Dec. 26, 1950 E. CARLSON 2,535,899

ANTENNA

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FIG. 1.

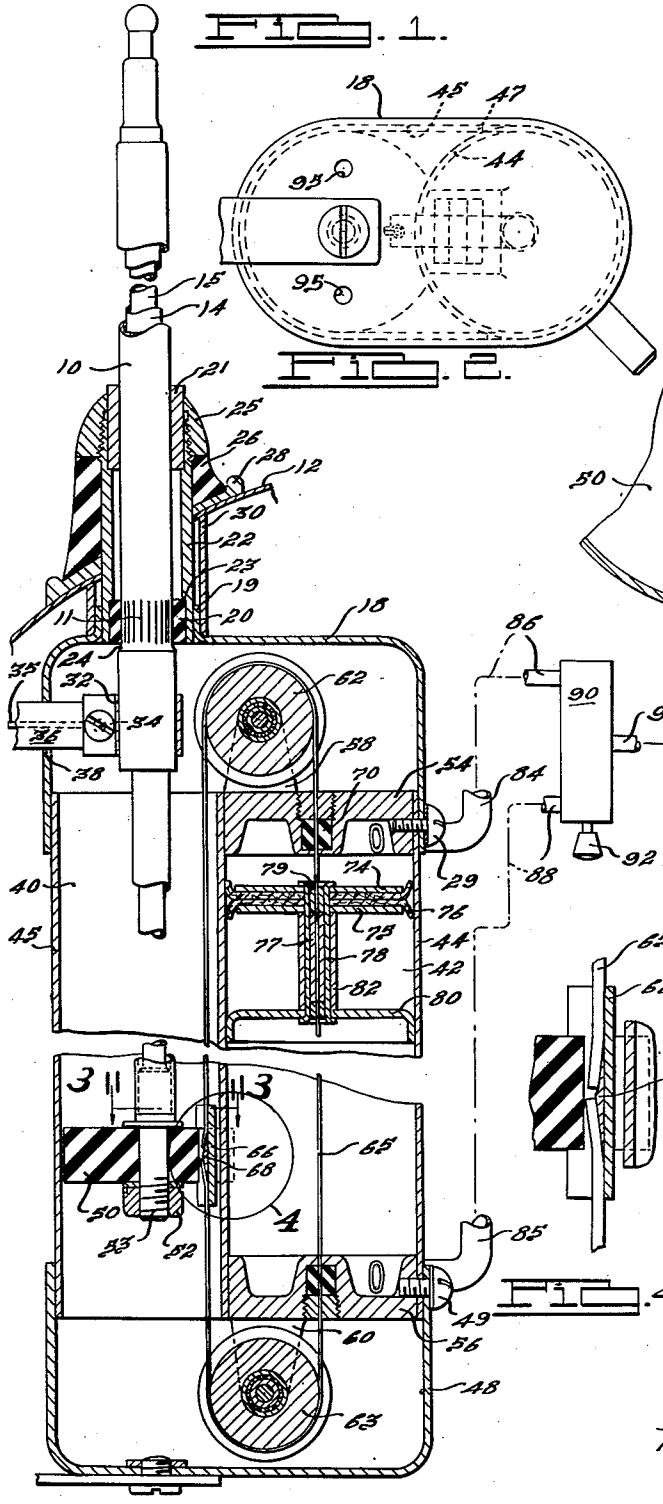


FIG. 2.

FIG. 3.

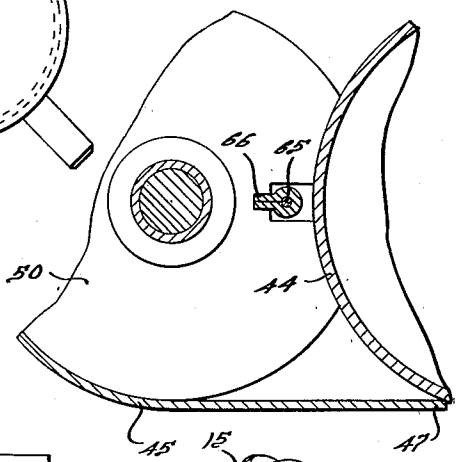


FIG. 5.

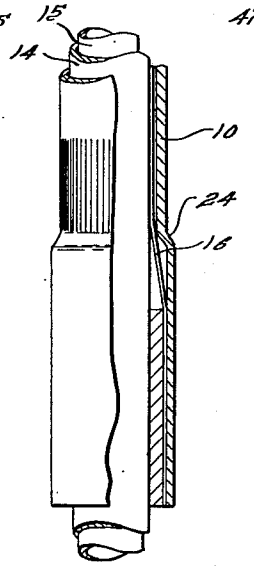


FIG. 4.

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ANTENNA

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2 Claims. (Cl. 250—33)

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The present invention relates to radio antenna constructions of the extensible and retractable type which is particularly suited for, although not exclusively restricted in its utility to, vehicular installations, as in motor cars, aircraft, and the like.

An important object of the invention is to provide an improved pressure-operable aerial which may be extended and retracted through selective connection thereof to pressure generating means such as the intake manifold of an internal combustion engine.

Another object is to provide such an antenna incorporating improved actuating means adapted to be concealed from view within the body of a vehicle upon which the antenna is installed, the mounting being such that the antenna is retracted into the vehicle when in the inoperative position and the parts being so arranged that the complete installation affords an antenna having a high quality or Q factor, low capacity, and the capacity of which remains substantially unchanged during extension and retraction of the antenna.

Another object is to provide such a retractable antenna installation the efficiency of which remains virtually unaffected by any moisture which may find its way into the interior of the mechanism by way of the opening in the vehicle body through which the antenna is projectable.

An object related to that last stated is to provide an improved actuable antenna assembly having an actuating motor of the reciprocating type and a housing into which the antenna is retractable and from which it may be projected, the motor and antenna housing being mounted relatively close to one another in parallel relation and isolated in such manner that neither is harmfully affected by the presence of the other, either electrically or mechanically, and moisture cannot accumulate in a manner which would interfere with the electrical efficiency of the antenna.

Other objects and advantages will be apparent upon consideration of the present disclosure in its entirety.

In the drawings:

Fig. 1 is a substantially central vertical longitudinal sectional view, centrally broken away, of a power-operable antenna constructed in accordance with the present invention, showing the same as installed in the body of a motor vehicle, which is fragmentarily illustrated, and also schematically showing connections to cooperating elements;

Fig. 2 is a bottom plan view thereof;

Fig. 3 is a sectional detail upon a larger scale, taken substantially on the line 3—3 of Fig. 1 and looking in the direction of the arrows;

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Fig. 4 is an enlarged sectional detail of the portion of Fig. 1 enclosed in the circle designated 4, showing the means for connecting the actuating wire to the antenna mast; and

Fig. 5 is a fragmentary composite view of the telescoping antenna mast assembly, partly in side elevation and partly in substantially radial longitudinal section.

Referring now to the drawings, reference character 10 designates a fixedly supported tubular antenna mast section adapted to be mounted in a position in which it projects substantially vertically through and upwardly from a portion of a body of the vehicle, as for example, the fender fragmentarily shown at 12 in Fig. 1. One or more additional telescopic extension antenna sections as 14 and 15 are slidable in the stationary section 10, and also slidable with respect to one another, effective continuous electrical connection between the sections 10, 14 and 15 being maintained as by interposed spring fingers as 16 of phosphor bronze or the like.

At its lower extremity, the stationary section 10 is attached to but insulated from the top cap portion 18 of a housing assembly which is also fixedly supported from the vehicle body structure. The cap 18 is of inverted cupped form, having flat sides and ends rounded as viewed in plan, and is provided with an upturned collar-like flange 19 of circular section through which the mast assembly extends. It will be seen that the cap may conveniently be formed of drawn sheet metal. The upturned collar 19 substantially exceeds the mast assembly in diameter, and between the collar and the mast an insulating bushing 20 and a tubular supporting neckpiece 22 are interposed, the neckpiece 22 being formed of a metal tube fitted into and welded or otherwise tightly secured to the collar 19. The lower extremity of the neck tube 22 is counterbored to provide an internal annular shoulder 23 against which the top of the bushing 20 fits, while the lower extremity of the mast section 10 is expanded to provide a shoulder 24 underlying the bushing 20. Neckpiece 22 is adapted to project up through an opening (undesignated) in the body of fender portion 12 and is externally threaded at its top to receive a nut 25 which may be of a domed or other ornamental configuration, as shown. Between the nut 25 and the outer surface of the body a filler piece 26 and resilient gasket washer 28 are interposed, and a spacing collar 30 is arranged beneath the fender portion 12, between such fender portion and the top of the cap 18, collar 30 being formed as a cylindrical tube surrounding the collar portion 19 and serving as a compression member when the nut 25 is tightened. An insulating bushing 21 corresponding to the bushing 20 is interposed between the nut

25 and the upper end of neckpiece 22 and the mast section 10. The portion of the mast within the bushing 20 is serrated, as indicated at 11, to prevent longitudinal displacement of the mast, which is also held by the connector clamp 32 tightly held upon its lower extremity as by the clamping screw 34. The lead-in connecting wire 35 which is connected to the connector clamp 32 extends outwardly through the side of the cap with respect to which it is insulated by an insulating bushing 36. The bushing 36 is formed of relatively rigid material and is attached to the coupling member 32 and projects through the side wall of the cap 18, thereby serving as a further lock for the mast portion 10. The aperture in the side wall of the cap through which the bushing 36 projects is designated 38.

The cap 18 serves as a closure and support for the upper extremity of an elongated dual housing assembly forming two longitudinal parallel chambers, one of which, designated 40, is aligned with and serves to accommodate the telescoping mast sections, while the other chamber 42 comprises the cylinder of the motor which serves to drive such telescoping sections during extension and retraction thereof. Cylindrical chamber 42 is formed by a seamless metal tube 44, while chamber 40 is formed by a channeled sheet member 45 of substantially U section, having the bight portion of the U of semicircular cross section and corresponding in radius to the radius of the tube 44, with the flat side portions of the U-sectioned member 45 so disposed that the free edges 47 thereof bear against the tube 44 throughout substantially its entire length. Since the flat sides of the housing member 45 are substantially tangential with respect to the tube 44, the dual housing assumes the cross-sectional form indicated in Fig. 2, having rounded wall portions formed by the bight of the U-shaped channel 45 and by the exposed side of the tube 44 and flattened side walls formed by the side flanges of the channel member 45. A bottom cap 48 conforming in its general shape to the top cap 18 marginally overlaps the lower ends of channel 45 and tube 44 to which it is secured as by screws 49.

The lower extremity of sliding antenna section 14 carries and is centered by a sliding spacer block 50 secured thereupon by means of a stud 53, fast in and projecting downwardly from the lower end of antenna section 14, and by a nut 52 on the stud. Slide member 50 moves freely within the compartment 40 and is of generally crescent shape, conforming to the internal cross section of such compartment.

A looped belt 65 is secured at its extremities to the slide member 50, as by means of the sheet metal clip 66 which is tightly wrapped around the extremities of the belt 65 and crimped against the same to retain them. The belt may be of wire or plastic, and if desired, solder or cement or the like may also be used, as indicated at 68, to additionally secure the belt with respect to the clip 66, the clip is so contoured that its upper and lower extremities overhang and underhang the top and bottom respectively of the slide 50, preventing vertical displacement of the slide with respect to the belt. The belt is trained over upper and lower pulleys 62, 63 housed in the cap portions 18, 40 respectively and so positioned and dimensioned that the other run of the looped belt extends axially through the cylinder 42. The pulleys are indicated as journaled in bearing brackets 58, 60 respectively, carried by upper and lower heads 54, 56 which close the ends of cylinder 42. The head members 54, 56 are of inwardly facing cupped form and may be positioned by the same screws as 29, 49 which are employed to retain the caps 18, 48. Packing means as 70 is also preferably provided, carried by the heads at the points of entry of the belt 65 and substantially sealing the belt with respect to the cylinder heads.

A piston assembly is secured to the belt within the cylinder 42 and is adapted to be urged longitudinally within such cylinder to actuate the mast section 14. The piston assembly comprises a pair of spaced washerlike plates 74, 75 serving as retainers for conventionally arranged, oppositely facing cupped packing washers 76. The assembly of washers 74—75—76 is retained and positioned by an axial tube 78 which is substantially longer than the piston plate assembly and extends downwardly therefrom to support a cupped spacer member 80 slidably fitted within the cylinder 42 and positioned far enough below the piston plate assembly to eliminate any tendency of the latter to cock within the cylinder. The ends of axial tube 78 are expanded above the top washer 74 and below the spacer 80, so that tube 78 serves as a hollow rivet to maintain the piston parts in assembled relation, the spacing between the bottom washer 75 and spacer 80 being maintained by a spacer tube 82 arranged therebetween and surrounding the axial tube 78. A clamping tube 77 is fitted tightly in and may be welded to the tube 78 and is also preferably secured to the belt as by soldering, as indicated at 79.

Pressure communication to the interior of the cylinder space 42 above and below the piston assembly is provided by coupling nipples 84 and 85 fitted in and sealed with respect to suitable aligned openings (undesignated) in the overlapping casing and end cap portions and projecting inwardly through the flanged walls of the cylinder head members 54 and 56, in which they may be threadedly fitted. Nipples 84 and 85 are adapted to be connected, as by means of suitable conduits 86 and 88, to a manually operable valve 90, the details of which form no part of my present invention and accordingly will require no explanation, although the valve preferably conforms to the disclosure of Cary W. Martin Patent No. 2,239,614, and is actuable, as by means of a knob 92, to selectively connect either of the lines 86, 88 to a reduced pressure area such as the intake manifold of a gasoline engine, to which connection may be effected by a conduit 94.

Openings as 95 may be provided in the bottom cap 48 so that any water which finds its way into the interior of the casing assembly from outside the vehicle portion 12 may readily escape.

It will be apparent that by selectively actuating the valve 92, pressure may be applied to either side of the piston assembly to so move the same as to raise or lower the antenna portion 14 at will, and that movement of this portion carries with it the inner section 15.

It will also be seen that various modifications may be introduced without departing from the spirit and scope of the subjoined claims.

I claim:

1. A power-operable extensible and retractable aerial construction comprising a housing structure incorporating a pair of substantially parallel elongated chambers arranged side-by-side, one of said chambers being open at the top and bottom thereof, an antenna rod slidable in said

last chamber through and from said top opening, and a pressure-operable motor element housed in the other of said chambers laterally offset and substantially isolated from the first-mentioned chamber and a belt operatively connecting the motor element to said rod to actuate the same.

2. In an extensible and retractable aerial construction, a housing structure defining a pair of elongated tubular chambers substantially isolated fom one another, antenna means including an antenna member slidable in a first one of said tubular chambers to extend more or less into and from the same, motor means within the other of said tubular chambers operatively connected to said member and actuatable to so slide such member, said housing structure comprising a tube defining the second tubular chamber, a piston slidable in said tube, the first tubular chamber lying beside and close to said tube, a guide member for said slidable antenna member slidably

housed within said first tubular chamber, and a substantially endless belt connecting said piston to said guide member and extending around end portions of said tube and first tubular chamber.

EMIL CARLSON.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,094,124	Huffman	Sept. 28, 1937
2,194,747	Giffoniells	Mar. 26, 1940
2,239,613	Martin	Apr. 22, 1941
2,253,379	Kinn	Aug. 19, 1941
2,273,628	Beaumont	Feb. 17, 1942
2,300,847	Russel	Nov. 3, 1942
2,319,860	Hann	May 25, 1943
2,391,073	Rappl	Dec. 18, 1945