March 4, 1941. A. A. JOHNSON 2,233,920

RADIO ANTENNA FOR AUTOMOBILES

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Fig. 1

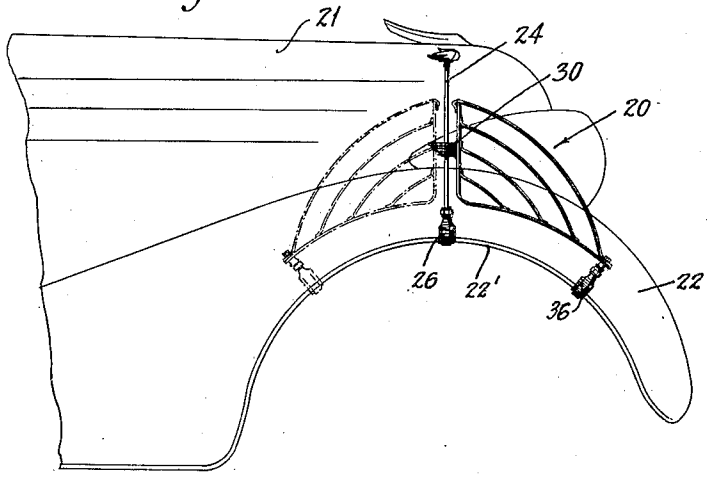


Fig. 2

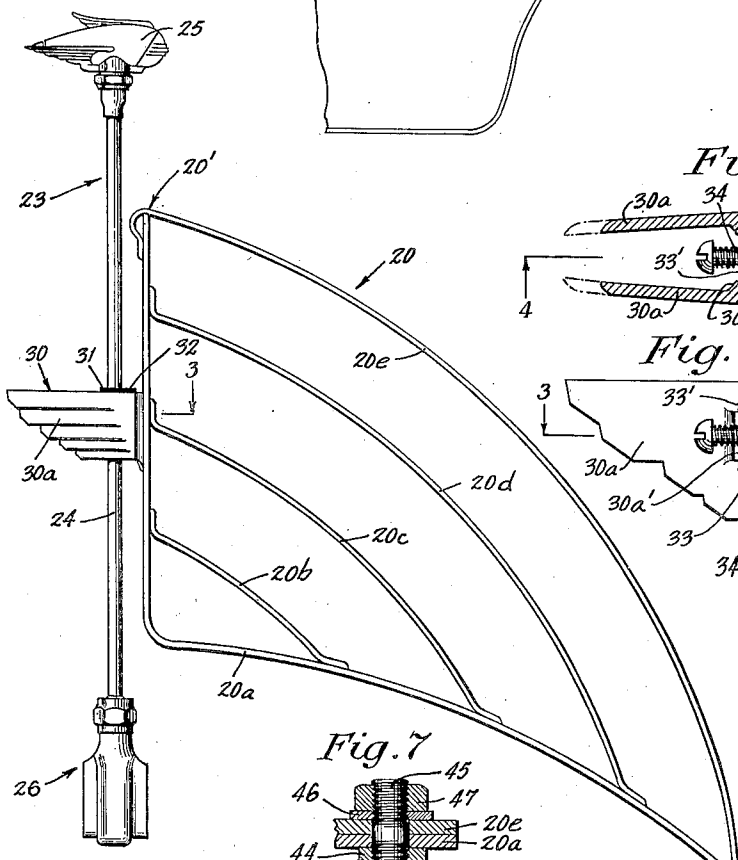


Fig. 3

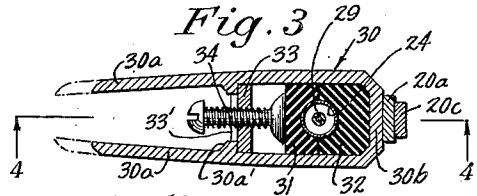


Fig. 4

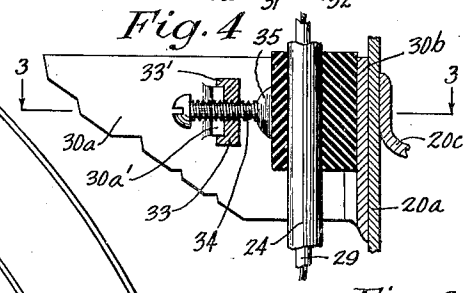


Fig. 5

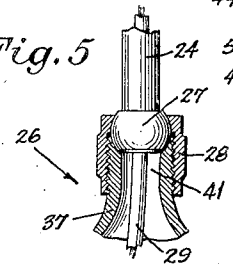


Fig. 7

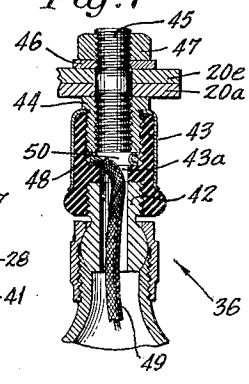
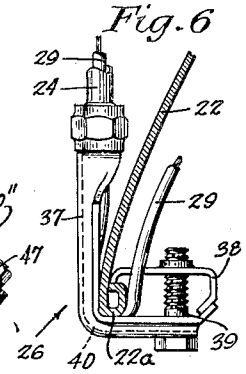
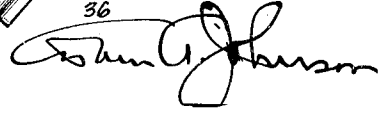


Fig. 6



INVENTOR



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RADIO ANTENNA FOR AUTOMOBILES

Filed Feb. 19, 1937 2 Sheets-Sheet 2

Fig. 8

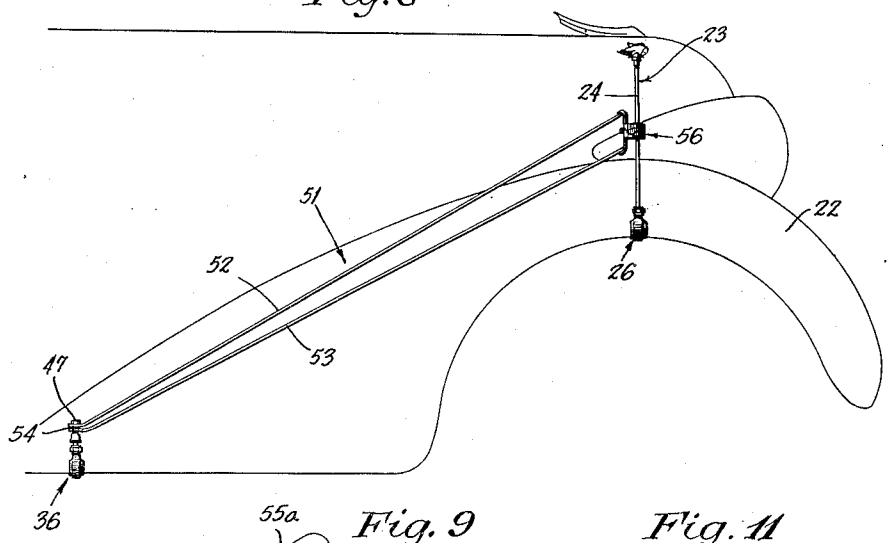


Fig. 9

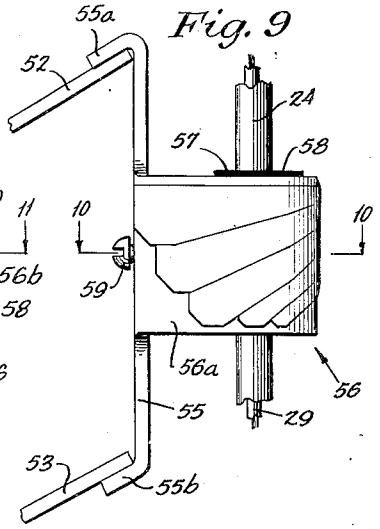


Fig. 11

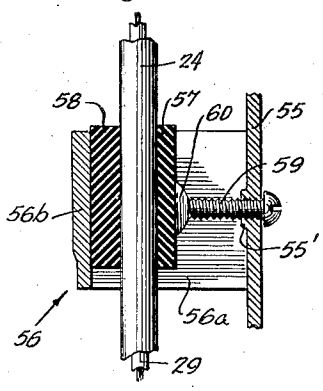


Fig. 10

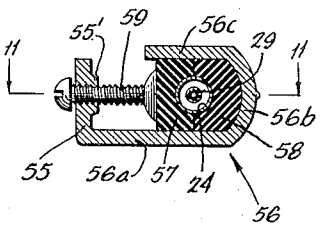


Fig. 12

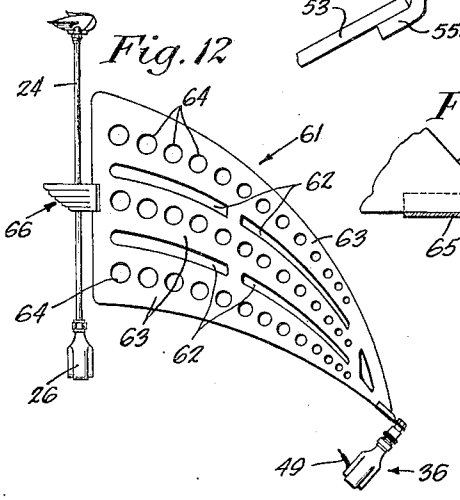


Fig. 13

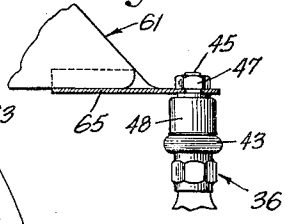
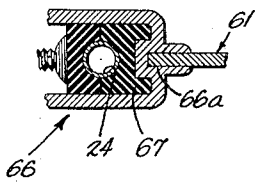
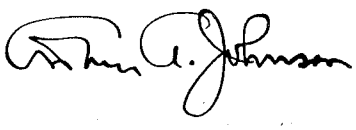


Fig. 14



INVENTOR



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2,233,920

UNITED STATES PATENT OFFICE

2,233,920

RADIO ANTENNA FOR AUTOMOBILES

Arthur A. Johnson, Bridgeport, Conn., assignor to Casco Products Corporation, Bridgeport, Conn., a corporation of Connecticut

Application February 19, 1937, Serial No. 126,540

2 Claims. (Cl. 250—33)

This invention relates to radio antennas, and more particularly, aims to provide an improved radio antenna to be carried by a motor vehicle on the exterior thereof.

An object of the present invention is to provide an antenna structure for an automobile, to be carried exteriorly thereof and at a location and in a way such that the antenna may be of extensive area for efficient action, and, at the same time, may constitute not only a practicable adjunct because arranged edge-on to the direction of travel of the vehicle, but also a decorative rather than an unsightly addition to the car.

As the invention is preferably carried out, the antenna structure is supported in part at least by a fender of the vehicle, and desirably by a front fender. Preferably, also, the antenna is comprised of a plurality of wires or rods, or a plurality of bar-like elements, these last, for instance, resulting from cut-away portions of a plate; with these wire rod or bar-like elements so joined, desirably to lie in a single plane, that a plate-like antenna is provided which may be placed to upstand at a side of the automobile and exterior thereto.

According to the invention, in a broader aspect thereof, the antenna is carried by positioning and insulating means comprising a plurality of spaced mounting means one of which is shaped to engage and be supported by an edge of the fender of a vehicle.

In a preferred embodiment, the antenna, near the end thereof which is remote from the mounting means engaging the fender edge, is connected to another mounting means shaped to engage and be supported by a fender guide.

By the present invention, the antenna may be arranged to extend in a fore-and-aft direction along the vehicle, and so as to be upstanding in a location beyond the side of the body of the car. The antenna may be of considerable expanse vertically because it is arranged edge-on in the direction of the travel of the vehicle. When the antenna is attached to the front fender, as is now preferred, it may be shaped pleasingly to taper in a forward or rearward direction over the fender and along the length of the car. And when one of the mounting connections for the antenna is to a fender guide on a front fender of a car, the antenna may be so designed as to appear to be a decorative foundational part of the fender guide. While the antenna may be variously modified in regard to the nature, shape and spacing of the conductor elements, for satisfaction of the decorative aim just mentioned, or otherwise, it is feasible to provide these elements large enough and in sufficient number to produce an extensive surface for intercepting and conducting electromagnetic waves.

Other features and advantages will hereinafter appear.

In the accompanying drawings, which illustrate various embodiments of the invention:

Figure 1 shows in side elevation one form of antenna according to the invention, secured at one end to the edge of a fender and secured at its other end to the staff of a fender guide on that fender; this view showing two possible positions of the antenna, one in full lines and the other in dot-and-dash lines.

Fig. 2 is a side elevational view similar to Fig. 1, but on an enlarged scale, with the fender and other parts of the vehicle of Fig. 1 omitted.

Fig. 3 is a horizontal section, taken on line 3 of Fig. 2, on a further enlarged scale; this view also being taken on the line **3—3** of Fig. 4.

Fig. 4 is a vertical section, taken on the line **4—4** of Fig. 3.

Fig. 5 is a fragmentary view, partially in vertical section, illustrating a detail of construction of the fender guide where the lower end of its staff is connected to a clamp for engaging a fender edge.

Fig. 6 is a fragmentary detail view, showing the lower end of the fender guide staff and the clamp last-mentioned, as these parts would be seen in looking toward the left in Fig. 2.

Fig. 7 is generally an axial section showing details of construction of a clamp for engaging the fender edge and carried by the antenna; this clamp being the one shown to the right in Fig. 2.

Fig. 8 is a view similar to Fig. 1, showing another embodiment.

Fig. 9 is an enlarged fragmentary view, showing certain of the parts of Fig. 7 as seen in that view.

Fig. 10 is a front section, taken on the line **10—10** of Fig. 9.

Fig. 11 is a vertical section, taken on the line **11—11** of Fig. 10.

Fig. 12 is a side elevation of an embodiment like that shown in Fig. 2, but with the plate-like structure which constitutes the antenna having bar-like conductors provided by perforating a plate.

Fig. 13 is an enlarged fragmentary view, partially in vertical section, showing a detail of

construction at one end of the plate where it is connected to a clamping device for application to a fender edge.

Fig. 14 is a similar view, in horizontal section, showing a detail of construction at the opposite end of the plate where it is connected to a clamping device for application to the staff of a fender guide.

Referring to the exemplifying form of the invention illustrated in Figs. 1 to 7, an antenna **20** is shown which is a plate-like attachment made up of a plurality of elongate conductors suitably connected, as by welding, to constitute a grille. In the present case, five such conductors are shown; one of which, **20***a*, is substantially L-shaped and the others of which, marked, respectively, **20***b*, **20***c*, **20***d* and **20***e*, are carried by the conductors **20***a*. In the present case, also, the four conductors last-mentioned are curvilinear and parallel, and their curvatures are such that the conductor **20** provides a convexly arched boundary for the grille extending between the top **20'** of the antenna and a lower tapered end **20''** thereof; while the lower limb of the L-shaped conductor **20***a* is upwardly concavely curved in agreement with the curvature of that part of the outer edge of the fender over which the antenna is intended to be mounted. The curvature relations just referred to are illustrated in Fig. 1, where parts of the front portion of an automobile are shown including a hood **21** and a front fender **22**.

It will be understood that when a grille constitutes the antenna of the present invention, any desired design of grille may be employed. According to present preference, however, when a grille is used as the antenna, and when the positioning means therefor includes a mounting means to engage and be supported by the staff of a fender guide, as shown in the drawings, it is recommended that there be employed a grille which, aside from the number of conductors included, in general will be in conformity with the grille above described. Such a grille, substantially triangular in outline, despite the curvatures along two sides thereof, is ideally adapted for use when supported at one end by the staff of a fender guide, and may be made fairly small and yet highly efficient; the curvatures of the conductors giving them greater lengths than would otherwise be possible, and increasing the attractiveness of appearance of the antenna.

A fender guide is shown at **23**, attached at the customary high point along the edge **22'** of the front fender **22** of Fig. 1. This fender guide, as usual, includes an upstanding staff **24**, carrying at the top of the guide a target **25**, and connected at its bottom to a suitable securing device **26** for seizing the edge of the fender and supporting the staff **24** upright. A feature of the device **26** is the inclusion therein of means for adjusting the staff to a vertical position after the device has been clamped to the fender edge, should such staff adjustment then be necessary; this means including, as shown in Fig. 5, a ball-and-socket joint, the ball **27** of which is carried by the lower end of the staff **24**, and the socket of which is partially formed in the upper end of the device **26** and partially formed in the upper end of a nut **28**, so that when the nut, in threaded engagement with the device **26** as illustrated, is tightened, the ball-and-socket joint is locked. Sometimes the target **25** of the fender guide has a translucent wall, and in the target is an electric light bulb for illuminating the same; and Fig. 5 shows an insulated wire **29** passing through a device **26** and through a central bore in the ball **27** and thence through the hollow interior of the staff **24**, which is tubular; this wire for conducting current to the bulb in the target. The terminal of the bulb other than the one connected to the wire **29** is usually grounded to the fender of a car through the staff **24**, which is of metal, and through the device, also of metal, whereby the staff is secured to the fender. Whether or not the fender guide is equipped with electrical means for illuminating the target by way of a contained bulb, the staff **24** is usually of metal and secured to the fender by a metal mounting means.

Therefore, in employing a fender guide as a part of the automobile to which an antenna is to be connected, the connecting means between the antenna and the staff should include a means for insulating the antenna from the fender guide.

Such a connecting means is shown in Figs. 3 and 4, as comprising a metal bracket **30**, generally U-shaped in horizontal section. This bracket is shown as including two decoratively shaped and finished side plates **30***a*, joined by an end plate **30***b*, to which latter is suitably secured as by welding, the upright limb of the conductor **20***a* of the antenna. At the inner end of the bracket are two blocks of insulation **31** and **32**, provided with matching half-round recesses running up and down the blocks at their meeting surfaces, so that between these recesses the staff **24** of the fender guide may be gripped when the blocks are forced together inward of the housing. Spaced outward of the insulator block **31** is a transverse vertical wall **33**, having upper and lower flanges **33'** engaging, as shown in Figs. 3 and 4, the tops and bottoms of a pair of vertical lugs **30***a'* formed on the inside faces of the side plates **30***a*. A screw **34** extends through a tapped hole in the plate **33**. The inner end of this screw carries loosely thereon a cup **35** to bear against the block **31** when the screw is tightened. Tightening of the screw forces the two blocks **31** and **32** together, clamping the blocks and hence the bracket **34** to the fender guide at a selected point along the length of the latter, and at the same time interlocks the flanges **33'** of the walls **33** with the lugs **30***a'* in the bracket.

An important feature of the invention, where a part of the antenna of the invention is secured to a fender guide or to some other part of the vehicle, is a securement of the antenna to a fender edge. In the present case, a means for securing the antenna to a fender edge is shown as comprising a clamping device **36**, similar to the clamping device **26** for securing as aforesaid the lower end of the fender guide **23** to the fender edge.

The clamping device **26**, as shown in Fig. 6, includes an L-shaped bracket **37**, a clamp-plate **38**, and a draft screw **39** for drawing these two parts together to obtain a tight and dependable grip on the fender. The bracket **37** is channeled as indicated in broken lines at **40**, and the channel in the upstanding limb of the bracket connects with a tubular neck at the top of the bracket, which neck is shown at **41** in Fig. 5. By this construction, a wire entering the neck of the bracket, as the wire **29** for serving a lamp in the target of the fender guide as aforesaid, may pass down along the channel in the bracket and under the bead **22***a* at the bottom of the fender, for extension beyond the fender. The clamping de-

vice **26** thus briefly described is claimed in a copending application Serial No. 94,911, filed by Joseph H. Cohen, August 8, 1936.

Referring now to the clamping device **36** for securing the antenna directly to a fender edge, this device is in the present case shown as constructed in the same way as the clamping device **26**; except that as seen in Fig. 7, the ball of the ball-and-socket joint, and corresponding to the ball **27** in Fig. 5, is formed on the lower end of a tubular metal piece **42** the upper portion of which is externally threaded. Secured directly to this metal upper portion **42** is the lower end of a tubular insulator **43**. This insulator is shaped interiorly, above a bottom threaded recess therein for receiving the threaded upper portion of the metal piece **42**, to provide an upper recess for having threaded therein a metal bushing **44**, and to provide a bore **43***a* of a diameter matching that of the bore through the metal piece **42**. This bushing, after being screwed tight into the insulator, is for taking the threaded lower end of the stud **45** by which the end **20''** of the antenna is connected to the clamping device **36**. The central part of this stud passes through a suitable aperture in the end **20''** of the antenna where the latter is of two-ply thickness as illustrated, resulting from the bringing together of terminal portions of the conductors **20***a* and **20***e*; the stud being secured in place on the antenna by the application to its upper threaded end of a washer **46** and a clamp nut **47**. In order to strengthen and dress up the insulator, and also to increase the capacitive effect of the antenna, the insulator is shown as enclosed within a metal shell **48**, metallically connected to the antenna by way of the bushing **44**.

In order to facilitate connection of the antenna to a radio receiver on the car, an insulated wire **49** is provided which runs down through the central bore **43***a* of the insulator **43**, and then through the bore of the metal piece **42**, as shown in Fig. 7, and then down through the channel which in the bracket of the device of Fig. 7 corresponds to the channel **40** of the bracket of Fig. 6, and then under the fender bead **22***a*, as in the case of the wire **29** of Fig. 6, for extension beyond the fender **22**. As shown in Fig. 7, the insulation of the wire **49** covers the latter completely except close to the upper end of the wire, where the wire is bared only sufficiently to allow it to be gripped in a familiar type of eyelet-clip **50**. Before being assembled in place as shown, this clip is applied to the bare end of the wire, to constitute a terminal-clip therefor, as the result of coiling the bared end of the wire within the annular channel of the eyelet and then axially compressing the latter; a notch (not shown) in the appropriate eyelet flange allowing the ungripped part of the wire to be bent perpendicular to the flare of the eyelet and within the peripheral limits of the same. The wire **49** is assembled as illustrated by extending the same down through the insulator **43** and the metal piece **42** until the eyelet-clip **50**, at the upper end of the wire, seats itself in the bottom of the upper threaded recess in the insulator **43**; after which the bushing **44** is screwed down tight to make good electrical contact with the eyelet-clip.

The antenna **20** may be mounted to extend ahead of the fender guide **23**, as shown in full lines in Fig. 1, or the antenna may be mounted to extend in rear of the fender guide, as shown in broken lines in Fig. 1. These two are only some of the possible ways of carrying out the invention, even where the positioning means for the antenna includes a mounting means shaped to engage and be supported by the fender guide. As will be understood, the antenna may be attached to the fender guide to extend both ahead of and in rear of the latter.

Where the antenna includes, as above-described, a mounting means, such as the securing device **30**, for attaching one part of the antenna to a fender guide, and also a mounting means, such as the securing device **36**, for attaching another part of the antenna to the fender, the most convenient way to mount the antenna would be first to clamp in place the last-mentioned securing device and then clamp in place the first-mentioned securing device; although, in describing these two devices, the device **30** was first-described and the device **36** later described.

Referring to the embodiment illustrated in Figs. 8 to 11, an antenna **51** is shown in which the conductors are substantially straight and few in number, but of considerable length; this antenna including two main conductors **52** and **53**, which extend and converge downward in rear of the fender guide **23**. The mounting of the converged lower ends of these conductors, to the edge of the fender **22**, and by way of the same securing device **36** as shown in Figs. 1 and 6, is as has already been described in connection with the antenna **20**, except that a washer **54** as shown in Fig. 7 is interposed between the lower end portions of the conductors **52** and **53** which are bent parallel. These bent conductor portions are provided with apertures to match the washer aperture, so that the upper part of the stud of Fig. 6 passes through these two apertures before the application to the stud of the nut **47**.

At its upper and wider end the antenna **51** is completed by a vertical conductor **55** having upper and lower end portions **55***a* and **55***b* bent, respectively, to agree with inclinations of the conductors **52** and **53**; the parts **52**, **53** and **54** being suitably interconnected where they overlap, as by welding.

The conductor **55** is shown as integral with a bracket **56** forming part of a means for connecting the antenna **51** to and insulating the latter from the staff **24** of the fender guide. The part of the bracket which is seen from offside the car here includes a side wall **56***a* the outer face of which may be given a decorative shaping as indicated. Integral with the wall **56***a* is a curved front wall **56***b*, and extended from the latter is a shorter side wall **56***c*; these parts establishing a pocket for the reception of two blocks **57** and **58** of insulation, similar to the blocks **30** and **31** of Fig. 3 in that they have matching half-round recesses running up and down the same at their meeting faces, for taking therebetween the staff **24** of the fender guide. A screw **59** extends through a tapped hole in a boss **55'** provided on the conductor **55** in the part thereof which participates in forming the bracket **56**. The inner end of this screw, as in Fig. 3, carries loosely a cup **60** to bear against the adjacent one of the two blocks when the screw is tightened. Tightening of the screw forces the blocks **57** and **58** together, clamping the blocks and hence the bracket to the fender guide at a selected point along the length of the latter.

Referring to Figs. 12, 13 and 14, there is shown a form of the invention in which the antenna is made of a single plate having cut-outs to establish a plurality of bar-like conductors. Here an antenna **61** is provided comprising a metal plate

having slots 62 establishing a plurality of bar-like conductors 63. Thus, as in the forms of the invention already described, a plate-like attachment is provided for serving as a radio antenna; with, however, different conductor elements parts of one integral member. The antenna 61 is further shown as provided with a plurality of apertures 64, desirably present to assist the slots 62 in relieving wind pressures on the antenna laterally of the vehicle.

The antenna 61 is shown as secured in place and insulated against being grounded to the car by a pair of securing devices for attachment to the same parts of the vehicle as the securing devices for the antenna of Fig. 2. In order to secure the antenna 61 to the edge of a fender 22, precisely the same securing device 36 is employed as in the form of the invention shown in Figs. 1 to 7, this device also for allowing take off of the wire 49 which is to connect the antenna with a radio receiver of the car. The clamp nut 47 at the top of the stud 45 of this securing device 36 connects up said device with the antenna 61, by being applied to the stud after the upper end thereof is sent through an aperture in a flat terminal extension 65 of a channel member engaging the underside of the antenna 61 at the front end thereof as indicated in Fig. 3, and suitably secured to the antenna as by welding. For securing the antenna 61 to the staff of the fender guide 23 a securing device 66 is shown which is in all respects like the securing device 30, except that the block of insulation 67 of the device 66, corresponding to the block 42 of Fig. 3, is vertically grooved at its front face, this groove for the accommodation of a channel formation 66a provided to receive and snugly fit the vertical edge of the antenna 61. Where thus interfitted, the device 66 and the antenna 61 may be secured together in any suitable way, as by welding.

Variations and modifications may be made within the scope of this invention, and portions of the improvements may be used without others.

I claim:

1. An antenna structure for a motor vehicle comprising an antenna; antenna positioning and insulating means comprising a plurality of spaced mounting means, one of said mounting means being shaped to engage and be supported by an edge of the fender of the motor vehicle and the other mounting means being shaped to engage and be supported by a vertical member secured to the fender of the motor vehicle; an insulator positioned between one of the mounting means and the antenna and connected to both, the insulator having an internal seat and a passageway leading therefrom to the exterior of the insulator; and a means conductively connected to the antenna to facilitate attachment of the conductor to a radio receiver, including a terminal from the antenna positioned in the seat so that a wire therefrom may pass through the passageway.

2. An antenna structure for a motor vehicle having a fender guide provided with a staff, comprising an antenna; a mounting means for one portion thereof, including a clamping means shaped to engage and be supported by the staff of the fender guide, and a mounting means for another portion of the antenna, including a clamping means shaped to engage and be supported by the fender edge, the first-mentioned mounting means including a metal clamp carrying an insulator for engaging the guide staff and a second-mentioned mounting means including a metal clamp carrying an upstanding metal part; a metal part depending from the antenna; an insulator at its lower portion sleeving said upstanding part and at its upper portion sleeving said depending part; and a terminal conductively connected to the antenna through said depending part to facilitate attachment of a conductor to the radio receiver, the insulator having an internal seat and a passageway leading therefrom to the exterior of the insulator, the terminal being held in said seat by said depending part.

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