

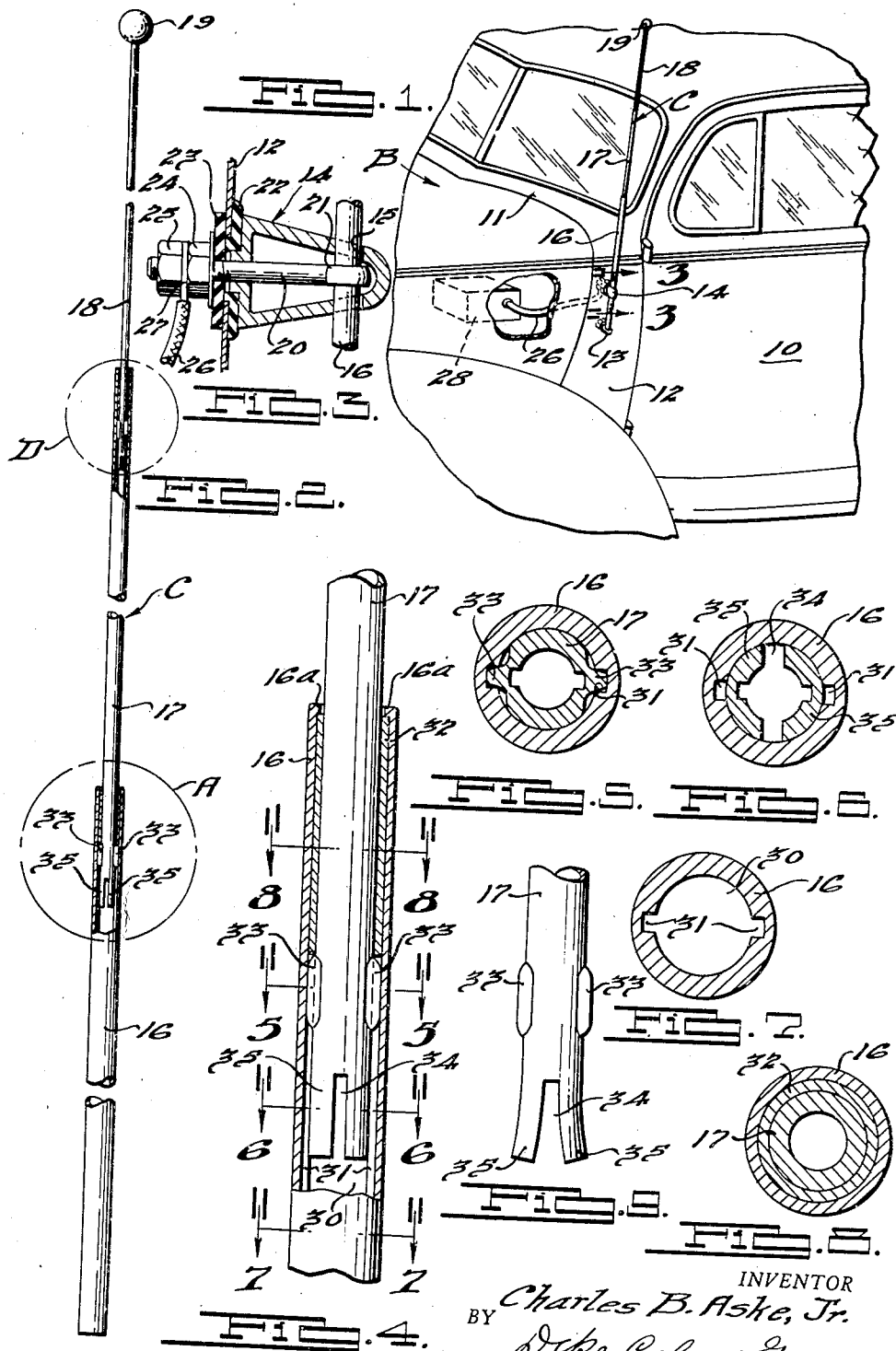
Dec. 9, 1941

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2,265,794

ANTENNA DEVICE

Filed Oct. 7, 1940



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UNITED STATES PATENT OFFICE

2,265,794

ANTENNA DEVICE

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Application October 7, 1940, Serial No. 360,005

7 Claims. (Cl. 250—33)

This invention relates to an improved vehicle radio antenna and more particularly to a novel antenna for use on an automobile or like vehicle in conjunction with a radio receiving set.

Previously known radio antennae of the sectional and extensible type have been subject to rattle, especially when the sections thereof were in fully or partially retracted position. This was due to the fact that the tubular sections were flexible and had a relatively loose fit one within the other throughout a major portion of their length. The sections would strike one another when subjected to vibration set up by the motion of the vehicle to which the antenna was applied and also because of wind conditions. In an effort to correct or minimize this undesirable condition, one end of the outer tubular section was swaged inwardly to a smaller diameter to match the outer or overall diameter of the inner section; or the opposite end of the inner tubular section was swaged outwardly to match the inner diameter of the outer tube section. Notwithstanding the relatively tight fit or joints at the section ends, such known antennae would rattle and make metallic noises and sounds which interfered with and prevented proper and desirable radio reception. Antennae of this general nature presented, moreover, a serious and objectionable condition which was detrimental to the adjustment of the sections because of the fact that the relatively tight joints provided at the ends of the sections would become wedged or stuck fast when the sections were fully extended or projected. Because of this condition it often became necessary to deliver a blow with an instrument to the topmost or outer section to release or free the stuck parts and permit shortening or collapsing of the antenna. Further attempts were made to prevent rattle between the sections or parts of previous antennae structures by employing liquid between the sections or springs in conjunction therewith with a view to reducing or eliminating rattles. Such structures were unsatisfactory from a practical standpoint for various reasons. They were expensive to manufacture and difficult to assemble. Furthermore, because of the particular shape and conformation of the ends of the sections, which were fashioned to provide tight joints or connections therebetween, it was necessary to employ tubular sections or rods of relatively large diameter which, obviously, required the use of a greater amount of material and thus increased the cost of manufacture.

One of the objects of the present invention is to provide an improved sectional radio antenna requiring a relatively small amount of material to manufacture, thus materially reducing production costs, and one in which the sections or telescopic parts of the antenna have bearing por-

tions which extend substantially throughout the length thereof to prevent rattle of the parts.

Another object of the present invention is to provide an improved sectional extensible and contractible radio antenna for use in conjunction with a radio receiving set of a motor vehicle in which the sections are of relatively small diameter and have a relatively tight or snug fit throughout their entire, or at least a major portion, of their length, and in which the joints or connections between the sections are so formed as to prevent any binding action between the parts which would render it difficult to project or retract the sections, but which serve to hold said sections in their various positions of adjustment against accidental relative movement or displacement.

Another object of the present invention is to provide an antenna of the foregoing character having relatively few parts, and one in which, by virtue of its novel structure and arrangement of parts, is free from objectionable noise and rattle while at the same time permitting the sections to be freely adjusted.

Another object of the present invention is to provide a sectional radio antenna of the foregoing character in which the parts thereof are supported in telescoping relation, and in which the slidable section or sections of the antenna are formed from spring metal having characteristics of expansion and contraction sufficient to hold the sections together in various positions of adjustment.

A further object of the present invention is to provide a sectional radio antenna having means to prevent rotation of the parts relative to one another, one which is easy to assemble and to install in a vehicle body, and one which can be produced at a relatively low cost.

The above and other objects and advantages of the invention will appear from the following description and appended claims when considered in connection with the accompanying drawing forming a part of this specification wherein like reference characters designate corresponding parts in the several views.

In said drawing:

Fig. 1 is a fragmentary perspective view of an enclosed vehicle body showing one application thereto of the radio antenna embodying the present invention.

Fig. 2 is an enlarged elevational view, partly in section, of the radio antenna shown in Fig. 1.

Fig. 3 is a detailed sectional view, on an enlarged scale, taken substantially along the line 3—3 of Fig. 2, looking in the direction of the arrows.

Fig. 4 is an enlarged sectional view taken in the area defined by the circle A of Fig. 2, and

showing in detail one of the joints or connections of the antenna of Fig. 2.

Fig. 5 is an enlarged section taken substantially along the line 5—5 of Fig. 4, looking in the direction of the arrows.

Fig. 6 is an enlarged section taken substantially on the line 6—6 of Fig. 4, looking in the direction of the arrows.

Fig. 7 is an enlarged section taken substantially along the line 7—7 of Fig. 4, looking in the direction of the arrows.

Fig. 8 is an enlarged section taken substantially along the line 8—8 of Fig. 4, looking in the direction of the arrows; and

Fig. 9 is a fragmentary sectional view of one end of an internal section or member of the antenna of Fig. 4, prior to assembly.

Before explaining in detail the present invention it is to be understood that the invention is not limited in its application to the details of construction and arrangement of parts illustrated in the accompanying drawing, since the invention is capable of other embodiments and of being practiced or carried out in various ways. Also it is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation, and it is not intended to limit the invention claimed herein beyond the requirements of the prior art.

Referring now to the drawing, Fig. 1 shows a fragment or portion of a conventional vehicle body B of the enclosed type. The body includes a door 10, a cowl 11 having side panel portions 12, one of which is shown.

The improved radio antenna of the present invention, shown as a whole at C in Figs. 1 and 2, is preferably attached to or mounted upon the panel 12 so as to be supported in an upright position. The lower end of the antenna, as shown, is supported by a socket portion formed in a bracket member 13, the lower or main section of the antenna having been first passed through an opening 15 formed in a bracket member or support 14 (see Fig. 3). The main section or tubular member 16 of the antenna receives and slidably supports a second section or tubular member 17, which in turn carries a slidable rod or section 18 having a cap piece or ball 19 at its upper or outer end. These members or sections of the antenna are arranged in telescoping relation and may be collapsed or extended to suit the particular requirements of the radio reception desired.

As seen in Fig. 3, the bracket 14 is held in position upon the panel 12 by means of a bolt 20 having a threaded inner end and eye or ring portion 21 at its outer end. The base of the bracket is insulated from the outer face of the panel 12 by a rubber washer or seal 22 and the bolt is insulated from said panel by means of a disk-like rubber washer or seal 23. The main section 16 of the antenna extends through the eye 21 and when the nut 24 is tightened to draw the bolt 20 inwardly, the section 16 will be caused to engage and bind against the adjacent wall of the bracket opening 15. A second or lock nut 25 is threaded onto the bolt and serves to hold or clamp a wire terminal or contact 27 in position between the two nuts. The terminal or contact 27 is mounted on one end of a lead-in cable or conductor 25 to a radio receiving set 28. By virtue of the socketed base supporting bracket or member 13 and the bracket 14, the main section 16 of the antenna is held or clamped in

place against movement relative to the panel 12.

Referring now particularly to Figs. 4 to 9 inclusive, the main section 16 of the antenna has an internal bore or socket portion 30 and a pair of internal opposed longitudinally extending slots or keyways 31 which extend throughout a portion of the length of the tube or member 16. The member 16 contains a bushing member or sleeve 32 which, as shown, is disposed within the bore above the upper ends of the keyways 31 and which may have a press fit with the tubular member 16 to maintain it in place. As shown in Fig. 4, the upper end of the section or member 16 is provided with an intumed flange 16a which will prevent the outward or upward movement or displacement of the sleeve 32. If desired, however, the sleeve or bushing may be welded to the member 16, in which case, if desired, the flange 16a could be omitted.

The second section or tubular member 17 of the antenna is, as shown, provided with a pair of external longitudinally extending ribs, lugs, or enlargements 33 which are disposed at diametrically opposed sides of the member. These lugs or projections 33 may be formed or pressed from the metal of the section 17 or, if desired, they may be separate parts secured to said section in any suitable manner, as by means of welding. As best seen in Figs. 4 and 5, the projections 33 are adapted to engage in the slots or keyways 31 and are slidable therein when the section 17 is moved relative to the main section 16. The sections cannot, however, be rotated relatively to one another.

The tubular member or section 17 has a saw cut or kerf extending inwardly or upwardly from its lower or inner end as shown at 34. Since the section 17 is formed from spring metal, the tendency of the lower end portions or depending members 35 thereof located at opposite sides of the slot 34, is to expand or to normally remain in spread or unstressed condition, as best seen in Fig. 9. While the member 17 is, as stated above, formed from spring metal, it is sufficiently stiff to frictionally engage the inner walls of the section or member 16 when the parts are assembled, with sufficient pressure to forestall any tendency of the sections to rattle.

While I have described only the joint or connection between the sections 16 and 17, as seen within the circle A, it will be understood that a similar joint or connection is provided between the tubular section 17 and the rod section 18, this second joint being shown generally within the circle D, Fig. 2.

The sectional antenna of the present invention is preferably assembled by inserting the rod 18 into the section 17 from the bottom of said section, after which the assembled sections 17 and 18 are inserted in the tubular section 16 from the bottom or inner end of the section 16. Thereafter the ball or cap piece 19 may be applied to the upper or outer end of the rod section 18. When the spread ends 35 of section 17 are moved into the bore 30 of section 16, they will be pressed or sprung inwardly to frictionally engage, under tension, the inner walls of said section 16. The similarly formed ends of the section 18 will do likewise when moved into the bore of section 17. When the sections of the antenna are in their fully extended or projected position, the lugs or keys 33 will engage the lower end of the bushing or sleeve 32, thereby preventing the outward or upward extension or projection of the movable members beyond the

position of the parts as shown in Fig. 4. Thus, the pairs of lugs or projections 33 not only serve to guide the movable sections of the antenna in a longitudinal direction during adjustment, as well as to prevent relative rotation of the sections, but also provide, in conjunction with the internal sleeves or bushings 32, stop means to prevent the sections from being separated or projected beyond a predetermined position.

The antenna as described above, after having been assembled as above stated, is attached or applied to the supporting brackets 13 and 14 as above described.

The members or sections of the antenna of the present invention have a relatively tight or snug fit one with the other throughout their length and are provided with parts or portions which are held under tension when the sections of the antenna are assembled, and which function to hold the movable parts in their various adjusted positions, thereby providing a much more desirable and rattle proof structure than has heretofore been possible. Moreover, and notwithstanding the relatively tight fit between the parts, the sections of the antenna may be moved or adjusted relatively to one another with ease and facility. Furthermore, by virtue of the improved joints or connections between the members of the present antenna, the possibility of binding, wedging, or sticking together of the sections thereof is entirely eliminated. As is well known, considerable difficulty has been experienced with previous antennae of the adjustable sectioned type due to binding or freezing of the parts.

I claim:

1. A radio antenna structure for use on a vehicle in conjunction with a radio receiving set, comprising a main tubular metal section insulatingly attached to the vehicle body, said section having a pair of internal opposed keyways extending longitudinally thereof throughout a portion of its length, a slidable tubular section telescoped within said main section and having a pair of diametrically opposed lugs engageable with and movable in said keyways, a rod section slidably mounted in said slidable tubular section, and a bushing disposed within said main section and located at one end of said keyways whereby to form a tight connection between said parts and to provide a stop engageable by said lugs for limiting the outward movement of said slidable section relative to said main section, certain of said sections having tensioned means engaging the walls of the other sections to frictionally hold the sections in their various positions of adjustment.

2. A radio antenna structure for use on a vehicle in conjunction with a radio receiving set, comprising a main tubular metal section insulatingly attached to the vehicle body, said section having a pair of internal opposed keyways extending longitudinally thereof throughout a portion of its length, a slidable tubular section telescoped within said main section and having a pair of diametrically opposed lugs engageable with and movable in said keyways, said slidable tubular section having a pair of internal diametrically opposed longitudinal keyways intermediate its ends, a rod section slidably mounted in said slidable tubular section, a pair of diametrically opposed lugs on the exterior of said rod adjacent its lower end engageable in said

last named keyways, bushings disposed within said main and slidable sections located at one end of each of said keyways, said bushings providing bearings for the sections and stops engageable by said lugs for limiting the upward movement of said sections, and means normally held under tension and forming a part of said sections for maintaining the sections against accidental movement relative to one another.

3. A radio antenna structure for use on a vehicle in conjunction with a radio receiving set, comprising a main section and a slidable section telescoped within the main section, a pair of keyways formed in said main section and extending longitudinally thereof, a bushing carried by the main section and positioned at one end of said keyways, and a pair of lugs formed on said slidable section and engageable in said keyways, the inner end of said slidable section being bifurcated to provide portions normally held under tension and frictionally engaging the main section to hold said sections in various adjusted positions.

4. A radio antenna structure for use on a vehicle in conjunction with a radio receiving set, comprising a main section and a slidable section telescoped within the main section, a pair of keyways formed in said main section and extending longitudinally thereof, a bushing carried by the main section and positioned above said keyways, and a pair of lugs formed on said slidable section and engageable in said keyways, the inner end of said slidable section having tensioned portions frictionally engaging the inner walls of said main section to maintain the parts against accidental movement in all of their adjusted positions and said sections having a relatively snug fit one with the other to resist rattle of said parts.

5. A radio antenna structure for use on a vehicle in conjunction with a radio receiving set, comprising a main section and a slidable section telescoped within the main section, a keyway or keyways formed in one section and extending longitudinally thereof, and a lug or lugs formed on the other section and engageable in said keyway or keyways, said slidable section having a spring-like split inner end held under compression within the main section.

6. A radio antenna structure for use on a vehicle in conjunction with a radio receiving set, comprising a main section and a slidable section telescoped within the main section, keyways formed in said main section and extending longitudinally thereof, a bushing interposed between the main and slidable sections at one end of the main section, and outward projections carried by said slidable section and engageable with the keyways, the lower end of said slidable section having spring fingers held under compression by engagement with the adjacent walls of the main section.

7. A radio antenna structure for use on a vehicle in conjunction with a radio receiving set, comprising a main section and a slidable section telescoped within the main section, a pair of keyways formed in said main section and extending longitudinally thereof, and a pair of outward projections carried by said slidable section and engageable with the keyways, the lower end of said slidable section having spring fingers held under compression by engagement with the adjacent walls of the main section.

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