Aug. 20, 1940. C. W. MARTIN 2,211,858

EXTENSIBLE AERIAL

Filed April 9, 1938

FIG.1.

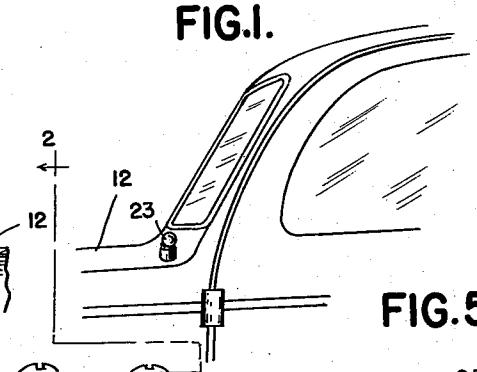


FIG.3.

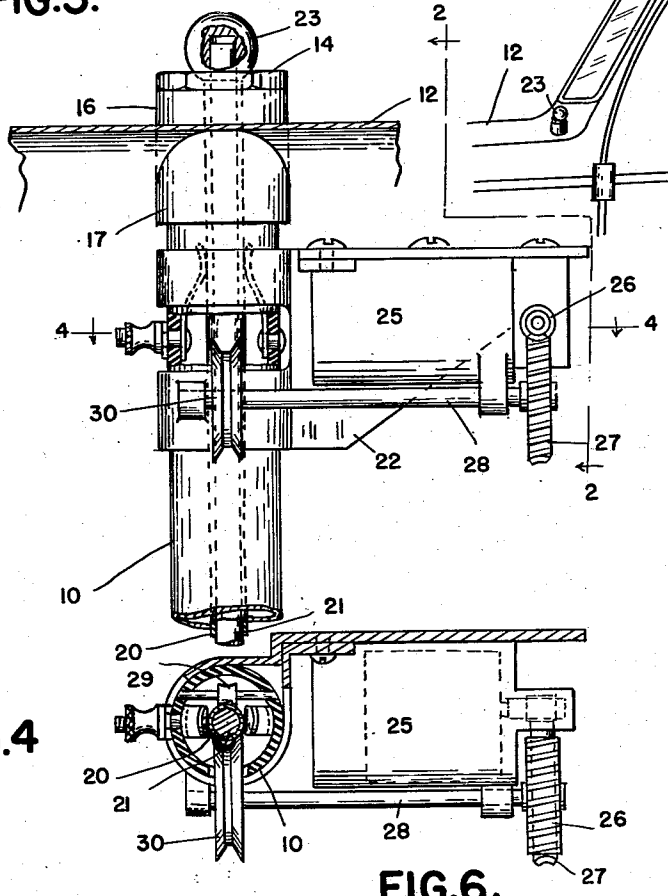


FIG.4

FIG.5.

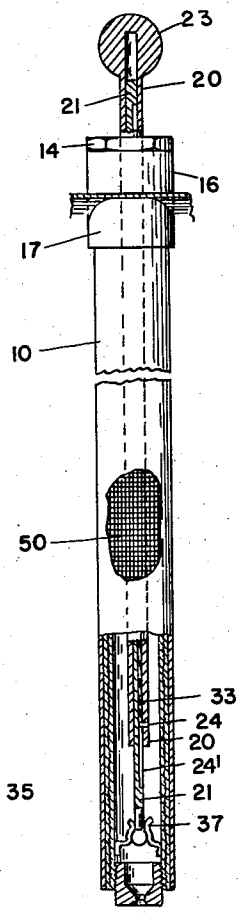


FIG.6.

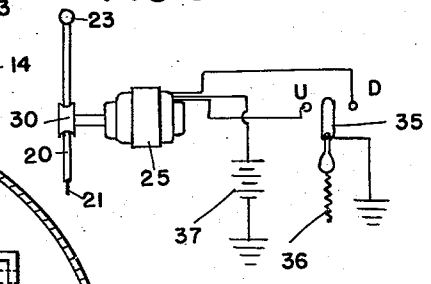
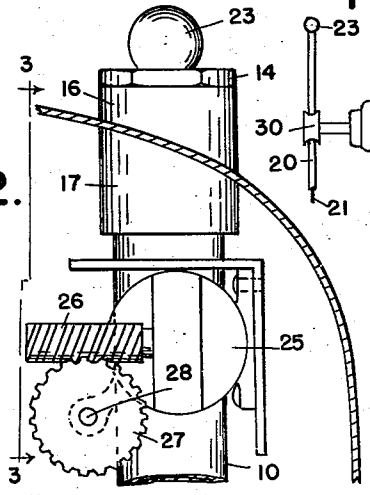


FIG.2.



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EXTENSIBLE AERIAL

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Application April 9, 1938, Serial No. 201,051

9 Claims. (Cl. 250—33)

This invention relates to the construction of extensible and retractible aerials, particularly for rotatable or movable radio installations. Although described in connection with a radio installation in a motor-car, it will be appreciated that the invention is equally applicable wherever a collapsible aerial of compact portions and neat appearance is desired.

An important object of the invention is to provide such an aerial which is very easily and quickly operable from fully extended to retracted position and vice versa, yet which may be held extended to any intermediate extent.

A further object is to provide improved electric motor and friction drive means for such an aerial, so constructed and arranged as to enable successive projection of a series of telescoped sections, and similar retraction thereof, out of and back into a tubular housing.

Another object is to provide improved means for preventing interference with radio reception by short wave radiations, such as those from the ignition system of a gasoline engine, without so completely shielding the tubular housing as to prevent all access of longer wavelength radiations thereto, whereby the antenna is enabled to function, when installed in or near the engine compartment of a vehicle, even though retracted or partly retracted into the tubular housing.

A still further object is to provide such an antenna and motor-driven actuating means therefor, which is of simple and inexpensive construction and reliable nature, whose response is non-directional and the sensitivity of which is variable at the will of the operator.

Other objects and advantages will be apparent from the following description, wherein reference is made to the accompanying drawing illustrating a preferred embodiment of my invention and wherein similar reference numerals designate similar parts throughout the several views.

In the drawing:

Figure 1 is a fragmentary and somewhat diagrammatic side elevational view of a motorcar provided with an aerial constructed in accordance with the present invention.

Figure 2 is a cross sectional view taken substantially on the line 2—2 of Figure 1, and looking in the direction of the arrows.

Figure 3 is a cross sectional view at right angles to Figure 2, taken substantially on the line 3—3 of the latter view, and looking in the direction of the arrows.

Figure 4 is a horizontal sectional plan view taken substantially on the line 4—4 of Figure 3, and looking in the direction of the arrows.

Figure 5 is an elevational view of the tubular casing, with an outer lamina or portion broken away to show the built-in shielding screen, also partly in section.

Figure 6 is a schematic diagram.

Referring now to the drawing, it will be seen that my improved antenna construction is carried by a tubular housing 10 formed of insulating material such as Bakelite and adapted to be supported in depending position by attachment of its upper end to the cowl portion 12 of a motor vehicle, through which it projects and upwardly from which the antenna is extensible. The upper end of the tube 10 is reduced and threaded, and attachment is effected by means of a nut 14; filler blocks 16, 17 conforming to the contour of the cowl being arranged above and below the cowl on the reduced section to take the compression resulting from tightening the nut.

The antenna proper comprises telescopically interfitted metal sections as 20, 21 slidable in the tube and with relation to each other. These are guided in the reduced upper end of the tube. Downward movement of the outer section 20 may be limited by a ball 23 mounted at its top. A pin 24 in the wall of the outer tube extends into a slot 24' in the inner section to limit movement of one section with relation to the other. In the slot above the pin a piece of spring wire 33 is placed which tends to bend toward a relaxed position, thereby contacting both sections and introducing friction between them. Element 33 also provides positive electrical connection between the antenna sections.

The sections are arranged to be lifted and retracted by an electric motor 25, which is reversible and which drives, through reduction gearing 26, 27, a friction wheel 30 projecting radially inwardly through the wall of the tube 10 and bearing against the antenna, which is backed at the point of such driving engagement by a freely rotatable thrust pulley 29. The motor is carried by a supporting bracket 22 clamped on the tube 10 and also supporting at one end the shaft 28 through which the friction wheel 30 is driven. The bracket is cut away to provide clearance for the friction wheel, and also for the mounting and terminal post 33 which carries the spring brush finger 35 for providing electrical connection to the antenna.

As shown in Figure 5, the inner section 21 extends downwardly somewhat farther than the outer section 20, and friction holding means such

as the detent fingers 37 are provided to prevent lifting the inner section before the outer is fully raised. In operation, the outer section is first lifted until the friction wheel passes off the same and engages the inner section, which is then lifted, carrying both sections on upward. The wheel is formed of relatively soft material such as rubber and it is somewhat compressed by engagement of the antenna in its gorge.

As schematically indicated in Figure 6, the motor 25 may be of a reversing type, and suitable switching means 35 may be provided engageable with contacts or a contact as U to energize the motor to rotate it in a direction to lift the aerial, while when the switch is thrown to another position represented by the contact D, the motor may be rotated in the opposite direction to retract the aerial. A spring as 36 is provided to center the switch means in a deenergized position in which the motor is stopped. By virtue of this arrangement, the antenna is held in any position in which it may be set, and it stops as soon as the operator's hand is taken from the switch. The source of current is designated 37, and the diagrammatic connections will readily be understood.

For short-range reception it is often desirable that the aerial be used in only partly projected position. At such time the portion of the aerial remaining inside the engine compartment and tube 10 is apt to pick up interference from the ignition system. I have found that if a solid metal tube is used, or solid shielding, the efficiency of the aerial when partially retracted is sharply reduced and in fact virtually destroyed, either because of the high degree of shielding or the high capacity. Due to the fact, however, that high frequency radiations are more easily impeded, or because of the lesser capacity, a screen-type shield as 50 is effective to kill ignition interference without harming antenna efficiency.

What I claim is:

1. An extensible and retractible aerial comprising in combination with a support, an elongated substantially inelastic antenna element slidable substantially vertically in the support, electric motor means, friction driving means operatively connecting the motor means to the antenna element to actuate the latter, said antenna element comprising a plurality of telescopically interfitted members, the friction driving means comprising a relatively deformable peripherally grooved wheel engageable with the outer of said members and rotatable to successively lift first the outer and then the inner thereof, the wheel moving off the outer member and into engagement with the inner member after full projection of the outer member, to thereafter lift both.

2. An extensible and retractible aerial comprising in combination with a support, an elongated substantially inelastic antenna element slidable substantially vertically in the support, electric motor means, friction driving means operatively connecting the motor means to the antenna element to actuate the latter, said antenna element comprising a plurality of telescopically interfitted members, the friction driving means comprising a relatively deformable peripherally grooved wheel engageable with the outer of said members and rotatable to successively lift first the outer and then the inner thereof, the wheel moving off the outer member and into engagement with the inner member after full projection of the outer member, to thereafter lift both, and means for holding the inner member against upward movement until the outer member is fully projected.

3. An extensible and retractible aerial comprising in combination with a support, an elongated substantially inelastic antenna element slidable substantially vertically in the support, electric motor means, friction driving means operatively connecting the motor means to the antenna element to actuate the latter, said support comprising a tubular member in which the antenna element is slidable, said friction driving means comprising a friction driving wheel projecting through said tubular member into engagement with the antenna element, said electric motor means being carried by the tubular member and geared to the friction driving wheel.

4. An extensible and retractible aerial comprising in combination with a support, an elongated substantially inelastic antenna element slidable substantially vertically in the support, electric motor means, friction driving means operatively connecting the motor means to the antenna element to actuate the latter, said antenna element comprising a plurality of telescopically interfitted members, the friction driving means comprising a relatively deformable wheel engageable with the outer of said members and rotatable by the motor means to successively lift first the outer and then the inner of such members, a tubular housing encircling said antenna element and supporting the same, said motor means and friction driving means also being carried by said housing.

5. An extensible aerial comprising a substantially vertically slidable element, means for moving said element, comprising a reversible electric motor, friction driving means connecting the motor to the slidable element, a source of current, a reversing switch for controlling operation of the motor and so of the aerial, said switch having a position of deenergization and positions for causing rotation of the motor in each direction, and means acting yieldably upon said switch to return the same to the deenergizing position.

6. In combination with an automotive vehicle having sheathing defining a body enclosure, and a source of electric current, said vehicle having electrical appurtenances within said sheathing, an extensible and retractible aerial comprising an antenna member extensible substantially vertically through and above said sheathing and retractible downwardly therethrough into the body enclosure, electric motor means within said body enclosure, energizable from said source of current and connected to said antenna element to extend and retract the same, and electrical shielding means arranged between the aerial and such electrical appurtenances, the aerial being insulated from said shielding means, said means connecting the electric motor means to the antenna element including speed reducing means and a friction drive.

7. In combination with an automotive vehicle having sheathing defining a body enclosure, and a source of electric current, an extensible and retractible aerial comprising an antenna member extensible substantially vertically through and above said sheathing and retractible downwardly therethrough into the body enclosure, electric motor means within said body enclosure, energizable from said source of current and connected to said antenna element to extend and retract the same, the means connecting the electric motor means to the antenna element including a

friction driving disc rotatable by the motor means and engaging said antenna element.

8. In combination with an automotive vehicle having sheathing defining a body enclosure, and a source of electric current, an extensible and retractible aerial comprising an antenna member extensible substantially vertically through and above said sheathing and retractible downwardly therethrough into the body enclosure, electric motor means within said body enclosure, energizable from said source of current and connected to said antenna element to extend and retract the same, the means connecting the electric motor means to the antenna element including a friction driving member rotatable by the motor means and engaging said antenna element upon one side to move the same, and a rotatable reaction element engaging the other side of said element.

9. In combination with an automotive vehicle having sheathing defining a body enclosure, and a source of electric current, an extensible and retractible aerial comprising an antenna member extensible substantially vertically through and above said sheathing and retractible downwardly therethrough into the body enclosure, electric motor means within said body enclosure, energizable from said source of current and connected to said antenna element to extend and retract the same, said antenna element comprising a plurality of slidably interfitted elements, the outer element also being slidable, said motor means first lifting the outer of said elements and then the inner, means preventing lifting an inner element before an outer element, and means frictionally resisting movement of one element with respect to another, said motor means acting upon an inner element to lift it and the outer element after the outer element has been fully extended.

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