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ANTENNA MOUNTING STRUCTURE

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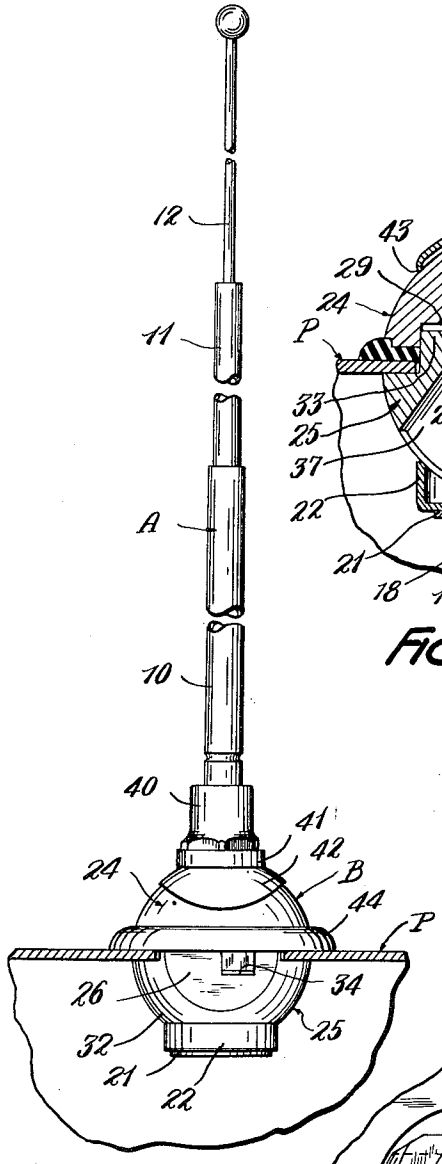

FIG. 1

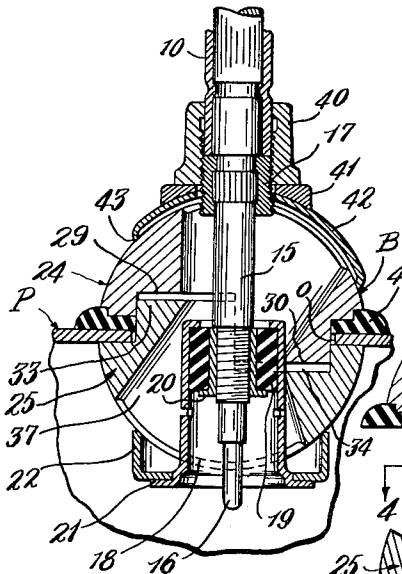

FIG. 3

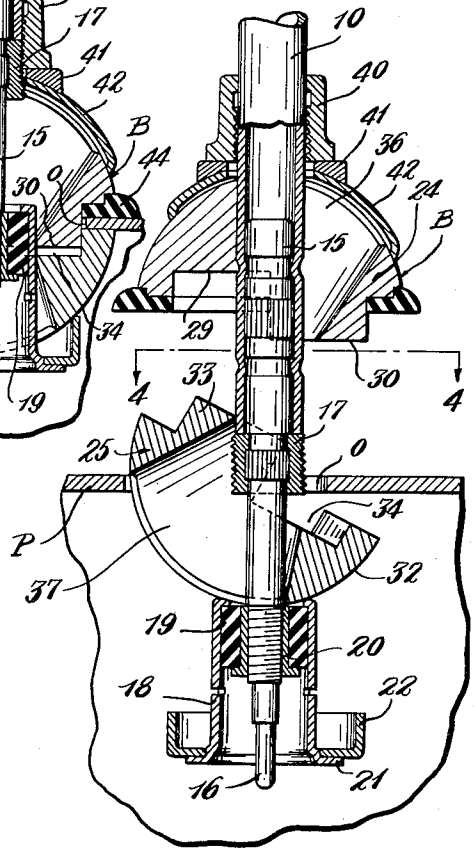

FIG. 2

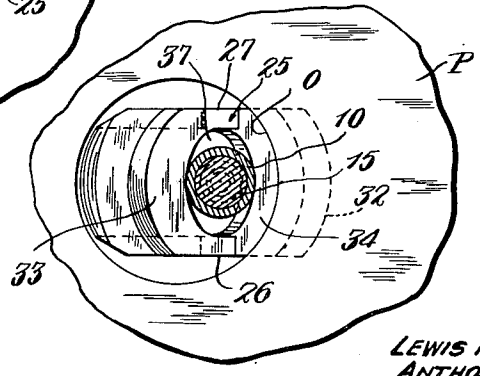

FIG. 4

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ANTENNA MOUNTING STRUCTURE

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2 Claims. (Cl. 248—43)

The present invention relates to a new and improved antenna mounting structure, and more particularly to a structure for mounting an antenna on a panel of an automotive vehicle body or the like.

Radio antennas are commonly mounted on vehicles, such as automobiles, by attaching the antenna supporting structure to a body panel or the like having an opening to receive the lower end of the antenna. In the installation of most of these types of antennas it has been necessary to work with the mounting structures from both sides of the panels which was a disadvantage as in most instances one installer could not simultaneously handle the parts of the antenna and its mounting on opposite sides of the panel, and quite often access to the inner side of the panel was difficult.

An object of the present invention is to provide a new and improved mounting structure for an antenna which can be installed in an opening in a panel, such as an automobile body panel, entirely from one side of the panel whereby it is possible for an installer to mount an antenna on an automobile body from the exterior thereof.

Another object of the invention is to provide a new and improved antenna mounting structure which can be installed on a panel of a vehicle, for example, entirely from one side of the panel, and which mounting structure is capable of supporting the antenna at desired angles relative to the panel so that the antenna may be mounted to extend vertically although the panel may be inclined.

More specifically an object of the present invention is to provide a new and improved mounting structure for antennas, which structure comprises two base members adapted to receive the antenna therethrough and to be clamped on opposite sides of a panel having an opening through which the antenna extends by clamping means on the antenna, one of the members having its width less than the diameter of the opening through the panel whereby it can be inserted endwise through the opening while loosely supported on the antenna and then positioned to bridge the opening through the panel after which the other base member can be placed over the panel opening and the members clamped to the panel by a clamp operating member on the antenna and disposed on the outer side of the second mentioned base member. Preferably, the base members are open to receive the antenna therethrough so that the antenna may be moved angularly with respect thereto, the outer surfaces of the base members being in the form of complementary spherical sections, and the clamp means on the antenna include two clamping members which are complementary to the respective spherical sections and engage the members to clamp the antenna at a desired angle relative to the members.

Other objects and advantages of the invention will be apparent from the following detailed description of a preferred embodiment of the invention, reference being made to the accompanying drawing, wherein;

Fig. 1 is an elevational view of an antenna mounted on a panel, shown in section;

Fig. 2 is a fragmentary sectional view, on an enlarged scale, of the antenna and its mounting structure shown in Fig. 1, and showing certain parts in positions assumed during the installation of the antenna on the panel;

Fig. 3 is a view similar to Fig. 2, but showing the antenna and its mounting structure installed on the panel; and

Fig. 4 is a sectional view taken substantially along line 4—4 of Fig. 2.

The present invention contemplates the provision of a mounting structure for an antenna, such as the so-called

"whip" type automobile radio antenna, which can be attached in an opening through a panel of an automobile body, for example. The panel is provided with an opening through which the base or lower portion of the antenna is adapted to extend and the antenna is supported in the opening by two base members on opposite sides of the panel and clamped to the panel by clamp elements. The members have aligned openings through which the antenna extends, which openings are slot-like in form to permit the antenna to be set at various angles relative to the base members, and the outer surfaces of the base members are in the form of complementary spherical sections so that the clamp elements may effectively clamp the antenna to the members throughout an angular range relative to the members. One of the members is somewhat narrower than the diameter of the opening in the panel so that it may be inserted lengthwise through the panel opening while supported on the antenna and drawn to the panel in a position to bridge the opening, after which the other base member may be positioned over the panel opening and the two members then clamped to the panel. The clamp elements are preferably operated by a device on the outer side of the secondly positioned base member so that the installation of the antenna can be made entirely from one side of the panel, including the adjustment of the angular position of the antenna.

Referring to the drawing, for the purpose of illustrating the invention a "whip" type automobile radio antenna A is shown mounted on a panel P, which may be a suitable portion of the automobile body such as the cowl, deck, or fender, for example. The antenna A is shown supported by a mounting structure B and normal to the panel surface, although it could be mounted at an angle to the panel, if desired.

The antenna A may be of any suitable construction and it is here shown comprising tubular members **10**, **11** and a rod **12** which are telescoped in a manner well understood in the art. The lower end of the tubular member **10** has a plug **15** integral therewith, which plug includes a pin contact **16** for effecting connection with a radio lead-in cable, not shown, and a threaded bushing **17** is press fitted to the plug. A grounding sleeve **18** is positioned around the lower portion of the antenna plug and is attached to and insulated from the plug by a tubular insulator **19** carried therein which has an internally threaded sleeve **20** secured therein and threaded onto the plug. The lower end of sleeve **18** has a peripheral flange **21** and a cup shaped clamp member **22** is carried by the flange.

The mounting structure B comprises two complementary members **24**, **25** which are positioned on opposite sides of panel P and over an opening O through the panel. The member **24** is preferably formed of a suitable relatively rigid insulating material and the member **25** is preferably formed of a metal to constitute a conductor. The member **24** is substantially semispherical and the diameter of its chordal surface is slightly greater than the diameter of the opening O, which in this case is circular. The member **25** has the form of a semisphere complementary to the member **24** but having two opposite side portions removed along planes indicated at **26**, **27** so that the member can be inserted lengthwise through the panel opening O after which it can be positioned to bridge or span the opening as shown in Figs. 1 and 3. It will be seen that the member **25** has a spherical section which is indicated at **32**, and this section is complementary to the semi-spherical form of member **24** when the two members are positioned on opposite sides of the panel, as clearly shown in Figs. 1 and 3.

The chordal faces of the members **24**, **25** have parts which interengage when the two members are brought together in alignment on opposite sides of the panel P as shown in Fig. 3, to maintain the members in proper relation with one another and to center the members in the opening O. The member **24** has a recess **29** and a boss **30** and member **25** has a boss **33**, which is adapted to fit into the recess **29**, and a recess **34** which receives the boss **30** of member **24**. The bosses **33**, **30**, cooperate with the walls of the respective recesses **29**, **34** and the

edges of opening O to maintain the members **24, 25** in the position shown in Fig. 3 and to center the members in the panel opening.

The member **24** has a slot-like opening **36** extending therethrough which opening flares toward the spherical surface, and member **25** has a similarly shaped opening **37**. The major axis of opening **37** extends lengthwise of the member **25**, i. e., parallel with the planes of sides **26, 27**. When the members are interlocked against the panel, as seen in Fig. 3, the openings **36, 37** are in alignment and are adapted to receive the lower portion of the antenna therethrough, and the flared form of the openings, in the embodiment shown, permits the antenna to be moved through approximately 37° relative to the base members.

The two members **24, 25** are adapted to be clamped to the panel by a suitable clamping means including a nut **40** which is adapted to be threaded on the bushing **17** and which nut bears against a washer **41** which in turn abuts a cap **42** in engagement with the outer spherical section of member **24**. Preferably, the cap **42** has the general form of a spherical section corresponding to the outer surface of member **24** and it has a circumferentially extending lip **43** which engages the surface of the member. By threading the nut **40** on the bushing, it reacts on the upper member **24** through cap **42** to draw the antenna plug **15** upwardly, as viewed in Figs. 2 and 3, and press the upper circular rim of the cup-shaped member **22** against the spherical section **32** of member **25** to firmly clamp the members **24, 25** to the panel. This clamping action also secures cup member **22** to member **25** and cap **42** to member **24** to lock the antenna in the desired angular position in the openings **36, 37**. The rim of cup member **22** and the lip of cap **42** grip the respective spherical sections of members **24, 25** at any angular position of the antenna due to the circular form thereof. Preferably, a resilient washer **44** is provided between the peripheral portion of the chordal face of member **24** and the panel P to provide a water tight seal between the member and the panel, and the member has an undercut edge portion which receives a corresponding projecting lip on the washer, as shown.

To install the antenna on the panel P, the opening O is formed of the proper diameter and the base end of the antenna, comprising the plug **15** and the grounding sleeve **18** thereon, is inserted through the opening. Preferably, the contact **17** is suitably connected with the radio antenna lead-in cable, not shown, prior to the insertion of the antenna base through the opening, in which case, the lead-in cable will be inserted through the opening ahead of the antenna base. If desired, the lead-in cable could be connected with the antenna after the antenna is installed. The member **25** may then be passed along the antenna from the outer end thereof with the antenna extending through the opening **37**, and by turning the member as shown in Fig. 2 and tilting the antenna slightly, the member may be moved endwise through the panel opening, after which it is turned so that it extends transversely of the opening. The antenna is drawn upwardly so that the cup member **22** raises the member **25** against the panel with the boss **33** projecting upwardly through the opening O and recess **34** in registration with the opening. Member **24** with the sealing washer **44** in place, is then positioned over member **25** with the antenna projecting through the opening **36** therein, and the bosses **33, 30** interfitting in the recesses **29, 34**, respectively and cooperating with opposite edges of opening O to center the members in the opening. The cap **42** and washer **41** are then positioned on member **24** and the nut **40** is then threaded onto the bushing **17** to draw members **24, 25** to the panel, as explained hereinbefore. Before the nut **40** is drawn tightly, the antenna is positioned at the desired angle relative to the panel by rotating the members **24, 25** and swinging the antenna in the aligned slot-like openings **36, 37**, after which the nut **40** is then drawn tight to lock the antenna and the members **24, 25** in position. It will be noted that the metallic member **25** provides a ground connection for a shielded antenna lead-in cable, which ground connection is effected with the panel and through sleeve **18** to the cable shield.

It is apparent that the improved antenna mounting structure can be readily installed with a minimum of tools and with access to but one side of the panel on which the antenna is to be mounted. This is particularly advantageous in mounting antennas on automobile bodies as the installation may be made entirely from the exterior of the automobile and the necessity for the installer to work on the inner side of the body panel where access is usually difficult, is eliminated. Furthermore, the mounting structure can be manufactured of a relatively few simple parts and it provides for a wide adjustment of the angular position of the antenna with respect to the panel on which it is mounted.

While we have described but one embodiment of the invention, it is to be understood that other forms of the invention might be adopted, all from within the scope of the claims which follow.

Having thus described our invention, we claim:

1. An antenna supporting structure adapted to be mounted on a panel having an opening therethrough, said structure comprising two antenna base members adapted to be disposed one on each side of the panel and bridge the panel opening, the width of one of said members being less than its length so that said one member can be passed endwise through the opening to be bridged thereby, the outer surface of each of said base members being in the form of a spherical section, said base members having openings therethrough adapted to be aligned when said members are disposed on opposite sides of the panel and bridging the panel opening, an antenna rod having a part adapted to extend through said aligned openings, said openings being in the form of slots to permit the antenna to be swung through a substantial angle relative to said base members, and means for securing the antenna to said base members comprising two spaced clamp elements having sections complementary to the respective spherical sections of said base members and engaging the respective base members the clamp element which engages said one base member having a maximum cross sectional width that does not exceed the width of said one base member whereby the said clamp element and said one base member together can be passed through the panel opening from one side to the other side of the panel, and means for forcing said clamp elements toward one another to clamp said members to the panel.

2. An antenna supporting structure adapted to be mounted on a panel having an opening therethrough, said structure comprising two antenna base members adapted to be disposed one on each side of said panel and bridge said opening, the outer surface of one of said base members being in the form of a semisphere and the outer surface of the other of said members being in the form of a semisphere having two opposite sides removed so that the width of the last mentioned member is substantially less than the width of the opening to be bridged thereby so that the last mentioned member may be inserted endwise through the opening, said base members having slot-like openings therethrough adapted to be aligned when said members are arranged to bridge the opening through the panel, the major axes of said slot-like openings extending longitudinally of said other member, an antenna rod having a part extending through said aligned openings and swingable in said aligned openings through a substantial angle relative to said base members, and means for securing the antenna to said base members comprising two clamp elements having sections complementary to the respective spherical sections of said base members and engaging the respective base members the clamp element which engages said other base member having a maximum cross sectional width that does not exceed the width of said other base member whereby the said clamp element and said other base member together can be passed through the panel opening from one side to the other side of the panel, and means for forcing said clamp elements toward one another.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,913,222	Von G. Glahn	June 6, 1933
2,394,276	Venditty	Feb. 5, 1946
2,454,897	Trowbridge	Nov. 30, 1948
2,468,391	Cejka	Apr. 26, 1949
2,470,693	Finke et al.	May 17, 1949
2,476,407	Eriksen	July 19, 1949
2,509,563	Grashow	May 30, 1950
2,524,534	Morris et al.	Oct. 3, 1950
2,536,053	Grashow	Jan. 2, 1951