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VARIABLE LENGTH ANTENNA

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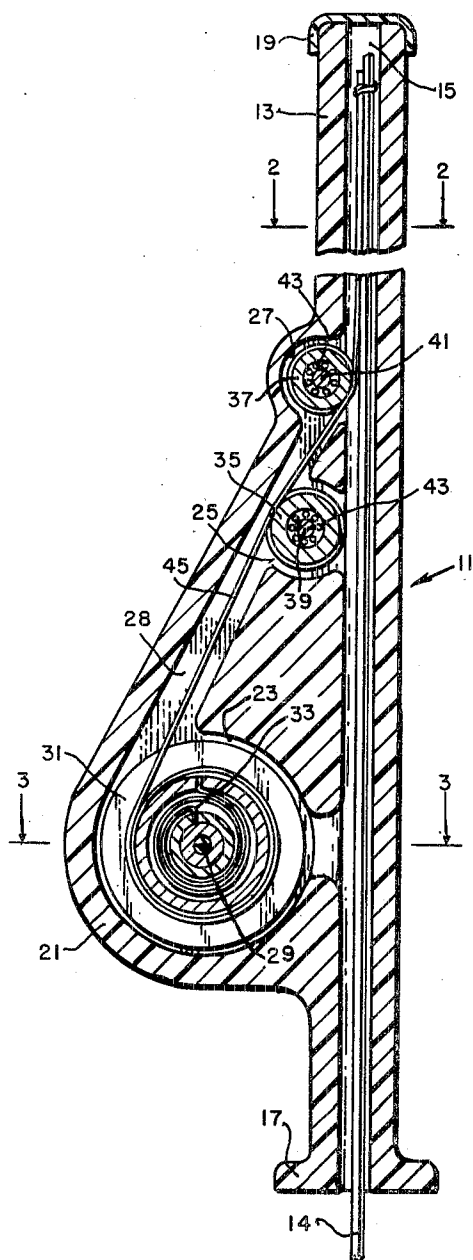


FIG. 1

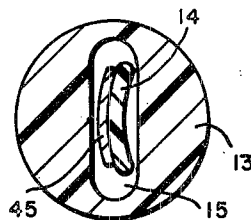


FIG. 2

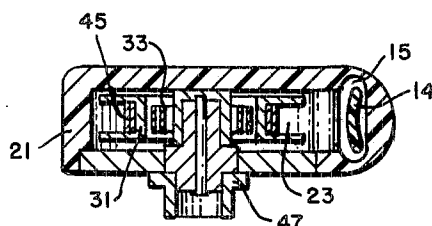


FIG. 3

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VARIABLE LENGTH ANTENNA

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3 Claims. (Cl. 343—723)

(Granted under Title 35, U. S. Code (1952), sec. 266)

The invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment of any royalty thereon.

The present invention relates to an antenna. More particularly the invention relates to a variable length antenna for use on mobile equipment such as tanks, cars, trucks, etc.

In the utilization of radio receivers and transmitters, particularly those operating in the relatively low frequency range, that is, from 20 to 70 megacycles, optimum results in reception and transmission are obtained when the antenna used in conjunction with such radio sets can be set or positioned at a predetermined length dependent upon the frequency used. To provide for such usages, variable length antennas have been designed, typical of which is one wherein the antenna is mounted upon a telescoping mast that can be raised to varying heights. Such masts utilize expensive and complicated driving gears to raise the mast to a desired position.

To this end, it is an object of the present invention to provide a variable length antenna of simple construction, that is easily assembled, has few moving parts, and is inexpensive to manufacture.

Heretofore extensible antennas have been devised wherein the metallic antenna has been exposed to adverse climatic conditions whereby the antenna has been impaired considerably with resultant loss of effectiveness. To this end it is an object of this invention to provide a variable length antenna so designed that the antenna is at all times confined in a protective tubing whereby the antenna will be protected from the elements even when in use. In this same vein, all of the elements of the complete assembly, with the exception of the driving element, are contained within a protective tubing and housing, thereby reducing to a minimum the possibility of damage to the antenna assembly.

Another object of the invention is to provide a variable length whip antenna assembly that can be readily and easily adjusted to any desired height dependent upon the frequency to which the radio set is tuned.

These and other objects and advantages will become more apparent as the description of the device proceeds which is to be read in view of the accompanying drawing in which:

Figure 1 is a longitudinal cross-sectional view of a preferred embodiment of the variable whip antenna of the present invention;

Figure 2 is a sectional view taken on the line 2—2 of Figure 1, and

Figure 3 is a sectional view taken on the line 3—3 of Figure 1.

Referring to the drawing, there is shown at 11 an antenna assembly which includes a plastic tubular supporting member 13 having a longitudinally disposed bore 15 extending through said member 13 and the lower portion of the assembly 11. An extensible pliable drive tape 14 is located in and extends through the bore 15 as more

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fully described hereinafter. The bottom end of the assembly 11 terminates in a flanged portion 17, said flanged portion being adapted to serve as a supporting means for the antenna assembly in a mounting bracket

5 which is affixed to the vehicle where the antenna is to be used. The other end of the assembly, i. e. the top end of the tubular member 13, has affixed thereon, by any appropriate means, a lid or cover 19 serving as a raincap to prevent rain or moisture from entering into the bore 15. For use as a radio antenna assembly, the assembly 11 should be made of a dielectric material that is relatively strong and rugged, but yet readily pliable, such as fiberglass or nylon. Being made of such material, the antenna assembly will not be damaged when meeting obstructions such as the low-hanging limbs of trees, etc.

Extending outwardly from the lower end of the body portion of the assembly 11 is a substantially triangular shaped housing 21 having a plurality of cavities 23, 25 and 27 therein and linked by a common passageway 28 which provides access between the housing 21 and the bore 15 of the tubular member 13. Located within the lowermost cavity 23 of the housing 21, and mounted upon a shaft 29, is a spring loaded reel assembly comprising the reel 31 and the spring 33. The spring 33 is preferably a flat spiral spring similar to a clock or coil spring and serves to maintain said reel under tension whereby said reel can be revolved, either clockwise or counterclockwise, as more fully described hereinafter. At the upper part of the housing and located within cavities 25 and 27 are a pair of vertically aligned guide rollers 35, 37, mounted on shafts 39 and 41 respectively, which are provided with ball bearings 43 to facilitate the movement of said rollers. Wound on the reel 31 is a substantially flat metallic ribbon antenna 45 which at one end is secured to the reel and extends through the passageway 28 over the surface of rollers 35, 37 and upwardly into the bore 15 of the tubular member 13. The other or free end of the ribbon antenna, that is, that portion of the antenna within the bore 13, is secured at its end by any appropriate means to the drive tape 14. The united antenna and drive tape is free to move up and down whereby the effective length of the ribbon antenna can be determined upon its position within the bore 15. The drive tape 14 is made of a plastic or any other substantially rigid non-conductive material, one end of which is secured to the ribbon antenna as heretofore set forth and the other end of which terminates in a driving means, either hand operated or motor controlled. In the sectional view of the assembly as shown in Figure 2, the drive tape 14 and the ribbon antenna 45 are shown, for reasons of clarity, as not to completely occupy the bore 13. However, in actual manufacture of the antenna assembly it is preferred to make the drive tape 14 of sufficient width and thickness, so that when secured to the ribbon antenna 45 both the antenna and the drive almost completely occupy the bore 15. By this arrangement buckling of the drive tape and the antenna is greatly minimized. As is apparent from the drawing, the drive tape extends through the bore 15 of the tubular member 13 and by operation of the driving means can be urged upwardly or downwardly. The driving means forms no part of the invention and is therefore not shown.

In the operation of the antenna assembly, the drive tape 14 is urged upwardly and in its upward movement will carry the ribbon antenna 45 secured to it to any desired position within the bore 15. It is to be understood that the force exerted upon the drive tape by the driving means will be sufficient to overcome any tendency of the spring 33 to urge the ribbon antenna to reverse itself upon the reel 31. The antenna can thus be maintained in such position for any desired length of time and when it is

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desired or necessary to lower the antenna to another position, the driving means can be reversed whereby the drive tape will be lowered. In such downward movement the ribbon antenna will be likewise carried downwardly and the action of the spring 33 will assist in winding the ribbon antenna evenly about the reel 31.

In order to appropriately connect the ribbon antenna to the radio transmitter and receiver, any form of connection such as a coaxial cable 47 can be linked to the antenna by any appropriate means.

While there has been described what is at present considered to be the preferred embodiment of this invention, it will be obvious to those skilled in the art that various changes and modifications may be made therein without departing from the invention, and it is, therefore, aimed in the appended claims to cover all such changes and modifications as fall within the true spirit and scope of the invention.

What is claimed is:

1. A variable length antenna assembly comprising a single integral elongated protective housing of flexible dielectric material having a longitudinal passageway with one end of said passageway terminating within said protective housing and with the other end of said passageway open to the outside of said protective housing, a substantially rigid drive element of insulating material disposed within said passageway and extending outside of said pro-

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5 tective housing, a flexible ribbon antenna having one end fastened to the end of said drive element within said passageway and the other end coiled up outside said passageway whereby longitudinal movement of said drive element varies the effective length of said antenna within said passageway.

10 2. An antenna assembly as in claim 1 wherein said ribbon antenna and said drive element are proportioned to substantially completely occupy said passageway whereby the wall of said passageway supports said antenna and drive element to minimize whipping and buckling of said antenna.

15 3. An antenna assembly as in claim 1 wherein the end of said ribbon antenna outside said passageway is wound on a reel mounted within a cavity in said housing said cavity being offset to one side of said passageway and said reel having a spring to keep said ribbon antenna under tension.

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