Feb. 8, 1944. W. J. WHITE 2,341,401

RADIO ANTENNA

Filed Aug. 9, 1939

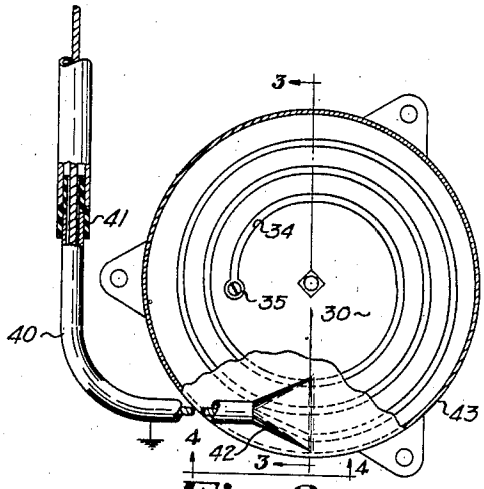


Fig. 2

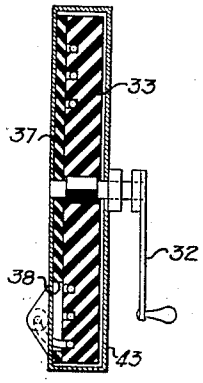


Fig. 3

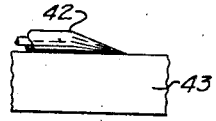


Fig. 4

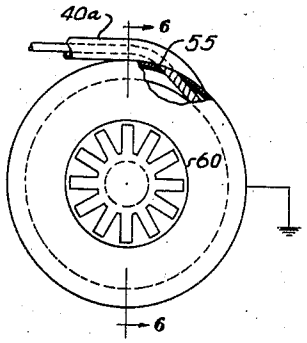


Fig. 5

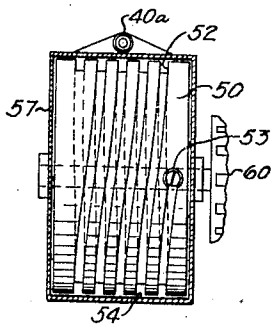


Fig. 6

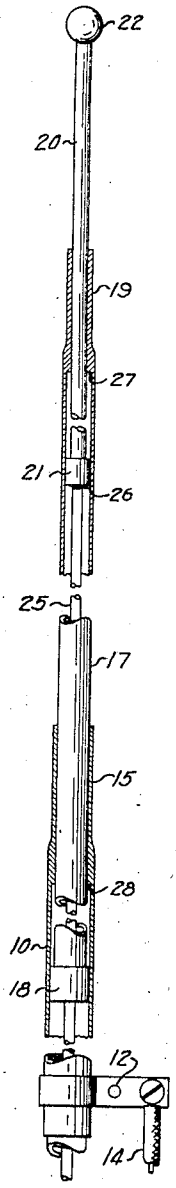


Fig. 1

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RADIO ANTENNA

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2 Claims. (Cl. 250—33)

This invention relates to an antenna assembly unit including a telescopically extensible aerial and a reel for extending and retracting the aerial.

An antenna of the general nature indicated above involves far more than at first appears. The entire assembly must be designed electrically to meet two conditions. First, the antenna proper, in addition to being an efficient medium for receiving or sending radio signals must be completely insulated from the metallic vehicle body on which it is normally mounted.

Second, for appearance sake, the aerial when retracted is contained within the body and even in an active position has parts electrically connected to it which are within the body. Such parts of the assembly must be properly shielded to prevent the signals from being interrupted by ignition noises and the like which might be picked up.

In addition to the electrical features outlined above the unit must be very easy to operate which means that the operating parts must not bind or jam. Reel operated antennae normally include a long guided flexible member and this has a tendency to bind in its confining case which aggravates the mechanical problem present.

Further such antenna must be made available in large quantities at a low cost of parts which are inexpensive and easily fabricated.

The chief object of the invention then is the provision of an operating mechanism which will function smoothly and with a minimum of effort and which is not liable to become jammed or locked during use. Still another object has been to provide an electrically efficient antenna of minimum cost and number of parts.

To the accomplishment of the foregoing and related ends, said invention, then, consists of the means hereinafter fully described and particularly pointed out in the claims; the annexed drawing and the following description setting forth in detail certain structure embodying the invention, such disclosed structure constituting, however, but one of various forms in which the principle of the invention may be used.

In said annexed drawing—

Fig. 1 is a side elevation partly in section of the signal-carrying antenna employed with my invention;

Fig. 2 is a vertical section through the winding reel mechanism employed;

Figs. 3 and 4 are sections through Fig. 2 as indicated by the lines 3—3 and 4—4 thereon;

Fig. 5 is a side elevation partially in section of a modified form of my invention; and

Fig. 6 is a section through Fig. 5 as indicated by the line 6—6 thereon.

Referring now to Fig. 1, the aerial proper comprises a sleeve 10 which is bolted as at 12 to the vehicle body and is insulated therefrom to prevent the transmission of the antenna signals to the car body with a consequent grounding thereof. A lead 14 from the base of the aerial connects with the radio set to transmit the signals between the set and the aerial. The sleeve 10 is necked inwardly as at 15 to closely embrace a second sleeve 17 slidable therein.

The sleeve 17 is provided with a resilient spring member 18 at its bottom portion which cooperates with the necked-in part 15 to retain the sleeves in fixed relation with each other and also to prevent rattling therebetween. The sleeve 17 is necked in at 19 and slidably receives a rod 20, which at its lower end is provided with a resilient spring member 21 similar to the member 18 and for the same purpose. A ball 22 surmounts the rod 20.

In extending the antenna the rod is pushed upwardly by a flexible cable 25, hereafter described, which is soldered as at 26 to the end of the rod.

As the rod 20 is pushed upwardly the member 21 ultimately engages a shoulder 27 formed by the necked-in part 19 and then pulls the sleeve 17 up until its member 18 comes into abutment with a similar shoulder 28 of the necked-in portion 15 of the sleeve 10. Electrical contact is maintained between the sleeve and the rod and the lead-in connection 14 to provide a continuous electrical unit.

The cable 25 is normally coiled about a reel 30 (Fig. 2) which is rotated by a hand crank 32. The reel is formed of a molded plastic disk 33 of insulating material, as "Bakelite." One flat face of the reel is formed with a helical recess 34 comprising several convolutions extending about the axis of the reel, as indicated in Fig. 2. This recess is adapted to accommodate the cable 25, which is secured at the inner end thereof at 35.

To hold the cable within the recess or passage a cover plate 37 is provided which lies closely adjacent the recessed face of the reel and prevents the cable from coming out of the recess except at a transverse slot 38 which is of a width sufficient to span all the convolutions of the recess 34. The cable, which is normally coiled in the reel 33, is guided onto or off of the reel

from a corresponding convolution by the slot 38 as the handle 32 is turned. The cable leads from the reel to the inner end of the rod 20 passing through the antenna sleeves and a sheath.

A metallic sheath 40 encloses the cable from the end of the sleeve 10 until it passes within the reel. The sheath is of metallic construction and is grounded as indicated in Fig. 2. It is electrically separated from the sleeve 10 by the insulating washer 41. The interior of the sheath is likewise insulated to prevent electrical contact between it and the cable with a consequent grounding of the antenna. A funnel-shaped metallic cap 42, insulated on the inside, connects the end of the sheath adjacent the reel and a metallic grounded container 43 which encloses the reel. This container surrounds the reel and cooperates with the sheath to prevent the wire 25 from picking up ignition noises and the like from the car and transmitting them to the set. There is of course no electrical contact between the cable and any part of the sheath or the funnel-like member 42 or the enclosure 43.

A modified form of my invention is shown in Figs. 5 and 6. This comprises a cylindrical reel 50 formed of similar material to the reel 33 which is provided with a continuous helical recess 52 extending peripherally of the cylinder and adapted to receive the wire 25. The wire is fastened at 53 into the end of the recess.

To guide the wire into the proper convolution of the recess and retain it therein an enclosing cover 54 formed of a molded insulating plastic, as the cover 37, is provided in which is formed an axially extending slot 55. The slot 55 functions precisely as the slot 38 shown in Fig. 3 in my preferred form of construction to guide the wire 25 onto and off of the reel.

A second enclosure 57 formed of sheet metal surrounds the entire reel and the cover or enclosure 54 to act as an electrical shield. This in turn is grounded to cut out ignition noises and the like which might be picked up by the wire and transmitted to the antenna and thence to the set. In like manner the sheath 40ª, which connects the reel 50 and the sleeve 10, is formed identically with the sheath 40 already described. In other words, it consists of a metallic exterior sheath which is grounded to the vehicle frame and a layer of insulation interposed between such sheath and the cable 25.

The knob 60 rotates the reel 50 to extend or retract the aerial proper. As the handle of either the preferred or modified form of my invention is turned a cable will be either drawn into or unwound from the corresponding reel. If it is unwound from the reel it pushes on the rod 20 to extend the antenna as above described. If, on the other hand, the cable is coiled onto the the reel the rod 20 is retracted and the antenna is collapsed. The structure of my invention may be installed in any desired place on a motor vehicle, as, for instance, adjacent the cowl or in one of the body pillars.

It will be seen from the foregoing description that I have provided a novel coil-up antenna system in which the antenna proper, including the flexible operating member is entirely insulated from an enclosing metallic case, which in turn is grounded to the vehicle. It will further be apparent that the reel in either the preferred or modified form is of such construction that no binding or locking of the parts can take place as the antenna proper is extended or retracted. Also, in place of the cable 25 I may employ a flexible tape or a solid flexible wire as well as the twisted cable shown.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the structure herein disclosed, provided the means stated by any of the following claims or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention:

1. In an extensible antenna adapted to be mounted on a motor vehicle, an antenna member adapted to be extended or retracted with respect to the vehicle body, a reel mounted for rotation adjacent the antenna, a continuous guiding passage in said reel comprising a series of circumferential convolutions extending about the axis of said reel, a flexible connecting member secured at one end to said antenna and at the other end coiled about said reel in the continuous passage thereof, a metallic container enclosing said reel and electrically insulated from said reel and flexible member, said container having a funnel shaped cap secured thereto, and a tubular metallic sheath extending from said cap to said antenna member, said sheath forming a guide for said flexible member and being insulated from said flexible member and from said antenna member and a ground connection for said sheath.

2. In an extensible antenna adapted to be mounted on a motor vehicle, an antenna member adapted to be extended or retracted with respect to the vehicle body, a reel mounted for rotation adjacent the antenna, a continuous guiding passage in said reel comprising a series of circumferential convolutions extending about the axis of said reel, a flexible connecting member secured at one end to said antenna and at the other end coiled about said reel in the continuous passage thereof, a metallic container enclosing said reel and electrically insulated from said reel and flexible member, said container having a slot in the periphery thereof, a hollow cap secured to said container and communicating with said slot, a tubular metallic sheath extending from said cap to said antenna member and in communication with said cap, said flexible member extending through said slot, cap and sheath and electrically insulated from said sheath, and a ground connection for said sheath.

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