March 17, 1953 E. CARLSON 2,632,106

RADIO AERIAL

Filed July 13, 1950

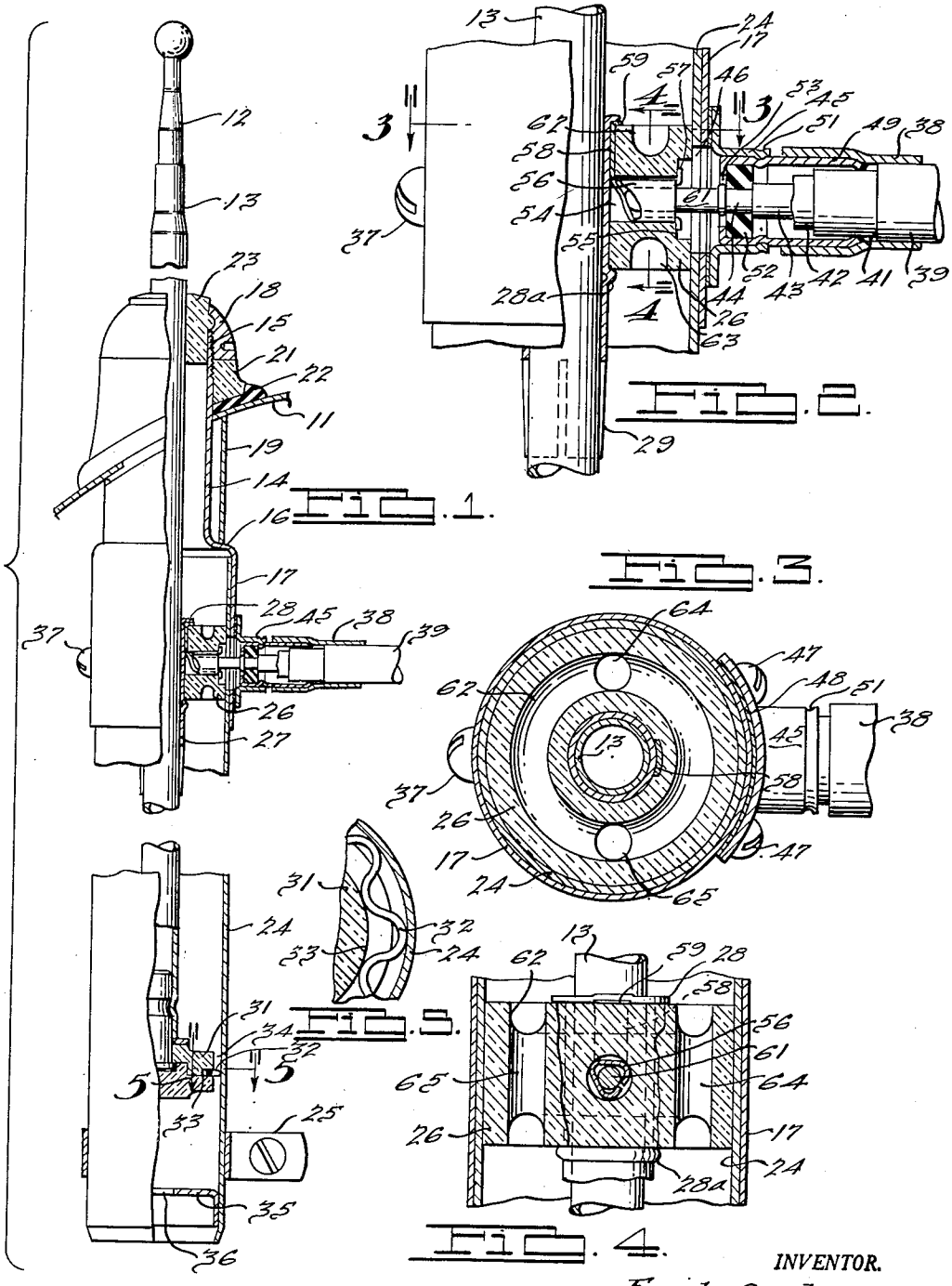


FIG. 1.

FIG. 2.

FIG. 3.

FIG. 4.

FIG. 5.

INVENTOR.
Emil Carlson.
BY
Harness, Dickey & Pierce
ATTORNEYS.

Patented Mar. 17, 1953

2,632,106

UNITED STATES PATENT OFFICE

2,632,106

RADIO AERIAL

Emil Carlson, Detroit, Mich., assignor, by mesne assignments, to Pioneer Specialty Company, a corporation of Michigan

Application July 13, 1950, Serial No. 173,649

3 Claims. (Cl. 250—33)

1

This invention relates to extensible and retractable radio antennas and mountings therefor, and particularly to an improved assembly consisting of an extensible and retractable antenna and mounting means therefor, especially adapted for vehicular installations and similar uses in which the antenna is mounted in a structure exposed to variable weather conditions.

A popular type of aerial for automobiles is the so-called "top-cowl" aerial consisting of telescopically extensible and retractable sections and designed to be mounted on an upper part of a fender, cowl, or other more or less horizontal panel of the vehicle, and to project downwardly therethrough so that at least a part of the antenna structure is concealed beneath the body panel. Some type of weather sealing means is customarily provided at the panel opening, and the lead-in connection is attached to the antenna below the panel. Despite the sealing means which may be provided, it is often impossible to prevent moisture from seeping through the antenna mounting and accumulating in the antenna housing below the structural support, thus short circuiting the antenna and creating the likelihood of damage due to corrosion.

It is therefore an object of this invention to provide, in such an extensible antenna of the type described, improved means for preventing any moisture which may enter the antenna housing from accumulating therein in such manner as to ground the antenna.

It is a further object to provide, in combination with such an antenna structure of the type having a grounded casing adapted for concealed mounting in the vehicle body, improved means for conducting away any moisture which may penetrate to the vicinity of the lead-in terminal (which must necessarily extend inwardly through the grounded casing) so that unwanted leakage to ground will not occur at the lead-in terminal.

Still another object is to provide an improved aerial of the indicated variety wherein leakage of energy to ground is effectively prevented in all internal parts of the structure and water which penetrates to the interior will immediately run off through the bottom of the housing.

It is also an object to provide an antenna having means as described above which can be easily and cheaply fabricated with a minimum number of parts, and in which such means do not impair the extensible and retractable function of the antenna.

Other objects of the invention will become apparent from the following specification, the drawing relating thereto, and from the claims hereinafter set forth.

2

In the drawing:

Figure 1 is an elevational view of my improved antenna construction and the lead-in connection thereto, parts being broken away for clarity;

Fig. 2 is an enlarged elevational view of the portion of my improved antenna in the vicinity of the lead-in connection;

Fig. 3 is a cross-sectional view taken along the line 3—3 of Fig. 2 and showing details of the construction.

Fig. 4 is a cross-sectional view taken along the line 4—4 of Fig. 2; and

Fig. 5 is a cross-sectional view taken along the line 5—5 of Fig. 1 and showing the arrangements of parts in the housing tube.

The improved antenna of my invention is mounted on a panel 11, which may comprise, for example, the fender or cowl panel of an automotive vehicle. The antenna proper consists of a plurality of telescopic members, two such members 12 and 13 being shown in the present instance. The inner member 12 may be of solid cylindrical cross-section, and the outer member 13 of tubular construction. The antenna illustrated is of the type which is manually actuatable to its extended and retracted positions, although it will be understood that the improved construction of my invention is equally applicable to antennas which are operated by remote or remotely controllable power means. The panel is provided with an apertured portion through which extends a cylindrical shell 14 having an upper threaded portion 15 above the fender surface, a shoulder 16 spaced below the fender, and an enlarged cylindrical section 17 below shoulder 16. The shell 14 is rigidly secured to the panel by means of a dome nut 18 which is threaded on portion 15, and which holds shoulder 16 upwardly against a tubular spacer 19 below the panel. The base of nut 18 is engageable with a neckpiece 21 of insulating material, the base of which in turn rests upon a gasket pad 22, which serves to prevent moisture from entering the panel aperture. An insulating bushing 23 is mounted within nut 18 and the threaded portion 15 of shell 14. This bushing serves as the uppermost support for the antenna section 13. It will be noted, however, that because of the innate limitations on the manufacturing tolerances of the various parts there remains the likelihood of moisture entering within shell 14 between bushing 23 and antenna section 13, as well as between other elements of the antenna mounting above the panel.

An elongated housing 24, which serves as an electrical shield as well as a protective casing and guide tube, is mounted at its upper end within enlarged section 17 of the shell, and extends therebelow a substantial distance, being attached at its lower end to the panel structure by means of a bracket 25. Mounted within the upper portion of the housing tube is a spacer block 26 of insulating material, which serves both as an antenna support and as a receiving member for the antenna lead-in connection, to be presently described. A sleeve 27 is centrally mounted within block 26, being secured thereto by an upper flange 28 and a lower flange 28a. Antenna section 13 is slidably mounted within sleeve 27, the sleeve having at its lower end fingers 29 which serve to frictionally grip the antenna section and to maintain effective electrical connection. The lower end of section 13 is provided with a piston-like member 31 loosely fitting within guide tube 24. A spring-like wire member 32 of sinuous shape is mounted within an annular slot 33 in piston 31 and, as shown in Fig. 5, partially extends from the slot in such fashion that it resiliently engages the inner surface of the guide tube at spaced points therearound, thus allowing the passage of moisture downwardly through annular space 34 surrounding the piston. Spring 32 provides sufficient friction to insure that gravity will not cause the aerial to descend, even under severe vibration.

The bottom of the housing is substantially closed by a closure 35, having a central opening 36, so as to limit the retracting movement of the antenna while allowing moisture to pass downwardly out of the housing tube.

The lead-in connection for the antenna may be of a conventional shielded coaxial type, and comprises a cable having an outer insulating layer 39, and a metallic shielding layer or "loom" 41. Within loom 41 are additional insulating layers 42 and 43, which surround the inner metallic conductor or lead-in wire (not shown) which is connected at the aerial end to a prong 44.

A receptacle sleeve 45 is attached to shell section 17 over an aperture 46 therethrough, the sleeve being attached by means of screws 47, and a gasket 48 being placed between the sleeve and section 17. A tubular connecting ferrule member 49 is soldered at one end to loom 41 and extends within the sleeve 45, being yieldably held in conducting relation with the sleeve by annular depression 51. Prong 44 is concentrically held within member 49 by an insulating washer 52, and extends through a central clearance aperture 53 in the outer end of member 49. Block 26 has a horizontally disposed aperture 54 in the central portion thereof, the outer end of the aperture being enlarged to provide a recessed shoulder 55. A jack receptacle member 56 is disposed within aperture 54, the receptacle being preferably constructed of wear-resistant metal. The outer end of the member 56 is provided with a plurality of tabs 57 which engage the recessed shoulder 55, and the inner end of the jack receptacle has a tongue 58 which is bent upwardly and is securely engaged between sleeve 27 and block 26, thus providing a conducting medium between the jack receptacle and sleeve 27. This construction not only provides an effective conducting path between the aerial and the lead-in wire, but greatly facilitates the assembling of the device. Before assembly, tongue 58 will extend in line with the body portion of the receptacle, which as the first step in assembly is inserted into aperture 54, so

that tabs 57 abut recessed shoulder 55 and tongue 58 extends partially into the central aperture of the block. Sleeve 27, with flange 28 still unformed thereon, is then slid upwardly through the central aperture until flange 28a abuts its lower edge. During this movement tongue 58 will be bent upwardly and the outer portion thereof will be firmly anchored in pressed relation between sleeve 27 and the block. The top edge of the sleeve is then swaged over to form flange 28, and the length of tongue 58 is such that the end portion 59 thereof will be bent over the block under flange 28, forming a tab 59 engaging the top surface of the block.

As best seen in Fig. 4, the body portion of the jack receptacle 56 is bent into three walls enclosing a space of substantially triangular shape therebetween. A projecting jack portion 61 of terminal prong 44 is adapted to project into and to be yieldably held within the triangular opening in the jack receptacle. It will be seen, therefore, that sleeve 27, tongue 58, jack receptacle 56 and jack prong portion 61 form a conducting path to the lead-in wire, while shell 14, screws 47, sleeve 45 and tubular member 49 form a conducting path to ground for the loom 41. A flexible sleeve 38 provides an effective seal between ferrule 49 and insulating sheath 39. A screw 37 coacts with screws 47 and with lead-in jack prong 61 to hold the shell 14, tube 24 and block 26 in rigidly secured relation.

In order to prevent the accumulation of moisture in the vicinity of the lead-in connection and other elements described above, block 26 is provided with an annular groove or channel 62 around its upper surface and a channel 63 on its lower surface, as best seen in Figs. 2 and 4. These channels are preferably of semi-circular cross-section, and are spaced substantially equidistant from sleeve 27 and housing 24. It will be evident that any moisture which may seep into the casing 14 from above will flow downwardly and eventually run into channel 62. In order to allow the moisture to flow downwardly from the channel 62, a pair of vertical drainage apertures 64 and 65 are provided in block 26 these apertures connecting the upper and lower channels. It will be understood that while two such apertures are shown in the preferred embodiment, it is within the contemplation of this invention to provide a single such aperture, or any number thereof. In the illustrated embodiment, the drainage apertures are preferably spaced circumferentially from the lead-in connection approximately 90° on either side thereof.

In the use of my antenna construction, the moisture which enters shell 14 and flows downwardly will collect in channel 62, as described above, and will continue its flow through drainage apertures 64 and 65, thus entering channel 63 and flowing down through housing tube 24. Due to the construction of piston 31 and sinuous element 32 described above, the moisture will continue its flow downwardly past the piston and through aperture 36 in closure 35, thus leaving the antenna structure. Since, under ordinary circumstances, the rate of flow of moisture into casing 14 will be slow enough so that all such moisture will be immediately carried off by the described means, it is apparent that no harmful accumulation of moisture within the antenna housing will occur.

While it will be apparent that the preferred embodiment of the invention herein disclosed is well calculated to fulfill the objects above stated, it will be appreciated that the invention is suscep-

tible to modification, variation and change without departing from the proper scope or fair meaning of the subjoined claims.

What is claimed is:

1. In an antenna mounting adapted to support an extensible antenna on a structural panel or the like and to accommodate a coaxial type of lead-in connection to said antenna, a shell extending through said panel and secured thereto, means on said shell for slidably supporting said antenna above said panel, an annular block within said shell, means within said block and in supporting engagement with said antenna below said first supporting means, a receptacle electrically connected to said lower supporting means and extending radially within said block for receiving one conductor of said lead-in connection, a sleeve electrically connected to said shell concentric with said receptacle for receiving the other conductor of said lead-in connection, said block having upper and lower surfaces, an annular channel in said upper surface, a drain passage portion in said block connecting said upper and lower surfaces, said apertured portion being spaced circumferentially from said receptacle, a housing tube extending downwardly from said shell, and a guided element mounted on one of said antenna sections and slidably engageable with said housing tube at spaced points around the inner surface thereof, whereby moisture drainage past said guided element is permitted.

2. The combination according to claim 1, said lower supporting means comprising a metallic sleeve extending axially within said block, and a tongue extending from said receptacle and secured between said sleeve and said block.

3. In an antenna mounting adapted to support an extensible antenna on a structural panel or the like, a shell extending through said panel and secured thereto, means on said shell for slidably supporting said antenna above said panel, an annular block within said shell, means in said block for slidably supporting said antenna below said first supporting means, said block having upper and lower surfaces, an apertured portion in said block connecting said upper and lower surfaces, said apertured portion being spaced from said supporting means, a housing tube extending downwardly from said shell, a piston-like member at the lower end of one section of said antenna and loosely fitting within said housing tube, and a sinuous wire member circumferentially mounted on said piston-like member and engageable with the inner surface of said housing tube at spaced points thereabout.

EMIL CARLSON.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,205,358	Hansell	June 18, 1940
2,319,860	Hann	May 25, 1943
2,327,163	Barrett	Aug. 17, 1943
2,499,137	Friedberg et al.	Feb. 28, 1950

FOREIGN PATENTS

Number	Country	Date
613,004	Great Britain	Nov. 22, 1948