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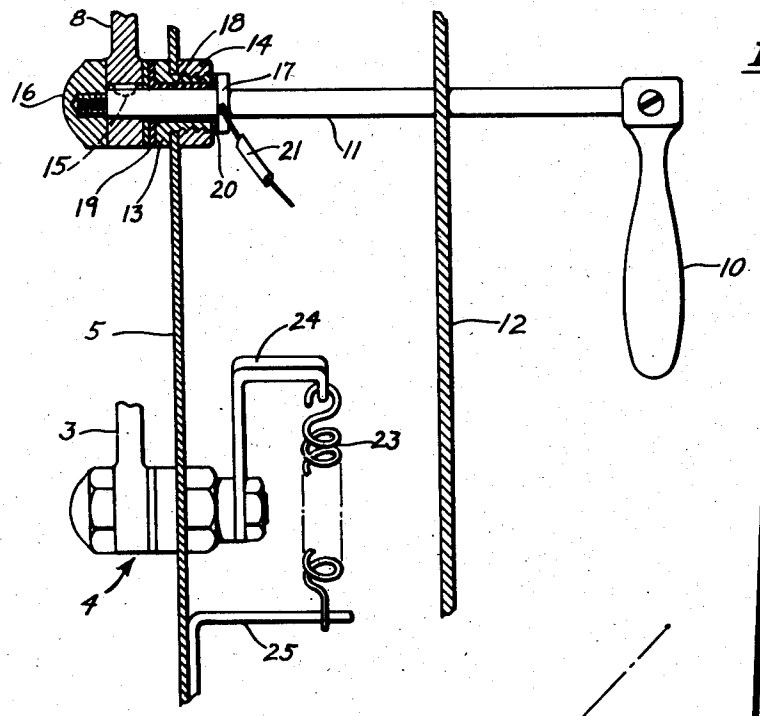


FIG. 2.

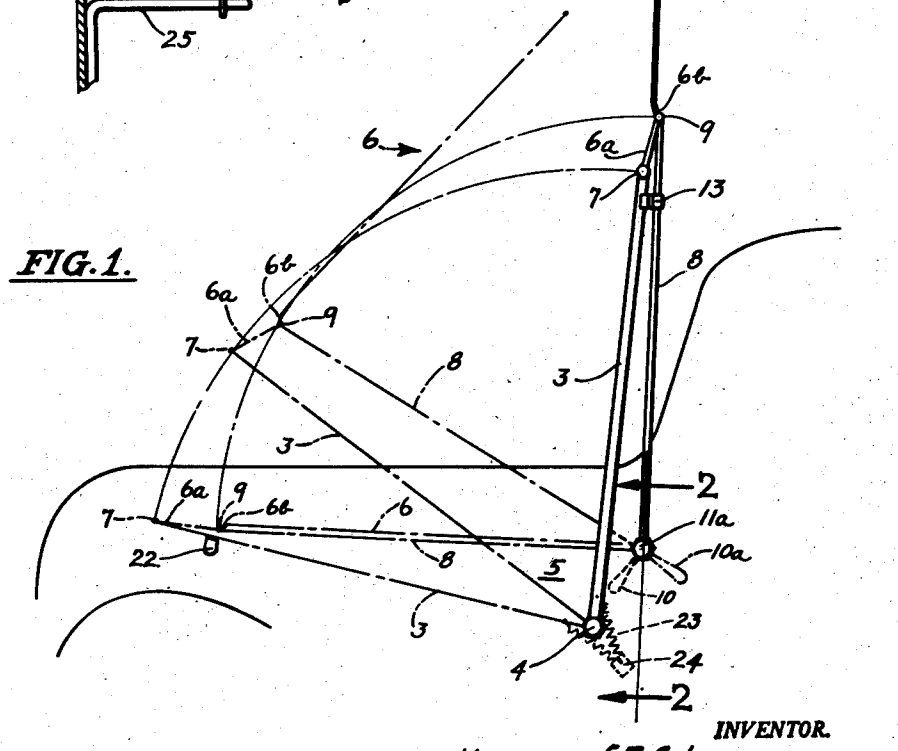


FIG. 1.

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2 Claims. (Cl. 189—26)

1

This invention relates to radio antennas, and has especial reference to extensible and retractable antennas, of particular utility with automobiles or other vehicles.

Still more particularly, the invention has reference to antennas of this type, which may be operated from within the vehicle to control the position and extension thereof.

Heretofore, such antenna structures have commonly been of the type having telescoping sections, and since it is desirable to control from within the vehicle both the position of said telescopic sections and their extension, the prior constructions have involved a large number of small moving parts. Such mechanical complexity and the attendant cost and assembly difficulties have, of course, been disadvantageous.

It is, therefore, a primary object of the present invention to overcome the aforesaid difficulties and disadvantages by the provision of an extensible and retractable antenna of unusual simplicity and low cost.

To this general end, the invention contemplates the provision of an antenna comprising links so articulated and proportioned as to be adapted for disposition either in substantially vertically extended alignment, or in substantially horizontal folded relation.

More particularly, it is an object of the invention to provide such a foldable antenna which may be positioned on a vehicle in such manner as to be capable of considerable extension therefrom or which, on the other hand, may be readily lowered and disposed in folded relation upon the car, in a position in which its sections blend with the contours of the vehicle, and present an unusually pleasing appearance.

The invention extends further to certain novel structural details and arrangements hereinafter described and illustrated in the attached drawings, in which:

Fig. 1 is an elevational view showing the antenna of the present invention, and illustrating one mode of association thereof with an automobile; and,

Fig. 2 is a sectional view taken through the wall of the automobile, along the line 2—2 of Fig. 1.

With particular reference to the drawings, the antenna therein illustrated as one embodiment of the invention comprises, in general, three articulated link sections shown, by way of example only, as pivotally secured to the side of the hood portion of an automobile, parts of which are indicated fragmentarily in the drawing. It will

2

be understood that the antenna is adapted for various other mounting arrangements such, for example, as an installation in which the structure is associated with the center mullion of a divided windshield and may be folded along the center portion of the hood.

The aforementioned links comprise a secondary base section 3 pivoted as at 4 to the exterior side wall 5 of the vehicle hood, and a capital section 6 including a short integral offset portion 6*a*. This offset extended portion 6*a* is pinned to the base section 3, the pivot point being shown at 7 in the drawing. The capital section 6 is further provided with a second short offset portion 6*b*, the purpose of which will appear hereinafter.

In addition to the links 3 and 6, the antenna includes a primary base section 8 which has pivotal connection, as at 9, to the link 6 at the point of intersection of the offset portions 6*a* and 6*b*. Link 8 is utilized as the driving portion of the linkage and, to this end, is provided with a handle 10 fixed to a short horizontal drive shaft 11 which extends through both the outer and inner sheets 5 and 12, respectively, of the automobile side wall, and defines a pivotal center 11*a*. The handle is preferably located within easy reach of the driver's position in the vehicle. A stop member S is carried by link 8 and, as clearly appears in Fig. 1, the secondary base section 3 is adapted to abut against this stop, when the antenna is in its elevated position, to insure that pivot point 7 will not pass to or over the line of centers defined by pivot points 4 and 9. In this connection, it should be noted that the angling of portion 6*a* with respect to the main body of link 6, improves the appearance of the antenna structure as a whole, by making it possible to substantially align the capital section with the primary base section 8 (in the vertical position) while still insuring that pivot 7 may be prevented from passing over center with respect to pivots 4 and 9.

Although the links 3 and 8 may be pivotally secured to the vehicle wall structure in any convenient manner, this attachment is preferably of the type now to be described, and shown in Fig. 2 in relation to link 8.

The drive rod 11 is journalled in the exterior wall 5 by means of a flanged bushing 13 having threaded engagement with a nut 14, the arrangement being such that adjacent portions of the wall are clamped between the flange and nut. The link 8 is keyed to shaft 11, as shown at 15, and a finish nut 16 has screw threaded engage-

ment with the end portion of shaft 11, said nut cooperating with an annular flange 17, formed integrally with said shaft, to maintain the various parts in assembled relation. It will be observed that an insulating bushing 18 is interposed between shaft 11 and the metallic bushing 13, said insulating bushing having flange portions 19 and 20 which prevent electrical connection between link 8 and the nut 13. In this way, the antenna is insulated from the automobile body, a lead 21 being fixed to flange 17, as by soldering or the like. The inner wall 12, commonly known as the "kick-pad" is generally made of some fibrous non-conducting material and, as a consequence, no insulation is illustrated between said wall and the shaft 11. In the embodiment illustrated, the electrically conducting portions of the antenna comprise links 6 and 8, while link 3, which is commonly under tension alone when the antenna is elevated and the vehicle is moving forward in a normal manner, preferably takes the form of a rod of some non-conductive material such as a plastic composition. A rod of this type is preferably employed for the link 3, since it obviates the necessity of providing insulation between said link and the vehicle structure, and further eliminates a double leakage path for the currents of the received signal.

As indicated in dotted lines in Fig. 1, the antenna may be moved from its vertical extended position to a lower position, adjacent the hood of the automobile, in which position the three sections are arranged in substantially horizontal folded relation. Movement of the operating handle from the position shown at 10 (see Fig. 1) to the position indicated at 10*a*, will impart a rotary movement to link 8 about the pivot 11*a*, which movement is continued until the primary base section 3 abuts against a stop 22 affixed to the side of the hood.

As indicated above, pivot point 7 is ahead of the line of centers of pivots 4 and 9, with respect to the direction of the rotational folding movement and, therefore, said pivot 7 precedes pivot 9, as will be apparent from the drawing, thereby causing the capital section 6 to be folded backwardly along link 8. As noted hereinabove, link 6 is provided with a short offset section 6*b* and, as will be apparent from inspection of the representation of the linkage in its fully folded position, the offset 6*b* permits link 6 to assume a folded position closely adjacent and parallel to link 8. The reverse movement of the antenna structure, back to its elevated position, will be apparent without further explanation.

A spring 23 reacts between a bracket 24, which is so mounted as to move with link 3 (see Fig. 2), and a second bracket 25 carried by the exterior wall 5. As best appears in Fig. 1, this spring provides an over-center mechanism which serves to resiliently maintain the antenna structure in either of its terminal positions.

While one exemplary embodiment of the present invention has been illustrated in the drawings, it will be understood that this embodiment is susceptible of certain changes and modifications. For example, the length of the various links, and the location and spacing of the various pivot points may be altered, if desired. However, the two base sections should be pivotally connected to the capital section 6 at points spaced in the plane of antenna movements, and the pivots 4 and 11 should also be journalled in the vehicle structure at points spaced from each other in said plane, the spacings being such as to permit the

desired degree of folding. While in the embodiment illustrated, the pivots 4 and 11*a* are spaced both vertically and horizontally, either horizontal or vertical spacing alone may be employed. However, it will be understood that such modifications are contemplated, as may come within the scope of the appended claims.

I claim:

1. In an extensible and retractable antenna structure, a pair of base links each having a terminal portion adapted for pivotal securement to fixed framing to provide for rotational swinging movements of said base links, a capital link carried by the outer end portions of said base links and pivotally connected thereto at points spaced along said capital link and lying in the plane of said swinging movements, whereby the several links are adapted for relative angular movement, the antenna structure further being adapted for movement between an extended terminal position in which one of said base links is in substantial parallelism with the major portion of said capital link and the antenna length is substantially equal to the sum of the lengths of the capital link and one of said base links, and a retracted terminal position in which the major portion of the capital link and the first said one base link are arranged in generally parallel folded relation with the length of the antenna structure being substantially equal to the length of one of said base links, the aforesaid points of pivotal connection being in general alignment with said portions adapted for pivotal securement when the antenna is disposed in either its extended or its retracted position, manually operable means effective to move the antenna structure between its said positions, said means exerting a force tending to cause improper relative angular movement of the links when the structure is moved from one of its terminal positions, and means for preventing such improper relative angular movement, said last means being disposed to contact one of said links and maintain a predetermined minimum spacing between the outer end portions of said base links when the structure is in said one terminal position.

2. In an extensible and retractable antenna structure, a pair of base links each having a terminal portion adapted for pivotal securement to fixed framing to provide for rotational swinging movements of said base links, a capital link carried by the outer end portions of said base links and pivotally connected thereto at points spaced along said capital link and lying in the plane of said swinging movements, whereby the structure is adapted for movement between an extended position in which one of said base links is in substantial parallelism with the major portion of said capital link and the antenna length is substantially equal to the sum of the lengths of the capital link and one of said base links, and a retracted position in which the major portion of the capital link and the first said one base link are arranged in generally parallel folded relation with the length of the antenna structure being substantially equal to the length of one of said base links, one of the aforesaid points of pivotal connection being spaced below and in generally vertical alignment with the other of said points when the antenna is extended, manually operable means effective to move the antenna structure between its extended and retracted positions, said means exerting a force during retractive movement tending to cause the upper point of pivotal connection to precede the

lower, whereby improper folding of the structure may result, and means comprising a stop member carried by one of said links and disposed to contact another thereof—when the antenna is extended—and maintain a predetermined minimum spacing between the outer end portions of said base links, whereby to insure that the said lower point of pivotal connection precedes the said upper point of pivotal connection during retractive movements of the antenna.

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