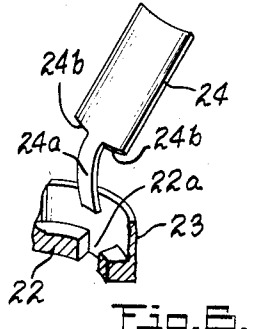
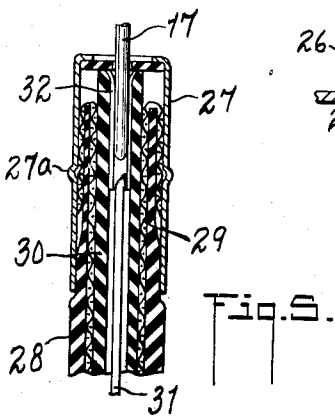
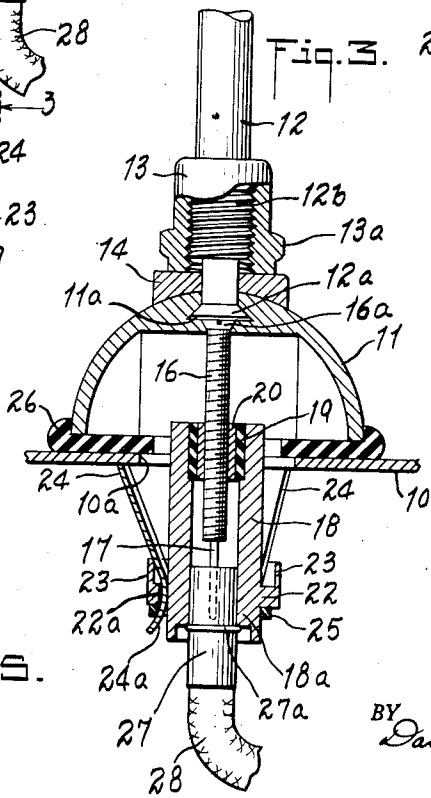
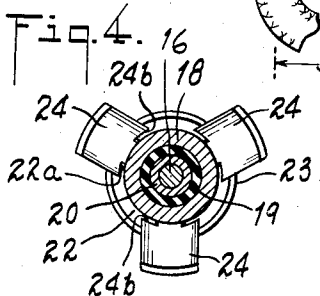
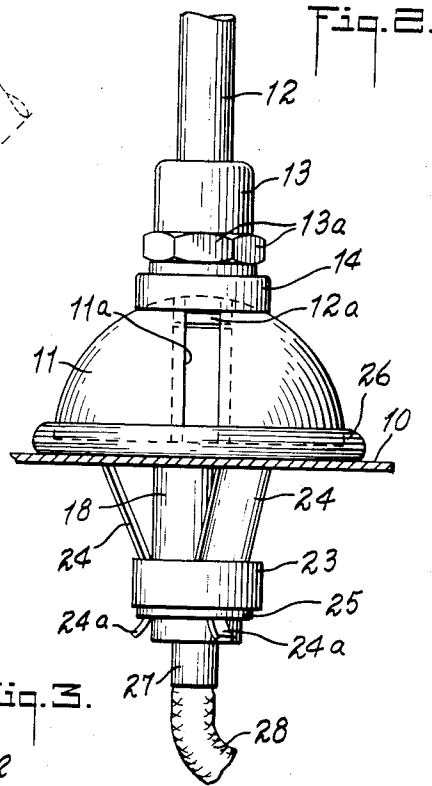
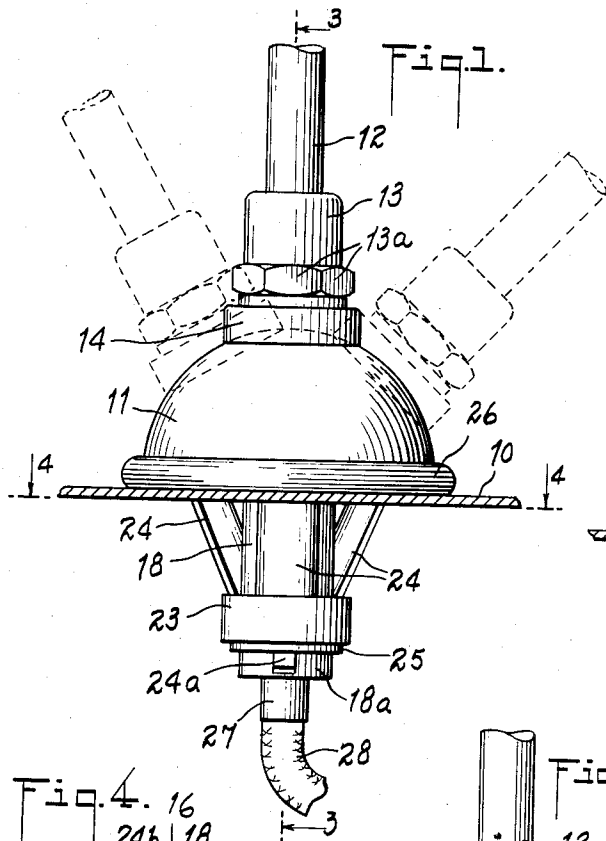


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AUTOMOBILE ANTENNA
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AUTOMOBILE ANTENNA

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This invention relates to antenna mountings and has particular reference to an improved antenna mount which is especially suited for automobiles and other vehicles.

It is common practice to install radio antennas on automobiles and other vehicles by means of a mount which is secured to the body of the vehicle. Such mounts include a base which is attached to the vehicle body and carries the usual antenna. However, the installation of antenna mounts, as made heretofore, has involved rather difficult operations, not only in the attachment of the mount to the vehicle body but also in the adjustment of the antenna so that it will extend at the desired angle to the particular body surface to which the mount is attached. In prior mounts, the range of this angular adjustment is small, and adjustment within even the limited range is difficult. Moreover, the prior antenna mounts are of complicated construction, particularly with respect to the means for securing the antenna to the vehicle body in the desired angular position and for insulation of the antenna circuit and grounding of the antenna lead.

The present invention has for its principal object the provision of an improved antenna mount of simple construction which can be quickly and easily installed on the vehicle and adjusted to any desired angle relative to the vehicle.

An antenna mount made according to the invention comprises a housing provided in its outer surface with a generally arcuate groove which is under-cut. This groove is adapted to receive an expanded end of an antenna member, the expanded end being movable in the groove to adjust the antenna to different angular positions relative to the housing. By means of a locking element, such as a collar threaded on the antenna, the expanded end of the antenna can be secured in any desired position in the under-cut groove of the housing, so as to hold the antenna at a predetermined angle relative to the housing. The antenna mount also comprises a clamping device carried by the housing for securing the same to the vehicle body.

A further feature of the invention resides in the clamping device for securing the housing of the antenna mount to the vehicle. This clamping device in its preferred form includes expansible means, such as spring-operated fingers, secured to the housing below the bottom thereof and adapted to be inserted through an opening in the body of the vehicle. The clamping device also comprises an operating member accessible from outside the housing and operatively connected to the expansible means for drawing the same against the inner surface of the vehicle body around the opening therein, whereby the housing is secured to the vehicle body.

Another feature of the invention resides in an arrangement whereby the clamping device securing the antenna mount housing to the vehicle also serves as part of the electrical connections. According to this feature, the operating member of the clamping device carries a live terminal electrically connected to the antenna through

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this operating member. Means are provided for electrically insulating this live terminal and operating member from the expansible means of the clamping device and from the body of the vehicle. The other terminal of the mount is a ground terminal electrically connected to the expansible means. Thus, when the housing of the antenna mount is secured to the vehicle body by actuation of the operating member, the expansible means make contact with the vehicle body so that the terminal which is electrically connected to the expansible means is automatically grounded.

For a better understanding of the invention, reference may be had to the accompanying drawing in which:

Fig. 1 is a front elevational view of a preferred form of the new antenna mount installed on the vehicle;

Fig. 2 is a side elevational view of the mount illustrated in Fig. 1, showing the under-cut groove in the outer surface of the mount housing;

Fig. 3 is a vertical sectional view of the mount illustrated in Figs. 1 and 2, showing the clamping device and the electrical connections;

Fig. 4 is a horizontal sectional view of the clamping device;

Fig. 5 is an enlarged vertical sectional view of the cable for making the electrical connections to the mount and

Fig. 6 is a detailed perspective view of part of the expansible means of the clamping device.

Referring to the drawing, the numeral 10 designates the body on which the antenna is to be mounted, the body in this case being shown as sheet metal forming a fender, cowl or other vehicle part used for supporting an antenna. The antenna mount comprises a hollow hemispherical housing 11 made of metal and open at the bottom. The housing is provided in its outer surface with an under-cut arcuate groove 11a extending in a substantially vertical plane to the lower edge of the housing at diametrically opposed points. As shown particularly in Fig. 3, the slot 11a is dove-tailed in cross section.

The lower part of the antenna is shown at 12. As illustrated in Fig. 3, the antenna has an expanded lower end 12a adapted to fit closely into the dove-tailed groove 11a. Above the expanded lower end 12a, the antenna is provided with an enlarged threaded portion 12b on which a locking element 13 is threaded. This locking element is shown in the form of a collar or nut having flat sides 13a; and by applying a suitable wrench to these flat sides of the locking collar, the latter can be screwed downward against a metal washer or adaptor 14 seated on top of the housing and through which the antenna extends.

It will be apparent that by tightening the locking collar 13 against the washer 14, the expanded lower end 12a of the antenna is drawn upward against the overhanging surfaces of the under-cut groove 11a, thereby clamping the antenna to the housing 11. However, when the collar 13 is loosened by screwing it upwardly on the threaded portion 12b, the antenna 12 can be adjusted to any desired angular position relative to the housing by simply sliding the expanded end 12a along the groove 11a. The expanded end 12a can be inserted into the groove 11a at either end of the groove, and once the antenna has been adjusted to the desired angle relative to housing 11 (by sliding the expanded end 12a along the groove 11a), the collar is tightened against the washer 14 to lock the antenna in the adjusted position, as previously described. The washer 14 serves to form a tight joint between the locking collar 13 and the rounded external surface of the housing 11, the lower surface of the washer being rounded to conform to the external surface of the housing.

The antenna mount is provided with a clamping device

comprising an operating member 16 which, as illustrated, is in the form of a vertical screw extending loosely through an opening in the wall of housing 11 at the bottom of groove 11a. The operating member or screw 16 extends downward through the central portion of the housing and projects through the bottom of the latter. At its upper portion, the screw 16 has an operating end or head 16a which lies flush with the bottom of groove 11a. The head 16a is accessible from outside the housing through the groove 11a, so that the screw can be rotated by means of a screw driver applied to the screw head. The screw 16 is electrically connected to the antenna member 12 through the housing 11. At its lower end, the operating member or screw 16 carries a live terminal 17 which, as shown, is in the form of a pin projecting downward from the lower end of the screw.

A conducting sleeve 18 surrounds the lower end portion of the operating member or screw 16. An electrical insulator in the form of an insulating bushing 19 is secured in the upper portion of sleeve 18. Secured within the insulator 19 is an internally threaded bushing 20 through which the screw 16 is threaded.

The conducting sleeve 18 is provided externally at its lower portion with an integral peripheral flange 22. Projecting upwardly from this flange is an integral lip 23 extending along the outer portion of the flange and surrounding the sleeve 18 in spaced relation thereto. The flange 22 is formed with circumferentially spaced openings 22a forming gaps between the lip 23 and the sleeve 18 proper. These flange openings 22a serve to receive expansible means in the form of fingers 24 extending upwardly from the flange 22. More particularly, each finger 24 is formed at its lower portion with a curved reduced end 24a extending downwardly through one of the flange openings 22a. The shoulders 24b formed by the reduced end of each finger 24 rest upon the upper surface of flange 22; and the reduced end 24a, by reason of its curvature, forms a fulcrum engaging the outer surface of sleeve 18 and on which the upper end of the finger 24 can swing toward or away from the sleeve. Outward swinging of the fingers 24 from the sleeve is limited by the flange lip 23, while inward swinging of the fingers toward the sleeve is limited by engagement of the upper portions of the fingers with the sleeve surface. Thus, the expansible means formed by the fingers 24 are in their expanded position when the fingers are swung outwardly against the lip 23 (as shown in Figs. 1-4) and are in their fully contracted position when the fingers are swung inwardly against the sleeve 18.

The fingers or expansible means 24 are urged outwardly toward their expanded position by yielding biasing means 25. This biasing means 25, as illustrated, is in the form of an elastic ring closely surrounding the sleeve directly below the flange 22 and through which the reduced ends 24a of the fingers extend. By reason of its tendency to contract around the sleeve 18, the elastic ring 25 (which may be made of rubber) acts to draw the extreme lower portions of the curved finger ends 24a against the sleeve 18 and thereby urge the upper ends of the fingers 24 outwardly from the sleeve.

It will be understood that the fingers 24 form an expansible means secured to the housing 11 through the connection comprising sleeve 18 and the operating member or screw 16. The expansible means 24 extend below the bottom of the housing and are readily insertable through an opening 10a in the body 10 on which the antenna is to be mounted (Fig. 3). The body opening 10a is somewhat larger than the flange 22 and lip 23 but is somewhat smaller in radius than the distance between the axis of screw 16 and the upper ends of the fingers or expansible means 24 when the latter are in their expanded position. Thus, when the sleeve 18 is lowered through the body opening 10a on the screw 16 and housing 11, the circular edge of the body opening 10a will be engaged by the fingers 24 intermediate their ends. There-

after, as the sleeve 18 is forced downward through the body opening, the fingers 24 will be swung inward against the action of the biasing means 25 and toward their contracted position against the sleeve surface. This inward swinging of the fingers 24 will continue until the upper ends of the fingers 24 pass completely through the body opening 10a, whereupon the fingers are released from the confining influence of the edge of the body opening 10a and are swung outwardly by the biasing means 25, so that the upper ends of the fingers now underlie the body 10 around the opening 10a. During this insertion of the expansible means 24 through the body opening 10a, the screw head 16a which carries the expansible means should be held down against its seat in the upper portion of housing 11, in order to prevent the sleeve 18 and screw 16 from being raised relative to the housing as the latter is lowered into position over the opening 10a. When the antenna member 12 is in its vertical position as illustrated in full lines in Fig. 1, the expanded lower end 12a of this member directly overlies the screw head 16 and, therefore, serves to prevent upward displacement of the screw in the housing incident to forcing the expansible means 24 through the body opening 10a.

When the expansible means 24 have been inserted through the body opening 10a, as previously described, the operating member or screw 16 is rotated relative to the sleeve 18 so as to draw the latter and the expansible means 24 upward toward the housing 11. In this way, the upper ends of the expanded fingers 24 are drawn against the lower surface of the body 10 around the opening 10a, whereby the body 10 is clamped firmly between the housing 11 and the expansible means or fingers 24. In other words, the housing 11 is now secured firmly to the body 10 by the clamping device comprising screw 16, sleeve 18 and expansible means 24-25. To obtain access to the screw head 16a for effecting this securement, the antenna member 12 is displaced from its vertical position to an angular position (as indicated by dotted lines in Fig. 1) so that the screw head 16a is exposed at the bottom of groove 11a. Once the securement has been effected by rotation of screw 16, the antenna member 12 can be returned to its vertical position overlying the screw head, if this is the desired ultimate position of the antenna relative to the housing 11.

As previously mentioned, the screw 16 is rotated relative to the sleeve 18 to secure the housing 11 to the body 10. In order to prevent rotation of the sleeve with the screw, the housing 11 can be raised slightly from the body 10 so as to engage the upper ends of the expanded fingers 24 with the lower or inner surface of body 10 while the screw 16 is being rotated.

While I have shown an expansible means comprising three fingers 24 spaced equidistantly around the sleeve 18, it will be understood that any other desired number of fingers can be employed. Also, the expansible means 24-25 and the operating member 16 may take other forms than those illustrated.

At the open bottom of housing 11 is an insulating member in the form of a gasket 26 which is clamped between the housing and the body 10 by the clamping device previously described. As shown in Fig. 3, the gasket 26 has a central opening through which the sleeve 18 extends with a clearance. Prior to insertion of the expansible means 24 through the body opening 10a, the screw 16 should be adjusted so that the space between the upper ends of fingers 24 and the lower surface of gasket 26 is somewhat greater than the thickness of the body 10. In this way, there will be sufficient clearance between fingers 24 and the body 10 to enable the fingers to be swung outwardly under the body when the housing 11 and gasket 26 are seated on the body at the conclusion of the insertion of the expansible means through the body opening.

The lower portion of the conducting sleeve 18 constitutes a ground terminal 18a in the form of a receptacle for the male terminal 27 of a cable 28. The cable plug

or terminal 27 fits closely into the sleeve receptacle 18a and is provided with an external shoulder 27a which limits the movement of the block into the receptacle. As shown particularly in Fig. 5, the cable 28 comprises a conducting layer 29 electrically connected to the cable plug 27 and located within the insulation covering the cable. Within the conducting layer 29 is an inner layer of insulation 30 surrounding a live wire 31. A metal receptacle 32 is electrically connected to the live wire 31 within the inner layer of insulation 30 and is adapted to receive the live terminal or pin 17 when the cable plug 27 is inserted in the sleeve receptacle 18a. Thus, when the parts are assembled as shown in Figs. 1-3, the antenna member 12 is electrically connected through housing 11 and screw 16 to the live terminal 17 which, in turn, is closely received in the cable receptacle 32 and is, therefore, electrically connected to the central conductor 31 of the cable. By means of the insulating gasket 26 and insulating bushing 19, the live terminal 17 is electrically insulated from the conducting body 10 on which the antenna is mounted. This body 10, however, is electrically connected through the expansible means or fingers 24 to the ground terminal 18a, which, in turn, is electrically connected through the cable plug 27 to the conducting layer 29 of the cable. It will be understood that the cable 28 leads from the antenna mount to the radio receiver or other electronic device (not shown) which is to be operated from the antenna 12.

It will be apparent from the foregoing that the clamping device 16-25 previously described serves not only as a means for securing the mount housing 11 to the vehicle body 10 but also as part of the electrical connections to the radio receiver or other electronic apparatus which is served by the antenna. When the clamping device is operated by the screw 16 to secure the mount to the vehicle body 10, the sleeve terminal 18a is automatically grounded to the vehicle body through engagement of the fingers 24 with the inner or lower surface of the body around the opening 10a this ground connection being insulated from the antenna circuit (including live contact 17) by the bushing 19 and gasket 26.

The present application is a continuation-in-part of my copending application Serial No. 544,223, filed November 1, 1955.

I claim:

1. A mount for securing an antenna to an electrically conductive body over an opening in the body, the mount comprising a housing having a generally arcuate undercut groove in its outer wall, the housing being open at the bottom, an antenna member having an expanded end portion receivable in the groove and movable therein to adjust said member to different angular positions relative to the housing, a locking element for securing the antenna member in a predetermined angular position relative to the housing, a clamping device including expansible means secured to the housing and extending below the bottom thereof, said means being insertable through said body opening, the clamping device also including an operating member accessible from outside the housing and connected to said expansible means for drawing the same against the inner surface of the body around said body opening, a live terminal in the housing electrically connected to the antenna member but electrically insulated from the expansible means and from said body, and a ground terminal electrically connected to the expansible means.

2. An antenna mount according to claim 1, in which the live terminal is carried by said operating member.

3. An antenna mount according to claim 1, in which said operating member is a screw extending through the housing wall and carrying the expansible means.

4. An antenna mount according to claim 1, in which said operating member is a screw extending through the housing wall and electrically connecting the antenna member to the live terminal.

5. An antenna mount according to claim 1, in which the housing is substantially hemispherical.

6. An antenna mount according to claim 1, in which the housing is substantially hemispherical, said operating member being a screw mounted in the housing for rotation about a generally vertical axis, the screw having an operating end located at the bottom of the groove.

7. An antenna mount according to claim 1, in which said operating member has an operating end located at the bottom of said groove.

8. An antenna mount according to claim 1, in which the expansible means include fingers mounted on said operating member and movable relative thereto between expanded and contracted positions.

9. An antenna mount according to claim 1, in which the expansible means include fingers mounted on said operating member and movable relative thereto between expanded and contracted positions, and yieldable biasing means urging the fingers toward their expanded positions.

10. An antenna mount according to claim 1, in which the clamping device also includes a sleeve connecting the operating member to the expansible means, the operating member being electrically insulated from the sleeve and electrically connecting the antenna member to the live terminal, the sleeve carrying the expansible means and forming said ground terminal.

11. A mount for securing an antenna to an electrically conductive body over an opening in the body, the mount comprising a housing having a bottom opening, an antenna member adjustably mounted on the housing, an operating member mounted in the housing for rotation relative to the antenna member and electrically connected to the antenna member, the operating member having an operating end remote from said bottom opening and accessible from outside the housing, a live terminal carried by said rotatable operating member and electrically connected thereto, expansible means connected to said operating member and located below said bottom opening, the expansible means being contractible for insertion through said body opening and being movable in expanded condition toward the housing by rotation of said operating member to clamp said body between the housing and the expansible means, an electrical insulator through which the expansible means are connected to the operating member, and a ground terminal electrically connected to the expansible means.

12. An antenna mount according to claim 11, comprising also a sleeve on which the expansible means are movably mounted for expansion relative to the sleeve, said sleeve forming said ground terminal and being connected to the operating member through said electrical insulator.

13. A mount for securing an antenna to an electrically conductive body over an opening in the body, the mount comprising a housing having a bottom opening, an antenna member adjustably mounted on the housing, an operating member mounted in the housing for rotation relative to the antenna member and electrically connected to the antenna member, the operating member having an operating end remote from said bottom opening and accessible from outside the housing, a live terminal carried by said rotatable operating member and electrically connected thereto, expansible means connected to said operating member and located below said bottom opening, the expansible means being contractible for insertion through said body opening and being movable in expanded condition toward the housing by rotation of said operating member to clamp said body between the housing and the expansible means, and a sleeve connecting the expansible means to the operating member and electrically insulated from the operating member, the sleeve forming a ground terminal electrically connected to the expansible means.

14. An antenna mount according to claim 13, in which

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the expansible means include fingers mounted on the sleeve and movable relative thereto between expanded and contracted positions.

15. An antenna mount according to claim 13, in which the expansible means include fingers mounted on the sleeve and movable relative thereto between expanded and contracted positions, and yieldable biasing means on the sleeve urging the fingers toward their expanded positions.

16. An antenna mount according to claim 13, in which said operating member is a screw extending into the sleeve and having an insulated threaded connection to the sleeve, the screw also having a head seated on the housing.

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17. An antenna mount according to claim 13, in which said live terminal is located within the sleeve.

References Cited in the file of this patent

UNITED STATES PATENTS

1,269,538	Huberick	June 11, 1918
1,890,348	Weatherhead	Dec. 6, 1932
2,251,889	Ludwig	Aug. 5, 1941
2,536,733	Finke et al.	Jan. 2, 1951
2,559,281	Croessant	July 3, 1951
2,786,884	Chadowski et al.	Mar. 26, 1957