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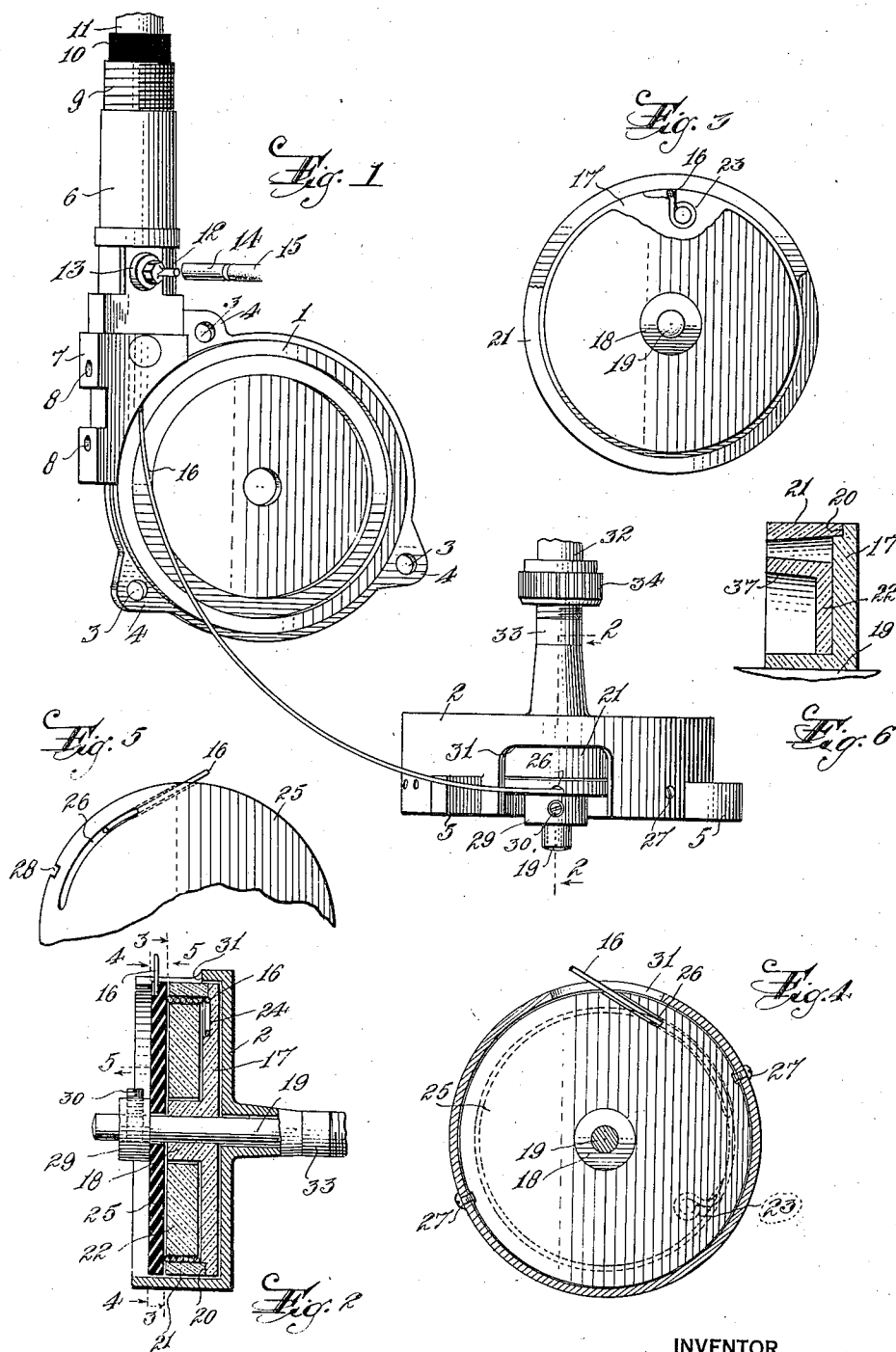
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2,274,883

MEANS FOR OPERATING RADIO ANTENNAS

Filed Jan. 15, 1941

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

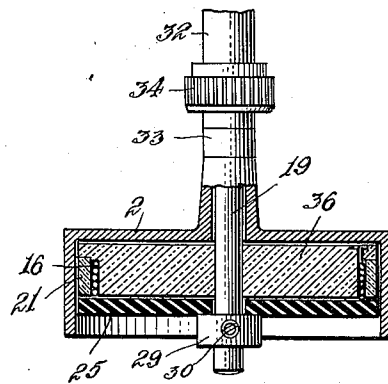


Fig. 6

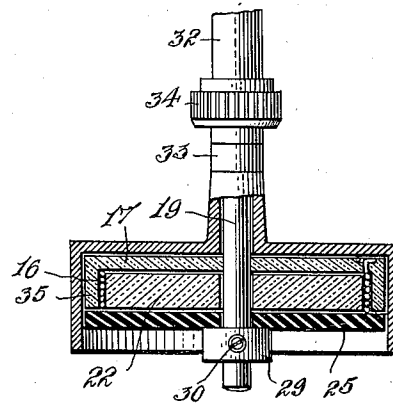


Fig. 7

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MEANS FOR OPERATING RADIO ANTENNAS

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This invention relates to the construction of a mechanism especially adapted for use in the operation of an antenna of the telescopic type.

Various means have been proposed for raising and lowering the sections of a telescopic type of antenna which is particularly adapted for use on automotive vehicles. More recently it has been proposed to operate the sections by means of a flexible member having considerable stiffness longitudinally of its length, such as a steel wire of suitable diameter, so that the wire may be wound up into convolutions or coils within a small container.

The use of such an operating element involves many difficulties for the reason that a wire of a size and longitudinal stiffness sufficient to push the antenna sections into extended position is hard to control in the winding and unwinding operations, particularly so during the unwinding operation or during the period of extending the antenna sections. Furthermore, the convolutions or turns tend to expand and push outwardly from the axial center of the container, drum or reel on which the flexible member is wound and thereby cause considerable friction and binding. Also, there is a tendency for the turns or convolutions to jump over one another and thereby become wedged.

It is therefore the principal object of my invention to provide an antenna operating mechanism which will overcome the several difficulties mentioned and heretofore encountered in the construction of such devices.

A further object is to provide a simplified construction which is relatively inexpensive and one which is highly efficient and easy to operate.

Other objects will appear from a reading of the following specification, taken in connection with the annexed drawings, wherein:

Figure 1 shows the two parts of the container or receptacle carrying the winding-up parts, the parts being separated one from the other.

Figure 2 is a part-sectional and part-elevational view on the line 2—2 of Figure 1.

Figure 3 is a section on the line 3—3 of Figure 2.

Figure 4 is a section on the line 4—4 of Figure 2.

Figure 5 is a fragmentary view on the line 5—5 of Figure 2.

Figure 6 is a fragmentary view of the three rotatable members, showing the space enlarged for the turns of a flexible operating member.

Figure 7 is a sectional view similar to Figure 2, but of a modified form of construction.

Figure 8 is a view similar to Figure 2 but of a further modified form.

In the different views, wherein like numbers refer to corresponding parts, 1 and 2 are separable parts of a casing which are held together by screws going through screw holes 3 in the ears 4 of part 1, and into threaded holes in the lugs 5 of part 2. The casing member 1 has a mounting stud 6 having a base portion 7 preferably integral with the casing member 1. The base portion is provided with tapped holes 8 for the purpose of attachment of the casing to a bracket or support member on the vehicle. In addition, the stud 6 is threaded at 9 to receive a nut used for supporting the stud where it comes through the cowl or part of the vehicle body.

Positioned within the stud 6 and extending downwardly into the base is an insulator 10, and carried within the insulator 10 is a section 11 of the antenna, which is held in place by a metallic stud 12 insulated as by an insulator 13 from the stud 6. The stud 12 is adapted to receive a connector 14 attached to a cable 15 coming from the radio set.

The other sections of the antenna are not shown, but it is to be understood that the lower end of the inner section is connected to a flexible operating element or member 16 which is a steel wire having considerable stiffness longitudinally of its length, but capable of being wound up within the container or casing in a manner to be presently described.

Positioned within the casing member 2 is a disc-like member 17 preferably of suitable insulating material and having a hub 18 through which passes a shaft 19. The insulator 17 is securely fastened to the shaft 19 for rotation therewith. The inner face of the disc 17 preferably has an annular seat 20 at its outer periphery, and positioned or abutting against this seat is a band-type ring or roller 21. Also mounted over the hub 18 is a ring-type roller 22, the diameter of which is less than the internal diameter of the band ring 21 by an amount slightly greater than the diameter of the flexible operating element 16, one end of which is drivingly attached in any satisfactory manner to the disc 17.

As shown in Figures 2 and 4, the inner end of the member 16 is formed into a loop 23 which is adapted to enter a recess 24 in the inner face of the disc 17. The outlet from the recess 24 is such that the convolutions or turns in the member 16 will be readily formed around the roller 22 as the shaft 19 is turned. Since the ring 21 preferably passes somewhat beyond the inner

face of the disc 17, exit from the recess 24 to the space between the rollers 21 and 22 is readily made. Positioned against the outer faces or edges of the rings 21 and 22 is a flat disc-type insulator 25 which has a groove 26 therein to allow the exit of the flexible member 16. The insulator 25 is held in the casing in any satisfactory manner as by a plurality of screws 27 adapted to enter recesses 28 in the edge of the insulator 25. In addition, a spacing collar 29 is preferably fastened to the shaft as by a set screw 30 and bearing against the central portion of the insulator 25. The casing member 2 has a cut-away portion 31 to allow exit of the flexible member 16 as it is wound and unwound from the casing.

While the driving connections to the shaft 19 are not shown, it may be stated that the shaft may have a slit therein to receive a drive member carried by a flexible cable 32 that is attached to the hub 33 of the casing member 2 by a coupling member 34.

It will be noted that the rollers 21 and 22 are free to turn entirely independent of each other and of the driving shaft 19 and the disc 17; and by reason of this free movement of the rollers between which the convolutions or turns of the flexible member are positioned, the binding and frictional action is reduced to a minimum and I have obtained from this construction a very easy-operating mechanism for raising and lowering a telescopic antenna.

This easy operation is enhanced by the fact that I prefer to provide a slight taper on both the parts 21 and 22 as shown exaggerated in Figure 6, or at least a taper on part 22, the taper beginning adjacent the inner edge of the disc 17. In Figure 6 the part 22 is shown slightly different than in Figure 2, in that less material is used by cutting it out to form a flange 37.

In Figure 7 the disc 17, fastened to the drive shaft 19, has an overhanging flange 35 which is spaced from the disc type roller 22 in the same manner as the two rollers 21 and 22 are spaced in Figure 2. It will be understood that the roller 22 in Figure 7 is free to rotate entirely independent of the shaft and the disc 17.

In Figure 8, a disc member 36, fastened to the shaft 19, is constructed somewhat differently from the disc member 17 in Figure 2 but utilizes the same type of band ring roller 21. Also, in Figures 7 and 8, the attachment of the inner end of the operating member 16 is different from the attachment shown in Figure 2, in that this end of the member 16 passes through the disc 17 and has its end bent over and set in a recess in the opposite side thereof.

What I claim is:

1. For actuating a flexible member used in operating an extensible antenna comprising a plurality of telescopic sections adapted to be mounted on an automotive vehicle; a structure including a casing, an operating shaft carried by the casing, a circular member mounted on the shaft to rotate therewith within the casing, the flexible member when the antenna is collapsed being wound up in adjacent convolutions of the same diameter and having one end fastened to said circular member while the other end extends out of the casing and is connected to the proper antenna section and at least one ring roller freely mounted so one of its peripheral surfaces along its length is in contact with the said convolutions of the flexible member to position and

guide them as the flexible member is extended and retracted by turning of the shaft.

2. For actuating a flexible member used in operating an extensible antenna comprising a plurality of telescopic sections adapted to be mounted on an automotive vehicle; a structure including a casing, an operating shaft carried by the casing, a circular member mounted on the shaft to rotate therewith within the casing, the flexible member when the antenna is collapsed being wound up in adjacent convolutions of the same diameter and having one end fastened to said circular member while the other end extends out of the casing and is connected to the proper antenna section, and a ring roller freely mounted over the convolutions and in contact therewith and turnable by the action of the flexible member as it is extended and retracted by turning of the shaft.

3. For actuating a flexible member used in operating an extensible antenna comprising a plurality of telescopic sections adapted to be mounted on an automotive vehicle; a structure including a casing, an operating shaft carried by the casing, a circular member mounted on the shaft to rotate therewith within the casing, the flexible member when the antenna is collapsed being wound up in adjacent convolutions of the same diameter and having one end fastened to said circular member while the other end extends out of the casing and is connected to the proper antenna section, and a ring roller freely mounted on the shaft and having its outer periphery in contact with the said convolution to assist in guiding and positioning them as the flexible member is extended and retracted by turning of the shaft.

4. For actuating a flexible member used in operating an extensible antenna comprising a plurality of telescopic sections adapted to be mounted on an automotive vehicle; a structure including a casing, an operating shaft carried by the casing, a circular member mounted on the shaft to rotate therewith within the casing, the flexible member when the antenna is collapsed being wound up in adjacent convolutions of the same diameter and having one end fastened to said circular member while the other end extends out of the casing and is connected to the proper antenna section, and a pair of concentric ring rollers disposed around the shaft and free to turn independent of the shaft, the said convolutions being closely disposed between the outer periphery of the inner roller and the inner periphery of the outer roller.

5. A structure for operating an antenna of the telescopic automotive vehicle type comprising a casing, an operating shaft carried by the casing, a circular member mounted on the shaft for rotation therewith within the casing, means having considerable stiffness longitudinally of its length, yet bendable into turns, one end being connected to said circular member while the other end is connected to the proper antenna section, a pair of concentric ring rollers disposed around the shaft and free to turn independent of the shaft, the rollers being spaced apart a distance a little greater than the thickness dimension of said means, the rollers acting as guides and supports for the turns of the said means as it is moved by said shaft.

6. A structure for operating an antenna of the telescopic automotive vehicle type comprising a casing, a disc of insulating material having a hub, an operating shaft passing through the disc

and hub and fastened thereto and extending on both sides of the disc and supported by the casing, a disc-type ring freely mounted on said hub, a band-type ring freely positioned over said disc ring and spaced therefrom a predetermined distance, and a flexible member having considerable stiffness longitudinally of its length, yet bendable in turns adapted to fit in spaced relation, longitudinally of said shaft, between the band ring and the disc ring in said space of predetermined distance which is slightly greater than the thickness of said flexible member, one end of which is operatively connected to said disc having the shaft, while the other end is connected to the proper antenna section.

7. A structure for operating an antenna of the telescopic automotive vehicle type comprising a casing, an operating shaft carried by the casing, a disc of insulating material rotatably carried by the shaft within the casing, a disc-type ring freely positioned around the shaft, a band-type ring freely positioned around the disc ring and having an internal diameter sufficiently larger than the diameter of the disc ring to receive an antenna-operating element, both rings being laterally positioned against a side wall of said disc carried by the shaft and a flexible antenna-operating element having considerable stiffness longitudinally of its length yet bendable in turns of equal diameter adapted to fit between said rings and be guided thereby, one end of said element being operatively attached to the disc carried by the shaft and the other end fastened to the proper antenna section.

8. In an antenna device of the type described, a plurality of telescopic sections, means for securing one of said sections to a vehicle, elongate flexible means having considerable stiffness longitudinally of its length but capable of being coiled up into laterally spaced turns and having one end fixed to the proper antenna section, the other end being attached to a member of an operating means, said means including a casing for mounting on the vehicle, and three independently rotatable members within the casing, one of said members comprising an operating shaft carrying said member to which one end of said flexible means is attached, a pair of freely mounted rollers concentrically spaced a distance just sufficient to freely receive the turns of said flexible members and keep them from riding one over the other as the flexible member is coiled and uncoiled by the operation of said shaft, and means for holding said rotatable parts in operative position within the casing.

9. In an antenna device of the type described, a plurality of telescopic sections, means for securing one of said sections to a vehicle, elongate flexible means having considerable stiffness longitudinally of its length but capable of being coiled up into laterally spaced turns and having one end fixed to the proper antenna section, the other end being attached to a member of an operating means, said means including a casing for mounting on the vehicle, and three independently rotatable members within the casing, one of said members comprising an operating shaft having a disc of insulating material fixed thereto and to which one end of said flexible means is attached, and a pair of rollers of insulating material surrounding the shaft and concentrically spaced one from the other and abutting laterally against said disc, the rollers being spaced sufficiently to receive the coils of said flexible member and to guide them as the said shaft and disc are turned, and a further means for guiding the flexible member to and from the antenna sections.

10. In an antenna device of the type described, a plurality of telescopic sections, means for securing one of said sections to a vehicle, elongate flexible means having considerable stiffness longitudinally of its length but capable of being coiled up into laterally spaced turns and having one end fixed to the proper antenna section, the other end being attached to a member of an operating means, said means including a casing for mounting on the vehicle, and a plurality of independently rotatable members within the casing, one of said members comprising an operating shaft carrying said member to which one end of said flexible means is attached which member is of disc form and made of insulating material and having an annular seat on its inner face at the periphery thereof, a band-type roller of insulating material having one edge fitting on said seat and to turn freely thereon, a disc type roller of insulating material freely positioned against the inner face of said disc carried by the shaft, the two rollers being concentrically positioned and radially spaced a distance just sufficient to receive the spaced coils of the said flexible member, and a plate of insulating material carried by the casing for holding said rotatable members in operative position and having an exit formation to guide the flexible member to the antenna sections.

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