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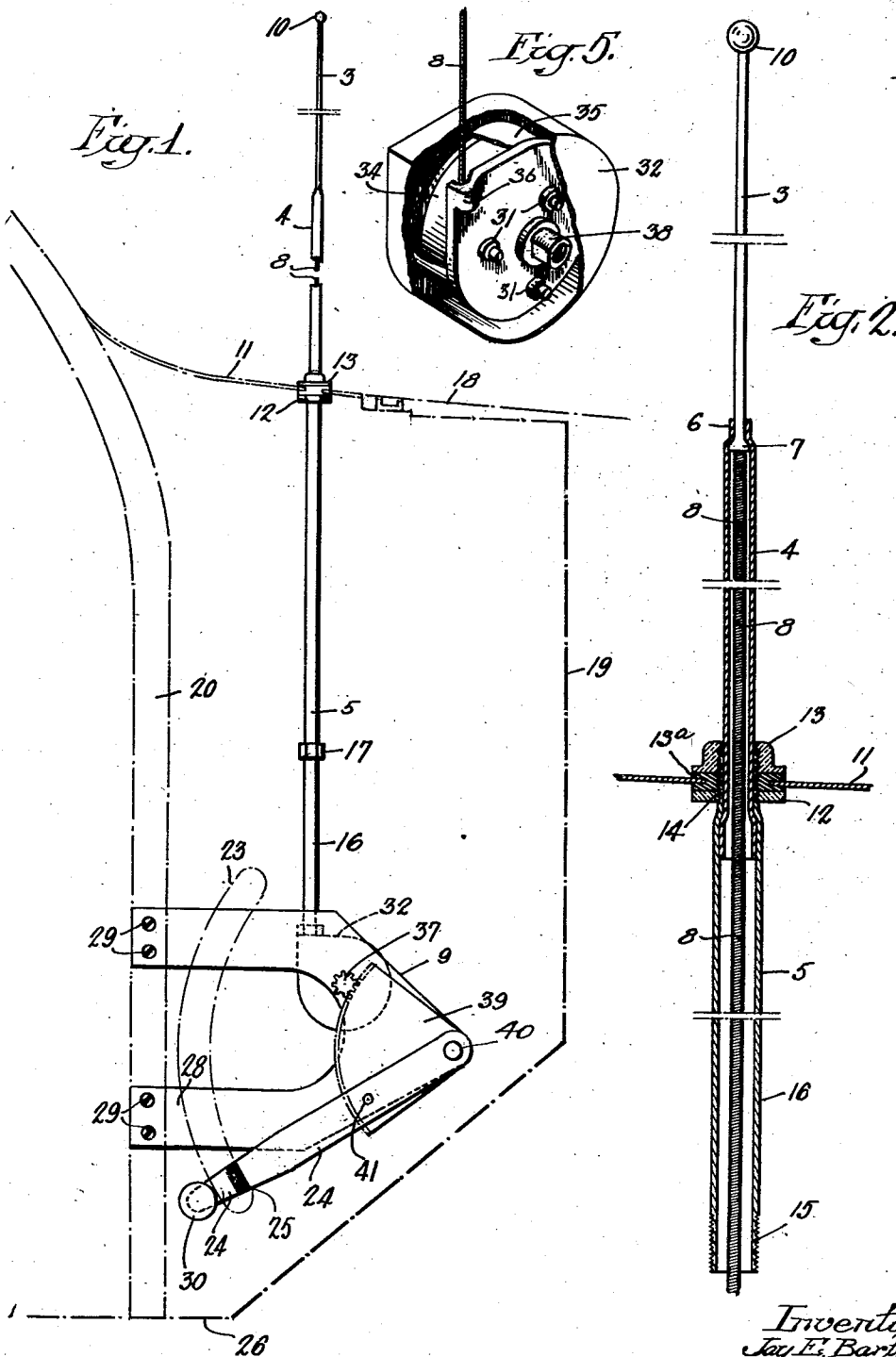
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2,350,866

ADJUSTABLE AUTOMOBILE ANTENNA

Filed Jan. 14, 1942

2 Sheets-Sheet 1



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Fig. 4.

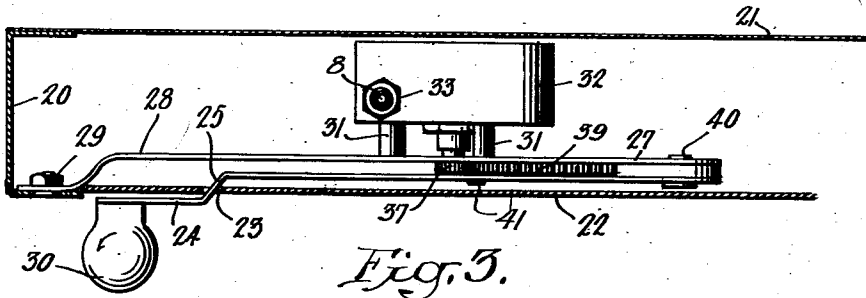
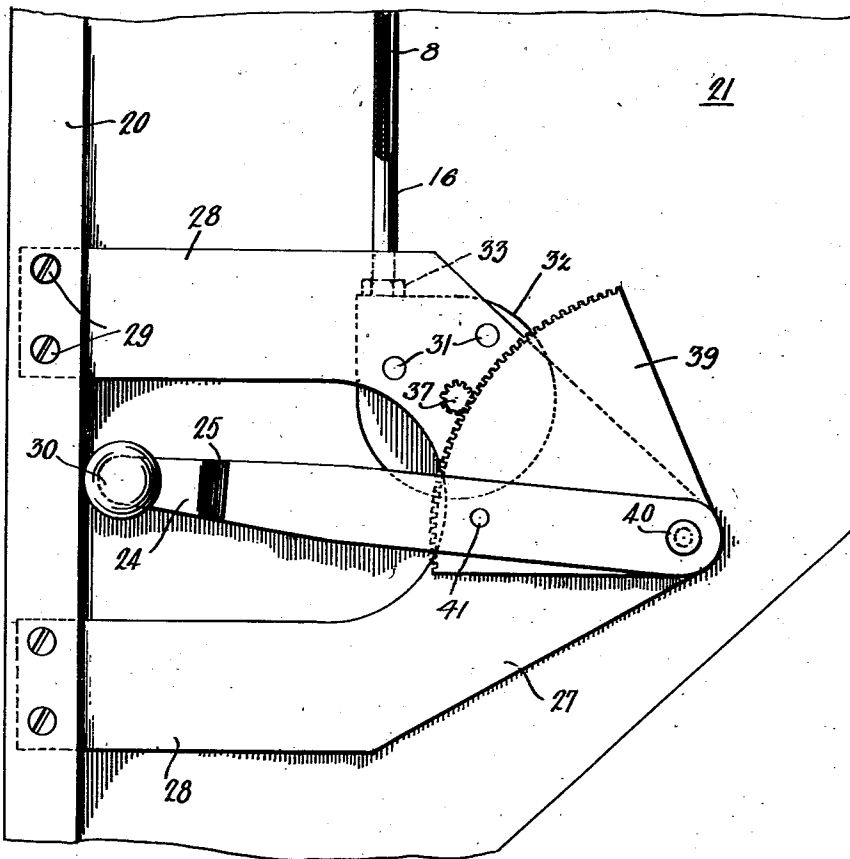


Fig. 5.



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UNITED STATES PATENT OFFICE

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ADJUSTABLE AUTOMOBILE ANTENNA

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Application January 14, 1942, Serial No. 426,755

5 Claims. (Cl. 250—33)

This invention relates to improvements in radio receiving antennae, and has especial reference to extensible and retractable aerials which may be used on automobiles or other vehicles.

More particularly, the invention is concerned with devices of the type which may be controlled from within the vehicle, and is especially concerned with the positioning and operation of the antenna elevating mechanism.

Frequently it is desired to raise or lower the antenna of an automobile radio receiver while driving, or to adjust the extension thereof to suit varying conditions of signal reception, and a number of antenna devices are now being marketed which provide control of the antenna extension from within the vehicle. However, the positioning of the actuating mechanism is so inconvenient or remote that actuation of the device while driving constitutes a definite hazard, as in doing so the driver must reach out to some unhandy position, with a consequent distraction of his attention or obstruction of his vision. In addition, many of the actuating mechanisms require close attention by the driver because of the complexity of their operation, or the necessity for repeated actuation.

With the above in mind, it is the primary object of the present invention to provide an extensible aerial, the actuating mechanism of which is conveniently placed for ready actuation during driving.

More particularly, the invention has as an object the provision of an automobile aerial assembly, in which the elevating mechanism is installed near the floor of the car, adjacent to the left leg of the operator, and which (with the exception of the operating handle) is completely hidden in the generally unused space behind the automobile kick-pad.

Further, it is an object of the invention to provide an antenna assembly which enables the extensible antenna per se to be mounted in the attractive and advantageous side-cowl position, and with little or no actuating linkage between the main stanchion tube and the elevating mechanism.

A still further object of the invention resides in the provision of an automobile radio aerial which lends itself well to easy and inexpensive installation, and is unusually rapid in its action, requiring only one actuation of the operating handle to obtain complete extension or retraction.

The above, as well as other objects and advantages, will be best understood by a consider-

ation of the following description taken together with the accompanying drawings, wherein is illustrated a preferred embodiment of the invention.

5 In the drawings:

Figure 1 is a side elevational view of the aerial and its actuating mechanism, and shows the association and positioning of these parts with relation to a portion of the automobile body shown in dot and dash outline;

10 Fig. 2 is an enlarged sectional view of the extensible antenna per se, and shows one way in which it may be mounted on the cowl of a vehicle;

15 Fig. 3 is a side elevational view of the actuating mechanism and its mounting on an automobile, with the pick-pad removed for the purpose of illustration;

Fig. 4 is a sectional view taken horizontally above the actuating mechanism; and

20 Fig. 5 is a perspective view of the reel, with a portion of the housing broken away to better illustrate certain portions of the mechanism.

With particular reference to the drawings, 25 Figs. 1 and 2 show that the antenna may comprise two extensible sections 3 and 4, and a fixed stanchion tube 5, within which the upper sections nest when retracted. As clearly appears in Fig. 2, (which shows the antenna completely extended) section 4 is provided with a crimped portion 6 at the upper end thereof, which is of a size to fit snugly about the rod 3, and constitutes a bearing therefor. Rod 3 has in turn a lower stop portion 7 of greater diameter than the upper part of said rod, which serves to positively limit the extension of this rod with relation to section 4. The stop-bearing joint provided between section 4 and stanchion tube 5 is exactly similar, and, therefore, will not be particularly described. An actuating tape or cable 8 extends up from the elevating mechanism, generally designated by the reference character 9, through the tube sections 4 and 5 and is fixed to upper section 3, as by spot-welding or the like. A ball tip 10 is fixed to the upper end of section 3, and is adapted to stop against the upper end of tube 4, thereby causing retraction of sections 3 and 4 within tube 5, when the actuating cable is pulled inwardly.

As will be seen from Figs. 1 and 2, the above described antenna structure is firmly clamped to and insulated from the metal of the automobile cowl (shown at 11) as by means of a pair of cooperating clamping nuts 12 and 13, made of some suitable insulating material. These mem-

bers 12 and 13 are engaged with threads 14 formed on the crimped end of stanchion tube 5, and a rubber washer 13a, grooved to receive the edge of cowl 11, is interposed between the clamping members. The lower end of tube 5, threaded at 15, is fixed to a short length of adapter tube 16, by means of the nut 17.

The actuating mechanism for the antenna, and its novel association with the automobile body, will now be described. The antenna, per se, extends through the automobile cowl 11 at a convenient distance behind the hood and firewall, diagrammatically indicated in Fig. 1 at 18 and 19, respectively. This mounting is, as mentioned above, at the left side of the driver; and although the invention is primarily concerned with the location of the actuating mechanism, it will be obvious that the aerial is preferably located directly thereabove and in line with the forward door-framing member 20, to which the actuating mechanism 9 is fixed.

The actuator itself (as best seen in Fig. 4) is located at the left side of the driver's position between the outside wall 21 of the automobile and that part of the interior finishing which is generally known as the kick-pad, shown at 22. This so-called kick-pad is a sheet of fibrous or other material disposed adjacent to the driver's feet and legs when in driving position. As may be seen in Fig. 4, the elements 21 and 22 form a hollow wall structure within which the actuator is disposed when it is attached to the door frame 20. A slot 23 is cut in this kick-pad to accommodate the operating handle 24, which is provided with a suitable offset 25. It will be seen from Fig. 1 that the actuating device is located a little above the floor line 26, which so places the handle 24 as to make it within easy reaching distance of the driver's left hand. With a driver of average height, no bending is necessary, and in addition no movements are made across the driver's field of vision. Thus, the actuator is conveniently located behind the readily removable kick-pad, and is completely concealed within otherwise unused space.

As best seen in Figs. 3 and 4, the device 9 comprises a main base plate 27, provided with rearwardly extending portions 28 which are fixed to the door framing member 20, as by bolts 29. As shown, the portions 28 are of a length sufficient to insure that the operating knob 30 will not extend into the door space. Fixed to the plate 27, as by studs 31, is a reel 32. This reel is coupled to the adapter tube 16, by a nut 33, and serves to actuate the antenna driving cable 8.

The reel itself is preferably of the general type disclosed and claimed in the copending application of H. J. Lyman, Serial No. 390,391, filed April 25, 1941. As the reel, per se, forms no part of the present invention, it need not be further described except to point out that it is provided with inside and outside winding drums (identified as 34 and 35, respectively, in Fig. 5), in accordance with the disclosure of the said Lyman application. In operation, when the cable is wound in, the drum 34 serves as the winding drum and when the tape is thrust out, wall 35 cooperates with a channeled coverplate 36 to form a tape extruding drum. If desired, the cable 8 may be used as the electrical lead-in, in which case the reel element is insulated from its coverplate and a suitable contact element extends through said plate. This structure has not been illustrated and need not be further described, as it is not important to the present invention,

and might be done in any one of several different ways.

A pinion 37 is fixed to the reel operating shaft 38 (which extends through plate 27) and is drivingly engaged by a sector gear 39 of relatively large radius as compared with the radius of pinion 37. The sector gear is pivoted to base plate 27 by means of a pin 40 and is adapted for actuation by the operating handle 24, which is also pivoted on pin 40 and is secured to the sector gear by a pin 41.

The radius of gear 39 is so chosen with relation to that of pinion 37 (approximately a 15 to 1 ratio) that the 70° movement provided for sector 39, is sufficient to obtain full extension of the antenna when the handle is moved to its lowermost position, and to provide complete retraction of the antenna upon movement of the handle to its upper limit. In the device illustrated, a movement of the operating handle of approximately 8 inches will effect a four foot extension of the aerial. This is, as brought out above, of decided advantage as it enables the antenna to be controlled with a minimum of effort, and thereby contributes to the increased safety of operation primarily afforded by the novel positioning of the antenna actuating mechanism.

From the foregoing, it will be evident that this invention provides a controllable antenna structure, the actuating mechanism of which is so placed as to practically eliminate the hazard formerly attendant to actuation of such devices during driving.

In addition, the mechanism lends itself well to inconspicuous mounting in generally unused space, and enables an antenna, controllable from within the vehicle, to be mounted in the attractive side-cowl position with little or no connection linkage between the main stanchion tube and the reel.

Still further, the mechanism is extremely simple to operate in that it requires only one movement of the operating handle, to effect complete elevation or retraction thereof.

While a preferred embodiment of the invention has been illustrated, it will be evident that the device might be modified in certain respects without departing from the spirit of the invention. In general, the invention contemplates such changes as may fall within the scope of the appended claims.

I claim:

1. An actuating mechanism for an automobile radio antenna, adapted for disposition in the narrow space between the outside wall and the kick-pad adjacent the driver's position, said mechanism comprising a flat support member, the major portion of which resides in a single plane, a reel carrying a flexible driving element for the antenna secured to one side of said support member and having a rotatable shaft extending to the opposite side of said member, a small pinion on said shaft at the said opposite side of said member, a large radius gear element rotatably mounted on said member at its said opposite side and meshing with said pinion, and an operating handle attached to said gear element and adapted to extend through the kick-pad to a position readily accessible to the driver.

2. The combination with a telescopic antenna for an automobile radio, of an actuating mechanism adapted for disposition in the space between the outside wall and the kick-pad adjacent the driver's position, said mechanism comprising a pivoted lever arm adapted to extend through an

arcuate opening in the kick-pad and movable by the driver through an acute angle within the confines of the kick-pad area, and means operable by the movement of said arm through said angle to effect adjustment of the antenna from its fully retracted position to its fully extended position or vice versa.

3. In combination with the side cowl portion of a vehicle body, a telescopic cowl antenna having a stationary tube vertically disposed within the narrow space between the cowl side wall and the adjacent kick-pad, said tube being of substantial length to receive the movable sections of the antenna when they are retracted, a lever arm mounted on a horizontal pivot in the lower portion of said space near the lower end of said tube, said arm extending through an opening in the kick-pad and being movable through a limited angle within the confines of the adjacent wall area, and means operable by the movement of said arm through said angle to effect adjustment of the antenna from its fully retracted position to its fully extended position or vice versa.

4. In combination with the side cowl portion of a vehicle body, a telescopic cowl antenna having a stationary tube vertically disposed within the narrow space between the cowl side wall and the adjacent kick-pad, said tube being of substantial length to receive the movable sections of the antenna when they are retracted, a support member within said space adjacent the lower end of said tube, a reel on said member coupled to the lower end of said tube, a flexible driving element on said reel connected to the movable sections of the antenna, a drive pinion for said reel, a gear element of relatively large radius engaging said pinion and rotatably mounted on said support member, the gear ratio between said pinion and said gear element being such that

rotation of said gear element through a limited angle will effect adjustment of the antenna from its fully retracted position to its fully extended position or vice versa, and an operating arm secured to said gear element and movable through the said limited angle within the confines of the adjacent wall area, said arm extending through an opening in the kick-pad and being readily accessible to an occupant of the vehicle.

5. In combination with the side cowl portion of a vehicle body, a telescopic cowl antenna having a stationary tube vertically disposed within the narrow space between the cowl side wall and the adjacent kick-pad, said tube being of substantial length to receive the movable sections of the antenna when they are retracted, a flat support member within said space adjacent the lower end of said tube, the major portion of said member residing in a single plane, a reel secured to one side of said support member and coupled to the lower end of said tube and having a rotatable shaft extending to the opposite side of said member, a flexible driving element on said reel connected to the movable sections of the antenna, a small pinion on said shaft at said opposite side of said member, a large radius gear element rotatably mounted on said member at its said opposite side and meshing with said pinion, the gear ratio between said pinion and said gear element being such that rotation of said gear element through a limited angle will effect adjustment of the antenna from its fully retracted position to its fully extended position or vice versa, and an operating arm secured to said gear element and movable through the said limited angle within the confines of the adjacent wall area, said arm extending through an opening in the kick-pad and being readily accessible to an occupant of the vehicle.

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