

[54] **LOW SILHOUETTE ANTENNA**

[72] Inventor: **James F. Holland**, 21814 Kinard Ave., Torrance, Calif. 90502

[22] Filed: **Nov. 5, 1970**

[21] Appl. No.: **87,157**

[52] U.S. Cl.**343/713, 343/743, 343/748, 343/829**

[51] Int. Cl.**H01q 1/32**

[58] Field of Search.....**343/741, 742, 743, 744, 748, 343/713, 829**

[56] **References Cited**

UNITED STATES PATENTS

3,266,042	8/1966	Mahoney et al.	343/743
2,467,961	4/1949	Caraway	343/744
3,299,428	1/1967	Tessari	343/744

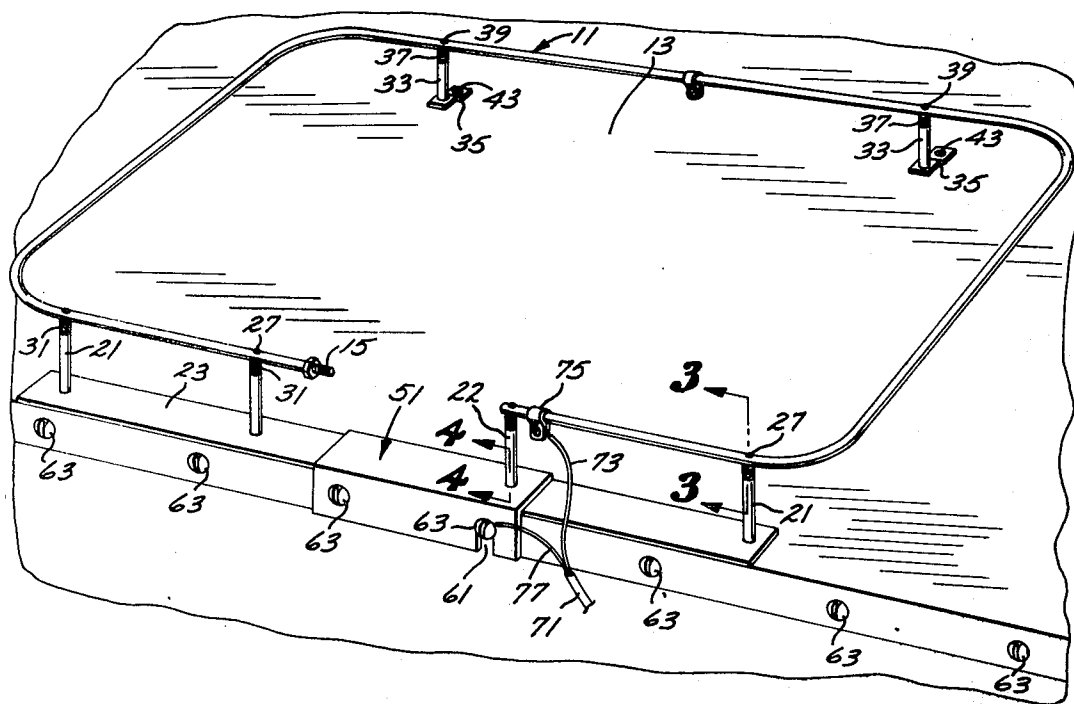
Primary Examiner—Eli Lieberman

Attorney—Fulwider, Patton, Rieber, Lee & Utecht

[57] **ABSTRACT**

A low silhouette antenna for mounting on an electrically conductive plate, such as a camper top, and including a radiator spaced from such plate. The radiator is formed to define a ring which is open on one side and terminates in ends that form extremities spaced apart a distance sufficient to minimize production of electrical capacitance therebetween. A distance adjusting means is provided for adjusting the frequency of the radiator whereby such antenna may be mounted on a camper and the distance adjusting means adjusted to adjust such radiator to its resonant frequency without the necessity of installing a capacitor.

2 Claims, 4 Drawing Figures



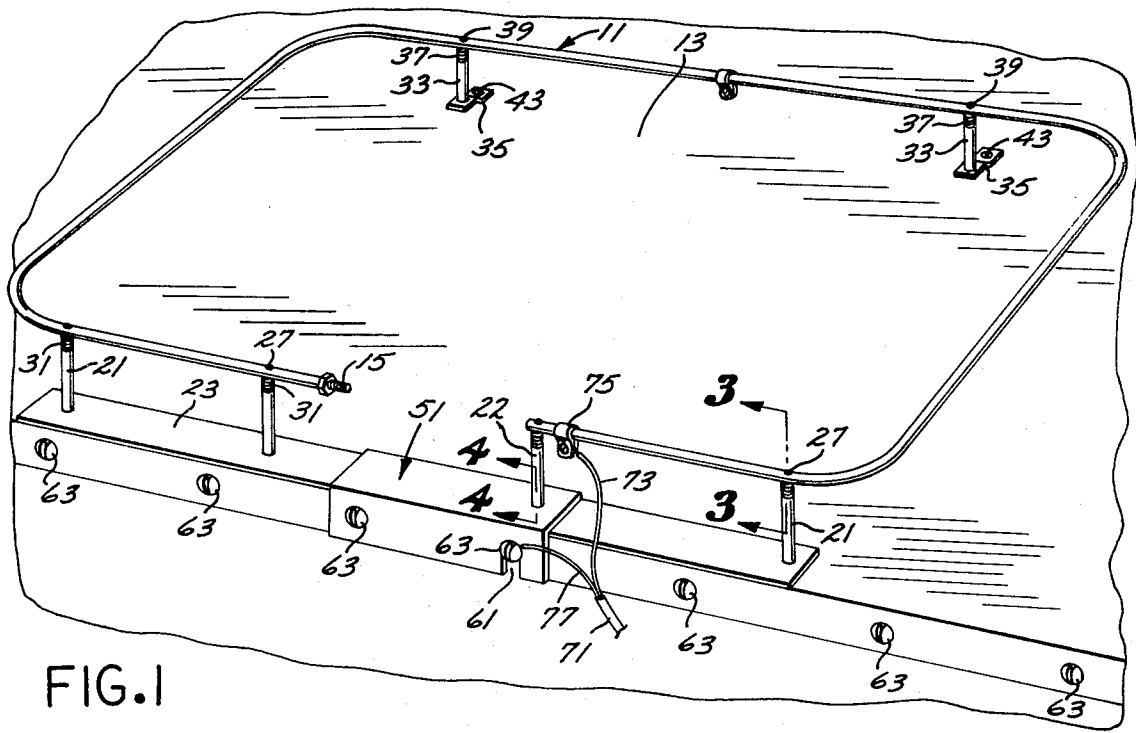


FIG. 1

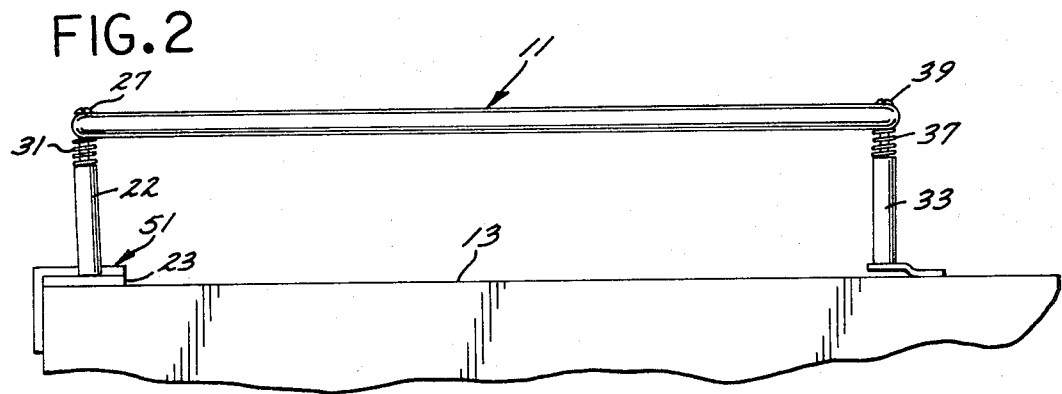


FIG. 2

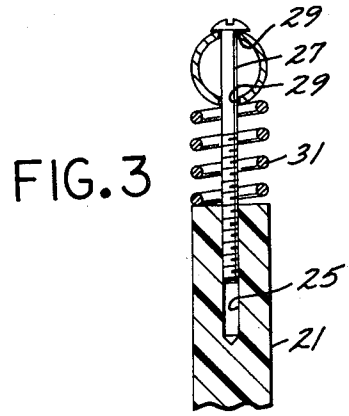


FIG. 3

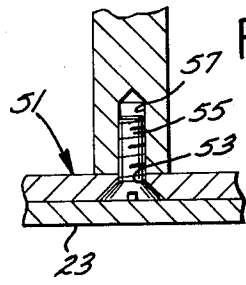


FIG. 4

INVENTOR.
JAMES F. HOLLAND
 BY *Zulwiler, Patton, Gieber,*
Lee and Updecht
 ATTORNEYS

LOW SILHOUETTE ANTENNA

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to antennas for two-way radios mounted in vehicles such as campers, mobile homes and automobiles.

2. Description of the Prior Art

Many short-wave radio antennas are in the form of vertically extending whip antennas. However, antennas of this type suffer the shortcoming that they project a substantial distance above the vehicle on which they are mounted, thereby severely restricting passage of such vehicle through areas having restricted overhead clearance.

Low silhouette antennas have been proposed which include horizontally disposed ring-shaped radiators mounted on metal plates and having a relatively expensive capacitor connected with one end thereof. An antenna of this type is shown in U.S. Pat. No. 3,151,328. Antennas of this type suffer the shortcoming that the capacitors required for medium and high range power are prohibitively expensive.

SUMMARY OF THE INVENTION

The low silhouette antenna of present invention is characterized by a ring-shaped radiator spaced from an electrically conductive element to provide a series tuned effect and is arranged coextensive therewith. Non-capacitor frequency adjustment means is provided for adjusting the resonant frequency of the radiator.

An object of the present invention is to provide a low silhouette antenna of the type described which is economical to manufacture and convenient to install.

Another object of the present invention is to provide a low silhouette antenna of the type described which has substantially unlimited power handling capabilities.

These and other objects and the advantages of the present invention will become apparent from a consideration of the following detailed description when taken in conjunction with the accompanying drawing.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a perspective view of a low silhouette antenna embodying the present invention;

FIG. 2 is an elevational view of the right hand end of the low silhouette antenna shown in FIG. 1;

FIG. 3 is a vertical sectional view, in enlarged scale, taken along the line 3—3 of FIG. 1; and

FIG. 4 is a vertical sectional view, in enlarged scale, taken along the line 4—4 of FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The low silhouette antenna of present invention includes a hollow tube which is bent to a rectangular shape to form a radiator, generally designated 11. The radiator 11 is disposed horizontally and mounted on a horizontal electrically conductive plate such as the roof 13 of a camper. One side of the radiator 11 is open and one extremity thereof is threaded and has a threaded frequency adjustment slug 15 screwed is threaded to enable the effective length of such radiator to be adjusted.

The radiator 11 is made of slightly resilient metal and is conveniently rectangularly shaped and is of sufficient size and strength to serve as a luggage rack on the top of a camper, mobile home or van. The front side of the radiator 11 is mounted on a plurality of vertically extending acrylic mounting posts 21 and an electrically conductive post 22. The posts 21 have their bottom extremities secured to a mounting strip 23. Referring to FIG. 3, the upper extremities of the mounting posts 21 and 22 are formed with vertically extending threaded bores 25 and mounting screws 27 are extended through bores 29 formed in the radiator 11 and screw into such bores 25. Compression springs 31 are interposed between the upper ends of the mounting post 21 and the radiator 11 to thereby enable the mounting screws 27 to be adjusted to vary the spacing between the radiator 11 and the camper top 13 to thereby vary the capacitance therebetween. Referring to FIG. 2, the bores 29 in the front side of the radiator 11 are drilled at an angle to provide for the mounting post 21 to project at approximately 85° from the radiator 11.

The rear side of the radiator 11 is supported by means of a pair of rear mounting posts 33 which have support feet 35 mounted on their lower extremities. Coil compression springs 37 are also interposed between the upper extremities of the mounting posts 33 and the underside of the radiator 11 and adjustment screws 39 extend through the radiator 11 and into threaded bores formed in the upper extremity of the mounting posts 33 to thereby provide means for adjusting the spacing between the rear side of the radiator and the electrically conductive camper top 13.

The mounting feet 35 include screw-receiving bores 43 whereby such feet may be secured to the camper top 13. However, in the arrangement shown, only the front side of the radiator 11 is secured to the camper top and the rear side of such radiator maintains the rear post 33 biased downwardly onto the mounting feet 35 to maintain such mounting feet securely against the camper top 13.

Referring to FIGS. 1 and 4, the metallic mounting post 22 is mounted on its bottom end from an electrically conductive angle iron which forms a mounting bracket 51. The mounting bracket 51 includes a pair of threaded bores 53 and a threaded screw 55 projects upwardly through one of such bores and screws into a threaded bore 57 formed in the lower extremity of the metallic mounting post 22.

The vertical leg of the mounting bracket 51 includes a downwardly opening slot 61 for receipt of a mounting screw 63. A bore is also formed in the vertical leg of the mounting bracket 51 and receives a second mounting screw 65. In this regard, it should be noted that the camper tops 13 of many campers are connected to the side or rear walls of such campers by means of mounting screws 63 and the antenna of present invention may be secured to the camper top 13 by merely removing two of the screws 63 and reinserting such screws through the vertical flange of the mounting bracket 51.

In operation, the low silhouette antenna may be mounted on a camper top 13 by merely removing two of the screws 63 and bringing the antenna into position with the slot 61 of the mounting bracket 51 positioned for receipt of the previously removed screws 63. The screws 63 may then be reinserted to hold the mounting

bracket 51 in place. A coaxial cable, generally designated 71, may then be run from the two-way radio and the lead end 73 connected with the radiator 11 by means of a connecting clip 75. The connecting clip 75 should be spaced a selected distance from the end of the radiator 11 to provide efficient coupling to such radiator. The ground lead 77 may then be grounded to the screw 63. This coupling of the coaxial cable 71 to the radiator 11 is conventionally referred to as a gamma match or shunt feed.

The radio may then be turned on and the adjustment screws 27 and 39 adjusted to space the radiator 11 from the vehicle top 13 a distance sufficient to provide the necessary capacitance for efficient operation of the radiator 11 at the desired frequency of operation. Adjustment may also be made by adjusting the slug 15 by screwing it further into or out of the end of the radiator 11.

Use of a capacitor in connection with an antenna radiator 11 normally increases the effective length thereof so a capacity tuned antenna, as shown in U.S. Pat. No. 3,151,328, would be physically shorter than one quarter wavelength. However, I have discovered with my radiator 11 the normal physical one quarter wavelength is too short to resonate so I make my radiator 11 approximately 4 percent longer than conventional one quarter wavelength radiators.

To determine the spacing between the radiator 11 and the vehicle top 13, such radiator 11 may be moved into position adjacent to such top 13 until such radiator 11 begins to exhibit a series tuned, or decoupling effect. This usually occurs at about 0.005 wavelength. This decoupling effect makes the radiator 11 act as if it were physically longer than it actually is. This arrangement causes the antenna of present invention to exhibit a high radiation resistance and also a high Q thereby making such antenna more effective than conventional one quarter wavelength antennas.

In contrast with the normal situation, where moving a radiator into closer spaced relationship with metal increases the capacity and lowers the resonant frequency and moving a radiator away from metal decreases the capacity and raises the resonant frequency, when the antenna of present invention is brought into position where the series tuned capacity effect is experienced, moving the radiator 11 closer to the roof 13 decreases the capacity and increases the resonant frequency and moving the radiator 11 away from the roof 13 increases the capacity and lowers the resonant frequency. If the radiator 11 is moved outside the range dictated by the 0.005 wavelength distance mentioned above, either too close to the roof 13 or too far from the roof 13, it will

react with the normal capacity effect as previously mentioned and will lose its effectiveness. It has been determined that a spacing of three and one half inches for the 27 megacycle citizens band antenna provides favorable results.

From the foregoing it will be apparent that the low silhouette antenna of present invention provides a highly effective relatively inexpensive antenna which provides substantially unlimited power handling capabilities without danger of overloading coils or capacitors normally incorporated in low silhouette antennas. Further, it has been determined that such antenna is both horizontally and vertically polarized so it can act as an efficient receiver from either a vertically or horizontally oriented transmitter antenna or an efficient transmitter to either horizontally or vertically oriented antennas.

Various modifications and changes may be made with regard to the foregoing detailed description without departing from the spirit of the invention.

I claim:

1. A low silhouette antenna for a selected frequency and comprising:

electrically conductive base means;

an elongated radiator having a length greater than a capacity tuned radiator for said selected frequency and formed to define a generally ring shape and terminating in ends spaced apart a distance sufficient to substantially eliminate capacitance therebetween;

mounting means for mounting said radiator spaced a sufficient distance from said base means to provide a series tuned capacity effect between said radiator and said base means; and distance adjusting means including means mounted on one of said spaced ends for adjusting the length of said radiator and means mounting said radiator to said base for adjustment to selected spacings therefrom whereby said antenna may be mounted on a mobile vehicle and said frequency adjusting means adjusted to the resonant frequency of said radiator without the necessity of installing a capacitor.

2. A low silhouette antenna as set forth in claim 1 wherein:

said distance adjusting means includes a plurality of upright posts supported from plate means having their upper extremities formed with respective upwardly opening threaded bores, springs interposed between the upper ends of said posts and said radiator and screws extending downwardly through said radiator and engaging said threaded bores.

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