May 11, 1954 F. V. GOSLINE 2,677,973

RETRACTABLE AERIAL

Filed July 20, 1950

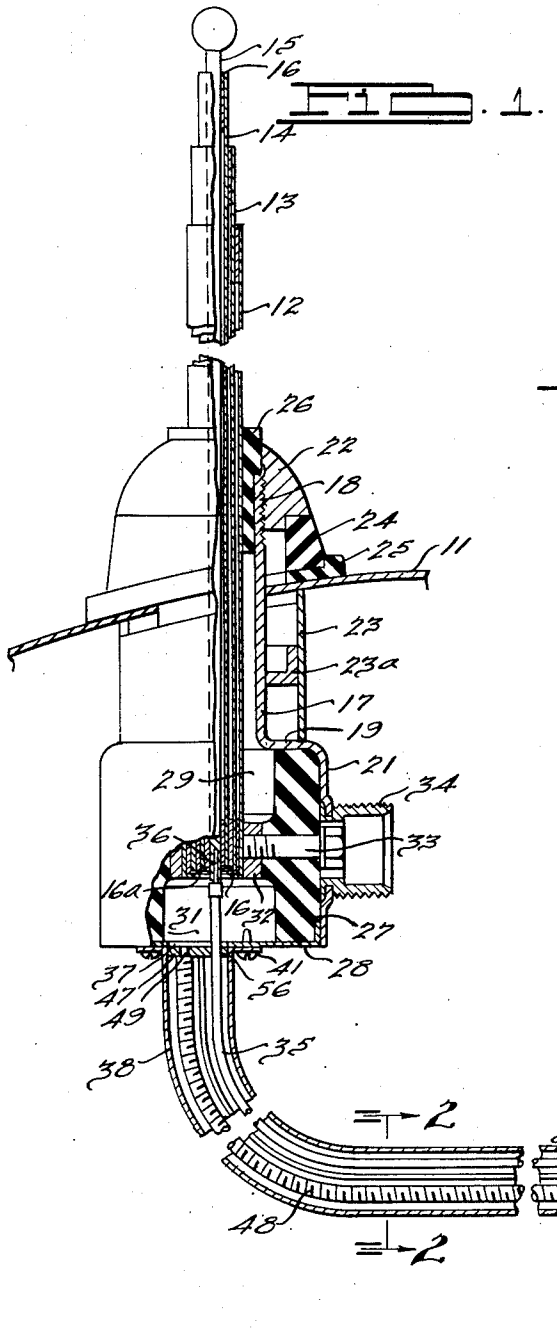


Fig. 1.

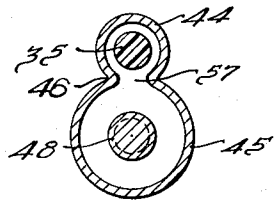


Fig. 2.

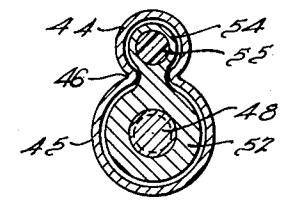
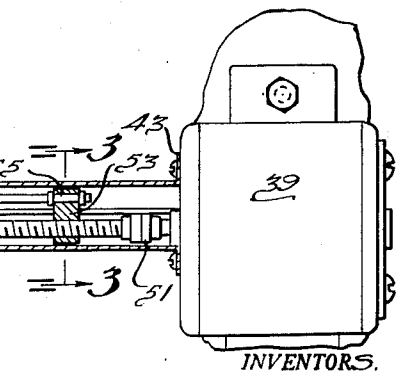


Fig. 3.



INVENTORS.

Frederick V. Gosline.

BY

Harness, Dickey & Pierce

ATTORNEYS.

Patented May 11, 1954

2,677,973

UNITED STATES PATENT OFFICE

2,677,973

RETRACTABLE AERIAL

Frederick V. Gosline, Detroit, Mich., assignor, by mesne assignments, to Pioneer Specialty Company, a corporation of Michigan

Application July 20, 1950, Serial No. 174,896

5 Claims. (Cl. 74—424.8)

1

This invention relates to extensible and retractable radio antennas and particularly to an improved assembly consisting of an extensible and retractable antenna, and actuating mechanism therefor, especially adapted for vehicular installations, as in motorcars, and in other places where actuation of the antenna from a remote point is necessary or desirable.

It is an object of this invention to provide an extensible radio antenna and actuating means therefor which is an improvement over the disclosures of Patent No. 2,346,728 and copending application, Serial No. 72,843, filed January 26. 1949, now Patent No. 2,580,889.

It is another object of this invention to provide an extensible antenna as described which is movable to its extended and retracted positions by flexible means, but which is positive in action both during extension and retraction of the antenna.

It is a further object to provide in an antenna of the character described novel actuating means including a flexible screwshaft (which may be formed of metal), a traveling nut, and a flexible dielectric rod actuatable by the screw and nut and secured to the aerial. My improved construction avoids the necessity of forming screw threads upon the dielectric material, which is undesirable because of a tendency of such threading to cause cracking of the dielectric material. I achieve a further advantage in that the traveler nut is entirely independent of the actuating motor, and the need for providing an axial passage through the motor shaft, such as is required with many of the prior art constructions, is eliminated.

It is also an object to provide an antenna of the class described and actuating means therefor which may be constructed with relatively few parts and which is flexible and adjustable in contouring and occupies a minimum of space so that it can conveniently be installed in a concealed manner in confined spaces of varying proportions, as for example, under or behind a body or fender panel of a motorcar.

Other objects and advantages of the invention will be apparent from the following specification, the drawings relating thereto, and from the claims hereinafter set forth.

In the drawings:

Fig. 1 is an elevational view, partly in cross section, showing the operative parts of the improved antenna and its associated mechanism in its retracted position;

2

Fig. 2 is a cross section of the actuating means taken along the line 2—2 of Fig. 1; and

Fig. 3 is a cross sectional view similar to Fig. 2, but taken along the line 3—3 of Fig. 1.

The antenna structure itself of the present invention may be of one of the multi-sectioned telescopic types now well known in the art. The preferred form shown is adapted to be mounted on a panel 11 which may comprise, for example, a fender or cowl panel of an automotive vehicle. The antenna proper consists of a plurality of tubular telescopic members 12, 13, and 14, and an inner cylindrical member 15, the outer member 12 being fixed to the fender by means later described. Members 13, 14, and 15 are slidable upwardly to an extended position limited by sleeves 16 which form stop shoulders between the antenna sections in their extended position, and which have flanges 16a limiting the retractive movement of the sections to the position shown in Fig. 1.

The panel 11 is provided with an apertured portion through which extends a cylindrical shell 17 having an upper threaded portion 18 above the panel surface, a shoulder 19 spaced below the panel, and an enlarged cylindrical section 21 below shoulder 19. The shell 17 is rigidly mounted to the fender by means of a dome nut 22 which is threaded on portion 18 and which holds shoulder 19 upwardly against a tubular spacer 23 below the fender. Annular member 23a inside spacer 23 maintains the spacer in concentric relation with shell 17. Nut 22 is preferably engageable with a neckpiece 24 of insulating material, the base of which rests upon a gasket pad 25 which serves to prevent moisture from entering the body aperture. An insulating bushing 26 is mounted within the nut 22 and the threaded portion 18 of shell 17. This bushing serves as the uppermost support for the antenna section 12.

An insulating block 27 of circular shape is mounted within the enlarged portion 21 of shell 17, being held in position by a plate 28 at the lower end of the shell. The upper and lower portions of block 28 are provided, respectively, with clearance recesses 29 and 31, and the portion of the block intermediate these recesses has therein a tubular metallic insert 32, the lower end of antenna section 12 being positioned within this metallic insert. A locking bolt 33 extends through a transverse aperture in block 27 and is threadably engageable with insert 32, the inner end of the locking bolt serving to firmly anchor the lower portion of section 12. Sec-

tion 21 may be provided with a threaded nipple 34 concentric with bolt 33 in order to receive the lead-in cable coupling nut (not shown). Bolt 33 serves as the lead-in terminal.

The mechanism for extending and retracting the antenna comprises a rod 35 formed of a flexible insulating plastic material such as nylon. The rod is rigidly secured to the lower end of innermost antenna section 15 by means of an insert 36, and extends slidably downwardly through an aperture 37 in plate 28. The rod, although flexible, is stiff enough to act in compression without buckling to push the aerial sections up to extended condition.

An elongated housing 38 extends between aperture 37 and a remotely positioned reversible driving motor 39, the housing being attached at either end by flanges 41 and 43, respectively. This housing may be formed of metal which is bendable to various curved shapes to facilitate installation, but stiff enough so it is not further distorted by the operating components after installation. It is partly flattened and creased throughout its length to a cross-sectional contour, clearly shown in Figs. 2 and 3, such that two partly cylindrical internal passages 44 and 45 are formed and joined throughout their length by a reduced opening 57 defined by the reentrantly creased portions 46. The reduced opening 57 is narrower than the diameter of rod 35.

A bearing end plate 47 is mounted at the terminal of housing 38 adjacent aperture 37, and an elongated threaded shaft 48 extends within tubular section 45 of the housing, the shaft being fabricated of flexible material which may be metallic. One end of threaded shaft 48 is provided with a journal pin 49 supported in a bearing aperture (not designated) in end plate 47. The opposite end of shaft 48 is connected to driving motor 39 by means of a coupling 51. It will be obvious therefore that upon actuation of motor 39, flexible shaft 48 will rotate within its tubular housing, irrespective of the irregular shape of the housing. The lower portion 52 of a nut 53 is threadably mounted on shaft 48, the nut being substantially 8-shaped as shown in Fig. 3. The upper portion 54 of the nut within tubular portion 44 is apertured and the end 55 of rod 35 is rigidly secured to portion 54 within said aperture. It will be noted by reference to Fig. 3 that the nut assembly is loosely, slidably fitted in the housing tube structure but cannot rotate therein due to the nonconcentric cross section of the parts.

In operation, the antenna may be moved to its extended position by actuating driving motor 39. The arrangement of the parts is such that when the antenna sections are in their retracted position, as shown in Fig. 1, nut 53 will be adjacent the inner end of the housing 38 near motor 39. Actuation of the motor will cause rotation of flexible threaded shaft rod 48, causing nut 53 to ride therealong to the left as seen in Fig. 1. This movement will cause a compressive stress in flexible rod 35, and since transverse movement of this rod is substantially prevented by the shape of tubular section 44 and constriction 46, the inner end of the rod attached to antenna section 15 at 36 will move upwardly extending this section. Interengageable sleeves 16 will coact to extend the other movable sections of the antenna. To retract the antenna, the direction of motor 39 is reversed, drawing nut 53 downwardly and to the right as seen in Fig. 1. The simultaneous inward movement of rod 35 will first retract section 15, and sleeves 16 will coact with flanges 16a to retract the remaining sections.

While it will be apparent that the preferred embodiments of the invention herein disclosed are well calculated to fulfill the objects above stated, it will be appreciated that the invention is susceptible to modification, variation and change without departing from the proper scope of the subjoined claims.

What is claimed is:

1. Means for longitudinally actuating an extensible radio antenna or the like comprising, a flexible elongated rod-like actuating element adapted to be mechanically connected to the antenna, a flexible threaded shaft extending in parallel spaced relation to said element, a driving nut attached to said element and threadably engageable with said shaft, whereby rotation of said shaft will cause longitudinal movement of said element, and means common to said element and said shaft for maintaining said element, said shaft and said nut in operating relationship.

2. Means for longitudinally actuating an extensible radio antenna or the like comprising, a flexible elongated rod-like actuating element adapted to be mechanically connected to the antenna, a flexible threaded shaft extending in parallel spaced relation to said element, a driving nut attached to said element and threadably engageable with said shaft, and means for preventing rotation of said driving nut comprising a guide tube in which said nut is slidably fitted, said tube also being bendable and enclosing said actuating element and shaft.

3. Means for longitudinally actuating an extensible radio antenna or the like comprising, a flexible but non-rotatable guide tube having two tubular portions therein in spaced parallel relation, a flexible elongated rod-like actuating element slidable in one of said tubular portions and adapted to be mechanically connected to the antenna, a flexible threaded shaft rotatable but non-slidable in the other of said tubular portions, and a driving nut slidable but non-rotatable in said tube and attached to said element and threadably engageable with said shaft, whereby rotation of said shaft will cause longitudinal movement of said element.

4. Means for longitudinally actuating an extensible radio antenna or the like comprising, a flexible guide tube substantially figure-8-shaped in cross section having two tubular portions therein in spaced parallel relation and a constricted connecting slot-like opening providing internal communication between said tubular portions, a flexible elongated rod-like actuating element in one of said tubular portions and adapted to be mechanically connected to the antenna, a flexible threaded shaft in the other of said tubular portions, and a slidable but non-rotatable driving nut having one portion threadably engageable with said shaft, a second portion attached to said element, and an intermediate portion slidably fitted in said constricted portion of the guide tube.

5. Means for longitudinally actuating an extensible radio antenna or the like comprising, a flexible guide tube substantially figure-8-shaped in cross section having two tubular portions therein in spaced parallel relation and a constricted connecting slot-like opening providing internal communication between said tubular portions, a flexible elongated rod-like actuating

element in one of said tubular portions and adapted to be mechanically connected to the antenna, said constricted portion being narrower than the diameter of said rod-like element, a flexible threaded shaft in the other of said tubular portions, and a slidable but non-rotatable driving nut having one portion threadably engageable with said shaft, a second portion attached to said element, and an intermediate portion slidably fitted in said constricted portion of the guide tube.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,061,345	Weston	May 13, 1913
1,903,811	Gebhard	Apr. 18, 1933
2,195,400	Arens	Apr. 2, 1940
2,240,488	Benson	May 6, 1941
2,319,860	Hann	May 25, 1943
2,346,728	Carlson	Apr. 18, 1944
2,580,889	Carlson	Jan. 1, 1952
2,581,171	Carlson	Jan. 1, 1952

FOREIGN PATENTS

Number	Country	Date
546,430	Great Britain	Jan. 2, 1942