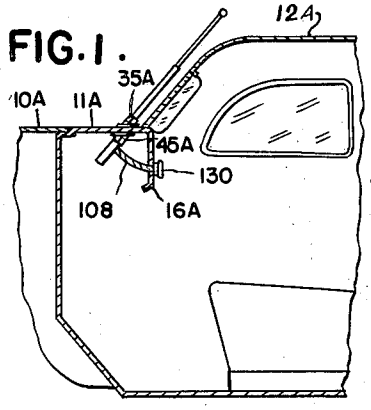
May 23, 1944. E. CARLSON 2,349,406

ANTENNA CONSTRUCTION

Filed June 22, 1940

FIG. 1.



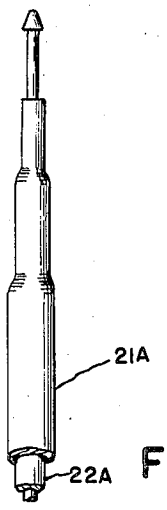


FIG. 4

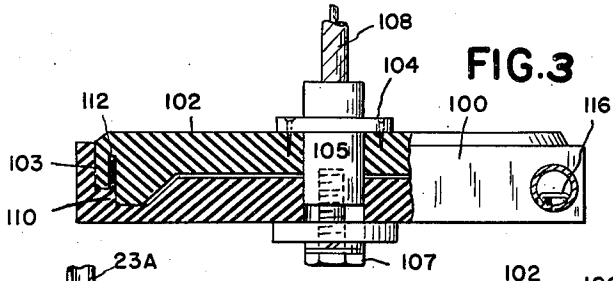


FIG. 3

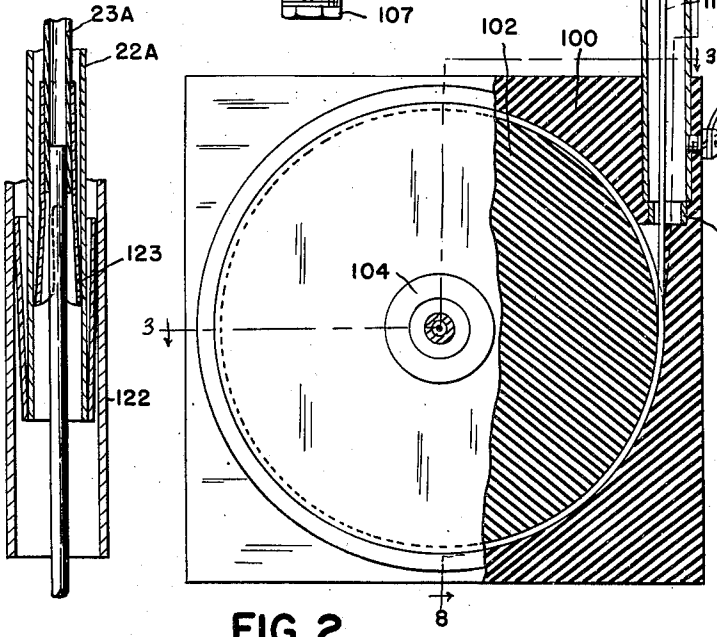


FIG. 2.

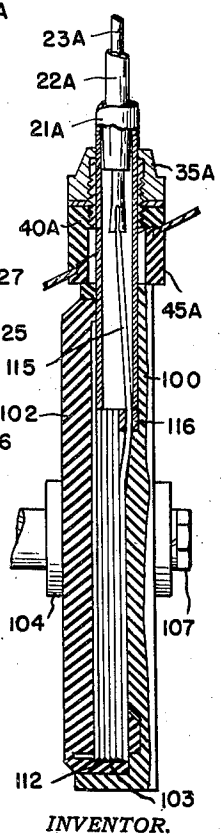


FIG. 5

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2,349,406

ANTENNA CONSTRUCTION

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

Application June 22, 1940, Serial No. 341,953

1 Claim. (Cl. 250—33)

This invention relates to radio antennae, and particularly to improved remotely operable telescopically extensible and retractible antennae of the relatively rigid, self-supporting type.

The invention contemplates the provision of improved means for extending and retracting such a telescoping antenna, which means is of extremely simple and positive mechanical character, operable by means of a crank or knob from a remote point. A related object is to provide improved means utilizing a simple stiff wire to extend and retract a telescoping antenna of the character indicated, which wire is adapted to be wound upon and unwound from a drum as the knob or crank is turned to retract or extend the aerial. While attempts to create a practical device of this character have been made in the past, it is believed that equivalent results have not heretofore been secured, with a device of comparably simple, inexpensive and reliable nature, while these characteristics are required to a high degree to render feasible the installation of such aerials upon passenger automobiles.

Another object is to provide a device of the indicated character employing a drum or reel for extending and retracting the antenna, which drum or reel is operable from a remote point by means of a Bowden wire cable or the like.

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:

Fig. 1 is a fragmentary and somewhat diagrammatic side elevational view of a motor vehicle equipped with an improved antenna system constructed and installed in accordance with the present invention.

Fig. 2 is a view partly in side elevation and partly in substantially central vertical section, showing the aerial construction removed from the vehicle.

Fig. 3 is a cross section taken substantially on the line 3—3 of Fig. 2 and looking in the direction of the arrows.

Fig. 4 is a sectional view taken substantially on the line 4—4 of Fig. 2 and looking in the direction of the arrows; and

Fig. 5 is an enlarged detail section of the friction imposing and electrical connecting means by which the telescoping sections are interconnected.

Referring now to the drawing: reference character 10A designates generally the body of a closed motor vehicle. The passenger compartment is formed by a raised section 12A of the body, and a cowl portion 11A adjacent the same, the entire body being sheathed in sheet metal.

The aerial proper consists of three telescoping metallic sections 21A, 22A, 23A, the first of which, comprising the outer section, is fixedly attached at its lower end to a supporting casing 100 formed of insulating material, such as hard rubber, this assembly being, in the installation shown, attached to the cowl 11A with the antenna sections projecting thereabove and the casing arranged therebelow in a manner presently to be described in greater detail. A generally cylindrical opening extends inwardly from one face of the casing, adapted to receive a conformably shaped reel, 102, rotatably mounted therein and also formed of insulating material. In the shown construction the reel is rotatably attached to the casing by means of a flanged metallic hub 104 carried by and rotatable upon a post 105 secured in the casing at the axis of the cylinder opening, as by means of the screw 107. The reel is adapted to be turned from a remote point, as by means of a Bowden wire assembly 108 attached to the hub 104.

The cylindrical opening in the casing into which the reel is fitted is of stepped counterbored form, as best shown in Fig. 3, the stepped contour being provided by an annular reentrant shoulder, 110, formed at the bottom outside corner of the reel opening. The reel is contoured to conform closely to and fill the entire reel opening, fitting snugly against both sides of the reentrant shoulder 110.

A cylindrical slot 112 extends inwardly of the reel from a point substantially in line with the inner edge of the shoulder 110. The slot is wide enough, in its radial dimension, to receive only a single turn of the wire, 115, which is used to actuate the telescoping aerial sections, but is deep enough to receive several turns along its length. The wire is thus prevented from "piling up"; that is, it can be wound into the slot helically, but one turn cannot overlie another. Stiff piano wire or the like is attached to the innermost section 23A of the telescoping aerial assembly, and projects downwardly through a restricted opening 116 which opens into the interior of the casing at a point lying substantially at the juncture of the slot 112 with the shoulder 110, and tangentially with respect to the reel. The restricted opening may be formed by squeezing the inner end of the tube 21A. It will be seen that no room is pro-

vided for the wire either to buckle or to contact any substantial portion of the inner surface of the casing. Due to the arrangement of the slot, 112, the portion of the reel outside the slot, designated 103, surrounds all portions of the wire which have been wound upon the reel.

The lower ends of the slidable sections 22A, 23A are provided with enlarged extremities 122, 123, respectively, these parts also frictionally engaging the interiors of the tubes in which they are slidable to provide electrical contact between the sections. The upper ends of the outer sections are reduced in diameter, as shown in Fig. 2, so that the enlargements 122, 123 effectively prevent escape of the inner sections from each other and from the outer section 21A.

When the reel is turned in a direction to wind the wire upon it, the sections are drawn downwardly into telescoping relation, the wire being fed into the slot 112 from the inner end, and each succeeding turn wound on the reel forces those previously wound to slide longitudinally along the reel and into the slot. The first turn is thus wound around the reel close to the shoulder 110, while the next turn is wound in the same place, but forces the first turn into the slot during the continued winding. When the reel is turned in the opposite direction, the wire is forced upwardly, to project the antenna. The tendency of the wire coiled upon the reel to unwind and expand during such unreeling can cause no binding of the reel in the casing by clutch action, since the turns cannot expand into contact with the interior of the casing itself, engaging only the guard portion 103, which turns as a part of the reel and assists in projecting the wire.

A screw 125 may extend through the side of the casing 100 and into the outer section 21A of the aerial to assist in locking the aerial sections in place as well as to provide a lead-in connection, the wire 127 being attached to the screw and extending to the radio apparatus (unshown).

As shown in Fig. 1, the aerial assembly may be mounted beneath the cowl 11A of the vehicle body 10A, while the antenna sections may extend through but be insulated from the cowling, the positioning and insulation being effected by means of insulating filler blocks 40A, 45A, shaped conformably to the cowl and to the inclination of the aerial assembly, the parts being held by a nut 35A screwed onto a threaded sleeve 135 surrounding and secured to the fixed antenna section 21A.

The Bowden wire 108 by which the reel is turned may extend through the instrument panel 16A, and a knob 130 may be attached to the wire to enable convenient operation of the reel.

I am aware that the invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof, and I therefore desire the present embodiment to be considered in all respects as illustrative and not restrictive; reference being had to the appended claims rather than to the foregoing description to indicate the scope of the invention.

I claim:

An extensible and retractible antenna construction comprising a plurality of telescoping members, one slidable within another, a flexible but relatively incompressible filamentary element connected to an inner one of said members and also extending through and from the outer thereof, and means for actuating said element to project and retract the inner member, comprising a casing having a substantially cylindrical chamber therein closed at one end by an end wall, a reel rotatable in the chamber and held against longitudinal movement therein, one face of said reel closely abutting and being closed by said end wall, the filamentary element being connected to the reel, said reel having a substantially cylindrical winding surface upon which said filamentary element may be wound to retract the antenna element and from which it may be unwound to project said antenna element, a guard portion rotatable with said reel and surrounding but spaced from said winding surface, the spacing between said winding surface and guard portion forming a slot opening laterally against said end wall of greater thickness than said filamentary element but less than twice the thickness thereof, and a guide opening extending through the casing at its closed end terminating at and substantially tangentially with respect to said winding surface, means at the open end of the slot for feeding the filamentary element laterally into and from the same when the reel is turned to wind and unwind said filamentary element, the winding surface and the inner surface of said guard portion being relatively smooth, whereby the turns of said filamentary element may slide laterally in and out of said slot as said element is wound and unwound, said reel and guard portion being integral, the winding surface being longer than the guard portion and projects beyond the open end of the slot, said means for feeding the filamentary element comprising an opening through said casing large enough to permit the filamentary element to pass freely therethrough but of insufficient size to permit buckling of said element, said opening extending substantially tangentially with respect to said winding surface and angularly inwardly toward said slot, to feed the filamentary element onto said winding surface and angularly inwardly toward the bottom of said slot as the reel is turned to wind the filamentary element thereupon, and vice versa.

EMIL CARLSON.