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VACUUM TYPE RADIO ANTENNA

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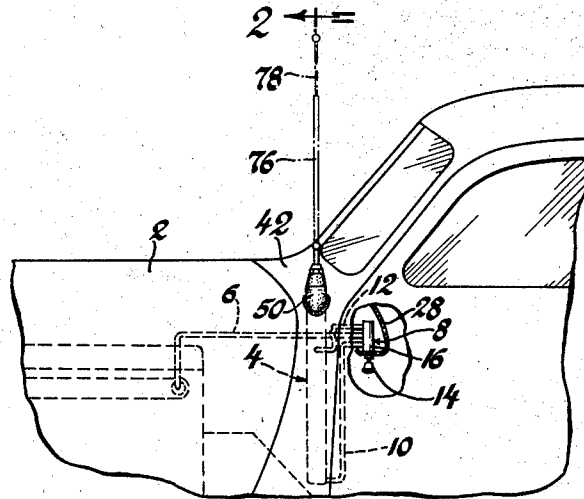
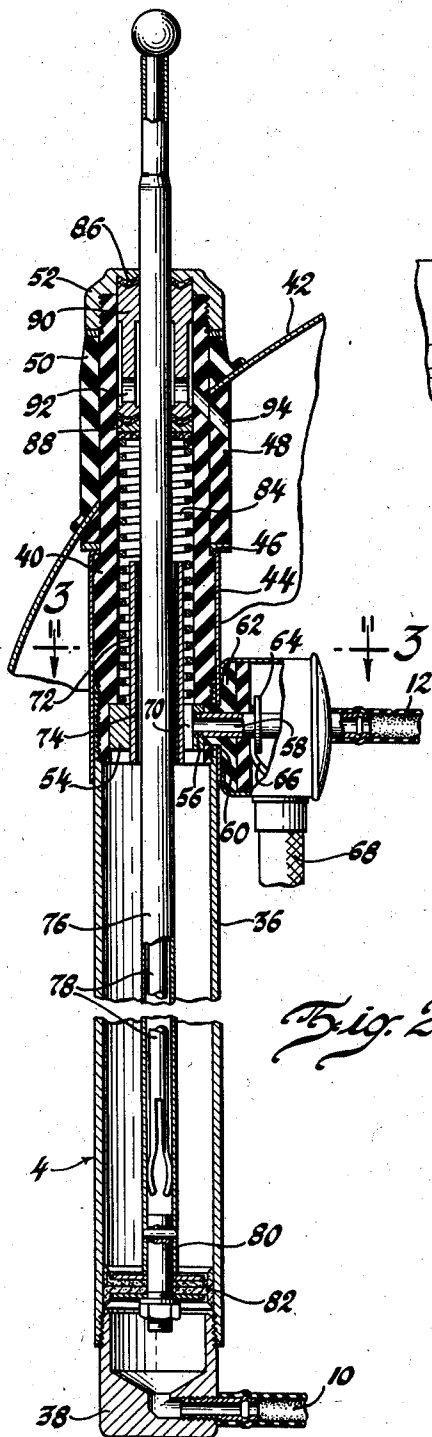


Fig. 1 2-2

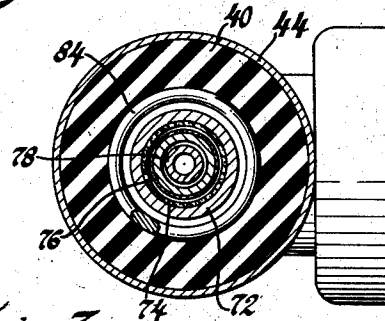


Fig. 3

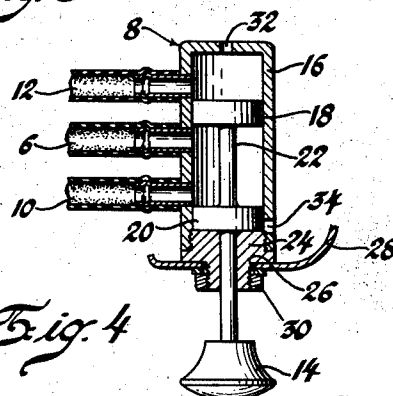


Fig. 4

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VACUUM TYPE RADIO ANTENNA

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5 Claims. (Cl. 250—33)

This invention relates to antenna devices and more particularly to retractable antennas such as those used on mobile vehicles.

With the increased use of radio receivers on automobiles, the question of providing an antenna for the same has become quite important. There are, of course, a number of problems involved in mounting upon a car or other vehicle an antenna for radio receiving purposes inasmuch as the bodies at the present time are substantially all sheet metal. This makes it necessary to mount the antenna on the exterior of the body. This again raises the problem of appearance as it is necessary to provide equipment that is not too prominent and which might spoil the overall appearance of the car.

There is also the problem arising of vibration which might cause poor contact between certain portions of the antenna or conductor lead-in, thus causing noise in the set. A very popular type of antenna at the present time which meets most of the requirements is a retractable, telescopic one in which at least a portion and sometimes a large amount of the antenna is normally supported within the confines of the vehicle, but may be extended upon desire to receive broadcast signals. One of these types is disclosed herein mounted in the side of the cowl and adapted to be projected upwardly, in this instance by vacuum applied from the motor of the vehicle, but this is only for illustration as my invention may be used with many other types of antenna.

It is, of course, necessary in this type of antenna to have telescoping parts, and because of this there must be some means for transmitting energy either between the telescoping parts per se, if they do not bear against each other with sufficient friction, or to some lead-in portion extending to the radio receiver. It has been common practice to provide small spring bow members in these locations in order to obtain sufficient contact between the parts to transmit the radiant energy. However, when the car was operated over highways which were not too smooth or operated at high speeds causing the antenna to whip in the wind, the contacts through these springs were caused to jar or move and this caused sputtering or noise in the radio receiver.

It is an object of the present invention to provide transfer means for radiant energy in an antenna system that will eliminate all possibility of noise.

It is a further object of my invention to provide an antenna in which there is no mechanical

connection between the antenna rod and the lead-in portion to the receiver.

With these and other objects in view, the embodiments of my invention will be better understood by reference to the following specification and claims and the illustrations in the accompanying drawing, in which:

Figure 1 is a partial side view of a car showing an antenna to which my invention may be applied;

Figure 2 is an enlarged sectional view taken on line 2—2 of Figure 1;

Figure 3 is a further enlarged and sectional view taken on line 3—3 of Figure 2; and

Figure 4 is a sectional view taken through the operating mechanism for raising and lowering the antenna.

Referring now more specifically to the drawing, there is illustrated a vehicle 2 in one side of the cowl of which is supported a cylindrical antenna housing indicated generally at 4, the top portion of which protrudes through the cowl and the lower or inner portion of which is supported between the side of the car and the kick pad.

Connected to a portion of the intake manifold is a vacuum line 6 which extends to a valve structure indicated generally at 8, there being a further connection 10 from the valve to the lower portion of the antenna housing. There is also a third short tube 12 connected between the valve mechanism 8 and the upper portion of the antenna housing. The valve portion has extending below the instrument panel a manually operated knob 14 which may be raised or lowered to operate the position of the antenna on the outside of the vehicle. The specific construction of the valve structure is best shown in Figure 4 and comprises an outer cylindrical shell 16 within which are supported a pair of spaced plungers 18 and 20, both mounted on a common shaft 22 directly connected to the external operating knob 14. One end of the cylindrical shell 16 is closed by a threaded plug 24, the exterior portion of the protruding end of which is threaded to extend through an opening 26 in the lower portion of the instrument panel 28 and is secured thereto by a suitable nut 30. Connected to one side of the cylindrical member 16 and in spaced relation are the series of flexible tubes formerly mentioned which are, reading from the top, 12, 6 and 10, respectively. There are also provided in the exterior surface of the member 16 two bleed openings, 32 at the top end and 34 adjacent the lower end. The tubes are connected to the intake manifold of the motor and also to the

casing of the antenna support in a manner to be described.

Referring now more specifically to Figure 2, the outer casing of the antenna support is provided by a cylindrical member 36 into the lower end of which is threaded a hollow nipple 33 to which is connected one end of the tube 10. The upper portion of the cylinder 36 is internally threaded and receives a long cylindrical bushing 40 formed of insulating material which is adapted to project up through, in this instance the cowl 42, of the car, but this may well be any other portion of the vehicle, such as the fender or other part. A small cylindrical metal sleeve 44 surrounds a portion of this insulating cylinder 40 and has an inwardly turned upper flange 46 to fit in a ring around the outer surface of the member 40 to act as a shoulder. There is then applied a cylindrical bushing 48 which slips down over the outer surface of the upper end of the member 40 and whose upper surface is adapted to correspond to the configuration of the metal member through which the member 40 passes. There is then applied on the outer surface of the metal member a second insulated cylindrical bushing 50 which coats with the member 48 to clamp the metal member therebetween and finally applied to the top threaded end of the member 40 is a threaded bushing 52 to clamp the whole assembly together and to the car.

Mounted within the lower end of the insulating cylinder 40 is a brass ring 54 secured in place by having a threaded opening 56 in one side thereof into which is threaded one end of a metal pipe 58. This pipe extends through an opening 60 in the side of the outer shell 36 but is entirely surrounded by an insulating grommet 62. To this metal pipe is secured a small metal disc 64 which acts as the lead-in take-off and to which a wire 66 going to the receiver is connected. This enters a suitable cable 68 to be conducted to the radio set. The pipe 58 is, of course, hollow and its outer end is connected to one of the vacuum tubes 12. The brass ring 54 has a slot 70 cut in one side whereby the interior area of the pipe 58 is connected to the hollow interior of the casing 36.

Mounted within the inner periphery of the brass ring 54 and rigidly connected thereto is a copper tube 72 which is concentric with the outer casing and hollow. Next there is concentrically mounted within the copper tube a rolled-up section of paraffin paper or other dielectric 74 which acts as an insulator between the copper tube 72 and the outermost concentric tube 76 of the telescopic antenna which extends all the way through to the bottom of this assembly. Within the hollow tube 76 there may be one or more other smaller concentric hollow tubes or only one, depending upon how high it is desired to project the antenna when it is entirely protruding from its holder. In this instance only one is shown but as many as may be desired can be provided.

In the bottom of the tube 76 there is tightly press-fitted a small pin 80 which extends through a plunger mechanism 82 tightly fitted within the inner surface of the casing 36. This is formed of any deformable material, such as leather, as to form a piston. This piston therefore forms two chambers in the outer casing, one below and one above the piston. It is therefore evident that as suction is applied to the chamber below the piston 82 the tube 76 and any other tube therein will be withdrawn within the confines of the outer shell 36 or if vacuum is applied to the

tube 12 above the piston the same will be protruded upwardly to extend from the cowl. The interior rod 78 of course must be manually pulled upwardly in order to place it in its extended position.

This action is controlled by the pneumatic valve 8 or rather by the operation of the manual button 14. If it is in the position shown in Figure 4, tube 6 coming from the intake manifold of the engine will supply vacuum to the tube 10, thus pulling the antenna down to the position shown in Figure 2, the tube 12 in this case being vented to the atmosphere through opening 32. By forcing the manual knob 14 upwardly tube 10 is cut off by valve 20 from tube 6 and is vented to the atmosphere through opening 34 and at the same time valve 18 passes beyond tube 12 to close vent 32 but connect tube 6 with tube 12 applying vacuum to the upper surface of the piston and extending the antenna upwardly from the cowl.

Inside the hollow opening in the insulated cylinder bushing 40 there is mounted a compression spring 84, the lower portion of which is exterior to the copper sleeve 72 and whose major purpose is to press against the brass ring 54 and to seal the upper portion through which the tube 76 passes against moisture. This is accomplished by having two chevron packings, one at 86 and one at 88, which bear against the sides of the tube 76 to prevent moisture from running down the outer surface thereof held in place by said spring. Between 86 and 88 there is a cylindrical member 90 which has inner and outer peripheral grooves cut therein and at one point openings 92 between the grooves, said surfaces between vented to the air through opening 94 in the insulating members 40 and 48 to allow any possible moisture leaking past the first packing to escape from this area or to prevent the build-up of any air pressure therein. Thus after the cap 52 is tightly screwed to the top of the antenna assembly the spring member 84 will maintain the chevron packings tightly in place and prevent any moisture leakage.

It will thus be seen that any waves of radiant energy intercepted by the antenna will pass through rod 78 to the outer tube 76 and form a certain potential on the surface surrounded by the copper tube 72, thus forming a condenser therewith and by capacity action be transferred to the copper tube, to the brass ring 54, to the pipe 58 and thereby taken off by the lead-in 66 to the receiver. There are no mechanical parts necessary for electrical connections from the rod itself to the lead-in, all of the energy being transferred by condenser action between the rod and the tube 72. Thus there can be no poor connections to cause scratching or other noise in the receiver and the reception is very much improved since springs or other physical connections are dispensed with and vibration or whipping of the antenna will cause no noise.

I claim:

1. In an antenna device, a casing, antenna means adjustably mounted thereon capable of relative movement with respect to the casing and formed of electrically conductive material, a conductive member mounted on the casing to at all times be in juxtaposition to some portion of the antenna means but not in contact therewith whereby electrical energy is transmitted from the antenna to the conductive body by condenser action between the two.

2. In an antenna device, a long cylindrical cas-

ing, a telescopic antenna retractably mounted within the casing for ejection from one end thereof, means for extending or retracting the antenna from the casing, means mounted on the casing surrounding the antenna near the end of travel in one direction and insulated therefrom through which the antenna moves, said last named means formed of conducting material, and means connecting said last named means to a lead-in conductor whereby radiant energy developed in the antenna will be transferred to the conductive means by condenser action.

3. In an antenna device, a long cylindrical casing, a telescopic antenna retractably mounted within the casing for ejection from one end thereof, sealing means to prevent leakage between the antenna and the casing at this end, a conductive cylinder mounted around the antenna but spaced therefrom, insulation means between the two whereby a condenser is formed and radiant energy developed in the antenna may be transferred to the cylinder by capacity.

4. In an antenna device, a cylindrical casing, an antenna retractably mounted within the casing for ejection from one end, a copper sleeve mounted around a portion of the antenna but spaced therefrom, means supporting said sleeve from the casing, said last named means being electrically conductive and transmitting energy to a lead-in whereby radiant energy developed in the antenna will be transferred by condenser action to the sleeve and thence to a lead-in.

5. In an antenna device, a cylindrical casing, an antenna retractably mounted within the casing for ejection from one end, a conductive sleeve mounted around a portion of the antenna but spaced therefrom, means supporting said sleeve from the casing, said last named means being electrically conductive and transmitting energy to a lead-in whereby radiant energy developed in the antenna will be transferred by condenser action to the sleeve and thence to a lead-in.

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