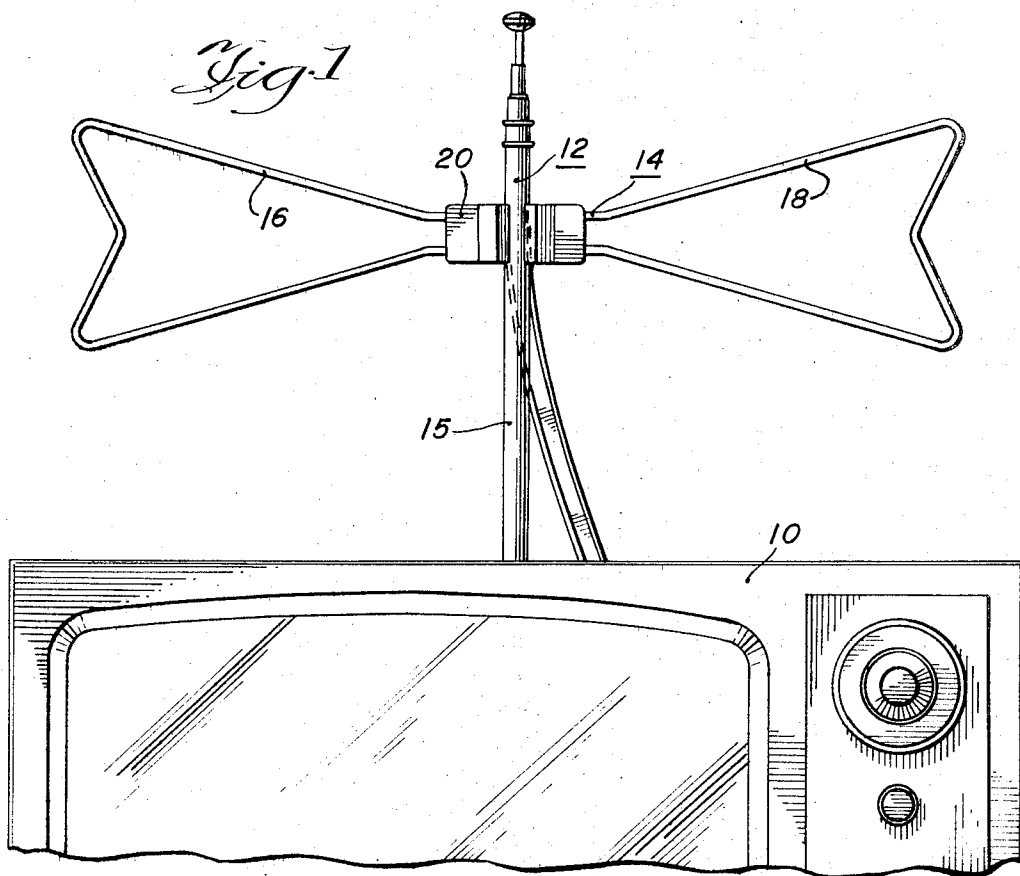
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3,363,255

FAN DIPOLE WITH MOUNTING CLIP

2 Sheets-Sheet 1

Filed Sept. 28, 1964



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Fig. 1

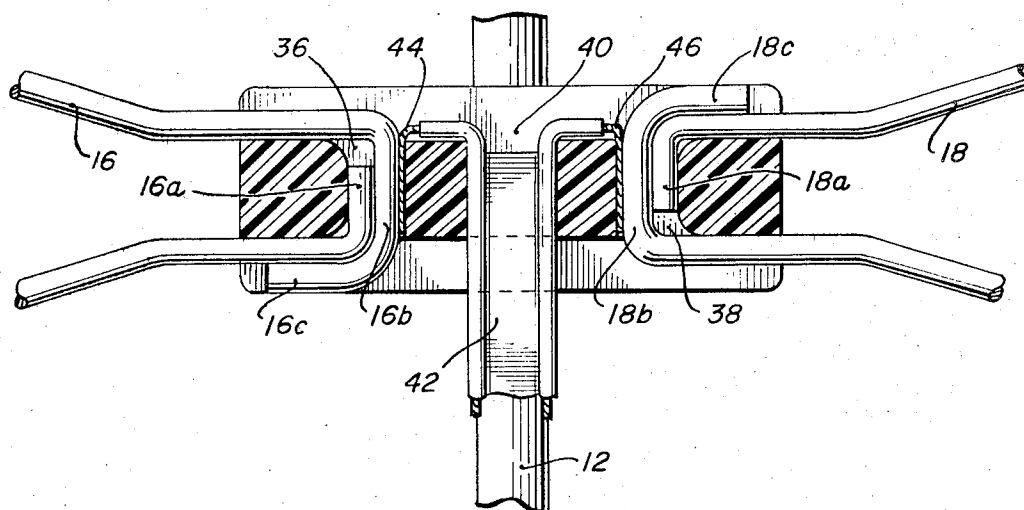


Fig. 3

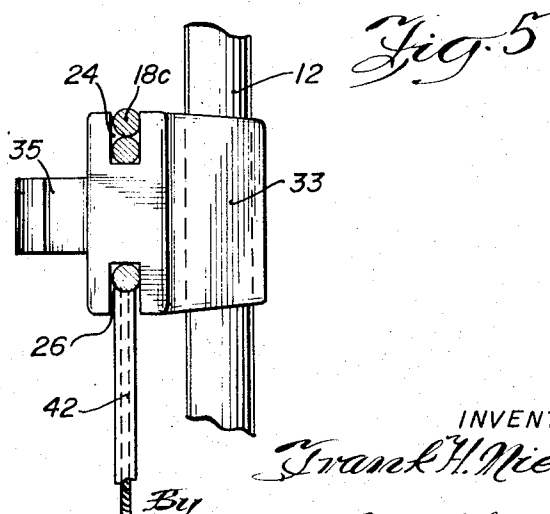
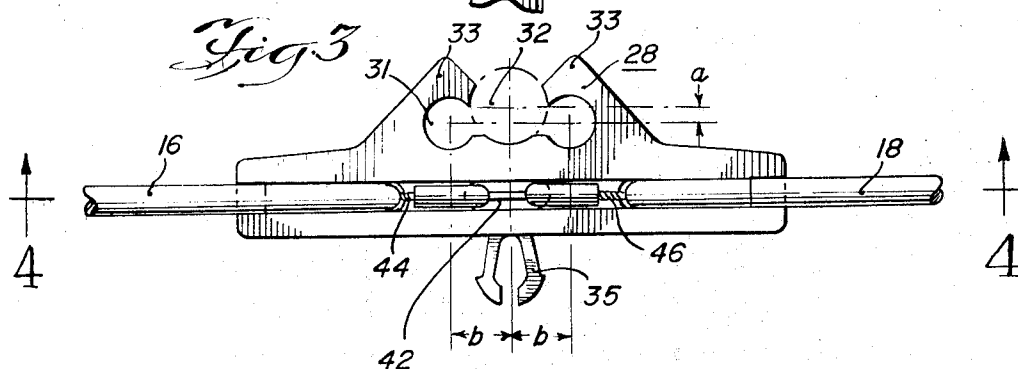


Fig. 5

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FAN DIPOLE WITH MOUNTING CLIP

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13 Claims. (Cl. 343—795)

This invention relates to antennas, and more particularly, to a novel television antenna and support therefor.

The rapid increase in number of UHF television stations has brought a need for equipment which can adapt a VHF television unit for reception of ultrahigh frequency signals. Portable television receivers in particular require UHF accommodation which does not impair the portability of the unit. Although many of the recent portable television receivers include recesses which are adapted to receive UHF tuners, there is generally no provision for the connection of a UHF antenna. A great need exists for an ultrahigh frequency antenna which is rugged and attractive, and which can be quickly and securely affixed to a portion of the portable television unit.

Where portability is desired, the UHF antenna unit may be affixed to a portion of the VHF telescopic antenna of the television receiver, which provides a convenient mast. When the receiver is moved it may be necessary to remove the UHF antenna, since it can be cumbersome in many situations. Additionally, to allow optimum ultrahigh frequency signal reception it is necessary to rotate the antenna unit to face the proper reception direction.

It was found however, that repeated manipulation of the UHF antenna, as for example revolution and removal thereof with respect to the telescopic antenna, caused loosening of the constituent parts of the antenna and its support. Many of the prior art UHF antennas which are adapted for connection to VHF telescopic antennas include several fastening members, such as screws and washers, to provide connections between the driven elements, the support, and the transmission line. The loosening of these fastening members may result in disconnection of the transmission line leads from the terminals, and may further allow the driven antenna elements to disengage the support.

Where solder is used to affix the transmission line leads to the proper terminals, an unattractive and generally inefficient product has resulted. Furthermore, since a non-conductive connection between the driven UHF elements and the VHF telescopic antenna is mandatory, the use of metallic fixtures for solder connection is undesirable.

To obviate the above-mentioned difficulties, the novel antenna and support of the present invention is formed in a manner whereby the necessity of separate fasteners, such as screws and washers, and for metallic fixtures is eliminated.

In the present invention there is provided an antenna support comprising a member, preferably unitary, formed of non-conductive material and having an aperture extending therethrough. Preferably, two apertures are provided, one for each folded element, as discussed fully below.

In one embodiment of the invention, a driven dipole which comprises a pair of folded elements is provided, and the inboard ends of each element are bent substantially perpendicular to the longitudinal axis of the element and extend in opposite directions with respect to each other. If only one aperture is used, the two folded elements are connected to the support member at opposite ends of the aperture and are separated by air.

In the embodiment where a pair of apertures are used, the inboard ends of the folded elements are placed within the apertures and an end portion of one of the inboard ends is further bent in the direction of the longitudinal

axis of the elements in order to connect the folded elements securely to the unitary support member. In a preferred embodiment, the apertures are formed of a size to receive the leads from the transmission line in addition to the inboard ends of the folded elements and in this manner the transmission line is securely affixed to the dipole without the necessity of utilizing any external fasteners or solder.

In one form of the invention, a third aperture is provided for reception of the transmission line, and it is preferred to form the three apertures in a collinear arrangement whereby the transmission line extends through the central aperture, and the two lead ends of the line and the inboard ends of the two folded elements extend through the outer apertures respectively.

The non-conductive member further includes a portion which is adapted for connection to a suitable mast, such as a telescopic VHF antenna. In a preferred form of the invention the connecting portion is formed integrally with the body of the member, in order to achieve a simple and reliable unit. The member is preferably formed of a resilient material such as polypropylene which allows a snap connection with a telescopic antenna or with whatever mast is employed.

In one embodiment of the invention, the connecting portion is made by drilling a central aperture and two side apertures through a formed member, wherein a portion of the central aperture overlaps a portion of each of the side apertures to define arcuate surfaces of a cylinder having substantially the diameter of the outer dimension of a telescopic antenna.

A further explanation is provided in the following description and claims and is illustrated in the accompanying drawings which disclose by means of examples the novel principles of the present invention, and the best mode of applying those principles. Although the invention is described with respect to an antenna for ultrahigh frequency signal reception, it is to be understood that such description is for illustrative purposes only and that the novel invention may be applied to many types of antennas.

In the drawings:

FIGURE 1 is a front elevation of the antenna unit of the present invention in conjunction with a typical VHF telescopic antenna affixed to a television receiver;

FIGURE 2 is a perspective view of the antenna support member of the present invention;

FIGURE 3 is a fragmentary plan view of the antenna of the present invention;

FIGURE 4 is a sectional elevation of the antenna unit of the present invention, taken along line 4—4 of FIGURE 3;

FIGURE 5 is a side elevation of the novel antenna unit shown in conjunction with a fragmentary telescopic antenna.

Referring to the drawings, in FIGURE 1 there is illustrated a conventional VHF television receiver 10 having a telescopic antenna 12 connected thereto. The telescopic antenna 12 is of the conventional type, its lower portion having an outer diameter of about 1/4 inch. The novel antenna unit, represented in FIGURE 1 generally by the reference numeral 14, is affixed to the bottom portion 15 of the telescopic antenna 12, with a snap fit. The driven dipole comprises two folded elements 16 and 18 which are securely connected to a support 20.

As seen most clearly in FIGURE 2, the support member 20 includes an elongated body portion 22, having channels 24 and 26 formed therein. For greatest strength and economy in manufacture, it is preferable to form the antenna support member 20 of a unitary piece of suitable non-conductive material. As a specific example, the use of polypropylene has been found quite suitable due

to its strength and resilience. This resilience is important to provide the necessary snap-on effect, as will be discussed below.

A snap-on connector portion 28 is preferably formed integrally with the support member 20 and may be cut by drilling three apertures 30, 31, and 32 as shown in FIGURES 2 and 3 to form a pair of resilient retaining arms 33 and a stop 34. In a specific embodiment, a diameter of .093 inch was found suitable for apertures 31 and 33, and a 1/4 inch diameter was found effective for the central aperture 32. The dimensions *a* and *b* shown in FIGURE 3, between the centerlines of the apertures were .65 inch and .27 inch respectively.

A suitable clip 35 may be connected to or formed integrally with the support member 20 to connect the member to the back of a television receiver during transportation thereof in order to effectively prevent misplacement of the support member.

With reference to FIGURES 3-5, it is seen that the inboard ends 16*a* and 16*b* of folded element 16, and the inboard ends 18*a* and 18*b* of folded element 18 are bent in a substantially perpendicular direction with respect to the longitudinal axis of the respective folded elements. The inboard ends are located within apertures 36 and 38 which extend from the nadir of the channel 24 to the nadir of the channel 26. To provide an extremely secure connection, the inboard ends extend toward each other and the end portions 16*c* and 18*c* of the inboard ends 16*b* and 18*b* respectively are bent toward the longitudinal axis of the respective folded elements.

In a preferred form of the invention, a third aperture 40 extends through the support member 20 and is formed in a collinear relationship with apertures 36 and 38. The transmission line 42 may be placed within the aperture 40 and the lead ends 44 and 46 are inserted into the apertures 36 and 38 respectively. The apertures are a suitable size whereby the inboard ends of the folded elements and the transmission line lead ends fit snugly therein. This expedient obviates the necessity for external fastening members such as screws and washers, or the need for solder-receiving fixtures. It will of course be most expedient to insert the lead ends 44 and 46 prior to insertion of the inboard ends of the folded elements.

In a specific example, the apertures 36 and 38 had a diameter approximating 1/8 inch and the central aperture 40 had a diameter of about 3/8 inch.

The present invention provides a simple yet highly effective and reliable antenna and support. The walls defining channels 24 and 26 enclose the inboard ends of the folded elements and the transmission line leads to provide an attractive appearance. The connecting member 28 can be affixed to a suitable mast such as of telescopic VHF antenna with a snap fit, due to its resilience.

Once the transmission line and the folded elements are connected to the support member 20, it will not be necessary nor desirable for the user to detach the elements. Although the support member 20 may be repeatedly removed from the telescopic antenna, the novel configuration will allow indefinite snap-back and long life. Additionally, the folded elements 16 and 18 cannot be inadvertently detached by a normal lateral force because there are no screws or washers which could loosen to impair the security.

All of the novel features of the present invention have been disclosed with respect to a preferred embodiment thereof. It is to be understood however, that further modifications may be made by those skilled in the art without departing from the spirit and scope of the novel invention.

What is claimed is:

1. A support for a UHF antenna comprising a member formed of non-conductive material having three apertures extending therethrough, one of said apertures being adapted to receive a portion of the transmission line therein and the other two apertures being adapted to securely

receive therein the respective inboard ends of a driven dipole and the leads from said transmission line, and means for connecting said member to a telescopic VHF antenna.

2. A support for a UHF antenna comprising a member formed of non-conductive material having three substantially collinear apertures extending therethrough, the central aperture being adapted to receive a portion of a transmission line therein and the outer two apertures being adapted to securely receive therein the respective inboard ends of a driven dipole and the leads from said transmission line, and means for connecting said member to a telescopic VHF antenna.

3. A support for a UHF antenna comprising a member formed of a resilient non-conductive material having three apertures extending therethrough, one of said apertures being adapted to receive a portion of a transmission line therein and the other two apertures being adapted to securely receive therein the respective inboard ends of a driven dipole and the leads from said transmission line, and means formed integrally with said member for snap-connecting said member to a telescopic VHF antenna.

4. A support for a UHF antenna comprising a polypropylene member having three substantially collinear apertures extending therethrough, the central aperture being adapted to receive a portion of a transmission line therein and the outer two apertures being adapted to securely receive therein the respective inboard ends of a driven dipole and the leads from said transmission line, and means formed integrally with said member for snap-connecting said member to a telescopic VHF antenna.

5. An antenna comprising a support member formed of resilient non-conductive material having a pair of apertures extending therethrough, said apertures securely receiving therein the respective inboard ends of a driven dipole and the leads from a transmission line, said dipole comprising a pair of folded elements, the inboard ends of each element being bent substantially perpendicular to the longitudinal axis of said element and extending in opposite directions with respect to each other, and means for connecting said member to a suitable mast.

6. A UHF antenna comprising a member formed of resilient non-conductive material having three apertures extending therethrough, one of said apertures being adapted to receive a portion of a transmission line therein and the other two apertures securely receiving therein the respective inboard ends of a driven dipole and the leads from said transmission line, said dipole comprising a pair of folded elements, the inboard ends of each element being bent substantially perpendicular to the longitudinal axis of said element and extending in opposite directions with respect to each other, and means for connecting said member to a telescopic VHF antenna.

7. A UHF antenna comprising a member formed of resilient non-conductive material having a pair of apertures extending therethrough, said apertures securely receiving the respective inboard ends of a driven dipole and the leads from a transmission line, said dipole comprising a pair of folded elements, the inboard ends of each element being bent substantially perpendicular to the longitudinal axis of said element and extending in opposite directions with respect to each other, the end portion of one of the inboard ends of each element being further bent in substantially the direction of said longitudinal axis whereby said elements will be securely retained within said member, and means for connecting said member to a telescopic VHF antenna.

8. A UHF antenna comprising a member formed of resilient non-conductive material having three apertures extending therethrough, one of said apertures being adapted to receive a portion of a transmission line therein and the other two apertures securely receiving therein the respective inboard ends of a driven dipole and the leads from said transmission line, said dipole comprising a pair of folded elements, the inboard ends of each element be-

ing bent substantially perpendicular to the longitudinal axis of said element and extending in opposite directions with respect to each other, the end portion of one of the inboard ends of each element being further bent in substantially the direction of said longitudinal axis whereby said elements will be securely retained within said member, and means for connecting said member to a telescopic VHF antenna.

9. A UHF antenna comprising a member formed of resilient non-conductive material having three apertures extending therethrough, one of said apertures being adapted to receive a portion of a transmission line therein and the other two apertures securely receiving therein the respective inboard ends of a driven dipole and the leads from said transmission line, said dipole comprising a pair of folded elements, the inboard ends of each element being bent substantially perpendicular to the longitudinal axis of said element and extending in opposite directions with respect to each other, the end portion of one of the inboard ends of each element being further bent in substantially the direction of said longitudinal axis whereby said elements will be securely retained within said member, and means formed integrally with said member for connecting said member to a telescopic VHF antenna.

10. A support for a UHF antenna comprising a member formed of non-conductive material having a pair of apertures extending therethrough, said apertures being adapted to securely receive therein the respective inboard ends of a driven dipole, and means formed integrally with said member for connecting said member to a telescopic VHF antenna, said connecting means comprising a pair of resilient retaining arms and a stop, the surfaces of said arms and stop being adapted to contact a telescopic antenna and defining three arcuate surfaces of a cylinder having substantially the diameter of the outer dimension of a telescopic antenna.

11. A UHF antenna comprising a member formed of resilient non-conductive material having three apertures extending therethrough, one of said apertures being adapted to receive a portion of a transmission line therein and the other two apertures securely receiving therein the respective inboard ends of a driven dipole and the leads from said transmission line, said dipole comprising a pair of folded elements, the inboard ends of each element being bent substantially perpendicular to the longitudinal axis of said element and extending in opposite directions with respect to each other, the end portion of one of the inboard ends of each element being further bent in substantially the direction of said longitudinal axis whereby said elements will be securely retained within said member, and means formed integrally with said member for connecting said member to a telescopic VHF antenna, said connecting means comprising a pair of resilient retaining arms and a stop, the surfaces of said arms and stop being adapted to contact a telescopic antenna and defining three arcuate surfaces of a cylinder having substantially the diameter of the outer dimension of a telescopic antenna.

12. An antenna support member formed in one piece of resilient non-conductive material, said member defin-

ing a pair of channels each of which opens to the outside of said member on opposite sides of said member, said member defining three collinear apertures extending therethrough, the axes of said apertures being parallel and extending perpendicular to the longitudinal direction of said channels; the central aperture being adapted to receive a portion of a transmission line therein and the other two apertures adapted to securely receive therein the respective inboard ends of a driven dipole and the leads from said transmission line; means formed integrally with said member for connecting said member to a telescopic VHF antenna, said connecting means comprising a pair of resilient retaining arms and a stop, the surfaces of said arms and stop being adapted to contact a telescopic antenna; and means located on the opposite side of said member from said connecting means for attaching said member to the back of a television receiver.

13. A UHF antenna comprising a one-piece member formed of resilient non-conductive material, said member defining a pair of parallel channels each of which open to the outside of said member on opposite sides of said member, said member defining three collinear apertures extending therethrough, the axes of said apertures being parallel and extending perpendicular to the longitudinal direction of said channels; the central aperture receiving a portion of a transmission line therein and the other two apertures securely receiving therein the respective inboard ends of a driven dipole and the leads from said transmission line; said dipole comprising a pair of folded elements, the inboard ends of each element being bent substantially perpendicular to the longitudinal axis of said element and extending in opposite directions with respect to each other, the end portion of one of the inboard ends of each element being further bent in substantially the direction of said longitudinal axis whereby said elements will be securely retained within said member, the portion of said inboard ends between each of said outer two apertures and the respective end of said member being positioned within said channels and thereby substantially hidden from view; means formed integrally with said member for connecting said member to a telescopic VHF antenna, said connecting means comprising a pair of resilient retaining arms and a stop, the surfaces of said arms and stop being adapted to contact a telescopic antenna; and means located on the opposite side of said member from said connecting means for attaching said member to the back of a television receiver.

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